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

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ABSTRACT

When a firm cross-lists its shares in segmented markets, the price of the first issued share, as a reference, plays both an informational and anchoring role in pricing the second issued share. We develop a model illustrating the dual-role. Empirically, we examine a group of Chinese firms that first issue foreign shares and then domestic A-shares, for which the anchoring effect adds to the A-share underpricing. Consistent with the model predictions, we find that the A-share underpricing is positively related to the difference in costs of capital in the two segmented markets, and that this positive association is weaker when participants are less likely to resort to the anchoring heuristic and when the A-share valuation involves less uncertainty.

1. Introduction

When a firm issues stocks to the public for the first time, this offering is an initial public offering (IPO). For a firm with publicly issued shares, its follow-on issuance is a seasoned equity offering (SEO). How about a firm that cross-lists its shares in two markets? Is the second listing an IPO, as this firm is new in the second market, or an SEO, as the firm has already listed its shares in the first market? In this study, we argue that the second offering is not an IPO, as the price history of the first issued share arguably provides ample information in pricing the second issued share. Neither is it an SEO, as the price of the first issued share is not a ready reference for the second issued share *across boarders* and plays an anchoring role. In a nutshell, we propose that in pricing the second issued share, the price of the first issued share, as a reference, serves both a beneficial informational role and a possibly harmful anchoring role.

Prior literature shows that for a security traded in multiple markets, the price from one market, as an important and conspicuous reference, helps to price the same security traded in other markets (Eun and Sabherwal, 2003). However, the referred price may not be a perfect reference due to market segmentation. Cross-listing normally involves cross-border listings, and the home market is often mildly or even severely segmented from the foreign market (Foerster and Karolyi, 1999; Chan et al., 2008), resulting in different rates of returns required by respective investors. Therefore, even for the same security issued by the same firm, prices across borders are not directly comparable. Consequently, the price from one market could be a biased and noisy reference for the price of shares issued in another market. Behavioral biases such as the anchoring heuristic (Tversky and Kahneman, 1974) might take effect in this occasion. We argue that for a firm that cross-lists its shares in two markets, in pricing the second issued share, market participants have a tendency to pay *too much* attention to the price of the first issued share at its *face value* and adjust *insufficiently* for the difference in the required rates of returns in the two markets. As a result, the offer price of the second issued share is biased toward the price of the first issued share.

We formalize the foregoing reasoning and develop a general model to describe the beneficial informational role and the possibly harmful anchoring role played by the reference price. Many studies have shown that the offer price in a typical IPO tends to be downward biased, and that IPOs on average are underpriced (e.g. Loughran et al., 1994). This downward-biased offer price is the prior. Then, we model the reference price revealed in another segmented market as a noisy signal, which is biased by the degree of valuation difference between the two classes of shares. In a rational Bayesian framework, investors can see through market

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segmentation and automatically adjust for the bias in the signal. In this situation, the information contained in the reference helps to reduce the underpricing. If market participants suffer from the anchoring bias, however, they tend to rely on the biased signal at its face value and fail to adjust sufficiently for the valuation difference. Consequently, the offer price is biased and the degree of underpricing is associated with the valuation difference. Specifically, if the reference price is consistently downward biased, the offer price is also downward biased due to the anchoring effect, resulting in greater underpricing. Conversely, if the reference price is consistently upward biased, the anchoring effect produces upward bias in the offer price, mitigating the degree of underpricing.

We utilize the IPO data of cross-listed Chinese firms to test the dual-role model empirically. As of December 31, 2010, 80 Chinese firms at some point first issued foreign shares (either on the Hong Kong exchange as H-shares or on the Chinese B-share market) and then issued Chinese A-shares. At the A-share issuance, the trading price of the corresponding foreign share is available as a reference and arguably plays a dual-role. This data set is appropriate for testing the dual-role model for at least four reasons. First, the tight control on capital accounts by the Chinese government exacerbates the segmentation between the Chinese domestic market and the foreign market, resulting in substantial difference between the two markets. Second, domestic A-share investors require a lower rate of return than foreign investors do (Fernald and Rogers, 2002, among others). This translates to higher asset valuation in the A-share market than in the foreign market. Thus, the foreign share price, when given too much weight, serves as a downside anchor that biases the A-share offer price downward. For this specific sample, the anchoring effect is harmful and results in greater underpricing, making the A-share first-day return an ideal proxy for the anchoring bias. Third, the primary market arguably involves higher valuation uncertainty than the secondary market, which further highlights the importance of both the informational and anchoring role played by the reference price. Finally, the Chinese securities market is still underdeveloped, and Chinese investors are relatively unsophisticated and more vulnerable to cognitive biases. The IPOs of Chinese cross-listed firms provide us with an ideal opportunity to examine the dual-role model.

In the empirical tests, we use the offer price-to-earnings (PEs) ratio to proxy for the anchored estimate of the A-share valuation level, and use the aftermarket PE observed one month after the A-share listing in the A-share market to proxy for the rational estimate. The foreign share PE ratio is used to proxy for the reference valuation level. The valuation difference is proxied by the difference in costs of equity capital, measured by the one-year buy-and-hold returns on respective foreign- and A-shares. Cross-sectionally, we find two pieces of evidence supporting the informational role played by the reference price. First, both the offer PE ratio and the aftermarket PE ratio are significantly positively related to the foreign share PE. Second, we discover a significant relation between the aftermarket PE and the A-share buy-and-hold returns. These two pieces of evidence suggest that the aftermarket PE ratio incorporates information concerning firm-level cash flows revealed by the foreign PE ratio, as well as information on the cost of capital in the A-share market. In contrast, we fail to find a significant relation between the offer PE ratio and the A-share buy-and-hold returns. This evidence suggests that in determining the A-share offer price, decision makers incline to refer to the foreign share valuation only and fail to adjust the estimate sufficiently for the valuation difference, consistent with the anchoring hypothesis.

We then examine the relation between the A-share underpricing and the valuation difference. The A-share underpricing is proxied by the first-day return upon the A-share listing. We find that after controlling for the adjustment made in the offering stage, the first-day return is still positively associated with the valuation difference, supporting the anchoring and insufficient adjustment argument. Specifically, the first-day return has a significantly negative association with the A-share buy-and-hold returns. It suggests that market participants tend to under-react to the variations in the A-share's cost of capital, but not to the foreign share's cost of capital, lending further support to the anchoring argument.

Furthermore, consistent with the model predictions, we find that the positive association between the A-share underpricing and the valuation difference is weaker when market participants are less likely to suffer from the anchoring bias, such as when the scale of the share issuance is larger, when the state ownership is diluted to a greater extent after the new share issuance, or when the flotation costs are lower. Besides, when the valuation uncertainty of A-shares is higher, as indicated by a higher first-day turnover ratio, the positive association between the underpricing and buy-and-hold returns is stronger. These results remain robust after we control for various determinants of underpricing and in different model specifications.

Our study contributes to the international finance literature in that we are the first to advocate the anchoring role played by the reference price in cross-listing. The proposed model and related analysis are applicable to foreign firms that use domestic share price as a reference in pricing their ADRs issued in the United States, or use the price of U.S. ADRs as a reference in pricing domestic shares. We remind market participants that the reference price also plays an anchoring role, which might work against its beneficial informational role and reduce pricing efficiency.

Besides, we conjecture that the anchoring bias in the financial market possibly influences managerial decisions on the listing sequence. An optimal strategy is to first issue shares in a market with a higher valuation level, and then issue shares in a market with a lower valuation level. By taking advantage of investors' anchoring bias, the issuer could boost its offer price and reduce underpricing in the second issuance. As the average valuation level is higher in the A-share market than in the H-share market, the first-A-then-H listing sequence could work to reduce the H-share underpricing, due to the anchoring propensity of investors in the H-share market. For instance, Minsheng Bank listed its A-shares in December 2000 and H-shares in November 2009. The first-day return on its H-share listing was −11.65%, and our anchoring argument could at least partially explain this phenomenon.

Our study also adds to the behavioral finance studies on the anchoring effect (Shafir et al., 1997, among others; George and Hwang, 2004; Campbell and Sharpe, 2009; Cen et al., 2012; Chang et al., 2011) by providing an additional piece of evidence from the primary market. We develop a model to describe one possible channel through which the anchoring bias might exert its influence. A generalization of this framework has the potential to explain the anchoring effect in other scenarios as well.

This study contributes to the extensive IPO literature. We take a behavioral standpoint and document an additional factor that may affect the degree of underpricing. Our anchoring argument is compatible with those of Loughran and Ritter (2002) and Krigman et al. (1999). Purnanandam and Swaminathan (2004) emphasize that the valuation levels of comparable firms are reasonable benchmarks for pricing new shares. This study, however, specifically investigates market participants' "misuse" of references resulting from their failure to adjust the estimate sufficiently for the underlying differences.

Finally, this study has important practical implications for Chinese economic reform. First, although Chinese financial market has experienced a rapid expansion, it is still relatively underdeveloped. Many investors, issuers, and even regulators fail to understand the barriers between domestic and foreign markets, and thus tend to suffer from strong anchoring bias. Our study could help these

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