
FRBSF WEEKLY LETTER

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The IPO Underpricing Puzzle

A large number of initial public offerings (IPOs) have come to market recently, and many have had a substantial run-up in price during early trading. A striking example is the offering by Boston Chicken, in which shares were offered at \$20 and appreciated to \$48.50 by the end of trading the first day. This level of price appreciation is by no means common, and many initial public offerings are followed by price declines. Nevertheless IPOs in the U.S. have consistently shown substantial initial-day returns averaging 15.3 percent for the 1960 to 1992 period, and similar results have been found for at least 25 other countries (Loughran, Ritter, and Rydqvist 1993).

While several explanations of IPO underpricing have been presented, it remains something of a puzzle to academic researchers who generally support the concept of efficient markets. This *Letter* discusses the structure of the IPO market and presents a summary of the explanations that have been proffered to account for IPO underpricing. Finally, it looks at the available evidence to distinguish the relative importance of each explanation and briefly discusses some of the questions that remain.

Going public

In the U.S. market, companies going public most frequently issue their equity securities through an investment bank using a "firm commitment" contract, in which the investment bank temporarily purchases the shares before they are allocated to the public. A less popular method is a "best efforts" offering, typically used for small and very young firms. In this case, the investment bank agrees to undertake its best efforts to sell the issue within a designated marketing period (usually 90 days).

In firm commitment contracts, the investment bank and firm agree on a preliminary price range for the shares. Then, during a pre-issue marketing period, indications of interest are collected from potential subscribers. Just before the offer date a final offer price is agreed upon that

in the majority of issues is within the initial price range. The investment bank then has discretion to allocate the shares among potential subscribers at this price. Thus, when there is substantial oversubscription, as often happens, some potential subscribers may receive only a fraction of the shares desired or be excluded from the issue.

Outside the U.S., these procedures often differ. For example, new issues on the French *Bourse* require the issuing firm to state a minimum price and then accept sealed bids for price and number of shares. The issuer, investment bank, and exchange agree on a market-clearing price. The most common difference is in the way oversubscription is handled, because not all countries give investment banks discretion to allocate shares. An extreme example is the Singapore IPO market where shares must be allocated by lottery within different classes of order size. Loughran, et al., find that, typically, investment banks use discretionary procedures for allocating shares, unless such procedures are ruled illegal. Regardless of the procedures used, they find initial underpricing in all 25 countries considered.

Theories on IPO underpricing

If markets are efficient, as academic researchers often contend, then the widely documented large initial returns to IPOs are puzzling, because firms appear to be leaving large amounts of money on the table when going public. But analysis suggests that underpricing does not necessarily occur for every issue at every point in time. Ritter (1987) finds that only 54 percent of a large sample of IPOs in the U.S. had positive initial-day returns. Also, evidence indicates that the market for IPOs goes through cycles, with larger amounts of underpricing in "hot" periods, when a lot of issues are coming to market, and smaller amounts of underpricing in "cold" periods, when only a few firms are going public.

This suggests that it is difficult to determine the value of shares in this market. Consistent with this, the rationales for IPO underpricing offered often rely on assumptions that the value of firms

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cannot be estimated precisely and that there are information asymmetries among groups of market participants.

An early explanation along these lines suggested that the initial underpricing is designed to "leave a good taste in the mouth" of investors. Initial investors, it is argued, remember the firm favorably when it returns to the market later to raise capital. This will increase the demand for shares for the subsequent offerings and allow the firm to recover some or all of the lost proceeds from the initial underpricing. An extension of this argument suggests that large initial underpricing leads to more potential investor interest in the IPO—a lot of "hype," in the jargon—which produces additional information about the firm. That additional information lowers the costs associated with future issues by the firm.

A second explanation focuses on the interests of the investment bank. Investment bankers may use superior information to underprice an issue intentionally to reduce their marketing costs or to create good will with investors. This explanation runs into trouble in terms of the potential damage to their reputation with other firms going public.

Perhaps the most popular explanations of initial underpricing rely on adverse selection associated with receiving an allocation of particular IPOs. Even if values are uncertain, investors with superior information would be less likely to purchase issues that are overpriced. As a result, less informed investors would be allocated more of the shares in the less attractive overpriced issues. As a result, less informed investors would earn lower, even negative, average returns on the issues they are allocated and might choose not to participate in IPOs. Thus to attract these investors to the IPO market, investment bankers must deliberately underprice new shares to overcome this form of the winners' curse problem and permit less informed investors to earn a positive return.

While this explanation has some appeal, it leaves many questions unanswered. Perhaps most important is whether an equilibrium level of underpricing exists that will attract these less informed investors given that the better informed investors will increase demand in response to deliberate underpricing.

An extension of this framework relies on the less informed demand as a lever to extract informa-

tion from those with superior estimates of the value of the shares. If some potential investors have better estimates of value than the investment bankers, then the investment bankers' threat of allocating to the less informed investors motivates the better informed to reveal their true demand for shares. This information can then be used in setting the final offer price to maximize proceeds. In this framework initial underpricing continues to exist as compensation to those with superior information for truthfully revealing their demand for shares. To make this explanation consistent with equilibrium, investors with superior information must be able to affect the final offer price by understating their demand for shares. Second, this behavior cannot damage their reputation with investment banks who might ration them out of future issues. These interdependent assumptions appear unlikely to hold in equilibrium, particularly if there are several informed bidders.

In a related explanation, investment bankers reduce the adverse selection consequences associated with the issuers' superior information about the value of the firm. If investment bankers develop a reputation for certifying that issues are priced consistent with any superior inside information, they have reason to protect their reputation for this service. Thus investment bankers may underprice to protect their reputation with investors.

A more recent explanation suggests an information framework where the success of an issue depends on getting investors approached early in the IPO process to view it favorably; subsequent investors then base their opinions and demand on the reaction of early potential investors.

Empirical evidence

Each of the explanations for underpricing IPOs has some appeal, but they lack convincing empirical support. Studies that attempt to distinguish between the various explanations for underpricing are rare. Beatty and Ritter (1986) document that investment bankers who underprice more or less than the average for each risk level lose future IPO market share. This suggests that reputation plays an important role in establishing the equilibrium level of underpricing for any particular issue. This evidence is inconsistent with the notion that investment bankers are underpricing to take advantage of less informed issuing firms.

Koh and Walter (1989) provide evidence related to the adverse selection characteristics associated with investing in IPOs. They find in the Singapore IPO market that underpricing is positively related to the level of oversubscription and that the ratio of shares requested by large investors

increases with the level of underpricing. Thus small investors are more likely to be allocated shares in less underpriced issues. However, they find that issues are oversubscribed on average by 40 times the number of shares. These results appear, at best, mixed regarding whether initial underpricing is used to attract less informed investors to purchase shares.

More recent evidence for the U.S. market by Weiss-Hanley (1993) relies on data for the preliminary filing range price data relative to the final offer price. With firm commitment issues in the U.S. the preliminary prospectus lists a preliminary price range and then on the offering day the final offer price is set. Evidence shows that if the final offer price is above the midpoint of the filing range then underpricing is higher, because a final offer price above the midpoint of filing range is interpreted as evidence of strong preliminary demand for the issue. These results are consistent with investment bankers adjusting the final offer price to reflect unexpectedly large demand for a particular issue. Why the price is not fully adjusted to reflect the increased demand is not clear.

Perhaps the most interesting evidence related to initial underpricing is found in McDonald and Jacquillat (1974). Using data from the sealed-bid auctions of companies to be listed on the French *Bourse*, they found that even after the issuing firm, bankers, and the exchange know the demand curve for the shares, they attempt to underprice by approximately 3 percent to encourage potential investors to continue to bid for the shares. It is worth noting that the relatively low underpricing they attempt to achieve is for established and well-known firms.

Data presented in these studies, plus the international evidence that initial underpricing is common across different markets, suggest that the bias toward underpricing is intentional. Additionally, it appears that investors' costs of participating in these markets are of concern when attempting to set the level of underpricing. That is, the average underpricing of IPOs may be necessary to compensate potential buyers for the cost of participation.

Conclusions

Large initial-day returns to IPOs on average are well-documented in the U.S. and in other mar-

kets. What is less understood is the rationale for this apparent practice of "leaving money on the table" when firms go public. Explanations for this behavior have traditionally relied on some form of informational asymmetry among the issuer, the investment banks, and the different groups of investors. Limited empirical evidence suggests oversubscription and underpricing are positively related and that issues are intentionally underpriced even when the issuer can observe the demand for shares through a sealed-bid auction. A lack of data on discretionary allocation decisions in oversubscribed issues limits research distinguishing between theories presented to date. Virtually ignored in explanations of initial underpricing is the potential benefit to secondary market liquidity from pricing to promote secondary market liquidity.

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Correction: Due to a clerical mistake, the example of a nominal income targeting rule in the last issue of the *Weekly Letter* (94-09) contained an error: In the third to last paragraph, trend growth in real GDP should read "2½ percent."

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