IMPROVING THE VIABILITY OF GOING PUBLIC FOR THE SMALL FIRM

A Report Prepared for the Small Business Administration

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Substantial underpricing persists in the market for initial public offerings. Over the period studied, the price appreciation during the first trading day for the entire sample exceeded the price appreciation in the NASDAQ index by approximately 19 percentage points. Thus, prices quickly settle substantially above the initial offering price in the aftermarket.

Perhaps the most important factor in explaining variation in underpricing across issues is the choice of underwriter. For the issues underwritten by the smallest underwriters, underpricing was approximately 35 percent. For issues underwritten by the largest underwriters, underpricing was approximately 9 percent. Once the underwriter is accounted for, additional factors have little power in explaining variation in underpricing across issues. Therefore, the firm can improve the probability of a more fully priced offering by employing the services of a nationally known underwriter. However, these underwriters are extremely selective in choosing firms to take public. Firms without well established track records and those wishing to raise less than approximately $12 million are typically not considered by the nationally ranked underwriters. The current structure of the underwriting industry places these firms in a "seller's market" for underwriting services.
There is persuasive evidence of a "speculative bubble" phenomenon in the market for newly issued equities. It appears that prices are bid up above "true values" in initial trading only to fall substantially over the following year. Thus, there is evidence that what is termed underpricing by underwriters may be, in part, overpricing by aftermarket participants in early trading.
IMPROVING THE VIABILITY OF GOING PUBLIC FOR THE SMALL FIRM

Introduction
Research in the area of small business finance has been limited despite the existence of over 17 million small non-farm businesses in the United States as of year-end 1986. The overwhelming majority of these firms rely primarily on non-public sources of funds to finance operations and growth. The traditional sources of funds for small businesses are trade credit, bank finance and private equity investment. In recent years, however, small firms have increasingly turned to the public equity markets. The number of initial public offerings (IPOs) increased from 2,126 in 1983 to 6,048 in 1986.

There are a number of advantages associated with going public for the small firm. First, it is likely that going public results in positive publicity and greater recognition by financial markets as well as other stakeholders. Second, the initial owners will benefit from increased liquidity. Third, the firm gains access to a large number of potential investors. Finally, going public is likely to reduce the firm's cost of equity capital. This is because the existence of a liquid market should reduce the marketability premium demanded by equity investors.
On the other hand, a number of disadvantages may also be associated with going public. First, the disclosure requirements of public issuance may deter many firms. Second, the initial expenses of IPOs are quite high. Because many of these expenses are fixed, the costs of going public are proportionately higher for small firms. Third, going public requires that some measure of control be surrendered. Finally, there is evidence that a substantial degree of underpricing is present in the market for IPOs. The result of this underpricing is to raise the cost of equity to the issuing firm.

The persistent underpricing of IPOs, and the resulting higher cost of equity, presents a hindrance to small firms considering going public. In other words, the underpricing phenomenon prevents some small firms from obtaining the benefits of public issuance enumerated earlier. As a result, greater insight into the nature and causes of initial underpricing would be of great help to these firms. If it were known, for example, that certain firm characteristics or underwriter related factors led to a greater degree of underpricing, then management could take steps prior to the initial offering to adjust these characteristics. Our research objective, therefore, is to provide insights regarding the determinants of pricing in the market for IPOs.

Substantive research in the area of initial public offerings (IPOs) began twenty years ago with the work of Reilly and Hatfield
The early research was focused on the documentation of the now well-known underpricing effect. Refinements and extensions followed, including efforts to explain the variation in underpricing across firms and underwriters. More recently, the application of information asymmetry and legal liability theories has been incorporated into IPO-related research. This literature is reviewed in the second section of the report.

In a historical perspective, the methodologies and approaches employed in the study of IPOs have, understandably, paralleled quite closely the methodologies and approaches employed in the study of other areas of finance. The preface to most finance textbooks contain reference to the evolution of the study of finance from a descriptive to an analytical field of study. For example, Copeland and Weston (1988) write:

"Prior to 1958, finance was largely a descriptive field of endeavor. Since then, major theoretical thrusts have transformed the field into a positive science . . . (Academician's) interest and training is in developing theories to explain economic behavior, and then testing them . . . Anecdotal evidence and business experience have been superceded by the analytical approach." (pp. iii-iv)

However, it is possible that "anecdotal evidence and business experience" will help to develop our understanding of the market for initial public offerings. That is, institutional practices and structure, as well as economic theory, may be helpful in explaining observed price behavior. Although prior IPO-related research is not lacking in theoretical or empirical rigor, it
falls short in helping potential issuers to understand the structure and practices of the underwriting industry. Therefore, the third section of the report presents the findings from our interviews with investment bankers active in the IPO market.

The fourth section contains our empirical analysis. This analysis includes descriptive and comparative data and the statistical analysis of IPO pricing. The fifth and final section contains a summary and recommendations to the management of firms considering IPOs.

Review of Prior Research

Five primary questions have been addressed in the academic literature related to initial public equity offerings. These are:

1. Is the pricing of IPOs consistent with market efficiency?
2. What are possible explanations for the general underpricing of IPOs?
3. What accounts for the variation of the degree of underpricing across IPO issues?
4. What accounts for the variation in the degree of underpricing of IPOs over time?
5. Is the aftermarket for IPOs efficient?
The general doctrine of market efficiency has extensive support among finance scholars and has been validated by much empirical research. An efficient market is a competitive market where prices reflect all available and relevant information. In an efficient market, therefore, security prices reflect "true values" and no undervalued or overvalued securities exist.

If the market for IPOs is efficient, then new issues will, on average, be priced at their "true values". If IPOs are, on average, overpriced, then underwriters will be unable to find buyers for the securities. If, on the other hand, IPOs are on average underpriced, then issuers will be dissatisfied and competition among underwriters for the lower level of business will cause offering prices to rise. Thus, market efficiency implies that competitive forces from investors and issuers will cause IPO prices to approach their true values.

However, prior research has conclusively demonstrated that IPOs are consistently underpriced. These studies cover a variety of time periods and utilize numerous data sets and each presents similar findings on the presence of underpricing, although not on its magnitude. Descriptive information for these studies is shown in Table 1. Underpricing is typically defined as abnormal appreciation from the offering price to the end of a specified holding period. Abnormal appreciation, in turn, is defined in relation to the price behavior of an index, typically NASDAQ.
That is:

\[ (1) \quad U_{Pt} = \frac{P_t - P_o - I_t - I_o}{P_o - I_o} \]

Where:

- \( U_{Pt} \) = degree of underpricing of the IPO measured over an interval of \( t \) days
- \( P_t \) = market price of the newly issued security \( t \) days after offering
- \( P_o \) = initial offering price
- \( I_t \) = level of a market index \( t \) days after the IPO offering
- \( I_o \) = level of the market index on the initial offering date

As the data in Table 1 show, underpricing is consistently positive. In other words, returns to investors able to purchase IPOs at the initial offering consistently exceed the returns to investors holding a broadly based index over the same period. Thus, prior research demonstrates that IPOs are, on average, priced below their true values.

These results lead directly to the second question addressed in the literature: What factors explain the general underpricing phenomenon? One possible explanation for the phenomenon is the possession of monopsonic market power by underwriters. Logue (1973) and Reilly (1977) have pointed out that underwriters have numerous incentives to underprice new issues. Underpricing reduces the underwriter's risk of undersubscription, and reduces the probability that the underwriter will be obliged to enter the
market to support the price. Further, underpricing results in satisfied investment customers. The existence of a motivation, however, is not sufficient to explain the existence of underpricing; monopsonistic power is a necessary condition. The presence of market power in the underwriting industry has some empirical support\textsuperscript{1}.

A more recent explanation of the underpricing phenomenon, focusing on information asymmetry, is contained in Rock (1986). Rock argues that the underpricing phenomenon is explained by the presence of two sets of investors, those informed about the true value of the issue and those lacking this information. When an issue is priced below its true value, the informed investors will buy the issue, resulting in over subscription or rationing. Unfulfilled demand results. If, however, the issue is priced above its true value, the uninformed but not the informed will buy. If issues are, on average, priced at their true values, the uninformed will not participate because they will end up with a disproportionate share of "losers". Therefore, in order to attract the uninformed investor to participate, the IPOs must, on average, be underpriced.

Tinic (1988) has recently proposed an innovative and intuitively appealing explanation for the underpricing phenomenon. Tinic

\footnote{See Rethinking Glass-Steagall, J.P. Morgan and Company, New York, 1984.}
argues that underpricing serves as insurance against legal liability for the issuer and the underwriter. The Securities Act of 1933 requires "due diligence" investigations to uncover false or misleading statements or omissions in the registration statements of securities to be issued. Litigation associated with due diligence requirements is increasingly time consuming and expensive. A legal action is less likely to be brought, however, if the initial issue is underpriced. Issuing firms are willing to "leave money on the table" in the form of underpricing as partial insurance against due diligence lawsuits.

In summary, three (non-mutually exclusive) plausible explanations have been presented for the general underpricing phenomenon: monopsonistic power by underwriters, asymmetric information, and the legal liability explanation proposed by Tinic. Given the pervasiveness of the underpricing phenomenon and the existence of plausible explanations, the third research question follows: What accounts for the variation in underpricing across issues? Results for a sample of studies devoted to this issue are shown in Table 2.

[Table 2]

As the table shows, the degree of underpricing has a persistent relationship with underwriter prestige. Issues underwritten by less prestigious firms show higher excess returns (or higher
underpricing) than those underwritten by more prestigious firms. Typically, the studies the Hayes (1971) method of underwriter classification. Larger issues are underpriced by a smaller amount, as are firm commitment (vs. best efforts) offerings.

Information theory is a rapidly growing field of study in financial economics and some researchers have approached the underpricing phenomenon from this perspective. Beatty and Ritter (1996) argue that underpricing will be greater when there is a higher degree of uncertainty surrounding the issue's post offering price. This argument is rooted in Rock's proposals of information asymmetry. The uninformed investors face the risk of losing (i.e., selecting an overpriced issue). This risk is higher for when there is greater ex ante uncertainty about the security's true value, and therefore these issues should exhibit higher degrees of underpricing. Beatty and Ritter verified their proposition empirically by demonstrating a significant positive relationship between the degree of underpricing and two proxies for ex ante uncertainty: (1) the number of uses to which issue proceeds were to be put, and (2) the size of the issue.

Miller and Reilly (1987) test the Beatty and Ritter uncertainty proposition by employing 4 variables as proxies for uncertainty. They are (1) issue size, (2) the standard deviation of daily returns in days 2 through 5, (3) trading volume, and (4) the bid-ask spread. All of the variables were found to be significantly
related to the degree of underpricing. Young and Zaima (1986) also use size as an uncertainty proxy and find a significant relationship. Johnson and Miller (1988) also find more underpricing associated with riskier issues.

It is commonly accepted among practitioners that riskier issues tend to be underwritten by less prestigious underwriters. Further, Johnson and Miller and Tinic have empirically documented this tendency. Underpricing is positively related to the risk of the issue and negatively related to the prestige of the underwriter. Therefore, it is not clear whether the causal relationship is between underpricing and risk or between underpricing and underwriter prestige. Johnson and Miller argue the former. They find that once risk is accounted for, underpricing is not related to underwriter prestige. However, both Logue and Tinic find that the characteristics of the issue have little explanatory power for underpricing after the prestige of the underwriter is accounted for. Therefore, the question of whether underwriter prestige has an independent effect on underpricing is, as yet, unsettled.

Downes and Heinkel (1982) use signalling theory to examine the underpricing phenomena in an asymmetric information context. The authors propose that the entrepreneur may positively signal the investment bankers about firm value by (1) retaining a high proportion of equity ownership, and (2) establishing a liberal dividend policy. If these signals are "believed" a lower degree of underpricing should result. Downes and Heinkel do not find a
significant effect from dividend policy. The equity retained, however, is found to be positively related to the total value of the firm's equity after the initial offer.

The fourth issue addressed in the literature examines the underpricing phenomenon in relation to market characteristics over time. For example, Logue finds that "market ebullience" at the time of issue is positively related to the degree of underpricing. Ibbotson and Jaffe (1973) examine the nature of "hot markets" in new issues. The authors find serial dependency in the performance of IPOs. That is, periods of high post-offering price appreciation are most likely when the prior month showed high price appreciation.

The fifth issue which has received attention is the degree of efficiency in the aftermarket of IPOs. This issue has been addressed by Reilly (1977), Stoll and Curley (1970), Ibbotson (1975), Miller and Reilly (1987), Chalk and Peavy (1987), Neuberger and Chappelle (1983).

The results of the first four studies are generally consistent with aftermarket efficiency; excess returns do not accrue to investors purchasing in the aftermarket. Chalk and Peavy, however, found that abnormal returns were generated on the second day of aftermarket trading, though the magnitude of the returns was much lower than that which occurred on the first day.
Neuberger and Chappelle found that excess returns persisted in the aftermarket for issues underwritten by firms in the lowest prestige tier. Overall, however, there is strong evidence in favor of aftermarket efficiency.

We may summarize the state of academic research on IPOs as follows. The persistent underpricing of IPOs may result from (1) monopsonistic power possessed by underwriters, (2) information asymmetries between managers and investors, and (3) the use of underpricing as insurance against legal liability. The degree of underpricing across issues shows a consistent negative relationship with the prestige of the underwriter retained to place the issue, and a consistent positive relationship with various proxies designed to measure the risk of the issue. Finally, underpricing has been shown to display cyclical patterns, and prices adjust rapidly in the aftermarket.

Discussions With Underwriters

Our starting assumption is that understanding of the price behavior of IPOs can be enhanced with a more substantive understanding of industry practices, customs, and institutions. While competitive markets provide one mechanism for allocating investment capital, they are not the only mechanism. Practices, customs and institutions also play a role. Our objective is to learn more about these non-market factors. We considered two methods, the survey and the interview. The benefits of the survey
approach are its time efficiency, cost efficiency, and ability to reach a large number of respondents. On the other hand, this approach is most amenable to short answer and objective questions, rather than to thought and opinion questions. In addition, we felt that the interview approach was more likely to elicit candid responses to our questions. Based upon these considerations, we chose to interview, rather than survey, industry participants.

Personal interviews were conducted with 12 underwriters on the east coast of the U.S.. Of these, four were "top tier" Wall Street firms, two were regional firms, and six were small "one office" firms. A telephone interview was conducted with one additional regional firm. Several of the firms requested anonymity and this courtesy was therefore extended to all firms. With one exception, all personal interviews were conducted in the underwriter's offices. Each interview lasted from 1 to 2 hours, and most interviews also entailed follow-up telephone conversations. The interviews were conducted over the period September-October, 1988. Although many topics were touched upon during the interviews, the primary foci were the market structure and segmentation in the underwriting industry, the pricing of new issues, and the underwriters' advice to small firms considering an IPO.
Market Structure and Segmentation

Prior research has documented the importance of "tiers" in the underwriting industry. Typically, researchers have segmented the IPO market into different prestige categories. It became clear from our discussions with underwriters that there was unanimity among industry participants regarding the existence of segmentation or tiers in the industry, and also regarding the structure of the tiers. The perception among participants is that the industry is segmented into five tiers. Approximate demarcations of the tier characteristics, according to the underwriters, are shown in Table 3.

[Table 3]

The major Wall Street firms comprise the first tier while the regional firms comprised the second tier. The third, fourth and fifth tier firms are "one office" enterprises. The important distinction among the first three tiers is the size of the offerings typically underwritten, rather than the type of offering or the nature of the issuing firm. In general, the larger underwriters do not underwrite highly speculative issues but instead target established companies with "track records". The type of track record required is typically flexible and a matter of judgement, although in two cases the underwriters had firm requirements. One firm required the potential issuer to have $1
million in net income for each of the prior four quarters while another required annual revenues in excess of $7 million.

An obvious question is why the top three tiers are size segmented. The response of the larger underwriters to this question is simply that underwriting the smaller issues is not financially viable given the high costs of operating in this segment of the industry. The smaller firms, on the other hand, lack the capitalization to support large new issues in the aftermarket. The fourth and fifth tier firms underwrite the issues of small, speculative companies rather than established firms. In general, the issues underwritten by the fifth tier firms do not meet NASDAQ listing requirements and are listed instead on regional exchanges.

There is much variation in market power across the tiers. The large Wall Street firms may be approached by 200 issuers for each underwriting assignment undertaken. The overwhelming majority of the issuers, therefore, are (1) turned away, (2) referred to a smaller underwriter, or (3) helped in arranging a private placement. For the small number of prime issuers, however, their is intense competition among the top tier underwriters. This competition tends to be based on service rather than on price or underwriting spread. It appears that commonly accepted industry standards govern both valuation and underwriter compensation, or spreads.
In general, the less "prime" the issuer, the lower the level of competition for the issue. This is true across all segments of the industry. Prime issues operate in a buyer's market for underwriting services while, the lower the quality of the issue, the more a seller's market governs the underwriting function. For example, the underwriter spread for prime issues at the time of our interviews was approximately 6 percent, while the spread for smaller and more speculative issues was about 10 percent.2

Underwriter compensation for issues to be traded on the NASDAQ system is regulated by the National Association of Securities Dealers. Total underwriter compensation may not exceed a specified (but confidential) percentage of the issue proceeds. For this reason, it is generally not financially feasible for issues of less than $2M to be placed in the OTC market. This limitation also implies that smaller issuers are in a weaker competitive position in their negotiations with underwriters.

Pricing of IPOs

Our discussions with the underwriters concerning the underpricing issue were very informative. A number of plausible explanations for the phenomenon, previously unexplored in the finance

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2 The underwriter spread is the difference between the price paid by the underwriter and the initial offering price to the investing public.
literature, were put forth. Responses on this issue varied sharply by underwriter tier.

Among larger underwriters, underpricing is a standard and deliberate practice. The common use of the term "IPO discounts" illustrates the wide use of the practice. The approach among these underwriters is to value potential issuers using the earnings multiples of comparable firms. The price of the IPO is then set at a discount of 5 - 15 percent below the value of comparable firms. The discounts tend toward the low end in ebullient markets, and toward the high end in softer markets.

The important issue, of course, is the anomaly of why the issuing firms consent to leave so much money on the table. Perhaps, however, the underpricing phenomenon is only "anomolous" when viewed within the context of frictionless and perfectly competitive markets. If markets operate with friction and in violation of a number of competitive market assumptions, underpricing may be the logical result.

The implication of one market imperfection, information asymmetry, has been explored in prior research. However, a number of other violations of the competitive market assumptions also have implications for the pricing of IPOs.
First, our discussions indicated that the realities of the marketplace prevent issuing firms from "shopping" for the highest issue price. These realities include search and information costs, as well as accepted though informal "codes of conduct". The process of going public may consume as much as a year, and substantial legal and accounting costs accrue early in the process. The underwriters we spoke to estimated that the elapsed time between the initiation of the process and the valuation varied between 4-6 months. Further, the actual offering price is known only the day before the initial offering. Clearly, the competitive market assumption that issuing firms are able to price shop costlessly is violated in practice. Furthermore, a number of underwriters noted that it is considered "bad form" to shop for underwriting services, - a recently published text advised that if such shopping is done, it should be done surreptitiously.\(^3\) In addition, the underwriters believe that most industry participants within a given category follow widely accepted valuation procedures. Thus, within an underwriter class, firms are likely to be given similar valuations.

A second reason for the apparent willingness of issuing firms to leave money on the table stems from the perceived strategic value of initial underpricing. The objective of the larger underwriters

\(^3\) The article warns potential issuers to "be careful" if more than one underwriter is approached because adverse consequences may result if it appears that the issuer is "shopping the offering". See Tapp (1988).
is a long term, rather than transaction based, relationship with the issuing company whereby the underwriter's role is to assure the firm access to the lowest possible cost of capital over the long run. The underwriters believe that the IPO discount furthers this long term objective. In the words of one large underwriter,

"One of the best ways to assure a firm access to the lowest possible cost of equity over the long run is a well received initial offering."

Another noted that,

"Markets remember. The firms with well received initial offerings are those most likely to have well received and fully priced secondary offerings. It is difficult (usually impossible) to sell a secondary offering to an investor who was burned on the IPO".

While this argument has been greeted with skepticism by finance scholars, it is a widely held view among business people. Indeed, the argument that issuers perceive strategic value in underpricing is supported by the fact that the IPOs of investment banks are underpriced by an amount comparable to the IPOs of other firms (Muscarella and Vetsuypens, 1988). In addition, it is relatively common for firms to issue a secondary offering after the IPO4.

A third point frequently raised by the underwriters is that the wealth of the initial owners of the firm is not adversely affected by underpricing. The private owners do not sell their stock in an

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4 One study estimates that one third of the companies that went public in the late 1970s and early 1980s have issued additional equity since then. See Welch (1988).
IPO - if it is sold at all the stock is typically "piggybacked" onto a secondary offering following the IPO. In addition, the initial owner/managers frequently have substantial options positions, and the value of these positions is determined by the market price of the stock rather than the initial offering price. Finally, the owner/managers, as well as family and favored customers and employees, virtually always participate in the IPO and profit personally from the underpricing.

A fourth reason for the preponderance of underpricing is another violation of competitive market theory. Finance theory makes no allowances for the phenomenon whereby sellers have preferences regarding the buyers of their securities - the theory assumes that buyers of securities are perfect substitutes for one another. Our discussions with underwriters, however, refuted this assumption. According to the underwriters, buyers of IPOs have varying degrees of desirability.

The term used by the underwriters to describe the most desirable buyers is "strong hands". A "weak hands" buyer will sell the IPO to take a profit shortly after the issue, while strong hands buyers commit to the retain the security for a longer time period. An increase in price is, of course, more likely when the IPO is placed in strong hands because the selling pressure, or available supply, of the security is lower. However, agreeing to be a strong hands buyer is only worthwhile to the buyer if some
compensation is given in exchange for the loss of liquidity. The compensation received is the underpricing.

For the underwriter, the implications of placing the IPO in weak hands are quite serious. The most threatening of the weak hands buyers are the "flippers" - funds set up as limited partnerships to participate in the IPO market. Flippers are often "in and out" of the IPO within minutes, taking profits of only perhaps an eighth of a point on the security. The flipper's investment is essentially riskfree. Among issues underwritten by the largest underwriters, the chance of price declines in the first trading days is minimal because the underwriters commit to support the price in the aftermarket. Further, buyers in the initial offering pay no sales commission. As a result, the flipper's downside is protected by the underwriter's price stabilization and the costless buying trade. The problem is, according to one underwriter, that

"Sales to the flippers aren't really sales - we'll have the shares back within a day or two."

In a recent Merrill Lynch offering, nearly 100 percent of the shares were "flipped back" to the underwriter within two days.5

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5 To make matters worse, Merrill Lynch had to pay nearly $9 million in commissions to its own salespeople for selling the stock which Merrill Lynch ended up owning again. See Gupta (1988).
The underwriters have devised a number of strategies to assure strong hands among buyers. First, some firms have implemented plans to track sellers in aftermarket transactions. The member of the underwriting syndicate found selling to a flipper has their commission revoked by the managing underwriter. A second tactic is to fill orders for the initial offering only if the buyer agrees to hold the security for a specified time period. A third is to fill orders for the initial offer only if the buyer agrees to also purchase a specified number of shares in the aftermarket - in effect agreeing to help the underwriter support the price. Finally, a number of underwriters noted that investors selling shortly after the offering are likely to be excluded from future initial offerings. Similarly, buyers agreeing to serve as strong hands for a weaker issue are sometimes rewarded with an allotment of the next desirable issue. This point is also made in a recent article which states:

"...(Those who) tacitly agree not to dump blocks ... of a marginal issue ... are usually rewarded with a generous allotment of a hot issue the next time the underwriter has one." (Mamis, 1988, p.60)

These practices are instrumental in explaining the general underpricing of IPOs. The underpricing serves as compensation for the constraints placed upon strong hands buyers. The market rewards these buyers for their loss of liquidity and/or their agreement to purchase in the aftermarket. The prevalence of these practices implies that returns to buyers of IPOs are not "abnormal" but are instead compensation to strong hands buyers for
their increased risk, loss of liquidity, and/or commitment to purchase in the aftermarket. Further, serving as a strong hands buyer for a weaker or more risky issue entails more risk than does serving as a strong hands buyer for a "hot" issue. Prior empirical work which found more underpricing among riskier issues is therefore consistent with the "strong hands" theory of underpricing. Underwriters appear to believe that

"...If there is any doubt that a given price or number of shares is tenuous, (it is) better to get institutions to commit to large chunks by underpricing..." (Mamis, 1988 p. 58)

Industry participants perceive sharp differences in the practices associated with underwriting the issues of established and profitable concerns vs. the issues of the more speculative firms. While the underwriters were aware of the price runups common in the IPOs of more speculative companies, most did not attribute this to underpricing. In the words of one,

"Just because I bring it out at $9 and it goes to $10, you can't conclude I've underpriced. If I brought it out at $10 it would have gone to $11. That's the way this (speculative IPO) market works. You can't conclude I've undervalued - How do you know that the aftermarket doesn't overvalue?"

Terms such as "greater fool theory", "pyramid schemes" and "disreputable practices" were repeatedly used in the description of the market for the IPOs of small, speculative firms. The price runups, according to the underwriters, are often the result of a
broad retail brokerage networks which target small, risk-oriented and generally uninformed individual investors. The great majority of institutional investors will not purchase the IPOs of speculative smaller companies; these issues must be sold through the retail networks. Another underwriter described the practices:

"The IPO comes out and the network starts. They will call one investor and tell them they have a great deal at $1 which is sure to go to $1.20. Then they call another and say they have a great deal at $1.20 which is sure to go to $1.30. This can go on for quite a while. When the next IPO comes out, your first group will be more than happy to pay $1.20 and your second group will be more than happy to pay $1.30."

The brokers repeatedly compared the practices of issuing small speculative IPOs to practices in the penny stock market where

"...brokers carry on high intensity sales campaigns ... and up to 90 percent of all trades may be among the same broker's customers..." (Reid, 1988 p. E1)

It is clear that what the underwriters are describing is a speculative bubble. Although speculative bubbles have been explored in the literature, the possibility of a speculative bubble explanation for the "underpricing" phenomenon in the IPO market has not been explored. The possibility of aftermarket overvaluation cannot be ruled out.

The underwriters emphasized that the valuation of the small speculative firms is a much different process than the valuation of more established firms. As previously mentioned, the valuation
of the established firms typically is done on the basis of comparable earnings multiples. Other accepted methods are comparable market to book ratios, revenue multipliers, and asset valuations. These approaches cannot be applied to the smaller speculative firms. For example, the blind pool IPOs have no earnings, no industry, no revenues, and no assets other than the cash raised from the IPO. The underwriters must often value these firms quite arbitrarily. The prospectus of one 1988 offering contains the following passage:

"There is no assurance that a public market will develop for the stock, or, if developed, no assurance that it will be sustained. The initial offering price has been arbitrarily determined by the underwriter and does not necessarily bear any relationship to the company's assets, book value, results of operations or other generally accepted criteria of value....The independent certified public accountants' report states that.....there is substantial doubt about the Company's ability to continue as a going concern."

The financial statements of the company show annual losses of over 200 times revenues for the only year of operation in which the company had revenues, and substantial losses for the other three years of operations. It is clear that the term "valuation" is used in a much different context when applied to firms such as these, and that activity in this market is best described as speculation rather than investment.

Advice of Underwriters to Firms Considering an IPO

The most prevalent advice given to firms considering an IPO was not to attempt a public issue prematurely. The underwriters
believe that a common error is for firms to attempt an IPO "before they are ready". In order to assure a well received offering and at least some participation by strong hands, the firm should be established in its business with strong prospects for growth. In addition, the management must be prepared to institute the systems and controls required of a public company, and be able to withstand public scrutiny. For example, with the exception of one, all of the underwriters commonly employ private investigators to examine backgrounds of company management. In addition, the disclosure requirements are often daunting to small firms. Many firms, according to the underwriters, are simply not prepared for this degree of scrutiny.

The underwriters advise that firms attempt to find other sources of equity capital before proceeding with a public offering. A well received and successful private placement or venture capital transaction serves as a track record in attracting interest to the eventual public offering.

The more prestigious underwriters argue, perhaps not surprisingly, that it may be advantageous for the firm to wait until it can meet the more stringent criteria imposed by the higher tier underwriters rather than to go ahead with an issue underwritten by a less prestigious firm. These underwriters argue that the firm will benefit from higher quality services, stronger placement,
more competitive pricing, and more well developed marketing capabilities.

The current structure of the industry makes it quite difficult for small firms wishing to raise less than approximately $2-3 million to do so through a public offering to be listed on a national exchange. First, the institutional investors have little interest in participating in issues of this size. Secondly, the costs of accounting, legal, and printing services, as well as management time, are proportionately higher for small issuers, and may be prohibitive. Thirdly, regulatory limits on underwriter compensation mean that the issuer will have few underwriters competing to provide services. At present, therefore, public offerings do not appear to be a viable alternative for firms wishing to raise under $2-3 million.

In summary, the best results will be obtained if the issuing firm can place itself in a seller's market for underwriting services. The present structure of the industry places firms wishing to raise relatively small amounts of equity at a substantial disadvantage.

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6 There are two primary reasons for this lack of interest. First, most institutions perform "in house" research that is not deemed to be worthwhile for small investments. Secondly, institutions are effectively limited to ownership positions under 10 percent, and prefer to have positions less than this limit. For smaller issues, the resulting investment may be too small to be of interest.
Empirical Analysis

Descriptive Statistics

The initial sample for our empirical analysis consists of all initial public offerings for which data were available on the Registration and Offering Statistics Tape from the SEC. The data cover the period 1977 - 1987. Data for Registration A offerings and closed end mutual funds were excluded.

Figures 1 and 2 show initial public offerings by year and type in number of issues and dollar volume, respectively.

[Figure 1]

[Figure 2]

These data illustrate several points. First, both the number and dollar volume of IPOs grew, although not steadily, over the sample period. However, the growth in dollar volume was at a substantially higher rate than the growth in the number of issues. This suggests that the size of individual initial offerings has grown appreciably over the sample period. Secondly, consistent with conventional wisdom, the IPO market clearly experiences "hot" and "cold" periods, and these periods are roughly coincident with the overall state of equity markets. Activity was highest in 1981 and 1983-86, and lowest in the late 1970s. Thirdly, there has been a relatively steady decline in the percentage of issues
underwritten on a best efforts basis. It is now relatively rare for the large Wall Street firms to underwrite issues on a best efforts basis. Indeed, none of the underwriters interviewed employed best efforts offerings with any frequency.⁷ Fourth, the data clearly show that best efforts offerings are much smaller than firm commitment offerings. Over the sample period, the average best efforts offering size was $3.23 million while the average firm commitment offering size was $17.53 million.

Figures 3 and 4 show IPO type and underwriter class by number of issues and dollar volume, respectively. Underwriter class is defined by four categories, depending on the breadth of operations: National (1), regional (2), state (3), and local (4).

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⁷ Two primary reasons account for underwriters' lack of interest in best efforts offerings. First, contrary to accepted opinion, several of the underwriters noted that there is effectively no difference in the risk assumed by the underwriter in a firm commitment vs. a best efforts offering. In a firm commitment, the underwriting agreement is usually signed the day before the initial offering, by which time the underwriter has already obtained commitments from buyers. Secondly, a best efforts offering is often viewed as one that the underwriter sees as "marginal" or one that was unable to attract investor interest in the "road show" preceding the offering.
As expected, the data show that class 1 firms tend to underwrite the largest issues. However, regional firms underwrote the largest number of issues.

Analysis of Price Behavior

Complete price data were available for 1,745 issues during the sample period. The degree of underpricing is computed by Equation 1, using NASDAQ as the relevant market index. Table 4 shows the degree of underpricing for the aggregate sample.

[Table 4]

The results indicate that if an investor had purchased each IPO at the offering date and price and held the investments for 1 day, the rate of return earned would be 19.24 percentage points higher than from similarly timed investments in the NASDAQ index. The results also show, however, that virtually all price adjustment takes place in the first trading day. After the first trading day, returns to IPO investors approximate those of the market index. This suggests that the aftermarket for IPOs is quite efficient. Nonetheless, the degree of initial underpricing shown by the aggregate data is quite high. It also appears that substantial price declines occur between 5 and 12 months following the offering.
There is, however, substantial variation in the degree of underpricing over time. Table 5 illustrates underpricing by year, for the period 1986.

(Table 5)
The degree of underpricing appears to be diminishing over the sample period. This may be attributable to greater sophistication on the part of issuers as the underpricing issue receives increasing attention, or to increased competition among underwriters. Taken together with the data shown in Figures 1 and 2, Table 5 shows that the degree of underpricing seems to have a weak negative relationship with the level of activity in the IPO market. That is, during years with a high number of issues, underpricing tends to be lower. A possible explanation for this relationship is that during years when IPOs are relatively scarce, demand exceeds supply for new issues. As a result, prices are driven up in the aftermarket.

Table 6 shows the degree of underpricing by type of offering for the entire sample period.

(Table 6)
Table 6 shows that while underpricing is significant for both types of offerings, it is substantially higher for issues underwritten on a best efforts basis. There are several possible explanations for this finding. First, it is generally true that only firms that are quite small and speculative are underwritten on a best efforts basis. Therefore, if the information asymmetry
theory proposed by Rock is valid, we would expect to see a higher
degree of underpricing for these issues. In essence, high levels
of underpricing are necessary in order to induce investors to
participate in the offering. Secondly, the firms that must
purchase underwriting services on a best efforts basis clearly
operate in a "seller's market" for these services. There is
likely to be minimal competition among underwriters for these
issues.

Conventional wisdom among practitioners holds that the issues of
smaller and more speculative firms are initially sold at lower
prices than those of more established firms. If this is true, and
if there is also more underpricing in the IPOs of more speculative
firms, then underpricing should show a relationship with the
initial offering price. Table 7 shows the relationship between
the degree of underpricing and initial offering price per share
(PPS).

[Table 7]

The data show a strong negative relationship between the level of
the initial offering price and the degree of underpricing. Issues
priced at less than $2.00 show substantially more underpricing
than do issues priced above this level. Again, this may be due to
the nature of the issuing firm - highly speculative companies tend
to be issued at low prices per share.
The relationship between underpricing and underwriter class is shown in Table 8.

As expected, the degree of underpricing shows a strong negative relationship with underwriter class. The issues of the smallest underwriters are underpriced by a greater amount than the issues of the largest underwriters.

The following points summarize our findings thus far:
1. Underpricing is higher during years of low activity in the IPO market.
2. Underpricing is higher for best efforts offering than for firm commitment offerings.
3. Underpricing is higher for low priced offerings than for higher priced offerings.
4. Underpricing is higher for issues underwritten by smaller underwriters than for issues underwritten by larger underwriters.

It is not clear, however, whether we are examining an issue effect or an underwriter effect. If underpricing is an issue effect, then an issue would be priced at the same level by all underwriters, because pricing would be determined by the characteristics of the issue rather than underwriter characteristics. The underwriter chosen would not have an
independent effect on the degree of underpricing. However, underpricing would still be greater for the issues underwritten by smaller underwriters simply because these underwriters typically deal in smaller and more speculative issues. If, however, underpricing is an underwriter effect, different underwriters would price the same issue differently. The choice of underwriter would have an independent effect on the degree of underpricing.

To examine this issue, we empirically test whether or not the characteristics of the issuing firm provide explanatory power for the degree of underpricing within a given underwriter class. The characteristics measured are firm profitability, firm leverage, and issue size. Our measure of firm profitability is the profit margin of the firm (earnings before tax divided by revenues) in the year prior to the offering. Leverage is measured by the ratio of total equity to total assets. In general, "high quality" issuers are those which are less leveraged and more profitable. Lower quality, or more speculative issues, have lower profits but a higher degree of borrowing. If underpricing is an issue effect, then these measures should provide explanatory power for underpricing within an underwriter class. The following regression equation is estimated for each of the four underwriter classes:

\[ \text{UP}_1 = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + e \]
where
\[ \text{UP}_1 = \text{the degree of underpricing for a holding period of 1 day} \]
\[ X_1 = \text{the profit margin of the issuer} \]
\[ X_2 = \text{the issuer's ratio of total equity to total assets} \]
\[ X_3 = \text{the dollar amount of the initial offering} \]

The results of the estimations are shown in Table 9.

[Table 9]

For underwriter classes 2, 3, and 4, none of the measures of firm/issue quality have a significant relationship with the degree of underpricing. It appears that, given the choice of underwriter, underpricing does not vary systematically with firm profitability, leverage, or issue size. For class 1 underwriters, however, the profit margin shows a statistically significant relationship with underpricing. In general, the choice of underwriter is the only consistently important factor in explaining IPO pricing.

The Phenomenon of Speculative Bubbles

Thus far we have followed conventional wisdom in our definition of underpricing as the excess return of IPOs over returns accruing to the market index. The validity of this definition, however, rests upon the assumption that the aftermarket correctly values the new issues. That is, if

\[ \frac{P_1 - P_0}{P_0} - \frac{I_1 - I_0}{I_0} > 0 \]
and if $P_1$ is the true value of the security, then we may conclude that underwriters underprice new issues. This conclusion is not valid, however, if $P_1$ is not the true value of the security - that is, if the initial aftermarket either under- or overvalues new securities. In order to examine this issue we compute the value $Y^*$ where

$$Y^* = \frac{P_{250} - P_1}{P_1} - \frac{I_{250} - I_1}{I_1}$$

If the customary assumption is correct and the aftermarket is efficient, then values for $Y^*$ should approximate zero. The returns to an investor purchasing the IPO at the close of the first trading day and holding for one year would approximate the returns from a similarly timed investment in the index. If, however, the initial aftermarket systematically overvalues IPOs, then we would observe negative values for $Y^*$. This would be consistent with the "speculative bubble" explanation posed by many of the underwriters. The aggregate value of $Y^*$ for the sample of 1745 issues is -11.56 percent. Thus, investors purchasing all IPOs in the open market at the close of the first trading day and holding each for a period of one year would have underperformed the market average by 11.56 percentage points. Tables 10 through 12 show values by year, by underwriter class, and by type of offering, respectively.
Negative values for $Y^*$ are obtained in 8 of the 10 years studied. We may conclude that an investor purchasing IPOs at the close of the first trading day would fairly consistently underperform relative to market averages. Following the price run ups of initial trading, the prices of newly issued securities fall over the ensuing year. The degree of price decline has an inverse relationship with underwriter class. However, it is not significant for best efforts offerings. In summary, there is strong evidence of a speculative bubble phenomenon. It appears that prices are bid up above the securities' true values, only to decline between 5 and 12 months following the offering.

Summary and Conclusions

Academic researchers have proposed three possible explanations for the systematic underpricing of IPOs. These are monopsonistic power by underwriters, information asymmetry, and the use of underpricing as insurance against legal liability. A number of other explanations were put forth by the underwriters interviewed for this study. These are underpricing as a strategic tool, lack of price competition among underwriters, and the strong vs. weak hands phenomenon.
The underwriters believe that many firms approach the public equity market prematurely. The underwriters stress that a successful offering requires an established firm with significant prospects for growth and profitability. Issues for firms which are smaller and more speculative will be refused by top tier underwriters and are less likely to be fully priced. Underpricing was found to be (1) diminishing over time, (2) more pronounced for best efforts offerings, (3) more pronounced for lower-priced issues, and (4) more pronounced for issues of smaller underwriters. In fact, once the underwriter class is accounted for, other firm specific factors such as profitability, leverage, and issue size do not add explanatory power. There is also strong evidence of a speculative bubble phenomenon in the IPO market.

The current structure of the underwriting industry is disadvantageous to small firms, especially those wishing to raise less than 2-3 million. These firms pay larger underwriting spreads and receive less competitive pricing. Further, the issuance costs and disclosure requirements are often prohibitive. At the present time, public equity is not an attractive option for these firms. These firms clearly operate in a seller's market for underwriting services.
Table 1

PRIOR RESEARCH: ARE NEW ISSUES UNDERPRICED?

<table>
<thead>
<tr>
<th>Study</th>
<th>Year</th>
<th>Sample Period</th>
<th>Sample Size</th>
<th>Degree of Underpricing*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reilly &amp; Hatfield</td>
<td>1969</td>
<td>1963-65</td>
<td>53</td>
<td>9.00a</td>
</tr>
<tr>
<td>Stoll &amp; Curley</td>
<td>1970</td>
<td>1957,59,63</td>
<td>205</td>
<td>42.40b</td>
</tr>
<tr>
<td>McDonald &amp; Fisher</td>
<td>1972</td>
<td>1969</td>
<td>142</td>
<td>28.00a</td>
</tr>
<tr>
<td>Logue</td>
<td>1973</td>
<td>1965-69</td>
<td>250</td>
<td>42.00cb</td>
</tr>
<tr>
<td>Neuberger &amp; Hammond</td>
<td>1974</td>
<td>1965-69</td>
<td>816</td>
<td>17.00a</td>
</tr>
<tr>
<td>Ibbotson</td>
<td>1975</td>
<td>1960-69</td>
<td>120</td>
<td>11.40a</td>
</tr>
<tr>
<td>Reilly</td>
<td>1977</td>
<td>1972-75</td>
<td>553</td>
<td>10.60a</td>
</tr>
<tr>
<td>Block &amp; Stanley</td>
<td>1980</td>
<td>1974-78</td>
<td>102</td>
<td>5.96a</td>
</tr>
<tr>
<td>Neuberger &amp; Chappelle</td>
<td>1983</td>
<td>1975-80</td>
<td>377</td>
<td>27.70a</td>
</tr>
<tr>
<td>Chalk &amp; Peavy</td>
<td>1987</td>
<td>1975-82</td>
<td>649</td>
<td>21.65d</td>
</tr>
<tr>
<td>Miller &amp; Reilly</td>
<td>1987</td>
<td>1982-83</td>
<td>710</td>
<td>9.87d</td>
</tr>
</tbody>
</table>

*Measured as holding period excess percentage return, relative to index, with purchase at initial offer price.

a2 days to 1 week holding period
b6 month holding period
c1 month holding period
d1 day holding period
FIGURE 1
NUMBER OF IPOs BY YEAR AND TYPE

NUMBER OF IPOs

77 78 79 80 81 82 83 84 85 86 87

YEAR

□□ FIRM COMMITMENT □□ BEST EFFORTS
FIGURE 2
DOLLAR VOLUME OF IPOs BY YEAR AND TYPE

DOLLAR VOLUME OF IPOs (billions)

YEAR

Firm Commitment
Best Efforts
FIGURE 3

NO. OF IPOs BY TYPE & UNDERWRITER CLASS

NUMBER OF IPOs

UNDERWRITER CLASSES

FIRM COMMITMENT

BEST EFFORTS
### TABLE 2

PRIOR RESEARCH: WHAT EXPLAINS THE VARIATION IN UNDERPRICING ACROSS ISSUES?

<table>
<thead>
<tr>
<th>Study</th>
<th>Year</th>
<th>Underwriter</th>
<th>Issue</th>
<th>Offering</th>
</tr>
</thead>
<tbody>
<tr>
<td>Logue</td>
<td>1973</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Neuberger &amp; Hammond</td>
<td>1974</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Block &amp; Stanley</td>
<td>1980</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neuberger &amp; Chappelle</td>
<td>1983</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beatty &amp; Ritter</td>
<td>1986</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Young &amp; Zaima</td>
<td>1986</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Chalk &amp; Peavy</td>
<td>1987</td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Miller &amp; Reilly</td>
<td>1987</td>
<td>X</td>
<td></td>
<td></td>
</tr>
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</table>
Table 3

Characteristics of Underwriter Tiers

<table>
<thead>
<tr>
<th>Tier</th>
<th>Typical Issue Size</th>
<th>Exchange</th>
<th>Typical Offer Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>$12M+</td>
<td>NYSE, Amex, Nasdaq</td>
<td>FC</td>
</tr>
<tr>
<td>2</td>
<td>8-12M</td>
<td>Nasdaq</td>
<td>FC</td>
</tr>
<tr>
<td>3</td>
<td>2-7M</td>
<td>Nasdaq</td>
<td>FC</td>
</tr>
<tr>
<td>4</td>
<td>2-7M</td>
<td>Nasdaq</td>
<td>FC, BE</td>
</tr>
<tr>
<td>5</td>
<td>.5-2M</td>
<td>regional exchanges</td>
<td>BE</td>
</tr>
</tbody>
</table>

BE = Best Efforts Offerings

FC = Firm Commitment Offerings
Table 4
Degree of Underpricing for Entire Sample (in percentage points*)

<table>
<thead>
<tr>
<th>t=1</th>
<th>t=2</th>
<th>t=20</th>
<th>t=100</th>
<th>t=250</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>19.24</td>
<td>19.86</td>
<td>20.58</td>
<td>23.01</td>
<td>5.03</td>
<td>1745</td>
</tr>
</tbody>
</table>

*t = trading days after offering.
Table 5

Degree of Underpricing by Year (percentage points)

<table>
<thead>
<tr>
<th>Year</th>
<th>t=1</th>
<th>t=2</th>
<th>t=20</th>
<th>t=100</th>
<th>t=250</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>1977</td>
<td>36.60</td>
<td>35.30</td>
<td>35.08</td>
<td>19.24</td>
<td>-6.85</td>
<td>27</td>
</tr>
<tr>
<td>1978</td>
<td>22.02</td>
<td>24.61</td>
<td>30.48</td>
<td>76.42</td>
<td>55.89</td>
<td>26</td>
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<tr>
<td>1979</td>
<td>14.46</td>
<td>15.04</td>
<td>30.32</td>
<td>27.58</td>
<td>126.49</td>
<td>53</td>
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<tr>
<td>1980</td>
<td>59.42</td>
<td>62.23</td>
<td>64.65</td>
<td>94.47</td>
<td>28.26</td>
<td>128</td>
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<tr>
<td>1981</td>
<td>12.11</td>
<td>12.64</td>
<td>13.46</td>
<td>2.27</td>
<td>-11.08</td>
<td>276</td>
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<tr>
<td>1982</td>
<td>34.18</td>
<td>33.43</td>
<td>37.09</td>
<td>46.27</td>
<td>11.11</td>
<td>93</td>
</tr>
<tr>
<td>1983</td>
<td>22.37</td>
<td>22.59</td>
<td>23.47</td>
<td>18.06</td>
<td>-2.13</td>
<td>447</td>
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</table>
Table 6

Underpricing by Type of Offering (percentage points)

<table>
<thead>
<tr>
<th>Type</th>
<th>t=1</th>
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<th>t=20</th>
<th>t=100</th>
<th>t=250</th>
<th>N</th>
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</thead>
<tbody>
<tr>
<td>FC</td>
<td>10.94</td>
<td>11.33</td>
<td>11.49</td>
<td>12.38</td>
<td>-5.3</td>
<td>1418</td>
</tr>
<tr>
<td>BE</td>
<td>59.91</td>
<td>61.72</td>
<td>65.89</td>
<td>76.25</td>
<td>57.4</td>
<td>294</td>
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Table 7

Underpricing and Initial Offering Prices (percentage points)

<table>
<thead>
<tr>
<th>PPS</th>
<th>t=1</th>
<th>t=2</th>
<th>t=20</th>
<th>t=100</th>
<th>t=250</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>.01-$1.00</td>
<td>78.31</td>
<td>79.35</td>
<td>82.75</td>
<td>99.01</td>
<td>76.71</td>
<td>266</td>
</tr>
<tr>
<td>1.01-$2.00</td>
<td>32.25</td>
<td>35.60</td>
<td>37.07</td>
<td>35.75</td>
<td>9.56</td>
<td>73</td>
</tr>
<tr>
<td>2.01-$5.00</td>
<td>10.89</td>
<td>11.98</td>
<td>12.56</td>
<td>14.72</td>
<td>-4.49</td>
<td>270</td>
</tr>
<tr>
<td>5.01-$10.00</td>
<td>5.69</td>
<td>6.04</td>
<td>6.21</td>
<td>7.00</td>
<td>-12.9</td>
<td>528</td>
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<tr>
<td>&gt; $10.00</td>
<td>7.32</td>
<td>7.47</td>
<td>7.45</td>
<td>5.84</td>
<td>-7.05</td>
<td>609</td>
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</tbody>
</table>
Table 8

Underpricing and Underwriter Class (percentage points)

<table>
<thead>
<tr>
<th>N</th>
<th>Class</th>
<th>t=1</th>
<th>t=2</th>
<th>t=20</th>
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<td>504</td>
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<td>9.64</td>
<td>9.73</td>
<td>8.41</td>
<td>6.78</td>
<td>-7.74</td>
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<tr>
<td>722</td>
<td>2</td>
<td>18.19</td>
<td>18.87</td>
<td>19.72</td>
<td>21.69</td>
<td>5.43</td>
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<tr>
<td>84</td>
<td>3</td>
<td>11.73</td>
<td>13.46</td>
<td>11.52</td>
<td>25.36</td>
<td>1.56</td>
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<td>35.19</td>
<td>36.21</td>
<td>40.37</td>
<td>46.70</td>
<td>22.81</td>
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</table>
Table 9

Results of Estimation of Equation (2)**

<table>
<thead>
<tr>
<th>Underwriter Class</th>
<th>$X_0$</th>
<th>$X_1$</th>
<th>$X_2$</th>
<th>$X_3$</th>
<th>F-Stat</th>
<th>$R^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (n=448)</td>
<td>5.87*</td>
<td>.00074*</td>
<td>.0237</td>
<td>-.000007</td>
<td>4.29</td>
<td>.028</td>
</tr>
<tr>
<td></td>
<td>(4.062)</td>
<td>(3.4)</td>
<td>(.85)</td>
<td>(-.02)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 (n=546)</td>
<td>12.38*</td>
<td>.00019</td>
<td>-.005</td>
<td>-.00015</td>
<td>1.46</td>
<td>.008</td>
</tr>
<tr>
<td></td>
<td>(7.13)</td>
<td>(.177)</td>
<td>(-.98)</td>
<td>(-1.8)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 (n=54)</td>
<td>11.21*</td>
<td>-.0016</td>
<td>.073</td>
<td>-.0005</td>
<td>1.085</td>
<td>.06</td>
</tr>
<tr>
<td></td>
<td>(2.19)</td>
<td>(-.319)</td>
<td>(1.67)</td>
<td>(-.709)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 (n=254)</td>
<td>31.14*</td>
<td>.024</td>
<td>.022</td>
<td>-.00038</td>
<td>1.26</td>
<td>.015</td>
</tr>
<tr>
<td></td>
<td>(3.73)</td>
<td>(1.79)</td>
<td>(.30)</td>
<td>(-.75)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

** t - statistics in parentheses
* - significant at .05
### Table 10
Values for $Y^*$ By Year (percentage points)

<table>
<thead>
<tr>
<th>Year</th>
<th>$Y^*$</th>
</tr>
</thead>
<tbody>
<tr>
<td>1977</td>
<td>-19.35</td>
</tr>
<tr>
<td>1978</td>
<td>33.85</td>
</tr>
<tr>
<td>1979</td>
<td>73.45</td>
</tr>
<tr>
<td>1980</td>
<td>-7.58</td>
</tr>
<tr>
<td>1981</td>
<td>-16.45</td>
</tr>
<tr>
<td>1982</td>
<td>-10.82</td>
</tr>
<tr>
<td>1983</td>
<td>-14.81</td>
</tr>
<tr>
<td>1984</td>
<td>-13.20</td>
</tr>
<tr>
<td>1985</td>
<td>-19.31</td>
</tr>
<tr>
<td>1986</td>
<td>-16.99</td>
</tr>
</tbody>
</table>

### Table 11
Values of $Y^*$ by Underwriter Class (percentage points)

<table>
<thead>
<tr>
<th>Class</th>
<th>$Y^*$</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>-15.35</td>
</tr>
<tr>
<td>2</td>
<td>-12.74</td>
</tr>
<tr>
<td>3</td>
<td>-6.81</td>
</tr>
<tr>
<td>4</td>
<td>-5.70</td>
</tr>
</tbody>
</table>

### Table 12
Values of $Y^*$ By Offering Type (percentage points)

<table>
<thead>
<tr>
<th>Type</th>
<th>$Y^*$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Best Efforts</td>
<td>-0.28</td>
</tr>
<tr>
<td>Firm Commitments</td>
<td>-13.91</td>
</tr>
</tbody>
</table>
References


