

THE ROLE OF REPUTATION IN EQUITY MARKETS

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ABSTRACT

This paper examines the returns to seller reputation in the market for initial public offerings. Investors adaptively learn about the quality of new issues by observing the past quality of issues underwritten by specific investment bankers. Underwriters are hypothesized to invest in intangible (reputation) capital to signal the production of high quality issues. Investment takes the form of underpricing in periods where the firm lacks an established reputation. A competitive return on the acquisition reputation capital is enjoyed in subsequent periods.

Empirical analysis of the spreads charged by underwriters and the offer price set on the IPO generally supports the underpricing hypothesis. Specifically, both the spread charged the issuer and the offering price set for the issue vary inversely with measures of seller experience -- or reputation. Underpricing can not be fully explained by incumbent theories which relate underpricing to ex ante pricing uncertainty.

The Role of Reputation in Equity Markets

"... it is a familiar rule in all business that a man should be paid in proportion to the trust reposed in him and the power which he enjoys."

D. Hume, History of England 1773

1. Introduction

This paper empirically examines the returns to seller reputation in the market for initial public offerings (IPO's) and discusses the mechanism by which firm-specific reputation capital is obtained. IPO's are first-time equity offerings made by firms with no public track record of the returns afforded to equity owners. Rarely is there publicly traded debt. IPO's are dominated by small, young firms, frequently producing new products with untested technologies. In short, investing in an IPO is risky. Furthermore, investors are likely to be at a comparative disadvantage in obtaining relevant financial and business information. The prospectus is an incomplete account of historic financial performance. Valuation is dependent upon projected future earnings -- expert opinion resides with the firm's insiders and its agents.

Investment bankers provide important certification and appraisal services in the market for new stock issues. Investors rely on expert opinion or, what this paper will call the "quality" of the investment banker in assessing the value of potential investments. Quality is unobservable, hence reputation -- i.e. past performance -- becomes important in evaluating the credibility of seller claims.

This paper draws on a large, primarily theoretical, body of literature on quality certification under asymmetric information. A direct implication of quality signalling is that the price of the good (new issue) and the

compensation of the third-party appraiser (investment banker) should be a function of the appraiser's established reputation capital. Reputation capital generates a stream of quasi-rents which discourage future opportunistic behavior on the part of sellers. Empirical tests of these hypotheses make up the bulk of this work.

The problems addressed below are not unique to the new issues market. Information asymmetries characterize a good many of the transactions which make up the investment banking industry. The assumed failure of private market signals has led to the evolution of direct regulatory mechanisms designed to mitigate information problems. By examining the operation of private quality signals, and their costs to sellers, we gain insight into the role of public policy in security markets.

2. Reputation and Quality Assurance

Several economists have addressed the problem of market performance where product attributes (quality, durability, safety) can not be accurately measured by consumers prior to purchase. (See Akerlof 1970; Darby and Karni 1973; Klein and Leffler 1981; Shapiro 1982, 1983; and Nelson 1974.) Common to many of the analyses is the notion that where buyers must rely on the seller's assessment of quality, sellers have a first-order incentive to overstate the quality of the product. The incentive to cheat, however, is mitigated by fear of lost future business, i.e., consumers learn and repeat sales are denied firms offering substandard products.

Repeat purchases are not sufficient to prevent fraud under the usual zero-profit implications of perfectly competitive markets. Promised quality levels are self-enforcing where the faithful seller expects to earn a stream of quasi-rents that exceed the short run gains to opportunistic behavior.

Klein and Leffler [1981] focus on investment in non-salvageable capital as a vehicle for generating these quasi-rents. Shapiro [1982, 1983] focuses on firm-specific reputation capital¹.

Specific capital in the investment banking industry is primarily intangible, taking the form of specialized information, long-term client relationships and expert "reputations".² While sunk tangible capital may serve as a quality signal, difficulties in observing and objectively measuring capital specific to investment banking suggests that a Klein-Leffler type quality signal may be imperfect. Instead, this paper concentrates on what Shapiro [1985] calls the "demand-side asset of reputation".

Reputation formation is adaptive. Entrants lack reputations, hence they are viewed as low quality producers. Firms must "invest" in reputation capital by producing high quality goods (high value IPO's). The products in this model are akin to what Nelson [1974] labeled experience goods -- the only way a seller can resolve uncertainty about his product is

¹See also Telser [1980] and Becker and Stigler [1974] for discussions of competitive mechanisms which result in self-enforcing contractual performance.

²Carosso [1970], in his history of investment banking in America, repeatedly emphasizes the importance of a firm's reputation in its ability to float new securities issues successfully and attract new business. Looking at modern-day investment banking practices, Hayes, Spence, and Marks [1983], focus on the common practice of establishing long-term banker-client relationships. The stability of client relationships in the investment banking industry is attributed to the fact that the underwriting function generally requires the exchange of inside information and results in the development of firm-specific matches between the skills of the investment banker and the financial needs of the client. Changes in the banker-client relationship are costly to both parties.

to sell it.³ Prices are quality-adjusted -- a function of accumulated reputation capital. Hence, firms suffer early losses as buyers' expectations adjust. Sellers are only willing to offer high-quality goods at below their cost because to do so provides consumers with product-specific information. Future, competitive returns on these initial information investments constitute price premia over the firm's variable costs of production. For buyers to be rational in their reliance on reputation, it must be the case that the value of the stream of quasi-rents exceeds the potential gains from shading on quality. Simply stated, the price premia on high quality goods can be viewed alternatively as return on reputation capital, or a bribe to discourage malfeasance. In competitive markets, the net present value of the firm's investment in reputation capital must equal zero.

As a result of this paper's focus on the relation between price and quality, this work also contributes to a body of literature that has grown up around a persistent anomaly in the field of finance -- namely the finding that many IPO's are underpriced. Information asymmetries play a central role in competing theories which attempt to explain IPO underpricing. The empirical section of this paper presents tests which discriminate between these alternative theories and the reputation-acquisition story presented here.

³ At first blush this may seem an unreasonable assumption for securities. Potential investors are swamped with reports, pro-forma financial statements, business analyses -- i.e. information. Yet the critical issue is the accuracy of the reports and quality of the judgments available from one's broker. The value of investment advice may not be revealed for weeks or months following the IPO offering.

3. A Simple Model of Reputation Acquisition

Consider a market in which buyers are imperfectly informed about the quality of a good (security). The past performance of incumbent sellers -- i.e., the quality and quantity of goods sold -- can be observed. Seller reputations are built on the basis of past performance, increasing when the performance of an issue exceeds expectations, and conversely declining when quality expectations are not fulfilled.

We can think of "quality" in terms of the amount of accurate information supplied to the investor regarding the expected performance of the issue. There are relatively few surprises in high-quality issues. "Blue chip" stocks, for example, are stable performers. Investors may not know the quality of the issue at the time of purchase, however they can draw inferences about the accuracy of the information supplied based on the reputations of the underwriters and brokers. Reputation is a quality signal.

Thus, underwriters build up stocks of reputation capital by producing "quality" issues. Quality issues are backed by accurate information on the issuer and its line of business, which in itself requires that the seller invest in obtaining specialized knowledge/human capital. These investments are not recoverable should the firm, or the individuals associated with the firm, leave the industry under suspicion of fraud or poor business practices. Firms/underwriters with established reputations and client relationships have incentives to maintain their reputations by continuing to provide high-quality goods and services.

We can use the stylized model developed by Shapiro [1983] to examine the reputation problem. Consider a market in which the quality of a good, q , is initially unknown. Buyers rely on the current reputation of the seller, R_t , in their assessment of product quality. Hence, price = $f(R_t)$. Quality

is revealed in the subsequent period and the reputations of sellers respond to prior period performance. Therefore

$$R_t = q_{t-1} \quad (1)$$

The market is competitive.⁴ The equilibrium price-quality schedule is derived from two necessary market conditions:

- In equilibrium, the firm has no incentive to reduce quality below the level expected by consumers. Cheating is not optimal -- consumers' quality expectations are rational -- i.e.

$$p(q^*) - c(q^*)(1+r)/r \geq p(q^*) - c(q_0) \quad \text{Condition (I)}$$

- The net present value of profits ≤ 0 . Hence there is no incentive for entry -- i.e.

$$p(0) - c(q^*) + ((p(q^*) - c(q^*))/r) \leq 0 \quad \text{Condition (II)}$$

Where $p(0)$ = price received by an entrant to the market, r = discount rate, and $c(q)$ = average cost of producing quality level q .

Goods sold in this market must meet some minimum quality level, q_0 . One can think of q_0 as a perfectly enforced government standard, or as the set of perfectly observable product attributes. (We can determine if the used car starts -- we simply can't judge how long it will continue to run). In the case of IPO's it is useful to think of q_0 as the level of audited financial information provided in the prospectus.

Entrants, who have no accumulated reputation, are assumed to produce

⁴The assumption of perfect competition constrains the value of the firms profits at any point in time. It does not, however, affect the characteristics of the optimal price-quality schedule or the speed at which equilibrium is reached.

goods with quality equal to q_0 . Hence, regardless of the actual quality of their goods, entrants receive a price that reflects the cost of producing a minimum-quality good, $p(0) = c(q_0)$.

Conditions (2) and (3) combined with the foregoing assumptions generates the equilibrium price-quality relationship.

$$p(q^*) = c(q^*) + r(c(q^*) - c(q_0)) . \quad (2)$$

Therefore, high quality producers have profit streams which vary over time. In the first period they produce a good with quality level q^* , incur costs $c(q^*)$ and receive a price $p(q_0) < c(q^*)$. The first period loss is a durable investment in information services -- once demonstrated, consumers are willing to pay a price that is commensurate with actual quality.⁵ In subsequent periods firms earn a premium over the variable cost of production which exactly equals the competitive return on the firm's investment in product information. The present value of the premium exceeds the single period gains from producing low quality goods and selling them at a high quality price. (Condition I).⁶

Finally, we can relax the assumption that learning about the true quality of the good occurs in the period immediately following the initial sale. Realistically, investors face signal noise extraction problems when evaluating the worth of risky assets. It may be difficult to distinguish

⁵The use of low-high pricing -- or penetration pricing -- is commonly discussed in marketing literature. Schmalensee [1982] examines the use of first period discounts in a similar context.

⁶The stream of quasi-rents can be capitalized to determine the asset-value of reputation:

$$V(q^*) = (1+r)(c(q^*) - c(q_0)).$$

Raising minimum quality standards (q_0) excludes low quality producers from the markets, reducing the asset-value of reputation. Of course, the real resource costs of increasing q_0 are well outside the scope of the model.

between losses that are due to misrepresentation of the quality of a firm's assets from those losses associated with firm or industry-specific demand or supply shocks. Let:

$$R_t = R_{t-1} + \gamma(q_{t-1} - R_{t-1}). \quad (3)$$

Then, in equilibrium,

$$p(q^*) = c(q^*) + (c(q^*) - c(q_0))(r/\gamma) \quad (4)$$

In part, the speed of learning parameters, γ , reflects the degree to which investors face noisy signals. Note that as $\gamma \rightarrow 1$ investors place more weight on single quality observations. The slower the rate at which consumers learn, the longer the time over which new entrants suffer losses, hence, the larger the price premia earned by established high-quality producers.⁷

Summarizing, first, the degree of underpricing is related to the difference between the equilibrium level of quality and the "minimum quality" that is attributed to entrants. The higher the quality signal that the firm wishes to send -- the greater the initial information investment.

Second, the higher the quality of the good, the greater the price premium earned in equilibrium. This stream of quasi-rents is sufficient to deter the firm from engaging in single period quality cutting.

Finally, the degree of underpricing and the magnitude of the premium are related to (1) the speed at which investors learn about seller quality and, (2) the discount rate. As information becomes less costly, firms can invest in less expensive signals.

⁷As shown in Simon [1985], reducing the speed at which consumers learn about product quality will reduce the firm's optimal choice of q .

4. Reputation Versus Uncertainty

The quality-assuring price path derived above is distinctly different from that which would be expected if the only problem facing consumers was the resolution of uncertainty regarding q . To illustrate the difference, consider a risk-neutral buyer. The expected quality of good offered by any entrant is strictly greater than q_0 , yet only a price commensurate with the minimum quality level is received by the seller. If buyers pay an unbiased price -- i.e. $p(0) = c(E[q])$ -- we would still expect to see that producers of high quality goods enter at low prices and subsequently receive higher prices for their products as uncertainty over quality is resolved. However, the price paid to entrants reflects an unbiased assessment of the quality of the good. On average, here would be no initial period underpricing across entrants. This is an important empirical distinction we will return to below.

There are also 2 key theoretical points. If entrants receive $p(0) = c(E[q])$ we have a characteristic "lemons" market. If entry is unchecked minimum quality producers will drive out high quality goods. Second, even if the entry of "lemons" is constrained, there is no equilibrium price premia that assures the maintenance of high quality levels. If $p(0) = c(E[q])$, the present value of the quasi-rent stream is strictly less than the potential gains from cutting quality to q_0 , reaping single period profits of $p(q^*) - c(q_0)$ and leaving the market.

If consumers behave fully rationally, in the sense that they are willing to pay up to the expected quality of the entrants goods, then if first period sellers set $p(0) = c(q_0)$, there will be excess demand. In the market for initial public offerings, there is substantial evidence of

rationing by sellers. Furthermore, rationing is more common among entrants. In the sample analyzed below over 30% of the issues were over-subscribed (demand > supply), while only approximately 10% were under-subscribed (supply > demand).⁸ For issues sold by new entrants to the equity underwriting market, over one half were oversubscribed while fewer than 10% were under-subscribed⁹. This evidence will be examined more fully below.

5. Empirical Analysis of the Role of Reputation in the Pricing of IPO's

The previous sections have examined a market in which consumers rely on sellers' reputations as a signal of product quality. The empirical implications of the model can be examined in the market for IPO's. Specifically, IPO's are products whose attributes are largely unobservable prior to purchase. The institutional features of the IPO market give investment bankers superior information regarding the "quality" of the offering, coupled with a monopoly position in its sale. Investors must rely on quality information provided by investment bankers. According to the reputation acquisition model, we expect to find initial underpricing of IPO's as investment bankers invest in reputation capital. Two testable hypotheses follow:

⁸ Define under-subscribed issues as those that remain "in syndicate" over 24 hours following the issue date, and oversubscribed issues as those with sharply higher (+10%) secondary market prices on the same day as the primary offering

⁹ SEC regulation requires that the entire issue be sold at a price that is fixed in advance of sale. If the issue is oversubscribed, shares are rationed by the investment banker -- usually favoring large, valuable customers. The investment banking syndicate continues to hold the shares of under-subscribed issues until either all shares are sold at the offer price, or, rarely, the syndicate is broken, the issue is re-registered and offered at a lower price. Precise data on which issues were over/under-subscribed are costly to obtain. The categorization adopted here is meant to be illustrative.

Hypothesis I: The extent to which an IPO is underpriced depends on the accumulated reputation capital of the investment banker. Reputation is a function of prior period quality. Empirically, we expect to find an inverse relationship between the degree of underpricing and the market share of the investment banker in the prior period¹⁰.

Hypothesis II: Investment in information services leads to larger sales and market share. "Optimal" underpricing of the entrant in the investment banking market creates firm-specific reputation capital, enabling the firm to receive a quality-adjusted price for its services in subsequent periods. Empirically, correct underpricing by entrants in period "t" feeds back to raise sales and market share in period t+1.

Up to now the paper has ignored a central feature of the market for new issues -- namely the role of the investment banker as an intermediary between the issuing corporation and the investing public. Investment bankers are compensated for their services on the basis of the dollar spread between the offering price to the public and the "firm-commitment" price paid to the issuing corporation.¹¹ Given the banker's position as an intermediary, the

¹⁰ Using Shapiro's model, it can be shown that under rather general demand and cost conditions sales and total revenue are increasing in reputation.

¹¹ New issues may be sold on either a "firm commitment" basis or a "best efforts basis". In firm commitment offerings the investment banker buys the entire issue from the corporation at a fixed price. The spread is the difference between the price paid to the corporation and the offer price to the public. The underwriter assumes all risk for fully subscribing the issue. In a best effort contract, the investment banker acts as a commissioned sales agent, never buying the offering outright. All issues in the sample are firm commitment offerings.

offering price to the public must to potential gains from serving two conflicting masters. While a low price will attract investors, unless the banker absorbs the difference in his commission the same low price imposes a cost on the issuing firm.

If the investment banker reduces the offering price without equally reducing his commission, in effect, part of the investment in reputation is borne by the issuing firm. Presumably, part of the returns to reputation capital will accrue back to the issuer. The relationships between investment bankers and issuing corporations, however, are quite durable. The low rate of turnover between investment bankers and their clients makes it virtually impossible to empirically examine the division of reputation capital in this data sample. ¹²

If underpricing is accomplished by reducing the commission rate (spread) the investment banker bears the full cost of the investment in reputation capital. Both definitions of "underpricing" are examined in the empirical analysis that follows.

A central assumption of this paper is that reputation accrues at least in part to the investment banker. Issuers effectively rent the reputations of the underwriters when floating new security issues. The role of quality assurance is best relegated to the investment banker, who is a frequent participant in the market for new issues. Were investors forced to rely on the reputation of the issuer, the long lags between successive issues would

¹² While the apparent joint investment in reputation capital is interesting, the division of gains is not critical for present purposes. Rather, if underpricing is observed in the offering price of the IPO it is useful to view both the cost of the investment and the returns as jointly accruing to an integrated underwriter-firm unit. Provided that the relationship between a firm and its banker is durable, the aggregate relationship between reputation investments and returns will not be biased.

make the information problem more acute. In general, in markets where experience, or learning, is required of consumers, infrequent sales slow the rate at which quality expectations are adjusted. The slower the rate at which buyers learn, the larger the wedge between the price observed in the market and the full information price -- the greater the uncertainty cost. Hence, investment bankers can be viewed as efficient providers of certification services.

6. Data

The underpricing hypotheses are examined using data on initial public offerings of stock that were floated between 1965 and 1969. The data set includes information on all SEC-registered IPO's from 1965-1969 that were listed on the NYSE, American Stock Exchange or Over-the-Counter market within two weeks of issue. "Registration A" filings -- common stock issues less than \$1.5 in total value -- are excluded. The primary sources of data are The Investment Dealer's Digest, Commercial and Financial Chronical, and the Wall Street Journal. The sample contains 1170 issues and represents approximately 90% of the value of common stock IPO activity during 1965-69. For each issue information was collected on (1) managing and co-managing investment banker(s); (2) market share of the investment bankers in the year of issue, prior years and subsequent year; (3) offer price ; (4) spread; (5) shares sold; (6) weekly and/or daily stock returns for the issue and a broad-based market index over the 6 months following the date of issue. The variables used in the empirical analysis are explicitly defined in the subsequent section.

The period between 1965 and 1969 was chosen for several reasons. First, it corresponds to a broad bull market in which there was significant

IPO activity. Second, IPO activity was distributed widely across different industries. In contrast, the "hot new issues markets" of 1979-80 are dominated by energy and technology issues. Finally, there are relatively few mergers among major investment banks during this era. Again, in contrast, the late 1970's-early 1980's are characterized by considerable horizontal merger and acquisition activity in the investment banking industry.¹³ It is unclear how reputation capital is affected by the merger or acquisition of competing suppliers.¹⁴

Between 1965 and 1969, 146 investment banking firms are identified as having managed or co-managed one or more IPO's. Market share estimates are computed, by year, for these firms. Market share is defined as the investment bank's value weighted share of IPO's relative to the total market value of IPO's in the sample. By restricting the "market" to the IPO sample, a narrow definition of both the extent of the market and the breadth of "reputation" are adopted. Specifically, investment bankers are given no credit for issues in which they were not the managing, or co-managing firm.¹⁵ Also, it is assumed that reputation does not extend beyond the IPO market. An entrant into the IPO market who has extensive experience in the bond market is treated identically to the firm that enters with no experience in the sale or distribution of any security. The wide-spread existence of brand name capital in the investment banking industry makes

¹³ See Gregg Jarrell [1984] for discussion of the historic forces which altered the market structure of the investment banking industry.

¹⁴ In the present analysis merged or acquired firms are dropped from the empirical analysis following the date of the merger or acquisition.

¹⁵ If 2 investment bankers are listed as co-managing the offering, the market value of the issue is split equally between them. Similarly, if 3 firms jointly manage the offering, the one-third of the value of the issue is allocated to each of their market shares.

this a clearly unrealistic assumption. It is, however, necessitated by the massive amounts of primary data which must be hand-tabulated. The obvious divergence between the measures of the "market" used in this paper and an ideal economic definition of the market will bias the analysis towards rejecting the proposed theory.

A randomly-selected subsample of 200 issues is employed to test Hypotheses I and II¹⁶. Table I summarizes the characteristics of the full sample and the subsample. Tables 2 and 3 provide descriptive statistics on the characteristics of the new issues sample and the characteristics of the managing underwriters.

7. Empirical Tests

Hypothesis I (underpricing is a function of reputation capital) and Hypothesis II (investment in reputation capital leads to larger market share) are empirically tested below. Underpricing is defined two different ways for each test : (1) underpricing the offering price on the IPO; and (2) reducing the spread (or dollar commission rate) charged the issuing corporation.

7.1. Hypothesis I(a): Underpricing the Issue

Table 4 examines the simple relationship between the average excess return earned on IPO's in the first month following the date of issue and

¹⁶ information on the number and dollar value of new issues underwritten by all 146 investment banking firms is used to compute market shares. Aftermarket returns and information on commission rates are collected only for the 200 issues in the subsample. Hypothesis I -- which requires information on prior period market share -- is examined using the 166 issues floated from 1966-1969. Hypothesis II -- which requires information on subsequent growth in market share -- is examined using the 161 issues floated from 1965-1968.

the number of IPO's managed (or co-managed) by the investment banker in the previous year¹⁷. Significant underpricing -- i.e. positive excess returns - is evident only among issues underwritten by investment bankers with little or no established reputation in the earlier period. This simple evidence is consistent with the reputation-acquisition story.

The relationship can be examined more precisely by explicitly controlling for the underwriter's prior period experience and other factors which affect the pricing of an IPO. Previous works by Rock [1986], Beatty and Ritter [1986], Logue [1973], Friend [1975] and Bloch [1986] link underpricing to the amount of ex ante uncertainty that surrounds the valuation of the IPO¹⁸. Measures of issue risk are included to discriminate between these hypotheses and the reputation acquisition story put forth in

¹⁷The results are not significantly affected if alternative measures of excess returns are used. A first-week risk-adjusted excess return was employed in a previous version of this paper. While the average first-month excess return = 6%, the average excess return for the sample over the first week = 4.3%. Employing net-of-market returns also fails to change the general results of the study -- although the measured excess returns increase since new issue betas are typically greater than one. It is not uncommon for a new issue to have its price "supported" by the syndicate in the period immediately following the date of issue. The first-month returns are selected over first-week returns to minimize the effects of stabilization by the investment banker.

¹⁸Rock [1986] hypothesizes that uninformed investors, unable to distinguish high quality IPO's from low quality issues, face a winner's curse. Informed investors compete with uninformed investors only for high quality issues -- hence good issues will be oversubscribed and uninformed investors will receive fewer shares than requested. Low quality issues, however, are not oversubscribed -- hence the uninformed investor ends up with a portfolio disproportionately weighted toward low quality issues. To compensate, uninformed investors are only willing to purchase IPO's if, on average, they are underpriced. Other researchers have focussed on the insurance function of investment banking -- noting that if underwriters are risk-averse underpricing may be optimal.

this paper.¹⁹

Let:

$$ER = a + b_1 \ln(1 + MS_{t-1}) + b_2 MKTRISK + b_3 \sigma(\text{RET}) + b_4 \text{DENTRANT} + e \quad (5)$$

Where ER is the first-month excess return on the IPO. ER is computed from a market model estimated on the first 25 weeks of returns following the date of issue. ER > 0 implies that the firm was underpriced.²⁰

MS_{t-1} - Value-weighted market share of the managing (or co-managing) underwriters in the year prior to the issue -- an instrument for accumulated reputation capital. The log transformation is used to reflect diminishing returns to reputation.²¹ The continuous formulation implicitly assumes that it takes more than one period for firm reputations to adjust to equilibrium levels.

MKTRISK - The standard deviation of the return on the market computed over the 13 weeks prior to the date of issue. MKTRISK is designed to capture the degree of market risk facing the

¹⁹Ritter and Beatty [1986] measure ex ante risk by examining the number of proposed sources and uses of funds listed in the prospectus. The ex post measures of risk used in this paper assume that expectations of risk are unbiased. Unlike Beatty and Ritter's measures, the measures used in this paper account for both market and firm-specific risk and provide a direct measure of volatility.

²⁰ER is computed as the cumulative abnormal return over the first 4 weeks following the date of issue.

²¹From the model, prior period reputation capital should be monotonically related to prior period market share. Current period reputation is a weighted average of prior period reputation and the quality of goods sold in t-1. Alternatively, one could estimate current period reputation as a distributed lag of quality in periods t-1, t-2,, t-n. Data limitations prevent the examination of more complex lag structures.

underwriter during the period when pricing, distribution and compensation decisions are typically made.

$\sigma(\text{RET})$ - The standard deviation of the first 13 weeks of returns following the date of issue. $\sigma(\text{RET})$ is a measure of total pricing risk/uncertainty facing the underwriter and investor - i.e. market and firm-specific risk. The use of an ex post measure assumes that expectations of risk are unbiased.

DENTRANT - Dummy variable = 1 if underwriter was not active in the prior period; = 0 otherwise. DENTRANT is included to evaluate whether the pricing decision of entrants differs from the relationship specified with $\ln(\text{MS}_{t-1})$. If reputations adjust completely after one period (year) we expect $b_4 < 0$, $b_1 = 0$.

Theory suggests that the b_1 and $b_4 < 0$; and b_2 and $b_3 > 0$. In particular, b_1 and/or $b_4 < 0$ implies that underpricing is a function of the prior reputation or experience of the underwriter -- not the characteristics of the issue itself. Results are reported in Table 5.²²

Results are supportive of the proposition that underpricing is a means by which less experienced firms establish reputation capital. The estimated coefficient on the market share variable is negative and significantly different from zero, indicating that underpricing declines as prior period market share increases. A large amount of observed underpricing can be attributed to new entrants. The coefficient estimate for DENTRANT is +.088

²²The model is estimated using GLS, weighing by the inverse of the standard errors of the individual market model regressions.

-- both statistically and economically quite significant.

In total, an underwriter with 1% of the market in the prior period will, ceteris paribus, increase the issue price (reduce the "excess return") by 9.1% compared to an underwriter with no prior period market share. Recall that IPO's floated by underwriters with no prior period market share earn average excess returns of 13%. Excess returns drop to zero for underwriters with 6% of the market. As prior period market share approaches 7.5% (the maximum value in the sample), IPO excess returns approach -1% (overpriced). Figure 1 displays the relationship between prior period market share and the degree of underpricing, holding all other explanatory variables at their mean values.

While the pattern of observed pricing is consistent with the reputation-acquisition theory, the magnitude of observed underpricing is inconsistent with the notion that the market structure of the investment banking industry is in equilibrium. From Figure 1, it is apparent that price premia are enjoyed only when a firm has grown to command a market share in excess of 6%. Only 2 firms in the sample meet this criteria. Furthermore the average "established" firm in the sample enjoys a market share of approximately 2%²³. A prior period market share of 2% translates into a 2% discount off a risk-adjusted price. While the magnitude of underpricing is not statistically significant for these medium-sized non-entrants, it is economically significant. There is little evidence to suggest that the adjustment period is sufficiently long and the "average" firm is still acquiring reputation capital. There is no discernable

²³ Define an established firm as one that is active in the sample throughout the period 1965-1969.

adjustment in average market share after 3 years.²⁴ Thus, even though the reputation model captures a large portion of underpricing behavior, it is inadequate to fully explain the magnitude of underpricing observed in the industry.

The empirical results also support the hypothesis that ex ante risk contributes to underpricing. This is consistent with the existence of an investors "winner curse", as suggested by Rock [1986] and Beatty and Ritter [1986]. Uncertainty over demand, coupled with regulatory requirements that issue price be set in advance may also generate an underpricing equilibrium (Logue [1973], Bloch [1986]). In keeping with either theory, the empirical analysis suggests that excess returns are positively related to risk -- measured either by the standard deviation of returns over the first 13 weeks following the date of issue or the degree of market volatility in the quarter preceding the issue date.²⁵

7.2. Hypothesis I(b): Underpricing the Spread

The evidence presented in the previous section suggests that the issuing corporation as well as the investment banker may systematically sacrifice current revenues when the underwriter lacks market experience.

²⁴In the sample, the average entrant enjoys a market share of .78% in his first year, 1.16% in the second year and 1.59% in the third year, but only 1.49% in the fourth year.

²⁵Underwriters tend to specialize according to issue type -- i.e. size, industry, or "riskiness" (See: Titman and Trueman [1986], Beatty and Ritter (1986), Hayes, et. al. (1985)). Hence, analyzing either hypothesis separately will overestimate the extent to which underpricing is attributed to either factor. In econometric terms, the variables are correlated, hence, left out variables will contribute to bias. Specialization will also contribute to cyclical patterns in the average degree of underpricing. Small, risky issues, underwritten by new investment bankers tend to go public more frequently in bull markets.

The degree to which the offer price of the IPO is underpriced varies inversely with the prior period market share of the underwriter.

If the objective of underpricing is to establish underwriter reputation capital, then underpricing the new issue appears to be an inefficient mechanism to adopt. Unless there is also a one-for-one reduction in the spread -- so that the net proceeds paid the issuer remain constant -- part of the cost is borne by the issuing firm. Rather, by reducing the spread between the offering price to the public and the firm commitment price paid the issuing corporation the underwriter alone would bear the costs of investment in reputation. The extent to which "underpricing" is evident in the spreads earned by managing underwriters is examined below.

Table 6 examines the simple relationship between the dollar spread earned by the managing underwriter and prior period market experience. The simple relationship ignores cross-sectional differences in the cost of underwriting or differences in the quality of service provided by the underwriter. Still, there is evidence of a direct relationship between prior market experience and the spread charged for investment banking services. The average spread earned by entrants in the market is \$.95, while firms that managed over 5 issues in the prior period earned, on average \$1.33 per share.

The relationship between established reputation and the spread can be analyzed more completely. Let:

$$\text{SPREAD} = a + b_1 \ln(\text{MS}_{t-1} + 1) + b_2 \text{MKTRISK} + b_3 \sigma(\text{RET}) + b_4 \text{PRICE} + b_5 \text{SHARES} \\ + b_6 \text{DENTRANT} + e \quad (6)$$

Where MS_{t-1} , DENTRANT , $\sigma(\text{RET})$, and MKTRISK capture established

reputation market risk and issue risk, as defined above.²⁶

SPREAD = Gross dollar spread between the offering price and the proceeds received by the issuing corporation.

PRICE = Issue price. All else equal, underwriters incur greater inventory carrying costs with higher priced issues .

SHARES = Number of shares, in millions. The number of shares included to capture economies or diseconomies of scale in managing an issue.

Results are presented in Table 7. As above, results support the contention that the degree of underpricing declines as the prior market share of the underwriter increases. The reputation proxy -- MS_{t-1} -- is significant and inversely related to price. Again, entrants into the market charge a significantly lower price for their services. The negative estimated coefficient on the DENTRANT dummy variable suggests that all else equal, a new investment banker will reduce the spread by approximately 20% . Issue and market risk contribute to higher spreads, however, the relationship is not statistically significant.

Variables included to capture the cost structure of underwriting exhibit mixed results. SPREAD rises with higher priced issues. A \$1.00

²⁶We expect $\partial(\text{SPREAD})/\partial(\text{RISK}) > 0$ since firm commitment underwriting contracts provide the issuer with insurance against adverse market conditions between the time the issue price is set and the time the issue is fully subscribed.

increase in the offering price results, on average, in a \$.04 increase in the underwriter's compensation.²⁷ There is no evidence of scale economies or diseconomies in the structure of underwriter compensation.

The relationship between the spread received by the managing underwriter and prior period market share is illustrated in Figure 2, holding all other explanatory variables at their means.

Finally, note that the relationship between price (spread) and market share is opposite that which one would expect if differences in firms' cost structures significantly affected market structure. We expect that market share rises as a firm's costs of production and/or market price fall. The opposite is evident here. Low prices are characteristic of firms with little or no prior period market share.

7.3. Hypothesis II: The Effect of Underpricing on Subsequent Market Share

In this section, the consequences of underpricing are examined. Specifically, is the investment banker who underprices in period t rewarded in terms of higher revenues and market share in the following period? For firms without established reputations we expect a positive relationship between underpricing in period " t " and growth in firm sales in " $t+1$ ". For firms with established reputation capital, the relationship should be reversed.

The time series analysis also avoids some of the specification problems

²⁷ Several alternative functional forms were examined for the relationship between price and spread -- including double log (constant percentage spread) and semi-log formulations. The results of the analysis are not significantly affected by the functional form adopted.

inherent in the cross sectional studies above. The quality and quantity of financial services provided by the investment banker are not observable -- hence the pricing equations suffer from left out variables. Specifically, we cannot observe the level of effort undertaken by the banker in distribution of the issue or the extent to which financial planning and advisory services may be packaged in with underwriting services. If the quantity and quality of service is highly correlated with prior period market experience, then the underpricing regressions can not be interpreted as underpricing. Rather, the higher prices received by larger underwriters are correctly adjusting for more and better services. By examining the feedback between "underpricing" and subsequent growth (or decline) in the firm's market share, however, these hypotheses can be separated. The reputation acquisition theory implies a dynamic relationship between underpricing and subsequent revenue. There is nothing to suggest that low quality firms should similarly exhibit substantial growth in market share. Again, underpricing will be analyzed both in terms of the spread and the IPO offer price.

7.3.1. IPO Excess Returns and Subsequent Growth in Market Share

The proposition that "correct" underpricing contributes to the growth of the firm is first examined by calculating the relationship between underpricing an issue at time "t" and the change in a firm's market share in the subsequent 12 month period (period t+1). Change in firm market share is measured in relative terms-- i.e.,

$$\text{Rel Mkt Share} = (\text{Mkt Share in period } t+1) / (\text{Mkt Share in period } t)$$

Underpricing (overpricing) is defined as the residual from a pricing model that excludes the market share and entrant dummy variables. -- i.e. equation (5) is estimated without the market share and entrant dummy variables, but including the regressors attributed to alternative theories. Positive residuals indicate "underpricing", negative residuals are defined as "overpricing". The simple relationship between current underpricing and subsequent growth is examined separately for "new entrants" -- i.e. firms that managed no IPO's in the prior period covered by the sample -- and for incumbent firms (the full sample less new entrant). Results are presented in Table 8.

Results suggest that the changes in market share are related to the degree of underpricing observed in the prior period. The relationship is strongest for "new entrants". New entrants who significantly underpriced issues in the first period had larger (relative) market shares in the following period. The relationship is not monotonic, however. Firms that engaged in the highest degree of underpricing grew in the subsequent period, but by less than did those underwriters that engaged in moderate underpricing. Obviously, excessive underpricing, without commensurate reductions in the spread, is costly to issuers. "New entrants" that overpriced issues suffer large declines in their market shares in the following year -- underwriters of the poorest performing issues lost nearly 70% of their market.

The "non-entrant" sample results suggest that firms which either significantly underpriced or overpriced were penalized in the subsequent period. Firms exhibiting the greatest growth in market share are those that

neither significantly over or underpriced the issue. Like the new entrant sample, incumbent firms appear to be more severely penalized for overpricing than for underpricing.

The relationship between underpricing and the subsequent change in the underwriter's market share is more explicitly examined in Table 9. Here Relative Market Share (RMS) is regressed against underpricing(ER). The quadratic formulation is employed to capture decreasing returns to underpricing. Offering an issue at below its market value is obviously costly to issuers. A reputation for giving away the IPO will presumably alienate corporate clients.

Specifically, let:

$$RMS_{t+1} = a + b_1 ER_t + b_2 (ER_t)^2$$

Again, underwriters are classified according to whether they are new entrants or incumbants and separate regressions are estimated for each group.

Results are consistant with the categorical analysis in Table 8. For the New Entrant sample under-pricing is positively related to subsequent growth in market share for moderate degrees of underpricing. The coefficient on $b_1 > 0$ while the quadratic coefficeient, $b_2 < 0$. The estimates are statistically significant and reflect a substantial economic relationship between prior underpricing and subsequent growth. For example, a new entrant who reduces the offering price by 13% (the average for the sample) enjoys a 15% growth in market share in the subsequent 12 month period, as opposed to an underwriter who prices an issue such that no excess return is earned and suffers a 1/3 decline in market share.

Underpricing by more than 44% is related to a loss in market share over the next 12 months.²⁸

7.3.2. Underpricing the Spread and Subsequent Growth in Market Share

Table 10 examines the relationship between underpricing and subsequent changes in market share using the underwriter's spread as the relevant "price". To define "underpricing" equation (6) is estimated without the market share variables, retaining other regressors postulated to be related to the underwriter's spread. Positive residuals are defined as overpricing, negative residuals convey underpricing. As in Table 8, underwriters are classified as new entrants or incumbants. Underwriters are ordered according to the estimated degree of underpricing and the simple relationship between relative market share and underpricing is examined.

As in the previous section, new entrants appear to benefit from charging low prices -- there is an inverse relationship between the "excess" spread charged in the first period and the underwriter's change in market share in the subsequent year. Among new entrants, the group exhibiting the largest growth in market share underpriced the spread by 20-35 cents per share. While the results are economically interesting, the relationship is not statistically powerful for the sample of new entrants. For incumbants,

²⁸The regression analysis relies on 2 simplifying assumptions. As in Table 8, new entrants are defined as those underwriters who floated no issues in the prior time period covered by the sample. Also, new issues are treated independently. If the investment banker underwrote other issues in the subsequent perior the effects of the performance of these issues is not captured in the analysis. The results of both of these simplifying conventions would be to bias the analysis against finding a significant relationship between underpricing and subsequent market share.

there is no clear cut relationship between underpricing as defined in the context of the simple spread model and subsequent changes in market share.

Summary and Conclusions

This paper has examined the returns to seller reputation in the market for initial public offerings. Investors adaptively learn about the quality of new issues by observing the past quality of issues underwritten by specific investment bankers. Underwriters are hypothesized to invest in intangible (reputation) capital to signal the production of high quality issues. Investment takes the form of underpricing in periods where the firm lacks an established reputation. A competitive return on the acquisition reputation capital is enjoyed in subsequent periods.

Empirical analysis of the spreads charged by underwriters and the offer price set on the IPO generally supports the underpricing hypothesis. Specifically, both the spread charged the issuer and the offering price set for the issue vary inversely with measures of seller experience -- or reputation. Underpricing can not be fully explained by incumbent theories which relate underpricing to ex ante pricing uncertainty. Finally, new entrants who underprice appear to attract substantially more business in subsequent periods.

The results are encouraging, however data and measurement problems suggest that they should be viewed with at least a grain of skepticism. Subsequent work must address the empirical relationship between quality and reputation capital, the extent to which reputations acquired in other investment banking services affect the IPO market, and the apparent joint

investment in reputation capital that is shared by the issuing firm and the underwriter.

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TABLE 1

IPO Activity and Subsample Coverage
By Year
1965-1969

<u>Year</u>	<u>IPO's: Full Sample</u>	<u>Subsample</u>
1965	169	34
1966	118	26
1967	257	49
1968	321	52
1969	305	39
	<hr/>	<hr/>
	1170	200

TABLE 2

Characteristics of the New Issue Sample

<u>Variable</u>	<u>Mean</u>	<u>Median</u>	<u>Range</u>
Size (million \$)	6.6	4.5	1.2 - 178
Shares (1000's)	351.6	300.0	100 - 4000
Offer Price	17.29	15.00	6.00 - 63.00
Commission Rate	7.20%	7.00%	3.68 - 17.10%
Excess Return (1st month)	6.38%	5.16%	-58 - +109%
Risk (σ return)	12.3%	15.1%	5.3 - 50.9%

TABLE 3

Characteristics of the Underwriters

<u>Number of Issues Managed 1965-69</u>	<u>% of Full Sample</u>	<u>% of Sub-sample</u>
1	38.0	32.0
2	15.7	17.5
3	5.8	5.0
4	8.0	10.0
5 - 10	17.2	16.0
11 - 20	9.5	11.0
Over 20	7.8	8.5
 Average # of Issues Managed	 5.4	 5.1
Range	1 - 36	1 - 29

TABLE 4

Simple Relationship Between IPO Excess Returns
and Underwriter Activity in Prior Period

<u>Average First Month Excess Return</u>	<u># Issues Managed By Underwriter in Previous Year</u>
.132 *	0
.049 *	1
-.005	2-3
.023	4-5
-.016	over 5

Notes: Average Excess Return computed from a market model estimated on the first 25 weekly returns. 1st "month" return = return over 4 weeks following issue.

Activity measured only for managing or co-managing underwriter. If issue is co-managed by 2 underwriters, each is credited with .5 issue.

* average return is significantly different from

zero

p < .05.

TABLE 5

IPO Underpricing and Underwriter Reputation

$$\text{Excess Return} = a + b_1 \ln(1+MS_{t-1}) + b_2 \text{MKTRISK} + b_3 \sigma(\text{RET}) + b_4 \text{DENTRANT} + e$$

<u>Variable</u>	<u>Est. Coefficient</u>	<u>T-value</u>
constant	0.000002	0.03
$\ln(1+MS_{t-1})$	-0.024	- 2.87 **
MKTRISK	1.253	1.48
$\sigma(\text{RET})$	0.491	3.27 **
DENTRANT	0.088	3.19 **

Adjusted R² = .289

n = 166

* statistically significant at $\alpha = .05$

** statistically significant at $\alpha = .01$

TABLE 6

Simple Relationship Between (Dollar) Spread
and Prior Period Underwriter Activity

<u>Avg. \$ Spread Earned by Underwriter</u>	<u># Issues Managed By Underwriter in Previous Year</u>
\$.95	0
.98	1
1.37	2-3
1.18	4-5
1.33	over 5

Notes:

Activity measured only for managing or co-managing underwriter. If issue is co-managed by 2 underwriters, each is credited with .5 issue.

TABLE 7

Underwriter Spread and Reputation

$$\text{SPREAD} = a + b_1 \ln(1+MS_{t-1}) + b_2 \text{MKTRISK} + b_3 \sigma(\text{RET}) + b_4 \text{PRICE} + b_5 \text{SHARES} + b_6 \text{DENTRANT} + e$$

<u>Variable</u>	<u>Est. Coefficient</u>	<u>T-value</u>
constant	.1637	4.22 **
$\ln(1+MS_{t-1})$.1444	2.10 *
MKTRISK	.0317	1.17
$\sigma(\text{RET})$.0271	1.06
PRICE	.0438	10.98 **
SHARES	-.0005	-0.16
DENTRANT	-.2134	-2.39 *

Adjusted R² = .549

n = 166

* statistically significant at $\alpha = .05$

** statistically significant $\alpha = .01$

TABLE 8

The Effect of Underpricing the IPO on Changes in Market Share

"Incumbents" vs. "New Entrants"

<u>"Incumbents"</u>		<u>"New Entrants"^a</u>	
<u>Excess Return</u>	<u>Relative Market Share</u>	<u>Excess Return</u>	<u>Relative Market Share</u>
Lowest 20%-ile (-.52 - -.15) ^b	.485	Lowest 20%-ile (-.52 - -.10)	.315
2nd 20%-ile (-.14 - -.01)	.781	2nd 20%-ile (-.09 - .03)	.694
3rd 20%-ile (0 - .08)	1.34* ^c	3rd 20%-ile (.04 - .15)	.920*
4th 20%-ile (.09 - .22)	1.22*	4th 20%-ile (.16 - .30)	1.638*
Highest 20%-ile (.23 - 1.1)	.865*	Highest 20%-ile (.31 - .75)	1.293*
F-stat(4,114) ^d = 4.21 p < .05		F-stat (4,43) = 3.03 p < .05	

^a"New Entrants" are defined as firms that underwrote no issues in the previous sample years. "Incumbents" are defined as the full sample excluding new entrants.

^bRange of excess returns included in the quintile.

^c* - Incumbent relative market share significantly different from new entrant at p<.05.

^dTest for equality of group means.

TABLE 9

Effects of Underpricing on Relative Market Share
 New Entrants Versus Incumbents
 (Standard Errors in Parentheses)

$$RMS_{t+1} = a + b_1 ER_t + b_2 (ER_t)^2$$

<u>Variable</u>	<u>Entrants</u>	<u>Incumbents</u>
Constant	0.67 ** (.201)	0.97 ** (.314)
ER	4.28 * (1.89)	0.40 (.759)
ER ²	4.76 * (2.22)	0.55 (.357)

* statistically significant at $\alpha = .05$

** statistically significant $\alpha = .01$

TABLE 10

The Effect of Underpricing the Spread on Changes in Market Share

"Incumbents" vs. "New Entrants"

<u>"Incumbents"</u>		<u>"New Entrants"</u> ^a	
<u>Excess Spread</u>	<u>Relative Market Share</u>	<u>Excess Spread</u>	<u>Relative Market Share</u>
Lowest 20%-ile	1.23	Lowest 20%-ile	.931
2nd 20%-ile	.742	2nd 20%-ile	1.39
3rd 20%-ile	1.02	3rd 20%-ile	.865
4th 20%-ile	1.29	4th 20%-ile	1.16
Highest 20%-ile	.63	Highest 20%-ile	.45
F-stat(4,114) ^b	= 1.74	F-stat (4,43)	= 1.98

^a"New Entrants" are defined as firms that underwrote no issues in the previous sample years. "Incumbents" are defined as the full sample excluding new entrants.

^bTest for equality of group means.

TABLE 11

Effects of Underpricing the Spread on Relative Market Share
 New Entrants Versus Incumbents
 (Standard Errors in Parentheses)

$$RMS_{t+1} = a + b_1 ES_t + b_2 (ES_t)^2$$

<u>Variable</u>	<u>Entrants</u>	<u>Incumbents</u>
Constant	0.96 * (.37)	0.87 * (.43)
ES	-0.58 (.422)	0.21 (.673)
ES ²	0.14 (.59)	-0.72 (.81)

* statistically significant at $\alpha = .05$

** statistically significant $\alpha = .01$

Figure 1

Excess Return Versus $MS(t-1)$

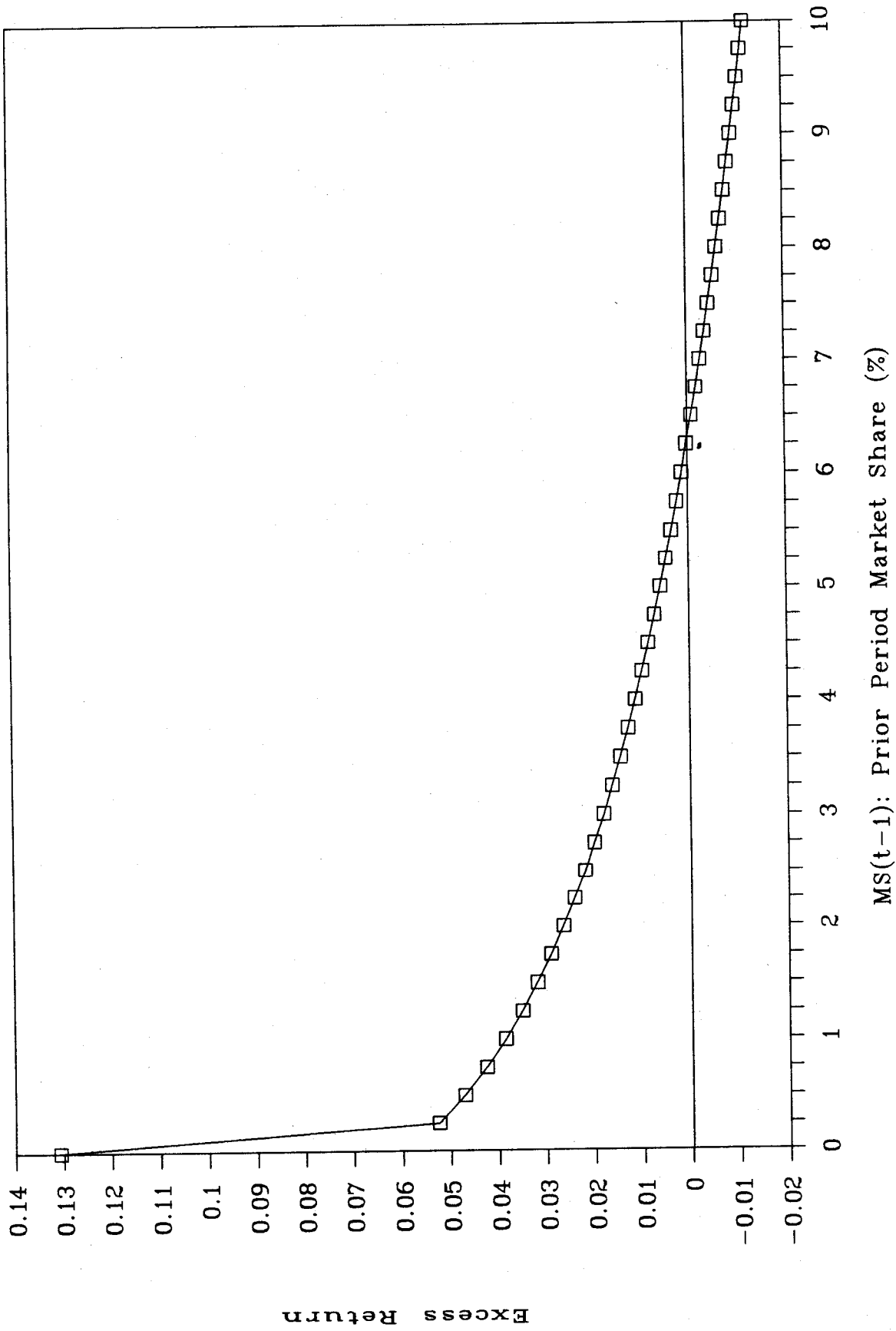


Figure 2

