

Discounting and Clustering in Seasoned Equity Offering Prices

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Abstract

An analysis of 4,814 SEOs during 1986-1999 indicates that the average offering of new shares is priced at a discount of 3.0% from the closing price on the day before the issue. Discounts have risen steadily over time, sharply increasing the indirect costs of issuing seasoned equity. There is evidence of increased clustering of offer prices at integers, and of greater importance in the analyst coverage provided by underwriters. Adjusting for other factors, we find that issues with integer offer prices, and underwriters with highly regarded analysts, are increasingly associated with larger discounts. The rise in discounts is consistent with an increased ability of investment bankers to extract rents from issuing firms.

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I. Introduction

This study examines the discounting of 4,814 U.S. seasoned equity offerings (SEOs) during 1986-1999. We find that the average offering is priced 3.0% below the closing market price of the day before the issue. There has been a dramatic rise over time in the average SEO discount, an indirect cost of issuing new seasoned equity for firms. The extent of the discount has increased relative to the magnitude reported in prior research. Smith (1977) reports an average discount of only 0.5% from 1971 to 1975, for example, while Loderer, Sheehan, and Kadlec (1991) find a 1.4% discount during 1980-1984. Since the late 1980s, the average SEO discount has generally risen. The average amount of money left on the table by issuing firms averaged \$7.1 million in 1999 compared to \$0.5 million in 1986. This increase in indirect issuing costs is not being offset by a decline in direct fees paid by the issuer. The average gross spread paid by firms has been approximately 5% throughout our period of study. More money left on the table for clients of investment bankers means less money for issuing firms in a seasoned equity offering.

Why has the average discount increased over time? We study four hypotheses that may be able to explain the documented patterns: changing issuer composition, short-selling, “leaving a good taste,” and investment banker power. The changing issuer composition hypothesis is that firms issuing seasoned equity more recently are subject to higher levels of uncertainty than issuers in earlier periods. Greater uncertainty in pricing issues should lead to higher SEO discounts. The second possible explanation is that short-sellers exert downward pressure on prices, forcing underwriters to offer seasoned

shares at prices lower than the prior stock price. The “leaving a good taste” hypothesis predicts that more frequent equity issuers should report lower discounts than infrequent issuers. The investment banker power hypothesis holds that underwriters extract rents from issuers through clustering of offer prices at whole dollars. We find some support for the changing composition and banker power hypotheses, but little for the other two explanations.

There has indeed been a shift in the composition of firms issuing seasoned equity over our sample period. In the second half of the 1990s, Nasdaq and technology issues represent a larger percentage of SEOs, while utility offerings represent a smaller percentage. Generally, Nasdaq and technology issues have greater uncertainty and higher levels of average discounts. Yet, over the time period examined, even non-Nasdaq and non-tech seasoned issuers report significant increases in average SEO discounts. Thus, the increase in discounts is attributable to more than a change in the composition of issuing firms.

Investment bankers generally provide the issuer with two services: pricing/distribution of shares and analyst coverage. We find several pieces of empirical evidence consistent with increased investment banker power in connection with these services. First, SEO pricing follows a particular pattern that partly explains the discount increase over time. Just as Christie and Schultz (1994) document for Nasdaq dealer quotes, SEO offer prices cluster around whole integers and generally avoid odd-eighths. Surprisingly, the offer prices of SEOs have moved to a coarser partitioning at the same time that market prices have moved to a finer partition.

An increasing fraction of integer offer prices are set at least one dollar below the issuer's prior closing stock price. In other words, underwriters set an offer price equal to the closing market price, but round down to a near but not necessarily the next integer. Second, we see an increasing trend in clustering in a sample of initial public offerings (IPOs) during the 1986-1999 period. We find that both IPOs and SEOs priced at integers report more underpricing.

Why would issuers allow more clustering in offer prices if it is at their expense? Or, why are the gains to investors not competed away through competition among investment bankers? Although a variety of investment bankers underwrite seasoned issues in the U.S., there is some evidence of consistently large market concentration by bankers with highly regarded research analysts. We find that investment bankers with a highly regarded analyst group, according to rankings by *Institutional Investor*, underwrite 72% of the total SEO proceeds during our sample period.

We conjecture that the discounting is not competed away because issuers place increasing importance on analyst coverage. This has increased bankers' ability to leave more money on the table for their favored clients. Extracting rents through the discounting of offer prices is much less transparent than extracting rents through a higher gross spread. In a finding consistent with the importance placed on coverage, we report that the quality of the analyst group is significantly linked to an underwriter's subsequent market share of seasoned offerings. In addition, we find that investment banks with highly regarded analysts are increasingly associated with SEOs that are discounted more, after adjusting for other factors.

The paper is organized as follows. Section II discusses the related literature. In section III we describe our sampling procedures and report trends in SEO discounts over time. Section IV introduces possible explanations of the SEO discount proposed by the literature. In section V, we focus on evidence of increased investment banker power. Section VI formally tests the investment banking power hypothesis using a multiple regression format. The final section summarizes our results.

II. Related Literature

Two other studies directly examine the increase in SEO discounts, and one other examines the impact of IPO offer price clustering. Using a sample of SEOs during 1993-1998, Corwin (2002) finds that underwriters are likely to set offer prices at the closing bid quote for Nasdaq-listed issues compared to the closing transaction price for New York Stock Exchange (NYSE) firms. This pricing practice partly explains why Nasdaq offers are more underpriced (compared to the closing transaction price) than NYSE SEOs. Altinkiliç and Hansen (2002) similarly find that underpricing is positively related to uncertainty about firm value.

Both Corwin (2002) and we document the increasing use of price rounding in the setting of SEO offer prices. Neither Corwin nor Altinkiliç and Hansen, however, examine analyst coverage nor address the characteristics that determine the subsequent underwriter SEO market share. Given the importance that issuers place on coverage, as documented by Krigman, Shaw, and Womack (2001), the quality of analyst coverage should be part of the analysis.

Finally, consistent with our IPO results, Bradley, Cooney, Jordan, and Singh (2002) find that IPOs with integer offer prices have higher first-day returns than those priced on dollar fractions. They argue that clustering at integers is a function of valuation uncertainty by the underwriter. When there is greater uncertainty about an initial public offering's market value, they maintain that there will be a greater probability that the offer price will be set at an integer to compensate the underwriter for assuming the additional underwriting risk.

Because the amount of uncertainty has increased as the level of valuations has risen, the uncertainty explanation is fully consistent with the increase in SEO and IPO discounting over time. This rise in valuation uncertainty, however, does not explain the increase in offer price clustering. If more uncertainty is present for recent issuers, why haven't offer prices been systematically set, for example, at a 3% discount? Clustering at integer prices implies different discount levels, depending on what the closing price was the day before, and hence different costs of issuance among firms. For example, a stock closing at \$31.375 that is priced at \$31.00 has a 1.2% discount, whereas a stock closing at \$31.125 that is priced at \$30.00 has a 3.8% discount. If both were priced at a 3% discount, the offer prices would be \$30.46 and \$30.22, respectively. Our investment banker power hypothesis, unlike the price uncertainty explanation, can shed light on the increasing use of whole dollar pricing for SEOs.

III. Data and Sampling Procedures

A. Sample Selection

The data include all common stock seasoned equity offerings (also known as follow-on offerings) by U.S. operating companies occurring between January 1986 and

December 1999 as identified by the Securities Data Company (SDC). The sample excludes equity offerings by closed-end investment funds, real estate investment trusts (REITs), unit investment trusts, beneficial interests, limited partnerships, American Depository Receipts (ADRs), and rights and unit issues. The issuing firm must be traded on the NYSE, Amex, or Nasdaq to be included in this study. We exclude 222 offerings with missing SDC closing prices on the day before the issue. The final sample is 4,814 U.S. SEOs.

B. Trends in SEO Discounts

Figure 1 shows the time trend of the mean and median discount and the average amount of money left on the table for our sample. SEO discounts are computed as the percent change from the offer price to the prior closing price, $\left[\left(\frac{P_{t-1} - OP}{OP}\right)100\%\right]$. An example of a 3% discount would be a prior-day closing price of \$51.50 compared to an offer price of \$50. Money left on the table is defined as the dollar discount multiplied by the number of shares in the offering, expressed in millions of constant 1999 dollars. The figure categorizes the average money left on the table by whether or not the underwriter has a highly regarded analyst group. *Institutional Investor* publishes an annual All-America Research Team for analysts recognized by major money management institutions as having performed the best in their research sectors during the previous year. The ten investment banking firms with the highest overall analyst ratings by *Institutional Investor* in a year are considered “highly regarded” or top-tier for our purposes.

SEO discounts (both mean and median) have clearly trended upward during the sample period. Similarly, the average amount of money left on the table has increased

for both sets of underwriters. Every year since 1986, underwriters with top-tier analyst teams have left, on average, more money on the table than other bankers. In 1999, the average amount of money left on the table by underwriters with a top-tier analyst group is \$8.9 million, compared to \$3.8 million by the other bankers.

Table 1 reports the number of offerings, discounts, gross spreads, average money left on the table, average total fees paid to underwriters, and aggregate market share of bankers with a top-tier analyst team. The highest average discount occurs in 1996, which also has the highest number of issues. Throughout the period, most sample issues are priced below the previous day's closing price. Overpriced issues represent 13% of the sample, while offerings priced at the closing market price represent another 18%. Overall, the average discount is 3.0%, with a median of 1.6%.¹ When we divide the sample period into three subperiods (1986-1989, 1990-1995, and 1996-1999), we see that discounts, both mean and median, have significantly increased over time. The average discount during 1986-1989 is 1.1% compared to 3.1% in 1990-1995 and 3.7% in 1996-1999.

The SEO discounts that we document are higher than those reported in earlier studies. Smith (1977), for example, reports an average offer-to-close return of 0.5% for his sample of 328 SEOs conducted on the NYSE/Amex during 1971-1975. Loderer, Sheehan, and Kadlec (1991) report an average offer-to-close return of 1.4% for 1,606 offerings during 1980-1984. In their sample, Nasdaq SEOs report an average discount of 1.6% compared to 0.0% for firms listed on the NYSE.

¹ Different calculation methods for SEO price discount produce similar findings. The average discount is 2.4% relative to the last sale price reported in the prospectus. Using different reference prices (i.e., midpoint-to-offer, bid-to-offer, or ask-to-offer return), Corwin (2002) also reports that the discount is substantially higher in his 1993-1998 SEO sample than that reported in the previous literature.

Interestingly, as the discounts (indirect costs) for an SEO have increased over time, average gross spreads (direct costs) have remained relatively stable. Consistent with the findings of Chen and Ritter (2000), SEO gross spreads have averaged about 5%. The combined direct and indirect costs have increased over time. Consequently, a substitution effect between direct and indirect costs is not an explanation for the upward trend in SEO discounts. The finding of a constant gross spread level is a little surprising, as average proceeds have risen during our sample period. Average SEO proceeds (in constant 1999 dollars) were \$70 million in 1986 compared to \$225 million in 1999. One would expect a decline in average gross spreads paid to the underwriter due to greater economies of scale for the more recent larger offerings.

Both the average amount of money left on the table and total fees have increased over time. The average amount of money left on the table is \$2.1 million, and the average total fees paid are \$4.0 million. The average total fee paid to underwriters has risen steadily, with higher offer prices and especially more shares sold at the seasoned offering. The overall cost (gross spread plus money on the table) of an average SEO has more than doubled over this 14-year period: \$3.3 million during 1986-1989, compared to \$8.8 million in 1996-1999.

The last column of Table 1 reports the aggregate market share for underwriters with a top-tier analyst group. During our sample period, the highly ranked analyst bankers took about 72% of total SEO proceeds public. Not surprisingly, underwriters with top-tier analyst teams are typically associated with NYSE-listed issuers and with higher market capitalization firms than other underwriters (average market value before offering of \$2,012 million compared to \$452 million).

IV. Possible Explanations for SEO Discounts

During 1986-1999 U.S. SEOs are underpriced on average by 3.0% relative to the prior day's close. Price discounts have increased through time. What are some possible explanations for the patterns seen in SEO discounts? We test whether the hypotheses of changing issuer composition, short-selling, and "leaving a good taste" are able to explain the SEO discount pattern. Our discussion focuses on patterns in the means, although analysis of medians produces similar conclusions.

A. Changing Issuer Composition Hypothesis

The greater the uncertainty of an offering to investors, the higher the expected discount should be. Overall, Nasdaq issues increasingly represent the market for seasoned offerings. The sample Smith (1977) uses is entirely composed of NYSE/Amex SEOs during 1971-1975. Less than half of the 1980-1984 SEO sample analyzed by Loderer et al. (1991) are Nasdaq-listed stocks. Nasdaq issues, however, represent about 59% of our sample during the 1986 to 1999 period. Increases in the proportion of technology-related offerings and a smaller number of utility issues are other examples of changing sample characteristics during our time period.

The changing composition of firms issuing equity might account for the positive trend of the average SEO discount. In other words, a growing number of riskier SEOs might be producing an increase in the average discount. To test this hypothesis, we use some proxies typically applied as uncertainty measures: exchange of listing, relative issue proceeds, and issuer industry.

Our first proxy for uncertainty is the primary exchange of issue. We combine NYSE and Amex issues because they share a common trading structure (i.e., specialist), although Amex issues are few in number. Nasdaq generally has less stringent listing requirements and a greater concentration of younger, smaller-capitalization firms than the other two exchanges. In our sample, Nasdaq issuers are on average smaller than NYSE/Amex firms in terms of pre-issue market value (\$604 million compared to \$2,178 million). They also tend to issue relatively more shares when they raise additional funds on the stock market (18.3% versus 13.5% of shares outstanding before the offering).

Our second proxy for uncertainty is SEO proceeds relative to issuer market value at the close of the trading day before the offering. The higher the ratio between proceeds and market value, Proceeds/Mkt , the greater the uncertainty about the offering. This proxy is regarded as high when the ratio is equal to or greater than the median of the sample distribution (0.2).

Finally, technology firms are generally associated with high uncertainty, and utility firms with low uncertainty. As documented by Masulis and Korwar (1986), public utility offerings are anticipated by investors more than industrial offerings. We define utility SEOs as firms operating in two-digit SIC industry 49, and technology issues by using the SIC codes in Appendix 4 of Loughran and Ritter (2002).²

Table 2 reports the average SEO discount categorized by high and low values of the four proxies for uncertainty. Not surprisingly, issues with greater uncertainty report higher average SEO discounts. That is, Nasdaq-listed, high relative proceeds, non-utility,

² Loughran and Ritter (2002) define technology stocks as firms with SIC codes as follows: 3571, 3572, 3575, 3577, 3578, 3661, 3663, 3669, 3674, 3812, 3823, 3825, 3826, 3827, 3829, 3841, 3845, 4812, 4813, 4899, 7370, 7371, 7372, 7373, 7374, 7375, 7378, and 7379.

and tech issues are associated with greater discounts. Although it is not reported in the table, the discount differences between each measure of uncertainty (i.e., Nasdaq versus NYSE/Amex) are statistically significant at conventional levels.

When the sample period is divided into three subintervals (1986-1989, 1990-1995, and 1996-1999), we see that the average SEO discount has generally increased over time for both riskier and less risky offerings. NYSE/Amex issues report an average discount increasing from 1.2% in 1986-1989 to 2.2% in 1996-1999. The average discount for Nasdaq SEOs increases from 1.0% to 4.5%. Although the increase is more pronounced for Nasdaq issues, all exchanges have experienced a statistically significant increase in discounts. Except for utility offerings, the last column of Table 2 reports that for all the categories there has been a statistically significant increase in average discounts between the earlier and later subperiods. Thus, the changing composition hypothesis does not completely explain why SEO discounts are now higher than they once were.

B. Short-Selling Hypothesis

The short-selling hypothesis for SEO discounts was developed by Barclay and Litzenberger (1988). They document strategic selling by traders starting on the announcement of new equity issues. Using intraday price data during 1981-1983, they report an abnormally high trading volume and an average -1.3% price drop in the fifteen minutes following an announcement. After the issue day, there is a significant price recovery of 1.5% , measured as the cumulative excess return at the end of the twentieth trading day.

This price pattern supports the argument that investors depress stock prices in a manipulative way to affect the offer price of new shares. Short-selling might reduce the informativeness of secondary market prices before the offering. Hence, a firm is forced to offer a high discount in order to market its new shares (Gerard and Nanda (1993)).³

We assume an investment bank typically uses the prior closing price as a reference in setting the offer price.⁴ If manipulative pressures on prices produce the SEO discount, we also expect the prior closing price, P_{T-1} , not to be fully informative. That is, the externalities produced by short-selling affect the information content of prices before the offering. This inefficiency is expected to be eliminated after the offering, when the closing prices of the issue day, P_T , and the day after, P_{T+1} , more accurately incorporate all available information. The short-selling explanation predicts that the distribution of P_{T-1} will be different from the distributions of P_T and P_{T+1} .

Contrary to this prediction, we find the distributions of P_{T-1} , P_T , and P_{T+1} to be quite similar, including in each subperiod. Using the two-sample Wilcoxon rank-sum test, we cannot reject the null hypothesis of equality between the distributions of P_{T-1} and P_T in the three subperiods (p -value = 0.95 for 1986-1989 prices, p -value = 0.79 for 1990-1995 prices, and p -value = 0.76 for 1996-1999 prices). The distributions of P_{T-1} and P_{T+1} are also found to be from populations with the same distribution. We therefore conclude that the short-selling explanation cannot account for the documented SEO patterns.

³ In 1988, the Securities and Exchange Commission (SEC) adopted Rule 10b-21, which prohibits the use of shares purchased at the offer price to cover short positions established after the filing of the registration statement. Safieddine and Wilhelm (1996) investigate the rationale and the consequences of the SEC mandate on short-run returns around the SEO date. Kadlec, Loderer, and Sheehan (1997) verify that the adoption of Rule 10b-21 has reduced short-selling.

⁴ We use the prior closing price as a price reference for the offer price setting instead of the last sale price reported in the prospectus. This is because it is the latest price reference at the time of the offering (i.e., easily available on the issue day for every issuing firm).

C. Leaving a Good Taste Hypothesis

The hypothesis characterized as “leaving a good taste in investors’ mouths” potentially provides some justification into why a company would allow its shares to be discounted in a seasoned offering. Issuers are willing to leave some money on the table for investors at earlier offerings, because firms want to come back later for additional funding (Jegadeesh, Weinstein, and Welch (1993)). The assumption is that investors remember whether they got a good deal or a poor one at the time of an earlier stock offering. Without the benefit of a past good experience, more marketing effort is required for an SEO, which is manifested in a higher required discount.

Table 3 tests this hypothesis by reporting the average SEO discount by subperiod and by whether the firm issued seasoned equity in the prior year. Because at the time of the offering, investors would know if the firm had issued equity in the prior year, this analysis does not entail a look-ahead bias.

In the later two subperiods, firms issuing equity within one year of a prior offering report significantly lower average SEO discounts than firms with no recent offerings. For example, during 1996-1999, firms report average SEO discounts of 3.9% if no offerings had occurred in the prior year compared to 2.2% if the firm had a recent equity offering. This provides some evidence consistent with the leaving a good taste hypothesis. Investors seem to require smaller discounts for more frequent issuers. One caveat in this analysis is that it does not control for other factors. More frequent issuers are generally larger than firms that seldom issue equity. In our regression model, we examine whether this finding remains robust after controlling for other factors.

V. Evidence of Increased Investment Banking Power

Another explanation of the SEO discount may relate to mechanisms in offer price setting by the underwriting industry. An analysis of trends in pricing patterns may shed light on the power of the investment banking industry or on changes in issuers' desire for favorable analyst coverage. This section examines the setting of offer prices by analyzing the distributions of dollar fractions.

A. Clustering of Dollar Fractions

Figure 2 shows distributions of the previous closing price and the SEO offer price by dollar fractions in the three subperiods. The dollar fractions are classified into five groups: 1) zero, 2) even-eighths, 3) odd-eighths, 4) odd-sixteenths, and 5) other. (The sample period ended before the establishment of decimal pricing.)

Panel A shows the fraction distributions of closing prices on the day before the SEO. Like Harris (1991), there is a clear pecking order among fractions. Overall, even-eighth fractions (\$0.25, \$0.50, and \$0.75) and odd-eighths (\$0.125, \$0.375, \$0.625, and \$0.875) are the most frequently used, followed by zero and then odd-sixteenths (\$0.0625, \$0.1875, \$0.3125, \$0.4375, \$0.5625, \$0.6875, \$0.8125, and \$0.9375). The latter are inevitably underestimated because the sixteenth quotations were introduced only in 1997.

Much as Christie and Schultz (1994) find for Nasdaq securities, we see a clustered distribution of fractions at even-eighths, particularly in the first two periods. More than 47% of previous closing prices are quoted in quarters (about 68%, including zero). The introduction of sixteenth quotations and the attention resulting from charges of collusion among market makers make the distributions more evenly dispersed across fractions in

the 1996-1999 subperiod. Overall, whole-number closing prices are less frequent in the later subperiods.

Offering prices, however, are increasingly set at integers over time. Panel B of Figure 2 indicates that integer offer prices rise from 29% of the 1986-1989 sample to 44% during 1996-1999. This increase in clustering at integers occurs simultaneously with declining use of even-eighths and odd-eighths. Despite a finer partitioning of market prices, bankers increasingly use a coarser partitioning in the setting of offer prices.

Starting January 29, 2001, NYSE-listed stocks have been priced using decimals rather than fractions. Since April 9, 2001, all Nasdaq-listed firms have been priced in decimals. We predict that the decimalization trend in U.S. stock markets should not impact the clustering tendency of offer prices. The trend toward more clustering of SEO offer prices has occurred despite increased precision in the pricing of stocks. In unreported results, we find that the frequency of clustering in SEO offer prices through the end of December 2001 is similar to the observed patterns during the 1996-1999 subperiod.

Does clustering relate to higher indirect costs for issuing firms? To more fully understand the change in the setting of offer prices, Figure 3 shows clustering patterns by subperiods for the subsample of 1,765 SEOs with integer offer prices. The number of SEOs set at whole dollar offer prices varies from 245 in the first subperiod to 782 in the third subperiod. For each integer-priced SEO, the offer price relative to the prior closing market stock price is divided into five categories: other higher integers, next-higher integer, same integer, next-lower integer, and other lower integers. To give an example,

if an SEO has a prior day closing price of \$14 $\frac{3}{8}$, the offer prices are categorized as follows: \$15 as next-higher integer, \$14 as next-lower integer, and \$13 as other lower integers. If both the prior closing price and the offer price are integers and coincide (for example, both are \$14), the offer price would be recorded as the same integer (i.e., no SEO discount would be observed).

Figure 3 reveals a sharp increase in the proportion of integer offer prices that are selected by the investment banker at the next lower integer or other lower integers. In 1996-1999, more than 80% of whole dollar offer prices were priced at the next or lower integers compared to 46% during the 1986-1989 period. The proportion of issues with an offer price selected at other lower integers has steadily risen over the sample period. At the same time, same-integer (no discount) SEOs have become less frequent.

B. Clustering of SEO and IPO Prices

The rise in integer offer prices set at least one dollar below the prior closing price provides some insight into the relationship of clustering at integers and the increase in average SEO discounts. Table 4 analyzes the effect of offer price clustering in both SEOs and IPOs by year. It shows that clustering of both SEO and IPO prices is costly for issuers.

First, SEOs priced at integer offer prices are on average discounted more than issues priced at fractions. The average discount is 3.9% for SEOs priced at whole dollars compared to a 2.4% discount for issues priced at fractions of dollars. Since 1990, the SEO discount associated with setting the offer price at integers has increased more than the discount associated with setting the price at fractional prices. The difference between means is statistically significant, particularly in the second half of the 1990s.

Second, an analysis of offer prices of 5,093 U.S. operating company IPOs during 1986-1999 indicates that here too the use of integer offer prices has increased over time. About 93% of IPOs are priced at integers in 1999, an increase from 56% in 1986. Pricing IPOs at integers rather than at fractions is associated with higher initial returns (i.e., the indirect cost of going public). Integer IPO prices yield an average first-day return of 21.4%, compared to 8.9% for fractional offer prices. This difference is generally significant throughout the period.

C. Determinants of Underwriter SEO Market Share

The offer price setting practice that investment bankers follow increasingly leaves more money on the table. What allows underwriters to round down offer prices more often in the 1990s than in the 1980s? Alternatively, why do issuers allow bankers to price offerings down, and thus leave more money on the table for investors?

We hypothesize that investment bankers use analyst coverage to assist in extracting rents from issuers via clustering of offer price and that analyst coverage is the source of investment banker power. Obviously, investment banks compete with one another for underwriting new shares. Annual different lead underwriter numbers range from 34 in 1988, the year after the market crash, to 86 in both 1993 and 1996. While in terms of the Herfindahl-Hirschman index, a measure of market concentration, the SEO underwriting industry is generally not concentrated over the time period, there is some evidence of industry concentration by bankers having a highly regarded analyst group. As reported earlier, underwriters with top-tier analysts raised about 72% in an average year of the total proceeds during 1986-1999, and underwrote half of the issues overall.

Analyst research is a crucial marketing tool that generates underwriting business. Lin and McNichols (1998) examine lead and co-manager analyst earning forecasts and recommendations around seasoned equity offerings during the 1989-1994 period. Recommendations issued prior to equity offerings by analysts affiliated with lead underwriters are significantly more favorable than those released by unaffiliated analysts. Only 0.7% of lead underwriter recommendations are “sell” or “strong sell,” compared to 79.8% that are “buy” or “strong buy” recommendations. Affiliated analysts continue to express more favorable views than unaffiliated ones in the three years following the offering.

Co-manager analysts issue similarly favorable reports. This is consistent with Chen and Ritter (2000), who argue that growth in the number of co-managers is motivated by a desire for additional analyst coverage at no incremental direct expense for issuers. Bradley, Jordan, and Ritter (2002), in examination of a sample of IPOs during 1996-2000, report that the more analysts initiating coverage, the more positive the abnormal returns for the issuer at the end of the quiet period.

Issuing firms have incentives to select as underwriter the investment bank whose analysts are both favorable and influential. Dunbar (2000) reports that market share changes of established investment banks (the book manager) are correlated with the IPO first-day return, abnormal compensation, and analyst reputation. Krigman, Shaw, and Womack (2001) indicate that the perceived quality of the affiliated analyst team is a key factor affecting underwriter selection. Consistent with their survey results, we find that analyst quality significantly affects the subsequent SEO market share of underwriters.

Table 5 shows an ordinary least squares regression model for the market share of SEO underwriters (the book manager). The dependent variable, UNDERWRITER MARKET SHARE_{j,T}, is computed as the ratio of proceeds raised by underwriter *j* divided by total market SEO proceeds in year *T*, expressed as a percentage. Of the 590 yearly underwriter regression observations, the highest calendar-year market share value belonged to Drexel Burnham Lambert, which in the low volume year of 1988 underwrote 21.9% of the proceeds-weighted seasoned offerings.

The independent variables are prior calendar-year market share, UNDERWRITER MARKET SHARE_{j,T-1}; the average percentage SEO discount applied by each underwriter *j* in the prior year, SEO DISCOUNT_{j,T-1}; the average percentage spread paid to each underwriter *j* in the prior year, GROSS SPREAD_{j,T-1}; and two dummy variables for underwriter reputation and analyst quality. UNDERWRITER REPUTATION is equal to one if the underwriter has a reputation rank equal to or greater than 8 (on the 0-9 Carter-Manaster scale), as determined in Loughran and Ritter (2002).⁵ TOP-TIER ANALYST_{j,T-1} assumes a value of one when the underwriter has an analyst group among the top-ten bankers selected by *Institutional Investor* each October of year. Several observations are removed in this process as some bankers did not underwrite any issues in the prior calendar year.

Coefficients and White's heteroskedasticity-adjusted t-statistics of the first regression show that prior market share, underwriter reputation, and analyst quality have a significant effect on subsequent underwriter market share. In particular, a highly regarded analyst team increases the underwriter market share by 1.5%, adjusting for other

⁵ Loughran and Ritter (2002) revise the Carter and Manaster (1990) reputation ranks as determined by Carter, Dark, and Singh (1998) for 1985-1991, and update the underwriter rankings for 1992-2000.

factors. Interestingly, average prior discount and gross spread of an underwriter do not reliably affect its subsequent underwriting business.

To capture the effect of analyst quality across time, $TOP-TIER ANALYST_{j,T-1}$ is multiplied by the three subperiod dummies, YR8689, YR9095, and YR9699. Controlling for other factors, the Table 5, column 2, coefficients of the resulting interactive variables show that employment of a highly regarded analyst team significantly affects underwriter market share in only the later two subperiods. This is consistent with the analyst coverage being more important as time progresses.

VI. Multiple Regression Tests

Our analysis so far finds some support for three hypotheses as possible explanations of the increase in SEO discounts from 1986 to 1999: changing issuer composition, leaving a good taste, and investment banking power. To examine the strength of the investment banking power hypothesis while simultaneously controlling for other factors, we develop a regression model whose dependent variable is the percentage SEO discount for the sample of 4,814 SEOs during 1986 to 1999:

$$SEO DISCOUNT_i = \beta_0 + \beta_1 NASDAQ Dummy_i + \beta_2 PROCEEDS/MKT_i + \beta_3 UTILITY Dummy_i + \beta_4 TECH Dummy_i + \beta_5 LNPRICE_i + \beta_6 GROSS SPREAD_i + \beta_7 PRIOR SEO Dummy_i + \beta_8 UNDERWRITER REPUTATION Dummy_i + \beta_9 TOP-TIER ANALYST_{T-1} Dummy_i + \beta_{10} CLUSTER Dummy_i + \epsilon_i$$

The first four regressors relate to issuer uncertainty proxies. The first is a dummy variable, NASDAQ, which is equal to one if the issuing firm is listed on Nasdaq. As a measure of issue liquidity uncertainty, we include the PROCEEDS/MKT variable, which is defined as the ratio of proceeds to issuer market value immediately prior to the SEO. UTILITY and TECH are two dummies related to the issuer's industry.

The model also includes three control variables. LNPRICE is the natural logarithm of the closing price on the day before the issue. This control variable captures the expected negative relationship between stock price level and SEO discount. GROSS SPREAD, expressed as a percentage of the issue proceeds, is the total direct fee paid to the investment banker for underwriting the offering. UNDERWRITER REPUTATION is a dummy equal to one if the underwriter reports a Carter-Manaster reputation rank equal to or greater than 8 (on a 0-9 scale), as determined by Loughran and Ritter (2002). PRIOR SEO is a dummy variable equal to one if the firm issued seasoned equity in the prior year, and otherwise equal to zero. This variable relates to the leaving a good taste hypothesis.

Two dummy variables, TOP-TIER ANALYST_{T-1} and CLUSTER, relate to the investment banker power hypothesis. The first dummy variable is equal to one if, in the prior year, *Institutional Investor* ranks the underwriter's analyst group among the top ten. The CLUSTER variable assumes a value of one if the offer price is set at a whole dollar value, or of zero if the offer price is set in dollar fractions.

Table 6 reports coefficients and White's heteroskedasticity-adjusted t-statistics of the ordinary least squares model for the SEO discount. The first eight regressions are generally univariate. The signs of the uncertainty proxies are as expected. The Nasdaq listing dummy variable has a positive coefficient, consistent with the findings of Altinkiliç and Hansen (2002) and Corwin (2002). The positive coefficient for the PROCEEDS/MKT variable implies that larger proceeds relative to market values produce more liquidity uncertainty, and hence higher SEO discounts. The coefficients on the industry dummies are opposite in sign: UTILITY is negative, while TECH is positive. As shown by the negative coefficient on LNPRICE, the lower the prior closing price, the

higher the percentage discount. The positive coefficient on GROSS SPREAD implies that higher spread offerings are associated with greater discounts. The negative coefficient on the PRIOR SEO dummy indicates that seasoned offerings following recent offerings have significantly lower discounts.

The coefficients on the UNDERWRITER REPUTATION and TOP-TIER ANALYST_{T-1} dummies are both significantly negative in the univariate regressions. As we have noted, underwriters with a highly regarded analyst team are more likely than other underwriters to underwrite the offerings of large-capitalization firms listed on the NYSE. These offerings have less uncertainty, and hence report lower average discounts than riskier seasoned offerings. Higher-reputation underwriters and highly ranked analyst bankers are positively correlated (correlation of 0.52). In regression 8, the dummy variable on the setting of an integer offer price, CLUSTER, is positive and highly significant. For example, an offer price set at an integer value adds 153 basis points to the SEO discount.

The last column of Table 6 reports multiple regression results. Many of the coefficients are substantially smaller in the multiple regression than in the univariate regressions. For example, the coefficient on the Nasdaq dummy drops from 188 basis points in the univariate regression to 62 basis points in the multiple regression. Seven of the independent variables are significant predictors of the SEO discount at conventional levels. The coefficient on PRIOR SEO is not statistically significant after controlling for other variables, so the leaving a good taste hypothesis cannot be a complete explanation of the SEO discount patterns.

The statistically significant positive coefficient on the analyst quality dummy, holding other things constant, is consistent with the investment banking power

hypothesis. Use of an underwriter with a highly regarded analyst team adds 47 basis points to the SEO discount, controlling for other factors. Note that the sign on the TOP-TIER ANALYST_{T-1} dummy variable changes from negative in the univariate regression to positive in the multiple variable regression. Thus, after adjusting for several uncertainty proxies, issues underwritten by investment bankers with highly regarded analyst teams reveal significantly higher SEO discounts than issues underwritten by those with less highly regarded analysts.

Rounding down to integer prices for SEOs may make the distribution of shares easier for underwriters, but it is costly for issuers. We posit that issuers have become more willing to accept rounded-down prices because of the increasing importance of analyst coverage in sustaining stock prices. If our prediction that analyst coverage has become more important is correct, we should see an increase in the coefficient values for the TOP-TIER ANALYST_{T-1} dummy variable over time.

Table 7 reports the regression results by the three subperiods. In the first subperiod, the only significant variable is the Nasdaq dummy. There is a low R-squared value (0.02) in this period. In the second subperiod (1990-1995), six of the variables are significant, and the R-squared value increases to 0.17; in the last subperiod the R-squared value is 0.16. The TOP-TIER ANALYST_{T-1} dummy coefficient grows in significance from 9 to 59 to 85 basis points over the three periods. Only in the later two periods is the effect of the analyst dummy statistically significant at conventional levels. The CLUSTER dummy also shows increased in statistical significance over the time period.⁶

⁶ When the UNDERWRITER REPUTATION variable is not included in the multiple regressions, the coefficients (White's heteroskedasticity-adjusted t-statistics) on TOP-TIER ANALYST_{T-1} are respectively 0.12 (0.45), 0.50 (2.26), and 0.66 (2.40) for the three subperiods.

The most economically and statistically significant variable in Table 6 and 7 regressions is the CLUSTER dummy which takes a value of one whenever the offer price is set at whole dollars. We know from Figure 3 that offer prices are increasingly set at other lower integers values relative to the prior closing price. To more fully understand the characteristics of firms with offer prices set at least one dollar below the prior closing price, we run a logit regression whose dependent variable is OTHER LOWER INTEGER dummy. This binary variable takes on the value of one if the SEO offer price is set at other lower integers relative to the prior closing price, and zero otherwise. In the first regression shown in Table 8, we use nine independent variables, PROCEEDS/MKT, LNPRICE, GROSS SPREAD, and the dummy variables NASDAQ, UTILITY, TECH, PRIOR SEO, UNDERWRITER REPUTATION, and TOP-TIER ANALYST_{T-1}. To gauge the changing probabilities of the dependent variable, the second regression adds two time period dummy variables.

The first regression of Table 8 reports that all the variables, except for PRIOR SEO and UNDERWRITER REPUTATION, are significantly linked to the probability that the investment banker sets the offer price to other lower integers. SEOs with characteristics as follows are positively related to the dependent variable: Nasdaq, technology industry, relative proceeds, stock price, gross spread, and bankers with highly regarded analysts. Utility offerings are negatively related to the setting of other lower integer offer prices. The second regression reports that, over time, there is an increasing likelihood that offer prices are set at other lower integer values, consistent with the evidence provided in Figure 3. In both regressions, the TOP-TIER ANALYST_{T-1} dummy variable is statistically significant at conventional levels. Hence, there is a greater probability that an offer price

will be set at lower other integers when the underwriter has a highly regarded analyst team, which is consistent with the investment banker power hypothesis.

VII. Conclusion

Our analysis finds offerings of seasoned shares over 1986-1999 priced at an average discount of 3.0% relative to the closing market price on the day before an issue. Discounts have steadily increased over time. Smith (1977) reports an average discount of 0.5% during 1971-1975 compared to our average discount of 4.0% in 1999. This is not a trivial concern for issuers. More money left on the table for an investment banker's clients is less money that the issuer raises from the seasoned offering. The increase in discounts has not been offset by a decline in gross spreads paid by issuers to investment bankers.

Our investigation of the increase in SEO discounts finds support for the changing composition and the investment banker power hypotheses. During the 1990s, Nasdaq-listed and technology issues increasingly represented the seasoned equity offering market, a change in sample composition that partly explains the discount pattern. Increased clustering at integer offer prices and an increased avoidance of odd-eighths in the setting of SEO prices provide other insights for the rise in reported discounts.

The various hypotheses advanced for clustering in closing or transaction prices are not consistent with the increase of clustering that we see in SEO offer prices. Researchers have interpreted integer offer prices variously as coordination on focal points, as a way to take advantage of the limited memory of investors, or as a way to

demonstrate the information function of prices. We do not see these arguments as entirely persuasive.⁷

Clustering SEO prices at integers is an easy convention for underwriters. Other conventions in the underwriting industry include a bunching of gross spreads on IPOs at 7% (Chen and Ritter (2000)), 15% overallotment options (Dunbar (1997)), and 180-day lock-up provisions (Field and Hanka (2001)).

The increase in discounts over time is consistent with issuing firms not trying to minimize the SEO discount. Instead, managers of issuing firms are focusing on selecting an underwriter who will aggressively talk up their stock. Although more money is being left on the table in the seasoned offerings than in the past, firms are accepting the increased discount due to their belief that by having an influential analyst transmit positive reports, their stock will see elevated valuation levels. Interestingly, recent evidence indicates that analysts sometimes did not personally believe their own bullish stock recommendations.⁸

In periods when many issuers were focused on analyst coverage, investment bankers were able to leave more money on the table for their favored clients. Loughran and Ritter (2002) make a similar argument to explain the growing underpricing of IPOs over time. Consistent with an increased emphasis on analyst coverage, three patterns are reported. First, in regressions with the SEO discount as the dependent variable, we find

⁷ Brenner and Brenner (1982) explain the use of odd prices (e.g., \$2.99) in non-negotiated markets by the biological constraint of customers' capacity for storing information. Kahn, Pennacchi, and Sopranzetti (1999) have used a similar argument to explain the clustering of bank deposit rates. Grossman, Miller, Cone, Fischel, and Ross (1997) provide a competitive theory of clustering that emphasizes the information and transaction roles of quotations in the degree of clustering. This argument generally applies better to quotes than to offer prices.

⁸ For example, the Securities and Exchange Commission recently filed a complaint against a former Roberson Stephens Inc. analyst for allegedly issuing false and misleading recommendations that did not accurately reflect his own personal beliefs concerning firm valuation.

that the coefficient on the top-tier analyst dummy variable increases over time from an insignificant 0.09% to a statistically significant value of 0.85% after controlling for other factors. Second, prior underwriter market share, underwriter reputation, and analyst quality are the three variables that explain most of a banker's subsequent ability to generate underwriting business in seasoned offerings. Finally, the probability of an SEO being priced at lower other integers relative to the prior closing price is positively and significantly related to a highly regarded analyst team at the underwriter.

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Table 1**Number, Discount, and Underwriter Gross Spread of SEOs, 1986-1999**

Issue Year	Number of SEOs	Average Discount	Median Discount	Average Gross Spread	Average Money Left on the Table (\$ millions)	Average Total Fees (\$ millions)	Total Market Share of Underwriters with a Top-Tier Analyst Team
1986	359	0.8%	0.0%	5.0%	0.5	2.6	69.8%
1987	214	1.3%	0.0%	5.0%	0.7	2.8	71.1%
1988	92	1.4%	1.0%	5.3%	0.9	2.9	66.5%
1989	168	1.2%	0.8%	5.4%	0.4	2.4	63.6%
1990	131	1.8%	0.9%	5.1%	0.8	2.9	73.6%
1991	386	2.9%	1.7%	5.1%	1.5	3.2	71.4%
1992	380	3.0%	1.7%	5.1%	1.5	3.5	81.3%
1993	521	3.5%	1.8%	5.2%	1.9	3.4	71.4%
1994	298	3.2%	2.1%	5.1%	1.7	3.3	66.9%
1995	470	3.2%	2.2%	5.1%	1.8	3.9	70.4%
1996	568	4.3%	2.5%	5.2%	2.5	4.0	62.9%
1997	495	3.3%	2.1%	5.0%	2.1	4.2	61.7%
1998	357	2.9%	2.0%	4.9%	3.0	5.6	71.1%
1999	375	4.0%	2.6%	4.8%	7.1	8.2	84.7%
1986-1989 (a)	833	1.1%	0.0%	5.1%	0.6	2.7	68.6%
1990-1995 (b)	2,186	3.1%	1.8%	5.1%	1.6	3.4	72.4%
1996-1999 (c)	1,795	3.7%	2.3%	5.0%	3.5	5.3	72.2%
<i>p</i> -value for Difference (b) – (a)	-	0.0000	0.0000	0.5725	0.0000	0.0000	-
<i>p</i> -value for Difference (c) – (b)	-	0.0007	0.0001	0.0621	0.0000	0.0000	-
Total	4,814	3.0%	1.6%	5.1%	2.1	4.0	71.9%

The sample consists of seasoned equity offerings (SEOs). Closed-end investment funds, REITs, unit investment trusts, beneficial interests, limited partnerships, ADRs, rights issues, and unit offerings are excluded from the sample. The SEO discount is defined as the percent price change between the prior closing price and the offer price, relative to the offer price. The gross spread is the total fee of underwriters, expressed as a percentage of the domestic proceeds. The money left on the table is the dollar discount multiplied by the number of offered shares. Money left on the table and total fees are both expressed in millions of constant 1999 dollars using the CPI. The last column reports the total market share of SEO underwriters with an analyst group among the top ten as selected by *Institutional Investor* in a year. The yearly market share is determined as the domestic proceeds of the issues conducted by underwriters divided by the total market SEO proceeds. *p*-values for difference within subsample means (medians) are from standard *t*-tests (Wilcoxon rank-sum tests).

Table 2

Average SEO Discount Categorized by Proxies of Uncertainty

Proxies	Overall		1986-1989		1990-1995		1996-1999		<i>p</i> -value for Difference (c) - (b)	<i>p</i> -value for Difference (d) - (c)	<i>p</i> -value for Difference (d) - (b)
	Discount (a)	N	Discount (b)	N	Discount (c)	N	Discount (d)	N			
Listed Exchange											
Nasdaq SEOs	3.7%	2,858	1.0%	426	4.0%	1,252	4.5%	1,180	0.0000	0.0313	0.0000
NYSE/Amex SEOs	1.9%	1,956	1.2%	407	2.0%	934	2.2%	615	0.0018	0.3403	0.0001
Relative Issue Proceeds											
High (Proceeds/Mkt)	3.8%	2,246	1.4%	333	4.0%	1,031	4.5%	882	0.0000	0.0464	0.0000
Low (Proceeds/Mkt)	2.2%	2,246	0.8%	363	2.1%	980	2.9%	903	0.0000	0.0003	0.0000
Utility Industry											
Utility Issues	1.2%	352	1.0%	90	1.0%	190	2.1%	72	0.9161	0.0120	0.1053
Non-Utility Issues	3.1%	4,462	1.1%	743	3.3%	1,996	3.7%	1,723	0.0000	0.0133	0.0000
Technology Industry											
Tech Issues	3.7%	905	0.7%	110	3.5%	374	4.8%	421	0.0000	0.0022	0.0000
Non-Tech Issues	2.8%	3,909	1.1%	723	3.0%	1,812	3.4%	1,374	0.0000	0.0770	0.0000

The sample consists of operating seasoned equity offerings during the 1986 to 1999 time period. The SEO discount is defined as the percent price change between the prior closing price and the offer price, relative to the offer price. Proceeds/Mkt is the ratio of the domestic proceeds to the market value. Market value is defined as the number of shares outstanding before the issue multiplied by the prior closing price. Proceeds/Mkt is high when the ratio is equal to or greater than the median value of the distribution (0.2). Utility issues are offerings whose firm has a two-digit SIC industry code of 49. Tech issues are defined by using the SIC codes in Loughran and Ritter (2002). *p*-values for difference within subsample means are from standard *t*-tests.

Table 3**Average SEO Discount Categorized by Subperiods and Previous Issue of Seasoned Equity**

	1986-1989	1990-1995	1996-1999
An SEO Occurred in the Prior Year	0.9% (N = 56)	1.8% (N = 216)	2.2% (N = 217)
No SEO in the Prior Year	1.1% (N = 777)	3.3% (N = 1,970)	3.9% (N = 1,578)
<i>p</i> -value for Difference	0.7672	0.0000	0.0000
Total	1.1% (N = 833)	3.1% (N = 2,186)	3.7% (N = 1,795)

The sample is categorized by whether a firm had conducted an SEO in the prior year. The SEO discount is defined as the percent price change between the prior closing price and the offer price, relative to the offer price. The number of observations is in parentheses. The *p*-values for difference within subsample means are from standard *t*-tests.

Table 4

Clustering of Offer Prices on SEOs and IPOs by Issue Year

Issue Year	Average SEO Discount		<i>p</i> -value for Difference	Average Initial Return on IPOs		<i>p</i> -value for Difference
	Whole Dollars	Fractions of Dollars		Whole Dollars	Fractions of Dollars	
1986	0.9% (N = 115)	0.7% (N = 244)	0.5821	7.8% (N = 257)	5.3% (N = 202)	0.0915
1987	1.2% (N = 59)	1.3% (N = 155)	0.9057	7.2% (N = 207)	4.8% (N = 122)	0.0835
1988	1.8% (N = 27)	1.2% (N = 65)	0.3702	6.1% (N = 75)	5.1% (N = 55)	0.5760
1989	1.0% (N = 44)	1.3% (N = 124)	0.7201	8.9% (N = 74)	7.2% (N = 41)	0.4253
1990	2.2% (N = 32)	1.6% (N = 99)	0.3337	11.4% (N = 78)	9.8% (N = 39)	0.5798
1991	3.6% (N = 133)	2.6% (N = 253)	0.0654	13.7% (N = 198)	10.1% (N = 95)	0.0686
1992	3.7% (N = 129)	2.7% (N = 251)	0.0609	11.4% (N = 300)	9.9% (N = 104)	0.4727
1993	4.9% (N = 176)	2.8% (N = 345)	0.0000	14.2% (N = 388)	8.5% (N = 122)	0.0032
1994	4.0% (N = 98)	2.9% (N = 200)	0.0646	10.9% (N = 295)	6.8% (N = 114)	0.0157
1995	4.0% (N = 170)	2.8% (N = 300)	0.0170	23.5% (N = 347)	14.3% (N = 103)	0.0006
1996	5.7% (N = 237)	3.3% (N = 331)	0.0000	17.6% (N = 523)	12.1% (N = 131)	0.0134
1997	4.0% (N = 214)	2.8% (N = 281)	0.0091	14.3% (N = 358)	12.2% (N = 100)	0.3276
1998	3.9% (N = 134)	2.3% (N = 223)	0.0002	22.7% (N = 238)	13.3% (N = 61)	0.1826
1999	5.1% (N = 197)	2.7% (N = 178)	0.0001	75.0% (N = 434)	6.9% (N = 32)	0.0001
Total	3.9% (N = 1,765)	2.4% (N = 3,049)	0.0000	21.4% (N = 3,772)	8.9% (N = 1,321)	0.0000

The SEO discount is defined as the percent price change between the prior closing price and the offer price, relative to the offer price. IPO initial return of 5,093 U.S. operating company IPOs during 1986-1999 is the price change from the offer price to the closing price at the end of the first day. The number of SEOs or IPOs in each cell is in parentheses. *p*-values for difference within subsample means are from standard *t*-tests.

Table 5

Ordinary Least Squares Model of the Yearly SEO Underwriter Market Share

	1	2
Constant	0.67 (1.24)	0.64 (1.21)
UNDERWRITER MARKET SHARE _{j,T-1}	0.66 (10.34)	0.66 (10.66)
SEO DISCOUNT _{j,T-1}	0.01 (0.55)	0.00 (0.23)
GROSS SPREAD _{j,T-1}	-0.10 (-1.13)	-0.09 (-1.08)
UNDERWRITER REPUTATION Dummy _j	0.66 (4.16)	0.67 (4.17)
TOP-TIER ANALYST _{j,T-1} Dummy	1.53 (3.53)	-
TOP-TIER ANALYST _{j,T-1} Dummy * YR8689 Dummy	-	1.10 (1.38)
TOP-TIER ANALYST _{j,T-1} Dummy * YR9095 Dummy	-	1.53 (2.60)
TOP-TIER ANALYST _{j,T-1} Dummy * YR9699 Dummy	-	1.93 (3.38)
R-Squared	0.71	0.71
Number of Observations	590	590

The dependent variable, UNDERWRITER MARKET SHARE_{j,T}, is the ratio of domestic proceeds raised by underwriter *j* divided by the total market SEO proceeds in year *T* expressed as a percentage. UNDERWRITER MARKET SHARE_{j,T-1} is the underwriter (book manager) market share in the prior year, expressed as a percentage. SEO DISCOUNT_{j,T-1} is the average discount applied by each underwriter *j* in the prior year. GROSS SPREAD_{j,T-1} is the average fee paid to underwriter *j* in the prior year, expressed as a percentage of the issue proceeds. UNDERWRITER MARKET SHARE_{j,T-1}, SEO DISCOUNT_{j,T-1}, and GROSS SPREAD_{j,T-1} are missing for underwriters that conducted no issues in the prior calendar year. UNDERWRITER REPUTATION is a dummy equal to one if the lead manager reports a reputation rank equal to or greater than 8 (on the 0 to 9 Carter-Manaster scale), as determined in Loughran and Ritter (2002). TOP-TIER ANALYST_{j,T-1} is a dummy equal to one if SEO underwriter *j* has an analyst group ranked among the top-ten groups as selected by *Institutional Investor* each October of the prior calendar year. YR8689 is a dummy equal to one if the issue occurs between 1986 and 1989. YR9095 is a dummy equal to one if the issue occurs between 1990 and 1995. YR9699 is a dummy equal to one if the issue occurs between 1996 and 1999. White's heteroskedasticity-adjusted t-statistics are in parentheses.

$$\begin{aligned}
 \text{UNDERWRITER MARKET SHARE}_{j,T} = & \beta_0 + \beta_1 \text{UNDERWRITER MARKET SHARE}_{j,T-1} + \beta_2 \text{SEO} \\
 & \text{DISCOUNT}_{j,T-1} + \beta_3 \text{GROSS SPREAD}_{j,T-1} + \beta_4 \text{UNDERWRITER REPUTATION Dummy}_j + \beta_5 \text{TOP-TIER} \\
 & \text{ANALYST}_{j,T-1} \text{ Dummy} * \text{YR8689 Dummy} + \beta_6 \text{TOP-TIER ANALYST}_{j,T-1} \text{ Dummy} * \text{YR9095 Dummy} + \\
 & \beta_7 \text{TOP-TIER ANALYST}_{j,T-1} \text{ Dummy} * \text{YR9699 Dummy} + \varepsilon_j
 \end{aligned}$$

Table 6

Ordinary Least Squares Model of the SEO Discount

	1	2	3	4	5	6	7	8	9
Constant	1.85 (19.86)	1.78 (13.60)	2.94 (34.27)	0.88 (0.92)	3.10 (38.58)	4.42 (24.21)	3.60 (32.00)	2.41 (27.35)	2.24 (2.17)
NASDAQ Dummy	1.88 (13.43)								0.62 (4.04)
PROCEEDS/MKT		6.08 (9.78)							0.95 (1.37)
UTILITY Dummy			-1.70 (-8.34)						-0.41 (-1.72)
TECH Dummy			0.80 (3.98)						0.69 (3.32)
LNPRICE				-0.76 (-3.65)					-1.05 (-5.04)
GROSS SPREAD				0.88 (10.41)					0.58 (5.34)
PRIOR SEO Dummy					-1.24 (-7.28)				-0.29 (-1.63)
UNDERWRITER REPUTATION Dummy						-1.91 (-9.66)			-0.52 (-2.40)
TOP-TIER ANALYST _{T-1} Dummy							-1.26 (-8.60)		0.47 (2.74)
CLUSTER Dummy								1.53 (9.82)	1.50 (9.36)
R-Squared	0.03	0.03	0.01	0.09	0.01	0.03	0.02	0.02	0.11
Number of Observations	4,814	4,492	4,814	4,730	4,814	4,814	4,814	4,814	4,417

The dependent variable, SEO DISCOUNT, is computed as the percent change from the offer price to the prior closing price, $\left[\left(\frac{P_{T-1} - OP}{OP} \right) 100\% \right]$. The average discount is 3%. NASDAQ is a dummy

variable equal to one if the issuing firm is listed on Nasdaq; it is zero otherwise. PROCEEDS/MKT is the ratio between the issue proceeds and the issuer market value at the time of the SEO. UTILITY and TECH are dummies equal to one if the issuer operates, respectively, in the two-digit SIC industry of 49 and in SIC codes specified in Loughran and Ritter (2002). LNPRICE is the natural logarithm of the closing price of the day before the issue in dollars. GROSS SPREAD, expressed as a percentage of the issue proceeds, is the total fee of the underwriter. PRIOR SEO is a dummy equal to one if the firm issued seasoned equity in the prior year. UNDERWRITER REPUTATION is a dummy equal to one if the lead manager has a reputation rank equal to or greater than 8, as determined in Loughran and Ritter (2002). TOP-TIER ANALYST_{T-1} is a dummy equal to one if the SEO underwriter has an analyst group ranked among the top-ten groups as selected by *Institutional Investor* each October of the prior calendar year. CLUSTER is a dummy variable equal to one if the offer price is set at integers, or zero if the offer price is set in dollar fractions. PROCEEDS/MKT and LNPRICE are winsorized at the 1% and 99% levels. White's heteroskedasticity-adjusted t-statistics are in parentheses.

$$SEO\ DISCOUNT_i = \beta_0 + \beta_1\ NASDAQ\ Dummy_i + \beta_2\ PROCEEDS/MKT_i + \beta_3\ UTILITY\ Dummy_i + \beta_4\ TECH\ Dummy_i + \beta_5\ LNPRICE_i + \beta_6\ GROSS\ SPREAD_i + \beta_7\ PRIOR\ SEO\ Dummy_i + \beta_8\ UNDERWRITER\ REPUTATION\ Dummy_i + \beta_9\ TOP-TIER\ ANALYST_{T-1}\ Dummy_i + \beta_{10}\ CLUSTER\ Dummy_i + \varepsilon_i$$

Table 7

Ordinary Least Squares Model of the SEO Discount by Subperiod

	1986-1989	1990-1995	1996-1999
Constant	1.47 (0.71)	1.57 (0.94)	3.63 (2.13)
NASDAQ Dummy	-0.83 (-2.67)	0.56 (2.45)	0.89 (3.46)
PROCEEDS/MKT	1.22 (0.94)	-0.63 (-0.61)	1.28 (1.16)
UTILITY Dummy	-0.18 (-0.31)	-0.52 (-2.32)	0.25 (0.41)
TECH Dummy	-0.38 (-1.35)	0.05 (0.20)	1.25 (3.73)
LNPRICE	-0.34 (-0.76)	-1.31 (-3.89)	-1.72 (-5.26)
GROSS SPREAD	0.13 (0.82)	0.93 (5.15)	0.74 (3.78)
PRIOR SEO Dummy	-0.09 (-0.17)	-0.43 (-1.66)	-0.28 (-0.98)
UNDERWRITER REPUTATION Dummy	0.07 (0.15)	-0.27 (-0.90)	-0.59 (-1.67)
TOP-TIER ANALYST _{T-1} Dummy	0.09 (0.26)	0.59 (2.48)	0.85 (2.84)
CLUSTER Dummy	0.33 (0.95)	1.19 (5.49)	1.79 (6.81)
R-squared	0.02	0.17	0.16
Number of Observations	696	1,997	1,724

The dependent variable, SEO DISCOUNT, is computed as the percent change from the offer price to the prior closing price, $\left[\left(\frac{P_{T-1} - OP}{OP} \right) 100\% \right]$. An example of a 3% discount would be a prior day closing price of \$51.50 compared to an offer price of \$50. NASDAQ is a dummy variable equal to one if the issuing firm is listed on Nasdaq, or zero if the issuing firm is listed on NYSE or Amex. PROCEEDS/MKT is a ratio of issue proceeds and issuer market value. UTILITY and TECH are dummies equal to one if the issuer operates, respectively, in the two-digit SIC industry of 49 and in SIC codes specified in Loughran and Ritter (2002). LNPRICE is the natural logarithm of the closing price of the day before the issue in dollars. GROSS SPREAD is the total fee of underwriters, expressed as a percentage of the issue proceeds. PRIOR SEO is a dummy equal to one if the firm issued seasoned equity in the prior year. UNDERWRITER REPUTATION is a dummy equal to one if the lead manager has a reputation rank equal to or greater than 8, as determined in Loughran and Ritter (2002). TOP-TIER ANALYST_{T-1} is a dummy equal to one if the SEO underwriter has an analyst group ranked among the top-ten groups as selected by *Institutional Investor* each October of the prior calendar year. CLUSTER is a dummy variable equal to one if the offer price is set at integers, or zero if the offer price is set in dollar fractions. PROCEEDS/MKT and LNPRICE are winsorized at the 1% and 99% levels. White's heteroskedasticity-adjusted t-statistics are in parentheses.

Table 8

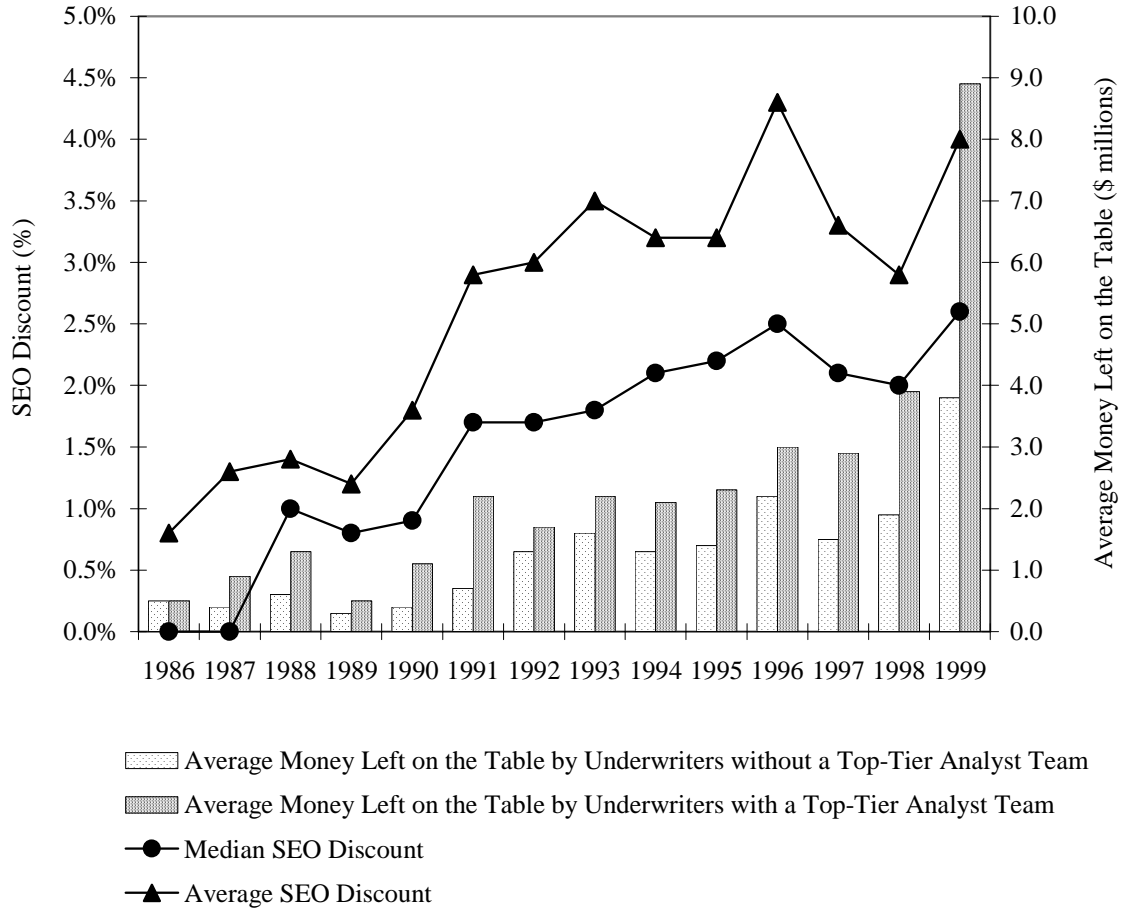
Logit Regression of Other Lower Integer Dummy Variable

	1	2
Constant	-9.28 (-14.35)	-9.96 (-13.72)
NASDAQ Dummy	0.42 (3.41)	0.32 (2.51)
PROCEEDS/MKT	0.97 (2.40)	0.82 (1.97)
UTILITY Dummy	-1.69 (-3.33)	-1.63 (-3.21)
TECH Dummy	0.45 (3.71)	0.39 (3.23)
LNPRICE	1.54 (12.52)	1.29 (10.16)
GROSS SPREAD	0.31 (4.96)	0.28 (4.14)
PRIOR SEO Dummy	0.16 (1.01)	0.10 (0.64)
UNDERWRITER REPUTATION Dummy	0.01 (0.06)	0.04 (0.23)
TOP-TIER ANALYST _{T-1} Dummy	0.28 (2.30)	0.28 (2.32)
YR9095 Dummy	--	1.54 (4.89)
YR9699 Dummy	--	2.13 (6.79)
Wald Chi-Squared Test Statistic	274.48	340.83
<i>p</i> -value for the Wald Chi-Squared Test Statistic	0.00	0.00
Pseudo R-Squared	0.10	0.13
Number of Observations	4,417	4,417

The dependent variable, OTHER LOWER INTEGER Dummy, has a value of one if the offer price is set at the other lower integers relative to the prior closing price; it is zero otherwise. NASDAQ is a dummy variable equal to one if the issuing firm is listed on Nasdaq, zero if the issuing firm is listed on NYSE or Amex. PROCEEDS/MKT is a ratio of issue proceeds and issuer market value. UTILITY and TECH are dummies equal to one if the issuer operates, respectively, in the two-digit SIC industry of 49 and in SIC codes specified in Loughran and Ritter (2002). LNPRICE is the natural logarithm of the closing price of the day before the issue in dollars. GROSS SPREAD is the total fee of underwriters, expressed as a percentage of the issue proceeds. PRIOR SEO is a dummy equal to one if the firm issued seasoned equity in the prior year. UNDERWRITER REPUTATION is a dummy equal to one if the lead manager has a reputation rank equal to or greater than 8, as determined in Loughran and Ritter (2002). TOP-TIER ANALYST_{T-1} is a dummy equal to one if the SEO underwriter has an analyst group ranked among the top-ten groups as selected by *Institutional Investor* each October of the prior calendar year. PROCEEDS/MKT and LNPRICE are winsorized at the 1% and 99% levels. YR9095 is a dummy equal to one if the issue occurs between 1990 and 1995. YR9699 is a dummy equal to one if the issue occurs between 1996 and 1999. White's heteroskedasticity-adjusted z-statistics are in parentheses.

Figure 1

Discount and Average Money Left on the Table for SEOs, 1986-1999

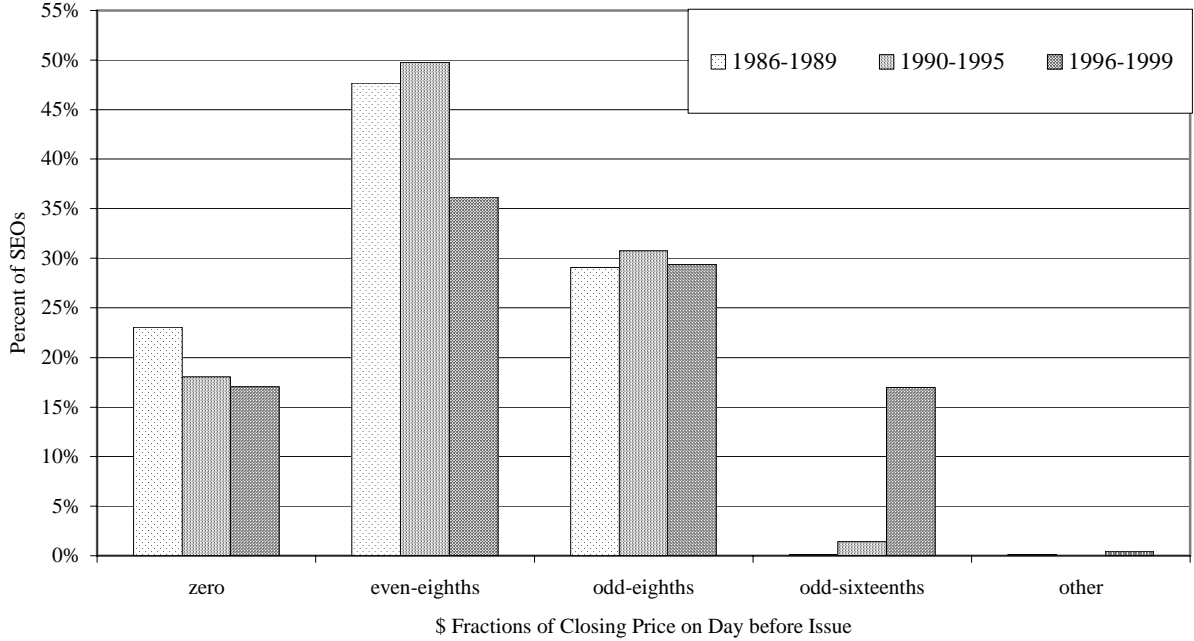


The sample consists of 4,814 seasoned equity offerings (SEOs). The SEO discount is defined as the percent price change between the prior closing price and the offer price, relative to the offer price. The money left on the table, expressed in millions of constant 1999 dollars, is the dollar discount multiplied by the number of offered shares. The ten investment banking firms with the highest overall analyst ratings by *Institutional Investor* in a year are categorized as underwriters with a top-tier analyst team.

Figure 2

Distribution of Dollar Fractions for SEO Prices over Time

Panel A: Distribution of Dollar Fractions for Closing Price on Day before Issue



Panel B: Distribution of Dollar Fractions for Offer Price

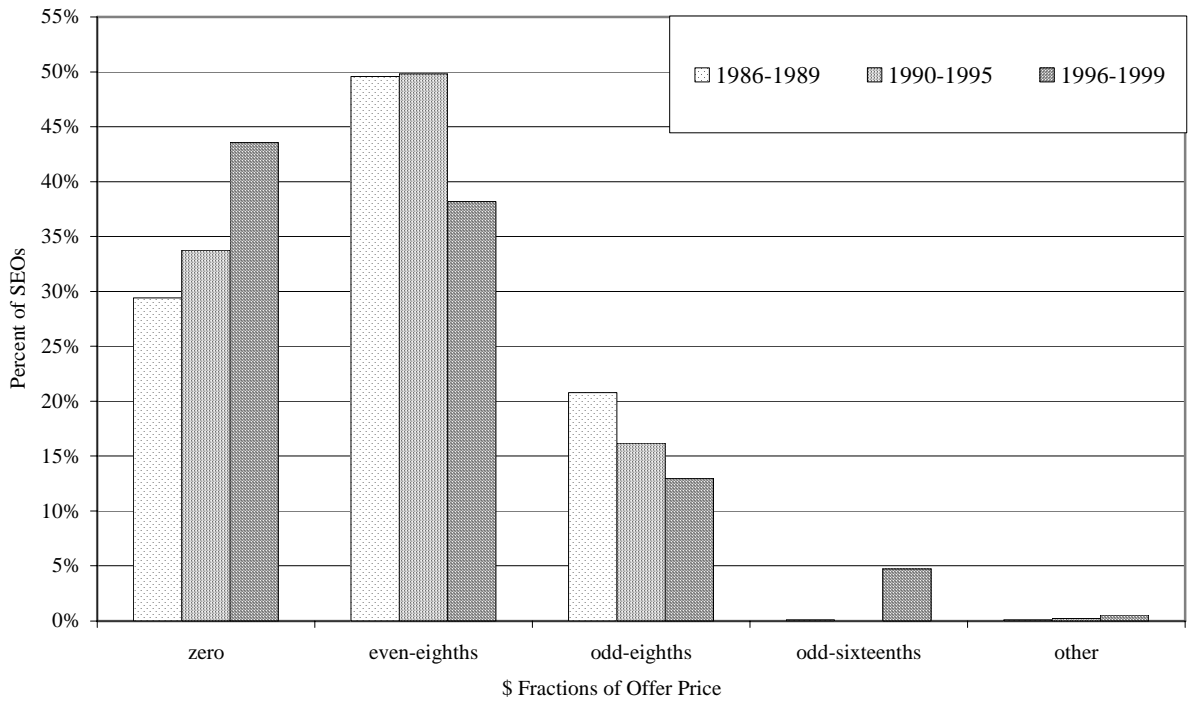
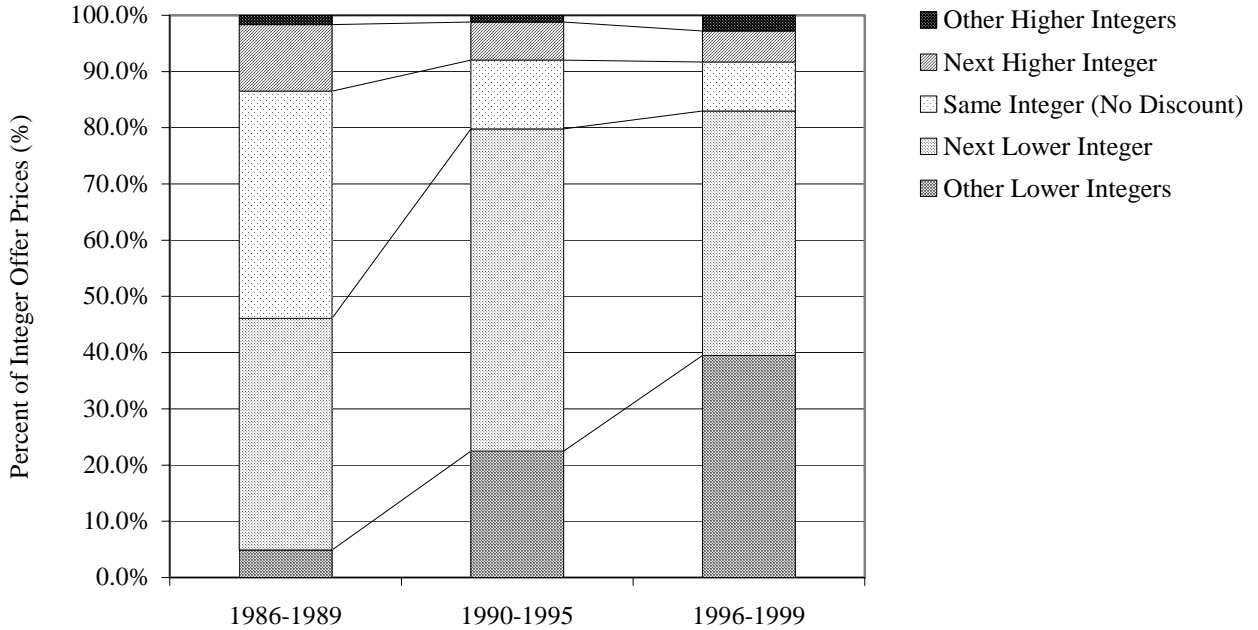


Figure 3

**Integer Offer Price Clustering Relative to the Closing Price on Day Before Issue
Categorized by Subperiod**



The sample consists of 1,765 SEOs with an integer offer price. The offerings are classified relative to the prior closing price. For example, if the prior closing price is \$25 1/4, the integer offer price might be \$25 (Next-Lower Integer), or \$24 or other lower integers (Other Lower Integers), or \$26 (Next-Higher Integer), or \$27 or other higher integers (Other Higher Integers). If prior closing price and offer price are both integer values and coincide, the offer price is recorded as Same Integer (i.e., no SEO discount).