December 1992

IPO Underpricing Firm Quality, and Subsequent Reissuance Activity

Karen C. Denning
West Virginia University

Stephen P. Ferris
Virginia Polytechnic Institute & State

Glenn Wolfe
University of Toledo

Follow this and additional works at: https://digitalcommons.pepperdine.edu/jef

Recommended Citation

IPO Underpricing, Firm Quality, and Subsequent Reissuance Activity

Karen C. Denning
Stephen P. Ferris
Glenn Wolfe

A signaling argument has recently been developed whereby IPO underpricing is a signal of future firm value. Only higher quality firms can be expected to recover the cost of this signal through subsequent offerings of seasoned equities. This study uses three proxies for firm quality and finds evidence of a positive relationship between these measures of firm quality and reissuance activity. Greater IPO underpricing is also found to be associated with greater levels of future equity selling and higher levels of earnings per share.

I. INTRODUCTION

Although the phenomenon of initial public offering (IPO) underpricing is extensively examined in the literature (see [28], [25], [26], [30], [20]) no consensual explanation for underpricing has evolved.[1] Recently however, work by Welch [31] and Allen and Faulhaber [2] suggests a signaling model of IPO underpricing that is driven by the reissuance behavior of these companies. That is, underpricing at the time of initial issue is a loss that only "good" or high-quality firms can expect to recoup. Consequently, it is costly for poorer-quality firms to imitate this underpricing. This line of reasoning suggests that underpricing can be used to signal future earning prospects. Hence, higher-quality firms may be able to recover the loss associated with an IPO underpricing through future offerings of equity. This reissuance argument of Welch and Allen and Faulhaber is in general agreement with Ibbotson's [15] observation that IPOs are underpriced in order to "leave a good taste in investors' mouths that future underwritings

Karen C.Denning ● College of Business Administration, West Virginia University, Morgantown, WV 26506.
Stepehn P. Ferris ● College of Business Administration, Virginia Polytechnic Institute and State University, Blacksburg, VA 24061.
Glenn Wolfe ● Department of Finance, University of Toledo, Toledo, OH 43606-3390.

from the same issuer could be sold at attractive prices."[2,3] This argument is also consistent with the empirical observation that IPO investors, on average, earn a positive abnormal return whereas investors in secondary offerings, on average, earn a negative abnormal return, (see Smith, [29]). Hence, it seems reasonable that "good," high quality firms can underprice expecting to recoup any losses when future projects require a secondary offering of equity.

This study analyzes the reissuance explanation for IPO underpricing through an examination of the relationship between firm quality and the subsequent offering of seasoned equity issues. Since the reissuance argument contends that IPO underpricing is a signal used by higher-quality firms whose cost is recovered in future selling activities, we should expect to observe a positive relation between measures of firm quality and reissuance activity. Additionally, IPO underpricing and the level of equity reissuance should be positively related as firms attempt to recoup any underpricing losses they incur upon going public.[4]

In the following section we discuss our data and sample construction procedures as well as the selection process for measures of firm quality. Section III contains further comments on our methodology and discusses the empirical findings. We conclude with a review and summary in section IV.

II. DATA DESCRIPTION

A. Sample Construction

In order to construct our sample, we consider all IPOs listed on the Registered Offerings Statistics (ROS) Tape compiled by the Securities and Exchange Commission.[5] Due to our desire to examine subsequent reissuance activity, we terminate our sample in 1985. This allows us to follow the reissuance behavior of the most recent IPOs for three years, since the ROS tape available to us is current only through 1988. Consistent with other researchers in this area, (e.g. [4], [23], [32]) IPOs registered under Regulation A (common stock offerings below $1,500,000) are not included in the sample. Likewise, unit offerings are also excluded. IPOs underwritten on a best efforts basis are not included in our study, since work by Ritter [27] and Chalk and Peavey [9] notes peculiarities in the initial performance of best efforts as compared to firm commitment offerings. Thus our final sample consists of 1,582 IPOs, spanning the years 1973-1985.

IPOs are typically traded on the OTC (Over-the-Counter) market. Consequently, we use the CRSP NASDAQ (National Association of Security Dealers Automatic Quotation) tape to obtain our time series of returns as well as the number of shares outstanding following the IPO.[6] Data concerning the

specifics of the registration for our sample is obtained from the ROS tape. Data obtained from this tape include the issuer, security type, offering date, offering price, number of shares offered to the public, size of the secondary distribution and the amount of debt outstanding prior to the IPO.[7] Earnings information on all of the IPO sample firms is obtained from COMPUSTAT.

B. Measure of Ex-Ante Firm Quality

Given that the reissuance argument for IPO underpricing is a signaling-based theory regarding the firm's prospects, the measurement of ex-ante firm quality is extremely critical. Unfortunately, however, there is no single agreed-upon definition or measure of firm quality. Nevertheless, the literature does suggest several alternatives. Leland and Pyle [21] contend that the degree of founder retention is a possible signal of firm quality. If the founders elect to retain a significant percentage ownership in the firm, this indicates favorable expectations concerning future firm earnings and growth. The firm's owners should possess the most complete information set available about the firm and presumably will adjust their holdings accordingly. Owner retention as a signal of firm value, however, has received only mixed support in the empirical literature. (See [10], [20].) Nevertheless, we will use the level of owner retention at the time of the IPO as one of the study's measures of ex-ante firm quality. Using share structure data available on the CRSP NASDAQ Tape and the ROS Tape, we calculate the percentage of owner retention, α as follows:

$$\alpha = \frac{\left(\begin{array}{c}\text{Shares Outstanding}\\\text{After IPO}\end{array}\right) - \left(\begin{array}{c}\text{Primary Shares}\\\text{Offered}\end{array}\right) - \left(\begin{array}{c}\text{Secondary}\\\text{Shares Offered}\end{array}\right)}{\left(\begin{array}{c}\text{Shares Outstanding}\\\text{After IPO}\end{array}\right) - \left(\begin{array}{c}\text{Primary Shares}\\\text{Offered}\end{array}\right)}$$

Appendix A contains a derivation of this measure for owner retention.

The agency literature (see [11], [24], [3]) develops a certification argument whereby firms that enter credit markets have their future earnings prospects implicitly certified by the lender's decision to extend credit. Harris and Raviv [13] examine the role of debt in the firm's capital structure and the consequent ability of investors to oversee managerial decisions. Debt is potentially a disciplining device, reducing the free cash flow available to management and, as Jensen [17] notes, restricting managerial discretion. Further, the mere ability of the organization to meet its contractual payments provides information about the quality or earning capability of the firm. Campbell and Kracaw [7] and Fama [12] suggest that borrowing reduces the information costs for all the firm's claimants. Thus, according to this

viewpoint, the existence of debt serves as one indicator of favorable future cash flows.[8] Allen and Faulhaber also suggest debt as a possible signal of IPO quality in their development of an underpricing equilibrium. Evidence from Megginson and Weiss [22] is consistent with this argument and indicates that venture capitalist backing of an IPO serves a certification function, reducing IPO underpricing and maximizing the IPO proceeds. Finally, James and Weir [16] provide evidence that firms with borrowing histories are underpriced substantially less than other initial offerings. Consequently, we use the amount of total long-term debt calculated from the last balance sheet prior to the IPO as another measure of firm quality.[9]

A number of studies (e.g. [4], [18], [8]) examine the relationship between IPO underpricing and the prestige of the lead investment banker. Using various methodologies, the authors separate investment bankers into various groups based upon their prestige or reputation.[10] The critical finding obtained from these studies is that more prestigious underwriters are generally associated with lower risk issues. Viewing low risk issues as higher quality firms, leads us to select the prestige or non-prestige of the leading IPO underwriter as our third and last measure of firm quality. Specifically, we adopt the classification scheme for underwriter prestige originally suggested by Hayes [14]. We define a prestigious underwriter as either a bulge bracket or major bracket banker.[11] Using this definition, approximately 10 percent of the underwriters are classified as prestigious.

It could be argued that low risk and high return are more direct measures of firm quality than those we have selected.[12] However, prior to their initial public offering, sample firms may not provide reliable or quantifiable data on these measures. Each of our quality proxies, debt, owner-retention, and underwriter prestige may correlate highly with firm quality. However, it may be that they are indirect measures of quality. The research of Megginson and Weiss [22] and Barry et al. [3] suggests that there are many potential measures of firm quality. [13] Enumerating them all and defining the best quality proxy is beyond the scope of our paper. Essentially we suggest that high quality firms are those with low risk, high return, and favorable future earnings prospects. We attempt to proxy these "high quality" variables with a high degree of founder retention, increased use of long term debt, and the employment of more prestigious underwriters.

III. EMPIRICAL RESULTS

A. Overview of Reissuance Activity

In Table 1, we present an overall analysis of IPO reissuance activity for IPOs falling within the period of 1977-1985. Of the 1,582 IPOs in our sample,

Table 1
The Reissuance Behavior of IPOs

Issue Subsequent to IPO	Number of Issuing Firms	Mean Number of Days Since IPO	Mean Number of Days Since Last Issue	Cumulative Value of Seasoned Issue Relative to IPO Value
First	251	445	445	1.89
Second	54	732	287	5.50
Third	10	846	113	12.60

only 20 percent (315 firms) do in fact, reissue equity.[14,15] Although this may be a low percentage, it may be that our selection of the study period eliminates some firms which do, in fact, subsequently reissue. Alternatively, it may be that firms expect to reissue, but that ex-post performance and financing needs do not warrant it. Or it may be that firms are able to correctly anticipate their future needs at the time of the initial offering and thus have no need to quickly return to the capital market. There is some evidence from our sample to support such a contention. On average those firms which did not reissue had larger IPOs as measured by the dollar registration value than those that did subsequently reissue. For instance, non-reissuers had average IPOs 3% larger than single reissuers while exceeding the IPO size of multiple re-issuers by nearly 10.5%. In addition to the relatively small number of reissuers, Table 1 also provides data on two other important features of reissuance activity. First, there is a noticeable tendency for reissuances to be, on average, much larger in size than the IPO. Each reissuance, in fact, tends to increase in magnitude relative to the IPO, so that the third reissuance is nearly seven times as large as the initial offering. This result is hardly surprising if reissuing firms are attempting to recoup their losses from the IPO. It is further consistent with higher quality firms or those with favorable growth and earnings prospects, reissuing to finance those opportunities. Secondly, we also observe in Table 1 a pattern of a decreasing intermission between reissues. The mean elapsed time between the second and third reissuance is about one-fourth that between the IPO and the first reissuance. Thus reissuing firms not only increase the mean size of their seasoned offerings, but also shorten the time between reissuances. Such findings are consistent with firms accelerating their schedule of reissuances in order to recapture their IPO losses. However, care should be taken not to over interpret the strength of this result. Presumably firms reissue because they need the financing. The present-value of an IPO underpricing loss, if recouped more than a year subsequent to the IPO, would hardly in itself justify incurring the initial IPO loss. It seems more reasonable to suggest that high quality firms, with favorable earnings projects and prospects need increasingly more financing to fund these projects.

B. Reissuance and Firm Quality

If IPO underpricing is a loss that only high quality firms can expect to recover at the time of subsequent seasoned offerings, then we should expect to observe a positive relationship between reissuance activity and measures of firm quality. In this section, we examine reissuance and various measures of firm quality.

In Table 2, the level of owner retention at the time of the IPO is divided into deciles. We examine mean issue size of subsequent proceeds as it relates to the IPO. Examining the first reissuance, (see column 2) the results indicate that reissuance size increases as the degree of owner retention increases. This finding holds across all the seasoned offerings (see columns 3 through 5) and is especially strong for the total reissuance figures. The highest decile of owner retention is associated with a mean value of total seasoned offerings that is three times as great as that of the lowest decile of owner retention. Panel B of Table 2 examines the statistical significance of the difference between the top and bottom deciles of our sample. As can be seen, the difference is statistically significant at the 1 percent level. These results are consistent with higher quality firms, as measured by the degree of founder retention, engaging in greater total reissuance activity than correspondingly lower quality firms.

Using the categorization of underwriter prestige described earlier in section II, we examine the reissuance behavior of IPOs. The results are presented in Table 3. In all cases, IPOs that were originally underwritten by a prestigious investment banking house returned to the market in larger volume than did those underwritten by non-prestigious investment bankers. The differences in mean issue size are significant at various standard levels of significance as indicated in panel B.

Results for the use of debt are consistent with our findings for the other measures of firm quality and also consistent with the results of James and Weir [16]. That is, there is a significant difference in reissuance activity between those IPOs with the highest debt levels prior to the IPO and those with the lowest (see Table 4). Firms with the highest degrees of financial leverage prior to going public follow the behavior of high quality companies and do in fact issue substantially more seasoned equity than less levered firms. Upon comparing the difference between total seasoned offering size for the first and last debt level deciles, we find it is significant at the one percent level.

Overall, the findings regarding our measures of firm quality and the volume of subsequent seasoned offerings support the contention that IPO underpricing signals the favorableness of future firm cash flows. A more direct test for our purpose is an examination of IPO underpricing and

Table 2
Mean Issue Size Relative to the IPO

Level of Owner Retention (Decile)	First Seasoned Offering	Second Seasoned Offering	Third Seasoned Offering	Total Seasoned Offerings
A. Reissuance Behavior and Firm Quality: Owner Retention Levels				
1	1.03	2.33	10.60	1.66
2	1.53	2.61	—	2.22
3	1.14	2.40	2.66	1.59
4	1.69	2.80	—	2.60
5	1.64	4.54	2.67	2.98
6	1.84	—	6.40	1.84
7	2.15	3.37	—	2.37
8	1.90	2.37	—	2.45
9	2.55	1.39	10.56	2.69
10	2.34	7.50	11.26	5.06

B. Mean Differences In Reissuance Activity Between Top and Bottom Deciles

First Seasoned Offering	Second Seasoned Offering	Third Seasone Offering	Total Seasoned Offerings
1.31	5.17	0.66	3.40
(2.10)*	(2.89)*	(1.43)	(2.78)**

Note: Decile 1 represents the lowest degree of owner retention at the time of the IPO while decile 10 represents the highest.
* indicates statistical significance at the 5 percent level
** indicates statistical significance at the 1 percent level.

Table 3
Mean Issue Size Relative to the IPO

Underwriter Prestige	First Seasoned Offering	Second Seasoned Offering	Third Seasoned Offering	Total Seasoned Offerings
A. Reissuance Behavior and Firm Quality: Underwriter Prestige				
Prestigious	2.33	4.55	10.60	3.90
Non-Prestigious	1.66	3.15	4.54	2.47

B. Mean Differences In Reissuance Activity Between Prestigious and Non-prestigious Underwritten IPOs

First Seasoned Offering	Second Seasoned Offering	Third Seasone Offering	Total Seasoned Offerings
0.67	1.40	6.06	1.43
(1.70)*	(2.13)**	(2.83)***	(2.27)**

Note: * indicates statistical significance at the 10 percent level
** indicates statistical significance at the 5 percent level.
*** indicates statistical significance at the 1 percent level.

reissuance activity. The greater the underpricing, the more costly the signal is to the firm. Thus, the more likely it should be that the firm will reissue in order to recover this cost. Our results for the underpricing deciles are presented in Table 5.[16,17] As in the previous tables, column 2 indicates the mean issue size of the first offering relative to the IPO proceeds. There is a marked tendency for firms with greater underpricing at the time of initial issue to return to the equity market in greater volume. This tendency remains consistent across all seasoned offerings (see columns 3 and 5). Column 5 indicates that those firms with the highest level of IPO underpricing re-issue nearly 2.5 times the volume of those with the least underpricing. This difference is significant at the one percent level. These results are consistent with an attempt by higher quality firms to offset their loss upon going public through the repeated sale of appreciated stock. Again, we do not suggest that seasoned offerings occur for the purpose of recovering IPO costs. Seasoned offerings presumably occur because the firm needs capital. However, higher quality firms can underprice at the initial offering, apparently knowing that subsequent seasoned offerings of appreciated equity will enable them to recover some of these losses.

However, there is a phenomenon which may help to explain why only 20% of the sample firms reissue. That phenomenon is the rationing of IPO shares. Full or overpricing of the seasoned offering to recoup the losses which result from IPO underpricing, suggests that there may be a wealth transfer from those investors buying the seasoned issues to those buying the initial offering. If the investors (initial and seasoned) are the same individuals or group, deferring the higher price of the seasoned equity sale would be economically rational. The rational investor would rather purchase an underpriced issue and then defer to the future the cost of overpriced seasoned equity offerings. This argument is consistent with the empirical findings of negative abnormal returns to secondary offerings as reported by Smith [29].

However, when those investors who are able to subscribe to the initial offering are different from those who purchase the secondary, the purchasers at the time of the secondary may be subsidizing the IPO investors if firms are underpricing the IPO with the intent to recoup any losses with future offerings. Since many new issues are oversubscribed, firms may be reluctant to favor one group at the expense of a second. Over subscription is consistent with Rock's [28] model of underpricing and it is further supported by the empirical results of Koh and Walter [19] and Benveniste and Spindt [5].[18] Firms may therefore plan their eventual financing needs well into the future and attempt to satisfy these needs at the time of the initial offering so as not to appear to favor one investor group over another. This line of reasoning suggests that only some high quality firms will recoup their losses whereas some high quality firms may simply be willing to bear the underpricing cost of the IPO.

Table 4
Mean Issue Size Relative to the IPO

Level of Long Term Debt (Decile)	First Seasoned Offering	Second Seasoned Offering	Third Seasoned Offering	Total Seasoned Offerings
A. Reissuance Behavior and Firm Quality: Use of Long Term Debt				
1	1.42	2.29	—	2.85
2	1.67	2.04	2.60	2.77
3	2.08	2.57	—	2.14
4	1.72	2.95	2.99	2.31
5	1.66	1.99	2.66	1.99
6	1.67	2.42	3.50	2.64
7	1.88	3.45	—	2.58
8	1.52	3.44	—	2.19
9	1.56	2.79	1.64	2.70
10	2.35	3.30	4.17	4.46

B. Mean Differences In Reissuance Activity Between Top and Bottom Deciles

First Seasoned Offering	Second Seasoned Offering	Third Seasone Offering	Total Seasoned Offerings
0.93	1.01	—	1.61
(1.24)	(2.23)*		(2.79)**

Note: Decile 1 represents the lowest degree of long-term debt usage immediately prior to the IPO while decile 10 represents the highest.
* indicates statistical significance at the 5 percent level
** indicates statistical significance at the 1 percent level.

To further examine the relationship between IPO underpricing and reissuance activity we estimate the following cross-sectional regression:

$$R_j = B_0 + B_1 SO_{j,1} + B_2 SO_{j,2} + \epsilon_j$$

where: R_j = underpricing of firm j at the time of the IPO
and $SO_{j,i}$ = market value for firm j of seasoned offering i relative to the initial public offering.

We obtain the following parameter estimates with t statistics provided in parentheses. Note that the coefficients associated with the first two seasoned offerings are significant at the 5 percent level. We estimate only the coefficients of the first two seasoned offerings because third and subsequent offerings are relatively rare and hence there are insufficient observations for meaningful estimation.

Table 5
Mean Issue Size Relative to the IPO

Level of Owner Retention (Decile)	First Seasoned Offering	Second Seasoned Offering	Third Seasoned Offering	Total Seasoned Offerings
A. Reissuance Behavior and IPO Underpricing				
1	1.35	1.37	1.77	1.64
2	1.88	2.56	2.34	2.32
3	1.18	2.68	2.01	3.81
4	1.67	1.73	—	1.96
5	2.29	2.44	—	2.76
6	2.15	2.98	2.71	2.55
7	1.59	4.06	—	2.14
8	1.60	2.47	—	2.14
9	2.69	3.91	4.30	3.24
10	2.31	5.00	4.58	3.93

B. Mean Differences In Reissuance Activity Between Top and Bottom Deciles

First Seasoned Offering	Second Seasoned Offering	Third Seasone Offering	Total Seasoned Offerings
0.96	3.63	2.81	2.29
(1.73)*	(2.88)***	(2.79)***	(3.02)***

Note: Decile 1 represents the lowest degree of owner retention at the time of the IPO while decile 10 represents the highest.
* indicates statistical significance at the 10 percent level
** indicates statistical significance at the 5 percent level
*** indicates statistical significance at the 1 percent level.

$$R_i = 0.518 + 0.275 \, SO_{j,1} + 0.089 \, SO_{j,2}$$
$$(0.951) \quad (2.124)^{**} \quad (2.540)^{**}$$

This positive relationship between IPO underpricing and subsequent reissuance is consistent with the cost recapture argument. Greater underpricing does seem to be associated with substantial reissuance activity.

An additional test of the signaling quality of IPO underpricing is the examination of underpricing and subsequent earnings performance. Higher quality firms should exhibit a superior earnings capability in addition to their hypothesized greater underpricing. Consequently we examine the following regression:

$$R_j = B_0 + B_1 EPS_{j,1} + B_2 EPS_{j,2} + B_3 EPS_{j,3} + \epsilon_j$$

Again, where: R_j = underpricing of firm j at the time of the IPO and $EPS_{j,i}$ = earnings per share for firm j in year i relative to the IPO.

The following parameter estimates are obtained, again with t statistics provided in the parentheses:

$$R_i = 0.418 + 0.843 \ EPS_1 + 0.747 \ EPS_2 + 0.029 \ EPS_3$$
$$\quad (1.123) \quad (1.731)^* \quad\quad (1.521) \quad\quad (1.043)$$

The coefficient of EPS_1 is significant at the 10% level while that for EPS_2 is significant only at the 13% level. Although not statistically strong results, these findings are in the hypothesized direction and do suggest evidence of a relationship between the level of IPO underpricing and firm quality as measured by the magnitude of subsequent earnings per share. Such a relationship is consistent with higher quality firms using underpricing as a signaling mechanism to the marketplace.

IV. CONCLUSIONS

This study empirically examines the signaling nature of IPO underpricing. Since underpricing is a costly signal, it can be most effectively used by high quality firms. Only high quality firms can recoup an underpricing loss by engaging in successful reissuance of equity. Using three different measures of ex-ante firm quality, our findings suggest that higher quality firms do, in fact, reissue in greater volume than lower quality firms. There is also evidence of a strong positive relationship between IPO underpricing and subsequent reissuance activity. Further, higher levels of underpricing at the time of the initial offering appear to be weakly associated with subsequently greater earnings per share. Overall, our findings suggest that underpricing may be used by better quality firms to signal their prospects to capital market participants. These findings are in agreement with much of the previous research concerning underpricing and firm quality and are further consistent with the models developed by Welch [31] and Allen and Faulhaber [2]. Whatever underpricing losses are suffered may be recovered through the significantly higher priced reissuances of seasoned equity. Yet not all firms promptly reissue. Hence these results, like those of previous researchers, fail to suggest a complete explanation for the underpricing of initial public offerings. A fuller explanation of the IPO phenomenon is likely to be multi-faceted, including considerations of information asymmetry, due diligence, insurance, and underwriter reputational capital. Yet these findings do suggest that a partial explanation as to why firms appear willing to

underprice, and "leave money on the table" at the initial offering is that they can recover these losses through seasoned offerings.

APPENDIX A
ESTIMATION OF THE OWNERS' RETENTION RATIO

We estimate the owners' retention ratio, α as the percentage of the firm's original capitalization that the founders elect to keep. It can be expressed as:

$$\alpha = \frac{\text{number of shares retained by founding shareholders}}{\text{number of shares originally issued by firm}} \qquad (1)$$

Although we do not have these specific variables available on the CRSP NASDAQ and ROS tapes, we can estimate equation (1) from the share structure data that is provided. Consider the following variables which are available from the ROS and COMPUSTAT tapes:

(1) PRIMARY = new shares offered to the public during the IPO
(2) SECOND = shares offered to the public through the sale of old shares by the firm's founders during the IPO
(3) OUTSTAND = total number of firm's shares outstanding after the IPO.

One can proceed to estimate the number of shares retained by the firm's founders after the IPO by defining the variable OLD as the number of shares originally owned by the founders. Thus,

$$\text{OUTSTAND} = (\text{OLD} - \text{SECOND}) + \text{PRIMARY} + \text{SECOND} \qquad (2)$$

Equation (2) shows that the total number of shares outstanding is the sum of the shares retained by the founders (OLD-SECOND), the secondary distribution and the primary shares. Thus, we can calculate the number of shares retained by the founding shareholders, RETAIN, by the following

$$
\begin{aligned}
\text{RETAIN} &= \text{OUTSTAND} - \text{SECOND} - \text{PRIMARY} \\
&= [(\text{OLD} - \text{SECOND}) + \text{SECOND} + \text{PRIMARY}] - \text{SECOND} \\
&\quad - \text{PRIMARY} \\
&= \text{OLD} - \text{SECOND} \qquad (3)
\end{aligned}
$$

Equation (3) thus provides an estimate of the shares retained by the original owners. The original capitalization of the firm, ORIGINAL can be estimated as:

ORIGINAL = OUTSTAND − PRIMARY

$$= [(OLD − SECOND) + SECOND + PRIMARY] − PRIMARY$$

$$= OLD \qquad\qquad (4)$$

We can therefore rewrite equation (1) as equation (3) divided by equation (4):

$$\alpha = \frac{OUTSTAND − SECOND − PRIMARY}{OUTSTAND − PRIMARY}$$

NOTES

1. This may be because a complete explanation of IPO underpricing will require the consideration of numerous factors such as informational asymmetries, underwriter due diligence efforts, issuer risk characteristics and reputational capital issues.

2. Aggarwal and Rivoli [1] suggest an alternative hypothesis with respect to new issuance that may deserve closer scrutiny. It may be that IPO's are not initially underpriced, but rather that subsequent to the issuance of a new security, the after market overvalues the security. We do not distinguish between over valuation in the immediate after market and under valuation at the initial offering. Which explanation is more accurate is not of central concern to this manuscript. The purpose of our paper is an attempt at explaining the relationship between initial performance, measures of firm quality, and subsequent reissuance activity.

3. It should also be recognized that as companies mature, they tend to become less risky as more information about their performance is available to investors. This allows these firms to become established in their respective industries and thus require less underpricing to place subsequent issues of their common stock.

4. The cost of going public consists of two components. The first is the direct cost which include underwriter commissions, legal fees and various advertising/administrative expenses. Ritter [27] estimates these at $250,000, plus 7% of gross proceeds. The indirect cost, which serves as the focus of this study is the underpricing. Ritter estimates the average underpricing for a new issue at nearly 15%.

5. Because there is some concern about the reliability of data from the ROS tape, when possible we verified the data with secondary sources such as *Investment Dealers Digest*, *The Wall Street Journal*, and *S&P Corporate News*.

6. We verified the shares outstanding date with data available from COMPUSTAT.

7. Studies by Ritter [25] and Barry et al. [3] find industry and timing patterns in the market for IPOs. The proliferation of new issues in the natural resources industries in the early 1980s is a noteworthy example. The sample used in this study however does not demonstrate any obvious year-to-year pattern in either the timing or industry distribution of IPOs. The annual frequency of IPOs ranges from a minimum of 10 in 1977 to a maximum of 359 is 1983. There is a skewness in the overall frequency of IPOs however with 74% of the IPOs occuring in the latter half of our sample period. The IPOs are broadly distributed across SIC codes, with all two digit groups represented. The greatest concentration [34%] is in the 30 group, a subset of manufacturing. The least concentrated SIC two digit grouping in our sample is 10, mining, which contains only 4.5% of our observations.

8. Debt may also serve as a variable which differentiates those firms with assets in place from those whose principal assets are future growth options.

9. We also use total long-term debt standardized by the value of the IPO and obtain essentially the same results as reported in Table 3. Thus we do not report these results separately. See Harris and Raviv [13].

10. Carter and Manaster [8] develop a continuous ranking scheme for underwriter prestige, but is fails to noticeably outperform a simple binary classification. Consequently, we elect to simply dichomotize our sample of investment bankers into prestigious and non-prestigious classifications. See Benveniste and Wilhelm [6] for other potential calssification schemes.

11. We also use two alternative definitions of underwriter prestige: bulge bracket alone and bulge, major, and sub-major brackets combined. The results are not significantly different from those obtained with the bulge-major bracket classification and hence are not reported.

12. James and Weir [16] suggest that debt may serve as a signal of risk. High risk firms may choose not to issue debt prior to the initial offering of equity due to the high dispersion of the firm's future value.

13. In Barry et al. [3], underwriter warrants are a potential quality measure. Warrants are a form of underwriter compensation which increase in value as the stock is more underpriced. Hence, given informational asymmetry between issuers and investors, the use of warrants reduces the probability or extent the issue is overpriced by providing the underwriter an incentive to set a lower initial offering price. Megginson and Weiss [22] examine venture capitalist backing of IPOs.

14. This percentage is consistent with the empirical evidence presented by Welch [31]. Of his sample of 1,028 IPOs, 28% representing 288 firms reissued with offerings of seasoned equity.

15. Of the 1,267 non-reissuers in our sample, 356 ceased trading before the end of our study period. If we consider only those IPOs which survived over the entire period of our analysis, then the percent of reissuers increases to 26%.

16. Our methods of estimating IPO underpricing follows that of Beatty and Ritter [4] and Ritter [27]. Underpricing is defined as: $(BP-OP)/OP$, where OP is the offering price and BP is the closing bid price on the first day of public trading.

17. Based upon data supplied by the Investment Dealer's Digest Corporation of New York, we examined more recent levels of IPO underpricing for years not contained in the sample. Using total registration of the issue as our measure of firm size, we classified IPOs for the years 1989 and 1990 into quartiles. The average underpricing for the smallest quartile over these two years was 11.65% while that for the largest quartile was 3.07%. The difference in mean underpricing across these quartiles was statistically significant at the 1% level using both the student t and Wilcoxon Z statistics.

18. See also Benveniste and Wilhelm [6].

REFERENCES

[1] Aggarwal, R. and P. Rivoli. 1990. "Fads in the Initial Public Offering Market." *Financial Management* ; 45-57.

[2] Allen, F. and G. Faulhaber 1989. "Signaling by Underpricing in the IPO Market." *Journal of Financial Economics.* 23: 303-324.

[3] Barry, C.B., C.J. Muscavella, J.W. Peavey, III and M. Vetsuypens. 1989. "Venture Capital Reputation Effects in Initial Public Offerings and Initial Public Offerings." Unpublished Working Paper. Southern Methodist University, Dallas, TX.

[4] Beatty, R.P. and J.R. Ritter. 1986. "Investment Banking Reputation and the Underpricing of Initial Public Offerings." *Journal of Financial Economics.* 15(1/2): 213-232.

[5] Benveniste. L.M. and P.A. Spindt. 1990. "How Investment Bankers Determine the Offer Price and Allocation of New Issues." *Journal of Financial Economics.* 24: 343-362.

[6] Benveniste, L.M. and W.J. Wilhelm. 1990. "A Comparative Analysis of IPO Proceeds Under Alternative Regulatory Environments." *Journal of Financial Economics.* 28(1/2): 173-208.

[7] Campbell, T. and W. Kracaw. 1980. "Information Production, Market Signalling and the Theory of Intermediation." *Journal of Finance.* 35: 863-882.

[8] Carter, R. and S. Manaster. 1990. "Initial Public Offerings and Underwriter Reputation." *Journal of Finance.* 45[4]:1045-1067.

[9] Chalk, A. and J. Peavy, III. 1989. "Understanding the Pricing of Initial Public Offerings." *Research in Finance.* edited by A. Chen, Greenwich, CT, JAI.

[10] Downes, D. and R. Heinkel. 1982. "Signaling and the Valuation of Unseasoned New Issues." *Journal of Finance.* 37[1]: 1-10.

[11] Easterbrook, F. 1984. "Two Agency-Cost Explanations of Dividends." *American Economic Review.* 74: 650-660.

[12] Fama, E. 1985. "What's Different about Banks?" *Journal of Monetary Economics.* 15: 5-29.

[13] Harris, M. and A. Raviv. 1990. "Capital Structure and the Informational Role of Debt." *Journal of Finance.* 45[2]: 321-350.

[14] Hayes, S.L. 1971. "Investment Banking: Power Structure in Flux."*Harvard Business Review. : 136-152.*

[15] Ibbotson, R.G. 1975. "Price Performance of Common Stock New Issues." *Journal of Financial Economics.* 2:235-272.

[16] James, C. and P. Weir. 1990. "Borrowing Relationships, Intermediation, and the Cost of Issuing Public Securities." *Journal of Financial Economics.* 28: 149-171.

[17] Jensen, M. 1986. "Agency Costs of Free Cash Flow, Corporate Finance, and Takeover." *American Economic Review.* 76: 323-329.

[18] Johnson, J.M., and R.E. Miller. 1988."Investment Banker Prestige and the Underpricing of Initial Public Offerings." *Financial Management. 17*[2]: 19-29.

[19] Koh, F. and T. Walter. 1989. "A Direct Test of Rock's Model of the Pricing of Unseasoned Issues." *Journal of Financial Economics.*23: 251-272.

[20] Krinsky, I. and W. Rotenberg. 1989."Signaling and the Valuation of Unseasoned New Issues Revisited." *Journal of Financial and Quantitative Analysis. 24*[2]: 257-266.

[21] Leland, H. and D. Pyle. 1976."Information Asymmetries, Financial Structure and Financial Intermediation. " *Journal of Finance.* 32: 371-387.

[22] Megginson, W. and K. Weiss. 1991. "Venture Capitalist Certification in Initial Public Offerings." *Journal of Finance. 46*[3]: 879-904.

[23] Miller, J.M. and R.E. Johnson. 1988."Investment Banking Prestige and the Underpricing of Initial Public Offerings." *Financial Management.* 17[2]: 19-29.

[24] Nanda, V. 1988. "Why Firms Go Public." Unpublished Working Paper. University of Chicago, Chicago, IL.

[25] Ritter, J.R. 1984. "The Hot Issue Market of 1980." *Journal of Business. 57*[2]: 215-240.

[26] Ritter, J.R. 1986. "Why New Issues are Underpriced." *Journal of Financial Economics.* 15: 264-281.

[27] Ritter, J.R. 1987. "The Costs of Going Public." *Journal of Financial Economics.* 19: 269-281.

[28] Rock, K. 1986. "Why News Issues are Underpriced." *Journal of Financial Economics.* 15: 187-212.

[29] Smith, C. 1986. "Investment Banking and the Capital Acquisition Process." *Journal of Financial Economics.* 15(1/2): 3-30.

[30] Tinic, S.M. 1988. "Anatomy of Initial Public Offerings of Common Stock." *Journal of Finance.* 43[4]: 789-822.

[31] Welch, I. 1989. "Seasoned Offerings, Imitation Costs, and the Underpricing of Initial Public Offerings." *Journal of Finance.* 44[2]: 421-449.

[32] Wolfe G. and E. Cooperman. "A Reassessment of the Excess Return Phenomenon For Initial Public Offerings of Common Stock."*Journal of Applied Business Research.* forthcoming.