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Evidence on the strategic allocation of initial public offerings

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Abstract

The evidence reported in this paper suggests that institutional investors capture a large fraction of the short-run profits associated with IPOs. The favored status enjoyed by institutional investors in underpriced offerings appears, however, to carry a *quid pro quo* expectation that they will participate in less-attractive issues as well. This finding conforms with the Benveniste and Spindt (1989) and Benveniste and Wilhelm (1990) prediction that U.S. underwriters behave strategically in the allocation of IPOs.

Key words: Initial public offerings; Share allocation; Institutional investors
JEL classification: G24

1. Introduction

Initial public offerings of equity (IPOs) are commonly oversubscribed (Ibbotson, 1975; Koh and Walter, 1989). In many countries, underwriters are legally bound to evenhandedly allocate shares among subscribers when oversubscription occurs (Loughran, Ritter, and Rydqvist, 1994). By contrast, underwriters bringing issues to market in the U.S. follow a 'book-building' approach in which offer prices are conditioned on nonbinding pre-offer indications of

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interest and IPO shares are allocated in a discriminatory fashion. Although the initial distribution of IPOs is private information, underwriters are criticized for favoring institutional investors with large shares of underpriced offerings. Popular accounts leave the impression that this favoritism occurs at the expense of retail investors or, more colorfully, that the status of retail investors has been reduced to that of 'peasant(s) among a cartel of aristocrats' (*Forbes*, May 25, 1992).

In this paper we present the first direct evidence of institutional domination of the short-run profits associated with IPOs. Drawing on distribution data for a sample of 38 IPOs managed (or co-managed) by a single underwriter during the period 1983–1988, we find that approximately 70% of the shares in underpriced offerings are allocated to institutional investors. Balancing their apparent preferential treatment in underpriced offerings, however, is the fact that institutional investors take similarly large positions in overpriced offerings. Moreover, we find that institutional investors are allocated large proportions of issues for which pre-offer interest is weak and also of issues for which it is strong. Thus the data support the conclusion that institutional investors capture the lion's share of profits associated with underpriced offerings, but only at the cost of active participation in less attractive offerings. Interestingly, *Business Week* estimates (April 4, 1994) that institutional investors purchase 80% of the shares in 'hot' deals but only 60% of the shares in 'normal' deals. Although it is not clear how these estimates were obtained or how deals are classified, our findings suggest that their estimates overstate the variation in institutional participation across offers. Moreover, our interpretation of the evidence stands in sharp contrast to their characterization of the market.

We also document a statistically significant positive correlation between initial institutional holdings and post-offer domestic institutional holdings reported in 13(f) filings with the SEC. This observation serves as the basis for an investigation of the population of IPOs brought to market during the 1983–1987 period for which post-offer institutional holding data are available. Using public reports of post-offer institutional holdings as a proxy for (unobservable) initial holdings, we report evidence consistent with our findings for the sample of IPOs for which initial institutional holding data are available.

It is often claimed that institutional investors are well-informed relative to retail investors. Even if this claim is true, our findings suggest that institutional investors are unable to use their information advantage to avoid investing in overpriced offerings. This interpretation of the evidence apparently casts doubt on the explanatory power of Rock's (1986) argument that informed investors impose a winner's curse on uninformed investors by demanding larger allocations of (rationed) offerings identified as underpriced and smaller allocations of those identified as overpriced. Moreover, the evidence is difficult to reconcile with Rock's prediction that uninformed investors earn the riskless rate when profits are weighted by the probability of receiving an allocation.

Of course, Rock (1986) assumes that it is costless for informed investors to abstain from participating in less-attractive offerings. In the U.S., however, failure to participate in such offerings can cost an investor the opportunity to participate in future offerings. The information-gathering theory proposed by Benveniste and Spindt (1989) predicts that the threat of exclusion from underpriced offerings (made credible by the underwriter's discriminatory power) can induce institutional investors to participate in (overpriced) offerings in which they would otherwise have little interest. Thus the favored status enjoyed by institutional investors in underpriced offerings carries a *quid pro quo* expectation consistent with the pattern observed in the data.

The following section describes the unique dataset on which the study is based. We show that although the sample is small and confined to IPOs brought to market by a single underwriter, it is in most respects representative of the population of firm-commitment offerings during the sample period. In Section 3 we investigate the sample for which initial institutional holdings are available, as well as the population of firm-commitment offerings brought to market during the sample period, for evidence on the degree to which institutional investors capture the benefits associated with IPOs. Section 4 offers a discussion of the theoretical and policy implications of our findings, and Section 5 concludes.

2. Data

2.1. Sample description

Our sample includes all 38 firm commitment IPOs managed (or co-managed) by a single (anonymous) underwriter during the 1983–1988 period. The data are derived from internal reports produced to market the firm's underwriting services. Although these reports are not available to the general public, they are shared freely with prospective issuing clients. In addition to the size and price of the offerings, the reports document the firm's distributional efforts and aftermarket support for its issues.

The firm reports allocation statistics for both institutional (domestic and foreign) and retail investors. Institutional investors are similar to one another in that they participate repeatedly in the firm's IPOs, although the institutional investor pool for each IPO is not necessarily the same. Representatives of the firm suggest viewing the institutional investor pool as including several distinct clienteles of investors. Some institutional investors participate only in IPOs of firms in particular industries. Others express interest only in 'growth' or 'value' stocks. Only a small fraction of the firm's institutional investor pool participates in most of the firm's offerings. Common to each clientele, however, is the expression of repeated interest in IPOs within their area of interest and the

Table 1
Fraction of shares allocated to each of four investor classes for the 38 sample issues brought to market during the 1983–1988 period

	Mean	Median	Std. dev.	Maximium	Minimum
Institutional (domestic)	50.3%	53.7%	15.5%	77.6%	5.0%
Institutional (foreign)	16.6%	14.3%	9.8%	40.4%	0.0%
Total institutional	66.8%	71.7%	15.8%	88.6%	6.6%
Retail	28.0%	24.3%	15.3%	93.4%	11.4%
External retail	5.1%	3.0%	5.7%	22.3%	0.0%
Total retail	33.2%	28.3%	15.8%	93.4%	11.4%

expectation of such interest by the firm. Finally, although representatives of the firm claim that institutional investors are not coerced to participate in IPOs, it is understood by both parties that allocation decisions are contingent on an investor's history with the firm. Thus an investor's ability to skim the cream from the pool of IPOs within an expressed area of interest is limited by the threat of being excluded from future offerings.

Retail investors are drawn mainly from the firm's existing retail brokerage accounts. Once allocated to an individual broker, distribution of IPO shares among retail investors is at the discretion of the broker, although the firm claims that IPO shares are never allocated to new accounts. A small fraction of retail allocations are the result of shares allocated to and distributed by firm employees who are registered brokers but who operate in some other capacity within the firm. For example, bond traders within the firm may also be registered brokers providing brokerage services to small clienteles of investors in addition to carrying out their trading responsibilities to the firm. Shares in this category are not allocated to retail accounts of the firm and are therefore referred to as *external* retail allocations.

Table 1 reports summary statistics for the distribution of IPOs across the four investor classes (domestic institutional, foreign institutional, retail, and external retail). Percentage allocations reflect the actual number of shares issued (including those issued through the exercise of the overallotment option). The firm claims to maintain a target institutional (domestic and foreign) allocation of 60%. The statistics reported in Table 1 indicate that the average institutional allocation (66.8%) is somewhat larger than this target during the sample period. In no case is an entire issue allocated to either institutional or retail investors.

Since initial distribution data are not generally available to researchers, we also investigate the degree to which publicly available reports of post-offer institutional holdings are correlated with initial institutional holdings. The SEC requires that domestic institutions controlling more than $100 million in equity

report their holdings on a quarterly basis. We collect the number of shares held by institutions as of the end of the calendar quarter in which the IPO took place from *Spectrum3: 13(f) Institutional Stock Holdings Survey* (e.g., March 31 holdings for IPOs between January 1 and March 31). We divide the number of shares owned by institutions by the number of shares outstanding to obtain a measure of post-offer institutional holdings. Assuming that other syndicate members follow an allocation strategy identical to that of the sample underwriter, the Pearson correlation between this measure of post-offer holdings and initial (domestic) institutional holdings is 0.91 ($p = 0.0001$). Similarly, the Spearman rank correlation coefficient is 0.76 ($p = 0.0001$). Of course, this comparison of initial and post-offer institutional holdings is indirect. Only large domestic institutions are required to report. Moreover, the sample underwriter distributes on average only 48.2% (median: 46.1%) of each issue, and there is surely variation across the allocation strategies followed by the remainder of the syndicate. Thus a direct comparison of initial and post-offer holdings is impossible. On the other hand, if our sample is representative of the population of firm-commitment offerings brought to market during the sample period, reported post-offer institutional holdings are a potentially useful proxy for initial institutional holdings.

2.2. *Comparison of sample and population characteristics*

We investigate the degree to which our sample is representative of the population by comparing the sample IPOs and underwriter to the 'population' of 1,477 firm-commitment IPOs brought to market during the 1983–1987 period as compiled by the *Investment Dealers' Digest Corporate Database* and *Securities Data Corporation* and screened by Hanley (1993). The population contains only IPOs subsequently traded in the over-the-counter market (as reported in the Standard and Poors Stock Price Record); we exclude unit offers and issues of financial institutions. The exclusion of IPOs listed on either the NYSE or Amex has the effect of eliminating closed-end funds and many of the reverse LBOs. Table 2 indicates that both the sample of 38 IPOs and the population of firm-commitment offerings (including an additional 156 issues brought to market in 1988) are distributed similarly across the sample period. Approximately one-half of both the sample and population IPOs were brought to market during the high-volume years of 1983 and 1986.

Table 3 provides a comparison of various characteristics of the IPO population and the 38-issue sample. Taken as a whole, the evidence suggests that the sample is representative of the population of IPOs during the sample period. For example, the difference between the 8.63% mean initial return for the sample and the population mean of 8.64% is not statistically significant at conventional significance levels, nor is the difference between the sample and population mean dollar value of shares offered. Further, the average size of the

Table 2
Distribution of IPOs across the sample period for both the sample of 38 IPOs and the population of IPOs brought to market during the sample period

The population of IPOs is comprised of all IPOs brought to market and subsequently traded in the over-the-counter market as compiled by the *Investment Dealers' Digest Corporate Database* and *Securities Data Corporation*, excluding financial institutions and unit offers. (Percent of total is reported in parentheses.)

Year	Sample	Population
1983	10 (26.3%)	468 (28.7%)
1984	4 (10.5%)	196 (12.0%)
1985	6 (15.8%)	203 (12.4%)
1986	9 (23.9%)	376 (23.0%)
1987	7 (18.4%)	234 (14.3%)
1988	2 (5.3%)	156 (9.6%)
Total	38	1,633

sample firms, measured by assets or revenue, is not statistically different from that of the average firm in the population. On the other hand, a Wilcoxon rank-sum test rejects ($p = 0.01$) the null hypothesis of equality for each of these characteristics of the sample and population IPOs, with the exception of the initial return.

Megginson and Weiss (1991) show that market share, defined as the total dollar amount underwritten by a given underwriter divided by total IPO capital raised during the sample period ($70.3 billion), yields underwriter rankings similar to those produced by Carter and Manaster (1990). Using market share to measure reputation, Table 3 indicates that the sample underwriter's reputation is similar to that of the mean for the population. (If the issue has more than one lead underwriter, market share is defined to be the average market share of the lead underwriters, so that average market share varies within the sample as a consequence of co-management.) In contrast, the cost of engaging the sample underwriter is significantly lower than the mean cost for the population. Finally, both the sample mean gross spread as a proportion of the offering amount and the mean value of relative offering expenses are statistically different from the corresponding population values.

3. Share allocation and institutional profits

Table 4 begins our investigation of the conjecture that underwriters favor institutional investors with large proportions of underpriced offerings; it categorizes sample IPOs according to whether the initial return from the offer price

Table 3
Comparison of the 38-issue sample with the population of 1,477 firm-commitment IPOs brought to market during the period 1983–1987.

Sample and population characteristics are drawn from the *Investment Dealers' Digest Corporate Database* and the Center for Research in Securities Prices daily return file. (Median values are reported in parentheses.)

	Sample	Population	*t*-statistic for difference in means
Initial return	8.6% (3.2%)	8.6% (2.0%)	−0.01
Offering price	$14.0 (12.9)	$9.9 (9.5)	6.22
Amount offered (in millions)	$24.9 (14.6)	$15.7 (9.3)	1.59
Pre-issue assets (in millions)	$97.3 (47.9)	$67.1 (11.5)	0.90
Preceding year's revenue (in millions)	$79.6 (57.8)	$65.8 (18.6)	0.93
Gross spread as a percent of offering amount	7.1% (7.1%)	7.9% (7.5%)	−8.69
Offering expenses as a percent of offering amount	3.0% (2.7%)	5.0% (4.0%)	−5.43
Average market share of lead underwriters[a]	3.0% (1.3%)	3.5% (1.5%)	−0.99

[a]Market share is the total dollar amount underwritten by an underwriter divided by the total capital raised by all issues classified as IPOs by the *Investment Dealers' Digest Corporate Database* ($70.3 billion during the 1983–1987 period). If the issue has more than one lead underwriter, then market share is the average market share of the lead underwriters. Therefore, issues underwritten by the sample underwriter may differ in the average market share of the lead underwriters as a result of co-management.

to the close of the first day of trading is negative (overpriced), zero, or positive (underpriced). Among the 38 sample offerings for which initial institutional holdings (domestic and foreign) are observable, 24 are underpriced. The mean return from a strategy of purchasing underpriced issues at the offer price and liquidating at the close of the first day of trading is 14.7%. Institutions purchased 70.4% of the shares in underpriced offerings distributed by the sample underwriter thereby capturing $20,809,992 (73%) of the $28,681,776 total first-day profits generated by underpriced offers. (Recall that the sample underwriter distributes on average only 48.2% of the shares offered.) Assuming that the remainder of the syndicate follows an identical distribution pattern, institutions capture $41,514,336 of the $56,804,160 first-day profits generated by underpriced offers. Of course, since lower-ranked members of the syndicate tend to be regional retail firms, it is likely that this assumption leads to overstatement

Table 4
Initial returns and distribution characteristics for the sample of 38 IPOs

Sample IPOs are classified by the size of their initial return. Dollar profit (loss) is calculated assuming that shares distributed by the sample underwriter are purchased at the offer price and liquidated at the close of the first day of trading. [Median values are reported in brackets.]

	Initial returns less than zero	Initial returns equal to zero	Initial returns greater than zero
Number of issues	9	5	24
Initial return	− 1.7% [− 1.4%]	0.0% [0.0%]	14.7% [12.7%]
Percent of issue sold to institutional investors	64.8% [71.6%]	53.4% [63.4%]	70.4% [73.3%]
Mean $ profit (loss) earned by institutional investors	($133,351) [($117,500)]	$0.00 [$0.00]	$867,083 [$554,600]
Total $ profit (loss) earned by institutional investors	($1,200,159)		$20,809,992
Total $ profits (losses)	($1,718,568)		$28,681,776

of the fraction of first-day profits captured by institutional investors. Simply assuming that the remainder of the issue is allocated to retail investors yields a lower bound of 37% on first-day profits captured by institutional investors. Thus the 38-issue sample for which initial institutional holdings are observable supports the conjecture that institutions capture the majority of the profits generated by underpriced IPOs.

On the other hand, institutional investors also purchase a relatively large fraction of the nine overpriced offerings. In fact, the median percentage of overpriced shares purchased by institutional investors differs little from the median for underpriced offerings. Although an institutional trading strategy of purchasing at the offer and liquidating at the close of the first day of trading results in losses of $1,200,159, or 70% of the $1,718,568 total losses, these losses are less than 10% of the $20,809,992 in profits generated by following the same strategy with underpriced issues. The difference in magnitude between profits and losses is related to both the relatively small number (nine) of overpriced issues and the relatively small absolute initial return (− 1.7%).[1] It is also worth

[1] We observe a similar pattern within the population of firm-commitment offerings for which reports of post-offer institutional holdings are available. In contrast to the 671 underpriced issues, only 242 (21%) of the population issues are overpriced. Similarly, the mean initial return for overpriced issues is − 4.22%, whereas the mean initial return for underpriced issues is 14.05%. A partial explanation for the relatively small losses on overpriced issues in both the sample and the population is that underwriters make efforts to support weak issues for a limited period of time following the offering (Miller and Reilly, 1987; Ruud, 1993; Hanley, Kumar, and Seguin, 1993).

Table 5
Ordinary least-squares estimates of coefficients from cross-sectional regressions of initial returns on the fraction of the issue purchased by institutional investors

Panel A contains regression results for the 38-issue sample for which initial institutional holdings are observable. Panel B contains regression results for the 1,168 firm-commitment offerings brought to market during the 1983–1987 period using post-offer reports of domestic institutional holdings as a proxy for initial institutional holdings. Market share is included to proxy for underwriter reputation and is defined as the total dollar amount underwritten by an underwriter divided by the total capital raised through IPOs during the 1983–1987 period. (t-statistics are reported in parentheses.)

Initial return$_i = a_0 + a_1$Institutional$_i + a_2$Market share$_i + e_i$

Intercept	% of issue sold to institutional investors	Average market share of lead underwriters	F-value	Adjusted R^2
Panel A: 38-issue sample				
−0.061	0.22		2.55	0.04
(−0.64)	(1.60)			
Panel B: Population				
0.075	−0.008		0.45	0.00
(12.15)	(−0.67)			
0.089	0.007	−0.472	12.15	0.019
(13.18)	(0.58)	(−4.88)		

noting that although the sample underwriter distributes 50% of the shares in underpriced offers, it distributes only 40% of the shares in overpriced offerings.

The mean percentage of institutional holdings for both overpriced issues and issues with an initial return of zero is sensitive to the exclusion of outliers. In only four cases is the fraction of the issue allocated to institutional investors less than 50%. In only one instance does this occur for an underpriced issue. Among those issues with zero initial returns, one issue exhibits an institutional allocation of only 6.6%. (Interest in this issue was so weak that the initial offer of 1.3 million shares was reduced to 900,000 shares; the firm ultimately sold 575,000 primary shares and held the remainder from the market.) The next-smallest institutional allocation of 27.6% occurs among the overpriced issues. All other issues exhibit institutional allocations in excess of 42%. Excluding these two outliers from the sample we find mean percentage institutional holdings of 69.5% among overpriced issues and 65% among issues with zero initial returns. Thus, initial institutional holdings appear to be largely independent of the degree to which an issue is underpriced.

Further evidence in support of this conclusion is provided by regressing an issue's initial return on the fraction of the issue purchased by institutional investors. The regression results for the 38-issue sample, reported in panel A of Table 5, support the conclusion that variation in the fraction of an issue

allocated to institutional investors does not explain a statistically significant proportion of the cross-sectional variation in initial returns. This conclusion is insensitive to the exclusion of outliers and alternative specifications of the regression model.[2]

In panel B of Table 5 we corroborate these results with similar evidence from the population of 1,168 issues brought to market during the 1983–1987 period for which post-offer institutional holdings are available. (When no institutional holdings are reported, the issue is excluded from the sample, because it is impossible to distinguish issues held entirely by retail investors from those with unreported institutional holdings.) The first regression simply uses post-offer institutional holdings as a proxy for initial institutional holdings. The second regression also controls for the fact that, in contrast to the 38-issue sample, underwriter reputation varies considerably across the population. We use the market-share variable described earlier as a proxy for underwriter reputation. Similar to the findings of Carter and Manaster (1990), issues with smaller initial returns are associated with more reputable underwriters. In neither case, however, does variation in reported post-offer holdings explain a statistically significant proportion of the cross-sectional variation in initial returns.

Thus far the evidence is consistent with the hypothesis that institutional investors are favored in the distribution of underpriced issues but that such treatment comes in exchange for participation in overpriced issues. Of course it is possible that institutional investors are simply unable to distinguish between (ex ante) underpriced and overpriced issues. It is perhaps more relevant, then, to ask whether retail investors are systematically excluded from issues drawing strong institutional interest prior to the offering. Since underwriters condition the final offer price (as well as the number of shares offered) on pre-offer institutional indications of interest, we follow Hanley (1993) and assume that issues with offer prices greater than the upper bound of the price (file) range disclosed in the issuing firm's preliminary prospectus drew relatively strong institutional interest prior to the offering. Similarly, we assume that issues priced within the offer range drew moderate interest and those offered at prices below the lower bound of the offer range drew relatively weak interest prior to the offering.

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[2]Hanley (1993) finds a statistically significant direct relation between initial returns and the percentage deviation of the offer price from the mean of the offer range. Including this variable in the regression model produces similar results, but has no qualitative effect on the institutional-holding coefficient. Defining the institutional-holding variable to be the natural log of the fraction of the issue purchased by institutional investors yields similar results. Finally, when the sample is divided into underpriced offerings and all others, both parametric and nonparametric tests fail to reject the hypothesis that initial institutional holdings are the same for both groups. Again, the conclusion is insensitive to exclusion of outliers.

Table 6
Initial returns and distribution characteristics for the sample of 38 IPOs

Sample IPOs are classified by the relation of their final offer price to the file range in the preliminary prospectus. Mean dollar profit (loss) earned by institutional investors is calculated per issue assuming that all shares distributed by the sample underwriter to institutional investors are purchased at the offer price and liquidated at the close of the first day of trading. [Median values are reported in brackets.]

	Final offer price less than the file range	Final offer price within the file range	Final offer price greater than the file range
Number of issues	8	20	10
Initial return	−2.1% [−1.9%]	8.2% [4.4%]	18.0% [12.0%]
Percent of issue sold to institutional investors	59.2% [64.5%]	67.7% [70.1%]	71.1% [73.0%]
Mean $ profit (loss) earned by institutional investors	($118,598) [($80,563)]	$550,588 [$229,800]	$917,951 [$435,568]

For two of the sample IPOs, the preliminary prospectus provides a single price rather than a range of prices. In both of these cases the offer price exceeds the preliminary price, and the issues were therefore designated as having sold above the offer range. In one case we were unable to obtain information about the suggested offer range and therefore assumed that the issue sold within the offer range. Under these assumptions Table 6 indicates that 18 of the IPOs in the current sample are offered at prices outside of the offer range. Of these, 10 are offered at prices greater than the upper bound of the offer range.

Consistent with Hanley's (1993) findings, we observe a direct relation between the initial return and the level of the offer price relative to the offer range. The mean initial return for IPOs offered at prices less than the lower bound of the offer range is −2.1%. In contrast, the mean initial returns for IPOs offered at prices within the offer range or above the upper bound of the offer range are 8.2% and 18.0%, respectively. Mean first-day dollar returns on shares distributed by the sample underwriter range from a loss of $118,598 for issues offered at prices less than the lower bound of the offer range to a profit of $917,951 for issues offered at prices greater than the upper bound of the offer range.

The relation between the fraction of the issue allocated to institutional investors and the level of the offer price relative to the offer range is less pronounced. Institutional investors purchase approximately 71% of the shares distributed by the sample underwriter in issues with offer prices in excess of the upper bound of the offer range, 68% of the shares in issues with offer prices

Table 7
Ordinary least-squares estimates of coefficients from cross-sectional regressions of the percentage deviation of the offer price from the mean of the file range on the fraction of the issue purchased by institutional investors

Panel A contains regression results for the 38-issue sample for which initial institutional holdings are observable. Panel B contains regression results for the 1,168 firm-commitment offerings brought to market during the 1983–1987 period using post-offer reports of domestic institutional holdings as a proxy for initial institutional holdings. Market share is included as a proxy for underwriter reputation and is defined as the total dollar amount underwritten by an underwriter divided by the total capital raised through IPOs during the 1983–1987 period. (*t*-statistics are reported in parentheses.)

Initial return$_i = a_0 + a_1$ Institutional$_i + a_2$ Market share$_i + e_i$

Intercept	% of issue sold to institutional investors	Average market share of lead underwriters	*F*-value	Adjusted R^2
Panel A: 38-issue sample				
−0.155	0.250		3.34	0.061
(−1.67)	(1.83)			
Panel B: Population				
−0.053	0.024		3.26	0.002
(−8.28)	(1.80)			
−0.042	0.037	−0.395	9.27	0.014
(−5.90)	(2.74)	(−3.91)		

within the offer range, and 59% of the shares in issues with offer prices less than the lower bound of the offer range.[3] However, the class of issues with offer prices less than the lower bound of the offer range contains the issue for which only 6.6% of the shares were allocated to institutional investors. Excluding this issue from the sample, we observe a mean institutional allocation of 67% for the class of issues.

We investigate the statistical significance of the relation between pre-offer institutional interest and the fraction of the issue purchased by institutional investors by regressing the percentage deviation of the offer price from the mean of the offer range on the fraction of the issue allocated to institutional investors for the 37 issues for which the offer range was known. The results reported in panel A of Table 7 indicate that the relation between institutional allocations

[3]In contrast to the distribution pattern among over- and underpriced offers, the sample underwriter distributed approximately the same fraction of issues with offer prices less than the lower bound of the offer range (47.3%) and issues with offer prices greater than the upper bound of the offer range (46.6%). For issues with offer prices within the offer range, the sample underwriter distributed 49.4% of the shares sold.

and pre-offer interest is statistically significant at the 10% level. Excluding the two outliers from the sample, however, we cannot reject the null hypothesis of no relation between institutional allocations and pre-offer interest at conventional levels of significance. On the other hand, both parametric and non-parametric difference tests reject at conventional significance levels ($p = 0.05$) the hypothesis that institutional allocations for issues priced above the mean of the offer range equal the allocations for those priced at or below the mean.

Similar results for the population of 1,168 issues brought to market during the 1983–1987 period are reported in panel B of Table 7. Regressing the percentage deviation of the offer price from the mean of the offer range on post-offer institutional holdings alone yields results similar to those obtained for the 37-issue sample. On the other hand, after controlling for differences in underwriter reputation, variation in post-offer institutional holdings explains a statistically significant proportion of the cross-sectional variation in the proxy for pre-offer interest. We obtain similar results using the absolute percentage deviation of the offer price from the mean of the offer range. We also control for market-wide movements by including the holding-period return from the filing date to the offer date for the NASDAQ equally-weighted index contained in the Center for Research in Securities Prices (CRSP) data file. Similar to the findings of Hanley (1993), this variable accounts for a statistically significant fraction of the variation in the independent variable. The remainder of our conclusions are robust to this addition to the model, however.

In summary, the evidence suggests that institutional investors do receive larger allocations of underpriced offerings. However, because institutions also take large positions in overpriced offerings there is no evidence of a statistically significant relation between institutional holdings and initial returns for either the sample of 38 issues for which initial holdings are observable or the population of firm-commitment offerings brought to market during the sample period. Although there is some evidence that institutional allocations are directly related to pre-offer interest, again we find that institutions are allocated large proportions of issues for which pre-offer interest is weak as well as of issues for which it is strong.[4]

4. Discussion

A number of theories have been advanced to explain the apparent short-run average underpricing of IPOs. Among these theories, several predict a relation

[4]Ritter (1991) suggests that evidence of long-run underperformance of IPOs reflects overly optimistic expectations among investors. If institutional investors are relatively sophisticated and therefore less likely to fall prey to fads in IPOs, we should observe a direct relation between an IPO's long-run performance and the fraction of the issue purchased by institutional investors. Although the 38-issue sample yields evidence consistent with this prediction, the population does not.

between the degree of underpricing and the distribution of shares among various investor clienteles. Rock (1986), for example, predicts that well-informed investors will dominate underpriced issues and systematically avoid overpriced issues. Assuming that the successful placement of IPOs rests on the continued participation of uninformed investors, a passive underwriter will find it necessary to underprice IPOs on average such that uninformed investors earn the riskless rate of return when profits are weighted by the probability of receiving an allocation.

This stylized model appears to capture the essence of primary markets in countries where underwriters play a relatively passive role in bringing new issues to market. In Singapore, for example, underwriters generally set prices independently of the market response to the issuing firm's prospectus. Moreover, rationing of oversubscribed shares is generally '... evenhanded in the sense that all applications of a particular size have an equal probability of being accepted' (Koh and Walter, 1989). When underwriters do discriminate in the allocation of shares, it is generally because of public policy concerns such as the desire to allocate a fraction of the approximately $2 billion privatization of Singapore Telecom to the domestic retail market. Thus underwriters act primarily as passive agents for the issuing firm. Under these circumstances Koh and Walter (1989) confirm the presence of a winner's curse in Singapore. Keloharju (1993) finds evidence of a winner's curse in Finland, where underwriters behave in a similarly passive manner.

In contrast, if institutional investors are well-informed relative to retail investors, the evidence reported in Section 3 suggests that the simple model analyzed by Rock (1986) cannot capture the full range of price and distribution outcomes observed in the U.S. Although institutional investors receive a large fraction of the shares in underpriced offerings, they also purchase a similarly large fraction of overpriced shares. In other words, if institutional investors are well-informed relative to retail investors, they are unable to use their information advantage over time to avoid investing in overpriced offerings.

Moreover, retail investors earn substantial average first-day profits from participation in the 38 sample issues: $193,510 per issue, or about 1.5% of the average dollar value of shares issued (based on the total market value at the offer price for the 38 sample issues, including shares sold through the overallotment option, of $1028.22 million and the total first-day profit of $56.8 million from purchasing at the offer price and liquidating at the first-day closing price). In fact, even if 100% of the shares in overpriced issues were purchased by retail investors during this period, their average first-day profit would remain positive unless institutional investors purchased in excess of 94% of the shares in underpriced offerings. (If we assume an identical distribution pattern among other members of the underwriting syndicate, retail investors earn an average first-day profit on the entire issue of $362,088, and average first-day retail profits remain positive unless institutional investors purchase in excess of 91.2% of the shares in underpriced offerings.) Of course, this analysis ignores the effect of rationing on *expected* returns. On the

other hand, the relative stability of the total retail allocation suggests that rationing alone will not diminish the attractiveness of IPOs to retail investors unless the degree of adverse selection within the retail pool dominates that which occurs across the pools of retail and institutional investors.

Of course, Rock (1986) assumes that underwriters respond passively in the presence of adverse selection, an apt characterization of the traditional underwriting practices in Finland and Singapore. In contrast, the information-gathering theory suggests that the practice of book-building followed by U.S. underwriters reflects an effort to mitigate the consequences of asymmetric information. The underwriter's leverage derives from the opportunity under U.S. securities regulation to condition both offer prices and share allocations on nonbinding indications of interest solicited from a pool of regular institutional investors. The power to discriminate in the allocation of shares introduces the threat of exclusion from underpriced offerings. This threat can be sufficient to make understating interest in an issue or declining to participate in less-attractive issues quite costly from the perspective of institutional investors. Although underpricing is still necessary to provide an incentive for institutional investors to give accurate indications of interest, a strategy favoring institutional investors with underpriced issues can lead to greater expected net proceeds than would be possible if no information were gathered and the full burden of adverse selection were borne.

For our purposes the key predictions of the information-gathering theory are that underpriced shares will be concentrated among institutional investors and that institutional investors can occasionally be called upon to invest in (overpriced) issues in which they would otherwise have little interest. The first prediction derives from the use of underpricing as an incentive to surrender private information and the observation that institutional investors are the focus of the underwriter's pre-offer information-gathering effort. Efficient use of the incentive requires concentration of underpricing among the segment of the investor population surrendering private information. Since retail investors have no voice in the pre-offer marketing effort, they should receive underpriced shares only if institutional demand falls short of the total shares issued or when the underwriter's information-gathering effort yields no information (and for incentive reasons it is necessary to allocate the issue to retail investors). In the latter case, underpricing is necessary because the underwriter's efforts have failed, and the market is characterized by the presence of adverse selection.[5]

[5]Benveniste and Wilhelm (1990) predict that investors providing negative indications of interest will be excluded from the offer. This feature of the models the result of both the discrete information structure (Benveniste and Wilhelm, 1990, footnote 5), and the absence of repeated trade between the underwriter and investors. Relaxing either or both of these restrictions reduces the importance of excluding investors providing negative indications for incentive purposes. For the remainder of the discussion we use a hybrid of the Benveniste and Wilhelm (1990) model in which repeat trade occurs to guide our interpretation of the evidence.

The sample underwriter's allocation of 70% of the shares in underpriced offerings to institutional investors is consistent with the efficient use of underpricing as an incentive. Of course, this finding is also consistent with Rock's prediction that informed investors will dominate underpriced offerings. Thus the prediction that institutional investors can be induced to purchase shares in less-attractive issues is crucial to any attempt to distinguish between the two theories. Benveniste and Spindt (1989) demonstrate that this prediction arises in a repeated-trade setting where underwriters can force investors to purchase shares of issues from which they expect to incur losses as long as these losses are offset by expected profits from their inclusion in future underpriced offerings. By trading repeatedly with a stable pool of investors, the underwriter effectively gains additional leverage over investors with private information. The underwriter is thus able to reduce expected underpricing while preserving the incentive-compatibility of providing accurate indications of interest. The finding that institutional investors also purchase a large fraction of shares in overpriced offerings is consistent with this element of the information-gathering theory. Finding active institutional participation in issues drawing relatively weak interest prior to the offering lends further weight to the argument.

If participation in less-attractive issues is the price of inclusion in underpriced offerings, we should observe several related patterns in the data. For example, the underwriter investigated in this study, perhaps in an effort to avoid alienating both the investing public and its regulators, claims to earmark 40% of the shares in each issue for distribution among retail investors. If this claim is true, then issues with initial institutional holdings well in excess of 60% might represent cases in which pre-offer demand was weak and institutional investors were compelled to purchase a larger fraction of the issue. In such cases we might expect the underwriter to be less aggressive in its use of the overallotment option and institutional investors to be more aggressive in flipping their initial holdings. Dividing the 38-issue sample into quartiles according to initial institutional holdings, we find evidence consistent with both conjectures. In the presence of post-offer price support, the burden associated with participation in less-attractive issues is therefore diminished.

Alternatively, Welch (1992) interprets the underwriter as an institution aimed at inhibiting communication among potential investors. In Welch's (1992) model, asymmetric information creates the potential for a *cascade* in which investors deciding whether to purchase shares in an IPO ignore their private information in favor of information inferred from previous sales. Issuers benefit from cascades, and cascades are more likely to occur when communication among investors is limited. Welch (1992, footnote 31) conjectures that '... the relationship between an investor and a selling investment bank is far more adversarial than the relationships among investors'. Assuming that investors do communicate with one another, one might also conjecture that given the atomistic nature of retail investors, communication occurs to a greater degree

among institutional investors. Marketing an issue to retail investors would then appear to be the more attractive alternative. In this regard, our evidence is inconsistent with the cascade theory. Of course, it is possible that retail distribution channels are operationally inefficient relative to institutional channels. Benveniste and Bu-Saba (1993) compare cascade and information-gathering strategies and demonstrate that information gathering generates higher expected proceeds for the issuing firm. On the other hand, cascades reduce uncertainty about the level of proceeds.

Obviously, the data are insufficient to reach a definitive conclusion regarding the relative explanatory power of these theories, in part because the theories are not mutually exclusive, positing that asymmetric information among potential investors lies at the root of IPO underpricing. Rock (1986), however, does not consider mechanisms for resolving the information problem, and consequently underpricing is a reflection of the winner's curse faced by uninformed investors. In contrast, Benveniste and Wilhelm (1990) demonstrate that under some conditions underwriters have the incentive and leverage necessary to resolve informational asymmetries among investors. Under these circumstances, underpricing is the cost of eliciting private information. Although much of the evidence is consistent with the hypothesis that underwriters allocate IPO shares strategically in an attempt to mitigate the adverse selection described by Rock (1986), a stronger conclusion would require data not incorporated in this study. For example, we cannot observe the degree to which sample IPOs are rationed, nor can we observe variation in allocation patterns within the institutional and retail investor pools. More importantly, we cannot be certain that institutional investors are indeed well-informed relative to retail investors. If the distribution of information is more heterogeneous within rather than across the two investor classes, our evidence provides little insight into the relative merit of the two theories in the absence of rationing and within-class allocation data.

Of course, it is difficult to explain the favored status enjoyed by institutional investors if institutional investors are not well-informed relative to retail investors. One possible explanation is that investment banks bundle IPOs with other services in a manner described by Smith (1977) and Chalk and Peavy (1987), although this explanation does not account for the similarly large institutional allocations in overpriced issues. Alternatively, institutional distribution channels may simply be more efficient. If so, however, it is not clear why retail investors would receive even a small allocation of IPO shares unless investment banks are concerned that exclusion of retail investors from IPOs will limit the breadth of share distribution, harm relations with retail investors, or, perhaps worse, draw the attention of the regulatory community.

It should also be noted that recent evidence on the role of post-offer price supports by underwriters (Hanley, Kumar, and Seguin, 1993; Ruud, 1993) suggests that even if the information-gathering theory is an accurate description of the underwriting process for firm-commitment offerings in the U.S., the equilibrium

is likely to be considerably more complicated than previously understood. In its current form, the information-gathering theory assumes that underwriters use a combination of underpricing, discriminatory allocation, and repeat transactions to elicit information from institutional investors. Although both post-offer price supports and rapid liquidation of shares (or flipping) impose a burden on underwriters, it is likely that such post-offer efforts complement pre-offer information gathering. It has been suggested that underwriters exercise control over the level of flipping among at least some of their investors by threatening exclusion from future IPOs (see the *Wall Street Journal*, December 29, 1993). Underwriters can then discriminate in the magnitude of expected profits allocated to individual investors by providing price support but limiting investor access to their artificially high bid price. In other words, although U.S. underwriters must sell IPO shares at a fixed price, their post-offer activities may permit them to replicate the effect of discriminatory pricing. Benveniste and Wilhelm (1990) demonstrate that the ability to set prices in a discriminatory manner leads to higher expected proceeds.

5. Conclusion

The evidence reported in this paper suggests that institutional investors are indeed the recipients of a large fraction of the short-run profits associated with IPOs. Although quite profitable, the favored status enjoyed by institutional investors in underpriced offerings appears to carry a *quid pro quo* expectation that they will participate in less-attractive issues as well. This pattern in the data suggests that U.S. underwriters behave strategically in their use of the freedom to discriminate in the allocation of IPOs. If this interpretation is accurate, our findings contradict the conventional wisdom that the apparent discriminatory practices of U.S. underwriters warrant criticism. Rather, the ability to engage in such practices may promote efficiency in U.S. capital markets by diminishing the consequences of an otherwise substantial market imperfection, and may in turn, shed light on the increasing popularity of the book-building approach to marketing IPOs (*The Economist*, January 9, 1993).

References

Benveniste, Lawrence M. and Walid Bu-Saba, 1993, Bookbuilding versus fixed price: An analysis of competing strategies for marketing IPOs, Working paper (Boston College, Chestnut Hill, MA).

Benveniste, Lawrence M. and Paul A. Spindt, 1989, How investment bankers determine the offer price and allocation of initial public offerings, Journal of Financial Economics 24, 343–362.

Benveniste, Lawrence M. and William J. Wilhelm, 1990, A comparative analysis of IPO proceeds under alternative regulatory environments, Journal of Financial Economics 28, 173–207.

Carter, Richard and Steven Manaster, 1990, Initial public offerings and underwriter reputation, Journal of Finance 45, 1045–1068.

Chalk, Andrew J. and John W. Peavy, 1987, Why you'll never get a 'hot' new issue, AAII Journal 9, 16–20.

Hanley, Kathleen Weiss, 1993, Underpricing of initial public offerings and the partial adjustment phenomenon, Journal of Financial Economics 34, 231–250 .

Hanley, Kathleen Weiss, A. Arun Kumar, and Paul J. Seguin, 1993, Price stabilization in the market for new issues, Journal of Financial Economics 34, 177–198.

Ibbotson, Roger G., 1975, Price performance of common stock new issues, Journal of Financial Economics 2, 235–272.

Keloharju, Matti, 1993, The winner's curse, legal liability, and the long-run performance of initial public offerings in Finland, Journal of Financial Economics 34, 251–277.

Koh, Francis and Terry Walter, 1989, A direct test of Rock's model of the pricing of unseasoned issues, Journal of Financial Economics 23, 251–272.

Loughran, Tim, Jay R. Ritter, and Kristian Rydqvist, 1994, Initial public offerings: International insights, Pacific-Basin Finance Journal, forthcoming.

Megginson, William L. and Kathleen A. Weiss, 1991, Venture capitalist certification in initial public offerings, Journal of Finance 46, 879–903.

Miller, Robert E. and Frank K. Reilly, 1987, An examination of mispricing, returns, and uncertainty for initial public offerings, Financial Management 16, 33–38.

Ritter, Jay R., 1991, The long-run performance of initial public offerings, Journal of Finance 46, 3–28.

Rock, Kevin, 1986, Why new issues are underpriced, Journal of Financial Economics 15, 187–212.

Ruud, Judith F., 1993, Underwriter price support and the IPO underpricing puzzle, Journal of Financial Economics 34, 135–152.

Smith, Clifford W., 1977, Alternative methods for raising capital: Rights versus underwritten offerings, Journal of Financial Economics 5, 273–307.

Welch, Ivo, 1992, Sequential sales, learning, and cascades, Journal of Finance 47, 695–732.