

**Is Institutional Investment in Initial Public Offerings
Related to Long-Run Performance of These Firms?**

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ABSTRACT

The phenomenally poor long-run performance of initial public offerings has been documented in the academic and business literature for many years now, yet investment in these firms continues to be as popular as ever. This study examines the holdings of institutional shareholders soon after the offering date and finds that initial public offerings having larger institutional shareholdings tend to subsequently earn significantly higher long-run returns than those with smaller institutional shareholdings, even after controlling for several firm characteristics. Indeed, we find that initial public offerings with higher institutional ownership soon after the offering date do not appear to significantly underperform a portfolio of seasoned firms matched by firm size, while initial public offerings with smaller institutional shareholdings frequently earn less than the risk-free rate in the long-run.

I. INTRODUCTION

The financial markets have long recognized that the performance of initial public offerings (IPOs) follows patterns distinct from those of more established firms. IPOs generally earn a substantial return in the first few days of trading, but the long-run performance of IPOs is usually poor relative to that of seasoned firms. Consequently, investors who purchase IPOs at the offer price can earn above-market returns by participating in the offering, but these initial gains may be extinguished if the investment is held for a longer period.

Several studies in the finance literature document the poor long-run performance of IPOs. In 1970, Stoll and Curley found that small IPOs issued in 1957, 1959, and 1963 underperformed the S&P industrial average for up to the ninth year after seasoning. Ibbotson (1975) examined IPOs issued from 1960 through 1969 and found negative performance from the second through the fourth years of seasoning, although he emphasized that he could not reject the hypothesis of no abnormal performance. Ritter (1991) found that 1,526 firms with initial public offerings between 1975 and 1984 substantially underperformed a sample of matching firms through the third year of seasoning. Loughran and Ritter (1995) found that, for IPOs during 1970 to 1990, investors received average returns of only 5 percent per year for five years following the issue.

There have also been many articles in the popular press discussing the long-run underperformance of initial public offerings. An article in *Forbes* magazine (December 2, 1985) reports that IPOs from 1975-1985 underperformed the S&P 500 stock index. A more recent article in *The Wall Street Journal* (March 17, 1994) reports a study by Prudential Securities which documents that 1,500 IPOs which came to market in 1991 underperformed the Nasdaq Composite index by more than 5% from the first-day close to two years later.

This pattern of poor long-run IPO performance raises the question of why informed investors hold IPOs beyond the initial period following the offering. Certainly, investors who are aware of the evidence regarding poor long-run IPO performance would avoid IPOs in the aftermarket unless they felt they could distinguish which IPOs would be poor long-run performers versus those which would not.

In the academic literature, researchers have argued that institutional investors are informed investors. For example, Michaely and Shaw (1994) contend, "We associate the informed investors in the IPO market with the institutional investors." Badrinath, Kale, and Noe (1995) also associate institutions with informed traders in the following argument: "...the past returns on stocks held by *informed institutional traders* will be positively correlated with the contemporaneous returns on stocks held by *noninstitutional uninformed traders*." (emphasis added).

This paper examines the long-run performance of initial public offerings as related to institutional investment shortly after the IPO date. If institutional investors are truly informed, one might expect IPOs with higher institutional shareholdings in the aftermarket to experience better long-run performance than IPOs with smaller institutional shareholdings. Evidence is presented in this paper supporting this statement.

We demonstrate that institutional investors may have some ability to predict the quality of the IPO: IPOs with larger institutional shareholdings within one quarter of the IPO date tend to perform better over a three-year period than those with little or no institutional shareholdings at the end of the first quarter. We examine the nature of this relationship by examining other possible factors which may explain why IPOs with larger institutional shareholdings tend to outperform those with little or no institutional shareholdings. Indeed, evidence is presented which demonstrates that institutional shareholdings are positively correlated with firm size as well as

firm age. For offerings between 1979 and 1989, we document that larger firms generally earned higher long-run returns than did smaller firms, consistent with Loughran and Ritter (1995). In addition, corroborating Ritter's (1991) findings, older firms as of the IPO date generally earned higher long-run returns than did younger firms. Even after controlling for firm size and age, however, institutional shareholdings are found to be significantly positively related to three-year IPO performance.

This paper does not demonstrate that institutional investors are informed. Indeed, we do not know what returns institutional investors actually earn in their IPO investments since we do not follow institutional ownership of IPOs through time. This paper does, however, provide evidence that IPOs with the smallest institutional investment at the end of the first calendar quarter following the IPO subsequently tend to be the poorest long-run performers. Additionally, given that IPOs with the largest institutional shareholdings do not, as a group, significantly underperform a portfolio of seasoned firms matched by size, this paper does provide evidence that there are groups of IPOs, identifiable ex-ante, which do not experience the abysmally poor long-run performance documented by Ritter (1991).

The paper is organized as follows. Section II describes the data. Section III presents descriptive statistics of the sample. Section IV describes the methodology used to measure long-run returns. Section V presents evidence of long-run performance of initial public offerings. Section VI relates long-run IPO performance to institutional shareholdings. Section VII concludes.

II. DATA

The sample consists of 2,973 companies going public in the U.S. during 1979-1989 which are subsequently listed on Center for Research in Security Prices (CRSP) Nasdaq or New York and American Exchanges (NYSE-Amex) daily tapes within three months of the IPO date and which have an offer price of at least \$1 (unit offerings are excluded).¹ To identify IPOs during 1979-1984, Ritter's IPO database was used. To identify IPOs during 1985-1989, *Going Public: The IPO Reporter* and *The Corporate Finance Sourcebook* were used.

The total number of operating company IPOs during the period was 4,763, of which 2,973 IPOs meet the requirements listed above. Most of the missing firms are small offerings not qualifying for Nasdaq. If a firm is listed on either CRSP Nasdaq or NYSE-Amex daily tapes within three months of the IPO date, then its performance is measured over the next three years or until its delisting date, whichever occurs first. Companies moving from Nasdaq to the New York or American Stock Exchanges (or vice versa) remain in the database.

The returns data and data on firm size are extracted from the 1992 CRSP daily tapes. The IPO offer price was obtained from Ritter's database for 1979 to 1984 and from *The IPO Reporter* and *The Corporate Finance Sourcebook* for 1985 to 1989. Data on firm age at the IPO date were obtained from Ritter's IPO database for 1979 to 1984 and from Moody's manuals for IPOs for 1985 to 1989. Data on SIC codes were obtained from Ritter's database for IPOs from 1979 to 1984 and from either Compact Disclosure, 10-K forms, or CRSP as soon after the IPO date as possible for IPOs from 1985-1989.

¹ All findings shown in this study have been replicated elsewhere including unit IPOs and IPOs with an offer price below \$1. Including these firms emphasizes the results reported herein.

Institutions classified by the SEC as 13f investment managers are required to declare their holdings to the SEC at the end of each calendar quarter (March 31, June 30, etc.).² Institutional shareholdings data are available quarterly from 1978 to the present in the *Spectrum 3: 13(f) Institutional Stock Holdings Survey* books. Thus, the earliest available data on institutional shareholdings of IPOs is at the end of the first quarter following the offering. This date will be referred to as Quarter 1 throughout and was determined as follows:

Date of IPO	Quarter 1 Date
December 16, Year t-1 – March 15, Year t	March 31, Year t
March 16 – June 15, Year t	June 30, Year t
June 16 – September 15, Year t	September 30, Year t
September 16 – December 15, Year t	December 31, Year t

The use of this date limits observations to institutional holdings in the aftermarket. Institutions purchasing IPOs only for the initial return are eliminated from the sample since there are at least two weeks between the offering date and observation of the 13f institutional holdings.

III. SAMPLE DESCRIPTION

Ritter (1991) establishes a standard of measures for the long-run performance of IPOs; this paper expands that work by incorporating institutional investment into the analysis. Ritter's performance measures are used except where noted.

To facilitate comparisons of Ritter's results to those presented in this paper, the results presented herein will occasionally be provided not only for the entire sample which covers 2,973

² A 13(f) institutional investment manager is one "exercising discretion over accounts with combined equity assets exceeding \$100 million."

offerings during 1979-1989, but also for two subperiods: (i) 1979-1984, which includes most of the period studied by Ritter, and (ii) 1985-1989, which does not.

To facilitate a better understanding of the data used in this study, Table 1 presents descriptive statistics of the sample. The IPO initial return, shown in the fourth column, is calculated using the offer price and the first-day closing price on CRSP. The average initial return is 10.10%, although the distribution of initial returns varies considerably from year to year. Most notably, there are discernable differences between the two subperiods, 1979-1984 and 1985-1989. The average initial return during the first subperiod was 12.4%, while that during the second subperiod was smaller at 7.8%. The difference is statistically significant with a t-statistic of 5.0.

The market value³ of the firms in the sample, shown in the fifth column of Table 1, is calculated in 1989 dollars using the U.S. GNP Deflator index. As with initial return, market value also varies considerably within the sample. Firms in the latter subperiod are larger, even after adjusting for inflation. For offerings during 1979-1984, the average market value (in \$1989) was \$72.3 million, while the average market value for offerings during 1985-1989 was \$120.9 million. The difference between these means is statistically significant with a t-statistic of 5.9.

The last two columns of Table 1 present average yearly 13f institutional ownership in IPOs and of all firms in general, respectively. Average annual institutional ownership is calculated as follows:

$$\% \text{ Held by 13f Institutions} = \frac{\sum_{i=1}^n \$\text{Holdings}_i}{\sum_{i=1}^n \$\text{MV}_i},$$

³ The firm's market value is calculated as the equity price multiplied by the total shares outstanding, both measured at Quarter 1 (see Table 1 for a definition of Quarter 1).

where $\$Holdings_i$ is the dollar value of the institutional ownership in firm i at Quarter 1 and $\$MV_i$ is the market value of firm i at the same date.

Institutional ownership in IPOs is rather low, averaging 11.55% over the entire period.⁴ On a quarterly basis, *Spectrum 3* reports the proportion of the market value of all firms owned by 13f institutions. As shown in the last column of Table 1, these proportions ranged from 32.7% to 40% over the 1979-1989 period. Thus, 13f institutional ownership of IPOs is generally smaller than 13f ownership of all firms. This confirms that institutions do seem to avoid IPOs relative to all firms, at least in the early aftermarket.

Although institutional ownership in IPOs generally tends to be rather small, it does appear to be larger in the post-1984 period. For offerings during 1979-1984 institutions owned 7.2% on average at Quarter 1 while for offerings during 1985-1989 institutions owned 11.8% on average.

In summary, we have demonstrated that IPOs did earn substantial initial returns over the period, ranging from a low of 6.17% in 1984 to a high of 30.85% in 1980. We also document that institutional ownership of IPOs is rather small, averaging about 11.55% over the period compared to more than 30% 13f institutional ownership in all firms. Additionally, there seem to be differences between the two subperiods in terms of firm size, institutional ownership, and initial

⁴ This figure is far smaller than the 27.40% institutional ownership reported by Michaely and Shaw (1994) for 717 IPOs during 1984-1988. This difference is because Michaely and Shaw reported institutional shareholdings as a percentage of IPO size, where IPO size is calculated as the offer price multiplied by the number of shares offered. In this paper, firm size is reported as of the same date that institutional shareholdings were collected. That is, in this study, firm size is the equity price at Quarter 1 multiplied by the total shares outstanding as of Quarter 1. For the 1,862 IPOs reported in this study that were issued during 1984-1988, the proportion held by 13f institutions as a percentage of offer price multiplied by number of shares offered, as calculated by Michaely and Shaw, is 26.08%. Note that using this measure results in institutional ownership percentages in excess of 100% for some firms, since 13f institutional shareholders sometimes own shares in firms pre-IPO.

For a sample of 718 IPOs for the years 1988-1992, at least 115 of the firms had 13f institutional shareholders before the IPO. For these firms, 13f institutions owned on average at least 28% of the pre-IPO firm. Moreover, the 13f (pre-IPO) shares not sold at the IPO accounted for at least 18% of the post-IPO firm (fully diluted to account for new shares issued).

returns. IPOs issued during 1979-1984 appear to be smaller firms, have smaller 13f institutional ownership, and offer higher initial returns than those issued during 1985-1989.

IV. METHODOLOGY

The long-run performance of IPOs is measured using two different methods: (1) an equally-weighted portfolio of IPOs is formed and rebalanced monthly, and the performance of this portfolio is compared to that of several benchmark portfolios; and (2) three-year buy-and-hold returns are calculated for each IPO, and these returns are compared to those of seasoned matching firms (see below for description of matching procedure).

Monthly Benchmark-Adjusted Returns

Monthly benchmark-adjusted returns are defined as the monthly raw return on a stock minus the monthly benchmark return for the corresponding period and are calculated for each IPO for three years beginning at the Quarter 1 date. The benchmarks used include: (1) a portfolio of one-month T-bills, (2) a portfolio of seasoned matching firms, and to facilitate comparison with Ritter's (1991) findings: (3) the CRSP value-weighted NYSE-Amex index, and (4) the CRSP value-weighted Nasdaq index. The benchmark-adjusted return for stock i in event month t is thus given by:

$$ar_{i,t} = r_{i,t} - r_{b,t}$$

where $r_{i,t}$ is the raw return for stock i during month t and $r_{b,t}$ is the return for benchmark b during month t . For each event-time month, an equally-weighted portfolio of IPOs is formed. The average benchmark-adjusted return on a portfolio of n stocks for event month t is defined as the average of the benchmark-adjusted returns:

$$AR_t = \frac{1}{n} \sum_{i=1}^n ar_{i,t}.$$

The cumulative benchmark-adjusted return from event month 1 (i.e., the first month following Quarter 1 date) to event month T is the summation of the average benchmark-adjusted returns:

$$CAR_T = \sum_{t=1}^T AR_t.$$

When a firm in the portfolio for month t is delisted from CRSP, the portfolio return for the next month is an equally-weighted average of the remaining firms in the portfolio. For the month in which an IPO is delisted, the return for both the IPO and the benchmark include only the days in which the IPO was listed.

Three-Year Buy-and-Hold Returns

In addition to benchmark-adjusted returns, three-year holding period returns are also computed which measure the total return from a buy-and-hold strategy in which a stock is purchased at the Quarter 1 date and held for a period of three years or its delisting date if earlier. Three year buy-and-hold returns are calculated as follows:

$$R_i = \prod_{t=1}^{36} (1 + r_{i,t}).$$

To measure the IPO return against a seasoned matching firm return, we use the following wealth relative measure::

$$WR = \frac{1 + \text{average three - year total return on IPOs}}{1 + \text{average three - year total return on matching firms}}$$

A wealth relative greater than one corresponds to a portfolio of IPOs outperforming a portfolio of matching firms, and a wealth relative less than one corresponds to the IPO portfolio underperforming that of the matching firms.

Matching Firm Procedure

Ritter (1991) chose matching firms from American and New York stock exchange-listed securities “to some extent” matched by industry and market capitalization with each IPO. In his footnote 8 he states, “Because the industry composition of Amex-NYSE firms differs so dramatically from that of IPOs, only 36% of the matching firms are in the same three-digit SIC industry code as their IPO (57% at the two-digit level).”

Because of this, in this study IPOs are matched to seasoned firms solely by market capitalization without regard to industry, as is done in Loughran and Ritter (1995). However, rather than considering only American and New York stock exchange-listed securities as possible matching firms, this study considers the entire universe of CRSP securities (including Nasdaq-listed securities). On March 31 of each year, all securities listed on CRSP are sorted by market capitalization. Firms with less than five years of CRSP data are then removed from the pool of possible matching firms to ensure that IPOs are matched with seasoned firms.

Next, the market capitalization of each IPO is determined at Quarter 1. Each IPO is then matched with a seasoned firm having the closest market capitalization (measured at March 31 of the same year as Quarter 1). Thus, IPOs are matched with firms on the American, New York, or Nasdaq exchanges, depending on which firm is closest in market capitalization. If a matching firm or IPO moves from one exchange to another over the buy-and-hold period, the firm is followed to the new exchange.

As in Ritter (1991), care was taken to avoid survivorship bias by choosing matching firms regardless of delistings. If a matching firm was delisted for any reason before the earlier of three years after Quarter 1 or the delisting date of the IPO, a second matching firm was chosen for the remaining period. For 675 of the 2,973 IPOs, a second matching firm was required. For 91 IPOs, three matching firms were required for the remainder of the interval due to the delisting of the second matching firm. Seven IPOs required four matching firms, and one IPO required five. In each case, the matching firm(s) return was calculated to correspond exactly to the three-year buy-and-hold period of the IPO (or shorter if the IPO delists early).

V. LONG-RUN PERFORMANCE

Before considering the effect of institutional investment as it relates to long-run performance of IPOs, we examine the overall performance of the IPOs. The cumulative returns for an equally-weighted portfolio of IPOs rebalanced monthly are plotted in Figure 1. The returns are measured for three years beginning at Quarter 1. The portfolio earned cumulative raw returns of 17% over the three-year period. However, subtracting off the cumulative return one could have earned on one-month T-bills, the IPO portfolio earned 3% below the T-bill rate. The portfolio earned -19.1% below the VW-Nasdaq index, -19.8% below the portfolio of matching firms, and -28.7% below the VW-NYSE-Amex index. Excluding the 14% average initial return, Ritter's sample earned cumulative three-year raw returns of about 26%, Nasdaq-adjusted returns of about -15%, matching-firm adjusted returns of about -29%, and NYSE-Amex-adjusted returns of about -24%.

The average monthly matching firm-adjusted returns (AR_t) and cumulative average matching firm-adjusted returns (CAR_t) for the 36 months after Quarter 1 are reported in Table 2.⁵

A preponderance of the monthly returns are negative (29 of 36), and the cumulative matching firm-adjusted average returns are significantly negative after about five months. These findings are consistent with Ritter (1991).

In order to evaluate the ability of institutions to invest selectively in higher-performing IPOs, the offerings were separated into two groups based upon the percentage of institutional investment at Quarter 1. A cutoff point of 5% was selected to allow for roughly equal sample sizes in each group. There were 1,396 IPOs with at least 5% institutional shareholdings and 1,577 with less than 5% institutional shareholdings at Quarter 1.

In Figure 2, we plot the cumulative raw returns of the two portfolios and, for comparison, the entire IPO sample. IPOs with at least 5% institutional shareholdings at Quarter 1 earned higher cumulative raw returns for the three-year period (earning cumulative raw returns of 23.2% over the three-year period) than those with less than 5% institutional shareholdings (which earned 11.3% over the three years).

Cumulative returns in excess of the risk-free rate, computed by subtracting the return of a portfolio of one-month T-bills from the raw IPO returns, are plotted in Figure 3. The portfolio of IPOs with at least 5% institutional ownership at Quarter 1 earned 5.08% above the risk-free rate over the three-year period, whereas the IPO portfolio with less than 5% institutional ownership at

⁵ The t-statistic for the average adjusted return is computed as $AR_t \cdot \sqrt{n_t} / sd_t$, where AR_t is the average matching-firm-adjusted return for month t , n_t is the number of observations in month t , and sd_t is the cross-sectional standard deviation of the adjusted returns for month t .

The t-statistic for the cumulative average adjusted return is computed as $CAR_t \cdot \sqrt{n_t} / csd_t$, where

$$csd_t = \sqrt{\sum_{i=1}^t \text{Var}(AR_i) + 2 \sum_{i < j} \text{Cov}(AR_i, AR_j)} \quad (\text{for } t = 1-36).$$

Quarter 1 earned 9.7% *below* the risk-free rate over the three year period. Moreover, this difference is statistically significant.

While the previous comparisons demonstrate that IPOs with at least 5% institutional ownership at Quarter 1 outperformed those with less than 5% institutional ownership, they do not tell us how well IPOs performed relative to seasoned firms. In Figures 4 and 5, we plot matching-firm adjusted returns and NYSE-Amex VW-adjusted returns, respectively, for the two groups of IPOs based on institutional ownership.

As can be seen in Figure 4, IPOs with little or no institutional shareholdings underperformed matching firms by 32.8%, while IPOs with 5% or more institutional shareholdings underperformed matching firms by 5.3% over the three-year period. The difference in performance between the IPO group with at least 5% institutional shareholdings and its matching portfolio is not significantly different from zero ($t=1.48$). Thus, we confirm Ritter's finding of IPO underperformance against matching firms for IPOs with small institutional shareholdings at Quarter 1, but we do not find significant underperformance against a matching firm benchmark for IPOs with above 5% institutional shareholdings. As shown in Figure 5, however, both portfolios severely underperformed the NYSE-Amex value-weighted adjusted index, although the portfolio of IPOs with at least 5% institutional ownership continues to outperform the IPO portfolio with less than 5% institutional ownership. The two portfolios underperformed the index by 35.5% and 21.2%, respectively.

Figures 6 and 7 illustrate that returns of equal-weighted portfolios with larger institutional shareholdings closely track those of matching firms. A portfolio of 1,142 firms with at least 7.5% institutional shareholdings underperformed a portfolio of matching firms by only 2.7% after three years while a portfolio of 887 firms with at least 10% institutional shareholdings underperformed

matching firms by only 2.0% (neither figure is statistically significantly different from zero). Inspection of these figures demonstrates that the difference between the returns of these portfolios and those of matching firms hover around zero for the entire three-year period.

The average monthly matching firm-adjusted returns series (AR_t) and the cumulative average matching firm-adjusted returns series (CAR_t) for IPOs with less than 5% institutional ownership and at least 5% institutional ownership at Quarter 1 are presented in Table 3. For the group with less than 5% institutional ownership, the AR_t series has positive abnormal returns for only 8 of 36 months. By contrast, for the group with at least 5% institutional ownership, 17 of 36 months have positive average abnormal returns. For IPOs with less than 5% institutional ownership, the CAR_t series is significantly negative from event month 6 forward. For IPOs with at least 5% institutional ownership, the CAR_t is positively significantly different from zero at month 2 ($t=1.98$) but otherwise never significantly different from zero.

The last two columns of Table 4 test the null hypothesis of no difference between the means of the AR_t and CAR_t series for the two groups based on institutional ownership.⁶ There are several months during which firms with at least 5% institutional ownership significantly outperform those with less than 5% institutional ownership. From month 6 on, the cumulative adjusted returns are significantly larger for those IPOs with at least 5% institutional ownership.

⁶ The test statistic used is as follows for the AR_t series, where σ refers to the standard deviation of the AR_t series as defined in footnote 5:

$$t = \frac{AR_t^{\geq 5\%} - AR_t^{< 5\%}}{\sqrt{\sigma_{\geq 5\%}^2 / n_t^{\geq 5\%} + \sigma_{< 5\%}^2 / n_t^{< 5\%}}}$$

The t-statistic testing for the difference between the CAR_t series is similar with “CAR” replacing “AR” and σ being the standard deviation of the CAR series as defined in footnote 6.

Thus far, we have documented that IPOs with larger institutional shareholdings outperform IPOs with smaller institutional shareholdings. The next two sections examine possible explanations for this finding.

VI. DETERMINANTS OF INSTITUTIONAL OWNERSHIP OF IPOs

In this section, we examine institutional ownership of IPOs by considering various target firm characteristics which may be driving institutional investment in these IPOs. We then consider how institutional investment in IPOs varies by industry before quantifying these relationships in regression analysis.

Table 4 characterizes the sample by 13f institutional ownership percentage at Quarter 1. Looking at the fourth column, it is evident that IPOs with less than 5% institutional ownership substantially underperformed seasoned matching firms, with a wealth relative of 0.636 for IPOs with no 13f ownership versus a wealth relative of 0.807 for those with 0-5% 13f ownership. IPOs with 5-10% and 10-15% institutional ownership also underperformed matching firms, although the wealth relatives of 0.935 and 0.934, respectively, are substantially higher. For IPOs with more than 15% institutional ownership, the wealth relatives are over one, ranging from 1.05 to 1.32. Generally speaking, IPOs with larger institutional ownership were more likely to earn returns similar to those of size-matched seasoned firms.

Firms with no 13f institutional ownership at Quarter 1 earned the highest average initial return of 16.4%, while firms with above 35% institutional ownership earned the lowest average initial return at 5.3%. This seemingly negative relation between institutional ownership and initial return suggests that if institutions do purchase shares of IPOs with the highest initial returns, these

shares have been “flipped” before Quarter 1, the date at which we measure institutional ownership.

As can be seen in column 6 of Table 4, there is a positive relation between institutional ownership and firm size at Quarter 1. IPOs with no 13f ownership are on average less than one-tenth the size of those with at least 35% institutional ownership. Similarly, as column 7 demonstrates, firms with no 13f ownership are on average only 8.5 years old, while firms with at least 35% institutional ownership are on average 29 years old. The relationship between age and institutional shareholdings appears to be monotonically increasing.

Table 5 demonstrates that the differences in the buy-and-hold raw returns, matching firm-adjusted returns, initial returns, firm size at Quarter 1, and age at IPO between firms with less than 5% institutional ownership versus those with at least 5% institutional ownership are statistically significant. Firms with higher institutional ownership tended to be larger, older, earn smaller initial returns, and earn higher long-run returns than firms with smaller institutional shareholdings at Quarter 1. These results hold over the entire period, as well as for each of the two subperiods (see Table 6).

The possibility of industry effects is suggested by Ritter’s (1991) study. He found that financial institutions earned substantial returns over the three-year aftermarket period while oil and gas firms earned extremely poor returns. Table 7 confirms these findings: financial institutions have a wealth relative of 1.22 while the wealth relative for oil and gas firms is just 0.41. Only electronic/electric equipment firms outperformed financial institutions (with a wealth relative of 1.26). No industry underperformed oil and gas firms.

Only seven industries (of the 29 listed) experienced returns superior to those of matching firms. Of these, only the following three have institutional shareholdings below 10%:

	Industry	Institutional Shareholdings	Wealth Relative
(i)	Electronic Equipment	5.03%	1.256
(ii)	Health Care and HMOs	9.55%	1.168
(iii)	Electric, Gas, and Sanitary Services	9.90%	1.006

The industries with the largest institutional shareholdings at Quarter 1 are:

	Industry	Institutional Shareholdings	Wealth Relative
(i)	Rubber Goods	21.46%	0.954
(ii)	Insurance Carriers and Agents	21.06%	1.085
(iii)	Communications	20.88%	1.195
(iv)	Chemicals & Allied Products	19.99%	0.950
(v)	Financial Institutions	15.99%	1.218

Each of these five industries with the largest institutional shareholdings as of Quarter 1 has a wealth relative of at least 0.95; three of the five have wealth relatives above 1.0.

The five industries with the lowest institutional shareholdings are:

	Industry	Institutional Shareholdings	Wealth Relative
(i)	Security & Commodity Brokers	5.23%	0.627
(ii)	Electronic/electric equipment	5.03%	1.256
(iii)	Airlines	4.53%	0.726
(iv)	Drugs and Genetic Engineering	3.15%	0.945
(v)	Investment Offices and Trusts	3.27%	0.903

Four of the five industries underperformed their size-matched firm portfolios, with industries (i) and (iii) performing particularly poorly.

One interesting point observable in Table 7 is that, although we previously found that 13f institutional investors appear to prefer larger IPOs to smaller ones, financial institutions are among the smallest firms in the sample (in terms of equity value at Quarter 1), yet they have one of the largest 13f institutional investments. Conversely, computer manufacturing firms are among the largest firms in the sample, yet they have one of the smaller institutional ownership

percentages. Thus, it appears that institutional investors are not merely following a blind strategy of investing in the largest IPOs.

The previous analysis has suggested that several variables may help to determine institutional shareholdings in IPOs at Quarter 1. Institutional shareholdings seem to be positively related to firm size and age and negatively related to the IPO's initial return (possibly because shares in IPOs earning larger initial returns have been flipped by the institutions before Quarter 1). Institutions also seem to prefer certain industries over others.

The ordinary least squares regression results reported below for offerings between 1979-1989 confirm these observations:

Quarter 1

$$\begin{array}{l} \text{Institutional \% Holdings} = -0.265 + 0.0264 \text{ Size} + .0090 \text{ Age} - 0.024 \text{ IR} + 0.0265 \text{ Bank} - 0.008 \text{ Oil} + \text{Time Dummies} \\ \text{\hspace{1.5cm}} \quad (-6.78) \quad (17.89) \quad (6.19) \quad (-3.45) \quad (4.68) \quad (-1.08) \end{array}$$

$$\bar{R}^2 = .21 \quad (\text{number of observations is 2,904})$$

where

- Size is the natural log of the firm's market value at Quarter 1 (in 1989 dollars),
- Age is the natural log of (1 + firm's age at IPO),
- IR is the initial return of the IPO from the offering price to the first day closing price on CRSP,
- Bank is a dummy variable taking the value one for financial institutions,
- Oil is a dummy variable taking the value one for oil and gas firms, and
- \bar{R}^2 is the adjusted R². T-statistics have been calculated using the White (1980) procedure to account for heteroskedasticity. T-statistics are reported in parentheses.

The size and age coefficients are positive and highly significant, again indicating that institutional shareholders tend to hold larger and older IPOs at Quarter 1. The initial return coefficient is negative and significant, indicating that by Quarter 1 institutions are less likely to hold IPOs which earned larger initial returns. As expected, the bank dummy is significantly positive and the oil

dummy is negative, although not significant.⁷ Quarter time dummies were included to account for differences in institutional ownership of IPOs throughout the time period.

VI. LONG-RUN IPO PERFORMANCE AND INSTITUTIONAL OWNERSHIP

The previous analysis demonstrates that institutional investors tend to hold older and larger IPOs. Table 4 demonstrated that IPOs with larger institutional shareholdings tended to experience better long-run performance relative to matching firms than did IPOs with smaller institutional shareholdings. If older and larger IPOs tended to earn higher long-run returns over the period, however, the finding that IPOs with higher institutional shareholdings experience better long-run performance than IPOs with fewer institutional shareholdings may simply be because institutional investors tend to prefer older and larger IPOs. To investigate this possibility, Table 8 presents cross tabulations of institutional shareholdings against firm size at Quarter 1 and Table 9 presents similar cross tabulations of institutional shareholdings versus firm age.

Panel A of Table 8 presents wealth relatives for IPOs broken into quartiles based upon institutional ownership and firm size and confirms the strong relationship between long-run performance and institutional shareholdings at Quarter 1. It appears that, even within the size quartiles (i.e., looking across the rows), the higher the institutional shareholdings, the better the long-run IPO performance. That is, controlling for firm size, institutional shareholdings still seem to be positively related to long-term IPO performance. Note, however, that only the quartile with the highest institutional ownership (above 11.75%) outperformed a matching firm portfolio (with a wealth relative of 1.03).

⁷ The regression was performed on the two subperiods, 1979-1984 and 1985-1989, with similar results. However, the oil coefficient was significantly negative for the 1979-1984 subperiod studied by Ritter but not for the 1985-89 subperiod.

Controlling for institutional shareholdings (i.e., looking down the columns), however, firm size seems to be positively correlated with IPO long-term performance for only the smallest institutional quartile (i.e., the first column). For the three quartiles with more than 0% institutional shareholdings, there is no discernable relationship between IPO firm size at Quarter 1 and subsequent long-term performance.

The cross-tabulations presented in Panel B highlight the abysmal long-run performance of initial public offerings. Many of the portfolios in Panel B, especially those with small institutional shareholdings, earned returns below the T-bill rate over the three-year period. In fact, the four portfolios with the smallest firm sizes and institutional shareholdings (1,028 firms of 2,973 total) earned returns far below the T-bill rate. Note also that the three of the quartiles with between 4.25-11.75% institutional shareholdings (i.e., rows 1, 2 and 4 in column 3) also earned below the T-bill rate over the three-year period.

Focusing on initial return, Panel C demonstrates that the smaller the institutional shareholdings at Quarter 1, the higher the initial return of the IPO. Even controlling for IPO size (i.e., looking across the rows), this relationship seems to hold. Looking down the columns, however, we see no clear-cut relationship between firm size and initial return.

Cross-tabulations based upon institutional ownership and firm age are presented in Table 9. Firms less than five years old severely underperformed their matching firm portfolios: wealth relatives were 0.76 for firms 0-1 years of age and 0.72 for firms between 2-4 years of age. IPOs at least 16 years old on average outperformed matching firms with a wealth relative of 1.07. IPOs under 16 years of age with no institutional shareholdings performed terribly relative to matching firms, with wealth relatives of around 60% (see column 1, rows 1-3). Panel B of Table 9 demonstrates that many of the IPOs earned below the T-bill rate over the period, especially

younger IPOs with little institutional shareholdings at Quarter 1. Panel C demonstrates that younger IPOs generally seemed to earn higher initial returns.

The evidence presented in Tables 8 and 9 supports that IPO age and size seem to be indicative of future long-run IPO performance and that institutional shareholdings at Quarter 1, even after controlling for firm size and age, may also be positively related to long-term IPO performance. To better understand these relationships, however, multiple regression is necessary.⁸

The multiple regression presented in Table 10⁹ confirms that IPOs with higher institutional shareholdings at Quarter 1 tend to earn higher three-year buy-and-hold raw returns, even after

⁸ In his Table X, Ritter (1991) performed the following regression:

$$\text{Return}_i = b_0 + b_1 \text{IR}_i + b_2 \text{Log}(1 + \text{age}_i) + b_3 \text{Market} + b_4 \text{Vol} + b_5 \text{Oil} + b_6 \text{Bank} + e_i,$$

where Return_i is the raw three-year return measured from the first aftermarket closing price to the earlier of the three-year anniversary or its CRSP delisting price, IR is the market-adjusted initial return, using the CRSP value-weighted index of Amex-NYSE stocks as the market index, $\text{Log}(1+\text{age})$ is the natural logarithm of one plus the difference between the year of going public and the year of founding, Market_i is the CRSP value-weighted market return for the same return interval as the dependent variable, Vol_i is the annual volume of IPOs in the year of issuance, Oil_i is a dummy variable taking on the value of 1 for oil and gas firms, and bank_i is a dummy variable taking on the value of 1 for banking and investment firms.

This regression was performed for the sample presented in this paper with results quite similar to those attained by Ritter. In addition, $\log(\text{firm size})$ and institutional shareholdings as of Quarter 1 were included as explanatory variables. Both were significant and positive. However, the problem with this regression (and that run by Ritter) is that it does not account for correlations within cohorts of IPOs (that is, firms going public during the same period). Ignoring possible correlations within cohorts biases the regression results. To account for this, this paper uses a fixed-effects model which accounts for differences within cohorts of IPOs in the regressions presented.

⁹ The regression in Table 10 was repeated using the institutional ownership measure used by Michaely and Shaw (1994), whereby institutional ownership at Quarter 1 is divided by the number of shares offered in the U.S. for the IPO. Additionally, gross proceeds (in \$1989) of the IPO for shares sold in the U.S. are used as a measure of firm size as in Michaely and Shaw. The results are similar to those reported in Table 10, but the significance level of the coefficient on institutional ownership drops to 10% for the regression reported in the last line of the table. As mentioned in footnote 4, however, 13f institutions do have access to and invest in some firms before the IPO, and they also buy shares in the offering initially sold outside the U.S. For these firms, measuring firm size using U.S. gross proceeds overestimates the 13f institutional shareholdings (to over 100% in some cases).

controlling for time and industry variation,¹⁰ initial return, firm age, and firm size at Quarter 1. The regression was also performed for the two subperiods 1979-1984 and 1985-1989 with results (not shown) substantially similar to those reported in Table 10 for the entire period. Thus, even after controlling for the observed variables and looking over two distinct time periods, we find that IPOs with higher institutional shareholdings at Quarter 1 perform significantly better in the long-run than IPOs with smaller institutional shareholdings.

The analysis of Table 10 was repeated in Table 11, but instead of industry dummies for the one-digit SIC codes, dummy variables for only oil and gas firms (OIL) and financial institutions (BANK) are included. Consistent with Ritter (1991), the results reported here also confirm that older IPOs earned higher returns in the long-run, oil and gas firms performed significantly worse in the long run, financial institutions performed significantly better in the long-run, and firms with higher initial returns performed worse in the long-run (although Ritter did not find this variable significant for the 1975-1984 period). In addition to Ritter's findings, Table 11 indicates that larger IPOs and firms with higher institutional shareholdings as of Quarter 1 performed better in the long-run.

The multiple regression of Table 11 is repeated in Table 12a for the subperiod 1979-1984 and in Table 12b for the subperiod 1985-1989. As can be seen in Table 12a, IPO size at Quarter 1 was not a significant predictor of IPO long-run performance for the earlier period. In Table 12b, we see that financial institutions did not earn significantly higher long-run returns (in fact, the

¹⁰ Dummy variables were used for each quarter, with the first quarter of the sample period as the numeraire. In addition, dummy variables were used for the one-digit SIC codes, with SIC code 0 being the numeraire. The one-digit SIC codes are as follows:

0	Agricultural Production	5	Service
1	Mineral Production	6	Financial Services
2	Heavy Industry	7	Commercial Services
3	Technical Manufacturing	8	Miscellaneous Services
4	Regulated Industries		

coefficient is negative), and oil and gas firms did not earn significantly poorer long-run returns in the latter period. The institutional shareholdings variable is more significant during the latter period, as it is not significant in the earlier period when all variables are included in the regression. When the (insignificant) IPO size variable is eliminated, though, institutional shareholdings is once again significant at the 5% level even for this subperiod.

Table 13 repeats the analysis of Table 10 but rather than using raw returns as the dependent variable, we use the matching-firm adjusted three-year return (that is, the cumulative raw holding period return minus the matching firm holding period return). Since firms are matched by size, the matching process acts as a control for size. Not surprisingly, then, the size coefficient is not significant when all variables are included in the regression. Other than the size coefficient, though, the results of this regression are fairly consistent with those presented in Table 10. Thus, whether we use raw returns or adjusted returns, we find that institutional shareholdings at Quarter 1 are significantly positively related to IPO long-run performance.

Since the returns of many firms overlap in the regressions shown in Tables 10-13, the t-statistics for the coefficients listed in these tables could be biased due to dependence among the disturbances. To test for such dependence, for each event month we performed a cross-sectional regression of the matching-firm adjusted return on the four main variables plus the industry dummies given in Table 13 (that is, one regression for each event month relative to Quarter 1, so that there are 36 cross-sectional regressions). We then averaged the coefficients and used the time series standard deviations to compute time-series based t-statistics. For each event month ($t=1-36$), the following cross-sectional regression was performed:

$$MAR_{i,t} = b_{0,t} + b_{1,t}INIT_i + b_{2,t}INST_i + b_{3,t}AGE_i + b_{4,t}SIZE_i + \text{Industry Dummies} + e_{i,t}$$

where $MAR_{i,t}$ is the matching firm adjusted return for firm i in event month t , $INIT_i$ is the market-adjusted initial return, $INST_i$ is the 13f institutional shareholdings, AGE_i is the natural logarithm of $(1 + \text{the firm } i\text{'s age})$, $SIZE_i$ is the natural logarithm of the firm's market value at Quarter 1 (measured in 1989 dollars), and the industry dummies are dummy variables for each one-digit SIC code level. The average coefficients and their t-statistics are as follows:

INIT	INST	AGE	SIZE	Intercept
-0.0098 (-2.59)	0.0255 (3.29)	0.0020 (3.29)	0.0005 (0.72)	-0.0069 (-0.46)

These results are consistent with those presented in Table 13. Institutional shareholdings at Quarter 1 and IPO age are significantly positively related to matching-firm adjusted IPO returns, and IPOs with larger initial returns tend to perform worse in the long-run.

VII. SUMMARY AND CONCLUSIONS

This research presents evidence that there are distinct groups of initial public offerings that do not seem to experience the exceptionally poor long-run performance documented by Ritter (1991). Specifically, we find that institutional investors, when they invest in IPOs at all, tend to invest in subsequently better-performing IPOs more often than can be attributed to random selection. The larger the institutional investment proportion in an IPO at the end of the first quarter following the offering, the higher the subsequent long-run performance is likely to be.

We have examined several firm characteristics, specifically firm size, firm age, industry, and initial return in the offering which are correlated with institutional investment levels and/or superior long-run IPO performance. Our evidence indicates that these variables, while demonstrating statistically significant explanatory power, are insufficient to account for the

apparent ability of institutional shareholders to avoid the worst losers in terms of long-run performance.

This evidence, however, does not prove that institutional investors are informed. Although the IPOs which institutional investors hold in the early aftermarket subsequently tend to earn larger long-run returns than IPOs with smaller institutional ownership, even these firms generally fail to significantly outperform a portfolio of matching firms. Indeed, even IPOs with larger institutional shareholdings significantly underperformed the value-weighted NYSE-Amex stock index over a three-year holding period.

There are also other possible explanations for why institutional investors seem to avoid the poorest performing initial public offerings. Michaely and Shaw (1994) find that offerings by the most reputable investment banks tend to earn smaller initial returns and larger long-run returns than do offerings of less reputable investment banks. Brav and Gompers (1995) find that venture capital-backed IPOs outperform nonventure capital backed-IPOs during the five years subsequent to their offerings when returns are calculated on an equal-weighted basis. Perhaps institutional investors are more likely to hold IPOs issued by more reputable investment banks or those with venture capital backing. Examination of these hypotheses is left for future research.

Another alternative explanation of the findings presented here is that institutions may follow investment strategies based upon characteristics, in addition to those investigated here, which happen to be correlated with higher long-run IPO performance. For instance, institutions may have a policy of trying to invest as conservatively as possible when investing in IPOs. The correlations of the size and firm age variables with institutional shareholdings would easily fit into such an explanation. A firm with a good track record and larger capitalization is probably less likely to suffer from the threat of bankruptcy or delisting following its IPO than is a younger, less

capitalized firm. Institutional investors may also be choosing certain industries over others for similar considerations. Indeed, we found that financial institutions had higher institutional investment than did oil and gas firms. Finally, the negative correlation between initial return and institutional investment at the first quarter could be attributed to general uncertainty about the offering's prospects. This may indicate a reluctance of institutional investors to speculate on firms about which little is known. Further investigation of these possibilities is also left for future research.