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The IPO Market: Do Investors and Analysts Who Follow IPOs Learn?

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INTRODUCTION

Various models exist suggesting why persistently high initial returns for new issue offerings are not inconsistent with efficient markets (Rock (1986), Tinic (1988), Welch (1989), among others). In addition, considerable work has also been done investigating both intermediate (one to six months) and long-term (one to five years) aftermarket and operating performance of these issues, including research by Ritter (1991), Ritter and Loughran (1995), Jain and Kini (1994), and Rajan and Servaes (1997). These studies show that in the years following an IPO, a company's stock returns tend to perform worse than a control group. While these studies provide some time series results, the majority of the results are of samples aggregated across the sample period. To date, work remains incomplete to determine if systematic changes in investor behavior is evident over time, or, in Ritter's words, whether "Bayesian investors . . . adequately revise their estimates." This paper extends the data sets of previous work and examines the time series data to see if investors appear to learn. By learn we mean gain knowledge and understanding through experience. Any actual learning should be reflected in future changes in behavior. We may expect that when faced with continual poor performance after the initial offering that investors may learn from their mistakes and change their behavior. Surprisingly, we find that investors' aggregate behavior does not seem to change over time. Tables 1 through 5 reveal no clear trend or changing pattern. After the initial price increase following the IPO, stock returns are on average negative over the next three years. This is true even for the most recent time periods.

Additionally, in an extension of Ragan and Servaes (1997), the evolution of analyst earnings forecasts is also followed over an extended sample period. We examine whether analysts are able to learn and to change their behavior over time. If analysts historically tend to be overly optimistic in their forecasts, we might expect that they will learn from their mistakes and make more accurate forecasts.

We find that the percentage of IPOs that analysts follow has increased dramatically over the past decade. We also find that those IPOs that are followed by analysts during the first year substantially outperform the IPOs that analysts do not follow. In eight of the first ten years of the study period, however, the returns for the stocks that were initially followed by analysts are negative in the second and third year following the IPO. Some learning by analysts, however, does appear to occur. Analysts have recently been more successful at selecting IPOs that perform well. Since 1991, the performance in years two and three of the IPOs followed by analysts was positive each year. This is true even though the analysts followed a larger percentage of IPOs since 1991.

Section I describes the data used in this study. Section II describes how we measure the aftermarket performance and how we select a control sample. Section III contains results on investor behavior over time and section IV contains results on analyst behavior over time. Section V contains concluding remarks.

THE DATA

The data were obtained from two sources. Jay Ritter generously provided the sample from his 1991 *Journal of Finance* paper which includes 1526 IPOs offered between 1975 and 1984.[1] Additional IPOs were obtained from the Securities Data Corporation New Issues database (SDC). IPOs from this source have an SDC-reported offer date between January 1, 1975 and December 31, 1995. To be consistent, selection criteria for IPOs from this source closely follow Loughran and Ritter (95) and are as follows: (1), the offer price must be $1.00 per share or more, (2) the offering must be of common stock only, (3), the company must appear on the CRSP NYSE-AMEX-NASDAQ daily tape within six months of its SDC-reported offer date, and (4) the gross proceeds from the sale must be at least $1,000,000. Using these criteria, 3,846 additional firms were obtained from the SDC database. The total data set includes 5,370 IPOs.

Table 1 presents basic distribution information concerning the entire sample. Over the entire sample period, there is no clear trend in the distribution of the number of offerings each year, except for two general observations. The first observation is that there was little activity during the first five years of the sample period. While this period represents nearly 23% of the time period examined, less than 3% of the total number of IPOs in the sample were

offered (0.6% of total offers when measured by size.) The second observation which can be made is that the cyclical nature of IPO activity does appear to be continuing through the most recent years of the sample period, a finding not previously reported. In six of the first eight years of the sample period, where changes from the previous year can be calculated (1976 - 1983), more IPOs came to the market than in the previous year. [2] Over the next seven years (1984 - 1990), the environment for IPOs apparently became less favorable. In six of these seven years, the number of offerings decreased from the year before. Finally, in five of the last six years of the sample period (1991 - 1996), increases in IPO offerings relative to the previous year are again observed.

Table 1: Descriptive Statistics of the Data Set

Panel A: Annual and Full Sample Statistics

| | | Offering Size | | | Percent of |
Year	Number of IPOs	Largest ($ millions)	Median ($ millions)	Mean ($ millions)	All Offerings By Size
1975	12	127.1	11.1	21.9	0.1%
1976	31	32.0	5.5	7.6	0.1%
1977	22	36.0	4.0	6.3	0.1%
1978	31	26.0	5.3	7.0	0.1%
1979	60	21.6	6.2	6.5	0.2%
1980	132	109.1	4.9	8.9	0.6%
1981	312	120.1	5.2	9.2	1.5%
1982	96	98.8	5.2	12.9	0.6%
1983	603	340.3	10.5	20.4	6.3%
1984	280	131.6	6.0	11.2	1.6%
1985	206	748.8	10.0	23.2	2.4%
1986	422	100.0	12.2	32.6	7.0%
1987	341	850.0	14.4	42.0	7.3%
1988	184	673.1	21.4	73.9	7.0%
1989	157	958.3	26.2	74.2	6.0%
1990	136	600.0	30.0	57.9	4.0%
1991	190	271.3	25.0	31.0	3.0%
1992	269	189.8	24.1	30.4	4.2%
1993	389	415.7	24.4	36.8	7.3%
1994	310	237.6	20.0	28.9	4.6%
1995	467	880.0	32.4	56.1	13.4%
1996	720	2147.5	33.2	61.2	22.5%
Total	5370	2147.5	17.0	36.4	100.0%

Panel B: Average Annual Percentage Change

	Number of IPOs	Largest ($ millions)	Median ($ millions)	Mean ($ millions)
--- 1976 - 1996	106.5%	183.6%	37.1%	47.1%
--- 1985 - 1996	44.8%	173.1%	25.7%	39.7%

Less clear are discernable trends for either mean or median offering size across the sample period. The strongest statements that can be made with regard to these descriptive measures are that (1), mean offering size for seven of the first eight years of the sample period is dramatically smaller than for the remaining years, and (2), median offering size is always less than mean offering size. The skewed distribution is a logical result since the lower boundary for offering size is $1 million and there is no upper boundary.

One final result appears in Table 1. Even in the face of general trends in the number of offers, there is persistent evidence that over the twenty-one year sample period, the IPO market is subject to very large variations in both the number and size of new issues offered from year to year. Panel B provides the absolute value of the average annual percentage change in the number of IPOs per year, the largest IPO, the median IPO and the mean IPO. Over the sample period, almost "wild" variations from year to year in number as well as size of offerings are present. Even for the period from 1985 through 1996 when the number of initial public offerings is consistently above two hundred (the second row of Panel B), the change from the number of issues offered the previous year is on average nearly forty-five percent. Furthermore, this dramatic fluctuation is also evident when examining the average annual absolute percentage change in offering size (173.1%), and to a lesser but still economically significant extent, when considering median and mean offering size (25.7% and 39.7%, respectively).

Table 2 presents descriptive statistics of sample firms by industry based on two digit SIC codes appearing in the Compustat manual. [3] There is a large concentration of IPOs within a handful of industries. While seventy-six industries are identified as having firms that underwent an IPO, fully 53.0% of all sample offerings occurred within just eight industries, and seventeen industries accounted for three-fourths of all offerings. The top thirty industries accounted for 88.1% of the entire sample IPOs, with the remaining 11.9% of offerings occurring in an additional forty-six industries.

Table 2: The Thirty Industries with the Most IPOs between 1975 and 1996

	Industry	Number	Offering Size Mean ($ millions)	Median ($ millions)	% of Total Offerings (by Size)	Cumulative % of Total Offerings
1	Business Services	686	28.6	20.3	10.0%	12.8%
2	Electric & Electric Equipment	445	26.3	13.5	6.0%	21.1%
3	Industrial, Comm'l & Computers	375	23.8	14.6	4.6%	28.0%
4	Measuring Instr., Photo, Watches	347	20.6	11.9	3.7%	34.5%
5	Holding Co.s, Other Investment Offices	331	120.0	66.0	20.3%	40.7%
6	Chemical & Allied Products	255	34.8	19.0	4.5%	45.4%
7	Depository Institutions	210	18.4	9.7	2.0%	49.3%
8	Health Services	196	24.3	15.8	2.4%	53.0%
9	Durable Goods--Wholesale	178	24.1	12.7	2.2%	56.3%
10	Oil & Gas Extraction	168	35.0	8.0	3.0%	59.4%
11	Communications	147	70.3	33.8	5.3%	62.2%
12	Eating & Drinking Places	134	15.4	9.0	1.1%	64.7%
13	Nondepository Credit Institutions	132	43.1	16.2	2.9%	67.1%
14	Engring, Acct, Mgmt & Related Services	121	22.4	16.0	1.4%	69.4%
15	Miscellaneous Retail	119	36.9	18.6	2.2%	71.6%
16	Nondurable Goods--Wholesale	95	32.4	14.5	1.6%	73.4%
17	Insurance Carriers	94	63.4	27.7	3.0%	75.1%
18	Transportation Equipment	73	45.5	18.3	1.7%	76.5%
19	Misc. Manufacturing Industries	70	21.5	15.2	0.8%	77.8%
20	Food & Kindred Products	67	51.5	13.2	1.8%	79.0%
21	Apparel & Accessory Stores	60	34.4	21.0	1.1%	81.2%
22	Elec, Gas & Sanitary Services	60	26.3	12.7	0.8%	80.1%
23	Fabr. Metal, except Mach, Trans Equip.	52	17.9	10.6	0.5%	82.2%
24	Primary Metal Industries	49	43.4	30.0	1.1%	83.1%
25	Motion Pictures	47	23.6	12.5	0.6%	85.8%
26	Motor Freight Transportation, Warehouses	47	22.7	17.0	0.5%	84.0%
27	Transportation by Air	47	18.5	12.6	0.4%	84.9%
28	Printing, Publishing & Related Areas	45	44.2	17.8	1.0%	86.6%
29	Security & Commodity Brokers	41	46.1	22.8	1.0%	87.4%
30	Amusement & Recreation Services	41	39.9	25.7	0.8%	88.1%
	All Others (46 others)	638	36.0	19.6	11.8%	100.0%
	Total	5370	36.4	17.0	100.0%	100.0%

While the majority of industries' median offering sizes are clustered between $10 million and $25 million, substantial differences do exist between certain industries. Median (mean) offering size ranges from a low of $8.0 ($35.0) million for the Oil and Gas Extraction industry (SIC code 13), to $66.0 ($120.0) million for firms classified as Holding Companies and Other Investment Offices (SIC code 67). In fact, so large are the offerings in this particular industry, that the industry with the nearest median offering size, the Communications industry (SIC code 48), has a median offering size of just slightly more than one-half that of largest industry, or $33.8 million ($70.3 million mean). Strangely, the Oil and Gas Extraction Industry also has the most disproportionate number of small firms, a result identified by Ritter (1984) as contributing significantly to what he termed the "hot issue" market of 1980 [for IPOs].

Further evidence of size concentration among the identified industries is evident when comparing an industry's aggregate dollar offerings relative to the total dollar offerings for the full sample. Using this measure, the largest concentrations occur within the SIC classifications designated as Holding Companies and Other Investment Offices (20.3% of the total), Business Services (10.0%), Electrical and Electrical Equipment (6.0%), Communications (5.3%), and Industrial, Commercial and Computer Equipment (4.6%). As a final comment regarding the information in Table 2, it should be noted that the industry concentration of offering size is surprisingly similar to the industry concentration of firm offerings. The top five industries account for 46.2% of total dollar volume, and the cumulative total for the top ten, fifteen and thirty industries is 63.3%, 74.0%, and 88.2%, respectively.

Table 3 presents for each year those three industries having the most offerings during the year, and again, there is some evidence of trends in initial public offerings. Industrial, Commercial and Computer Equipment firms appear in the top three industries for ten of the first eleven years of the sample period, and twelve times overall. The Business Services industry appears twelve times as well, and the Electrical, Except Computers industry (SIC code 36) appears sixteen times in the top three.

Table 3: The Three Industries with the Largest Number of IPOs Each Year From 1975 through 1996

			Industry with Most IPOs				Industry with Second Most IPOs				Industry with Third Most IPOs			
					% of Yearly Total				% of Yearly Total				% of Yearly Total	
Year of IPOs	Total # of IPOs	Total # of Ind.	Industry	No.	IPOs	$ Value	Industry	No.	IPOs	$ Value	Industry	No.	IPOs	$ Value
1975	12	9	Food & Kindred Products	2	16.7%	50.6%	Chemicals. etc.	2	16.7%	15.5%	Ind'l, Comm'l & Comp. Eq.	2	16.7%	10.6%
1976	31	17	Ind'l, Comm'l & Comp. Eq.	8	25.8%	32.0%	Electrical, Ex. Computers	3	9.7%	12.2%	Depository Institutions	3	9.7%	9.5%
1977	22	15	Ind'l, Comm'l & Comp. Eq.	3	13.6%	15.3%	Measuring Inst, Photo	3	13.6%	7.9%	Depository Institutions	3	13.6%	4.8%
1978	31	15	Ind'l, Comm'l & Comp. Eq.	6	19.4%	12.2%	Electrical, Ex. Computers	4	12.9%	16.2%	Measuring Inst, Photo	4	12.9%	11.9%
1979	60	17	Oil & Gas Extraction	15	25.0%	22.7%	Measuring Inst, Photo	9	15.0%	11.1%	Ind'l, Comm'l & Comp. Eq.	8	13.3%	18.5%
1980	132	34	Oil & Gas Extraction	30	22.7%	22.2%	Ind'l, Comm'l & Comp. Eq.	17	12.9%	26.1%	Electrical, Ex. Computers	15	11.4%	10.1%
1981	312	43	Oil & Gas Extraction	63	20.2%	18.5%	Electrical, Ex. Computers	42	13.5%	8.3%	Business Services	33	10.6%	10.1%
1982	96	27	Business Services	20	20.8%	20.7%	Ind'l, Comm'l & Comp. Eq.	13	13.5%	21.6%	Electrical, Ex. Computers	11	11.5%	10.0%
1983	603	60	Business Services	71	11.8%	8.0%	Ind'l, Comm'l & Comp. Eq.	63	10.4%	12.4%	Electrical, Ex. Computers	55	9.1%	7.0%
1984	280	52	Electrical, Ex. Computers	32	11.4%	7.0%	Business Services	30	10.7%	7.0%	Ind'l, Comm'l & Comp. Eq.	22	7.9%	10.1%
1985	206	43	Depository Institutions	26	12.6%	11.2%	Electrical, Ex. Computers	16	7.8%	2.4%	Ind'l, Comm'l & Comp. Eq.	15	7.3%	4.0%
1986	422	54	Depository Institutions	48	11.4%	7.2%	Business Services	37	8.8%	3.4%	Holding Co.s, Other Invest.	27	6.4%	28.9%
1987	341	51	Holding Co.s, Other Invest.	34	10.0%	42.2%	Depository Institutions	28	8.2%	2.6%	Electrical, Ex. Computers	21	6.2%	2.0%
1988	184	38	Holding Co.s, Other Invest.	54	29.3%	69.5%	Depository Institutions	27	14.7%	1.8%	Electrical, Ex. Computers	11	6.0%	0.8%
1989	157	37	Holding Co.s, Other Invest.	38	24.2%	59.8%	Business Services	19	12.1%	3.0%	Electrical, Ex. Computers	11	7.0%	3.9%
1990	136	33	Holding Co.s, Other Invest.	35	25.7%	54.9%	Electrical, Ex. Computers	11	8.1%	3.6%	Oil & Gas Extraction	10	7.4%	7.7%
1991	190	41	Business Services	26	13.7%	13.0%	Chemicals. etc.	24	12.6%	14.6%	Measuring Inst, Photo	15	7.9%	6.6%
1992	269	46	Measuring Inst, Photo	27	10.0%	8.9%	Business Services	26	9.7%	8.8%	Health Services	20	7.4%	7.1%
1993	389	52	Electrical, Ex. Computers	42	10.8%	8.2%	Business Services	39	10.0%	8.1%	Ind'l, Comm'l & Comp. Eq.	27	6.9%	5.6%
1994	310	48	Business Services	39	12.6%	10.3%	Electrical, Ex. Computers	36	11.6%	9.2%	Ind'l, Comm'l & Comp. Eq.	21	6.8%	5.5%
1995	467	52	Business Services	102	21.8%	15.4%	Electrical, Ex. Computers	46	9.9%	8.8%	Measuring Inst, Photo	31	6.6%	4.9%
1996	720	56	Business Services	182	25.3%	19.7%	Measuring Inst, Photo	62	8.6%	5.4%	Electrical, Ex. Computers	40	5.6%	8.0%

THE MEASURES OF AFTERMARKET PERFORMANCE AND
THE SELECTION OF CONTROL FIRMS

To be consistent with earlier work, two measures of the aftermarket performance are used: conventional cumulative benchmark-adjusted abnormal returns (CAR) and buy and hold returns. The benchmark-adjusted CAR series appearing in this study are straightforward, utilizing daily portfolio rebalancing and benchmarks of the CRSP NYSE/AMEX/NASDAQ value-weighted and equal-weighted indices, as well as returns for matched control firms. [4] The benchmark-adjusted return for firm i on day t is calculated as:

$$ar_{it} = r_{it} - r_{mt}$$

where, $\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad$ (1)

r_{it} = the raw return for security i on event day t.
r_{mt} = the return for the benchmark m on event day t.

Calculating the average benchmark-adjusted return yields

$$AR_t = \frac{1}{n}\sum_{t=1}^{n} ar_{it}. \qquad\qquad\qquad\qquad\qquad (2)$$

The cumulated average benchmark-adjusted return is simply the summation of the daily average benchmark-adjusted returns

$$CAR_{it} = \sum_{t=2}^{756} AR_t. \qquad\qquad\qquad\qquad\qquad (3)$$

The calculation of the buy and hold return is as equally straightforward.

$$R_i = \prod_{t=1}^{756}(1 + r_{it}) \qquad\qquad\qquad\qquad\qquad (4)$$

where,

R_i = the compound return for firm i through day t
r_{it} = raw return for security i on event day t.

This equation measures the individual holding period return for the sample and control firms through any period. Consistent with Ritter (1991) and Loughran and Ritter (1995), as well as others, the initial return is *not* included in the holding period return calculation; the holding period return begins with the return on the second day of trading reported by CRSP. The individual buy and hold returns are then averaged, and a relative measure of the sample firms' aftermarket performance is calculated by a wealth relative, defined as follows: (i.e. for the three-year period)

$$WR = \frac{(1 + \text{average 3 - year total return on IPOs})}{(1 + \text{average 3 - year total return on matching firms})} \qquad\qquad (5)$$

The interpretation of this ratio is direct. If the wealth relative is greater than 1.00, the sample IPO firms outperformed the control firms. If it is less than 1.00, the sample IPO firms underperformed the control firms.

As with the calculation of the wealth relative, the criteria for selecting matched control firms also follows Loughran and Ritter (1995). Potential control firms not issuing stock within the previous five years were ranked according to capitalization and that firm nearest in capitalization but larger than the sample firm was selected as the control. If the control firm was delisted prior to the last trading date of the sample firm, the next largest potential control firm (measured at the time of the offering), became the new control firm. In the event the control firm issued additional equity prior to the last trading date of the sample firm, a new, nonissuing control firm replaced the issuing firm on the old control firm's offer date (again, using the size criteria described above.) Matching firms by industry, is not done, so as to maintain consistency with Loughran and Ritter (1995). [5]

AFTERMARKET PERFORMANCE, ARE INVESTORS LEARNING?

After the initial one-day positive return, the returns of IPOs have been shown to underperform control samples [See Ritter (1991) and Ritter and Loughran (1995)]. It appears that investors are overly optimistic at the offering and bid up the price of the stock "too high". Then in the following years, when reality sets in, the stock underperforms the market and the stock price is set at a more realistic level. Rational investors observing this past

trend in prices may be expected to change their behavior. The investors could cease to bid up the price of the initial offering by such large amount and the result could be a better performance of returns over the following years.

In table 4, we examine whether investors appear to be "learning " over time. One indication of learning would be if the wealth relatives in year 1, 2 and 3 would cease to decline or begin to decline by smaller amounts in more recent years. If the wealth relatives stay below 1.0 over time we can conclude that "learning" is not taking place.

If analysis is confined to those years with at least 100 IPOs, the initial return ranged from a low of 5% in 1988 to a high of 39% in 1980. One discernable trend is that the initial return was less than 10% from 1984 through 1989, and above 10% from 1990 through the end of the sample period. During the years when the number of IPOs was generally increasing (1978-1983 and 1991-1996) the initial return never average less than 10%. During the years when the number of IPOs was declining (1984-1990) the initial return never averaged more than 10%. Furthermore, it is not apparent that the initial return is directly related to the proportion of the firms having a positive initial return.

Table 4: Aggregate Returns and Wealth Relatives by Year of Offering

			Percent of Firms Whose Initial Return is:			Wealth Relatives at End of:		
Year	No.	Initial Ret.	Positive	Negative	Unchanged	Year 1	Year 2	Year 3
75	12	0.00	33.3 %	66.7%	0.0%	0.89	0.77	0.79
76	31	0.06	64.5 %	35.5%	0.0%	0.86	1.03	1.07
77	22	0.09	63.6 %	36.4%	0.0%	1.01	1.12	1.51
78	31	0.32	80.6%*	19.4%	0.0%	0.84	0.99	0.99
79	60	0.27	78.3%*	20.0%	1.7%	1.43	1.40	1.03
80	132	0.39	82.6%*	14.4%	3.0%	0.99	0.67	0.67
81	312	0.10	73.4%*	23.4%	3.2%	0.73	0.78	0.54
82	96	0.16	73.7%*	25.3%	1.1%	1.05	0.64	0.58
83	603	0.13	76.0%*	21.7%	2.3%	0.86	0.85	0.95
84	280	0.09	73.6%*	22.9%	3.6%	1.08	0.98	0.82
85	206	0.08	75.7%*	23.8%	0.5%	0.93	0.81	0.80
86	422	0.08	66.4%*	28.9%	4.7%	0.98	0.92	1.04
87	341	0.07	60.8%*	33.0%	6.2%	0.91	0.84	0.88
88	184	0.05	63.6%*	25.5%	10.9%	0.98	0.92	0.50
89	157	0.07	77.1%*	17.8%	5.1%	1.01	0.77	0.48
90	136	0.10	66.2%*	25.0%	8.8%	0.89	0.70	0.62
91	190	0.13	81.6%*	16.3%	2.1%	0.88	0.93	0.85
92	269	0.12	72.5%*	21.2%	6.3%	0.88	0.78	0.82
93	389	0.12	77.1%*	18.5%	4.4%	0.92	1.00	1.08
94	310	0.10	78.7%*	11.9%	9.4%	1.17	1.21	NA
95	467	0.20	82.4%*	14.3%	3.2%	1.05	NA	NA
96	720	0.17	79.7%*	15.0%	5.3%	NA	NA	NA
Total	5370	0.13	74.6%*	20.9%	4.5%	0.96	0.89**	0.83***

An * in the percent positive column (column 4) indicates that the column's percentage is significantly different from 50.0% (the null) at the .05 significance level using a binomial test. The totals at the bottom of the wealth relative columns are significantly different from 1.0 (the null) at the .01 (**) or .005 (***) significance level as indicated.

If IPOs are ordinary events, we would expect that about 50% of the firms would have a positive initial one-day return. Table 4 shows that 74.6% of all IPOs have a positive initial one-day return. This is significantly different from 50%, at the .05 significance level, using a binomial test.

Also, if IPOs are ordinary events we would expect their performance in years 1, 2 and 3 following the IPO to be approximately equal to that of the control firms. This would result in wealth relatives close to 1.0. In year 1 the wealth relative is 0.96 which shows that the IPOs have underperformed the control firms, but not by a statistically significant amount using a binomial test. In years 2 and 3 following the IPO the wealth relatives are 0.89 and 0.83, respectively, which are significantly lower than 1.00 at the .05 and .01 levels, respectively. The IPOs performance continues to deteriorate over the time period.

Table 5 presents additional information on the performance of sample firms partitioned by offering year and whether the firm is actively trading at the end of each of the three years. The results in this table are presented to

help determine if the performance results are driven by a small number of firms. Again, there appears to be no relationship between the level of IPO activity for the year and either the number of firms actively trading over time or the performance of those firms. Additionally, there seems to be no relationship between the prior year's issuing activity and the direction of the aftermarket performance change for the following year. However, there are a few general observations that can be made. Most apparent is the high average number of firms still actively trading after one year, 97.8%. Each subsequent year there is a reduction in firms trading, with an average of 89.8% and 79.9% of firms trading at the end of years 2 and 3, respectively. For the full sample, at the end of each year slightly more than half of the firms (51.8%) have outperformed the matched control firm. This suggests that the generally poor aftermarket performance of the aggregated IPO sample (aggregated either by year or across the full sample) is not characteristic of most firms. More than half of the firms outperform their control firm but the ones that underperform their control firm do so by a larger margin. Therefore, when the results are aggregated, the overall sample of IPOs underperforms the overall sample of controls. As a final comment concerning Table 5, there appears to be no trend in firm performance over the sample period as measured by the percent of firms having a performance superior to that of the control in the years following the IPO. After 2 years 51.0% have outperformed the matched control firm and after 3 years 50.5% have outperformed the matched control firm.

The results in tables 4 and 5 seem to indicate that investors are not learning. The poor performance of stock returns following an IPO has not diminished in recent years. Even though this pattern has been occurring for years, investors have not altered their behavior. These results favor the theory that the investors who are most enthusiastic about a particular stock offering bid up its initial price and then as more realistic scenarios unfold the stock price returns to a more appropriate level.

Table 5: The Number of IPOs Offered by Year and the Percent of Firms Actively Trading 1, 2, and 3 Years from the Offer Date

Year	No.	Firms Active at End of Year 1			Firms Active at End of Year 2			Firms Active at End of Year 3		
		Percent of IPOs Issued	% with Wealth Rel. >1	<1	Percent of IPOs Issued	% with Wealth Rel. >1	<1	Percent of IPOs Issued	% with Wealth Rel. >1	<1
75	12	100.0%	41.7%	58.3%	83.3%	20.0%*	80.0%	83.3%	20.0%*	80.0%
76	31	100.0%	41.9%	58.1%	93.5%	65.5%	34.5%	87.1%	44.4%	55.6%
77	22	95.5%	61.9%	38.1%	77.3%	64.7%	35.3%	84.5%	20.0%*	13.3%
78	31	100.0%	51.6%	48.4%	90.3%	64.3%	35.7%	71.0%	72.7%*	27.3%
79	60	93.3%	64.3%*	35.7%	96.7%	72.4%*	27.6%	90.0%	55.6%	44.4%
80	132	98.5%	51.5%	48.5%	88.6%	41.0%*	59.0%	73.5%	45.4%	54.6%
81	312	96.2%	39.0%*	61.0%	88.8%	53.1%	46.9%	81.1%	31.6%*	68.4%
82	96	95.8%	59.8%	40.2%	89.6%	45.3%	54.7%	77.1%	45.9%	52.7%
83	603	98.0%	46.7%	53.3%	89.2%	47.8%	52.2%	77.4%	52.7%	47.3%
84	280	96.8%	59.0%*	41.0%	85.4%	54.8%	45.2%	71.4%	48.5%	51.5%
85	206	97.1%	52.5%	47.5%	86.4%	42.1%*	57.9%	73.8%	53.9%	46.1%
86	422	98.1%	53.6%	46.4%	89.1%	49.5%	50.5%	76.1%	54.8%	45.2%
87	341	94.4%	49.1%	50.9%	82.1%	48.2%	51.8%	73.3%	54.0%	45.6%
88	184	96.7%	44.9%	55.1%	89.7%	47.9%	52.1%	82.6%	45.4%	54.6%
89	157	98.7%	49.7%	50.3%	96.2%	49.0%	51.0%	87.3%	43.8%	56.2%
90	136	99.3%	42.2%	57.8%	95.6%	43.1%	56.9%	89.7%	41.8%	58.2%
91	190	100.0%	54.2%	45.8%	97.9%	54.8%	45.2%	88.4%	60.1%*	39.9%
92	269	99.3%	47.9%	52.1%	94.8%	49.0%	51.0%	80.3%	56.5%	43.5%
93	389	99.0%	51.4%	48.6%	90.0%	58.0%*	42.0%	84.3%	59.8%*	40.2%
94	310	99.0%	63.5%*	36.5%	92.6%	58.2%*	41.8%	NA	NA	NA
95	467	98.5%	60.0%*	40.0%	NA	NA	NA	NA	NA	NA
96	720	NA	NA	NA	NA	NA	NA	NA	NA	NA
	4650	97.8%	51.8%*	48.2%	89.8%	51.0%	49.0%	79.9%	50.5%	48.5%

An * indicates the percentage is statistically different from 50.0% (the null) at the .05 level.

THE CHANGING BEHAVIOR OF ANALYSTS, ARE THEY LEARNING?

Section III shows that investors as a group do not appear to be learning and changing their behavior. Is the behavior of analysts any different? One could argue that analysts are a more sophisticated and better informed group and could perhaps be first to change their behavior based upon observations of the past.

The IBES tapes show which firms are being followed by analysts and data are available from 1981 to 1996. Table 6 presents this IBES data merged with the IPO sample. The percentage of newly listed firms followed by IBES has ranged from 8% in 1981 to 75% in 1995. Table 6 also shows the performance of IPOs that were followed by analysts within one year of their offer date (panel A, at top) versus those IPOs that were not followed by analysts (panel B, at bottom). It is immediately clear that the wealth relatives in years one, two and three are greater for those firms followed by analysts than for those not followed by analysts. A Wilcoxon matched-pairs signed rank test (Siegel, 1956, pp. 75-83) was used to determine if the wealth relatives at the end of each year in panel A are statistically larger than the wealth relatives in panel B. For each of the three years the wealth relatives are significantly larger in panel A than in panel B at the .01 significance level.[6] It appears that analysts are quite adept at selecting IPOs to follow.

Previous research has suggested that firms that have less information available about them tend to earn higher returns. One of the earlier studies in this area, Barry and Brown (1984), used the time that a stock has been listed as a proxy for the availability of information. Newly listed firms have less information available about them causing investors to demand higher returns for these firms. Our study examines IPOs which, by definition, have not listed at all, and consequently have even less information available about them. Our results suggest that when the period of time a stock has been listed is near zero, investors feel more comfortable investing in stocks that analysts have chosen to follow. The evidence of this is the higher wealth relatives in panel A as compared to panel B. The information provided by the analysts about these new firms may in fact help their performance.

For the time period 1981-1990, however, the returns in years two and three are negative. This can be seen by observing the declining wealth relatives in years two and three. The general decline in wealth relatives in years two and three occur in both the IPOs that are followed by the analysts and those not followed by the analysts. During this ten year period, for the IPOs appearing on IBES (in panel A), the wealth relatives decline from year 1 to year 2 in 8 of the 10 years (the exceptions are years 1981 and 1986.) The wealth relatives also decline from year 1 to year 3 in 8 of the 10 years (the exceptions are years 1986 and 1987.) During the same ten-year period, for IPOs not appearing on IBES (in panel B), the wealth relatives *also* decline from year 1 to year 2 in 8 of the 10 years (exceptions are years 1981 and 1983.) They also decline form year 1 to year 3 in 8 of 10 years (exceptions are years 1983 and 1986.) So the declines in wealth relatives are substantial and similar among both IPOs appearing on IBES and those not appearing on IBES.

In Contrast, after 1990 the wealth relatives of the IBES IPO group increase in *every* year from year 1 to year 2 and in *every* year from year 1 to year 3. This indicates that the IPOs followed by analysts change from showing lower returns in years 2 and 3 before 1991 to showing higher returns in years 2 and 3 in the years following 1990. To determine if the post 1990 increasing wealth relatives are significantly different from the pre 1991 decreasing wealth relatives a Fisher Exact Probability test is performed (Siegel, 1956, pp. 96-104.) This test shows that the change in wealth relatives from year 1 to year 2, before 1990, are significantly different from the change in wealth relative form year 1 to year 2, after 1991, at a .05 significance level. This is also true for the changes in wealth relatives from year 1 to year 3. The same tests are performed for the firms not followed by IBES and no statistically significant differences are found.

This suggests that analysts appear to be learning and changing their behavior. They have been better able to select IPOs that will perform well over two to three years since 1991 than before 1991. This is even more striking given that the percentage of IPOs followed by the analysts has increased dramatically during the last several years. Before 1991 the average number of IPOs followed per year was 82 which represented 30% of all IPOs. After 1991 the average number of IPOs followed per year was 265 which represented 68% of all IPOs.

Table 6: Aftermarket Performance by Year: IBES vs. Non-IBES

Panel A - IPO's Appearing on IBES Withing 1 Year of Their Offer Date

Yr	Total No. of IPOs	No. of IBES IPOs	IBES as % of total	Day 1 Return	End of Year 1 Wealth Relative	End of Year 1 No. Still Trading	End of Year 2 Wealth Relative	End of Year 2 No. Still trading	End of Year 3 Wealth Relative	End of Year 3 No. Still Trading
81	312	25	8	0.05	1.12	25	1.41	24	0.87	24
82	95	25	26	0.14	1.06	25	0.65	25	0.63	21
83	603	159	26	0.11	0.78	157	0.69	147	0.75	130
84	280	54	19	0.03	1.25	53	1.09	49	0.92	42
85	206	63	31	0.07	1.03	62	0.93	58	1.00	51
86	422	173	41	0.07	1.14	171	1.17	157	1.27	139
87	339	110	32	0.06	1.03	103	1.00	93	1.21	84
88	184	74	40	0.06	1.10	73	1.08	70	0.66	66
89	157	75	48	0.08	1.18	75	0.87	74	0.44	70
90	136	63	46	0.12	0.99	63	0.89	60	0.88	59
91	190	117	62	0.13	1.03	117	1.08	115	1.24	107
92	269	187	70	0.13	0.97	186	1.00	178	1.15	150
93	389	241	62	0.14	1.01	238	1.13	220	1.18	210
94	310	193	62	0.11	1.33	192	1.35	179	NA	NA
95	467	348	75	0.21	1.14	342	NA	NA	NA	NA
96	720	506	70	0.17	NA	NA	NA	NA	NA	NA

Panel B - IPO's Not Appearing on IBES Withing 1 Year of Their Offer Date

Yr	Total No. of IPOs	Non - IBES IPOs	Non as % of total	Day 1 Return	End of Year 1 Wealth Relative	End of Year 1 No. Still Trading	End of Year 2 Wealth Relative	End of Year 2 No. Still trading	End of Year 3 Wealth Relative	End of Year 3 No. Still Trading
81	312	287	92	0.10	0.71	275	0.74	253	0.52	229
82	95	70	73	0.16	1.03	67	0.63	61	0.56	52
83	603	444	74	0.13	0.89	434	0.92	392	1.04	337
84	280	226	81	0.10	1.04	218	0.96	190	0.79	158
85	206	143	69	0.09	0.89	138	0.76	120	0.71	101
86	422	249	59	0.08	0.89	243	0.78	219	0.91	182
87	339	229	67	0.08	0.86	219	0.78	187	0.76	165
88	184	110	60	0.05	0.91	105	0.83	95	0.42	86
89	157	82	52	0.07	0.87	80	0.70	77	0.56	67
90	136	73	54	0.07	0.80	72	0.57	70	0.45	63
91	190	73	38	0.14	0.69	73	0.71	71	0.44	61
92	269	82	30	0.11	0.71	81	0.41	77	0.35	66
93	389	148	38	0.08	0.79	147	0.80	130	0.95	118
94	310	117	38	0.09	0.94	115	1.02	108	NA	NA
95	467	119	25	0.18	0.85	118	NA	NA	NA	NA
96	720	214	30	0.16	NA	NA	NA	NA	NA	NA

CONCLUSION

The initial one-day performance of IPOs has historically been high. In our sample from 1975-1996 it averages 13% which is consistent with pervious research. The performance after this initial price increase has been historically poor. We find that IPOs underperform a control group in the first three years following the initial return. Again, this is consistent with previous research.

We examine the performance of IPOs over time and determine that investors have not changed their behavior. This is true even after many years of evidence that IPOs underperform the market in the years following the offering. Investors continue to bid up prices of new stock issues and then are subjected to poor performance in the subsequent years.

We also examine IPOs that are followed by analysts. Analysts have proven to be able to select IPOs that perform much better in year one than those they do not follow. The fact that an analyst is following a company seems to help its initial performance. In the second and third years following the offering, before 1991, however, the IPOs followed by the analysts did not performed better than those they did not follow. In contrast, beginning in 1991, the firms followed by analysts have continually improved in the second and third years following the offering. The analysts appear to be changing their behavior and improving their performance over time. This indicates that analysts may be "learning".

ENDNOTES

[1] Of the 1,526 fims in Ritter's sample, only 1,524 were found on the NYSE-AMEX-NASDAQ daily tape.

[2] It is during this period that the most dramatic annual change in the number offers occurs: in 1981, 312 IPOs were marketed, followed by only 96 in 1982 (a 69.2% drop). This was followed in 1983 by a total of 603 IPOs (a 528.1% increase.) The following year, 1984, only 280 IPOs were offered, representing a drop of 53.6% from 1983.

[3] SIC codes were listed in a field in the data set provided by Jay Ritter and are available in the Securities Data Corp database. For the few firms with missing SIC codes, the first available CRSP designated SIC code for that firm was used.

[4] Results using the value-weighted index are reported. The results for the equal-weighted index are not reported but are essentially identical.

[5] In their paper, Loughran and Ritter (1995) provide two reasons why they do not match by industry. They first speculate that if firms time initial public offerings to benefit from industry-wide misvaluations, "controlling for industry effects will reduce the ability to identify abnormal performance." Their second argument is one largely of data constraints: there are too few potential sized-matched firms meeting the equity issuing constraints the authors establish within a particular industry. Consequently, one firm might serve as the control for a number of sample firms.

[6] The statistical tests performed in this paper are nonparametric. Many attributes of out data are not normally distributed (i.e. the skewness of the offering size in Table 1 among others) and would violate some of the normality assumptions in parametric tests. Frequently the power of nonparametric tests is lower than tests that assume normality and, therefore, lead to conservative conclusions. Nonparametric tests have a long history of use in Accounting (i.e. (Foster, 1977) and (Lorek, 1979) among others) and Finance (i.e. Corrado, 1989) among others.) Two well known books on nonparametric statistics are (Siegel, 1956) and (Hollander and Wolfe, 1973.)

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