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The Persistence of IPO Mispricing and the Predictive Power of Flipping

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ABSTRACT

This paper examines underwriters' pricing errors and the information content of first-day trading activity in IPOs. We show that first-day winners continue to be winners over the first year, and first-day dogs continue to be relative dogs. Exceptions are "extra-hot" IPOs, which provide the worst future performance. We also demonstrate that large, supposedly informed, traders "flip" IPOs that perform the worst in the future. IPOs with low flipping generate abnormal returns of 1.5 percentage points per month over the first six months beginning on the third day. We show that flipping is predictable and conclude that underwriters' pricing errors are intentional.

THE PRICE SETTING PROCESS FOR initial public offerings (IPOs) is a multi-round negotiation among the firm going public, the underwriter, and investors. Despite the presumed intention of underwriters to obtain the best price for the issuing firm by balancing supply and demand, the evidence is less than convincing that they are able to accomplish this task consistently. In a sample of 1,232 large-capitalization IPOs in the period from 1988 to 1995, 149, or 12 percent, provided a first-day return of 30 percent or more. One might conclude that substantial money was left on the table in these "hot" deals. However, 25 percent of IPOs during the same period closed trading on the first day at or below the offer price. In these "cold" deals, the issuing firms ostensibly received top dollar for their shares, but possibly alienated new shareholders due to disappointing first-day performance.

We show that despite this apparent mispricing the market underreacts in choosing its initial trading price relative to both the offering price and the initial filing range. Hanley (1993) offers the first piece of the IPO pricing puzzle.

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She demonstrates that the relationship between the IPO offer price and the "price talk" (the preliminary filing range) predicts the direction of initial stock returns. Stocks that are priced above the initial filing price range perform very well on the first day (in spite of being offered at the higher price), and stocks that are priced below the initial filing range do poorly on the first day. Thus, the offer price represents a partial adjustment to the information about investor demand received subsequent to the price talk.

Affleck-Graves, Hegde, and Miller (1996) provide another piece of the puzzle. They examine the relationship between opening-day return and short-term aftermarket performance and find that three-month risk-adjusted returns are in the same direction as the original mispricing. We provide a finer opening-day partitioning and show that initial returns predict subsequent long-term (one-year) excess returns.[1] Hot IPOs outperform in the first year, cold IPOs underperform, and extra-hot IPOs (those with first-day returns in excess of 60 percent) provide the worst future performance.

Prior literature gives us only modest evidence as to what information we should expect from one-day returns. There is pervasive evidence in behavioral decision research that decision makers anchor on an initial expected outcome and insufficiently adjust to new information.[2] The corresponding result, stock price drift, has been exhibited in investors' responses to earnings announcements, dividend initiations and omissions, share repurchase announcements, seasoned equity offerings, and brokerage analysts' buy and sell recommendations.[3] In the case of IPOs, underwriters anchor on the midpoint of the filing range and do not sufficiently adjust the offer price to fully reflect institutional indications of interest gathered during roadshows. We demonstrate that information about the quality of issues appears to be available because we observe large investors selling on the first day those issues that have the worst future performance.

We focus on the information contained in this first-day trading. Flipping, which is defined as the immediate sale of IPO allocations back to the market or the underwriting syndicate, has been demonized by both underwriters and the financial press. "Flipping screws up the market," and "they (flippers) are parasites who prey off a system that basically works," say syndicate managers (Maher (1990), Pratt (1994)). Underwriters aggressively attempt to discourage flippers by various penalty schemes such as threatened exclu-

[1] This result is not without controversy. Ritter (1991) and Carter and Dark (1993) find in studies of prior periods (1975 to 1984 and 1979 to 1984) that firms with the highest initial returns do not have higher aftermarket excess returns. There are two differences between our data sets. First, Ritter includes smaller firms not included in our sample. These smallest firms have the highest initial return, but the lowest three-year returns in his sample (Table IV in Ritter (1991)). Second, market reactions are different in the more recent time period we examine. Levis (1993) finds, in U.K. data, a three-year return distribution conditional on the first-day return consistent with our results.

[2] See Slovic and Lichtenstein (1971) or Kahneman, Slovic, and Tversky (1982).

[3] Post-earnings announcement drift has been shown by Bernard and Thomas (1989, 1990), among others. For dividends, see Michaely, Thaler, and Womack (1995); for share repurchases, see Ikenberry, Lakonishok, and Vermaelen (1995); and for brokerage recommendations, see Womack (1996).

sion from future hot offerings.[4] They, as well as academics (Carter and Dark (1993)), contend that flipping has a detrimental effect on the early price performance of IPOs. In contrast, we conclude that flipping is a rational response to underwriters' mispricing. We demonstrate that heavily flipped IPOs significantly underperform IPOs with less flipping over future holding periods.[5] If new issue prices adjust toward fair value in the first year, then flipping is the appropriate *response* to unfavorable pricing. Flipping is not the *cause* of the poor price performance.

In order to capture information-based trading, we operationalize flipping as the percentage of first-day dollar volume "sold" (traded on the bid side of the market) in block trades.[6] Flipping accounts for 45 percent of trading volume on the first day in cold issues compared to only 22 percent in hot issues, despite significantly higher trading volume in hot issues. We demonstrate that flipping is a significant predictor of future stock performance. The difference in one-year size-adjusted returns (beginning on the third day) between the first and fourth flipping quartiles is 26.2 percentage points. Block traders appear to possess and use superior information; they flip issues that subsequently underperform the market. Thus, flipping provides valuable information (superior to the initial return) about the direction of the subsequent price adjustment to equilibrium fair value.

We show that flipping provides a link between the empirical findings of Hanley and Wilhelm (1995) and Field (1995) on institutional investment in IPOs and the theoretical underpricing literature. Rock (1986) argues that IPOs are underpriced to provide incentives for uninformed investors to bid for shares. Institutional investors bid for and gain a larger allocation of stronger IPOs, leaving a disproportionate share of weaker IPOs for the smaller investor. Underpricing exists to mitigate the impact of the lemons problem for small investors. The implication of Rock's model is that, assuming institutions are proxies for informed investors, we should find lower institutional investment in cold issues relative to hot issues. Benveniste and Spindt (1989) argue that underpricing exists to compensate regular investors for revealing truthful information. They demonstrate that distributional priority for future IPOs is given to regular investors, providing a motivation to take all IPO allocations. Hanley and Wilhelm (1995) show that the level of institutional buy-in to IPOs is con-

[4] On June 2, 1997, the Depository Trust Company (DTC) brought to full implementation its new IPO tracking system, which monitors flipping in an automated fashion. The system allows the lead underwriter to know within three days who has flipped shares. This enables the lead underwriter to punish syndicate members who place shares in the hands of flippers. It remains an empirical question whether this system will result in lower levels of flipping.

[5] Hanley, Lee, and Seguin (1996) examine IPOs of closed-end funds and show that a selling imbalance (which is different from our flipping metric) in the first few days of trading predicts cumulative (negative) returns for the first three to four months of trading. Our paper differs in two important respects: first, we analyze large operating company IPOs where institutions have more long-term interest, and second, we find that the return disparity (conditioned on price and trading activity) extends substantially beyond the underwriter's stabilization period.

[6] We use block trades as a proxy for institutional informed trading. Specifically, we use the Lee and Ready (1991) algorithm to "sign" trades as buys or sells according to the bid and ask quote in place at the time of the trade.

stant at about 70 percent. Field (1995), however, demonstrates that the level of institutional investment in IPOs (measured approximately six months after the IPO) is highly variable. These findings appear to be at odds.

We demonstrate that flipping, a rational response to underwriters' mispricing, completes the story. Institutional investors may buy all issues equally. Based on either superior information, or opening trade performance, however, institutions selectively flip IPOs that have the worst future performance, resulting in differential institutional investment levels across IPOs when measured at a later point in time. The cost of flipping is minimized by the underwriting syndicate's provision of aftermarket price support. By placing a stabilizing bid, underwriters effectively truncate the lower tail of the initial return distribution, minimizing the risk exposure of investors who have the ability to flip unwanted allocations (Ruud (1993)). Importantly, it is the industry practice of price support that supports flipping as a profitable trading strategy (for those who have access to primary IPO offerings).

Finally, Fama (1997) asserts that much of the apparent overreaction and underreaction to information disappears when portfolios are value-weighted and common factors such as size and book-to-market effects are controlled for. Our results on flipping do not disappear. In a five-factor model (market, size, book-to-market, general market momentum, and IPO market momentum) using calendar-time value-weighted portfolio regressions, the level of flipping continues to differentiate good from poor first-year performers. The models "load" significantly on the size and book-to-market factors that have been observed elsewhere for IPOs (Brav and Gompers (1997) and Loughran and Ritter (1995)), but the proxies for equity and IPO momentum have little (if any) explanatory power (see Table VII, Section VI).

The remainder of the paper is summarized as follows. Section I provides a description of our IPO data and sample selection. Section II has an analysis of the long-term performance of IPOs. Section III discusses the microstructure characteristics of the first day of trading. Section IV relates flipping to institutional investment and future performance. Section V examines the robustness of our results. Section VI addresses methodological concerns and addresses IPO and general market momentum as explanations for IPO performance, and Section VII concludes.

I. Data and Sample Selection

The data used in this study come from three sources. Firms conducting initial public offerings in the period of January 1988 through May 1995 are collected from the Securities Data Company (SDC) New Issues database.[7]

[7] We stop our initial data collecting in May 1995 so that we have at least six months of post-IPO return for each company. These are critical to our analysis; return (CRSP) data were available only until December 1995, at the time of collection. Our results do not change significantly if we use December 1994 as our stopping point. In Section V, we verify our results out-of-sample on 232 IPOs (which meet our selection criteria) issued between June 1995 and December 1995 (inclusive) using CRSP data through December 1996.

We exclude financial corporations including banks, savings and loans, closed-end funds, and real estate investment trusts, partnerships, and unit offerings. Our intention is to study IPOs that are reasonably large and important to institutional investors. Ritter (1991) establishes that, on the whole, IPOs perform poorly in the aftermarket. However, Michaely and Shaw (1998) demonstrate that performance can be explained in part by institutional investment in an issue. During the 1984 to 1988 period, IPOs with no institutional holdings significantly underperformed both the market and a portfolio of IPOs that had positive institutional presence. Thus, we exclude the smallest IPOs from our analysis and focus on issues with potential institutional interest. As such, we constrain our sample to IPOs with an offer price above $8 per share and for which the post-issue equity market capitalization (based on the offer price and assuming no overallotment option exercise) of the firm is greater than $50 million.[8] Requiring prices and return data for all companies from the Center for Research in Security Prices (CRSP) database further reduces the SDC sample by 38 (mostly foreign) companies.

Finally, in order to examine trading patterns in IPOs, we collect trade and quote data from the New York Stock Exchange TAQ database (TAQ). This source permits examination of intraday price and volume results such as a firm's return from the offer price to the opening trade on the first day (see Table III in Section IV). The TAQ database begins in January 1993. We collect trade and quote data for the first five days of trading for the 611 firms in our sample that went public after January 1, 1993. This sample is used for our inquiry into flipping as a rational response to mispricing.

Our final sample of IPOs, for which we have SDC variables such as offering date, number of shares offered, offer price, lead underwriter, and CRSP daily return and volume information, covers 1,232 IPOs, of which 244 began trading on the NYSE, 31 on the AMEX, and 957 (78 percent) on Nasdaq.

Table I provides descriptive statistics on the 1,232 IPOs examined in this paper. The median firm in our sample offers 3 million shares, garnering proceeds of about $41 million. The mean and median market capitalization of the firms at their offering is $325 million and $120 million. Of course, these figures slightly understate the actual initial market capitalizations for most companies once they are trading since they do not consider the exercise of overallotment options or the underpricing of most IPOs.

[8] SDC reports 3,331 IPO offerings in our time frame. Of those, 866 (26 percent) are financial corporations (including closed-end funds and REITs) and 479 (14 percent) are unit offerings. Of the 3,331 IPO offerings, 1,019 (31 percent) are excluded because they are below $8 per share and 1,369 (41 percent) are excluded because of the $50 million minimum capitalization constraint. With some overlap among these various constraints, 1,232 IPOs are included in our sample, representing a sizable proportion of all money raised by corporations through IPOs. Although the market roughly doubled during the time period we analyze, there is no indication that our fixed cutoffs of $8 per share and $50 million market capitalization have induced any bias. That is, the percentage of all IPOs we select in each year because of these cutoffs does not appear to increase or decrease over the eight-year period.

Table I

IPO Sample Description

Initial Public Offerings (IPOs) conducted in the U.S. markets by nonfinancial operating companies from January 1988 to May 1995 with pro forma market capitalization above $50 million, offering price of $8 or greater, and with available CRSP and Securities Data Company data are included in the sample. Unit and partnership offerings are excluded. The sample is divided into approximately equal halves, with a cutoff date of December 31, 1992. (Intraday trade and quote data (NYSE Transactions and Quotations data) become available at the beginning of 1993.) The one-year size-adjusted return is calculated from day 3 to day 368 after the IPO. Mean values are provided with medians in parentheses.

	All IPOs N = 1232	IPOs 1988–1992 N = 621	IPOs January 1993–May 1995 N = 611
Pro forma market capitalization ($ millions)	$ 324.5	$ 243.2	$ 407.2
	(120.3)	(121.4)	(119.0)
Offering proceeds ($ millions)	76.5	74.3	78.8
	(41.0)	(41.2)	(40.7)
Shares offered ($ millions)	5.0	5.0	5.1
	(3.1)	(3.1)	(3.0)
First-day return	12.3%	10.7%	13.9%
	(6.2%)	(5.3%)	(6.8%)
Second-day return	0.2%	0.4%	0.1%
	(0.0%)	(0.0%)	(0.0%)
One-year size-adjusted return	6.5%	1.9%	11.2%
	(−2.9%)	(−6.1%)	(2.1%)

II. First-Day and Longer Term Returns

To evaluate the short- and long-term performance of IPOs, we calculate the first- and second-day raw returns and excess returns for longer buy-and-hold periods.[9] We compare buy-and-hold returns with several benchmark portfolios: the Nasdaq Composite index, the CRSP equal-weighted index, and the appropriate CRSP market capitalization (size) decile index. Though all indices provide similar results, we feel that the size-decile index is appropriate for several reasons. First, it is parsimonious and approximately reflects the benchmark that would be used by professional investors. Second, it explicitly accounts for the well-known size factor, and most IPOs are small-size stocks. Third, the market-segment portfolios created by CRSP are value-weighted. Hence, potential bias from compounding an equal-weighted index has been reduced (see Canina et al. (1998)). Fourth, it has been previously advocated in the literature for event studies (Dimson and Marsh

[9] Excess returns for the opening day and the second trading day for each firm (t = 1 and 2) are negligibly different from the raw returns. None of our results qualitatively change if excess returns are used for calculations. We intentionally use raw first-day returns for separating our sample into cold, cool, hot, and extra-hot deals. A large percentage of the firms classified as cold have an opening (for the TAQ sample) or a close-of-first-day (for the CRSP sample) return of exactly zero percent, indicating possible underwriter support at the offer price.

(1986)). Thus, we use the size-adjusted benchmark in our preliminary analysis. In Section VI, we demonstrate that accounting for other factors such as price-to-book and momentum in calendar-time portfolios does not significantly affect our conclusions. As noted by other researchers, calendar-time portfolio regressions do not reflect either an investor's result or a typical benchmark, so we choose to use them in a diagnostic capacity.

The size-adjusted excess return is defined as the geometrically compounded (buy-and-hold) return on the stock minus the geometrically compounded return on the relevant CRSP market-cap decile portfolio:

$$ER^{i}_{3\ to\ M} = \left[\prod_{t=3}^{M} (1 + r_t^i) - \prod_{t=3}^{M} (1 + r_i^{size}) \right], \tag{1}$$

where r_t^i is the raw return on stock i on day t, and r_t^{size} is the return on the matching CRSP market capitalization size decile for day t. $ER^{i}_{3\ to\ M}$ is the excess return for firm i beginning on the third trading day for the IPO, extending for M months (M periods of 21 trading days). If a firm is delisted during the period (four observations in the first 12 trading months, zero observations in the first six months), the mean return reflects fewer observations in subsequent periods. An analysis of the delisted firms shows that their returns at the time of delisting are not significant outliers and therefore do not bias our results.

The average excess return for each period, *PER* (Portfolio Excess Return) is the mean of the ER^i:

$$PER = \frac{1}{n_M} \left(\sum_{i=1}^{n} ER^i \right), \tag{2}$$

where n_M equals the number of surviving firms in the event period with available returns; t-statistics are calculated using the cross-sectional variance of excess returns in the relevant period.

We partition all IPOs into one of four categories. Cold IPOs are defined as offerings where the first-day unadjusted return is zero or negative (26 percent of IPOs). Cold issues are often price-supported. We expect to observe the syndicate bid in many of these offerings, which demonstrates the willingness of the underwriter to repurchase shares, usually at the offer price, to support the stock. The remaining IPOs are classified as cool, hot, or extra-hot. Cool IPOs (35 percent of the sample) are defined as those with a first-day return greater than zero but less than 10 percent. Hot IPOs (36 percent of the sample) have a first-day return equal to or greater than 10 percent but less than 60 percent. Extra-hot IPOs (three percent of the sample) are those with a first-day return greater than 60 percent.

Data suggest two significant regime shifts. First, cold IPOs appear to behave differently than non-cold IPOs. Asquith, Jones, and Kieschnick (1998) provide evidence that cold IPOs are drawn from a different distribution than

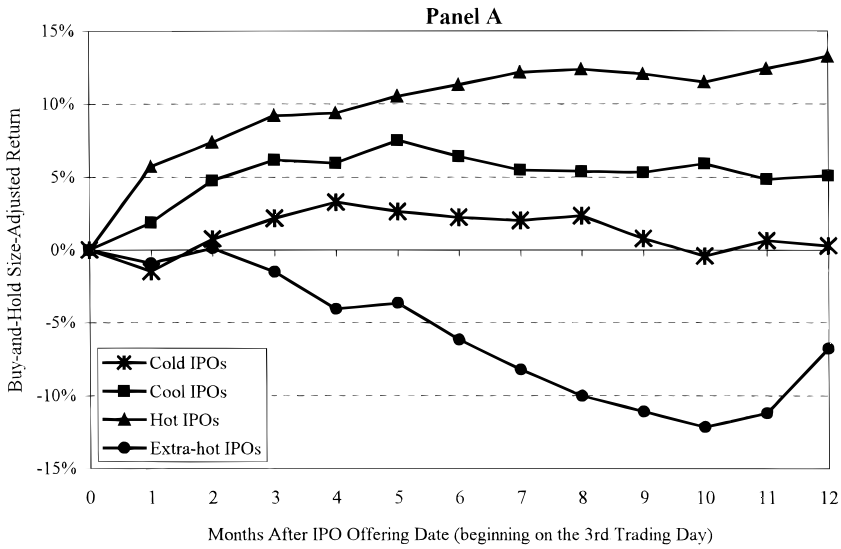
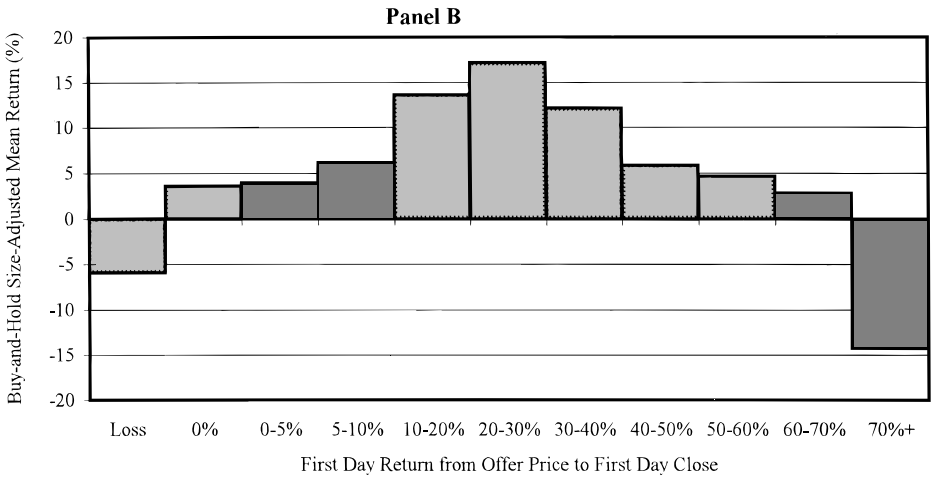


Figure 1. Size-adjusted performance (beginning on day 3) partitioned by opening day return. Those IPOs conducted in the U.S. markets by operating companies from January 1988 to May 1995 with pro forma market capitalization greater than $50 million, offering price of $8 or greater, and with available CRSP and SDC data are included in the sample. Unit and partnership offerings are excluded. The IPOs are partitioned into four groups using the raw return from offer price to the first-day closing price. Cold IPOs (318) are those with a first-day return of zero percent or less and extra-hot IPOs (33) are those with a first-day return of 60 percent or more. The partition of cool (438) versus hot (443) is split at 10 percent. Panels B and C partition the IPOs into 11 groups using the raw return from offer price to the first-day closing price. Panel B contains mean size-adjusted one-year excess returns, and Panel C contains median one-year size-adjusted excess returns.

other IPOs. Second, extra-hot IPOs perform worse than cool and hot IPOs. Our cutoff between cool and hot definitions is arbitrary; the relationship is locally monotonic, and other partitions yield similar results. We show a finer partition of the data in Figure 1, Panels B and C, allowing the reader to assess our cutoffs.

Tables I and II include return calculations using daily CRSP data for both short and long horizons. Table I contains return data for the entire sample and provides a partitioning by the subperiods 1988 to 1992 and 1993 to 1995 (the period with TAQ data). We find an average first-day return of 12.3 percent overall, which is consistent with other studies using large IPOs during our time period. We also show that the initial and subsequent performance of IPOs in the most recent two and one-half years (January 1993 to May 1995) is higher than in the earlier period. The 621 IPOs offered in 1988 to 1992 have one-year excess returns averaging 1.9 percent, compared to 11.2 percent for the 611 IPOs issued in January 1993 to May 1995. We believe this accounts for the differences between our mean and median returns and those of earlier studies.



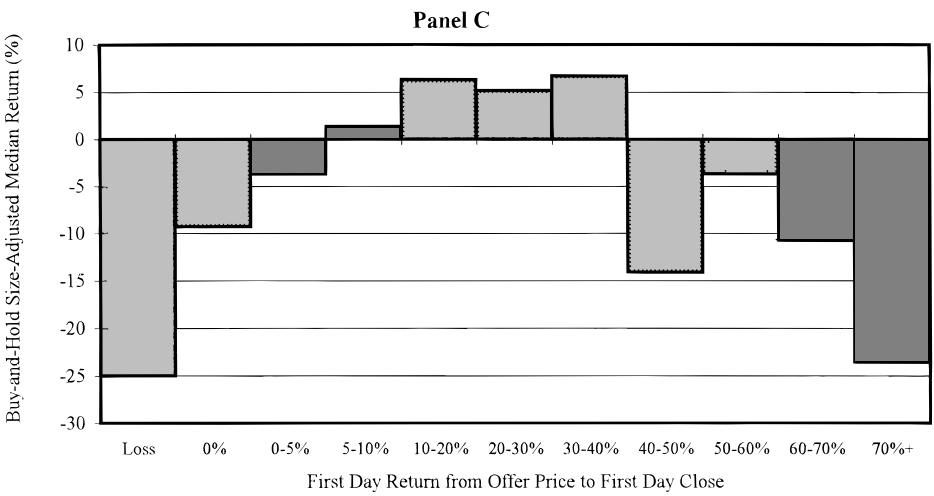


Figure 1. Continued.

Table II presents the return statistics partitioned by opening day performance. A majority of the offerings in the cold category close trading on the first day unchanged from the offering price, not lower than the offering price. As mentioned previously, this is the result of temporary price support from underwriters, as described by Ruud (1993) and others. Hanley, Kumar, and Seguin (1993) find that prices fall following the hypothesized period of price support. Consistent with their findings, the cold IPOs in our sample decline 1.5 percent on average in the month following the offering.

Table II and Figure 1 quantify and show the first main result of this paper—that partitioning the sample of IPOs by first-day returns gives an indication of future performance. However, the results are not monotonic. We find extra-hot IPOs do not outperform hot ones. No theoretical cutoff

Table II

Full IPO Sample Partitioned by Underpricing

IPOs for January 1988 through May 1995 are partitioned into four groups using the raw return from the offer price to the first-day closing price. Cold IPOs are those with a first-day return of zero or less and extra-hot IPOs as those with a first-day return greater than 60 percent. The partitions of cool and hot are split at 10 percent. Medians are not reported when they are essentially the same as the means. Post-offering excess returns beginning on the third day after the offering are buy-and-hold returns, using a capitalization-weighted size-decile benchmark. First-day volume as a percentage of shares offered is presented unadjusted and adjusted by dividing Nasdaq volume by two to account for interdealer transactions.

	Cold IPOs First-Day ≤ 0% $N = 318$	Cool IPOs 0% < First-Day ≤ 10% $N = 438$	Hot IPOs 10% < First-Day ≤ 60% $N = 443$	Extra-Hot IPOs First-Day > 60% $N = 33$	Kruskal–Wallis Test χ^2 (p-value)
First-day return (offer-to-close)					
Mean	−1.2%	4.6%	24.4%	80.3%	no meaning, defined
Median	0.0%	4.3%	21.1%	75.0%	as different
First-day volume as percentage of shares offered					
Mean	42.3%	51.1%	81.3%	130.6%	359.3 (0.0001)
Adjusted mean	24.0%	29.7%	43.7%	67.3%	366.6 (0.0001)
One-month excess return from day 3					
Mean	−1.5%	1.9%	5.7%	−0.9%	52.6 (0.0001)
Median	−2.7%	1.0%	4.1%	−5.2%	
Six-month excess return from day 3					
Mean	2.2%	6.4%	11.3%	−6.2%	12.7 (0.0052)
Median	−4.2%	3.2%	5.8%	−15.7%	
One-year excess return from day 3					
Mean	0.3%	5.1%	13.2%	−6.8%	11.0 (0.0117)
Median	−12.4%	−2.7%	4.7%	−21.3%	

Percentage change from midpoint of filing range to offer price					
Mean	−9.7%	−1.7%	12.6%	29.2%	442.7 (0.0001)
Overallotment exercised (mean) (15 percent maximum)	2.8%	7.4%	12.1%	13.2%	323.6 (0.0001)
Second-day return (mean)	−0.1%	0.1%	0.7%	−0.3%	4.4 (0.2217)
Pro forma market capitalization ($ millions)					
Mean	$237.37	$472.19	$250.90	$192.48	7.9 (0.0480)
Median	$116.35	$125.94	$115.04	$172.60	
Proceeds of offering ($ millions)					
Mean	$77.15	$85.98	$68.88	$48.19	5.9 (0.1155)
Median	$39.00	$42.00	$40.25	$43.01	

has been suggested between the cool/hot and the "overheated" extra-hot groups. We have chosen 60 percent for our presentation, but one should recognize that a cutoff is making dichotomous what is essentially a continuous variable.

We find that the mean and median one-month excess returns for cold and extra-hot IPOs are negative and that the same returns are positive for cool and hot IPOs. This relationship of cold and extra-hot to cool and hot IPOs continues at the six-month and one-year time frames as well. In parametric as well as nonparametric statistical tests, the differences between the four groups are significant at conventional levels.

III. Initial Trading Activity in IPOs

One aspect of IPOs often highlighted by the financial press is the heavy first-day trading that puts many IPO firms on the list of the largest volume stocks for the day. From this point in the study, we focus on the 611 IPOs from the January 1993 through May 1995 period for which TAQ data are available. TAQ data allow us to examine intraday trading activity. To provide a basic understanding of the magnitude of first-day trading, we calculate the total number of shares traded on the first day as a percentage of the number of shares offered in the IPO.[10] We find a significant range of first-day adjusted trading volume within the sample with a minimum of one percent, a median of 33 percent, and a maximum of 209 percent of shares offered. However, volume quickly dissipates. The mean number of trades executed on the first day of public trading is 822, declining consistently over the next four days to an average level of only 93 trades by the fifth day. Figure 2 shows shares traded as a percentage of shares offered over the first five days, partitioned by initial IPO performance. The heaviest trading activity takes place in extra-hot IPOs, with average first-day (adjusted) volume of about 1.9 million shares or 70 percent of shares offered. However, the relative level of trading quickly dissipates on days 2–5 across all IPOs regardless of first-day return.

A similar pattern of rapid trading decline also occurs within the first trading day. We construct this information by aligning trades in event time starting with the first hour of trading. The percentage of trades that occur during each of the first six hours of trading is shown in Figure 3.[11] The immediacy

[10] To keep NYSE/AMEX and Nasdaq results comparable, we divide shares traded in the Nasdaq market by two and report these as adjusted volume totals (Atkins and Dyl (1997)). Transaction-specific measures of trading activity (flipping and order imbalance) are based on transactions as reported in the TAQ database. There is no known methodology that can be uniformly implemented to adjust volume at the transactions level. Krigman (1997) demonstrates that the level of volume inflation is highly variable from stock to stock and day to day for the same stock.

[11] In Figure 3, we only include trading for the first six hours because the majority of IPOs in our sample open between 10:00 a.m. and 11:00 a.m., and thus do not have a full six and one-half hours of trading on the first day.

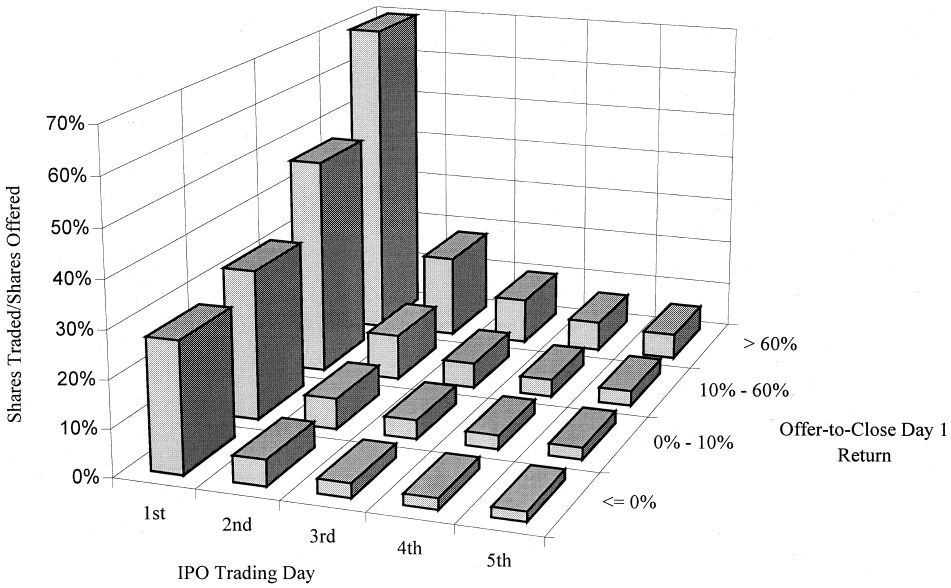


Figure 2. Daily trading activity by day 1 performance: January 1993–May 1995. Daily trading volume is presented by day 1 offer-to-close return groups. Of the 611 IPOs for this period, 136 cold IPOs have first-day performance less than or equal to zero percent, 227 have first-day returns greater than zero percent but less than 10 percent, 224 have returns equal to or greater than 10 percent but less than 60 percent, and 24 extra-hot IPOs have first-day returns greater than 60 percent. Nasdaq volume is divided by two to control for differences in trading protocol between the exchanges.

of the trading is dramatic. Approximately 52 percent of the day's trading activity takes place in the first hour of trading. The first two hours account for more than 72 percent of the day's trading activity.

To provide some insight into who is trading during this time, we partition the trades into three groups; trades of fewer than 1,000 shares, trades of 1,000 to 9,999 shares, and trades of 10,000 shares or more. We find that 57 percent of the block trades (10,000 shares or more) on the opening day of trading take place within the first hour.

Trading activity is much greater in hot issues than in cold ones. On the opening day of trading, an average of 2,886 trades are made in the extra-hot issues compared to only 345 trades in the cold issues. The number of block trades is significantly higher in the hot issues as well. Interestingly, however, block trades in the extra-hot issues account for only 39 percent of the shares transacted for the day compared to 68 percent in the cold issues. The difference is significant at the 0.0001 level and is indicative of heavier proportionate institutional trading in cold issues. Hanley et al. (1996) examine order imbalance, defined as [(shares sold − shares bought) ÷ (total shares issued)], as indicative of buyer versus seller initiated trading. In cold issues, we expect trading to be seller-initiated, whereas in hot issues we expect

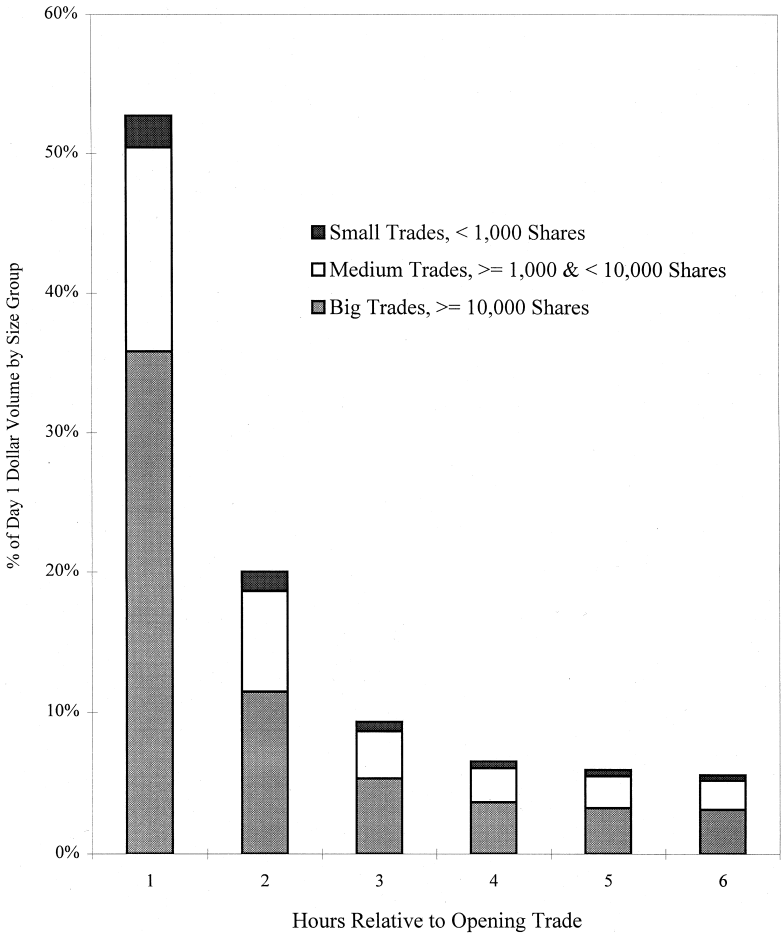


Figure 3. Day 1 hourly dollar volume by trade size, January 1993–May 1995. Opening day dollar volume transacted by trade size is presented as a percentage of opening day total dollar volume for IPOs issued January 1993 through May 1995. Small trades are those of fewer than 1,000 shares, medium trades range from 1,000 to 9,999 shares, and big trades are those of 10,000 shares or more. More than 50 percent of the opening day dollar volume is transacted in the first hour of trading in IPO stocks.

more volume to be buyer-initiated. Table III confirms this intuition. The order imbalance in cold issues is +0.22 versus +0.06 in hot issues. The difference is statistically significant at conventional levels.

Although we find heavier trading in hot issues, block trades account for a significantly larger percentage of transactions in cold issues, 16.1 percent, compared to only 8.4 percent for hot issues. Thus, though we show in Section II that first-day returns predict future performance, these statistics lead us to consider whether the first-day block trading activity is of incremental value in predicting longer-term winners.

Table III

Trading Activity and Returns Partitioned on First-Day Underpricing

The 611 IPOs from January 1993 through May 1995 (where Transactions and Quotations data are available) are split based on the first-day offer-to-close return. Extra-hot IPOs (24) are defined as those that have offer-to-first-day-close returns greater than 60 percent. Cold IPOs (136) are those that close at or below their offer price. Cool IPOs (227) have offer-to-close returns greater than zero percent and less than 10 percent, and hot IPOs (224) have offer-to-close returns greater than 10 percent and less than 60 percent. The statistics included are the mean and median shares and prints transacted on day 1, the large trader activity, the day 1 order imbalance, defined as the sell-signed dollar volume minus the buy-signed dollar volume divided by total day 1 dollar volume, the offer-to-open return, the open-to-close day 1 return, the opening bid-ask spread, the size of the offering, and the size-adjusted performance over several horizons. Trading volume is presented unadjusted and adjusted where Nasdaq volume is divided by two to account for interdealer transactions. Other partitions that distinguish the extremes (cold and extra-hot from warm and hot) (quartiles, quintiles, etc.) produce similar return differences.

	136 Cold IPOs First Day ≤ 0%		227 Cool IPOs 0% < First Day ≤ 10%		224 Hot IPOs 10% < First Day ≤ 60%		24 Extra-Hot IPOs First Day > 60%		Kruskal-Wallis Test	
	Mean	Median	Mean	Median	Mean	Median	Mean	Median	χ^2	p-value
Proceeds of offering ($ millions)	$75.43	$37.09	$82.78	$41.13	$80.16	$40.75	$47.75	$42.15	1.2	(0.7413)
Day 1 volume as percentage of shares offered	46.5%	39.3%	53.9%	46.9%	93.7%	98.1%	150.4%	135.9%	220.2	(0.0001)
Adjusted volume as percentage of offered	27.5%	25.4%	31.9%	31.1%	46.6%	45.6%	69.6%	64.9%	167.8	(0.0001)
Day 1 order imbalance	21.8%	19.1%	9.3%	6.7%	6.0%	4.4%	6.7%	1.5%	88.3	(0.0001)
Opening bid-ask spread	$0.45	$0.50	$0.48	$0.50	$0.74	$0.75	$0.78	$0.50	59.7	(0.0001)
No. of shares transacted, day 1	2,007,625	1,500,850	2,084,996	1,702,600	3,209,283	2,543,650	3,941,942	3,617,350	87.5	(0.0001)
Adjusted shares, day 1	1,262,690	787,775	1,406,353	1,004,700	1,986,876	1,302,075	1,970,971	1,808,675	54.9	(0.0001)
No. of trades reported, day 1	345	284	504	430	1,216	1,001	2,886	2,137	270.0	(0.0001)
Block trade (>10,000 shares) activity, day 1										
As percentage of shares	68.3%	69.4%	62.0%	64.1%	54.8%	55.0%	39.0%	40.4%	123.8	(0.0001)
As percentage of trades	16.1%	14.7%	12.1%	11.4%	8.4%	7.6%	3.8%	3.8%	164.3	(0.0001)
Flipping ratio, day 1	45.4%	44.7%	30.8%	29.1%	22.8%	20.9%	14.0%	13.5%	186.1	(0.0001)
Return Statistics										
Offer-to-open	2.3%	0.0%	5.3%	4.5%	21.6%	18.4%	71.1%	66.0%	372.5	(0.0001)
Open-to-close, day 1	−3.2%	−2.0%	−0.5%	0.0%	3.1%	2.9%	8.6%	7.2%	114.6	(0.0001)
Size-adjusted performance										
Day 3 to 1 month	−0.83%	−1.30%	2.81%	1.00%	6.13%	3.55%	−0.02%	−5.85%	17.9	(0.0005)
Day 3 to 6 months	0.98%	−9.75%	8.52%	4.40%	13.90%	10.30%	−3.21%	−17.25%	15.8	(0.0013)
Day 3 to 1 year	−2.12%	−16.65%	11.54%	2.90%	20.12%	8.55%	−1.16%	−20.10%	13.6	(0.0035)

IV. Flipping as a Predictor of Future Returns

We define flipping for our study as the immediate first-day selling of block allocations by institutional investors. Clearly, large investors are not the only ones capable of selling their shares in the aftermarket, but there are several reasons to examine block sales specifically. First, the academic literature often characterizes large traders as informed (as opposed to naive or 'noise' traders). By focusing on large-trader behavior, we may be able to discern whether they in fact garner excess profits due to their potentially informed nature. Second, underwriters report that most IPO firms are vitally interested in placing large allocations of shares in the hands of committed institutional investors, presumably from a belief that thereby trading volatility will be minimized and value will be maximized. The absence of flipping, then, is a measure of whether their placement strategy has been successful.

First, we provide an operationalized definition of large traders. We define activity of large traders as transactions of 10,000 shares or more, although our results are not sensitive to this arbitrary, but institutionally accepted, cutoff.[12] Though the frequency (count) of trades by large traders is small relative to other traders' activity, averaging 9.9 percent of first-day trades, the effect of their trading is significant. On the first day of trading, block trades account for 59.8 percent of all shares traded.

We hypothesize that a measure of flipping may be valuable in detecting informed behavior by large traders. We define flipping as the ratio of first-day sell-signed block-trade dollar volume to total dollar volume traded on the first day.[13] Table III shows that the level of flipping is very different from cold IPOs to hot IPOs. For cold IPOs, flipping accounts for 45 percent of total dollar volume executed on the first day of trading. For hot and extra-hot IPOs, 22 percent and 14 percent, respectively, of the first-day dollar volume is flipped. The monotonic difference in flipping among the four first-day return groups is significant at the 0.0001 level. Consequently, we rank and partition all IPOs into quartiles by this flipping metric. Figure 4 illustrates that the portfolio of lowest flipping quartile IPOs achieves the highest size-adjusted return over one-month, six-month, and one-year holding periods. An examination of the one-year excess return of IPOs partitioned by flipping group shows that the lowest flipping quartile has significantly higher returns than the interquartile range, which has significantly higher returns than the high flipping quartile (F-value = 12.41, p-value = 0.0005).

Thus, the second main result of this study is that IPOs with lower flipping on the first day (especially the lowest quartile) significantly outperform those with high first-day flipping, over the next year. We have shown that first-

[12] We replicate our results using a 5,000-share cutoff for large trades. The results are substantially identical to those reported using the 10,000-share designation. The NYSE TAQ database does not provide information on exact trades. Prints are provided that sometimes are aggregates of trades executed at the same price and time on an exchange. All references to trades are prints as reported by TAQ. The aggregated trades are flagged with a B code that indicates a bunched transaction. All results remain when we exclude the trades flagged B.

[13] We use the Lee and Ready (1991) algorithm to sign all transactions.

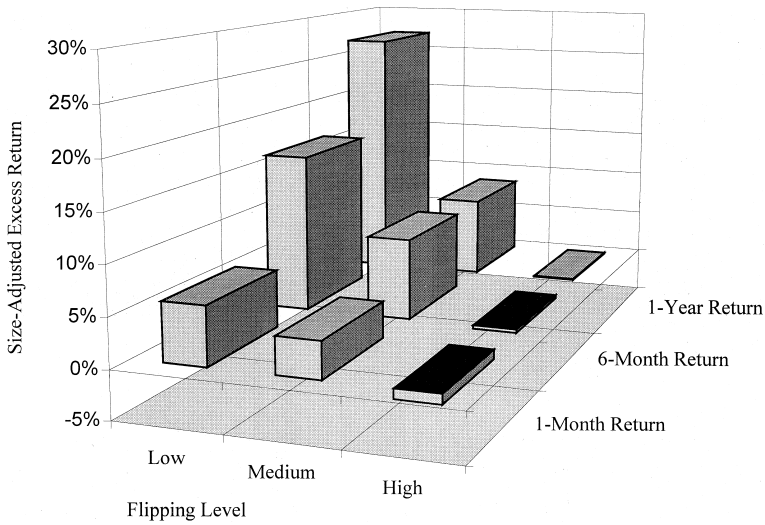


Figure 4. Size-adjusted performance by flipping quartile. One-month, six-month, and one-year size-adjusted returns are presented for the 611 IPOs offered from January 1993 through May 1995. The sample is partitioned by the level of day 1 "flipping," defined as the percentage of dollar volume executed in sell-signed trades of more than 10,000 shares. Low flipping is the lowest quartile, medium flipping represents the interquartile range, and high flipping is the upper quartile. The IPOs with the lowest level of flipping on the opening day perform the best over future trading periods.

day performance predicts one-year returns and that flipping also predicts one-year returns. Next, we ask the question: Can we predict the amount of flipping from ex ante factors?

The offer-to-open return provides the market with the first indication of IPO performance. As such, institutional investors may condition flipping behavior on the first trade price. The offer-to-open return in our sample ranges from −4.5 percent to +127.5 percent with an average of 13.2 percent. We also control for the effects of firm size and underwriter and estimate the following regression (White's heteroskedasticity-adjusted t-statistics are reported in parentheses):

$$\underset{}{Flipping} = \underset{(-0.34)}{-0.054} + \underset{(1.46)}{0.0001\,Rank} + \underset{(2.43)}{0.021\ln(Mktcap)} - \underset{(-9.88)}{0.333\,Return}, \tag{3}$$

$$N = 611, \quad \text{Adj. } R^2 = 0.135 \quad F\text{-value} = 32.74 \quad p\text{-value} = 0.0001,$$

where *Flipping* is the percentage of sell-signed dollar volume executed in trades of 10,000 shares or more on the first day of trading; *Rank* is a ranking of underwriters based on equity capital; *Mktcap* is the total market capitalization of the firm at the time of the IPO; and *Return* is the percentage change from the offer price to the opening trade price.

The level of flipping is explained by the level of underpricing (*Return*), controlling for both firm size and the quality of the underwriter. The negative and significant coefficient of the *Return* variable indicates that large traders flip IPOs that open at a low price relative to the offer price. The positive and significant coefficient of the *Mktcap* variable is consistent with the argument in Michaely and Shaw (1994) that larger IPOs are more difficult to market, holding other things constant. Thus, we see higher flipping in larger deals.

We have demonstrated that flipping is predictable and is related to the future performance of IPO stocks. We next examine whether first-day flipping partially explains the divergent results of Field (1995), who finds significant variance in institutional holdings in the period subsequent to IPO, and Hanley and Wilhelm (1995), who find a stable allocation of IPO shares to institutional investors of about 70 percent of shares offered.[14] To do this, we collect institutional holdings as of the first quarterly 13F filing post-IPO for the 552 IPOs in our sample (of 611) for which data are available. Results of this analysis are presented in Table IV.

We show that the percentage of shares offered that are held by institutions after three months is significantly different across flipping quartiles. IPO stocks that are heavily flipped on the first day have lower institutional holdings after three months. A Wilcoxon Rank Sum test rejects the equality of the distribution of the number of institutional investors across flipping quartiles ($\chi^2 = 10.59$, p-value = 0.005). Shares held by institutions, measured as a percent of shares offered, is also significantly different across flipping quartiles ($\chi^2 = 6.72$, p-value = 0.0347). Table IV documents that institutional investment is also related to the opening price performance of IPOs. We conclude that if institutional buy-in to IPOs is constant, as found by Hanley and Wilhelm (1995), flipping based on either superior information or opening day performance results in differential institutional investment profiles a few months later.

V. A Two-Factor Trading Strategy and Robustness

We have shown that the first-day return and the level of flipping on the first day predict the performance of IPO stocks over the next year. With the exception of extra-hot IPOs, the higher the first-day return, the higher the one-year size-adjusted return; the lower the flipping (sell-side block activity), the higher the one-year size-adjusted return. For example, selecting a portfolio of the lowest flipping quartile produces a mean one-year size-adjusted return of 27.8 percent relative to 0.1 percent for the highest flipping quartile. Portfolio selection based on flipping yields a larger return

[14] Field's IPO sample contains 1,862 IPOs issued during the period 1984–1988. Our exclusion of small IPOs results in significantly higher levels of institutional holdings during the 1993 to 1995 period than she finds in her sample.

Table IV

Institutional Investment by Flipping Activity and First-Day Performance

Institutional ownership from the first quarterly 13F filing that is at least one-quarter post-IPO is provided for 552 of the 611 IPOs for which data are available. We provide data on the number of institutions reporting holdings and institutional shares as a percentage of shares offered in the IPO. We include a nonparametric Kruskal–Wallis test of the equality of the distribution across flipping and performance partitions. Panel A presents institutional ownership partitioned by flipping quartile. Flipping is defined as the sell-signed dollar volume executed in blocks of 10,000 shares or more divided by the total day 1 dollar volume. The sample is split based on flipping levels; low flipping is the lowest quartile, medium flipping represents the interquartile range, and high flipping is the upper quartile. Panel B presents the data partitioned by opening day performance. Extra-hot IPOs (23) are defined as those with offer-to-first-day-close returns greater than 60 percent. Cold IPOs (115) are those that close at or below their offer price. Cool IPOs (211) have offer-to-close returns greater than zero percent but less than 10 percent, and hot IPOs (203) have offer-to-close returns greater than 10 percent and less than 60 percent.

		No. of Institutional Holders		Institutional Shares as Percentage of Shares Offered	
	Obs.	Mean	Median	Mean	Median
Panel A: Partitioned by Flipping Quartile					
High flipping	134	30	25	66%	64%
Medium flipping	278	34	30	71%	68%
Low flipping	140	33	31	82%	73%
χ^2 Kruskal–Wallis		10.594		6.721	
(p-value)		(0.0050)		(0.0347)	
Panel B: Partitioned by Opening Day Performance					
Cold IPOs	115	23	21	66%	62%
Cool IPOs	211	30	26	73%	67%
Hot IPOs	203	40	35	75%	73%
Extra-hot IPOs	23	42	39	82%	84%
χ^2 Kruskal–Wallis		86.176		16.049	
(p-value)		(0.0001)		(0.0011)	

differential than conditioning on opening day performance. A natural follow-on question is whether the two factors jointly can provide a more potent model for predicting returns, or whether they proxy for a single factor.

To address this issue, we partition the IPOs by flipping quartile within the opening-day performance categories. Again, low flipping is defined as the first quartile, medium contains the next 50 percent of the firms, and high contains firms in the highest quartile of firms ranked by flipping. The results shown in Table V and Figure 5 are consistent with first-day return and first-day trading activity having independent predictive power for future returns. Focusing on one-year returns, we find that average returns

Table V

Returns Partitioned by First-Day Performance and Flipping Activity

The 611 IPOs from January 1993 through May 1995 are split based on opening day offer-to-close performance and flipping activity. Flipping is defined as the sell-signed dollar volume executed in blocks of 10,000 shares or more divided by the total day 1 dollar volume. The sample is split based on flipping levels; low flipping is the lowest quartile, medium flipping represents the interquartile range, and high flipping is the upper quartile. Mean and median size-adjusted returns are provided for one-month, six-month, and one-year return horizons.

	136 Cold IPOs First Day ≤ 0%		227 Cool IPOs 0% < First Day ≥ 10%		224 Hot IPOs 10% < First Day ≥ 60%		24 Extra-Hot IPOs First Day > 60%		All IPOs (611)	
	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median
1-month size-adjusted returns by day 1 flipping activity										
Low	−1.9%	−1.5%	8.8%	9.5%	6.2%	4.8%	−0.9%	−6.5%	5.9%	3.5%
Medium	1.2%	−0.7%	2.0%	0.5%	6.3%	4.1%	3.2%	18.7%	3.7%	1.9%
High	−1.9%	−1.3%	−0.7%	−3.2%	3.7%	−0.2%	None	None	−1.0%	−1.6%
6-month size-adjusted returns by day 1 flipping activity										
Low	23.2%	15.3%	17.8%	13.1%	19.0%	14.8%	1.1%	−18.8%	16.6%	13.2%
Medium	8.3%	−1.2%	7.3%	6.4%	10.8%	7.4%	−19.5%	2.2%	8.5%	6.4%
High	−4.6%	−19.5%	3.0%	−1.2%	12.6%	6.9%	None	None	−0.3%	−7.5%
1-year size-adjusted returns by day 1 flipping activity										
Low	13.7%	9.3%	33.8%	10.1%	29.2%	20.2%	3.3%	−13.5%	27.1%	11.1%
Medium	5.6%	−8.3%	2.6%	−3.4%	16.4%	7.1%	−17.4%	−31.3%	8.6%	2.4%
High	−7.5%	−30.5%	11.7%	1.6%	−0.1%	4.7%	None	None	0.1%	−10.8%

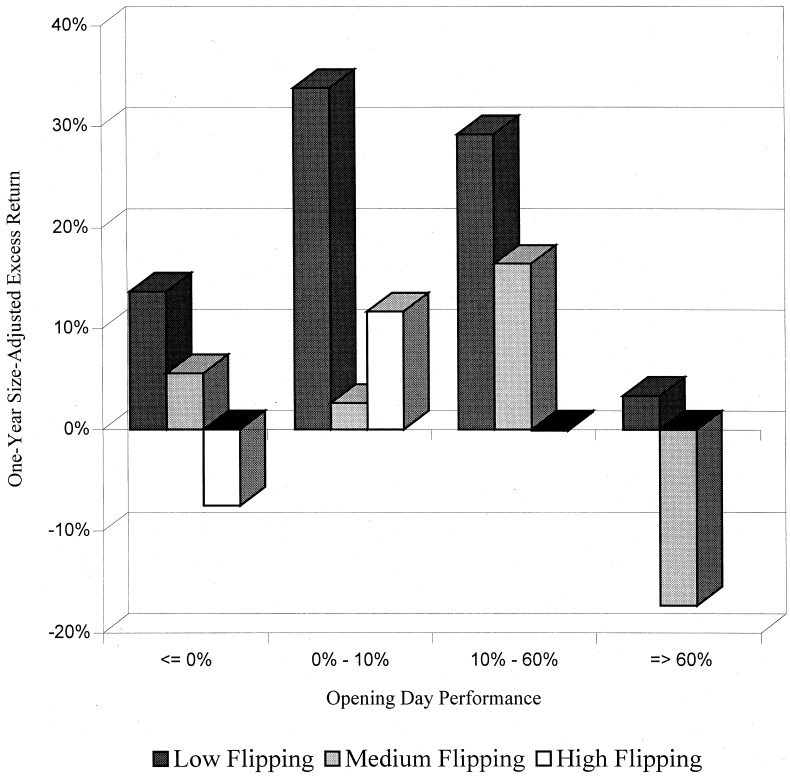


Figure 5. Mean returns by opening day performance and flipping group. One-year size-adjusted excess returns are presented partitioned by opening day offer-to-close performance and flipping group. Low flipping is the lowest quartile, medium flipping represents the interquartile range, and high flipping is the upper quartile. The 611 IPOs offered from January 1993 through May 1995 are included in the analysis. The high flipping, extra-hot category contains no observations and the medium flipping, extra-hot category contains only five observations.

increase across the cold, cool, and hot classifications. Also, within each classification, the low flipping IPOs have substantially higher returns than the high flipping IPOs for both six-month and one-year horizons. For example, the low flipping quartile of hot IPOs has a one-year size-adjusted mean return of +29.2 percent compared with −0.1 percent for the high flipping quartile. The low flipping quartile provides the highest six-month and one-year return within each of the opening-day return categories.

An important question is whether these results hold consistently throughout our sample and in future periods. We address concerns of robustness in two ways. First, we provide results partitioned by shorter time periods. Second, we collect an additional 232 IPOs issued from June 1995 through December 1995 which meet the selection criteria outlined in Section I. This

Table VI

Robustness of Results over Time

Results for the 843 IPOs issued during 1993 through 1995 are presented partitioned by calendar year to address robustness concerns. The 1995a column contains 82 IPOs issued January through May 1995 which are contained in the original analysis; 1995b contains 232 IPOs issued June through December 1995 which are added to the dataset to perform out-of-sample tests. Panel A provides information on the distribution of flipping by time period. Flipping is defined as the dollar volume of sell-motivated block trades as a percentage of total day 1 dollar volume. Panel B presents mean and median one-year size-adjusted excess returns by flipping category. Low flipping contains the lowest quartile of flipping, medium flipping contains the interquartile range, and high flipping contains IPOs that had the highest quartile of flipping. The high flipping category contains one IPO with a 360 percent one-year return that drives the group result. Excluding this IPO results in an average return of 6.4 percent for the remaining 13 IPOs in the category.

	1993	1994	1995a	1995b (Out-of-Sample Period)	Full Sample
Panel A: Distribution of Flipping Ratio by Calendar Year					
N	305	224	82	232	843
Mean	0.301	0.318	0.282	0.319	0.309
Quartile 1	0.178	0.184	0.179	0.208	0.185
Median	0.282	0.278	0.253	0.290	0.280
Quartile 3	0.406	0.441	0.356	0.403	0.406
Panel B: One-Year Excess Returns by Flipping Quartile and Calendar Year					
Low flipping					
Mean	12.2%	52.8%	19.5%	29.0%	27.5%
Median	4.2%	28.8%	20.1%	11.7%	11.2%
Medium flipping					
Mean	5.4%	12.5%	9.5%	6.2%	7.8%
Median	3.6%	6.4%	−16.5%	−10.8%	−3.8%
High flipping					
Mean	−2.0%	−4.6%	32.3%	4.7%	1.3%
Median	−8.9%	−13.7%	−10.9%	−7.5%	−10.2%

group of IPOs is used to perform an out-of-sample robustness check. We stop collecting observations at the end of 1995 so that we can calculate post-offer one-year performance.

Flipping is a significant predictor of future performance. The stability of its distribution across calendar years is presented in Table VI, Panel A. The median level of flipping ranges from 25.3 percent to 28.9 percent across time periods. (A Wilcoxon Rank Sum test fails to reject the equality of the distributions across calendar years ($\chi^2 = 5.31$, p-value = 0.1500).) Importantly, the distribution of the flipping ratio for the 232 out-of-sample IPOs issued from June through December 1995, which meet the selection criteria discussed in Section I, is not significantly different from the original sample distribution.

Next we present one-year size-adjusted returns for the out-of-sample period conditioned on first-day flipping. The flipping groups (low, medium, and high) are based on flipping quartiles during the period January 1993 through May 1995. We use the same quartile breaks for the June 1995 through December 1995 subset of data. As can be seen in Panel B of Table VI, the flipping-return relationship is robust across subsamples and the out-of-sample period.

On average, the low flipping group provides the greatest average return over time and the high flipping group provides the lowest one-year excess returns. For the original sample of 611 IPOs (January 1993 through May 1995), the low flipping quartile outperforms the high flipping quartile by 27.0 percentage points. For the out-of-sample period, the difference is 24.3 percentage points. We conclude that the results presented in the main body of the paper are reasonably robust over time and are even predictive.

VI. Methodological Concerns and Momentum

We have demonstrated that IPOs with low levels of flipping outperform IPOs with higher levels of flipping. We have also demonstrated that cold IPOs continue to underperform and hot IPOs continue to do well in the following year. However, to this point, we have only controlled for size in our buy-and-hold return analysis.

Lyon, Barber, and Tsai (1997) support use of the Fama–French three-factor model using calendar time portfolios to estimate long-run abnormal performance. This approach controls for the nonindependence of returns over time, size, and book-to-market effects, and avoids the problem associated with drawing inferences on skewed long-horizon returns. We estimate the following three-factor model:

$$r_{\mathrm{it}} - r_{\mathrm{ft}} = a_{\mathrm{iT}} + \beta_{\mathrm{iT}} RMRF_{\mathrm{t}} + s_{\mathrm{iT}} SMB_{\mathrm{t}} + h_{\mathrm{iT}} HML_{\mathrm{t}} + e_{\mathrm{it}} \qquad t = 1,2,\ldots,\mathrm{T}, \tag{4}$$

where r_{it} is the monthly return on a portfolio of IPOs, r_{ft} is the monthly return on three-month T-bills, *RMRF* is the excess return on a value-weighted aggregate market proxy, *SMB* is the difference in the returns of a value-weighted portfolio of small stocks and large stocks, *HML* is the difference in the returns of a value-weighted portfolio of high book-to-market stocks and low book-to-market stocks. The estimate of the intercept, α_{iT}, provides a test of the null hypothesis that the mean monthly abnormal return on the calendar portfolio is zero. The number of IPOs is not constant from month to month, thus we use weighted least squares to account for the time-varying number of observations used to create the calendar portfolios. The calendar portfolios are value-weighted to minimize the impact of "bad model" prob-

lems.[15] Loughran and Ritter (1998) argue that multifactor model regressions may actually induce bias against finding abnormal returns when they are in fact present, especially when the target population comprises small stocks like typical IPOs.

Additionally, Jegadeesh and Titman (1993) and Carhart (1997), among others, have shown momentum in stock returns to be a significant factor in explaining performance. Therefore we include *PR1YR*, a factor-mimicking portfolio for return momentum.[16] Finally, to control for the effect of hot versus cold IPO markets (IPO momentum), we construct a fifth factor. We define *IPOMOM* for a month as the median change from the midpoint of the initial filing range to the final offer price for all IPOs issued in the prior month. This variable is a proxy for the level of pre-issue excess demand in IPO underwriting. We estimate the following five-factor model that controls for both general equity momentum and IPO momentum:

$$r_{\mathrm{it}} - r_{\mathrm{ft}} = a_{\mathrm{iT}} + \beta_{\mathrm{iT}} RMRF_{\mathrm{t}} + s_{\mathrm{iT}} SMB_{\mathrm{t}} + h_{\mathrm{iT}} HML_{\mathrm{t}} + p_{\mathrm{iT}} PR1YR_{\mathrm{t}} + m_{\mathrm{iT}} IPOMOM_{\mathrm{t}} + e_{\mathrm{it}} \qquad t = 1,2,\ldots,\mathrm{T}. \tag{5}$$

For each calendar month, we calculate the value-weighted return (weighed by the offering proceeds) on a portfolio composed of all firms that went public during the previous 12 months (and, separately, during the last six months).[17] For example, construction of the 12-month portfolio for January 1994 includes the return on all IPOs issued in January 1993 through December 1993 inclusive. We calculate a time series of monthly portfolio returns. The time series of monthly portfolio excess returns (portfolio return less the risk-free rate) is regressed on the five factors above. The model is calculated for the full sample of IPOs for January 1988 through December 1995 and for the subperiod January 1993 through December 1995 (the period with TAQ data available). We partition the portfolios based on flipping quartiles and opening day performance. Regression results are presented in Table VII.

For the period 1988 to 1995, hot IPOs, those with first-day returns greater than 10 percent and less than 60 percent, generate small positive excess returns. The inclusion of momentum terms in the regression, however, ren-

[15] Fama and French (1993, 1996) document that three-factor models have systematic problems explaining the average returns on categories of small stocks. Value weighing is used to avoid giving more weight to small stocks.

[16] PR1YR is defined as the equal-weight average of firms with the highest 30 percent returns lagged one month minus the equal-weight average of firms with the lowest 30 percent returns lagged one month. The four factors, RMRF, SMB, HML, and PR1YR, are provided by Mark Carhart.

[17] The calendar-time regressions capture excess returns starting on the first day of the month following the month of the IPO. Returns between the offering date and the end of the first month are not incorporated in this analysis.

ders the abnormal performance of hot IPOs insignificant in value-weighted portfolios. (In equal-weighted portfolios, the abnormal performance is significant.) Thus, equity momentum appears to explain some of the performance of hot IPOs. However, the extra-hot IPOs (those with first-day returns greater than 60 percent) generate significantly negative abnormal returns. For the 6-month and 12-month portfolios, extra-hot IPOs underperform by two to three percentage points per month. The majority of this underperformance is not generated in the first six months but in months seven through 12 following the IPO.

Consistent with the results in Section IV, the low flipping quartile portfolio provides significant positive excess returns in the calendar time regressions. Interestingly, neither the general momentum nor the IPO momentum factors are significant in the regressions. In the six-month portfolio, the low flipping group provides positive abnormal returns of 1.6 percent per month. In each model specification, the abnormal return or "alpha" of the low flipping portfolio is statistically significantly higher than that of the medium flipping quartile portfolio. We conclude that informed institutional investors appear to execute a profitable trading strategy, flipping IPOs that perform the worst in the future.

VII. Discussion and Conclusion

We begin this paper with the observation that there is considerable variance in the first-day returns of IPOs. Furthermore, this variance and the associated trading activity predict returns for the next year. This begs an important question: Are underwriters *intentionally* mispricing IPOs?

The partial adjustment phenomenon appears to be pervasive in the financial markets, as it is in most human behavior. As shown here and in Hanley's (1993) study, underwriters fail to fully adjust their estimates of a firm's value when they price a security relative to the preliminary price range (the price talk). There are plausible explanations for this partial adjustment. In the case of cold IPOs, it is clear that underwriters have a difficult time "building the book" of committed investors. We observe substantial flipping by uncommitted investors in these IPOs. We suggest that at least two factors are at work in cold IPOs. First, having overestimated the price associated with adequate demand in the preliminary price range, underwriters are unable to adjust completely to the new lower demand information because of their prior pricing "commitments." An important factor an IPO firm weighs in choosing an underwriter is: What price will the underwriter get for my stock? A cold IPO often results from an issuing firm's unwillingness to accept a price lower than that "promised" in the price talk. In these cold deals, if the underwriting is consummated (and these are the only ones we observe), it is due to the marketing muscle of the underwriting firm which ostensibly drums up marginal buyers to complete the "book." Thus, on average, the IPO firm and its original shareholders win at the expense of new investors.

Table VII

Calendar Time Portfolio Regressions

Weighted least squares regressions are run for all IPOs for the 1993 to 1995 and 1988 to 1995 horizons. Monthly return alphas are calculated for 12-month calendar time portfolios. These are calculated by regressing the monthly return of all IPOs issued within the preceding 12 months on three and five factors. We also provide the alpha intercept from identical regressions run on six-month calendar time portfolios that contain all IPOs issued within the preceding six months. Returns are included beginning in the first calendar month after the IPO. The dependent variable in the regressions is the portfolio return less the risk-free T-bill rate, the independent variables are the excess return on the market portfolio ($R_m - R_f$), SMB is the difference in returns of a value-weighted portfolio of big and small stocks, HML is the difference in returns of a value-weighted portfolio of high book-to-market and low book-to-market stocks, PR1YR is a factor mimicking portfolio for one-year return momentum, and IPOMOM is the median change from the midpoint of the initial filing range to the offer price for all IPOs in the preceding month. Portfolios are then partitioned by flipping and opening-day performance groups. The low flip portfolio contains the first quartile, medium flip contains the interquartile range, and high flip contains IPOs in the highest quartile of flippers. Cold IPOs are defined as those with a first-day return of 0 percent or less and extra-hot IPOs as those with a first-day return greater than 60 percent. The partitions of cool and hot are split at 10 percent. t-statistics are contained in parentheses. F-tests for the equality of regression intercepts across models are presented in the bottom panel.

Panel A: Calendar Time Regression Estimations

	12-Month Calendar Time Portfolios							6-Month
	Intercept	$R_m - R_f$	SMB	HML	PR1YR	IPOMOM	Adj. R^2	Intercept
All IPOs 1993–1995	0.257	1.393	0.828	−0.553			0.88	0.565
	(0.91)	(11.90)	(5.24)	(−2.91)				(1.34)
	0.252	1.389	0.818	−0.564	−0.037	0.025	0.89	0.491
	(0.78)	(11.63)	(4.94)	(−2.89)	(−0.28)	(0.59)		(1.01)
Low flip portfolio	0.816***	1.407	0.665	−0.909			0.83	1.582***
	(2.23)	(9.20)	(3.17)	(−0.36)				(2.78)
	0.858**	1.403	0.633	−0.937	−0.124	0.039	0.84	1.502***
	(2.06)	(9.05)	(2.92)	(−3.69)	(−0.71)	(0.70)		(2.26)
Medium flip portfolio	−0.074	1.426	1.024	−0.450			0.85	0.146
	(−0.21)	(9.88)	(5.33)	(−1.93)				(0.30)
	−0.008	1.418	0.987	−0.473	−0.126	0.037	0.85	0.205
	(−0.02)	(9.70)	(4.93)	(−2.00)	(−0.77)	(0.70)		(0.37)
High flip portfolio	0.406	1.242	0.650	−0.596			0.69	0.615
	(0.88)	(6.45)	(2.45)	(−1.90)				(0.95)
	0.247	1.244	0.696	−0.568	0.165	0.000	0.69	0.389
	(0.47)	(6.34)	(2.52)	(−1.77)	(0.76)	(0.00)		(0.52)

All IPOs 1988–1995	0.305	1.336	1.007	−0.361			0.88	0.736***
	(1.50)	(18.81)	(12.27)	(−3.98)				(2.85)
	0.246	1.333	1.025	−0.361	0.0333	0.018	0.88	0.711***
	(1.10)	(18.55)	(10.87)	(−3.68)	(0.37)	(0.71)		(2.47)
Cold IPO portfolio	0.170	1.244	1.098	−0.032			0.72	0.906**
	(0.54)	(11.52)	(8.64)	(−0.23)				(2.14)
	0.272	1.253	1.042	−0.069	−0.112	−0.002	0.73	0.970**
	(0.79)	(11.46)	(7.14)	(−0.46)	(−0.80)	(−0.05)		(2.09)
Cool IPO portfolio	0.199	1.241	0.949	−0.212			0.73	0.578
	(0.68)	(12.19)	(7.75)	(−1.60)				(1.60)
	0.168	1.239	0.961	−0.208	0.024	0.007	0.73	0.746*
	(0.52)	(11.98)	(6.95)	(−1.43)	(0.18)	(0.19)		(1.90)
Hot IPO portfolio	0.544*	1.474	1.054	−0.671			0.85	1.049***
	(1.95)	(14.87)	(9.57)	(−5.37)				(2.74)
	0.322	1.459	1.162	−0.612	0.198	0.026	0.85	0.747*
	(1.05)	(14.73)	(9.10)	(−4.57)	(1.63)	(0.72)		(1.70)
Extra-hot IPO portfolio	−1.917*	1.896	0.988	−1.936			0.60	−1.354
	(−1.87)	(4.65)	(2.26)	(−3.88)				(−0.85)
	−2.423**	1.848	1.030	−1.977	0.166	0.155	0.61	−2.492
	(−2.02)	(4.45)	(2.17)	(−3.82)	(0.36)	(0.99)		(−1.34)

Panel B: Tests for Equality of 12-Month Regression Intercepts

	3-Factor Model		5-Factor Model	
	F-value	*p*-value	*F*-value	*p*-value
H0: Flipping: low = medium = high	2.649	(0.0745)	2.131	(0.1213)
H0: Day 1 return: cold = cool = hot = extra-hot	1.736	(0.1600)	2.456	(0.0636)

*, **, *** Indicates significance at the 10, 5, and 1 percent levels, respectively.

Capital markets specialists at investment banks suggest a second, less intuitive reason for the partial price adjustment to low demand signals. They suggest that lowering the price during the pricing process may actually *lessen*, rather than increase, demand for shares.[18] This counterintuitive result is consistent with positive feedback investment strategies wherein investors form extrapolative expectations; they buy when prices rise and sell when prices fall (DeLong et al. (1990)).

It is more puzzling why new issues are often *underpriced* by huge amounts. We report that 12 percent of IPOs open for trading up more than 30 percent from the offer price. It is clear that these over-heated IPOs open at a premium considerably higher than is targeted for most underwritings and that the IPO firm and its previous shareholders receive substantially less (by selling at the offer price) than immediate fair value for their shares. Though indications of interest from institutional investors are not publicly disclosed by underwriters, the financial press regularly reports that these extra-hot IPOs are oversubscribed by 10 or more times the shares being offered. We conjecture that the resulting (substantial) underpricing in these hot deals is intentional. Underwriters rarely raise the price enough in extra-hot deals to lessen the excess demand. It is unclear why or if firms that are substantially underpriced (and "leave millions on the table") do not find the means to punish underwriters who insufficiently adjust the final offer price of their shares. Dunbar (1999) suggests that underwriters *are* punished by subsequent loss of underwriting market share. However, the loss of future market shares does not compensate the IPO firm for money left on the table. This appears to be a fruitful topic for further research.

Again, investment banking professionals offer a more complex story for why they do not raise the offering prices of what are obviously extra-hot deals. Price maximization (for the IPO firm) is important, but it is not the unique goal. A common goal of both the underwriter and the IPO firm is to attract well known and informed institutions as buy-and-hold purchasers of the offering. Underwriters claim that by raising the offer price more than about 20 percent above the original price range, their ability to attract the desired set of investors is compromised. In fact, they claim that ex post extra-hot deals usually obtain from "irrational" retail demand (by small investors) rather than institutional purchases (at levels of 50 percent or higher than the offer price). Conversations with portfolio managers at several well-known investment management firms confirm these claims and support our finding that extra-hot deals have the lowest proportion of block trades (as a percentage of all trades on the first day).

Finally, we conclude that flipping of IPOs is rational behavior. That is, flippers quickly sell issues that perform the worst in the future (often with the benefit of underwriter price support that minimizes their exposure to losses), and they sell less in the best future performing issues. The evidence

[18] We acknowledge and greatly appreciate conversations with senior officials at Goldman Sachs and Morgan Stanley.

suggests that either (1) institutional investors have superior information relative to the underwriter regarding IPO quality (for they collectively appear to execute a profitable trading strategy on the first day) or (2) underwriters intentionally under- and overprice IPOs without immediate measurable penalties. We conjecture that the latter is more likely.

This study also suggests a profitable trading strategy in IPOs—namely, IPOs with positive (but not *too* positive) returns *and* with relatively low sell-motivated block trading activity on the first day outperform other IPOs over the next year.

REFERENCES

Affleck-Graves, John, Shantaram Hegde, and Robert E. Miller, 1996, Conditional price trends in the aftermarket for initial public offerings, *Financial Management* 25, 25–40.

Asquith, Daniel, Jonathan D. Jones, and Robert Kieschnick, 1998, Evidence on price stabilization and underpricing in early IPO returns, *Journal of Finance* 53, 1759–1773.

Atkins, Allen B., and Edward A. Dyl, 1997, Market structure and reported trading volume: Nasdaq versus the NYSE, *Journal of Financial Research* 20, 291–304.

Benveniste, Lawrence M., and Paul A. Spindt, 1989, How investment bankers determine the offer price and allocation of new issues, *Journal of Financial Economics* 24, 343–361.

Bernard, Victor L., and Jacob J. Thomas, 1989, Post-earnings-announcement drift: Delayed price response or risk premium?, *Journal of Accounting Research* 27, 1–36.

Bernard, Victor L., and Jacob J. Thomas, 1990, Evidence that stock prices do not fully reflect the implications of current earnings for future earnings, *Journal of Accounting and Economics* 13, 305–340.

Brav, Alon, and Paul A. Gompers, 1997, Myth or reality? The long-run underperformance of initial public offerings: Evidence from venture and nonventure capital-backed companies, *Journal of Finance* 52, 1791–1821.

Canina, Linda, Roni Michaely, Richard Thaler, and Kent L. Womack, 1998, Caveat compounder: A warning about using the CRSP equal-weighted index, *Journal of Finance* 53, 403–416.

Carhart, Mark M., 1997, On persistence in mutual fund performance, *Journal of Finance* 52, 57–82.

Carter, Richard B., and Frederick H. Dark, 1993, Underwriter reputation and initial public offers: The detrimental effects of flippers, *The Financial Review* 28, 279–301.

De Long, J. Bradford, Andrei Shleifer, Lawrence H. Summers, and Robert J. Waldmann, 1990, Positive feedback investment strategies and destabilizing rational speculation, *Journal of Finance* 45, 379–395.

Dimson, Elroy, and Paul Marsh, 1986, Event study methodologies and the size effect: The case of UK press recommendations, *Journal of Financial Economics* 17, 113–142.

Dunbar, Craig G., 1997, Factors affecting investment bank initial public offering market share, *Journal of Financial Economics*, forthcoming.

Fama, Eugene F., 1997, Market efficiency, long-term returns, and behavioral finance, Working paper, University of Chicago.

Fama, Eugene F., and Kenneth French, 1993, Common risk factors in the returns on stocks and bonds, *Journal of Financial Economics* 33, 3–56.

Fama, Eugene F., and Kenneth French, 1996 Multifactor explanations of asset pricing anomalies, *Journal of Finance* 51, 55–84.

Field, Laura C., 1995, Is institutional investment in initial public offerings related to long-run performance of these firms?, Working paper, Pennsylvania State University.

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

Hanley, Kathleen Weiss, Arun Kumar, and Paul J. Seguin, 1993, Price stabilization in the market for new issues, *Journal of Financial Economics* 34, 177–197.

Hanley, Kathleen Weiss, Charles M. Lee, and Paul J. Seguin, 1996, The marketing of closed-end fund IPOs: Evidence from transactions data, *Journal of Financial Intermediation* 5, 127–159.

Hanley, Kathleen Weiss, and William J. Wilhelm Jr., 1995, Evidence on the strategic allocation of initial public offerings, *Journal of Financial Economics* 37, 239–257.

Ikenberry, David, Josef Lakonishok, and Theo Vermaelen, 1995, Market underreaction to open market share repurchases, *Journal of Financial Economics* 39, 181–208.

Jegadeesh, Narasimhan, and Sheridan Titman, 1993, Returns to buying winners and selling losers: Implications for stock market efficiency, *Journal of Finance* 48, 65–91.

Kahneman, Daniel, Paul Slovic, and Amos Tversky, 1982, *Judgment under Uncertainty: Heuristics and Biases* (Cambridge University Press, New York, N.Y.).

Krigman, Laurie, 1997, The impact of trading protocol on reported volume and empirical measures of liquidity, volatility and execution cost, Unpublished Ph.D. dissertation, University of Colorado.

Lee, Charles M. C., and Mark Ready, 1991, Inferring trade direction from intraday data, *Journal of Finance* 46, 733–746.

Levis, Mario, 1993, The long-run performance of initial public offerings: The UK experience 1980–1988, *Financial Management* 22, 28–41.

Loughran, Tim, and Jay R. Ritter, 1995, The new issues puzzle, *Journal of Finance* 50, 23–51.

Loughran, Tim, and Jay R. Ritter, 1998, Uniformly least powerful tests of market efficiency, Unpublished manuscript, University of Florida.

Lyon, John D., Brad M. Barber, and Chih-Ling Tsai, 1999, Improved methods for tests of long-run abnormal stock returns, *Journal of Finance* 54, 165–201.

Maher, Philip, 1990, Winning the war on flippers has brokers howling in pain, *Investment Dealers Digest* 56, 6–7.

Michaely, Roni, and Wayne H. Shaw, 1994, The pricing of initial public offerings: Tests of adverse-selection and signaling theories, *The Review of Financial Studies* 7, 279–319.

Michaely, Roni, and Wayne H. Shaw, 1998, Underwriter choice, institutional holdings, and future IPO performance, *Advances in Quantitative Analysis of Finance and Accounting* 6, 137–150.

Michaely, Roni, Richard Thaler, and Kent L. Womack, 1995, Price reaction to dividend initiations and omissions: Overreaction or drift?, *Journal of Finance* 50, 573–608.

Pratt, Tom, 1994, Book-entry IPO tracking said to expose flippers, *Investment Dealers' Digest* 50, 12.

Ritter, Jay, 1991, The long-run performance of initial public offerings, *Journal of Finance* 46, 3–27.

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

Ruud, Judith S., 1993, Underwriter support and the IPO underpricing puzzle, *Journal of Financial Economics* 34, 135–151.

Slovic, Paul, and Sarah Lichtenstein, 1971, Comparison of Bayesian and regression approaches to the study of information processing in judgment, *Organizational Behavior and Human Performance* 6, 649–744.

Womack, Kent L., 1996, Do brokerage analysts' recommendations have investment value?, *Journal of Finance* 51, 137–167.