Affiliated Mutual Funds and the Allocation of Initial Public Offerings

Jay R. Ritter and Donghang Zhang*

Current Version: February 21, 2006

Abstract

We examine how investment banks use initial public offerings (IPOs) in relation to their affiliated mutual funds. The dumping ground hypothesis predicts that the lead underwriter allocates cold IPOs to its affiliated funds so that more deals can be completed when demand for these IPOs is weak. Affiliated funds may also receive more cold IPOs because the lead underwriter uses allocations of hot IPOs to unaffiliated funds to gain trading commission business. The nepotism hypothesis predicts that the lead underwriter allocates hot IPOs to its affiliated funds to boost their performance and thus attract more money. We find little evidence supporting the dumping ground hypothesis, although there is some evidence supporting the nepotism hypothesis during the internet bubble period of 1999-2000.

---

* Ritter is from the Warrington College of Business, University of Florida, Gainesville, FL 32611-7168, and Zhang is from the Moore School of Business, University of South Carolina, Columbia, SC 29208. Ritter can be reached at (352) 846-2837 or jay.ritter@cba.ufl.edu. Zhang can be reached at (803) 777-0242 or zhang@moore.sc.edu. We thank Dan Bradley, Shingo Goto, Inmoo Lee, Greg Niehaus, Eric Powers, Jonathan Reuter, Paul Schultz, Jason Smith, Sergey Tsyplakov, and seminar participants at Clemson University, the University of South Carolina, Peking University, the 4th Asian Corporate Governance Conference, the 2005 FMA Annual Meeting, and the 2006 AFA Annual Meeting for helpful comments. We thank Renjie Wen for helpful research assistance. Special thanks also go to Tong Yu for his help with matching the CRSP fund data with the Spectrum data used in this paper.

Affiliated Mutual Funds and the Allocation of Initial Public Offerings

February 21, 2006

Abstract

We examine how investment banks use initial public offerings (IPOs) in relation to their affiliated mutual funds. The dumping ground hypothesis predicts that the lead underwriter allocates cold IPOs to its affiliated funds so that more deals can be completed when demand for these IPOs is weak. Affiliated funds may also receive more cold IPOs because the lead underwriter uses allocations of hot IPOs to unaffiliated funds to gain trading commission business. The nepotism hypothesis predicts that the lead underwriter allocates hot IPOs to its affiliated funds to boost their performance and thus attract more money. We find little evidence supporting the dumping ground hypothesis, although there is some evidence supporting the nepotism hypothesis during the internet bubble period of 1999-2000.

Keywords: Initial public offerings, mutual funds, IPO allocations

***JEL* classification: G24**

1. Introduction

Many investment banks underwrite initial public offerings (IPOs) and also manage mutual funds. During 1990 – 2001, 361 different investment banks were lead underwriters of U.S. IPOs, and more than 60 of them, including almost all of the largest investment banks, had affiliated mutual funds. For example, Goldman Sachs Asset Management and Securities Services had assets under management of $351 billion as of December 31, 2001. Goldman Sachs was also the lead underwriter on 313 IPOs with total proceeds of more than $91 billion during 1990-2001.[1]

When an investment bank is both the seller and a possible buyer of a security, a potential conflict of interest naturally arises. This potential conflict of interest is of great importance for IPOs because of persistent IPO underpricing. This paper examines how investment banks allocate IPOs to their affiliated funds.

This topic is of more than academic interest. Regulators have been concerned about the potential conflicts of interest for decades. The Investment Company Act of 1940 and SEC Rule 10(f)-3 set restrictions on a lead underwriter's allocations of IPO shares to its affiliated mutual funds. Recently, Director of the Division of Enforcement of the U.S. Securities and Exchange Commission (SEC) Stephen M. Cutler expressed concerns that asset managers affiliated with an investment banking firm may feel pressured to invest in companies underwritten by the investment banking firm (Cutler (2003)). Solomon (2004) reports that the SEC was investigating whether investment banks have been pressuring their affiliated mutual funds to buy shares of their clients' initial public offerings.

The financial press has also raised concerns that investment banking firms are using purchases by affiliated mutual funds to support the price of cold IPOs. For example, Dietz and Henkoff (2004) report that mutual funds affiliated with large investment banks, including Citigroup, Credit Suisse First Boston, Goldman Sachs, Merrill Lynch, and Morgan Stanley, invested heavily in their clients' stocks while other institutional investors were reducing holdings in these stocks amid performance concerns.

[1] As is the convention, the proceeds figure is calculated using global proceeds excluding overallotment options, and the number of IPOs excludes unit offers, closed-end funds, REITs, ADRs, IPOs with an offer price below $5, and banks and S&Ls.

Three factors play an important role when an investment bank determines how it uses its affiliated funds in an offering. First, the underwriting discount (the gross spread) gives the investment bank an incentive to complete the deal. When demand is weak, the investment bank could use its affiliated funds to buy shares that otherwise would have found buyers only at a lower price. Without the additional demand, a withdrawn or downsized deal might result, or a price decline once trading commenced might occur.

Second, the investment bank receives commission paybacks when it allocates underpriced IPOs to an unaffiliated fund (Nimalendran, Ritter, and Zhang (2006) and Reuter (2006)).[2] This reduces the incentive to allocate hot IPOs to affiliated funds, because when the shares are allocated to unaffiliated clients part of the money left on the table in underpriced deals flows back to the investment bank through commission business. The money left on the table is defined as the first-day capital gain per share multiplied by the number of shares sold, and measures the dollar value of the gains available to allocate to clients.

Third, the first two factors would result in more cold IPOs being allocated to affiliated funds. As a counter force, the investment bank also has an incentive to allocate hot IPOs to its affiliated funds to boost their performance. Better fund performance will attract more money inflows. The incentive would be even stronger if the investment bank could allocate hot IPOs to star funds in its affiliated fund family, because a star fund that has exceptionally high returns can attract more money inflows both to the fund and to other funds in its family (Gaspar, Massa, and Matos (2006), and Nanda, Wang, and Zheng (2004)).

It is the balance of these three factors that determines an investment bank's optimal use of its affiliated funds in IPOs. This tradeoff leads to two alternative hypotheses. The first hypothesis is that investment banks allocate more cold IPOs to their affiliated funds or pressure the funds to buy cold IPOs in the aftermarket as a means of price support. Investment banks might also allocate a higher proportion of cold IPOs to their affiliated funds as a consequence of allocating disproportionately more hot IPOs to unaffiliated funds in order to attract more commission business. We call this the dumping ground hypothesis.

[2] We use the term "paybacks" in the general sense that if an underwriter is allocating underpriced IPOs, rent-seeking investors will be willing to offer commission business to the securities firm if this increases the chance of being allocated shares in hot IPOs.

The second hypothesis is that investment banks preferentially allocate underpriced shares to affiliated funds. The investment bank benefits if the resulting higher performance attracts fund inflows and subsequent management fee income. We call this the nepotism hypothesis.

Because whether the dumping ground hypothesis or the nepotism hypothesis dominates depends on the relative costs and benefits, market conditions could affect which hypothesis dominates. When the overall expected first-day return of IPOs is high and attracting money inflows for the affiliated funds is most important because of the greater performance-funds flow sensitivity that exists in bull markets (Karceski (2002)), we posit that the underwriter would allocate more hot IPOs to its affiliated funds. Thus, we predict that the nepotism hypothesis will be more important in hot IPO markets than in cold IPO markets, relative to the dumping ground hypothesis. Of course, the dumping ground and nepotism incentives could balance out for the same fund, or the underwriter could simply treat affiliated and independent funds in the same way due to regulatory or ethical concerns. In these situations there would be no detectable difference in allocations to affiliated and unaffiliated funds.

We examine mutual fund affiliations and a proxy for IPO allocations from 1990 to 2001.[3] During 1990-2001, 2,257 IPOs are associated with one or more lead underwriters that had affiliated funds. The mutual funds that were affiliated with the lead underwriter received allocations of 283 IPOs, where we use the first post-IPO reported mutual fund share holdings within six months of the offer date as our proxy for whether the fund was allocated IPOs. We use this proxy for the fund's allocations, as does Reuter (2006), because the actual allocation data are not publicly available. The reported holdings are from the Spectrum Mutual Funds Holding database (often referred to as Spectrum 1&2). The first reported holding within six months is used because the required reporting frequency is semi-annual. We denote the 283 IPOs for which the affiliated funds reported holdings as the R ("Reported") group of IPOs, and the rest of the IPOs as the NR ("Not Reported") group of IPOs. We view the R group as the IPOs that were allocated to affiliated funds.

[3] The mutual fund data are available since 1980. However, it is difficult to determine the affiliations of mutual funds and investment banks for the 1980s. Consequently, we focus on the 1990s and later.

For the whole sample period, the R group of IPOs has a 29% higher initial return than that of the NR group, where the initial return is defined as the change from the offer price to the first-day closing price. To capture the potential changes in IPO market conditions and the importance of attracting money inflows for the affiliated funds, we further divide our sample period into five subperiods: 1990 – 1994, 1995 – 1996, 1997 – 1998, 1999 – 2000, and 2001. The R group of IPOs has higher average initial returns than the NR group of IPOs in every subperiod except for 2001, during which the R group has an insignificant 4% lower initial return. The initial return difference is significant for 1990 – 1994 and 1999 – 2000. The univariate comparison seems to support the nepotism hypothesis.

Our multivariate analysis, however, presents a more complicated picture than that in the univariate analysis. For the internet bubble period (1999 – 2000), an IPO would have a 13% higher initial return if it was allocated to the funds affiliated with the lead underwriter, a much smaller difference than the simple univariate difference of 35%. For the periods of 1995-1996 and 2001, the IPOs allocated to the affiliated funds have a statistically insignificant 4% or 2% lower initial return, respectively. For the periods of 1990-1994 and 1997-1998, the difference is positive but insignificant. We do not find any significant support for the dumping ground prediction that affiliated funds receive IPOs with lower initial returns.

The public and regulators are concerned with dumping cold IPOs into affiliated funds because many non-sophisticated mutual fund investors are involved. Our inability to find significant support for this hypothesis with the overall sample could be because we have not looked in the right place. As a further attempt, we examine the relative size of allocations to the affiliated funds.

When demand for an IPO is weak, the dumping ground hypothesis predicts that the underwriter would have the greatest incentives to allocate more shares to its affiliated funds. For 1995 – 1996, an IPO would have a 12% lower return if there was a large allocation to the funds affiliated with the lead underwriter. During 1990 – 1994, an IPO would also have a 10% lower return if there was a large allocation to the affiliated funds. This evidence is consistent with the dumping ground hypothesis.

We also compare the long-run performance of the R group and the NR group of IPOs. We use the three-year buy and hold return to measure IPO long-run performance. We use three different benchmarks: the value-weighted CRSP index, size matching, and style (size and book-to-market ratio) matching. Our analysis suggests that there is no consistent under- or over-performance in the long-run if an IPO is allocated to affiliated mutual funds.

To the best of our knowledge, this paper and Johnson and Marietta-Westberg (2005) are the first to focus on how U.S. investment banks use their affiliated mutual funds in security offerings, although Ber, Yafeh, and Yosha (2001) examine this issue using a sample of 82 Israeli IPOs, of which 11 are allocated to affiliated funds. Johnson and Marietta-Westberg examine the role of managing underwriters and their affiliated mutual funds in the two years after a company goes public for a sample of IPOs from 1993-1998. They focus on aftermarket purchases and sales by the funds that are affiliated with the underwriters. They find that lead underwriters use their affiliated funds to help secure follow-on equity deals, and that these investment banks also pass on information to their affiliated funds so that their affiliated funds can engage in cherry-picking for better performers. Unlike our paper, they do not distinguish between hot and cold IPO markets.

The allocation process of IPOs has recently attracted much attention. Loughran and Ritter (2002, 2004) posit that the objective function of the lead underwriter is not perfectly aligned with the issuing firm and the lead underwriter may use its market power opportunistically. Nimalendran, Ritter, and Zhang (2006) and Reuter (2006) provide evidence that the lead underwriter links allocations of IPO underpricing benefits to both short-run and long-run commission generation. In this paper we examine whether the lead underwriter also uses its affiliated funds to either support an IPO or reap additional benefits. This sheds further light on the agency issue. Contrary to articles in the financial press, our findings suggest that the use of affiliated funds to support cold IPOs is not widespread. The incentives of the managers of the affiliated mutual funds are apparently aligned more closely with the interests of the fund holders than with the investment bankers of the parent firm.

Gaspar, Massa, and Matos (2006) suggest that mutual fund families strategically allocate different IPOs to different funds in the family as an intra-family subsidization. The reason for such intra-family subsidization is the asymmetric relation between fund performance and money flows. We also check the characteristics of affiliated funds and the allocation of IPOs. A profit-maximizing family of funds would prefer to allocate hot IPOs to a fund with good recent performance, young age, small size, and high fees. We find that an IPO would have a lower initial return if it is allocated to affiliated funds that have above-median assets or generate below-median fees within the fund family. Strikingly, although affiliated funds received IPOs with 13% higher initial returns during the internet bubble period, an IPO would still have a 16-18% lower first-day return if it is allocated to a fund that is large or generates lower fees. We need caution, however, if we try to link this evidence to the dumping ground hypothesis. Since, at least for unaffiliated mutual funds, the underwriter's allocation of IPOs is at the family level, it is not the underwriter's decision as to which fund in the family receives IPO shares. Thus, it is more likely that the above evidence is merely a reflection of intra-family subsidization rather than dumping by the underwriter.

The rest of the paper is organized as follows. In the next section we develop a model and the hypotheses. In Section 3 we describe the data and report descriptive statistics on IPOs and mutual fund holdings. In Section 4 we conduct the univariate analysis. Section 5 contains the regression results for the overall sample. In Section 6 we discuss the use of the reported holding within six months of the IPO offer date as a proxy for initial allocation, and offer further tests that shed light on the relations of allocation size and fund characteristics with IPO first-day returns. We report results on long-run performance and IPO allocation to affiliated funds in Section 7, and provide some concluding remarks in Section 8.

2. Mutual Fund Affiliations and IPO Allocation – A Model and the Hypotheses

The Investment Company Act of 1940 prohibits an affiliated mutual fund from buying any shares of a security offering during the existence of the syndicate if the fund is in any way related to any syndicate members (Section 10(f)). The SEC adopted Rule 10(f)-3 in 1958 to exempt certain types of transactions. The SEC amended Rule 10(f)-3 in 1979 to allow an affiliated fund to buy up to 4% or $500,000 of an offering, whichever is greater, although in no circumstance may the purchase be more than 10% of the offering. This is called the percentage limit. In 1997 the SEC amended the rule again to raise the percentage limit to 25%, and the dollar amount limit was dropped. The purchase, however, has to be done through a member of the syndicate other than the affiliated underwriter. The SEC further amended the rule in 2003 to apply the percentage limit only when the affiliated underwriter is the principal underwriter.[4]

The spirit of Section 10(f) of the Investment Company Act is to prevent the underwriter from using funds under its control as a dumping ground for unmarketable securities. Rule 10(f)-3, however, gives investment banks flexibilities of using their affiliated funds in security offerings. Thus, it is important to have a framework to understand how the different incentives that the underwriter faces can influence allocations of IPOs between affiliated and unaffiliated institutional investors. In the rest of this section, we first develop a model to shed light on the underwriter's allocation decision. We then develop the hypotheses based on the model for our empirical analysis.

2.1. A Model

An investment bank (an underwriter – we will use these two terms interchangeably in the paper) needs to determine the optimal allocations of IPOs to two institutional investors, an independent fund and an affiliated fund. This long-term relation covers two different types of market cycles: hot and cold IPO markets. For each market cycle, there is only one IPO with an offer size of one share and an offer price of one dollar.[5] For simplicity, we also make the following assumptions:

- If a deal is completed, the underwriter receives a constant underwriting commission, the gross spread, of G.
- The initial return (first-day return) of each IPO, *IR*, which is not known until the allocation, is an independent draw from a uniform distribution $U(\underline{u},\overline{u})$.[6] The mean initial return, $\frac{\underline{u}+\overline{u}}{2}$, takes the value of r_H if it is a hot IPO market, and r_C if it is a cold IPO market, where $r_H > r_C$. The state of the market is known, as well as the underlying distribution, at the beginning of the cycle.

[4] See SEC release Nos. IC-22775, IS-1095, and IC-25888 for more detail on the regulatory changes.
[5] Alternatively, we can assume that the number of IPOs is fixed. As long as the underwriter bundles IPO allocations during an IPO market cycle (Sherman (2000)), the intuition will remain the same.
[6] In practice the initial return can not be determined with certainty before the allocation. However, the literature suggests that the initial return can be predicted using some pre-issue observable variables with a high R^2. So it is reasonable to make this assumption.

- Denote the allocation to the affiliated fund as $A(IR)$, and for the independent fund as $I(IR)$. Note that both allocations depend on the initial return, *IR*. We assume that $A, I \in \{0,1\}$. That is, the IPO share will be allocated to either the affiliated fund or the independent fund, but not both.
- The participation of the independent fund is necessary, and that the independent fund manager requires an expected return on its IPO allocation of no less than $\underline{r}$ over any given IPO market cycle, where $\underline{r} > 0$, $r_C < \underline{r} < r_H$, and $\underline{u} < \underline{r} < \overline{u}$ for both the cold and hot IPO market cycles. But the affiliated fund manager takes an issue unconditionally.[7]
- For the affiliated fund, the management fee, which is proportional to assets under management, is the only source of revenue. The initial return of an IPO, if allocated to the affiliated fund, affects its performance and hence money inflows from mutual fund investors. Everything else being equal, the present value of the incremental management fees associated with the allocation of the IPO is $m[E(A * IR) - b]$, where m is a scalar representing the present value of fees (net of costs) attracted per dollar of excess performance, and b is a constant benchmark. Note that $E(A * IR)$ is the expected amount of money left on the table received by the affiliated fund, but, since the offer size is one share, it is also a return. Furthermore, we assume that $E(A) > 0$. That is, the affiliated fund is expected to invest in certain IPOs underwritten by the investment bank. Consequently, $m[E(A * IR) - b]$ could be negative. The affiliated fund could be better off if it invests the money $E(A)$ somewhere else such as an index portfolio.
- The independent fund manager adjusts its commissions based on IPO allocations. The incremental effect due to the allocation of the IPO on commission business is $k[E(I * IR) - \underline{r}]$, where k is a scalar. That is, the commission paybacks are proportional to the underpricing benefits above $\underline{r}$ received by the independent fund.

The revenues for the investment bank from each IPO come from three sources: the gross spread, the management fee on the affiliated fund's assets, and commission paybacks

[7] The affiliated fund could also refuse to accept cold IPOs. This will make the affiliated fund behave more like the unaffiliated fund. It is an empirical question as to what degree the affiliated fund will accept IPOs unconditionally to help the parent firm.

from the independent fund. We can write the optimization program for the investment bank at the beginning of an IPO market cycle as follows:[8]

$$\max_{A,I}\{[G + m(E(A*IR) - b) + k(E(I*IR) - \underline{r})], 0\}$$

$$\begin{aligned}
&s.t. \\
&E[I*IR] \geq \underline{r}. \\
&E[A] > 0 \\
&A, I \in \{0,1\} \\
&A + I = 1
\end{aligned}$$

The independent fund requires a minimum expected return on its IPO allocations over an IPO market cycle. So it is obvious that some IPOs with extreme low initial returns have to be allocated to the affiliated fund, if the investment bank forces the deal through. However, this may hurt the performance of the affiliated fund such that the loss in management fee dominates the underwriting revenue. The investment bank may simply withdraw the deal from the market, and take the zero profit. For simplicity, we further assume that the underwriting revenue G always dominates and the deal will always go through, and that the benchmark for affiliated fund money flows, b, is the same as the required minimum return, $\underline{r}$, for the independent fund. The simplified optimization program is then as follows:

$$\max_{A,I}[(m-k)(E(A*IR) - \underline{r})]$$

$$\begin{aligned}
&s.t. \\
&E[I*IR] \geq \underline{r} \\
&E[A] > 0 \\
&A, I \in \{0,1\} \\
&A + I = 1
\end{aligned}$$

Now it is clear that how the investment bank allocates an IPO depends on the trade-off between the internal management fee and the external trading commission income. If these two sources of income are equal, we assume that the investment bank will favor its affiliated fund. The solutions of the model depend on the parameters. Below we analyze the four

[8] Note that both *A* and *I* are functions of *IR*. Also, we assume that the affiliated fund will always channel trading commissions to the investment bank. We also treat the minimum initial return requirement by the independent fund and its commission payback schedule as being exogenously determined such that they guarantee the optimal outcome regarding the performance and money flows for the independent fund. Consequently, we do not model trading commissions generated by the affiliated fund and the money inflows to the independent fund.

different cases generated by the interaction of hot vs. cold markets and management fees vs. commission paybacks to gain insight into the underwriter's allocation problem. The solutions are summarized in Figure 1.

Case 1: Cold IPO market cycle: $E(IR) = r_C$

Note that $E(IR) = r_C < \underline{r}$, and that the constraint $E(I * IR) \geq \underline{r}$ suggests that the affiliated fund has to take more IPOs from the lower end of the distribution. This does not necessarily mean that the affiliated fund has to take all IPOs from the left end of the distribution. But an IPO with relatively better performance for the affiliated fund will have to be offset by IPOs with even worse initial returns so that the resulting expected return for the independent fund meets the minimum return requirement. For tractability, we assume that the funds in this case and the following cases will take IPOs starting from one end of the distribution until the optimal expected return is obtained. Note that this assumption will not change the expected return received by either fund for each market cycle.

Case 1a: $m < k$. If the underpricing generates more commission paybacks from the independent fund than management fees from the affiliated fund, the underwriter obviously allocates all IPOs with initial return above $\underline{r}$ to the independent fund. That is,

$$A^* = \begin{cases} 1 & \text{if IR} \in [\underline{u}, T_{1a}] \\ 0 & \text{if IR} \in (T_{1a}, \bar{u}] \end{cases} \text{ and } I^* = \begin{cases} 0 & \text{if IR} \in [\underline{u}, T_{1a}] \\ 1 & \text{if IR} \in (T_{1a}, \bar{u}] \end{cases}, \text{ where } T_{1a} = \underline{r}.$$

Case 1b: $m \geq k$. The constraint $E(I \times IR) \geq \underline{r}$ becomes binding when management fees exceed commission kickbacks. This in turn indicates that $A^* = \begin{cases} 1 & \text{if } IR \in [\underline{u}, T_{1b}] \\ 0 & \text{if } IR \in (T_{1b}, \bar{u}] \end{cases}$ and

$I^* = \begin{cases} 0 & \text{if } IR \in [\underline{u}, T_{1b}] \\ 1 & \text{if } IR \in (T_{1b}, \bar{u}] \end{cases}$, where the cutoff point $T_{1b} = \sqrt{\bar{u}^2 - 2\underline{r}(\bar{u} - \underline{u})}$. Note that $T_{1b} < \underline{r}$.

That is, although during the cold IPO market cycle the affiliated fund has to take IPOs with the worst performance, the independent fund will also receive some IPOs with an initial return less than the minimum required expected return. The intuition is that although the management fee revenue is higher than the profit-sharing from commissions, the independent fund must be given hot IPOs in order to induce it to participate in the offerings. Note that we assume that the affiliated funds can not simply take all IPOs due to capital constraints and regulations, and that the participation of the independent fund in a given IPO market cycle is necessary.

Case 2: Hot IPO market cycle: $E(IR) = r_H$

Case 2a: $m < k$. If the commission paybacks dominate, the affiliated fund will still take all the IPOs with initial returns below $\underline{r}$. We have the same solutions as in Case 1a. That is, $A^* = \begin{cases} 1 & \text{if IR} \in [\underline{u}, T_{2a}] \\ 0 & \text{if IR} \in (T_{2a}, \bar{u}] \end{cases}$ and $I^* = \begin{cases} 0 & \text{if IR} \in [\underline{u}, T_{2a}] \\ 1 & \text{if IR} \in (T_{2a}, \bar{u}] \end{cases}$, where $T_{2a} = \underline{r}$.

Case 2b: $m \geq k$. The underwriter will ask the independent fund to take the IPOs starting from the lower end of the distribution because $\frac{\underline{u} + \bar{u}}{2} = r_H > \underline{r}$. The constraint $E(I \times IR) \geq \underline{r}$ is again binding, and $A^* = \begin{cases} 0 & \text{if } IR \in [\underline{u}, T_{2b}] \\ 1 & \text{if } IR \in (T_{2b}, \bar{u}] \end{cases}$ and $I^* = \begin{cases} 1 & \text{if } IR \in [\underline{u}, T_{2b}] \\ 0 & \text{if } IR \in (T_{2b}, \bar{u}] \end{cases}$, where the cutoff point $T_{2b} = \sqrt{\underline{u}^2 + 2\underline{r}(\bar{u} - \underline{u})}$. That is, IPOs with better initial returns will go to the affiliated fund. The intuition is that the independent fund will receive the minimum number of IPOs with positive returns to keep it willing to accept all of the IPOs with negative returns.

2.2. *The Hypotheses*

The underwriter has incentives to complete more IPOs in order to earn investment banking fees. Conditioning on an IPO being completed, we can use Figure 1 to summarize our model. IPO allocations are driven by the interaction of two factors: the IPO market condition and the relative importance of the affiliated and unaffiliated funds in their abilities to generate revenues for the underwriter. Two interesting patterns then arise. First, during a cold IPO market cycle, the expected return of the IPOs received by the affiliated fund is always lower. The investment bank needs to use its affiliated fund to complete more deals. Second, during a hot IPO market cycle, the relative performance of IPOs received by the affiliated and the unaffiliated funds depends on the relative importance of money inflows and the associated management fees versus commission paybacks.

Our model then leads to two alternative hypotheses: the dumping ground hypothesis and the nepotism hypothesis. The dumping ground hypothesis refers to the situation in which the underwriter allocates (dumps) more cold IPOs to its affiliated funds so that more deals can go through or more trading commissions can be received from unaffiliated institutional investors (Cases 1a, 1b, and 2a). The underwriter is more likely to ask the affiliated funds to take more cold IPO shares to create more demand to support these cold IPOs so that other institutional investors can share less of the burden. The nepotism hypothesis refers to the situation in which the underwriter uses hot IPOs to boost the performance of its affiliated funds. If the mutual fund industry is rapidly expanding, the underwriter will use hot IPOs to boost the performance of its affiliated funds to attract more money inflows and gain market share for its asset management business (Case 2b). If the underwriter simply treats all funds in the same way due to regulatory concerns, we would observe that both hot and cold IPOs are allocated to affiliated and unaffiliated funds in the same way. This is our null hypothesis.

Once an underwriter has allocated IPO shares to a fund family, the family may then choose to allocate the shares to funds within the family in a manner so as to maximize the present value of the family's total management profits. Within the same market cycle and within the fund family, some fund characteristics, such as fund size, total fees, age, and year-to-date performance, affect how allocations of IPOs influence the performance of the fund and its money inflows (the parameter m in the model). Consequently, the dumping ground hypothesis and the nepotism hypothesis could co-exist, while dumping happens more often with large, low fee, old, and underperforming funds because their abilities to generate management fees are relatively insensitive to dumping and nepotism, and nepotism happens more often for funds with the opposite characteristics.

3. Data and Descriptive Statistics

3.1. Data

The Thomson Financial Security Data Company (SDC) global new issues database is used to identify IPOs from 1990 to 2001. We exclude all unit offerings, American Depository Receipts (ADRs), Real Estate Investment Trusts (REITs), closed-end funds, partnerships, and banks and S&Ls. We also exclude IPOs with an offer price of less than $5. We use the 2004 Center for Research in Security Prices (CRSP) database of daily stock prices in our long-run performance studies, restricting the sample to Amex, NYSE, and NASDAQ-listed stocks. We identify 4,262 IPOs from 1990 to 2001 after applying these filters. Since our focus is on how the lead underwriter allocates IPOs between affiliated funds and unaffiliated funds, we further require that for an IPO to be in our sample, its lead underwriter(s) has affiliated funds, and that at least one fund, either affiliated or unaffiliated, reported holdings of the IPO within six months of the offer date. This reduces the number of IPOs to 2,257, with a pronounced tendency to screen out the smaller IPOs.

We use the CDA/Spectrum Mutual Funds Holding database, which is often referred to as the Spectrum 1&2 database, to obtain reported holdings for IPOs. This database covers all mutual fund filings with the SEC and an additional 3,000 global funds. The reported holding for each stock is at the fund level, and is reported semi-annually.[9] We exclude all funds with reported assets under management of less than $1 million at the time of reporting.

We use CUSIP numbers for each stock/IPO to match each mutual fund's reported holdings and our IPO sample. We use the first reported holdings within six months of the offer date for each IPO as our proxy for the initial IPO allocations, since the actual allocations are not publicly available.[10] We will discuss why we think that this is a good proxy for this study in Section 6.1. The reported holdings refer to the first reported holdings within six months of the offer date in the rest of the paper, unless explicitly stated otherwise. Throughout the paper we use reported holdings and initial allocations interchangeably unless the context suggests otherwise.

We utilize the mutual fund directory published by the Investment Company Institute, Moody's *Bank and Finance Manual*, and the websites of the investment banks in our sample (when available) to determine the affiliations between mutual funds and investment banks. A

[9] Thomson Financial also has another related fund holding database called CDA/Spectrum Institutional Money Manager Holdings. This is also referred to as Spectrum 3&4 or Institutional 13(f) Common Stock Holdings database. The 13(f) data are from the 13F form filed with the SEC and include holdings at the fund family level on a quarterly basis. We use Spectrum 1&2, the fund level holding data, instead of the 13(f) data because our analysis requires information at the individual fund level. Also, for the 13(f) data, a fund family only needs to report holdings of a position in a stock greater than 10,000 shares or $200,000. As reported in Panel B of Table 2, the average per stock holding in an IPO is 85,460 shares or $2.04 million. But the standard deviations are as high as 281,876 shares or $8.38 million (not reported in the table). This indicates that the 13(f) data could exclude many smaller positions, which may bias the results if used. It should be noted that it is unusual for a mutual fund, other than a small index fund, to hold a few shares, such as 500 shares or 2,000 shares, of many different stocks. Instead, actively managed funds typically hold either at least 40,000 shares or zero shares of a limited number of stocks, perhaps because of the fixed cost of actively paying attention to each stock.

[10] Note that the required reporting frequency for the Spectrum data is six months, although many funds report holdings voluntarily on a quarterly basis.

manual name match is first performed based on the presumption that a prestigious investment bank would protect its brand name and only allow its affiliated funds to use it. We then use the aforementioned sources to supplement and confirm the affiliations from the name match. There are some major mergers and acquisitions among big investment banks in our sample period, and it is important, for example, not to link any Chase Manhattan funds to JP Morgan before their merger in 2000. We use the SDC Mergers and Acquisitions database and corporate history published on the websites of some investment banks to make sure the affiliations are time sensitive to mergers and acquisitions.

3.2. Descriptive Statistics

We divide the sample period into five subperiods: 1990-1994, 1995-1996, 1997-1998, 1999-2000, and 2001. Our model suggests that there are two forces influencing the allocation of IPOs between affiliated and unaffiliated funds. One factor is the IPO market condition, and the other is the importance of attracting money inflows. We use the overall IPO market returns published on Jay Ritter's website to determine the IPO market cycles. We use two different criteria to determine if a month is a hot IPO market: whether the previous month mean IPO initial return is greater than 15%, and whether the moving average of the initial return over the previous three months is greater than 15%. Although these two different criteria generate different results (not reported), two periods, 1995-1996 and 1999-2000, have many consecutive months of hot IPO markets.

As to the importance of attracting money inflows, we report in Figure 2 the size of equity-related mutual funds (equity and hybrid funds) and the annual money inflows into mutual funds, measured in dollars and as a percentage of assets under management. Assets under management display an upward trend and peak during the internet bubble period. The numbers in Figure 2 suggest that the mutual fund industry experienced fast expansion in percentage terms during 1991-1994. Considering both the IPO market cycles and the mutual fund market expansion, we divide our sample period into the aforementioned five subperiods.

We report the summary statistics for our 2,257 sample IPOs in Table 1. The underwriter reputation rank is from Loughran and Ritter (2004) and is defined as the prestige rank on a 1 (low) to 9 (high) scale as in Carter and Manaster (1990). There are on average 33.04 funds reporting holdings of an IPO within six months of the offer date, and the average holding by all funds is 33.80% of the total number of shares offered. Both the number of funds with reported holdings within six months and the percentage of the public float held by these funds display an upward trend. The average reported holding by all funds ranges from 28.90% in the early 1990s to 41.40% in 2001. This is higher than the annual average mutual fund holdings of 5-30% from 1980 to 2000 reported by Binay and Pirinsky (2003) and the average 25% holding for the period from 1980 to 2000 reported by Field and Lowry (2006) using the 13(f) data. The major reason for our higher average holdings by mutual funds is that we are reporting the means of IPOs conditional on each IPO being held by at least one reporting fund and the lead underwriter having affiliated funds. These screens remove many of the smaller IPOs that institutions are less likely to own and that are taken public by underwriters that are not large integrated securities firms.

We report the summary statistics on mutual funds in Table 2. For comparison, we report mean assets and per stock holdings (in both number of shares and dollars) for all reporting funds in Panel A. We first aggregate the numbers for each fund over each report date. An observation in Panel A is for one fund-report date combination, and each fund generates roughly two observations per year.[11] One noticeable feature in Panel A of Table 2 is the dramatic increase in the number of funds during 1999-2001, as indicated by the number of observations for this subperiod.

The descriptive statistics for all funds that reported holdings in IPOs are reported in Panel B of Table 2. During the sample period, a fund on average reported holdings of 2.96 stocks that had gone public in the previous six months. The per stock holding for IPOs averages 85,460 shares with a market value on the reporting date of $2.04 million, which is much smaller than the per stock holding of all stocks including IPOs and non-IPOs reported in Panel A, 145,861 shares with a market value of $4.05 million. This is reasonable since on average IPOs have a smaller public float compared to more seasoned companies held by mutual funds.

In Panel C we report descriptive statistics for affiliated funds that report holdings of affiliated IPOs. This panel sheds light on the involvement of an affiliated fund in IPOs underwritten by its parent company. The number of IPOs with reported holdings from the

[11] Some funds report voluntarily on a quarterly basis, and these funds would generate four observations per year.

affiliated funds is only 1.48 on average, smaller than that in Panel B. Note that the mean reported holding, 75,495 shares or $1.69 million per IPO, is smaller than those in Panel B. In all three panels of Table 2, we also report fund assets as a reference.[12]

4. Who Receives Better IPOs? – A Univariate Analysis

In this section we divide the IPOs into two groups: the NR group that has No Reported holdings from the lead underwriter affiliated funds and the R group that has Reported holdings from the affiliated funds. We compare the characteristics of the IPOs in these two groups, and perform t-tests to study whether the affiliated funds receive IPOs with better or worse performance.

The results are reported in Table 3. Through its affiliated funds, the lead underwriter invested in 283 IPOs, 12.5% of the sample. The percentage increases from less than 10% in 1990 – 1994 and 1995 – 1996 to approximately 30% in 1999-2000 and 2001. Throughout the sample period, the lead underwriter-affiliated funds on average go with the crowd – when the affiliated funds invest in an IPO (the R group), we have reported holdings from more funds, and the percentage holdings by these funds (including the affiliated funds) are also higher. On a per IPO basis, when the lead underwriter allocated an IPO to one or more of its affiliated funds, the average number of affiliated funds that received allocations is two. This number is monotonically increasing from 1.18 affiliated funds during 1990-1994 to 3.21 affiliated funds in 2001. Conditioning on the affiliated funds having received shares, the average holding is 2.30% of the shares offered. The average holding decreases from 3.82% during 1990-1994 to 0.70% in 2001.

The offer size of the R group IPOs, measured by the dollar proceeds, is more than three times greater than that of the NR group IPOs. This is not surprising, in that a large offering presumably will be held by more funds, and even with no preferential treatment an affiliated fund is more likely to hold shares in a large offering than in a small offering. This difference is much larger in the later subperiods, and is not present in the early years. Firm

[12] For many years we find quite some non well-known funds with assets that easily surpassed the size of the Fidelity and Vanguard S&P500 Index funds. In the Spectrum database, assets are reported as $\times \$10,000$. The numbers for these non well-known funds clearly suggest data errors, probably the use of wrong units. We set those assets numbers that are likely to be data errors as missing in calculating the mean assets in Table 2.

size, measured by the pre-issue book value of assets, shows a similar pattern. The reputation rank of the lead underwriter for the R group IPOs is slightly higher than that for the NR group IPOs. Again this difference comes from the later subperiods, possibly reflecting the increasing dominance of high prestige investment banks during our sample period.

We report the average initial returns and their differences for the R and NR groups at the bottom of Table 3. The p-values for the t-statistics are reported in the parentheses in the last row. For the whole sample period, the R group IPOs have a statistically significant 28.6% higher initial return than the NR group IPOs. If we examine different subperiods separately, however, a much richer pattern arises. The initial return difference between these two groups during 1999-2000 is a statistically significant 35.4%. This subperiod, often referred to as the internet bubble period, is characterized as a hot IPO market with severe underpricing and aggressive commission payments (Nimalendran et. al. (2006)). The dollar amount of assets under management and the dollar amount of inflows into mutual funds also reached their peaks during this period. As suggested by the model, it is not surprising that the underwriters steered more hot IPOs to their affiliated funds.

The 1995-1996 subperiod is another hot IPO market cycle, but the initial return difference is only an insignificant 1.9%. This is possibly due to the fact that the cash inflows to the mutual funds, as shown in Figure 2, slowed down in this period, which reduced the incentive to improve fund performance by allocating hot IPOs to an affiliated fund. For 1990-1994, the R group of IPOs has a statistically significant 7.1% higher initial return. For the other subperiods, the difference is insignificant.

Overall, the evidence from Table 3 is informative, but not conclusive. The affiliated funds tend to receive better IPOs, although the difference for three of the five subperiods is statistically insignificant. There are confounding factors, however, that may account for some of the higher initial returns for IPOs that are allocated to affiliated mutual funds. For example, when the affiliated funds receive shares, the mean percentage holdings by institutional investors, including both affiliated and unaffiliated funds, is also higher. The higher initial return of the IPOs that are allocated to affiliated funds could be simply because institutional investors were overall favored in these IPOs. In the next two sections, we develop an empirical model and run multivariate regressions to shed more light on the hypotheses.

5. Regression Results

5.1. The Empirical Model

It seems natural to consider a Probit model specification as follows:

$$AFA^i = X^i_{controls}\beta_{controls} + \gamma IR^i + \varepsilon^i \quad (1)$$

where AFA^i is a dummy variable that equals one if the **A**ffiliated **F**unds receive **A**llocations of IPO i and zero otherwise, $X^i_{controls}$ represents the control variables, and IR^i is the IPO initial return.[13] Such a model specification could be misleading, however, as we explain below.

The initial return and institutional allocations of an IPO are jointly determined. Building on Aggarwal, Prabhala, and Puri's (2002) empirical model, we propose the following model:

$$IR^i = X^i_{IR}\beta_{IR} + \alpha INST^i + \varepsilon^i \quad (2)$$

$$INST^i_j = X^i_{INST}\beta_{INST} + Y^i_{INST-j}\delta + \left(AF^i_j \times X^i_{INST}\right)\gamma_1 + AF^i_j\gamma_2 + \eta^i_j \quad (3)$$

$$INST^i = \sum_j INST^i_j \quad (4)$$

In equations (2), (3) and (4), $INST^i_j$ is the allocation of IPO i to institutional investor j, and $INST^i$ is the overall allocation of IPO i to institutional investors (mutual funds). The inclusion of $INST^i$ in equation (2) captures private information that institutional investors could have but do not reveal in the bookbuilding process. It could also capture the association between the initial return of an IPO and the underwriter's decision of allocating it to the affiliated funds. X^i_{IR} and X^i_{INST} are vectors of IPO-related factors that jointly determine the initial return and institutional allocations. X^i_{IR} and X^i_{INST} could be overlapped. Y^i_{INST-j} is the vector of fund-related factors. AF^i_j is a dummy variable that equals one if institutional investor j is affiliated with the lead underwriter of IPO i and zero otherwise (note that no

[13] An OLS model, instead of a Probit/Logit model, could also be estimated if we use the actual reported holdings as the dependent variable.

allocation is required). If γ_1 (a vector of coefficients) and γ_2 (a scalar) do not equal zero, it would suggest that the lead underwriters treat affiliated investors differently.

Now it is clear why we argue that the model specification in equation (1) could be misleading. Note that IR^i (or its premarket indicators such as the adjustment of the offer price) is one of the factors in X^i_{INST}. The model in equation (1) is simply a probit/logit version of that in equation (3). It is clear that the coefficient γ in equation (1) is jointly determined by the coefficients on IR^i and γ_1. When γ_1 is zero, a positive/negative coefficient of IR^i will give us a misleading γ.

One way to test our hypotheses is to estimate equation (3). Unfortunately this requires information at the individual fund level that is either not publicly available or difficult to measure.[14] We can, however, find an indirect and parsimonious way to test if γ_1 and γ_2 equal zero. Let us plug equations (3) and (4) back into equation (2), and we have

$$IR^i = X^i_{IR}\beta_{IR} + \alpha\begin{bmatrix}\sum X^i_{INST}\beta^A_{INST} + \sum Y^i_{INST-j}\delta + \\ \sum\left(AF^i_j \times X^i_{INST}\right)\gamma_1 + \sum AF^i_j\gamma_2 + \sum \eta^i_j\end{bmatrix} + \varepsilon^i \tag{5}$$

We can rewrite equation (5) as:

$$\begin{aligned} IR^i = X^i_{IR}\beta_{IR} &+ \alpha\left[\sum X^i_{INST}\beta^A_{INST} + \sum Y^i_{INST-j}\delta + \sum \eta^i_j\right] \\ &+ \alpha\left[\sum\left(AF^i_j \times X^i_{INST}\right)\gamma_1 + \sum AF^i_j\gamma_2\right] + \varepsilon^i \end{aligned} \tag{6}$$

The second term in equation (6) captures the total institutional allocations due to the IPO-related factors and the fund-related factors (except affiliations). If we assume that the only overall difference between affiliated and unaffiliated funds is the possible different treatment they could receive from the lead underwriter, we can replace the terms in the first bracket with $INST^i_{NA}$, which is defined as the total allocations to unaffiliated institutions, to capture any private information institutional investors may have, as suggested by Aggarwal, Prabhala, and Puri (2002). The third term, $\alpha\left[\sum\left(AF^i_j \times X^i_{INST}\right)\gamma_1 + \sum AF^i_j\gamma_2\right]$, captures the impact of the

[14] For example, it would be useful to have information on how aggressive a fund is in bidding for an IPO and how informative the bidding is. This requires information from the order book and the actual allocations of an IPO. Cornelli and Goldreich (2001) and Jenkinson and Jones (2004) examine order books for some European IPOs, and shed light on how the lead underwriter allocates shares to different investors. They come to different conclusions, however, regarding how much of actual allocations can be explained by information-theoretic bookbuilding models.

difference of the allocations between affiliated and unaffiliated funds. We can replace the terms in the bracket with the affiliated fund allocations dummy, AFA^i, and then transform the model into

$$IR^i = X_{IR}^i \beta_{IR} + \lambda INST_{NA}^i + \theta AFA^i + \mu^i \qquad (7)$$

Note that by using the AFA^i dummy instead of the reported holdings, we give up the information in the size of the reported holdings, as well as the noise in it because it is an imperfect measure for allocations. The interpretation of the model is straightforward: if the nepotism hypothesis is true, we would have $\theta > 0$; if the dumping ground hypothesis is true, we would have $\theta < 0$.

Equation (7) will be the regression model we estimate in our following analyses. But before we report the empirical results, it is important to point out that our empirical estimations of the reduced form in equation (7) do not suffer from endogeneity issues. As revealed in equations (2) – (4), the endogeneity of institutional allocations is because of the common factors that affect both IPO initial returns and institutional allocations. For this reason, Aggarwal, Prabhala, and Puri (2002) use the unexpected institutional allocations to capture private information. But their study suggests that there is no reason to believe that institutional allocations are strongly correlated with the error term in the initial return regression. So statistically there is no reason to believe that either $INST_{NA}^i$ or AFA^i is correlated with μ^i. Consequently, the estimation of θ would not be biased.

5.2. Regression Results

To estimate equation (7), we need to determine the variables in X_{IR}^i that we use to help explain the initial return. Following the literature, we include four variables. The first one is the pre-market adjustment, denoted as $Adjustment$ and defined as the percentage pre-market adjustment from the mid-point of the initial file price to the offer price. LN_Assets, defined as the natural log of the inflation-adjusted pre-issue book value of assets, is also included. We include the tech dummy $Tech\_Dummy$ as the third control variable. This dummy is one for tech IPOs and zero otherwise.[15] The last variable, the Carter and Manaster

[15] Tech IPOs are defined as those with SIC codes of 3571, 3572, 3575, 3577, 3578, 3661, 3663, 3669, 3671, 3672, 3674, 3675, 3677, 3678, 3679, 3812, 3823, 3825, 3826, 3827, 3829, 3841, 3845, 4812, 4813, 4899, 7371,

(1990) reputation rank of the lead underwriter, $Lead\_Rank$, as updated by Loughran and Ritter (2004), measures the prestige status of an investment bank.[16] We use the first reported holdings within six months of the offer date by all funds that are not affiliated with the lead underwriter to proxy for the allocations to unaffiliated institutional investors. Following Aggarwal, Prabhala, and Puri (2002), we use the natural log of the total number of shares. The model we will estimate is then as follows. Note that to simplify the notation the superscript i is dropped.

$$\begin{aligned} IR = \beta_0 + \beta_1 * Adjustment + \beta_2 * LN\_Assets + \beta_3 * Tech\_Dummy \\ + \beta_4 * Lead\_Rank + \lambda * INST_{NA} + \theta * AFA + \mu \end{aligned} \tag{8}$$

We estimate the model separately for the five subperiods: 1990 – 1994, 1995 – 1996, 1997 – 1998, 1999 – 2000, and 2001. We report the regression results in Table 4. The coefficients of all the control variables in our regression have the expected signs and are consistent with what has been reported in the literature. The pre-market adjustment variable, $Adjustment$, is significantly positive for all subperiods, and it has the largest impact on initial returns during the internet bubble period, consistent with the evidence in other articles.[17] We expect the coefficient for LN_Assets to be negative since large issuers are less risky and are more likely to be seeking to maximize the offer price, and should be less underpriced. The coefficient for LN_Assets is negative and statistically significant at the 10% level or better for all subperiods. Technology companies tend to be more underpriced, and consistent with

---

7372, 7373, 7374, 7375, 7378 and 7379. We also give IPOs defined as internet companies a tech dummy value of one using the list of internet IPOs on Jay Ritter's website.

[16] Because of the joint determination of underpricing and the lead underwriter, there is a potential endogeneity problem with using *Lead_Rank* as an explanatory variable. In Loughran and Ritter's (2004) Tables V and VI, where both OLS and instrumental variables specifications are reported, there is almost no difference in the coefficients on a dummy variable for using a prestigious underwriter.

[17] The underpricing of IPOs jumped to a record high of 70% during the internet bubble period (see Table 1). Houston, James, and Karceski (2005) show that, during the internet bubble period, underwriters frequently low-balled the file price range. This suggests that, for the internet bubble period, the variable *Adjustment* could be endogenous. To address this concern, we also estimate a model with control variables similar to Loughran and Ritter (2004). Specifically, we drop the *Adjustment* variable as a control variable and replace it with the logarithms of sales and firm's age, as well as a VC dummy (one if a firm is backed by venture capitalists and zero otherwise), the percentage of primary shares offered in the offering, and market share overhang (the ratio of retained shares to issued shares). We keep the other control variables (*LN_Assets, Tech_Dummy, Lead_Rank and* $INST_{NA}$). The coefficients for all the control variables are consistent with what have been reported in Loughran and Ritter (2004) and this paper, and the coefficients for the *AFA* dummy remain qualitatively unchanged (results not reported).

our expectation, the coefficient for $Tech\_Dummy$ is positive and statistically significant for all subperiods.

The underwriter reputation variable, $Lead\_Rank$, has positive coefficients for all subperiods, but is only statistically significant (p=0.07) for the internet bubble period (1999-2000). In all but one subperiod this variable is economically significant. For example, in 1997-1998 the coefficient suggests an additional 14% underpricing, everything else equal, if an issuing firm moves from a penny stock underwriter with a reputation rank of 2.0 to a bulge bracket underwriter such as Goldman Sachs with a reputation rank of 9.0. Note that the overall IPO underpricing for our sample during this subperiod is only 22%. For the internet bubble period, such a migration from a less known underwriter to a well known underwriter would suggest additional underpricing of 46%.

The reported holdings by unaffiliated institutional investors variable, $INST_{NA}$, is positively related to the initial return except for 1997-1998. The coefficient for this variable is only statistically significant at the 1% level for the internet bubble period. This is consistent with the finding reported by Aggarwal, Prabhala, and Puri (2002) that institutional investors have private information not fully revealed in the pre-market.

The dummy variable, AFA, is one if affiliated funds received allocations and zero otherwise. The coefficient on this variable during the internet bubble period suggests a 13% initial return difference between IPOs that the lead underwriter allocated to affiliated funds and those that it did not, with a p-value of 0.09. The coefficients for this variable for 1995 – 1996 and 2001 are negative but insignificant. The 2001 subperiod represents a period during which the IPO market was cold and the investment banks were scrutinized on their allocation practices. To support the cold IPOs or to appear impartial in IPO allocations would result in relatively more cold IPO allocations for affiliated funds.

As to the 1995-1996 subperiod, although it was a hot IPO market cycle, the magnitude of IPO underpricing is much lower than that of the internet bubble period. More cold IPOs could still be allocated to affiliated funds due to the slow down of money inflows into the mutual fund industry. The coefficient for the AFA dummy for 1990 – 1994 is positive but insignificant. This is different from the univariate analysis, suggesting that after controlling for other factors that help explain IPO initial returns, the favoritism for affiliated funds during this period is not as strong as suggested in the univariate analysis.

Overall, the evidence is weakly supportive of the nepotism hypothesis. During a hot IPO market with severe underpricing such as the internet bubble period, the lead underwriter does have a tendency to allocate more hot IPOs to its affiliated fund. This is consistent with the nepotism hypothesis. There is no strong evidence, however, supporting the dumping ground hypothesis. One interpretation of this is that the management fees and/or the regulations have provided sufficient incentives for affiliated fund managers to focus on their own funds' returns, thus being unwilling to help support the price on a cold IPO that their parent firm is underwriting.

6. Discussion and Further Tests

Our regression results in the previous section provide weak support for the nepotism hypothesis. The validity of our tests, however, relies on how accurately the *AFA* dummy (equal to one if an affiliated fund reports holdings of the IPO) captures the underwriter's allocation decision. The negative coefficient for institutional holdings during the 1997-1998 subperiod, which is the same sample period of the Aggarwal, Prabhala, and Puri (2002) study, suggests that aftermarket flipping may bias our analysis. In this section we first discuss some concerns about our proxy, take a diversion to discuss an interesting feature about IPO allocations using actual allocation data, present a further test that sheds light on the model, and then present evidence regarding the intra-family allocations of IPOs.

6.1. Reported Holding as a Proxy for IPO Allocation

We use the first reported holding by a mutual fund within six months of the IPO offer date as a proxy for the initial IPO allocation the fund received. The mean percentage of the shares issued that funds hold at the first reported holding within six months of the IPO ranges from 28.9% in 1990-1994 to 41.4% in 2001. The mean actual allocation to institutional investors during these periods, as reported for various U.S. IPO samples using proprietary data, ranges from 67% to 77% (Hanley and Wilhelm (1995), Aggarwal, Prabhala, and Puri (2002), and Boehmer, Boehmer, and Fishe (2006)). This indicates that our measure captures about half of the actual allocations when measured using the number of shares. There are two reasons why our number is low. First, the mutual funds holding database does not cover some institutional investors such as hedge funds. Second, mutual funds sell some of their allocations in the aftermarket. If the shares are sold to individual investors or smaller institutions, they will not be included in our calculations.[18]

A small sample of eleven IPOs helps to shed light on the magnitude of the aftermarket selling and the resulting discrepancy between allocations and the reported holdings. Through a Freedom of Information Act request to the Office of the Attorney General of the State of New York, we have obtained allocation data for eleven IPOs underwritten by Salomon Brothers/CitiGroup between June 1997 and January 2000.[19] We manually compare all the account names that received allocations of each IPO to the mutual funds that appear in the Spectrum database within two years of the offer date of the IPO. We report the summary statistics on actual allocations and reported holdings in Table 5. For the eleven IPOs, on average 197 accounts are allocated shares from the institutional pot and only 80 of these accounts appear in the Spectrum database.

The average allocation for all accounts for these eleven IPOs is 43,911 shares, and for the mutual funds in the Spectrum database, the average allocation for these eleven IPOs is 62,365 shares. On average, out of the 80 accounts that received allocations, 18 accounts reported holding the IPO within six months of the offer date. Conditional on reporting a holding, the average first reported holding within six months is 83,038 shares.[20] The mutual funds in the Spectrum database tend to receive larger allocations, and when they do report holdings, the average holding is greater than the IPO allocation. (This is because the funds that reported holdings on average received larger allocations and were less likely to flip the shares, and because they accumulated more shares in the aftermarket.) However, the number of accounts that reported holdings within six months is only about 22% of the accounts that

[18] Aggarwal (2003) and Boehmer, Boehmer, and Fishe (2006) report that some institutional investors in their samples flipped their allocations shortly after the IPO started trading and such flipping counts for up to 25% of the allocations. Some of these shares are purchased by other institutional investors.

[19] Salomon Smith Barney was created in November 1997 through the merger of Salomon Brothers with the Smith Barney division of Travelers, which subsequently merged with Citibank in 1998 to create Citigroup.

[20] The allocations are reported at the fund family level, i.e., only one number is reported for Fidelity, although Fidelity could split the shares of the IPO among its funds. The reported holding in the Spectrum database is at the fund level, i.e., each Fidelity fund is required to report its holdings. We aggregate all funds in the family in calculating the average reported holdings in Table 5.

received allocations. We also look at the number of accounts that reported holdings within two years of an IPO. The average number of accounts increases to 28 (34%), but it is still far below the number of accounts in the Spectrum database.

The sample in Table 5 is small, but it does give us a peek into the relation between actual allocations and the first reported holding within six months of the IPO. It suggests that the reported holding, when used as a proxy for actual allocations, only captures a minority of the actual allocations. Meanwhile, the numbers reported in Table 5 also suggest that there exists a positive correlation between the number of accounts in the Spectrum database that received allocations and the number of accounts that reported holdings.

The fact that some institutional investors such as hedge funds are not included in the Spectrum database does not systematically affect the variables we are interested in because this study focuses on affiliated and unaffiliated mutual funds. The aftermarket selling and the resulting discrepancy between the reported holding and the actual allocation, however, could be an important concern. We do the following to minimize potential biases.

First, to take into account aftermarket flipping, we only use a dummy variable, instead of actual reported holdings, to capture whether affiliated mutual funds received any allocations in our analysis. For such a dummy variable to be consistently biased in support of the dumping ground hypothesis, affiliated funds would have to consistently buy cold IPOs after receiving zero allocations and/or flip all allocations of hot IPOs. Alternatively, a bias in favor of the nepotism hypothesis exists if the nepotism hypothesis is dominant and affiliated funds tended to flip cold IPOs and buy hot IPOs in the aftermarket.

Second, institutional investors often require a minimum position in an IPO and they rarely buy shares in the immediate aftermarket if they do not receive an allocation (Zhang (2004)). This behavior suggests that if the reported holding is not zero and the corresponding dummy is one, it is not a misrepresentation of a zero allocation.[21] The only concern here is that the underwriter could use the affiliated funds to buy cold IPOs in the aftermarket to support the stock price.[22] If the underwriter uses unaffiliated mutual funds to temporarily park

[21] Our examination of the eleven IPOs as used in Table 5 confirms this view.

[22] An April 29, 2004 Bloomberg story (Dietz and Henkoff (2004)) suggests that investment banks may have engaged in long-term price support as a mechanism for gaining future banking business. They reported examples in which funds affiliated with investment banks accumulated shares in the aftermarket while other institutional

the shares and dump them onto its affiliated funds in the aftermarket, it will make Rule 10(f)-3 irrelevant, although it is against the spirit of the regulation. This, however, makes no economic difference for our analysis.

Third, if the affiliated funds receive IPO allocations and flip all the shares in the aftermarket, it will result in a miscoded zero dummy for allocations using the Spectrum proxy. In a hot IPO market when the underwriter may use hot IPOs as booster shots, such miscoding would be more likely to work against us finding support for the nepotism hypothesis because even hot IPO allocations for affiliated funds will be coded as zero (put differently, the practice of nepotism could be more widespread than what we are able to identify in this paper). If affiliated funds are receiving cold IPOs for price support concerns, it is unlikely that they would then defeat this strategy by flipping the shares.

If the affiliated funds flip hot IPOs and keep cold IPOs, however, any empirical support for the dumping ground hypothesis could be due to biases caused by the fact that the AFA dummy does an inadequate job in capturing hot IPO allocations. Let's call this problem the miscoded-zero bias. Some counter factors should alleviate concern about this bias. First, we use a dummy variable, and an affiliated fund needs to flip all the shares for any miscoding to arise. Second, laddering, whereby some investors agree to buy additional shares in the aftermarket to drive up the price in return for receiving allocations at the offer price, seems to be more severe in hot IPOs (Hao (2005) and Griffin, Harris, and Topaloglu (2006)), and this suggests that some buying pressure still exists even in hot IPOs. Third, and most importantly, although the miscoded-zero bias makes it more likely for us to find support for the dumping ground hypothesis, we still find little support for it for the overall sample. This suggests that the miscoded-zero bias should not be a serious concern.

6.2. The Winner's Curse Problem

One interesting feature of Table 5 is that there is evidence that institutional investors face a winner's curse (Rock (1986)). Specifically, the IPOs with the highest first-day returns are allocated to more institutions and the average number of shares that each of these institutions receives is smaller. The correlation between the first-day return and the number of

---

investors reduced holdings. The evidence in the story is over the long-term. In the immediate aftermarket, price support is likely to be done by covering short positions, including not exercising the Green Shoe option (Aggarwal (2000)).

accounts receiving allocations is 0.78, which is significantly different from zero at the 1% level. The correlation between the first-day return and the average allocation size is -0.52, which is significant at the 10% level. This is not merely because some hedge funds receive small allocations on hot IPOs—the pattern shows up not only in the initial allocations with all accounts but also in the mutual fund accounts in the Spectrum database. Surprisingly, in this sample of 11 IPOs there is little tendency to allocate shares to more accounts for larger offerings. The correlation between the offer size and the number of accounts receiving allocations is only an insignificant 0.08.

It should be noted that this adverse selection problem is not necessarily the cause of IPO underpricing. Instead, it may merely reflect rent-seeking behavior on the part of institutional investors. That is, to the degree that the institutions expect that there will be high underpricing, more of them ask for allocations, and the underwriter responds by giving more of them allocations, but fewer shares each.

6.3. IPO Performance and Large Allocations to Affiliated Funds

Trading commissions are an important factor in determining IPO allocations (Reuter (2006)). As suggested by our model, the practice of dumping cold IPOs into affiliated funds could occur even during a hot IPO market cycle. However, the previous univariate and multivariate analyses do not provide any significant support for the dumping ground hypothesis. This could be because investment banks do not use their affiliated funds to support cold IPOs. But it could also be because underwriters only need support from affiliated funds for certain IPOs. Our previous analyses may fail to detect it when all IPOs are pooled together. In this sub-section, we re-estimate equation (8) with further classifications of IPOs based on allocation size.

For each IPO that was allocated to the affiliated funds, we calculate the average per fund holding for the affiliated funds and the unaffiliated funds. We then take the ratio of the average affiliated per fund holdings over the average unaffiliated per fund holdings for each IPO. We construct a dummy variable $Large\_Allocation$ that equals one if such a ratio is above one. We then estimate the following model:

$$
\begin{aligned}
IR = \beta_0 + \beta_1 * Adjustment + \beta_2 * LN\_Assets + \beta_3 * Tech\_Dummy \\
+ \beta_4 * Lead\_Rank + \lambda * INST_{NA} + \theta_1 * AFA \\
+ \theta_2 * AFA \times Large\_Allocation + \mu
\end{aligned} \quad (9)
$$

If the commission paybacks received from unaffiliated funds are an important factor in IPO allocations, we would see a more negative initial return difference if a large allocation is given to the affiliated funds. That is, we would expect the coefficient on the interaction variable $AFA \times Large\_Allocation$ to be negative. Note that the average allocation size would be smaller for hot IPOs, everything else equal, because of the strong demand. This, however, does not affect our analysis here because we use the per fund allocation ratio between affiliated and unaffiliated funds for each IPO, and the demand for an IPO would have the same impact on both the nominator and the denominator under the null hypothesis.

We report the regression results in Table 6. We do not include the year of 2001 in this analysis and the analysis in the next sub-section because of the small sample size. The coefficients for all the control variables have qualitatively the same point estimates and statistical significance as in Table 4. Some interesting patterns arise. For 1990-1994, the affiliated funds actually get IPOs with 7.44% higher initial return when the size of the allocation is small. When the allocation gets bigger, the IPOs that were allocated to the affiliated funds have statistically insignificant first-day returns of -2.79% ($7.44 - 10.23$) compared to if no allocation was received. The difference (-10.23%) in initial returns when a large allocation is received is statistically significant at the 1% level.

In the hot market subperiod of 1995-1996, the coefficient for the AFA dummy for this subperiod in Table 4 was negative but insignificant. In Table 6, however, when the affiliated funds receive a large allocation of shares, the IPOs are not only of statistically significant worse performance compared to those IPOs from which affiliated funds only get relatively small allocations, but also of significant worse performance (-11.62%) compared to the overall IPO sample. The negative correlation between the size of allocations to affiliated funds and the initial returns of IPOs for 1990-1996, as suggested by the results presented in Tables 4 and 6, is mildly supportive of the dumping ground hypothesis.

6.4. *IPO Performance and Characteristics of Affiliated Funds – Intra-Family Allocation Issues*

In the mutual fund industry virtually all funds are affiliated with fund complexes, and a fund family/complex has multiple funds with different investment objectives, size, age, and fee structures. Cross-fund subsidizations within a family could happen so that more money can be attracted for the fund family (Gaspar, Massa, and Matos (2006)). This suggests that the allocation of cold and hot IPOs could involve different funds in the same affiliated fund family. A more detailed classification of the affiliated funds that received allocations of an IPO could reveal more information on how the affiliated funds are involved in association with IPO underwriting.

We obtain further information on mutual funds such as investment objectives, assets, fees, age, and fund performance from the CRSP mutual fund database. In the CRSP mutual fund database, different fund classes of the same fund are reported separately, while in the Spectrum database the reported holdings for the same fund are pooled together. We manually match all CRSP funds (all fund classes if applicable) with the Spectrum database based on fund names. Following Gaspar, Massa, and Matos (2006), we look at four characteristics of the funds: fund size, total fees, year-to-date return (fund performance), and fund age.

We measure fund size using the total net asset value (TNA) at the end of calendar year from the CRSP fund database. Total fees are equal to the expense ratio, plus the total load divided by seven (the average number of years of investment in a fund. See Sirri and Tufano (1998)). We obtain monthly fund returns from the CRSP fund database, and the year-to-date return for a month is the sum of all monthly returns up to the current month of the same calendar year. Fund age is also measured on a monthly basis and is defined as the number of years from the month when the fund was founded to the current month. When a fund has multiple classes and the measures for these four characteristics differ, we use the numbers of the fund class that has the largest total net assets.

We then calculate the medians for the four characteristics. For fund size, total fees, and fund age, the median values are calculated for each fund family. For year-to-date return, the median is calculated for the same investment style, i.e., the same investment objective code as defined in the CRSP fund data (e.g., long-term growth funds), across all fund families. We then separate the affiliated funds into two groups: in-favor funds (those where hot IPO allocations would have the greatest positive effect on the present value of management fees) and out-of-favor funds (those where hot IPO allocations would have the least effect). For the variables of total fees and year-to-date return, a fund is classified as an in-favor fund if its value of the interested variable is above the corresponding median value, and as an out-of favor fund if otherwise. It is straightforward that the funds with high fees would be favored because attracting more money to these funds would generate revenues at a faster pace. The high performance fund could also be favored because of the convex relation between fund performance and money inflows.

For the variables of fund size and fund age, a fund is labeled as an in-favor fund if the variable values are below the median values. A $500,000 quick profit from a hot IPO would have much more impact on the fund performance for a $100 million fund than it does for a $10 billion fund, and a young fund without much of a track record would be more sensitive to performance improvements.

We construct four fund characteristic dummy variables for each IPO that is allocated to an affiliated fund based on the four fund characteristic variables: $Large\_Fund$ for fund size, Low_Fees for total fees, Low_Return for year-to-date return, and Old_Fund for fund age. We use fund size and total fees for the same year of the IPO since these two are measured annually. For measures of year-to-date return and fund age, we use the numbers in the month before the IPO. All four dummy variables are set to one for an IPO if the affiliated fund receives an allocation and the affiliated fund is an out-of-favor fund based on the corresponding fund characteristic. If more than one affiliated fund is allocated shares of an IPO and these affiliated funds have different values for a fund characteristic dummy, we set the dummy variable to zero (i.e., in-favor funds receive allocations from the IPO) because we are more concerned with the dumping ground hypothesis.

With the CRSP fund database, we are only able to match the affiliated funds of 200 IPOs out of the 283 IPOs that are allocated to affiliated funds. For the 83 IPOs for which we do not have information from the CRSP fund database, we simply set the dummy variables to zero because again we are more concerned with the dumping ground hypothesis. We then interact separately the four fund characteristic dummy variables with the AFA dummy, and estimate the following model:

$$\begin{aligned} IR = \beta_0 + \beta_1 * Adjustment + \beta_2 * LN\_Assets + \beta_3 * Tech\_Dummy \\ + \beta_4 * Lead\_Rank + \lambda * INST_{NA} + \theta_1 * AFA \\ + \theta_2 * AFA \times Fund\_Characteristic + \mu \end{aligned} \tag{10}$$

In equation (10) the variable $Fund\_Characteristic$ represents the aforementioned four dummy variables. Note that each interaction variable enters the regression separately.

We report the results in Table 7, which consists of four panels, one for each interaction variable. For all four panels, the control variables are qualitatively the same as in Table 4, so in the table we only report the coefficients on AFA and $AFA \times Fund\_Characteristic$. For year-to-date return (Panel C) and fund age (Panel D), no clear pattern shows up, and almost all coefficients on AFA and $AFA \times Fund\_Characteristic$ for different subperiods are statistically insignificant.

Except for 1995-1996, during which affiliated funds are overall allocated with IPOs with worse performance as also reported in Tables 4 and 6, the coefficients on the interaction variables for fund size (Panel A) and total fees (Panel B) are all negative. During 1999-2000, the internet bubble period, nepotism is more dominant as reported in Table 4. Strikingly, the coefficients on the interaction variable for this subperiod suggest that an IPO would underperform as much as 32% if it is allocated to out-of-favor affiliated funds compared to IPOs that are allocated to in-favor affiliated funds. This difference is statistically significant at the 1% level. Even compared to the overall IPO sample, an IPO would still underperform as much as 15-18% when it is allocated to out-of-favor affiliated funds.

Our finding is consistent with that in Gaspar, Massa, and Matos (2006), suggesting that intra-family cross-subsidization by allocating IPOs strategically is present in the mutual fund families affiliated with investment banks. Because all the affiliated fund families are associated with a security underwriting division that has different objectives, the evidence in Table 7 is supportive of the dumping ground hypothesis if the parent firm directly determines which of the affiliated funds in the family receive different IPO allocations. Alternatively stated, the fact that some other affiliated funds might receive better IPOs does not alleviate the concern that certain funds will be used as dumping grounds, against the interest of investors in these funds. Discussions with practitioners indicate that the allocation of IPOs by the underwriter is at the fund family level for both unaffiliated and affiliated funds. Thus, we think that the evidence is more likely to be a reflection of the intra-family allocation issue (the family allocates IPOs in a manner to maximize the present value of management fees) instead of dumping by the underwriter.

7. Do Affiliated Mutual Funds Receive IPOs with Better Long-run Performance?

We use the three-year buy-and-hold (BH) return, measured from the closing market price on the first day of trading, to measure long-run performance. We compare the three-year BH return to three benchmarks: the CRSP value-weighted index, a size-matched benchmark, and a style-matched benchmark. For the size match for each IPO, we choose a non-issuing company with the closest but smaller market capitalization from the candidate firms. The candidate firms are the companies in the CRSP database that have been CRSP-listed for at least five years as of the offer date and have not conducted a seasoned equity offering (SEO) in the past five years.

If the matching firm gets delisted during the matching period, the next best match is substituted in on a point-forward basis. If the IPO firm gets delisted during the matching period, we substitute the CRSP value-weighted index on a point-forward basis. As to the style match, we apply the same requirements on the candidate companies and follow the same procedure in finding substitutes if a firm gets delisted. For the style match, however, we first require the matching candidate to be in the same size decile as the issuing company (we use NYSE-listed companies to determine the cutoffs for the deciles), and within the same decile we find the company with the closest but greater book-to-market ratio as the match.

Table 8 reports the comparisons of the long-run performance of IPOs with and without reported holdings by the affiliated funds. For the whole sample period and all the subperiods, although the three-year BH abnormal return difference is as high as 70% between the R-group IPOs that were allocated to the affiliated funds and the NR-group IPOs that were not, none of these return differences is statistically significant. Unlike the case for initial returns, affiliated mutual funds do not receive IPOs with better or worse long-run performance compared to those that the unaffiliated funds receive. Boehmer, Boehmer and Fishe (2006) find that institutional investors receive IPOs with better long-run performance. Our results suggest that within the institutional investor camp, affiliation with investment banks does not seem to give mutual funds an edge in predicting the long-run performance of IPOs.[23]

8. Conclusion

Many investment banks have affiliated mutual funds. The 1940 Investment Company Act and SEC Rule 10(f)-3 put a percentage limit on how an investment bank can allocate securities it underwrites to its affiliated funds. The spirit of the law is to prevent investment banks from using funds under their control as a dumping ground for unmarketable securities. In this paper we examine how investment banks allocate IPOs to their affiliated funds. The number of IPOs that are allocated to affiliated funds has been increasing over time. We use the first post-IPO reported holdings within six months of the offer date as our proxy for whether the fund was allocated IPOs. The percentage of IPOs with reported holdings from affiliated funds increases from less than 10% in the early 1990s to more than 25% in 2001. However, conditioning on a non-zero holding for the affiliated funds, the mean reported holding for the affiliated fund family is only 4.6% of the shares issued. This suggests that the letter of the law has been followed.

However, within the limits of regulations, investment banks have incentives to utilize their affiliated funds to help IPO underwriting or to reap additional benefits. The financial press and regulators have expressed concern that investment banks might have used their affiliated funds as a dumping ground for cold IPOs. On the contrary, our findings suggest that this is not a big concern. For the internet bubble period of 1999-2000, we find that affiliated funds tend to receive IPOs with high initial returns, suggesting that investment banks take advantage of a hot IPO market with severe underpricing. For the 1990-1996 period, we have some evidence suggesting that investment banks put their affiliated funds in a disadvantageous position and allocate more shares to their affiliated funds when demand for

[23] This is a joint test of the informativeness of initial allocation and aftermarket flipping. But given that the focus is on the long-run performance, potential biases caused by the use of the reported holding as a proxy for the initial allocation are not a big concern. Furthermore, Boehmer, Boehmer, and Fishe (2006) suggest that institutional investors' aftermarket flipping is not informative.

an IPO is weak. However, we do not find significant evidence in either direction for other periods (1997-1998 and 2001).

We also shed light on several related issues dealing with IPO allocations. Using a sample of 11 IPOs for which we have actual allocation data, we report that hot IPOs are allocated to a much larger number of institutional investors, with the average account receiving fewer shares. Within the affiliated fund family, more cold IPOs are allocated to funds that generate lower fees or have larger assets. However, this may exist with unaffiliated fund families as well (Gaspar, Massa, and Matos (2006)).

Our paper is the first to focus on how U.S. investment banks use their affiliated mutual funds in security offerings. The size and the importance of investment bank affiliated funds have been increasing, so the importance of the topic has also been increasing. Our results, however, suggest that during the 1990-2001 period there is little reason for policymakers to be concerned.

References

Aggarwal, Reena, 2003, Allocation of initial public offerings and flipping activity, *Journal of Financial Economics* 68, 111-135.

Aggarwal, Reena, Nagpurnanand R. Prabhala, and Manju Puri, 2002, Institutional allocation in initial public offerings: Empirical evidence, *Journal of Finance* 57, 1421-1442.

Ber, Hedva, Yishay Yafeh, and Oved Yosha, 2001, Conflict of interest in universal banking: Bank lending, stock underwriting, and fund management, *Journal of Monetary Economics* 47, 189-218.

Binay, Murat, and Christo A. Pirinsky, 2003, Institutional participation in IPOs, Working paper, Koc University and Texas A&M University.

Boehmer, Beatrice, Ekkehart Boehmer, and Raymond P. H. Fishe, 2006, Do institutions receive favorable allocations in IPOs with better long run returns?, *Journal of Financial and Quantitative Analysis*, forthcoming.

Carter, Richard B., and Steven Manaster, 1990, Initial public offerings and underwriter reputation, *Journal of Finance* 45, 1045–1067.

Cornelli, Francesca, and David Goldreich, 2001, Bookbuilding and strategic allocation, *Journal of Finance* 56, 2337-2369.

Cutler, Stephen M., 2003, Remarks before the National Regulatory Services Investment Adviser and Broker-Dealer Compliance/Risk Management Conference, Charleston, South Carolina, September 9.

Dietz, David, and Ron Henkoff, 2004, Citigroup uses mutual funds as ‘dumping grounds’ for clients, *Bloomberg*, April 29.

Field, Laura Casares, and Michelle Lowry, 2006, Institutional investment in newly public firms, unpublished Penn State University working paper.

Gaspar, José-Miguel, Massimo Massa and Pedro Matos, 2006, Favouritism in mutual fund families? Evidence on strategic cross-fund subsidization, *Journal of Finance* 61, 73-104.

Griffin, John, Jeffrey Harris, and Selim Topaloglu, 2006, Why are IPO investors net buyers through the lead underwriters?, *Journal of Financial Economics*, forthcoming.

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.

Hao, Qing ‘Grace’, 2005, Laddering in initial public offerings, Working paper, University of Missouri.

Houston, Joel, Christopher James, and Jason Karceski, 2006, What a difference a month makes: Stock analyst valuations following initial public offerings, *Journal of Financial and Quantitative Analysis,* forthcoming.

Jenkinson, Tim and Howard Jones, 2004, Bids and allocations in European IPO bookbuilding, *Journal of Finance* 59, 2309-2338.

Johnson, William C., and Jennifer Marietta-Westberg, 2005, Universal banking, asset management, and stock underwriting, Working paper, Michigan State University.

Karceski, Jason, 2002, Returns-chasing behavior, mutual funds and beta's death, *Journal of Financial and Quantitative Analysis* 37*,* 559-594.

Ljungqvist, Alexander, Felicia C. Marston, and William J. Wilhelm, Jr., 2006, Competing for securities underwriting mandates: Banking relationships and analyst recommendations, *Journal of Finance* 61, 301-340.

Ljungqvist, Alexander, and William J. Wilhelm, Jr., 2003, IPO pricing in the dot-com bubble, *Journal of Finance* 58, 723-752.

Loughran, Tim, and Jay R. Ritter, 2002, Why don't issuers get upset about leaving money on the table in IPOs? *Review of Financial Studies* 15, 413-443.

Loughran, Tim, and Jay R. Ritter, 2004, Why has IPO underpricing changed over time? *Financial Management* 33(3), 5-37.

Nanda, Vikram, Jay Wang, and Lu Zheng, 2004, Family values and the star phenomenon, *Review of Financial Studies* 17, 667-698.

Nimalendran, M., Jay R. Ritter, and Donghang Zhang, 2006, Do today's trades affect tomorrow's IPO allocations? *Journal of Financial Economics*, forthcoming.

Reuter, Jonathan, 2006, Are IPO allocation for sale? Evidence from the mutual fund industry, *Journal of Finance*, forthcoming.

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

Sherman, Ann E., 2000, IPOs and long-term relationships: An advantage of book building, *Review of Financial Studies* 13, 697-714.

Sirri, Erik, and Peter Tufano, 1998, Costly search and mutual fund flows, *Journal of Finance* 53, 1589-1622.

Solomon, Deborah, 2004, SEC is probing banks' influence on mutual fund share purchases, *Wall Street Journal*, May 12, Page C1.

Zhang, Donghang, 2004, Why do underwriters allocate extra shares that they have to buy back? *Journal of Financial and Quantitative Analysis* 39*,* 571-594.

Table 1 Summary Statistics on IPOs

This table reports the descriptive statistics of all the IPOs for which the lead underwriter(s) has affiliated funds and there are reported fund holdings within six months during 1990 – 2001, excluding ADRs, unit offerings, REITs, closed-end funds, and partnerships, banks and S&Ls and IPOs with offer price less than $5. The initial return is defined as the return from the offer price to the first day closing price. We exclude international tranche and assume no exercise of the overallot option in calculating the IPO proceeds. We adjust both the IPO proceeds and the pre-issue book value of assets to year 2001 dollars. The reputation rank is from Loughran and Ritter (2004), and is defined as the prestige rank on a 1 to 9 scale (9 for high prestige) following Carter and Manaster (1990). The reported holdings by funds with different affiliations are the first reported holdings within six months of the IPO offer date. The percentage holding is defined as the total reported holding by all funds divided by the number of shares offered in the U.S. market (excluding overallotment shares).

	1990 – 2001	1990 – 1994	1995-1996	1997– 1998	1999 – 2000	2001
Number of IPOs	2,257	742	555	370	537	53
Mean Initial Return (%)	29.35	11.53	19.40	21.99	70.62	16.28
Mean Offer Price ($)	14.23	13.48	14.21	13.97	15.32	15.65
Mean Pre-Issue Book Value of Assets ($mil)	745.20	522.07	290.43	717.57	1,241.72	4,226.40
Mean Proceeds ($mil)	121.28	83.86	83.96	128.12	171.66	477.58
Mean Shares Offered in the U.S. (million shares)	5.87	4.04	4.25	6.20	8.45	20.10
Mean Reputation Rank of the Lead Underwriter	8.39	8.35	8.26	8.34	8.55	8.72
Mean Number of Funds Reporting Holdings per IPO	33.04	18.95	25.07	31.30	55.70	96.15
Mean Percentage Holding by All Funds	33.80	28.90	35.16	33.43	38.65	41.40

Table 2 Summary Statistics on Funds

This table reports summary statistics for funds in the Spectrum 1&2 database after excluding all funds with reported total assets less than $1 million. Information for each fund for each reporting date is first aggregated, and an observation reported in this table refers to one fund per reporting date (most funds report twice per year). We report the summary statistics for the whole sample period (1990 – 2001) and five subperiods. In all panels, assets are the mean reported fund assets under management in $millions. Some funds apparently reported their assets with different units (the default in the Spectrum database is x10,000 dollars). We set the assets for the observations that we can identify as obviously wrong to missing. The per stock holding, reported both in number of shares and in dollars, is the average holding of a stock across the sample. We use all funds and all stocks in calculating the statistics in Panel A. For the other panels, only IPOs are used in calculating average per stock holding, and all observations (fund-report date) are within six months of the offer date of the IPO. The mean Number of IPOs Invested is conditional on at least 1 IPO (from the last six months) being reported as held by that fund. We include funds that report holdings of IPOs in the sample (IPOs in which the lead underwriter has affiliated funds) in Panel B. For Panel C, we report the summary statistics for affiliated funds that invested in affiliated IPOs.

	1990 – 2001	1990 – 1994	1995-1996	1997– 1998	1999 – 2000	2001
Panel A: All Funds and All Domestic Stocks						
Number of Observations	154,476	27,871	24,554	28,195	47,383	26,473
Assets ($million)	624.91	358.42	611.80	946.01	644.13	548.02
Per Stock Holding (shares)	145,861	106,050	122,712	140,349	162,148	185,962
Per Stock Holding ($million)	4.05	2.95	3.14	4.61	5.14	3.56
Panel B: Funds That Invested in IPOs						
Number of Observations	25,262	5,380	3,470	4,684	8,296	3,432
Number of IPOs Invested (per fund/report date)	2.96	2.58	3.78	2.64	3.57	1.66
Assets ($million)	776.58	421.13	735.32	931.26	944.94	755.50
Per IPO Holding (shares)	85,460	72,483	75,571	93,237	92,074	89,196
Per IPO Holding ($million)	2.04	1.32	1.65	1.96	2.73	2.01
Panel C: Affiliated Funds and Affiliated IPOs						
Number of Observations	386	56	22	73	193	42
No. of Affiliated IPOs Invested (per fund/report date)	1.48	1.23	1.64	1.42	1.61	1.19
Assets ($million)	551.36	160.21	365.32	464.89	763.35	344.48
Per IPO Holding (shares)	75,495	76,628	91,320	66,575	82,548	48,786
Per IPO Holding ($million)	1.69	1.31	1.86	1.31	2.08	0.99

Table 3 Univariate Analysis

We report mean fund holdings, performance and other characteristics, including size (proceeds and pre-issue book value of assets) and reputation of the lead underwriter, of IPOs with either no reported (NR) or reported (R) holdings by funds affiliated with the lead underwriter(s) for the whole sample period and each subperiod. The sample is restricted to IPOs for which lead underwriters have affiliated funds. The number of funds that reported holdings is per IPO. The corresponding percentage holding is total reported number of shares held by all funds of an IPO divided by the total number of shares offered. We only include the reported holdings within six months of the IPO offer date. All the statistics are the means within the respective groups, except for the number of IPOs in the first row and the initial return difference in the last row. The last row reports the IPO initial return mean differences, with p-values (calculated assuming independence and normality) reported in parentheses.

	1990 – 2001		1990 - 1994		1995 - 1996		1997 - 1998		1999 - 2000		2001	
	NR	R	NR	R	NR	R	NR	R	NR	R	NR	R
Number of IPOs	1,974	283	685	57	525	30	310	60	415	122	39	14
Number of Funds with Reported Holdings	28.7	63.5	18.4	25.2	24.8	30.0	27.9	48.7	47.7	83.0	64.7	183.8
Reported Fund Holdings (%)	32.55	42.50	28.37	35.23	34.92	39.42	32.00	40.81	36.37	46.42	37.64	51.88
Number of Lead-Underwriter-Affiliated Funds with Reported Holdings	0	2.01	0	1.18	0	1.47	0	1.65	0	2.58	0	3.21
Reported Lead-Underwriter-Affiliated Fund Holdings (%)	0	2.30	0	3.82	0	2.66	0	1.78	0	1.94	0	0.70
Proceeds ($ Million)	96.1	296.9	84.2	79.9	84.3	77.7	96.4	292.0	115.6	362.5	254.1	1,100.1
Pre-Issue Book Value of Assets ($ Million)	495.7	2,464.8	544.7	254.7	297.7	159.1	629.0	1,169.3	541.5	3,634.3	530.0	14,576.5
Reputation Rank of Lead Underwriter	8.36	8.59	8.36	8.23	8.26	8.27	8.30	8.57	8.48	8.80	8.62	9.00
Initial Return (%)	25.76	54.38	10.99	18.07	19.30	21.16	21.14	26.39	62.57	97.97	17.32	13.40
Initial Return Difference	28.61 (*0.00*)		7.09 (*0.00*)		1.86 (*0.70*)		5.25 (*0.40*)		35.40 (*0.00*)		-3.92 (*0.50*)	

Table 4 IPO Performance and Allocations to Funds Affiliated with the Lead Underwriter

We estimate the model separately for five subperiods. For all subperiods, the dependent variable is the percentage initial return measured as the change from the offer price to the first-day market closing price. We use *Adjustment* to capture the percentage pre-market adjustment from the mid-point of the initial file price to the offer price. The firm size, *LN _ Assets*, is the log value of the inflation-adjusted pre-issue book value of assets. The tech dummy *Tech _ Dummy* is one for tech IPOs (including internet firms) and zero otherwise. The reputation rank of the lead underwriter, *Lead _ Rank*, measures the prestige status of an investment bank as defined in Carter and Manaster (1990) on a 1-9 scale, with 9 being high prestige. The variable $INST_{NA}$ is the natural log of the total number of shares in reported holdings within six months of the offer date by all funds that are not affiliated with the lead underwriter. The dummy variable *AFA* is one if the reported holding by funds that are affiliated with the lead underwriter is not zero, and is zero otherwise. The sample only includes IPOs for which the lead underwriter(s) has affiliated mutual funds. The number of IPOs, excluding observations with missing values, and the adjusted R^2 for each regression are reported at the bottom of each panel. The *p*-values for the coefficients, corrected for heteroskedasticity, are reported in parentheses.

$$IR = \beta_0 + \beta_1 * Adjustment + \beta_2 * LN\_Assets + \beta_3 * Tech\_Dummy + \beta_4 * Lead\_Rank + \lambda * INST_{NA} + \theta * AFA + \mu$$

Variable	1990 - 1994	1995 - 1996	1997 - 1998	1999 - 2000	2001
Intercept	7.38	16.49	22.64	-39.26	-37.71
	(0.11)	(0.07)	(0.05)	(0.23)	(0.36)
Adjustment	0.45	0.72	0.69	1.50	0.62
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
LN _ Assets	-1.38	-2.14	-1.58	-7.34	-2.77
	(0.00)	(0.00)	(0.10)	(0.00)	(0.08)
Tech _ Dummy	3.28	5.63	13.14	16.94	12.83
	(0.01)	(0.00)	(0.02)	(0.00)	(0.05)
Lead _ Rank	1.07	0.19	1.96	6.63	5.17
	(0.11)	(0.89)	(0.24)	(0.07)	(0.33)
$INST_{NA}$	0.20	1.16	-3.41	7.52	3.77
	(0.76)	(0.35)	(0.10)	(0.01)	(0.21)
AFA	2.51	-3.64	0.61	12.96	-1.53
	(0.19)	(0.36)	(0.89)	(0.09)	(0.72)
Num _ IPOs	718	495	366	530	38
Adjusted R^2	34%	41%	17%	49%	40%

Table 5 Reported Holdings and Initial Allocations

This table reports the IPO information, initial allocations and reported holdings from the Spectrum database for eleven IPOs underwritten by Salomon Brothers/CitiGroup. Offer size is the number of shares offered in million shares, excluding the green shoe option, and initial return (InitRet) is the percentage return from the offer price to the first-day market closing price. Average allocation is the mean number of shares allocated to an account, and average holding is the mean number of shares first reported by a mutual fund within six months or two years (that is, if a fund reports holdings of an IPO more than once within six months or two years, only the first reported holding is used). The averages across the eleven IPOs are reported in the bottom row. We separate the accounts that received allocations (based on actual allocations using Citigroup data) for each IPO into two groups based on whether an account appeared in the Spectrum database within two years using a name matching. Accounts not in the Spectrum database are those that received IPO allocations but are not subsequently covered in the Spectrum database.

	IPO Characteristics			Initial Allocations		Accts NOT in the Spectrum Database		Accts in the Spectrum Database		First Reported Holding within 6 Months		First Reported Holding within 24 Months	
	Offer Date	**Offer Size**	**InitRet (%)**	**No of Accts**	**Average Allocation**	**No of Accts**	**Average Allocation**	**No of Accts**	**Average Allocation**	**No of Accts**	**Average Holding**	**No of Accts**	**Average Holding**
Qwest	6/23/97	11.50	27.27	143	74,367	75	57,167	68	93,338	22	132,170	42	174,991
US LEC	4/23/98	5.50	61.27	137	30,461	78	19,841	59	44,501	12	47,915	16	40,973
Hyperion	5/4/98	10.00	8.62	158	49,513	93	25,742	65	83,523	15	113,861	26	123,329
Verio	5/11/98	5.50	17.65	204	19,944	121	12,979	83	30,098	17	56,824	38	137,722
Allegiance Telecom	6/30/98	7.60	-8.33	69	195,752	41	143,359	28	272,471	4	196,875	12	171,439
Global Crossing	8/13/98	16.80	31.26	188	77,301	108	63,023	80	96,575	22	125,153	46	195,904
Rhythms NetConn.	4/6/99	9.38	229.19	295	23,971	170	17,688	125	32,516	33	39,695	40	68,468
Focal Comm.	7/28/99	9.95	50.00	155	44,532	89	23,933	66	72,311	14	79,186	19	66,598
Radware Ltd.	9/29/99	3.50	52.78	127	15,938	88	8,938	39	31,733	9	62,159	9	62,159
Williams Comm.	10/1/99	23.68	22.00	207	91,140	124	69,056	83	124,133	27	113,519	46	114,583
Interwave	1/28/00	8.50	183.69	483	13,767	295	8,576	188	21,912	19	19,422	19	19,422
Average	**N/A**	**10.17**	**61.40**	**197**	**43,911**	**117**	**30,811**	**80**	**62,365**	**18**	**83,038**	**28**	**120,503**

Table 6 IPO Performance and Large Allocations to Funds Affiliated with the Lead Underwriter

For IPOs that were allocated to funds affiliated with the lead underwriter, we first calculate the ratio of the average per fund holding of the affiliated funds over the unaffiliated funds. The dummy variable, *Large_Allocation*, is one for an IPO if this ratio is above one and zero otherwise. We then interact this dummy variable with the *AFA* dummy (equal to one if an affiliated fund reports holdings of an IPO, and zero otherwise) and estimate the following regression model:

$$IR = \beta_0 + \beta_1 * Adjustment + \beta_2 * LN\_Assets + \beta_3 * Tech\_Dummy + \beta_4 * Lead\_Rank + \lambda * INST_{NA} + \theta_1 * AFA + \theta_2 * AFA \times Large\_Allocation + \mu$$

The sample size and the adjusted R^2 for each regression are reported at the bottom of each panel. The *p*-values for the coefficients, corrected for heteroskedasticity, are reported in parentheses. We exclude 2001 because of the small sample size.

Variable	1990 - 1994	1995 - 1996	1997 - 1998	1999 - 2000
Intercept	7.50	16.43	22.45	-40.60
	(0.11)	(0.07)	(0.05)	(0.22)
$Adjustment$	0.46	0.72	0.69	1.50
	(0.00)	(0.00)	(0.00)	(0.00)
LN_Assets	-1.44	-2.12	-1.57	-7.30
	(0.00)	(0.00)	(0.11)	(0.00)
$Tech\_Dummy$	3.33	5.60	13.06	16.97
	(0.01)	(0.00)	(0.02)	(0.00)
$Lead\_Rank$	1.12	0.24	1.91	6.75
	(0.10)	(0.86)	(0.25)	(0.07)
$INST_{NA}$	0.14	1.07	-3.30	7.55
	(0.82)	(0.39)	(0.11)	(0.01)
AFA	7.44	-0.04	-0.60	11.41
	(0.00)	(0.99)	(0.85)	(0.18)
$AFA \times Large\_Allocation$	-10.23	-11.58	2.79	4.25
	(0.00)	(0.07)	(0.74)	(0.78)
Num_IPOs	718	495	366	530
Adjusted R^2	35%	41%	17%	49%

Table 7 IPO Performance and Characteristics of Funds Affiliated with the Lead Underwriter

We separate affiliated funds into two groups using the median values of the following characteristics: fund size (total net asset value (TNA) at the end of the calendar year), annual management fees (including expenses and front- and back-end loads), year-to-date return (measured at the end of the previous month of the IPO), and fund age (measured in number of years since the fund was founded to the previous month of the IPO). The information on fund characteristics is from the CRSP mutual fund database. For fund size, annual management fees, and fund age, the median value is calculated for all funds in the same family. For year-to-date return, the median value is for all funds from different fund families that have the same investment style (the investment objective). For each IPO that has reported holding from affiliated funds, four dummy variables are then constructed based on these characteristics: $Large\_Fund$ is one if an affiliated fund has a TNA above the median and zero otherwise; Low_Fees is one if an affiliated fund charges a lower fee than the median and zero otherwise; Low_Return is one if an affiliated fund has a year-to-date return less than the median year-to-date return and zero otherwise; and Old_Fund is one if an affiliated fund's age is greater than the median age and zero otherwise. We interact these dummy variables with the AFA dummy, and estimate the following model:

$$IR = \beta_0 + \beta_1 * Adjustment + \beta_2 * LN\_Assets + \beta_3 * Tech\_Dummy + \beta_4 * Lead\_Rank + \lambda * INST_{NA} + \theta_1 * AFA + \theta_2 * AFA \times Fund\_Characteristic + \mu$$

The results for each interaction are reported in a panel separately. All the control variables are qualitatively the same as in Tables 4 and 6, and are not reported. The sample size for each regression in all four panels is identical to that reported in Table 6 and is not reported. The adjusted R^2 is also qualitatively the same as in Table 6 and is not reported. The *p*-values for the coefficients, corrected for heteroskedasticity, are reported in parentheses. We exclude 2001 because of the small sample size.

Variable	1990 – 1994	1995 - 1996	1997 - 1998	1999 – 2000
Panel A: Fund Size				
AFA	3.65	-2.46	2.22	16.68
	(0.07)	(0.60)	(0.68)	(0.04)
$AFA \times Large\_Fund$	-5.92	-6.05	-6.42	-32.17
	(0.25)	(0.34)	(0.34)	(0.01)
Panel B: Management Fees				
AFA	2.72	-3.87	0.84	14.08
	(0.17)	(0.45)	(0.85)	(0.07)
$AFA \times Low\_Fees$	-2.28	0.89	-2.31	-31.95
	(0.72)	(0.88)	(0.82)	(0.05)
Panel C: Fund YTD Return				
AFA	2.17	-5.76	3.21	12.87
	(0.36)	(0.23)	(0.55)	(0.11)
$AFA \times Low\_Return$	1.06	4.56	-9.39	0.82
	(0.79)	(0.57)	(0.11)	(0.96)
Panel D: Fund Age				
AFA	3.24	-1.84	-4.68	12.99
	(0.14)	(0.67)	(0.16)	(0.10)
$AFA \times Old\_Fund$	-4.54	-7.69	14.58	-0.13
	(0.17)	(0.43)	(0.10)	(0.99)

Table 8 Who Receives IPOs with Better Long-run Performance?

This table compares the mean long-run performance, measured by three-year buy-and-hold (BH) returns minus the benchmark returns, of IPOs with no reported (NR) holdings or with reported (R) holdings by affiliated funds. The three benchmarks include the CRSP value-weighted index (VW-Index), size matching, and style matching. For size and style matching, each IPO is matched with one non-issuing firm, and the difference in the respective returns is calculated. The 2004 CRSP data are used in calculating the long-run returns. The BH returns are measured using the first closing market price after going public. The *p*-values of the t-test for the differences are reported in parentheses. The p-value calculation assumes independence and normality.

	1990 – 2001		1990 - 1994		1995 - 1996		1997 - 1998		1999 – 2000		2001	
	NR	R	NR	R	NR	R	NR	R	NR	R	NR	R
Number of IPOs	1,974	283	685	57	525	30	310	60	415	122	39	14
3-Year BH Minus VW-Index (%)	-11.32	-1.41	4.80	-1.38	-50.45	17.20	41.13	63.14	-30.26	-37.73	15.22	-1.61
Difference (%)	9.91 (*0.57*)		-6.18 (*0.81*)		67.65 (*0.24*)		21.81 (*0.72*)		-7.47 (*0.29*)		-16.83 (*0.56*)	
3-Year BH Minus Size Matching (%)	-7.80	-28.01	8.46	2.62	-9.64	-9.34	47.70	76.40	-73.53	-93.94	-10.24	-65.76
Difference (%)	-20.22 (*0.30*)		-5.84 (*0.84*)		0.29 (*1.00*)		28.70 (*0.67*)		-20.41 (*0.13*)		-55.52 (*0.13*)	
3-Year BH Minus Style Matching (%)	2.60	-5.56	11.39	-21.90	3.94	73.72	56.10	115.82	-55.37	-75.02	0.97	-47.08
Difference (%)	-8.16 (*0.70*)		-33.29 (*0.30*)		69.78 (*0.16*)		59.72 (*0.37*)		-19.65 (*0.35*)		-48.05 (*0.16*)	

Figure 1 IPO Allocation between the Affiliated and the Independent Funds

We illustrate the optimal IPO allocation decision for the six cases of the model. Note that an investment banking firm will collect less in management fees or less in trading commissions if, respectively, the affiliated fund or the independent fund receives an IPO with a return less than the benchmark return $\underline{r}$. The benchmark return is constant in all cases, and the change of its relative positions in the uniform distribution hence indicates the change of the IPO market conditions. The four cases are organized in such a way that each row is for one IPO market condition, the first column is for the cases where the trading commissions are more important than the management fees (that is, for the same amount of underpricing benefits, it would generate more trading commissions for the underwriter if it is allocated to the independent fund), and the second column is for the opposite where the management fees are more important than the trading commissions. In all figures, A^* and I^* represent optimal allocation cutoffs to, respectively, the affiliated fund and the independent fund. m is the (present value of the) fractional management fees from more funds under management when an affiliated fund receives an IPO allocation. k is the fraction of the money left on the table rebated to the underwriter through commissions when an unaffiliated fund receives an IPO allocation.

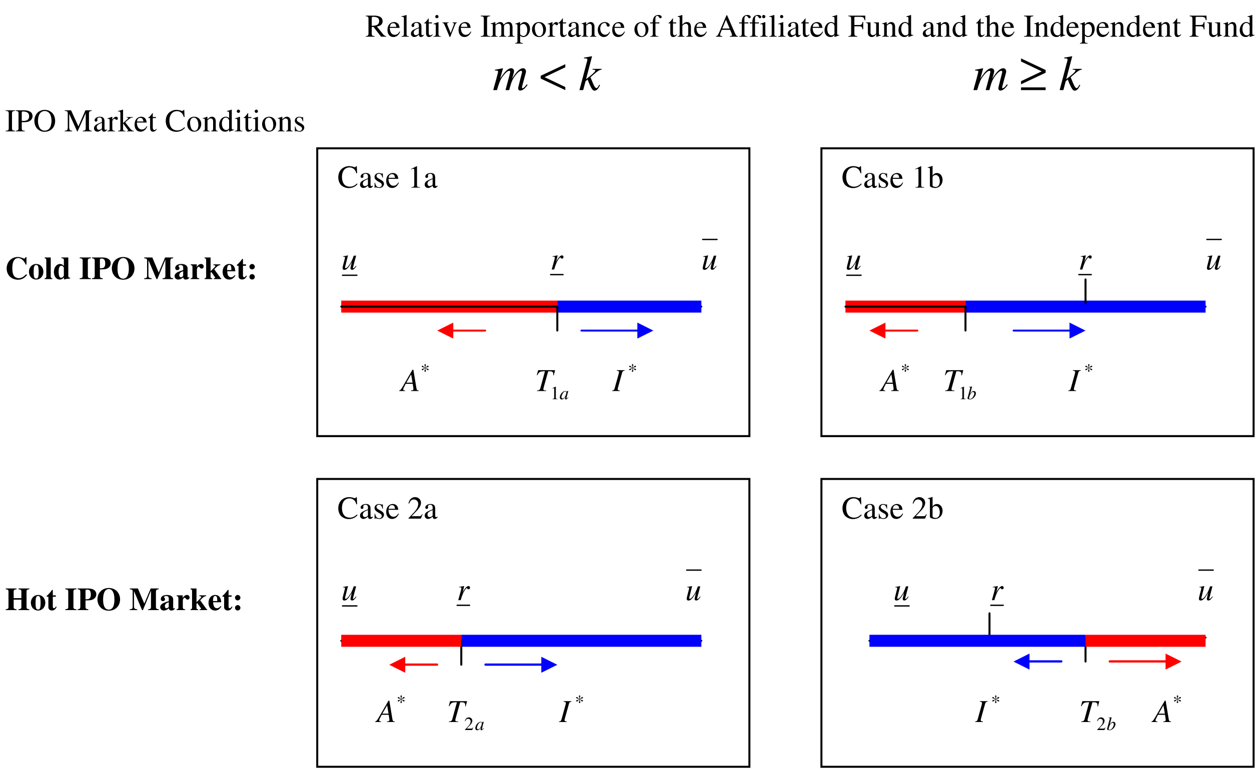

Figure 2 Mutual Fund Cash Inflows

We report the assets under management ($ billion) in Figure 2.1, the net new cash flow (NNCF) in dollars ($ billion) in Figure 2.2, and the NNCF as a percentage of beginning of year fund assets in Figure 2.3 for equity funds and hybrid funds from 1990-2001. The data source is from *Mutual Fund Fact Book 2003* published by the Investment Company Institute (ICI).

Figure 2.1 Assets Under Management for Equity and Hybrid Funds

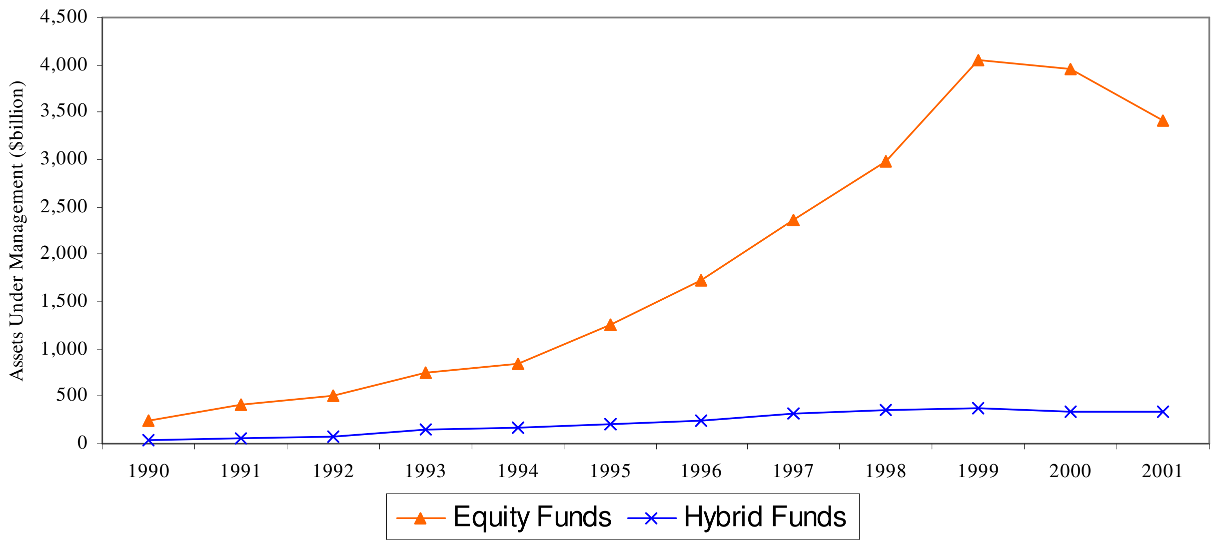

Figure 2.2 NNCF for Equity and Hybrid funds

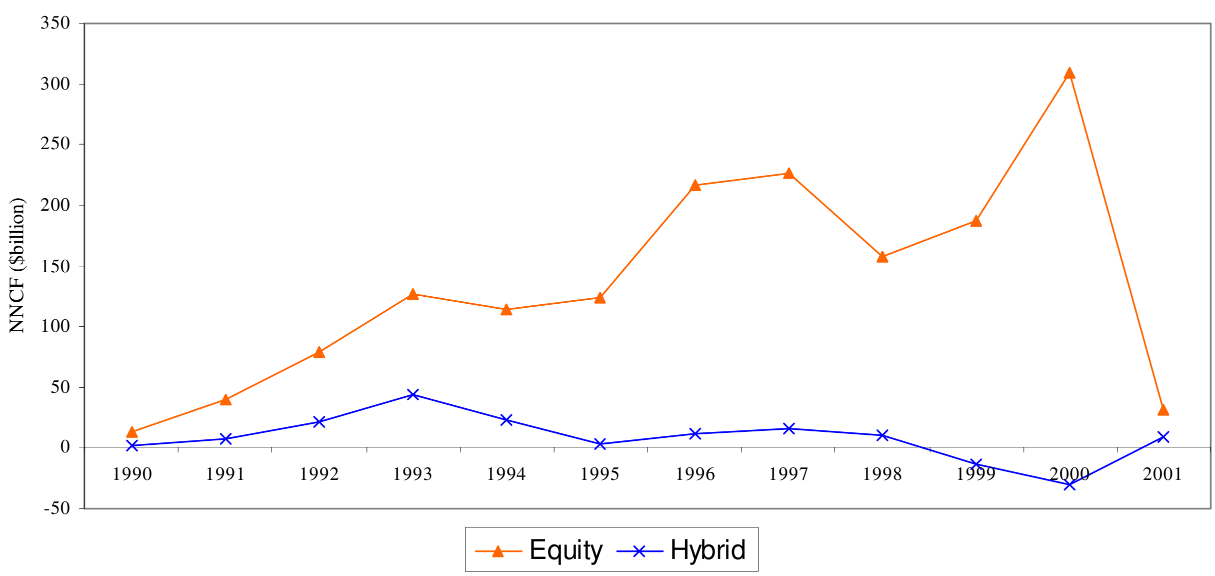

Figure 2.3 NNCF Measured as Percentage of Fund Assets for Equity and Hybrid Funds