

Affiliated Mutual Funds and the Allocation of Initial Public Offerings

Jay R. Ritter and Donghang Zhang*

Current Version: October 3, 2006

Journal of Financial Economics, forthcoming

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, especially during the internet bubble period of 1999-2000.

Keywords: Initial public offerings, mutual funds, IPO allocations

JEL Classification: G24

* 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. Zhang is currently visiting at the Smeal College of Business, Penn State University, University Park, PA 16802. Ritter can be reached at (352) 846-2837 or jay.ritter@cba.ufl.edu. Zhang can be reached at (814) 865-3763 or duz2@psu.edu. We thank Dan Bradley, Shingo Goto, Bill Johnson, Inmoo Lee, Greg Niehaus, Eric Powers, Gita Rao, Jonathan Reuter, Paul Schultz, Jason Smith, Sergey Tsyplov, an anonymous referee, and seminar participants at Clemson University, Indiana 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.

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 IPO. 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 et al., 2006, Reuter, 2006, and Goldstein et al., 2006). 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. This income source 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 investment bank 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 (Nanda et al., 2004, and Gaspar et al., 2006).

The third factor serves as a counterforce to the first two factors, which by themselves would result in more cold IPOs being allocated to affiliated funds. 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. As a means of price support, investment banks might allocate more cold IPOs to their affiliated funds or pressure the funds to buy cold IPOs in the aftermarket. 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 incentive to allocate cold IPOs to affiliated funds the dumping ground hypothesis.

Alternatively, investment banks might 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 incentive to allocate hot IPOs to affiliated funds 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. We posit that the underwriter would allocate more hot IPOs to its affiliated funds when the overall expected first-day return of IPOs is high and attracting money inflows for the affiliated funds is most important, due to the greater performance-funds flow sensitivity that exists in bull markets (Karczeski, 2002). Thus, we predict that the nepotism hypothesis will be relatively more important in hot IPO markets than in cold IPO markets.

We examine mutual fund affiliations and a proxy for IPO allocations from 1990 to 2001.² During 1990-2001, 2,257 out of 4,262 U.S. 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.

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

² 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.

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 this subperiod. For the periods of 1995-1996 and 2001, respectively, the IPOs allocated to the affiliated funds have a statistically insignificant 4% or 2% lower initial return in the multivariate analysis. 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. This relation between IPO allocations and fund affiliations with the lead underwriter remains the same when we use the premarket price adjustment (as a measure of the expected underpricing) instead of the initial return to measure IPO performance and when we also control for any influence of the involvement of funds that are affiliated with the investment banking industry but not the lead underwriter.

The public and regulators are concerned with dumping cold IPOs into affiliated funds because many unsophisticated mutual fund investors are involved. Our inability to find significant support for this hypothesis in the overall sample could be because we have not looked in the right place. Consequently, we examine whether affiliated funds receive especially large allocations when demand for an IPO is weak. Consistent with the dumping ground hypothesis, 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. We define a large allocation for an affiliated fund as one that is greater than the average allocation for the unaffiliated funds.

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. The evidence 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 et al. (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 conclude 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. In another related paper, Massa and Rehman (2006) also find that mutual funds affiliated with commercial banks have an informational advantage in investing in companies that are loan clients of the bank.

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 et al. (2006), Reuter (2006), and Goldstein et al. (2006) provide evidence that the lead underwriter links allocations of IPOs to both short-run and long-run commission generation. In this paper we examine whether the lead underwriter also uses allocations of IPOs to its affiliated funds to either support weak IPOs or reap additional benefits. This sheds further light on this 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. This is in contrast to the incentives of the analysts who work for investment

banks, whose interests are more closely aligned with the investment bankers. James and Karceski (2006) show that affiliated analysts actively provide “booster shots” (positive stock recommendations) on recent IPOs when the stock price is in danger of falling below the offer price.

Gaspar et al. (2006) suggest that mutual fund families strategically allocate different IPOs to different funds in the family. 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. Consistent with these preferences, we find that IPOs allocated to affiliated funds that have above-median assets or generate below-median fees within the fund family have a lower initial return. Strikingly, although affiliated funds received IPOs with 13% higher initial returns during the internet bubble period, the IPOs have 16-18% lower first-day returns than the average of the overall sample if they are 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. In general, the underwriter allocates IPOs to a fund family, and the fund family then decides which specific fund 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 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 performance. 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 – 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 could 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.³

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 the ability to allocate shares to their affiliated funds in security offerings, providing that another syndicate member implements the allocation. Because of this ability, 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.

Suppose that 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. These allocations will involve many IPOs covering both hot and cold IPO markets. The revenues for the investment bank from each IPO come from three sources: the gross spread, commission paybacks from the independent fund, and the change in the present value of the management fees on the affiliated fund's assets. The gross spread is proportional to the amount of proceeds of completed IPOs. The commission paybacks increase when more hot IPOs (and hence more money left on the table) are allocated to the independent fund. On the other hand, if the

³ See SEC release Nos. IC-22775, IS-1095, and IC-25888 for more detail on the regulatory changes.

underwriter allocates more hot IPOs to its affiliated fund, it can attract more money inflows to this fund and increase the present value of management fees.

The independent fund has no incentive to accept IPO allocations unconditionally because it requires a minimum overall expected return on its IPO purchases. Consequently, some IPOs with extremely low initial returns may have to be allocated to the affiliated fund if the investment bank forces the deals through. Low returns on these weak deals will hurt the performance of the affiliated fund, however, resulting in reduced management fees that can dominate the underwriting revenue from the completed deals. The investment bank may simply withdraw weak deals from the market, and take zero profit rather than forcing them through. If the investment bank does complete a deal, how the investment bank allocates the IPO depends on the trade-off between the internal management fees and the external trading commission income.

Note that the affiliated fund cannot receive all of the shares in all IPOs due to regulatory restrictions (Rule 10(f)-3). Consequently, the participation of the independent fund is necessary. In a cold IPO market, during which the overall first-day return is low, the investment bank needs to allocate more (relatively) hot IPOs to the independent fund to attract enough demand for the IPOs. Consequently, the investment bank has to allocate more cold IPOs to its affiliated fund even though the affiliated fund would generate more asset management fees if these allocations did not occur. Put differently, in a cold IPO market, the need to complete deals and generate underwriting revenues is likely to dominate the fee and performance considerations of the affiliated fund, resulting in more allocations of cold IPOs to the affiliated fund.

In a hot IPO market, during which the overall first-day return is high, the investment bank might still allocate more cold IPOs with low initial returns to its affiliated fund. This allocation pattern would occur when a hot IPO allocation results in the investment bank receiving more commission paybacks from the independent fund than the increase in the present value of the fees from the affiliated fund. On the other hand, if the resulting money inflows due to the sweetened performance of its affiliated fund generate more fees than commission paybacks from the independent fund, more hot IPOs will then be allocated to the affiliated fund. This could be especially relevant due to the greater fund flow-performance

sensitivity in bull markets (Karceski, 2002) that often coincide with hot IPO markets (Lowry and Schwert, 2002).

To summarize, the underwriter has incentives to complete more IPOs in order to earn investment banking fees. Conditioning on an IPO being completed, IPO allocations are driven by the interaction of two factors: the condition of the IPO market 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, the expected return of the IPOs received by the affiliated fund is likely to be relatively lower because the investment bank needs to use its affiliated fund to complete more deals. Second, during a hot IPO market, the relative performance of IPOs received by the affiliated and unaffiliated funds depends on the relative importance of money inflows and the associated management fees versus commission paybacks.

Our discussion 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. The nepotism hypothesis refers to the situation in which the underwriter allocates more hot IPOs to its affiliated funds so as to boost their performance.

Our analysis also generates conditional predictions. We posit that the dumping ground hypothesis is more likely to dominate in cold IPO markets due to the underwriter's desire to complete deals. We posit that the nepotism hypothesis is more likely to dominate in hot IPO markets when the mutual fund industry is rapidly expanding, since hot IPO allocations help attract more money inflows for its asset management business. On the other hand, 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, irrespective of market conditions.

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 a given hot or cold IPO market

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. 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 fund performance, 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.⁴ We exclude all funds with reported assets under management of less than \$1 million at the time of reporting.

⁴ 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

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. 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. 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 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. As we discussed in Section 2, 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 relative to generating commission paybacks. We use the average first-day IPO returns in a calendar year, along with the magnitude of money inflows into mutual funds, to classify the five subperiods as hot or

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 deviation is 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 only 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.

cold IPO markets. Based on these criteria, 1995-1996 and 1999-2000 are categorized as hot IPO markets.

[Insert Fig. 1 about here]

As to the importance of attracting money inflows, we report in Fig. 1 the size of equity-related mutual funds (equity and hybrid funds) and the annual money inflows into these funds, measured both 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 Fig. 1 suggest that the mutual fund industry experienced fast expansion in percentage terms during 1991-1994. Considering both the average first-day IPO returns and the inflows into mutual funds, 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 33.8% 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 28.9% in the early 1990s to 41.4% in 2001.

[Table 1 about here]

These percentages are lower than the annual average mutual fund holdings of 47-74% from 1990 to 2000 reported in Binay et al. (2006), who use 13(f) data. The 13(f) data cover both mutual funds and other institutional investors such as pension funds and insurance companies, which is why Binay et al. (2006) report higher institutional holdings. Both Binay et al. (2006) and this paper report the mean institutional holding of IPOs conditional on each IPO being held by at least one reporting fund. This screen removes many of the smaller IPOs that institutions are less likely to own. Field and Lowry (2006) report an average 25% holding for the period from 1980 to 2000 using 13(f) data, but unlike us they include smaller IPOs with no institutional holdings in their calculations.

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. An observation in Panel A is for one fund-report date combination, and each fund generates roughly two observations per year.⁵ One noticeable feature is the dramatic increase in the number of funds during 1999-2000, as indicated by the number of observations for this subperiod compared to 1997-1998.

[Insert Table 2 about here]

Panels B and C of Table 2 report conditional means. The descriptive statistics for all funds that report one or more holdings in IPOs in a given filing are reported in Panel B. During the sample period, these funds on average reported holding 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 145,861 shares with a market value of \$4.05 million for all holdings reported in Panel A. 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 affiliated funds is 1.48 on average. 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.⁶

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 lead underwriter affiliated funds. We compare the characteristics of the

⁵ Some funds report voluntarily on a quarterly basis, and these funds would generate four observations per year.

⁶ 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 ×\$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.

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 one or more affiliated funds having received shares, the average holding is 2.30% of the shares offered per IPO for each fund that holds the IPO. The average holding decreases from 3.82% during 1990-1994 to 0.70% in 2001.

These percentages suggest that the use of affiliated funds by underwriters for either nepotism or dumping ground purposes is not pervasive. If only 12.5% of IPOs are held by any affiliated funds and, conditional on this occurring, the IPO is held by 2.01 funds, each of which owns 2.30% of the shares issued, the product of these numbers shows that on average only about 0.6% of the shares issued are held by affiliated funds at the first reporting date. Thus, the allocation of shares to, and/or their subsequent purchase in the aftermarket, by affiliated mutual funds does not appear to be a widespread practice by IPO underwriters.

[Insert Table 3 about here]

In Table 3 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 presumably 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 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 we discussed in Section 2, it is not surprising that the underwriters steered more hot IPOs to their affiliated funds.

The 1995-1996 subperiod is another hot IPO market, 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 Fig. 1, 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.

5. Regression results

5.1. IPO performance and allocations to funds affiliated with the lead underwriter

The initial return of an IPO and its allocations to institutional investors, including funds affiliated with the lead underwriter, are likely to be affected by some common factors. Whether the IPO is allocated to the affiliated funds, however, should not be related to the IPO initial return after controlling for the common factors, if our null hypothesis is true. To test whether the nepotism hypothesis or the dumping ground hypothesis dominates IPO allocations, we estimate the following reduced-form model, with the percentage initial return on an IPO as the dependent variable:

$$IR = \beta_0 + \beta_1 Adjustment + \beta_2 Ln(Assets) + \beta_3 Tech_Dummy + \beta_4 Lead_Rank + \lambda INST_{NA} + \theta AFA + \mu \quad (1)$$

We use the reported holdings of institutional investors that are not affiliated with the lead underwriter, $INST_{NA}$, to capture the impact of private information possessed by institutional investors, as suggested by Aggarwal et al. (2002). Following the literature, we also include four other control variables. The first control variable is the premarket price adjustment, denoted as *Adjustment* and defined as the percentage premarket adjustment from the midpoint 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 technology industry IPOs and zero otherwise.⁷ The last variable, the Carter and Manaster (1990) reputation rank of the lead underwriter, *Lead_Rank*, measures the prestige status of an investment bank.⁸

The dummy variable *AFA* is one if the reported holding of the funds that are affiliated with the lead underwriter of the IPO is positive, and zero otherwise. Note that by using the *AFA* dummy instead of the reported holdings, we give up the information in the size of the

⁷ 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, 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.

⁸ 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. If there are co-lead underwriters, we use the Carter-Manster rank of the most prestigious lead underwriter.

reported holdings, as well as the noise in it because it is an imperfect measure for actual allocations. The interpretation of the model is straightforward: if the nepotism hypothesis is true, $\theta > 0$; if the dumping ground hypothesis is true, $\theta < 0$.

[Insert Table 4 about here]

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 coefficient for *Adjustment* is significantly positive for all subperiods, and this variable has the largest impact on initial returns during the internet bubble period, consistent with the evidence in other articles.⁹ 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 our expectation, the coefficient for *Tech_Dummy* is positive and statistically significant at the 5% level or better 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 to a bulge bracket underwriter such as Goldman Sachs with a reputation rank of 9. 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%.

⁹ The underpricing of IPOs jumped to a record high of approximately 70% during the internet bubble period (see Table 1). Houston et al. (2006) show that during this 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 estimate a model with control variables similar to Loughran and Ritter (2004). Specifically, we drop *Adjustment* as a control variable and replace it with the logarithms of sales and firm 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 other 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).

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, however, for the internet bubble period. This generally positive coefficient is consistent with the finding reported by Aggarwal et al. (2002) that institutional investors have private information not fully revealed in the premarket.

The coefficient on the dummy variable AFA 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. In the other subperiods, the coefficients are insignificant with fluctuating signs, with 1995-1996 and 2001 negative.

The 2001 subperiod represents a period during which the IPO market was cold and the investment banks were scrutinized on their allocation practices for hot IPOs. 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, 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. For 1990-1994, the coefficient for the AFA dummy is positive but insignificant.

Overall, the evidence is weakly supportive of the nepotism hypothesis during the internet bubble period, with the lead underwriter having a tendency to allocate more hot IPOs to its affiliated fund. There is no strong evidence for any subperiod, 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.

After controlling for other factors that help explain IPO initial returns, the favoritism for affiliated funds is not as strong as suggested in the univariate analysis. It is not clear, however, whether the Table 3 univariate results, in which affiliated funds hold IPOs that have initial returns that are 28.6% higher, or the Table 4 multiple regression results, in which the coefficients on the affiliated funds dummy variable are much closer to zero, contain the stronger evidence. The smaller coefficients on the affiliated funds dummy variable, along

with large positive coefficients on the tech stock dummy, suggests that tech stock IPOs with high returns are disproportionately allocated to affiliated funds. This practice could be interpreted as consistent with the nepotism hypothesis, even if the coefficients on the affiliated funds dummy variable are close to zero.

5.2. *Price adjustment and allocations to funds affiliated with the lead underwriter*

Allocations to the affiliated funds are finalized in the premarket before the actual underpricing is known. If affiliated funds are receiving differential treatment in allocations for hot and cold IPOs, the allocations should be more strongly related to predicted underpricing than the actual underpricing, which can be decomposed into predicted underpricing plus noise. The strongest predictor of actual underpricing is the premarket price adjustment (see e.g., Hanley, 1993). As a robustness test, we investigate whether allocations to the affiliated funds are related to the expected underpricing as measured by the price adjustment. We estimate the following model:

$$\begin{aligned} Adjustment = & \beta_0 + \beta_1 Ln(Assets) + \beta_2 Tech_Dummy \\ & + \beta_3 Lead_Rank + \lambda INST_{NA} + \theta AFA + \mu \end{aligned} \quad (2)$$

In Eq. (2), the dependent variable, *Adjustment*, is the premarket price adjustment defined as the percentage change from the mid-point of the initial file price to the offer price. The control variables and the *AFA* dummy are the same as in Eq. (1). We estimate Eq. (2) separately for the five subperiods, and the results are reported in Table 5. The coefficients for the control variables are generally similar to those reported in Table 4. This is not surprising, since the price adjustment is closely related to the underpricing.

[Insert Table 5 about here]

The coefficient for the *AFA* dummy remains statistically insignificant for 1995-1996 and 2001. For 1990-1994 and 1997-1998, it remains positive and becomes statistically significant. For the internet bubble period of 1999-2000, it is still positive and statistically significant. It is difficult to directly compare the coefficients on the *AFA* dummy in Tables 4 and 5 because the aftermarket uncertainty that determines the relation between the premarket price adjustment and the actual underpricing could have changed over time. The basic pattern regarding (actual or expected) underpricing and allocations to the affiliated funds, however, remains unchanged. That is, we find little evidence supporting the dumping ground

hypothesis. On the other hand, the Table 5 coefficients are consistent with the nepotism hypothesis.

5.3. *Affiliations with the lead underwriter vs. affiliations with the investment banking industry*

Our univariate and multivariate results are based on the comparisons of the R and NR groups of IPOs, and the reported holdings used in such classifications are from funds that are affiliated with the lead underwriter. Any fund that is affiliated with a lead underwriter can also be classified as simply being affiliated with the investment banking industry. A Merrill Lynch affiliated fund may simply be able to identify IPOs with better first-day performance, and this may have nothing to do with Merrill Lynch being the lead underwriter. In other words, the relation between underpricing and the *AFA* dummy may not be because of the lead underwriter's allocation decisions as we hypothesize. To investigate this issue, we estimate the following model:

$$IR = \beta_0 + \beta_1 Adjustment + \beta_2 Ln(Assets) + \beta_3 Tech_Dummy + \beta_4 Lead_Rank + \lambda INST_{NA} + \theta_1 IBAFA + \theta_2 AFA + \mu \quad (3)$$

Compared to Eq. (1), the model specification in Eq. (3) includes an additional control variable, *IBAFA*. This dummy variable equals one if any funds that are affiliated with the investment banking industry report holdings of the IPO and zero otherwise. Consistent with the expansion of the mutual fund industry during our sample period, the involvement of the investment banking affiliated mutual funds in IPOs also increases over time. The percentages of IPOs that have reported holdings from one or more funds affiliated with investment banks are 48% for 1990-1994, 83% for 1995-1996, 86% for 1997-1998, 98% for 1999-2000, and 100% for 2001. These are much higher than the 10-30% of IPOs with reported holdings from lead underwriter affiliated funds.

[Insert Table 6 about here]

We report the regression results for the first four subperiods in Table 6 because the coefficient for the *IBAFA* dummy is not estimable for 2001. Except for 1999-2000, during which the coefficient for the *IBAFA* dummy is insignificant due to the lack of variation of the *IBAFA* dummy variable, the coefficients for this variable are positive and statistically significant at the 5% and the 10% levels. This could be because the investment bank-affiliated

funds, as well as other institutional investors, are able to pick IPOs with better first-day performance (Aggarwal et al., 2002), or because they are favored or better informed due to their affiliations with investment banks.

Importantly, the Table 6 coefficients for the *AFA* dummy, after controlling for the involvement of funds affiliated with the investment banking industry, remain virtually unchanged compared to those in Table 4. The relation between underpricing and allocations to the lead underwriter-affiliated funds is not due to these funds' affiliations with the industry, suggesting that being affiliated with the lead underwriter that is in charge of the allocations of the IPO is not merely proxying for a more general investment banking industry affiliation.

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 et al. (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 hypotheses, and then present evidence regarding the intra-family allocations of IPOs.

6.1. Reported holding as a proxy for IPO allocation

Throughout this paper, 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 et al., 2002, and Boehmer et al., 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

institutional investors such as hedge funds, pension funds, and insurance companies. 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.¹⁰

A small sample of 11 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 11 IPOs underwritten by Salomon Brothers/CitiGroup between June 1997 and January 2000.¹¹ 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 7. For the 11 IPOs, on average 197 accounts are allocated shares from the institutional pot and only 80 of these accounts appear in the Spectrum database.

[Insert Table 7 about here]

For these 11 IPOs, the average allocation for all institutional accounts is 43,911 shares, in contrast to the average allocation of 62,365 shares for the mutual funds in the Spectrum database. On average, out of the 80 Spectrum 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.¹² 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

¹⁰ Aggarwal (2003) and Boehmer et al. (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.

¹¹ 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.

¹² 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 7.

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

The sample in Table 7 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 7 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. This is consistent with the positive correlation (0.91 Pearson correlation) between the 13(f) reported holdings and the actual allocations reported by Hanley and Wilhelm (1995).

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 feel that this concern is unlikely to be important for the following reasons.

First, to take into account aftermarket flipping, in our empirical work we 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 allocations of hot IPOs. Alternatively, a bias in favor of the nepotism hypothesis exists if affiliated funds tend 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. (We have confirmed this by examining the 11 IPOs used in Table 7.) 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.¹³ If the underwriter uses unaffiliated mutual funds to temporarily park 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 to boost the performance of an affiliated fund, such miscoding would work against 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 the purpose of price support, 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, 2006, and Griffin et al., 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 in the overall sample. This suggests that the miscoded-zero bias is not a serious concern.

¹³ 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 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 overallotment option (Aggarwal, 2000).

6.2. *The winner's curse problem*

One interesting feature of Table 7 is that there is evidence that institutional investors face a winner's curse (Rock (1986)). The winner's curse problem is present when an investor receives a higher fraction of its indication of interest, the lower is the initial return. Specifically, 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, lowering the average allocation size. The pattern shows up not only in the initial allocations with all accounts but also in the mutual fund accounts in the Spectrum database. Another interesting feature of this sample of 11 IPOs is that 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 we discussed in Section 2, the practice of dumping cold IPOs into affiliated funds could occur even during a hot IPO market. 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 subsection, we re-estimate Eq. (1) with further classifications of IPOs based on allocation size.

For each IPO that was allocated to one or more affiliated funds (using our full sample, with the first reported holdings proxying for allocations), 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:

$$\begin{aligned}
 IR = & \beta_0 + \beta_1 Adjustment + \beta_2 Ln(Assets) + \beta_3 Tech_Dummy \\
 & + \beta_4 Lead_Rank + \lambda INST_{NA} + \theta_1 AFA \\
 & + \theta_2 AFA \times Large_Allocation + \mu
 \end{aligned}
 \tag{4}$$

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 relatively large allocation is given to the affiliated funds. That is, we would expect the coefficient on the interaction variable *AFA × 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 numerator and the denominator under the null hypothesis.

[Insert Table 8 about here]

We report the regression results in Table 8. 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 a 7.44% higher initial return when the size of the allocation is small. When the allocation gets larger, 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 in Table 4 was negative but insignificant. In Table 8, however, when the affiliated funds receive a large allocation of shares, the IPOs are not only of reliably worse performance compared to those IPOs in which the affiliated funds receive only relatively small allocations, but also of significantly 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 1990-1994 and 1995-1996, as suggested by the results presented in Tables 4 and 8, is mildly

supportive of the dumping ground hypothesis. For the 1997-1998 and 1999-2000 subperiods, however, there continues to be no support for 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 occur so that more money can be attracted for the fund family (Gaspar et al. (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 used in 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 et al. (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 year t from the CRSP fund database. Management fees are equal to the year t expense ratio (including 12b-1 fees), plus the total load divided by seven (the average number of years of investment in a fund as reported in Sirri and Tufano (1998)). We use fund size and management fees for the same year (year t) of the IPO because they are measured annually. The year-to-date return is the sum of all monthly returns from the CRSP fund database up to the month before the IPO. 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 month before the IPO. 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, and as an out-of-favor fund if otherwise. 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 would 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 value is less than the median value. 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 have a higher fund flow sensitivity to performance improvements.

For each IPO that is allocated to an affiliated fund, we construct four dummy variables based on the four fund characteristics: *Large_Fund* for fund size, *Low_Fees* for total fees, *Low_Return* for year-to-date return, and *Old_Fund* for fund age. 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 (separately) estimate the following model for each of the four fund characteristics:

$$\begin{aligned}
IR = & \beta_0 + \beta_1 Adjustment + \beta_2 Ln(Assets) + \beta_3 Tech_Dummy \\
& + \beta_4 Lead_Rank + \lambda INST_{NA} + \theta_1 AFA \\
& + \theta_2 AFA \times Fund_Characteristic + \mu
\end{aligned} \tag{5}$$

In Eq. (5) the variable *Fund _ Characteristic* represents one of the aforementioned four dummy variables.

[Insert Table 9 about here]

We report the results in Table 9, 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 we only report the coefficients on *AFA* and *AFA × Fund _ Characteristic*. For year-to-date return (Panel C) and fund age (Panel D), no clear pattern shows up, and almost all of the coefficients on *AFA* and *AFA × Fund _ Characteristic* for different subperiods are statistically insignificant.

The coefficients on the interaction variables for fund size (Panel A) and management fees (Panel B) are all negative, except for 1995-1996, a subperiod during which affiliated funds are generally allocated IPOs with worse performance, as we reported in Tables 4 and 8. 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 findings are consistent with those of Gaspar et al. (2006), suggesting that intra-family cross-subsidization by allocating IPOs strategically is present in mutual fund families affiliated with investment banks. The Table 9 evidence is consistent with intra-family dumping. Discussions with practitioners indicate that the allocation of IPOs by the underwriter is at the fund family level, with the family then determining which funds in the family receive the allocations. 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.

There is still a policy concern, however, in that the holders of out-of-favor funds are being used to subsidize the holders of in-favor funds.

7. Do affiliated mutual funds receive IPOs with better long-run performance?

In this section, we examine whether long-run performance is related to the holdings of affiliated funds. 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 (Amex, NYSE, and NASDAQ stocks) 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.

[Insert Table 10 about here]

Table 10 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 at conventional levels, even though we assume independence of the observations, which inflates the statistical significance. 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 et al. (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.¹⁴

8. Conclusion

Many investment banks have affiliated mutual funds. The 1940 Investment Company Act and SEC Rule 10(f)-3 set a percentage limit on the number of shares that an investment bank can allocate 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. We use the first post-IPO reported holdings within six months of the offer date as our proxy for whether the fund was allocated shares. The percentage of IPOs with reported holdings from affiliated funds has increased over time, 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% (2.3% per fund multiplied by two, the conditional average number of funds that report holdings) of the shares issued. Since only 12.5% of IPOs are held by any affiliated mutual funds, the unconditional percentage of shares issued that is held by affiliated mutual funds averages only 0.6% of the public float. This suggests that the letter of the law has been followed.

Within the limits of regulations, however, 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 unlikely to be a widespread practice. For 1990-2001, the average initial return for IPOs held by affiliated mutual funds is 54.4%, almost 29% above the average of 25.8% for other IPOs that were from the same underwriters but were not held by their affiliated funds. For the

¹⁴ This is a joint test of the informativeness of initial allocation and aftermarket flipping since we use holdings that, on average, are almost three months after the IPO. Since in Table 10 our focus is on 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 et al. (2006) suggest that institutional investors' aftermarket flipping is not informative.

internet bubble period of 1999-2000, we find that affiliated funds tend to receive IPOs with higher initial returns, suggesting that investment banks take advantage of a hot IPO market with severe underpricing to preferentially allocate shares to their affiliated funds. For the 1990-1994 and 1995-1996 subperiods, 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 an IPO is weak. However, we do not find significant evidence in either direction for either 1997-1998 or 2001.

We also shed light on several related issues dealing with IPO allocations. 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 et al. (2006)). 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, than for cold IPOs.

Our paper is the first to focus on how U.S. investment banks use their affiliated mutual funds in allocating IPOs. 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, at least for the 1990-2001 period, there is little reason for policymakers to be concerned.

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Table 1
Summary statistics on IPOs

This table reports the descriptive statistics of all the IPOs during 1990-2001 for which the lead underwriter(s) has affiliated funds and there are reported fund holdings within six months of the offer date, 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 the international tranche, if any, and assume no exercise of the overallotment 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 mutual funds are the first reported holdings within six months of the IPO offer date, using the Spectrum 1&2 database. The percentage holding is defined as the total reported holdings by all mutual 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 pre-issue book value of assets (\$ millions)	745.20	522.07	290.43	717.57	1,241.72	4,226.40
Mean proceeds (\$ millions)	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 holdings by all funds (%)	33.80	28.90	35.16	33.43	38.65	41.40

Table 2
Summary statistics on mutual funds

This table reports descriptive statistics for funds in the Spectrum 1&2 database after excluding all funds with reported total assets less than \$1 million. An observation refers to one fund per reporting date (most funds report twice per year). We report the 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 of dollars. Some funds apparently reported their assets with different units (the default in the Spectrum database is ×\$10,000), and we set the assets for the observations that we can identify as obviously being wrong to missing. The per stock holding, reported both in number of shares and in dollars, is the mean holding of a stock per report, conditional on a stock being held. We use all funds and all stocks in calculating the statistics in Panel A. For the other panels, only IPOs are used in calculating the mean per stock holding, and all observations (per fund/report date) are within six months of the offer date of the IPO. In Panel B, we report means conditional on a fund reporting holdings of one or more IPOs (from the last six months). In Panel C, we report means for affiliated funds that report one or more investments in affiliated IPOs. An affiliated fund is defined as a fund that is managed by the lead underwriter of the IPO.

	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 (\$ millions)	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 (\$ millions)	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 (\$ millions)	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 (\$ millions)	2.04	1.32	1.65	1.96	2.73	2.01
Panel C: Affiliated funds that invested in 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 (\$ millions)	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 (\$ millions)	1.69	1.31	1.86	1.31	2.08	0.99

Table 3
Univariate Analysis

We report the mean fund holdings, performance and other characteristics, including size (proceeds and pre-issue book value of assets) and Carter-Manaster 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 (as of the first reporting date within 6 months of the IPO) in the Spectrum 1&2 database is per IPO. The corresponding percentage holding is the total reported number of shares held by all funds of an IPO divided by the total number of shares offered (not including overallotments). We only include the reported holdings within six months of the IPO offer date. All of the numbers 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 difference in the mean IPO initial return, with two-tailed 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 per IPO	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 (%)	32.6	42.5	28.4	35.2	34.9	39.4	32.0	40.8	36.4	46.4	37.6	51.9
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 (\$ millions)	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 (\$ millions)	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

The model specification is as follows:

$$IR = \beta_0 + \beta_1 Adjustment + \beta_2 Ln(Assets) + \beta_3 Tech_Dummy + \beta_4 Lead_Rank + \lambda INST_{NA} + \theta AFA + \mu$$

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 premarket 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 technology industry 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, and observations with missing values are excluded. The *p*-values for the coefficients, corrected for heteroskedasticity, are reported in parentheses.

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

Table 5
Price adjustments and allocations to funds affiliated with the lead underwriter

The dependent variable, *Adjustment*, is defined as the percentage premarket adjustment from the mid-point of the initial file price to the offer price, as is in Table 4. The model specification is as follows:

$$Adjustment = \beta_0 + \beta_1 Ln(Assets) + \beta_2 Tech_Dummy + \beta_3 Lead_Rank + \lambda INST_{NA} + \theta AFA + \mu$$

The control variables, including the firm size ($Ln(Assets)$), the tech dummy ($Tech_Dummy$), the reputation rank of the lead underwriter ($Lead_Rank$), and the unaffiliated institutional holding ($INST_{NA}$), are the same as in Table 4. 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, and observations with missing values are excluded. The p -values for the coefficients, corrected for heteroskedasticity, are reported in parentheses.

Variable	1990-1994	1995-1996	1997-1998	1999-2000	2001
<i>Intercept</i>	-26.70 (0.00)	-29.74 (0.00)	-58.68 (0.00)	-57.04 (0.00)	65.56 (0.28)
<i>Ln(Assets)</i>	-3.34 (0.00)	-0.43 (0.55)	-0.88 (0.26)	-1.48 (0.14)	3.36 (0.17)
<i>Tech_Dummy</i>	7.12 (0.00)	9.75 (0.00)	9.04 (0.00)	26.49 (0.00)	0.15 (0.99)
<i>Lead_Rank</i>	2.47 (0.01)	2.06 (0.06)	5.76 (0.00)	4.56 (0.01)	-8.98 (0.19)
<i>INST_{NA}</i>	4.44 (0.00)	3.13 (0.01)	2.36 (0.07)	3.88 (0.02)	-1.13 (0.77)
<i>AFA</i>	10.03 (0.00)	1.71 (0.68)	6.83 (0.03)	7.09 (0.06)	-7.57 (0.34)
Sample size	718	495	366	530	38
Adjusted R ²	11%	6%	13%	12%	-2%

Table 6**Affiliations with the lead underwriter vs. affiliations with the investment banking industry**

The model specification is as follows:

$$IR = \beta_0 + \beta_1 Adjustment + \beta_2 Ln(Assets) + \beta_3 Tech_Dummy + \beta_4 Lead_Rank + \lambda INST_{NA} + \theta_1 IBAFA + \theta_2 AFA + \mu$$

The dependent variable (IR) and the control variables, including the premarket price adjustment ($Adjustment$), the firm size ($Ln(Assets)$), the tech dummy ($Tech_Dummy$), the reputation rank of the lead underwriter ($Lead_Rank$), and the unaffiliated institutional holding ($INST_{NA}$) are the same as in Table 4. 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 dummy variable $IBAFA$ is one if the reported holding by funds that are affiliated with the investment banking industry is not zero, and is zero otherwise. The sample only includes IPOs for which the lead underwriter(s) has affiliated mutual funds, and observations with missing values are excluded. We exclude 2001 because all IPOs during the year have the $IBAFA$ dummy equal to one. The p -values for the coefficients, corrected for heteroskedasticity, are reported in parentheses.

Variable	1990-1994	1995-1996	1997-1998	1999-2000
<i>Intercept</i>	7.08 (0.12)	15.98 (0.08)	19.38 (0.11)	-36.83 (0.24)
<i>Adjustment</i>	0.45 (0.00)	0.70 (0.00)	0.65 (0.00)	1.50 (0.00)
<i>Ln(Assets)</i>	-1.35 (0.00)	-2.00 (0.00)	-1.39 (0.14)	-7.36 (0.00)
<i>Tech_Dummy</i>	3.30 (0.01)	5.97 (0.00)	12.90 (0.02)	17.00 (0.00)
<i>Lead_Rank</i>	1.06 (0.11)	0.05 (0.97)	1.89 (0.27)	6.68 (0.07)
<i>INST_{NA}</i>	-0.13 (0.85)	0.49 (0.69)	-4.80 (0.04)	7.64 (0.01)
<i>AFA</i>	2.06 (0.29)	-4.42 (0.28)	-0.20 (0.96)	12.98 (0.09)
<i>IBAFA</i>	2.26 (0.09)	4.93 (0.05)	11.60 (0.06)	-3.59 (0.72)
Sample size	718	495	366	530
Adjusted R ²	34%	41%	17%	49%

Table 7
Reported holdings and actual allocations

This table reports the actual allocations to institutional investors for 11 IPOs where Salomon Brothers/Citigroup was a book runner, along with the reported holdings from the Spectrum database. Offer shares are the number of shares offered in millions, excluding the overallotment option, and initial return (IR) is the percentage return from the offer price to the first-day closing market 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 11 IPOs are reported in the bottom row. We separate the accounts that received allocations for each IPO into two groups based on whether an account appeared in the Spectrum database within two years using a name matching procedure. Accounts not in the Spectrum database are those that received IPO allocations but are not subsequently covered in the Spectrum database, such as hedge funds.

	<u>IPO characteristics</u>			<u>Actual initial allocations</u>		<u>Accts NOT in the Spectrum database</u>		<u>Accts in the Spectrum database</u>		<u>First reported holding within 6 months</u>		<u>First reported holding within 24 months</u>	
	<u>Offer date</u>	<u>Offer shares</u>	<u>IR (%)</u>	<u>No of Accts</u>	<u>Average allocation</u>	<u>No of accts</u>	<u>Average allocation</u>	<u>No of accts</u>	<u>Average allocation</u>	<u>No of accts</u>	<u>Average holding</u>	<u>No of accts</u>	<u>Average holding</u>
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 Global	6/30/98	10.00	-8.33	69	195,752	41	143,359	28	272,471	4	196,875	12	171,439
Crossing Rhythms	8/13/98	16.80	31.26	188	77,301	108	63,023	80	96,575	22	125,153	46	195,904
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	10.39	61.40	197	43,911	117	30,811	80	62,365	18	83,038	28	120,503

Table 8
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 average per fund holding of 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 *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
<i>Intercept</i>	7.50 (0.11)	16.43 (0.07)	22.45 (0.05)	-40.60 (0.22)
<i>Adjustment</i>	0.46 (0.00)	0.72 (0.00)	0.69 (0.00)	1.50 (0.00)
<i>Ln(Assets)</i>	-1.44 (0.00)	-2.12 (0.00)	-1.57 (0.11)	-7.30 (0.00)
<i>Tech_Dummy</i>	3.33 (0.01)	5.60 (0.00)	13.06 (0.02)	16.97 (0.00)
<i>Lead_Rank</i>	1.12 (0.10)	0.24 (0.86)	1.91 (0.25)	6.75 (0.07)
<i>INST_{NA}</i>	0.14 (0.82)	1.07 (0.39)	-3.30 (0.11)	7.55 (0.01)
<i>AFA</i>	7.44 (0.00)	-0.04 (0.99)	-0.60 (0.85)	11.41 (0.18)
<i>AFA × Large_Allocation</i>	-10.23 (0.00)	-11.58 (0.07)	2.79 (0.74)	4.25 (0.78)
Sample size	718	495	366	530
Adjusted R ²	35%	41%	17%	49%

Table 9**IPO performance and characteristics of funds affiliated with the lead underwriter**

Using information from the CRSP mutual fund database, we separate affiliated funds into two groups based on the median values of the following characteristics: fund size (total net asset value (TNA) at the end of the calendar year), annual percentage management fees (including expenses and front- and back-end loads), year-to-date return (measured at the end of the month prior to the IPO), and fund age (measured as the number of years between when the fund was founded and the month prior to the IPO). For fund size, annual percentage 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 a 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 (equal to one if an affiliated fund reports holdings of an IPO and zero otherwise), 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 8, and are not reported. The sample size for each regression in all four panels is identical to that reported in Table 8 and is not reported. The adjusted R^2 is also qualitatively the same as in Table 8 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
<u>Panel A: Fund size</u>				
<i>AFA</i>	3.65 (0.07)	-2.46 (0.60)	2.22 (0.68)	16.68 (0.04)
<i>AFA</i> × <i>Large_Fund</i>	-5.92 (0.25)	-6.05 (0.34)	-6.42 (0.34)	-32.17 (0.01)
<u>Panel B: Management fees</u>				
<i>AFA</i>	2.72 (0.17)	-3.87 (0.45)	0.84 (0.85)	14.08 (0.07)
<i>AFA</i> × <i>Low_Fees</i>	-2.28 (0.72)	0.89 (0.88)	-2.31 (0.82)	-31.95 (0.05)
<u>Panel C: Fund YTD return</u>				
<i>AFA</i>	2.17 (0.36)	-5.76 (0.23)	3.21 (0.55)	12.87 (0.11)
<i>AFA</i> × <i>Low_Return</i>	1.06 (0.79)	4.56 (0.57)	-9.39 (0.11)	0.82 (0.96)
<u>Panel D: Fund age</u>				
<i>AFA</i>	3.24 (0.14)	-1.84 (0.67)	-4.68 (0.16)	12.99 (0.10)
<i>AFA</i> × <i>Old_Fund</i>	-4.54 (0.17)	-7.69 (0.43)	14.58 (0.10)	-0.13 (0.99)

Table 10
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. BH returns (dividends plus capital gains) are measured from the first closing market price after going public to the earlier of the delisting date or the third year anniversary. The two-tailed *p*-values of the t-test for the differences are reported in parentheses. The *p*-value calculations assume 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)	

Fig. 1. Mutual fund cash inflows. We report the assets under management (\$ billion) in Fig. 1.1, the net new cash flow (NNCF) in dollars (\$ billion) in Fig. 1.2, and the NNCF as a percentage of beginning of year fund assets in Fig. 1.3 for equity funds and hybrid funds from 1990-2001. The data source is the *Mutual Fund Fact Book 2003* published by the Investment Company Institute (ICI).

Figure 1.1 Assets under management for equity and hybrid funds

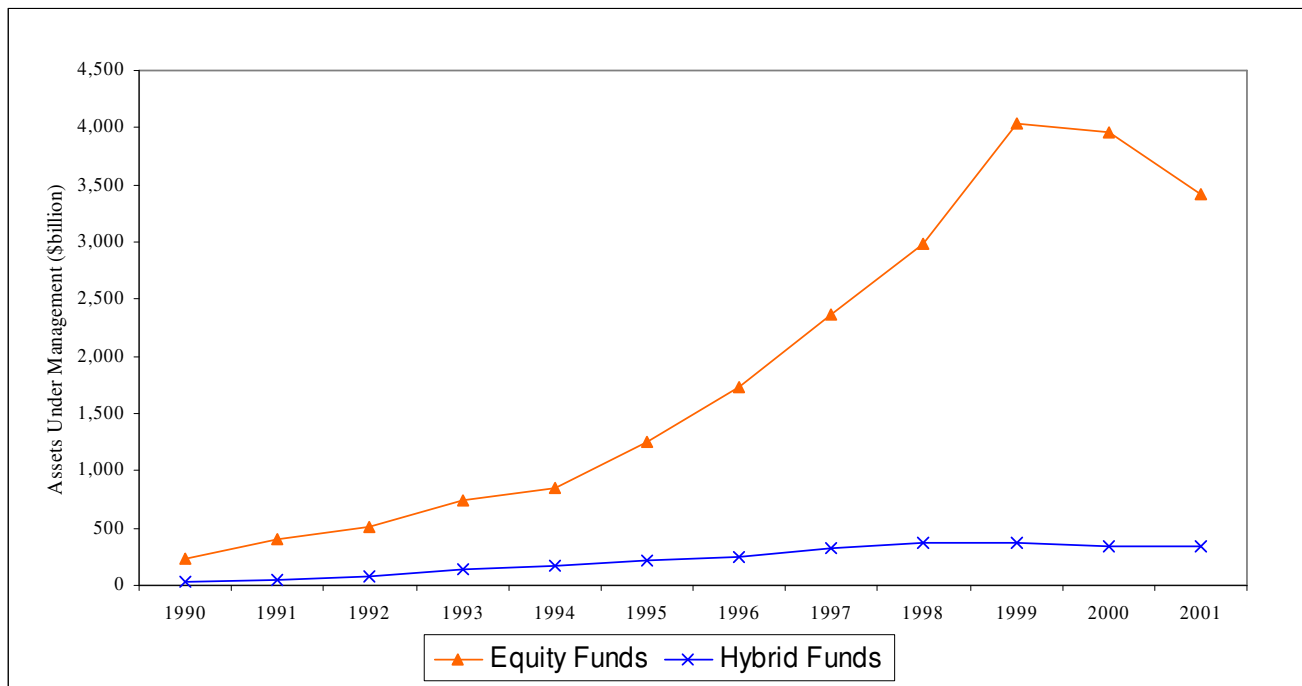


Figure 1.2 Net new cash flow (NNCF) in dollars for equity and hybrid funds

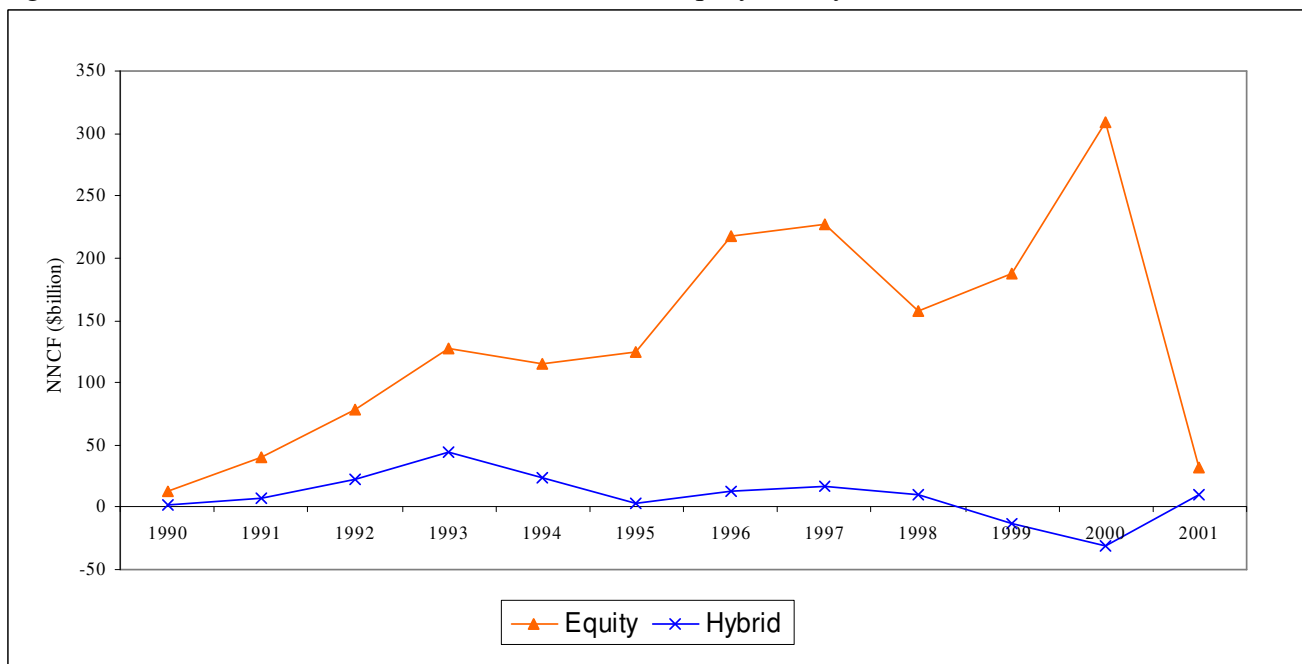


Figure 1.3 Net new cash flow (NNCF) in percentage of fund assets for equity and hybrid funds

