

# The Performance of Investment Bank-Affiliated Mutual Funds: Conflicts of Interest or Informational Advantage?

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## Abstract

Using a comprehensive sample of U.S. mutual funds from 1992 to 2004, we find strong evidence that investment bank-affiliated funds underperform unaffiliated funds. Consistent with the conflict of interest hypothesis, we find that affiliated funds hold disproportionately large amounts of stocks of their initial public offering and seasoned equity offering clients. Moreover, worse-performing clients are more likely to be held by affiliated funds. Our results are robust to alternative risk adjustments, portfolio weighting schemes, and regression methodologies. Overall, our findings are consistent with the idea that investment banks use affiliated funds to support underwriting business at the expense of fund shareholders.

## I. Introduction

Bank funds buy clients' shares as a show of support to help win more underwriting, lending, and merger work. . . [As an investment bank], you want to show that you are not only able to sell the deal, but you are able to put away the product. The more you can do that, the more your clients are going to be attracted to you. (Edward Siedle, former SEC attorney, cited in "Wall Street's Dumping Ground," *Bloomberg* (June 2004), by David Dietz and Adam Levy)

There has been much controversy about the appropriate scope of financial institutions' activities. In particular, one issue that has arisen in the wake of the 2007–2008 financial crisis is the ability of financial services "supermarkets" to offer competitive products in their varied lines of business, including asset management.<sup>1</sup> Financial conglomerates may possess private information about their

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<sup>1</sup> See, for example, "Wasting Assets," *Economist* (June 18, 2009).

lending or investment banking clients but also face potential conflicts of interest among their business divisions.<sup>2</sup> In this paper, we provide evidence on the interplay of superior information and conflicts of interest within financial institutions by examining the performance of investment bank-affiliated mutual funds.

During our sample period from 1992 to 2004, nearly a quarter of all U.S. mutual funds were affiliated with investment banks. However, little research has focused on the performance of these funds. While affiliation with an investment bank may cause funds to pursue the interests of the bank at the expense of fund shareholders, affiliated funds may also use the superior information acquired through investment banking relationships to benefit fund shareholders. The purpose of this paper is to empirically examine the performance of investment bank-affiliated mutual funds and thus shed light on the net impact of investment banking relationships on the welfare of fund shareholders.

Anecdotal evidence suggests that affiliated funds face implicit or explicit pressure to buy their investment banking clients' shares to help win future underwriting and corporate advisory business (Lucchetti (2003), Dietz and Levy (2004)).<sup>3</sup> According to the Securities Industry Association, over our sample period, the 10 largest investment banks earned up to 7% of revenues from their asset management business, and up to 65% of revenues from their underwriting business and "other related securities business" such as corporate advisory services (Morrison and Wilhelm (2007)).<sup>4</sup> Given that more revenues come from underwriting and advisory services than from asset management, it seems plausible that investment banks may use their asset management arm to support their investment banking business even if it lowers fund performance.<sup>5</sup> In particular, since the stocks of equity issuers perform poorly in the long run (Loughran and Ritter (1995), Spiess and Affleck-Graves (1995)), affiliated funds that overweight these clients' shares, especially the worse-performing client stocks that need more support, will tend to underperform. Therefore, the conflict of interest hypothesis predicts that affiliated funds will underperform.

An alternative hypothesis regarding the effect of investment banking relationships on affiliated fund performance is that affiliation with an investment bank provides funds with more abundant resources and enhanced research capabilities. Moreover, investment banks, through the process of due diligence, might acquire superior information about their investment banking clients. For example, Massa and Rehman (2008) investigate the effect of the lending behavior of banks on the portfolio choice of their affiliated mutual funds. They find that affiliated funds exploit inside information about borrowing firms by increasing holdings of stocks

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<sup>2</sup>See Mehran and Stulz (2007) for a review of the literature on conflicts of interest in financial institutions.

<sup>3</sup>The International Organization of Securities Commissions Report "Conflicts of Interest of CIS Operators" (2000) lists similar cases from outside the United States.

<sup>4</sup>The rest of the revenues come from proprietary trading and brokerage commissions.

<sup>5</sup>Managers of affiliated funds have incentives to support their affiliated investment banking business due to job security and compensation concerns. For example, Farnsworth and Taylor (2006) report survey evidence that firm success factors such as firm profitability have more effect on fund manager compensation than does fund performance.

that subsequently outperform. Bodnaruk, Massa, and Simonov (2009) show that merger and acquisition (M&A) advisors acquire stakes in target firms before deals are announced, suggesting that these advisors exploit their privileged information. If managers of affiliated funds exploit their superior information to benefit fund investors, then affiliated funds will tend to outperform unaffiliated funds (informational advantage hypothesis).

The conflict of interest hypothesis and the informational advantage hypothesis make diametrically opposed predictions regarding the performance of investment bank-affiliated funds. It is an empirical question which of these effects dominates. We address this question by examining a comprehensive sample of U.S. equity and hybrid mutual funds over the period from 1992 to 2004. We find strong evidence that affiliated funds significantly underperform unaffiliated funds. Depending on which performance evaluation model is used, the average annualized risk-adjusted returns of affiliated funds are between 1.08% and 1.68% lower than those of unaffiliated funds. This performance difference is not driven by fund fees. Using gross returns, we continue to find that affiliated funds underperform unaffiliated funds by 0.72%–1.44% a year. The magnitude of this underperformance is slightly lower (0.72%–0.84% a year) but remains statistically significant after we control for various fund characteristics in a cross-sectional regression framework. This finding suggests that shareholders of affiliated funds are adversely affected by investment banking relationships. We emphasize that our findings do not imply that the informational advantage effect does not exist; they simply suggest that the conflict of interest effect dominates the informational advantage effect.

To provide more direct evidence on the conflict of interest hypothesis, we examine the affiliated mutual funds' holdings of their client firms (hereafter client holdings) that recently conducted initial public offerings (IPOs) or seasoned equity offerings (SEOs). While investment banks have an incentive to hold their clients' stocks to help win future investment banking deals, the academic literature provides strong evidence that equity issuers underperform in the long run. Therefore, evidence of overweighting these stocks would be consistent with the conflict of interest hypothesis because it is contrary to the best interest of fund shareholders.

We find that affiliated funds hold a disproportionately large amount of their investment banking clients' shares. Compared to unaffiliated funds, affiliated funds hold more than twice as much of their IPO and SEO clients' shares. To verify that holdings of these recent clients' stocks negatively affect fund performance, we examine the subsequent performance of these stocks. Consistent with the long-run stock underperformance of IPOs and SEOs documented in prior literature, we find that the client holdings of affiliated funds underperform the Daniel, Grinblatt, Titman, and Wermers (DGTW) (1997) benchmark by 1.42% per quarter. The client holdings also underperform nonclient holdings by 1.52% per quarter. The poor performance of client holdings is particularly striking among IPO clients. Affiliated funds' IPO client holdings underperform the DGTW benchmark (nonclient holdings) by 3.01% (3.11%) per quarter.

Moreover, the IPO and SEO clients' stocks held by affiliated funds underperform the clients' stocks *not* held by affiliated funds by 0.81% per quarter. The underperformance is 2.75% per quarter if we examine IPO clients only. The

evidence suggests that worse-performing clients that need more support are more likely to be held by affiliated funds. This result provides further support for the conflict of interest hypothesis. The underperformance of client holdings, combined with the earlier finding that affiliated funds tend to overweight these stocks, provide at least a partial explanation for the underperformance of affiliated mutual funds.

We perform numerous robustness checks and find that our results are robust to equal-weighted portfolios, rolling regression approach, load-adjusted fund returns, top-tier investment banks, family-level regressions, and alternative sample periods and risk adjustments. Overall, our fund performance and holdings results are consistent with the conflict of interest hypothesis and inconsistent with the informational advantage hypothesis.

A potential alternative explanation for the underperformance of affiliated funds is that managers of investment bank-affiliated mutual funds have inferior investment skills, and these managers mistakenly believe that their clients' stocks are truly good investments. While we recognize the possibility of this alternative explanation, we do not believe that it drives our findings. Considering that our sample of investment banks includes such reputable names as Goldman Sachs, Morgan Stanley, and Merrill Lynch, one would be hard pressed to make an argument that unaffiliated mutual funds on average are able to attract and retain better talents than these affiliated funds, unless the pressure on managers of affiliated funds to buy their investment banking clients' shares reduces the affiliated funds' ability to retain the best talents (Lucchetti (2003)).<sup>6</sup>

Our study is closely related to Johnson and Marietta-Westberg (JM) (2009) and Ritter and Zhang (2007). JM analyze a group of IPO underwriters that also manage institutional funds. They find that holding IPO clients' shares significantly increases the probability that the IPO underwriter is retained as the underwriter for the client's follow-on SEO. They also find that in some cases, IPO stocks purchased by their underwriter's affiliated funds earn positive abnormal returns. However, JM do not examine the overall performance of these affiliated funds. Ritter and Zhang examine how investment banks allocate IPOs among affiliated mutual funds and unaffiliated funds. They find little evidence that investment banks allocate more cold IPOs to their affiliated funds. However, they do not examine fund holdings beyond 6 months of the IPO date, nor do they examine the performance of affiliated mutual funds.<sup>7</sup>

Our paper is also related to several recent papers examining agency conflicts in mutual funds. Massa (2003) examines the structure of the mutual fund industry and shows that fund families optimally pursue "fund proliferation" strategies that benefit the fund management company but are contrary to the interests of fund shareholders. Nanda, Wang, and Zheng (2004) document a spillover effect of star funds and show that fund companies, especially families with low skill,

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<sup>6</sup>Another potential explanation for the underperformance of affiliated funds is that shareholders of affiliated funds do not monitor fund performance as closely. However, untabulated results reveal no evidence that shareholders of investment bank-affiliated funds are less sensitive to fund performance than those of unaffiliated funds.

<sup>7</sup>In Section III.D.1, we provide a more detailed comparison between our study and these 2 papers.

have a strong incentive to pursue star-creating strategies. Gaspar, Massa, and Matos (2006) present evidence that fund families strategically transfer performance across funds to increase overall family profits.

The rest of the paper is organized as follows: In Section II we discuss our data and sample. In Section III we present our empirical results. Section IV concludes.

## II. Data, Sample, and Descriptive Statistics

### A. Data and Sample

The data for this study come from several sources. The Center for Research in Security Prices (CRSP) Mutual Fund Database provides information on fund returns, total net assets (TNA), fees, investment objectives, and other fund characteristics. We include all domestic equity and hybrid funds that exist in the CRSP Mutual Fund Database during the period from 1992 to 2004. We include hybrid funds because these funds have substantial holdings in stocks. We exclude index funds and funds whose TNA are below \$15 million (Elton, Gruber, and Blake (2001)). We begin our sample in 1992 because this is the 1st year the CRSP Mutual Fund Database reports information about fund management companies.

The Thomson mutual fund holdings database contains quarterly or semi-annual stock holdings for all U.S. mutual funds.<sup>8</sup> We include all funds in the Thomson mutual fund holdings database that have an investment objective code (IOC) of 2 (aggressive growth), 3 (growth), or 4 (growth and income). We merge the CRSP Mutual Fund Database with the Thomson mutual fund holdings database by using the MFLINK linking file obtained from Wharton Research Data Service.<sup>9</sup>

We obtain all U.S. new common stock issues (including both IPOs and SEOs) for the period from 1989 to 2004 from the Thomson Securities Data Company (SDC) New Issues Database. We exclude American depository receipts, closed-end funds, units, real estate investment trusts, limited partnerships, financial firms, and IPOs with an offer price below \$5. For each IPO or SEO, we obtain the offer date, the Committee on Uniform Security Identification Procedures (CUSIP) number of the issuer, and the name of the lead underwriter(s).

We obtain stock returns, share prices, SIC codes, and total shares outstanding from the CRSP stock database. We obtain book value of equity from Compustat. We obtain Fama and French (1993) factors, the momentum factor, and returns on the 1-month T-bill from Kenneth French's Web site ([http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data\\_library.html](http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html)), and benchmark bond index

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<sup>8</sup>A detailed description of this database can be found in Wermers (2000).

<sup>9</sup>An alternative database for institutional holdings is the 13F database. The 13F database, however, does not provide overall return performance for institutional portfolios. Since our primary interest is to evaluate the net impact of investment banking relationships on the welfare of fund investors, we limit our sample to mutual funds. Ritter and Zhang (2007) also examine only mutual funds.

returns from Lehman Brothers. Stocks or firms in the Thomson mutual fund holdings database, the SDC databases, and Compustat are matched with the CRSP stock database based on 8-digit CUSIP numbers.

## B. Investment Bank-Affiliated Funds

We manually identify investment bank-affiliated mutual funds by matching the names of fund management companies with the names of investment banks, and by using a variety of sources including *Moody's Bank and Finance Manual*, *Nelson's Directory of Institutional Money Managers*, *Securities Industry Yearbook*, the Thomson SDC M&A database, the Factiva news article database, and company Web sites.

There were a number of M&As in the financial industry over our sample period. When determining whether a fund family is affiliated with an investment bank, we paid special attention to M&As among investment banks and fund companies. In particular, for each fund management company that was involved in a merger or acquisition, we carefully determined the period during which the fund company was affiliated with an investment bank.

## C. Descriptive Statistics for Fund Sample

Table 1 presents the descriptive statistics for our fund sample. We present summary statistics on fund characteristics for equity funds in Panel A and hybrid funds in Panel B. In each panel, we present results for all funds in column (1), affiliated funds in column (2), unaffiliated funds in column (3), and the difference between affiliated funds and unaffiliated funds in the rightmost column. For each fund characteristic, we first calculate the cross-sectional average fund characteristic in each year and then report the time-series average of these cross-sectional averages.

Results in Panel A of Table 1 indicate that affiliated equity funds are smaller and younger than unaffiliated funds. Affiliated funds charge higher fees than unaffiliated funds (1.25% vs. 0.97%). Approximately  $\frac{1}{2}$  of the difference in the expense ratio is attributed to the 12b-1 fee. Affiliated funds also charge a higher load than unaffiliated funds. The stock, bond, and cash holdings are very similar between affiliated funds and unaffiliated funds. Results in Panel B indicate that affiliated hybrid funds tend to be smaller, younger, charge higher fees and loads, and trade less actively. We find that affiliated hybrid funds hold significantly more equity and less bonds or cash than unaffiliated funds.

## III. Empirical Results

We present our empirical results in this section. In Section III.A we compare the performance of affiliated funds and unaffiliated funds. In Section III.B we examine whether affiliated funds overweight their clients' stocks in their portfolios. We also evaluate the subsequent performance of client stocks held by affiliated funds against various benchmarks. In Section III.C we report results for a series

TABLE 1  
Descriptive Statistics for Affiliated and Unaffiliated Mutual Funds (1992–2004)

Table 1 presents the descriptive statistics for our sample funds. The sample includes all domestic equity and hybrid funds that exist any time between 1992 and 2004 in the CRSP Survivor-Bias-Free Mutual Fund Database. We exclude index funds and funds with less than \$15 million in total net assets (TNA) from our sample. Affiliated funds are funds that are affiliated with an investment bank. Unaffiliated funds are funds that are not affiliated with any investment bank. We obtain the list of fund management companies from the CRSP Mutual Fund Database and the list of investment banks from the SDC New Issues Database. We identify investment bank-affiliated mutual fund families by matching the names of fund management companies with the names of investment banks, and by using a variety of sources including *Moody's Bank and Finance Manual*, *Nelson's Directory of Institutional Money Managers*, *Securities Industry Yearbook*, the Thomson SDC M&A database, Factiva news article database, and company Web sites. Fund characteristics are from the CRSP Mutual Fund Database. Panel A contains summary statistics for equity funds, of which there are 1,114 distinct affiliated funds and 3,801 distinct unaffiliated funds. Panel B contains summary statistics for hybrid funds, of which there are 314 distinct affiliated funds and 996 distinct unaffiliated funds. We first calculate the TNA-weighted average fund characteristics (except TNA and Age, for which we take the equal-weighted average) across all funds in each fund category for each year. We then report the yearly average fund characteristics over the period from 1992 to 2004. Numbers in parentheses are *t*-statistics, and \*\*\*, \*\*, and \* indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Variable	All Funds (1)	Affiliated Funds (2)	Unaffiliated Funds (3)	(2) – (3)
<i>Panel A. Equity Funds</i>				
TNA (\$ million)	636.35	348.61	704.55	–355.94*** (–13.26)
Age (years)	10.43	7.72	11.05	–3.33*** (–5.36)
Expense ratio (%)	1.00	1.25	0.97	0.28*** (33.74)
12b-1 fee (%)	0.19	0.33	0.18	0.15*** (13.12)
Turnover (%)	72.80	77.14	72.30	4.84 (1.20)
Total load (%)	2.60	2.83	2.57	0.26*** (4.96)
Holdings				
Stocks (%)	90.73	90.86	90.71	0.15 (0.37)
Bonds (%)	1.54	1.02	1.60	–0.58*** (–4.16)
Cash (%)	6.25	6.15	6.26	–0.11 (–0.29)
<i>Panel B. Hybrid Funds</i>				
TNA (\$ million)	609.11	369.57	675.66	–306.09*** (–8.58)
Age (years)	10.54	7.22	11.38	–4.16*** (–6.12)
Expense ratio (%)	0.89	1.21	0.84	0.37*** (19.35)
12b-1 fee (%)	0.20	0.48	0.16	0.32*** (14.93)
Total load (%)	2.50	4.01	2.27	1.74*** (23.01)
Turnover (%)	64.29	58.84	65.17	–6.33*** (–3.82)
Holdings				
Stocks (%)	60.66	66.30	59.84	6.46*** (6.12)
Bonds (%)	24.72	21.85	25.14	–3.29*** (–7.66)
Cash (%)	6.76	5.36	6.97	–1.61*** (–4.33)

of robustness checks. In Section III.D we provide several discussions related to our analyses.

## A. Performance of Affiliated and Unaffiliated Mutual Funds

### 1. Portfolio Analysis

The conflict of interest hypothesis predicts that affiliated funds underperform unaffiliated funds, while the informational advantage hypothesis predicts the opposite. To examine the net impact of these 2 effects, we start by comparing the performance of affiliated funds with that of unaffiliated funds. We first use a portfolio approach. Specifically, each month we divide all equity (or hybrid) funds into affiliated or unaffiliated funds. Within each category, we compute the TNA-weighted portfolio returns for each month.<sup>10</sup> We then evaluate the performance of these 2 portfolios based on the time series of monthly portfolio returns.

Following prior literature, we use the capital asset pricing model (CAPM) 1-factor model, Fama and French (1993) 3-factor model, and the Carhart (1997) 4-factor model to evaluate equity fund performance. The factor model regressions are

$$(1) \quad r_{p,t} = \alpha_p + \beta_{1,p} \text{RMRF}_t + e_{p,t},$$

$$(2) \quad r_{p,t} = \alpha_p + \beta_{1,p} \text{RMRF}_t + \beta_{2,p} \text{SMB}_t + \beta_{3,p} \text{HML}_t + e_{p,t},$$

$$(3) \quad r_{p,t} = \alpha_p + \beta_{1,p} \text{RMRF}_t + \beta_{2,p} \text{SMB}_t + \beta_{3,p} \text{HML}_t + \beta_{4,p} \text{UMD}_t + e_{p,t},$$

where  $r_{p,t}$  is the monthly return on a portfolio of equity funds in excess of the 1-month T-bill return; RMRF is the excess return on a value-weighted market portfolio; and SMB, HML, and UMD are returns on zero-investment factor-mimicking portfolios for size, book-to-market, and momentum, respectively.<sup>11</sup> To test for differences between affiliated and unaffiliated fund portfolios, we first take the difference in monthly returns between these 2 portfolios each month. This gives us a time series of monthly return differences. Then we run regression equations (1)–(3) using these monthly return differences as the dependent variable. The estimated intercept gives the difference in alphas between the 2 portfolios.

Since hybrid funds have substantial holdings in both stocks and bonds, we expand the CAPM 1-factor model, Fama and French (1993) 3-factor model, and Carhart's (1997) 4-factor model by adding 3 bond factors:

$$(4) \quad r_{p,t} = \alpha_p + \beta_{1,p} \text{RMRF}_t + \beta_{2,p} \text{GOV}_t + \beta_{3,p} \text{CORP}_t + \beta_{4,p} \text{JUNK}_t + e_{p,t},$$

$$(5) \quad r_{p,t} = \alpha_p + \beta_{1,p} \text{RMRF}_t + \beta_{2,p} \text{SMB}_t + \beta_{3,p} \text{HML}_t + \beta_{4,p} \text{GOV}_t \\ + \beta_{5,p} \text{CORP}_t + \beta_{6,p} \text{JUNK}_t + e_{p,t},$$

$$(6) \quad r_{p,t} = \alpha_p + \beta_{1,p} \text{RMRF}_t + \beta_{2,p} \text{SMB}_t + \beta_{3,p} \text{HML}_t + \beta_{4,p} \text{UMD}_t \\ + \beta_{5,p} \text{GOV}_t + \beta_{6,p} \text{CORP}_t + \beta_{7,p} \text{JUNK}_t + e_{p,t}.$$

<sup>10</sup>We show in Section III.C.2 and Panel B of Table 7 that our results are qualitatively similar when we use equal-weighted portfolios.

<sup>11</sup>Our results are similar when we use a rolling regression approach to estimating factor loadings. See Section III.C.3.



Here,  $r_{p,t}$  is the monthly return on a portfolio of hybrid funds in excess of the 1-month T-bill return; RMRF, SMB, HML, and UMD are as defined earlier in the Carhart 4-factor model; and GOV, CORP, and JUNK are Lehman Brothers index excess returns for government bonds, corporate bonds, and high-yield bonds, respectively. The bond factors included in the above models are similar to those used by Elton, Gruber, and Blake (1995). For ease of exposition, we refer to the model in equation (4) as the 4-factor model, the model in equation (5) as the 6-factor model, and the model in equation (6) as the 7-factor model.

Table 2 reports the results for equity funds. The results in Panel A indicate that affiliated funds underperform unaffiliated funds. The average net return of affiliated funds over our sample period is 0.77% per month, while the corresponding return for unaffiliated funds is 0.86% per month. The return difference of 9 basis points (bp) per month (1.08% per year) is both economically

TABLE 2  
Performance of Affiliated and Unaffiliated Equity Mutual Funds

Table 2 compares the performance of affiliated versus unaffiliated equity mutual funds. The sample period is from 1992 to 2004. The sample includes all domestic equity funds that exist any time between 1992 and 2004 in the CRSP Survivor-Bias-Free Mutual Fund Database. We exclude index funds and funds with less than \$15 million in total net assets (TNA) from our sample. Fund returns and investment objectives are from the CRSP Survivor-Bias-Free Mutual Fund Database. Investment objectives are based on the Investment Company Data, Inc. (ICDI) objective reported in the CRSP Mutual Fund Database. Affiliated funds are funds that are affiliated with an investment bank. Unaffiliated funds are funds that are not affiliated with any investment bank. We obtain the list of fund management companies from the CRSP Mutual Fund Database and the list of investment banks from the SDC New Issues Database. We identify investment bank-affiliated mutual fund families by matching the names of fund management companies with the names of investment banks, and by using a variety of sources including *Moody's Bank and Finance Manual*, *Nelson's Directory of Institutional Money Managers*, *Securities Industry Yearbook*, the Thomson SDC M&A database, Factiva news article database, and company Web sites. We first calculate the TNA-weighted average returns across all funds in each fund category for each month. We then estimate the risk-adjusted returns using the time series of these monthly average returns. In addition to raw returns, we report the CAPM 1-factor, Fama and French (1993) 3-factor, and Carhart (1997) 4-factor alphas. The CAPM 1-factor, Fama and French 3-factor, and Carhart 4-factor models are described in Section III.A.1. Gross returns are calculated by adding back 1/12th of the annual expense ratio to the net return. Panel A reports fund returns in percents per month. Panel B reports the factor loadings of the 4-factor Carhart model for net fund returns. Numbers in parentheses are *t*-statistics, and \*\*\*, \*\*, and \* indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

*Panel A. Returns (% per month)*

	Net Return			Gross Return		
	Affiliated Funds	Unaffiliated Funds	(1) - (2)	Affiliated Funds	Unaffiliated Funds	(3) - (4)
Returns (% per month)	(1)	(2)	(1) - (2)	(3)	(4)	(3) - (4)
Raw return	0.77** (2.22)	0.86** (2.51)	-0.09** (-2.33)	0.87** (2.52)	0.93*** (2.73)	-0.06* (-1.69)
1-factor alpha	-0.18*** (-2.75)	-0.09* (-1.90)	-0.09** (-2.39)	-0.07 (-1.16)	-0.01 (-0.20)	-0.06* (-1.70)
3-factor alpha	-0.22*** (-4.46)	-0.08** (-2.08)	-0.14*** (-4.19)	-0.12** (-2.46)	-0.00 (-0.11)	-0.12*** (-3.49)
4-factor alpha	-0.24*** (-4.81)	-0.11*** (-2.85)	-0.13*** (-3.84)	-0.14*** (-2.82)	-0.03 (-0.85)	-0.11*** (-3.14)

*Panel B. Factor Loadings*

	RMRF	SMB	HML	UMD
Affiliated funds	1.00*** (73.82)	0.14*** (10.50)	0.03** (2.01)	0.02* (1.92)
Unaffiliated funds	0.99*** (93.64)	0.07*** (6.52)	-0.01 (-0.89)	0.03*** (3.54)
Affiliated funds - Unaffiliated funds	0.01 (1.27)	0.07*** (8.05)	0.05*** (4.02)	-0.01 (-1.24)

and statistically significant ( $t = 2.33$ ). Results based on the CAPM 1-factor alpha, Fama and French (1993) 3-factor alpha, and Carhart (1997) 4-factor alpha continue to suggest that affiliated funds underperform unaffiliated funds. Depending on which model we use, we find that affiliated funds underperform unaffiliated funds by about 0.09%–0.14% a month. These differences are statistically significant at the 5% level or better. We note that both affiliated funds and unaffiliated funds underperform their benchmarks. This result is consistent with prior findings that actively managed mutual funds as a whole underperform the market after fees (Jensen (1968), Gruber (1996), and Carhart (1997)).

We showed in Table 1 that affiliated funds have a higher expense ratio than unaffiliated funds. Therefore, it is possible that affiliated funds underperform because of higher fees. To address this issue, we examine gross returns by adding the expense back. We continue to find that affiliated funds underperform unaffiliated funds. Although the performance gaps are not as large as those for net returns, they remain statistically significant. These results suggest that expense ratio does not drive the underperformance of affiliated funds.

To investigate whether affiliated and unaffiliated funds take different levels of risk or follow different investment styles, we present in Panel B of Table 2 the factor loadings on the Carhart (1997) 4-factor model.<sup>12</sup> Both affiliated and unaffiliated funds have a market beta approximately equal to 1. Factor loadings on SMB and HML suggest that affiliated funds tilt their portfolio slightly more toward small stocks and value stocks than do unaffiliated funds. Finally, unaffiliated funds are more likely to invest in momentum stocks than are affiliated funds, but not significantly so.

Table 3 reports the results for hybrid mutual funds, which include “balanced,” “total return,” and “income” funds. These funds typically have substantial holdings in both stocks and bonds. Similar to our results on equity funds, we find that affiliated hybrid funds significantly underperform unaffiliated hybrid funds. The average monthly net return is 0.67% for affiliated funds and 0.80% for unaffiliated funds. The difference of 0.13% per month is statistically significant at the 1% level. The results are similar after adjusting for systematic factors. Affiliated funds underperform unaffiliated funds by 0.14% per month regardless of whether we use the 4-factor alphas, 6-factor alphas, or 7-factor alphas. Using gross returns reduces the performance differences to the range of 0.08%–0.09% per month, but the underperformance by affiliated funds remains statistically significant at the 5% level. Factor loadings reported in Panel B suggest that affiliated hybrid funds invest more in equity than unaffiliated funds do. This result is consistent with the descriptive statistics reported in Table 1.

Overall, we find strong evidence that affiliated funds underperform unaffiliated funds using a portfolio approach. This result holds for both equity funds and hybrid funds, and it is robust to various models of risk adjustment. Next, we examine the performance of affiliated funds using a multivariate cross-sectional regression framework.

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<sup>12</sup>Previous research (Brown and Goetzmann (1997), Carhart (1997), and DGTW (1997)) shows that size, value, and momentum help explain differences in fund performance.

TABLE 3  
Performance of Affiliated and Unaffiliated Hybrid Mutual Funds

Table 3 compares the performance of affiliated versus unaffiliated hybrid mutual funds. The sample period is from 1992 to 2004. The sample includes all domestic hybrid funds that exist any time between 1992 and 2004 in the CRSP Survivor-Bias-Free Mutual Fund Database. We exclude index funds and funds with less than \$15 million in total net assets (TNA) from our sample. Fund returns and investment objectives are from CRSP Survivor-Bias-Free Mutual Fund Database. Investment objectives are based on the ICDI objective reported in the CRSP Mutual Fund Database. Affiliated funds are funds that are affiliated with an investment bank. Unaffiliated funds are funds that are not affiliated with any investment bank. We obtain the list of fund management companies from the CRSP Mutual Fund Database and the list of investment banks from the SDC New Issues Database. We identify investment bank-affiliated mutual fund families by matching the names of fund management companies with the names of investment banks, and by using a variety of sources including *Moody's Bank and Finance Manual*, *Nelson's Directory of Institutional Money Managers*, *Securities Industry Yearbook*, the Thomson SDC M&A database, Factiva news article database, and company Web sites. We first calculate the TNA-weighted average returns across all funds in each fund category for each month. We then estimate the risk-adjusted returns using the time series of these average returns. We use the following models to evaluate the risk-adjusted performance: i) a 4-factor model, ii) a 6-factor model, and iii) a 7-factor model. The 4-, 6-, and 7-factor models are described in Section III.A.1. Gross returns are calculated by adding back 1/12th of the annual expense ratio to the net return. Panel A reports fund returns in percents per month. Panel B reports the factor loadings of the 7-factor model for net returns. Numbers in parentheses are *t*-statistics, and \*\*\*, \*\*, and \* indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

*Panel A. Returns (% per month)*

	Net Return			Gross Return		
	Affiliated Funds	Unaffiliated Funds		Affiliated Funds	Unaffiliated Funds	
Returns (% per month)	(1)	(2)	(1) – (2)	(3)	(4)	(3) – (4)
Raw return	0.67*** (2.99)	0.80*** (3.85)	-0.13*** (-3.86)	0.79*** (3.47)	0.87*** (4.15)	-0.08** (-2.49)
4-factor alpha	-0.09 (-1.13)	0.05 (0.57)	-0.14*** (-4.93)	0.02 (0.18)	0.11 (1.40)	-0.09*** (-3.30)
6-factor alpha	-0.24*** (-5.15)	-0.10** (-2.34)	-0.14** (-4.81)	-0.13*** (-2.80)	-0.04 (-0.80)	-0.09*** (-3.18)
7-factor alpha	-0.20*** (-4.59)	-0.06 (-1.61)	-0.14*** (-4.57)	-0.09** (-2.07)	0.00 (0.03)	-0.09*** (-2.97)

*Panel B. Factor Loadings*

	RMRF	SMB	HML	UMD	GOV	CORP	JUNK
Affiliated funds	0.73*** (50.60)	-0.05*** (-3.74)	0.22*** (14.41)	-0.05*** (-5.27)	0.21 (1.62)	-0.07 (-0.54)	-0.01 (-0.19)
Unaffiliated funds	0.67*** (50.58)	-0.04*** (-3.54)	0.22*** (15.50)	-0.04*** (-5.06)	0.20* (1.69)	-0.01 (-0.10)	0.02 (0.70)
Affiliated funds – Unaffiliated funds	0.06*** (6.51)	-0.01 (-0.75)	0.00 (0.38)	-0.01 (-0.96)	0.01 (0.11)	-0.06 (-0.66)	-0.03 (-1.21)

## 2. Cross-Sectional Regressions

We showed in Table 1 that affiliated funds tend to be smaller, younger, and charge higher fees and loads. Therefore, one might be concerned that our univariate portfolio results in the previous section are driven by the systematic differences in these fund characteristics. To mitigate this concern, we examine fund performance using a cross-sectional regression framework. We follow Chen, Hong, Huang, and Kubik (2004) to estimate the following regression model each month:

$$\begin{aligned}
 (7) \quad r_{i,t} = & a + b_1 \text{AFFUND}_{i,t} + b_2 \text{LOGTNA}_{i,t-1} + b_3 \text{LOGFAM}_{i,t-1} \\
 & + b_4 \text{EXP}_{i,t-1} + b_5 \text{LOGAGE}_{i,t-1} + b_6 \text{LOAD}_{i,t-1} + b_7 \text{FLOW}_{i,t-1} \\
 & + b_8 \text{FUNDRET}_{i,t-1} + b_9 \text{TURNOVER}_{i,t-1} + e_{i,t},
 \end{aligned}$$

where  $r_{i,t}$  is 1-month-ahead investment objective-adjusted fund return.<sup>13</sup> AFFUND is the dummy variable for investment bank-affiliated mutual funds. LOGTNA is the logarithm of the TNA of the fund. LOGFAM is the logarithm of the TNA of the fund family that the fund belongs to. EXP is the fund expense ratio. LOGAGE is the logarithm of 1 + the fund age. LOAD is the fund's total load charge. FLOW is the fund flow in the past year and is defined as

$$(8) \quad \text{FLOW}_t = \frac{\text{TNA}_t - \text{TNA}_{t-1} (1 + R_t) - \text{MGTNA}_t}{\text{TNA}_{t-1}},$$

where  $R_t$  is the fund return and  $\text{MGTNA}_t$  is the amount of assets acquired from a fund merger. FUNDRET is the fund return over the past year. TURNOVER is the fund's turnover rate. We estimate regression equation (7) each month using weighted least squares, where the weight for each observation is the fund's lagged TNA. We use the Fama and MacBeth (1973) method to calculate standard errors while adjusting for possible serial correlation with the Newey and West (1987) method.

Table 4 reports the regression results. Because the turnover data are missing from the CRSP Mutual Fund Database for 1 year in our sample, we separately report our results with or without turnover as a regressor.<sup>14</sup> Consistent with Chen et al. (2004), we find that fund performance is negatively related to fund size while positively related to fund family size. We find fund performance, especially net fund returns, to be negatively related to fund expense ratio. This result is consistent with Carhart (1997). Similar to Chen et al., we find fund returns to be persistent and negatively related to past fund flows.

Most importantly, we find that fund performance is significantly and negatively related to the affiliated fund dummy variable. Specifically, the coefficient on the affiliated fund dummy variable is  $-0.07$ , which suggests that after controlling for other fund characteristics, an affiliated fund underperforms an unaffiliated fund by about 7 bp per month. This magnitude is smaller than the 9–14 bp underperformance reported in Tables 2 and 3, but it is still statistically significant at the 5% level and is robust to whether we examine net returns or gross returns. Overall, the results in Table 4 confirm our earlier finding based on portfolio analysis that affiliated funds significantly underperform unaffiliated funds. This finding suggests that the underperformance of affiliated funds is not driven by other fund characteristics.

Overall, we find robust evidence of underperformance by affiliated funds using both a portfolio approach and a cross-sectional approach. This finding provides support for the conflict of interest hypothesis, and it suggests that any positive effect of the informational advantage possessed by affiliated funds is offset and dominated by the adverse effect of conflicts of interest.

<sup>13</sup>We obtain similar results when we estimate equation (7) at the fund family level or use the Carhart (1997) 4-factor alpha as the dependent variable. We report these robustness results in Sections III.C.5 and III.C.9.

<sup>14</sup>Turnover is missing for all funds in 1991. Since we use lagged turnover in regression equation (5), the missing data affect our regression of monthly fund returns in 1992.

TABLE 4  
Cross-Sectional Regressions of Fund Performance

Table 4 presents results for the cross-sectional regressions of fund performance for equity and hybrid mutual funds. The sample period is from 1992 to 2004. Fund returns and investment objectives are from the CRSP Survivor-Bias-Free Mutual Fund Database. Investment objectives are based on the ICDI objective reported in the CRSP Mutual Fund Database. We exclude index funds and funds with less than \$15 million in total net assets (TNA) from our sample. Affiliated fund dummy is a dummy variable that takes the value of 1 if the fund belongs to a fund family that is affiliated with an investment bank, and 0 otherwise. We obtain the list of fund management companies from the CRSP Mutual Fund Database and the list of investment banks from the SDC New Issues Database. We identify investment bank-affiliated mutual fund families by matching the names of fund management companies with the names of investment banks, and by using a variety of sources including *Moody's Bank and Finance Manual*, *Nelson's Directory of Institutional Money Managers*, *Securities Industry Yearbook*, the Thomson SDC M&A database, Factiva news article database, and company Web sites. We report the average coefficients from regressions of 1-month-ahead investment objective-adjusted fund returns on various fund characteristics. Gross returns are calculated by adding back 1/12th of the annual expense ratio to the net return. We calculate both lagged fund flow and lagged fund return using past 1 year's data. We use weighted least squares regressions where the weight is the fund's lagged TNA. We use the Fama and MacBeth (1973) method. Numbers in parentheses are *t*-statistics, which are based on the Newey and West (1987) standard errors, and \*\*\*, \*\*, and \* indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Independent Variables	Dependent Variable: 1-Month-Ahead Investment Objective-Adjusted Fund Return			
	Net Return (% per month)		Gross Return (% per month)	
	Model 1	Model 2	Model 1	Model 2
Intercept	0.14 (1.30)	0.10 (0.94)	0.14 (1.30)	0.10 (0.94)
Affiliated family dummy <sub><i>t</i></sub>	-0.07** (-2.33)	-0.06** (-2.18)	-0.07** (-2.33)	-0.06** (-2.18)
Log fund TNA <sub><i>t-1</i></sub>	-0.02 (-1.13)	-0.01 (-0.77)	-0.02 (-1.13)	-0.01 (-0.77)
Log family TNA <sub><i>t-1</i></sub>	0.01 (1.38)	0.01 (1.33)	0.01 (1.38)	0.01 (1.33)
Expense ratio <sub><i>t-1</i></sub>	-0.08* (-1.81)	-0.08** (-2.10)	0.01 (0.13)	0.01 (0.19)
Log fund age <sub><i>t-1</i></sub>	0.00 (0.12)	-0.00 (-0.16)	0.00 (0.12)	-0.00 (-0.16)
Total load <sub><i>t-1</i></sub>	0.00 (0.39)	0.00 (0.44)	0.00 (0.39)	0.00 (0.44)
Fund flow <sub><i>t-1</i></sub>	-0.07** (-2.59)	-0.08** (-2.46)	-0.07** (-2.59)	-0.08** (-2.46)
Fund return <sub><i>t-1</i></sub>	0.02*** (3.07)	0.02*** (3.08)	0.02*** (3.07)	0.02*** (3.08)
Turnover <sub><i>t-1</i></sub>		0.02 (0.52)		0.02 (0.52)
Average $R^2$	0.18	0.20	0.18	0.19

## B. Affiliated Mutual Funds and Client Holdings

We show in the previous section that affiliated funds significantly underperform unaffiliated funds, which is consistent with the conflict of interest hypothesis. To provide more direct evidence, we consider a particular setting where the potential conflict of interest is likely to be severe. Specifically, we examine the affiliated mutual funds' holdings of their client firms that recently conducted IPOs or SEOs. We focus on holdings of IPO and SEO clients because the academic literature provides strong evidence that these stocks underperform in the long run. However, to support recent underwriting deals and to help win future investment banking deals from their clients, investment banks have an incentive to buy and hold their clients' stocks through their affiliated mutual funds. For example, in a *Wall Street Journal* article, Lucchetti (2003) describes that an underwriting executive at Deutsche Bank asked the chief investment officer at Deutsche's asset

management unit to “be a team player” and buy shares of the struggling company Vivendi Universal, which Deutsche had helped bring public. In a *Bloomberg* article, Dietz and Levy (2004) cite numerous examples in which mutual funds run by the biggest securities firms load up on shares of IPO clients, even when the stocks are performing poorly. Evidence of overweighting these stocks would be consistent with the conflict of interest hypothesis because it is contrary to the best interests of fund shareholders.

### 1. Client Holdings of Affiliated Mutual Funds

We classify a stock as a client stock for a fund if the fund’s affiliated investment bank has underwritten an IPO or SEO for the firm during the past 3 years; otherwise, a stock is classified as a nonclient stock. We report both the aggregate holding of all client stocks by a fund and the average holding of each client stock by a fund. We scale dollar holdings by the TNA of the fund.

Table 5 reports the results. In column (1) we report the aggregate and average holdings of client stocks by affiliated funds. In column (2) we report the

TABLE 5  
Holdings of Client Stocks by Affiliated Funds versus Unaffiliated Funds

Table 5 presents the average holdings of client stocks by investment bank-affiliated funds and unaffiliated funds, conditional on positive holdings. We report both the aggregate holding of all client stocks by a fund and the average holding of each client stock by a fund. We scale dollar holdings by the total net assets (TNA) of the fund. The sample period is from 1992 to 2004. We exclude index funds and funds with less than \$15 million in TNA from our sample. Stockholdings are from the Thomson Mutual Fund Stockholdings Database. Our fund sample includes all domestic equity funds that are affiliated with an investment bank and have an investment objective code of “aggressive growth,” “growth,” or “growth and income” in the Thomson stockholdings database. We obtain the list of fund management companies from the CRSP Mutual Fund Database and the list of investment banks from the SDC New Issues Database. We identify investment bank-affiliated mutual fund families by matching the names of fund management companies with the names of investment banks, and by using a variety of sources including *Moody’s Bank and Finance Manual*, *Nelson’s Directory of Institutional Money Managers*, *Securities Industry Yearbook*, the Thomson SDC M&A database, Factiva news article database, and company Web sites. A stock is classified as a client stock for a fund if the company has conducted an IPO or SEO in the past 3 years that was underwritten by the fund’s affiliated investment banking firm. The sample of IPOs and SEOs and the associated underwriters are from the Thomson SDC New Issues Database. Share prices are from the CRSP stock database. Numbers in parentheses are 2-sided *p*-values, and \*\*\*, \*\*, and \* indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

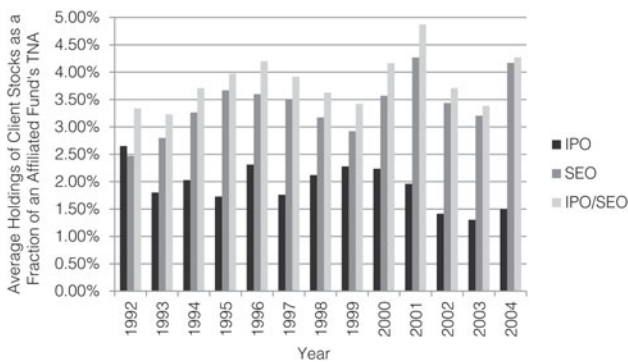
	Client Stocks Held by Affiliated Funds	"Client" Stocks Held by Unaffiliated Funds	(1) – (2)
	(1)	(2)	
<i>Panel A. All Clients</i>			
Aggregate holdings/fund's TNA	3.99%	1.94%	2.05%*** ( <i>p</i> < 0.01)
Per stock holdings/fund's TNA	0.89%	0.90%	–0.01% ( <i>p</i> = 0.17)
No. of client stocks held per fund	4.5	2.2	
<i>Panel B. IPO Clients</i>			
Aggregate holdings/fund's TNA	1.95%	0.84%	1.11%*** ( <i>p</i> < 0.01)
Per stock holdings/fund's TNA	0.73%	0.76%	–0.03%* ( <i>p</i> = 0.09)
No. of client stocks held per fund	2.7	1.1	
<i>Panel C. SEO Clients</i>			
Aggregate holdings/fund's TNA	3.59%	1.14%	2.45%*** ( <i>p</i> < 0.01)
Per stock holdings/fund's TNA	0.94%	0.95%	–0.01% ( <i>p</i> = 0.30)
No. of client stocks held per fund	3.8	1.2	

corresponding holdings by unaffiliated funds. In the 3rd column we report the difference between columns (1) and (2). Consistent with the conflict of interest hypothesis, we find that the aggregate holding of client stocks in affiliated funds is significantly higher than that in unaffiliated funds: 3.99% compared to 1.94%. This difference in client stock holdings between affiliated and unaffiliated funds is statistically significant at the 1% level. Further analysis shows that the average holding per client stock is nearly identical between affiliated funds and unaffiliated funds (0.89% vs. 0.90%). However, affiliated funds hold twice as many client stocks as unaffiliated funds (4.5 vs. 2.2). Similar results hold when we examine IPO and SEO clients separately, suggesting that affiliated funds overweight both IPO and SEO clients' stocks. Given that stocks of equity issuers underperform in the long run, we interpret these findings as suggesting that investment banks use affiliated funds to support the prices of their IPO and SEO client stocks.<sup>15</sup>

In Figure 1 we plot the average holdings of all IPO and SEO client stocks as a fraction of an affiliated fund's TNA for each year during our sample period. Two patterns emerge from this figure. First, the aggregate holdings of client stocks are fairly stable over time. This suggests that our results are unlikely to be driven by any particular year in our sample. Second, it appears that there is a significant overlap between the IPO and SEO client stocks, suggesting that many of

FIGURE 1  
IPO and SEO Client Holdings as a Fraction of Affiliated Fund's TNA

Figure 1 presents the average holdings of all IPO and SEO client stocks as a fraction of an affiliated fund's total net assets (TNA) for each year during our sample period from 1992 to 2004. We exclude index funds and funds with less than \$15 million in TNA from our sample. Stockholdings are from the Thomson Mutual Fund Stockholdings Database. Our fund sample includes all domestic equity funds that are affiliated with an investment bank and have an investment objective code of "aggressive growth," "growth," or "growth and income" in the Thomson stockholdings database. We obtain the list of fund management companies from the CRSP Mutual Fund Database and the list of investment banks from the SDC New Issues Database. We identify investment bank-affiliated mutual fund families by matching the names of fund management companies with the names of investment banks, and by using a variety of sources including *Moody's Bank and Finance Manual*, *Nelson's Directory of Institutional Money Managers*, *Securities Industry Yearbook*, the Thomson SDC M&A database, Factiva news article database, and company Web sites. A stock is classified as a client stock for a fund if the company has conducted an IPO/SEO in the past 3 years that was underwritten by the fund's affiliated investment banking firm. The sample of IPOs/SEOs and the associated underwriters are from the Thomson SDC New Issues Database. Share prices are from the CRSP stock database.



<sup>15</sup>In unreported tests, we compare average per stock holdings of client and nonclient stocks by affiliated mutual funds. We reach the same conclusion, that affiliated funds overweight their client stocks.

the IPO clients are also SEO clients of the same investment bank. This overlap is consistent with the finding in JM (2009) that by holding the IPO firm's shares, IPO underwriters can significantly increase their chance of underwriting the IPO firm's follow-on offerings.

## 2. Performance of Client and Nonclient Stocks Held by Affiliated Mutual Funds

In the previous section we document evidence that affiliated funds overweight their clients' stocks in their portfolios. In this section we compare the subsequent performance of IPO and SEO client holdings against various benchmarks. This analysis has 2 specific objectives. The 1st objective is to investigate whether the underperformance of equity issuers documented in the previous literature holds in our sample. The 2nd objective is to test a prediction of the conflict of interest hypothesis that worse-performing clients are more likely to be supported by affiliated funds.

In addition to raw returns, we also use the characteristic-based benchmarks of DGTW (1997) to evaluate the performance of fund holdings. Specifically, we subtract from the return of each stock the return of a well-diversified portfolio with similar size, book-to-market ratio, and momentum attributes.<sup>16</sup> These stock characteristics have been shown to explain the cross section of average stock returns (Fama and French (1993), Jegadeesh and Titman (1993)).

Table 6 reports the results. In column (1) we report the performance of affiliated funds' client holdings. For comparison, we also report the performance of client stocks not held by affiliated funds in column (2) and the performance of nonclient holdings in column (3). In columns (4) and (5) we report the performance of "client" stocks and nonclient stocks held by unaffiliated funds.<sup>17</sup> In the last 3 columns we report the differences between column (1) and columns (2)–(4), respectively.

We find strong evidence that the IPO/SEO client holdings of affiliated funds significantly underperform various benchmarks during the subsequent quarter. The average raw return of client stocks held by affiliated funds is only 0.22%, which is 1.42% ( $p$ -value < 0.01) below DGTW (1997) benchmark returns. This finding is consistent with the long-run underperformance of stock issuers documented in the prior literature. By contrast, there is no evidence that nonclient stocks held by affiliated funds underperform. On average, the nonclient holdings earn 2.98% per quarter and are 0.10% above the DGTW benchmark returns. The performance difference between client and nonclient holdings is economically large (−2.76% and −1.52% per quarter using raw and DGTW returns) and statistically significant.

Moreover, we find that client stocks held by affiliated funds significantly underperform those client stocks *not* held by affiliated funds. Specifically, client

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<sup>16</sup>For IPO stocks that lack prior return data, we match only by size and book-to-market ratio. For IPO stocks that also lack prior book-to-market data, we match only by size. In the final sample, we are able to match 2,910 distinct IPO stocks.

<sup>17</sup>In column (3), the performance of nonclient holdings by affiliated funds is identical across Panels A, B, and C of Table 6 because, by definition, nonclient holdings refers to the same set of stocks regardless of whether we compare them with IPO or SEO client stocks. The same applies to column (5).



TABLE 6

## Performance of Client and Nonclient Stocks Held by Affiliated Funds and Unaffiliated Funds

Table 6 presents the time-series cross-sectional average performance of client stocks and nonclient stocks held by investment bank-affiliated funds and unaffiliated funds. The sample period is from 1992 to 2004. We exclude index funds and funds with less than \$15 million in total net assets (TNA) from our sample. Stockholdings are from the Thomson Mutual Fund Stockholdings Database. Our fund sample includes all domestic equity funds that are affiliated with an investment bank and have an investment objective code of "aggressive growth," "growth," or "growth and income" in the Thomson stockholdings database. We obtain the list of fund management companies from the CRSP Mutual Fund Database and the list of investment banks from the SDC New Issues Database. We identify investment bank-affiliated mutual fund families by matching the names of fund management companies with the names of investment banks, and by using a variety of sources including *Moody's Bank and Finance Manual*, *Nelson's Directory of Institutional Money Managers*, *Securities Industry Yearbook*, the Thomson SDC M&A database, Factiva news article database, and company Web sites. The sample of IPOs and SEOs and the associated underwriters are from the Thomson SDC New Issues Database. A stock is classified as a client stock for a fund if the company has used the fund's affiliated investment banking firm as the underwriter for its IPO or SEO in the past 3 years. "Client holdings" are holdings of clients' shares. "Nonclient holdings" are holdings of firms that are not clients of the affiliated investment bank. Total shares outstanding and share prices are from the CRSP stock database. Stock returns and Daniel, Grinblatt, Titman, and Wermers (DGTW) (1997) benchmark returns are computed using data from the CRSP stock database and the Compustat database. Returns are expressed in percents per quarter. Differences in means are tested by *t*-tests. Numbers in parentheses are 2-sided *p*-values, and \*\*\*, \*\*, and \* indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

1-Quarter- Ahead Returns (% per quarter)	Affiliated Funds			Unaffiliated Funds		Difference		
	Client Holdings	Clients Not Held	Nonclient Holdings	"Client" Holdings	Nonclient Holdings	(1) - (2)	(1) - (3)	(1) - (4)
	(1)	(2)	(3)	(4)	(5)			
<i>Panel A. All Clients</i>								
Mean raw returns	0.22 (0.45)	2.15*** (<0.01)	2.98*** (<0.01)	1.28*** (<0.01)	3.66*** (<0.01)	-1.93*** (<0.01)	-2.76*** (<0.01)	-1.06*** (<0.01)
Mean DGTW adjusted returns	-1.42*** (<0.01)	-0.61*** (<0.01)	0.10*** (<0.01)	-1.02*** (<0.01)	0.47*** (<0.01)	-0.81*** (<0.01)	-1.52*** (<0.01)	-0.40* (0.10)
<i>Panel B. IPO Clients</i>								
Mean raw returns	-2.23*** (<0.01)	2.11*** (<0.01)	2.98*** (<0.01)	0.95*** (<0.01)	3.66*** (<0.01)	-4.34*** (<0.01)	-5.21*** (<0.01)	-3.18*** (<0.01)
Mean DGTW adjusted returns	-3.01*** (<0.01)	-0.26 (0.20)	0.10*** (<0.01)	-1.16*** (<0.01)	0.47*** (<0.01)	-2.75*** (<0.01)	-3.11*** (<0.01)	-1.85*** (<0.01)
<i>Panel C. SEO Clients</i>								
Mean raw returns	0.60** (0.05)	2.14*** (<0.01)	2.98*** (<0.01)	1.10*** (<0.01)	3.66*** (<0.01)	-1.54*** (<0.01)	-2.38*** (<0.01)	-0.50* (0.09)
Mean DGTW adjusted returns	-1.17*** (<0.01)	-0.91*** (<0.01)	0.10*** (<0.01)	-1.21*** (<0.01)	0.47*** (<0.01)	-0.26 (0.38)	-1.27*** (<0.01)	0.04 (0.88)

stocks not held by affiliated fund underperform the DGTW (1997) benchmark by 0.61% per quarter, but this underperformance is much smaller than that of client stocks held by affiliated funds, indicating that worse-performing clients are more likely to be held by affiliated funds. This finding provides further support for the conflict of interest hypothesis.

One might argue that the potential conflict of interest is more severe for IPO clients than for SEO clients because of the severity of the long-run underperformance and the potential future investment banking deals of IPO firms. Consistent with this argument, we find that the underperformance of client holdings is much more pronounced for the IPO clients. The IPO client stocks held by affiliated funds underperform the DGTW (1997) benchmark by 3.01% (*p*-value < 0.01) per quarter. These IPO client holdings also underperform nonclient holdings by 3.11% (*p*-value < 0.01) and IPO clients not held by 2.75% (*p*-value < 0.01).

Overall, we find strong evidence that client stocks held by affiliated funds underperform various benchmarks. This result, combined with our earlier finding

that affiliated funds overweight their clients' stocks in their portfolios, provides at least a partial explanation for the underperformance of affiliated mutual funds.

### 3. How Much Do Client Holdings Contribute to the Underperformance of Affiliated Mutual Funds?

To gauge the magnitude of the contribution of client holdings to the underperformance of affiliated mutual funds, we provide several simple calibrations in this section. We rely on the various performance estimates in Table 6 to measure the client holdings' contribution to fund performance. We focus on IPO clients because much of the evidence of client holdings' underperformance in Table 6 is due to IPO clients.

According to Table 5, an affiliated fund holds an average of 1.95% of its TNA in its IPO client stocks. Hypothetically, if affiliated funds' IPO client holdings are replaced with their nonclient stock holdings, then the average fund raw return could be improved by 10.1 bp ( $5.2\% \times 1.95\%$ ) per quarter, or about 3.4 bp per month. We show in Tables 2–3 that based on gross raw returns, affiliated funds underperform unaffiliated funds by 6–7 bp per month. In other words, holdings of IPO client stocks in the affiliated funds explain about 50% of the underperformance. An alternative assumption would be to replace the affiliated funds' IPO client holdings with the client stocks held by unaffiliated funds. In this case, the average fund raw return could be improved by 6.2 bp ( $3.18\% \times 1.95\%$ ) per quarter, or 2.1 bp per month. This would account for about  $\frac{1}{3}$  of the performance gap between unaffiliated funds and affiliated funds. Lastly, if affiliated funds' IPO client holdings are replaced with the IPO clients that are not held by affiliated funds, then the average affiliated fund raw return could be improved by 8.5 bp ( $4.34\% \times 1.95\%$ ) per quarter, or about 2.8 bp per month. This would account for about 40% of the performance gap between unaffiliated funds and affiliated funds. In summary, the previous calibrations suggest that between  $\frac{1}{3}$  and  $\frac{1}{2}$  of the underperformance of affiliated mutual funds could be explained by their IPO client holdings.

## C. Robustness Checks

We perform a series of robustness checks in this section. For brevity, for the portfolio approach we report only the results based on Carhart's (1997) 4-factor alphas (for equity funds) or 7-factor alphas (for hybrid funds); for the cross-sectional regression analysis, we report only the coefficient on the affiliated fund dummy variable.

### 1. Comanagers

Given that lead managers have the most reputational capital at stake in IPOs or SEOs, we would expect that the extent of conflicts of interest should be more severe for lead underwriters than for other syndicate members. To test this hypothesis, we repeat our analyses for a sample of equity funds affiliated with comanagers of IPOs and SEOs. In Panel A of Table 7, we compare the performance of 3 groups of funds: lead underwriter-affiliated funds, comanager-affiliated funds, and funds that are not affiliated with any lead manager or comanager. Consistent

TABLE 7  
Performance of Investment Bank-Affiliated Mutual Funds and Unaffiliated Mutual Funds:  
Robustness Checks

Table 7 presents results for robustness checks on the risk-adjusted performance of equity and hybrid mutual funds affiliated with investment banks. The sample period is from 1992 to 2004. The sample includes all domestic equity funds that exist any time between 1992 and 2004 in the CRSP Survivor-Bias-Free Mutual Fund Database. We exclude index funds and funds with less than \$15 million in total net assets (TNA) from our sample. Fund returns and investment objectives are from CRSP Survivor-Bias-Free Mutual Fund Database. Investment objectives are based on the ICDI objective reported in the CRSP Mutual Fund Database. We obtain the list of fund management companies from the CRSP Mutual Fund Database and the list of investment banks from the SDC New Issues Database and Mergers and Acquisitions Database. We identify investment bank-affiliated mutual fund families by matching the names of fund management companies with the names of investment banks, and by using a variety of sources including *Moody's Bank and Finance Manual*, *Nelson's Directory of Institutional Money Managers*, *Securities Industry Yearbook*, the Thomson SDC M&A database, Factiva news article database, and company Web sites. Except for Panel B (where equal-weighted returns are reported), we first calculate the TNA-weighted average returns across all funds in each fund category for each month. We then estimate the risk-adjusted returns using the time series of these monthly average returns. Panel A compares returns between lead manager-affiliated funds, comanager-affiliated funds, and funds that are not affiliated with either lead managers or comanagers. Panel B reports equal-weighted portfolio returns. Panel C reports results using rolling regressions with a rolling window of 36 months. Panel D reports load-adjusted returns. Panel E excludes mutual funds that are affiliated with non-top-tier investment banks. Top-tier investment banks are defined as investment banks with a Carter and Manaster (1990) reputation rank of 9. Reputation ranks are downloaded from Jay Ritter's Web site (<http://bear.warrington.ufl.edu/ritter/ipodata.htm>). Unaffiliated funds are funds that are not affiliated with any investment bank. Panel F excludes the 1999-2000 period from the sample. In Panels A-F, we use the Carhart (1997) 4-factor model for equity funds and the 7-factor model for hybrid funds to evaluate the risk-adjusted performance. In Panel G, we report conditional alphas estimated based on equations (11) and (12). Fund returns are expressed in percents per month. Numbers in parentheses are *t*-statistics, and \*\*\*, \*\*, and \* indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	Lead Manager- Affiliated Funds	Comanager- Affiliated Funds	Unaffiliated Funds			
Returns (% per month)	(1)	(2)	(3)	(1) - (2)	(1) - (3)	(2) - (3)
<i>Panel A. Comanagers</i>						
<i>Equity Funds</i>						
Net return (% per month)	-0.24*** (-4.81)	-0.15*** (-3.12)	-0.11** (-2.56)	-0.09* (-1.85)	-0.13*** (-3.92)	-0.04 (-0.79)
Gross return (% per month)	-0.14*** (-2.82)	-0.07 (-1.37)	-0.03 (-0.64)	-0.07 (-1.36)	-0.11*** (-3.27)	-0.04 (-0.78)
<i>Hybrid Funds</i>						
Net return (% per month)	-0.20*** (-4.59)	-0.08 (-1.52)	-0.06 (-1.50)	-0.12** (-2.41)	-0.14*** (-4.50)	-0.02 (-0.46)
Gross return (% per month)	-0.09** (-2.07)	0.01 (0.22)	0.01 (0.13)	-0.10** (-2.08)	-0.10*** (-2.99)	0.00 (0.13)
	Equity Funds			Hybrid Funds		
	Affiliated Funds	Unaffiliated Funds		Affiliated Funds	Unaffiliated Funds	
Returns (% per month)	(1)	(2)	(1) - (2)	(3)	(4)	(3) - (4)
<i>Panel B. Equal-Weighted Portfolios</i>						
Net return (% per month)	-0.21*** (-3.58)	-0.15*** (-2.87)	-0.06*** (-2.83)	-0.16*** (-5.54)	-0.12*** (-4.64)	-0.04* (-1.96)
Gross return (% per month)	-0.08 (-1.32)	-0.04 (-0.77)	-0.04* (-1.70)	-0.05* (-1.84)	-0.02 (-0.62)	-0.04* (-1.89)
<i>Panel C. Rolling Regressions</i>						
Net return (% per month)	-0.16*** (-3.19)	-0.09** (-1.99)	-0.07** (-2.34)	-0.14*** (-2.90)	-0.03 (-0.77)	-0.11*** (-3.33)
Gross return (% per month)	-0.09* (-1.71)	-0.01 (-0.11)	-0.08** (-2.24)	-0.02 (-0.35)	0.02 (0.49)	-0.04 (-1.19)
<i>Panel D. Load-Adjusted Returns</i>						
Net return (% per month)	-0.28*** (-5.48)	-0.14*** (-3.63)	-0.13*** (-3.90)	-0.24*** (-5.53)	-0.09** (-2.25)	-0.15*** (-5.07)

(continued on next page)

TABLE 7 (continued)  
 Performance of Investment Bank-Affiliated Mutual Funds and Unaffiliated Mutual Funds:  
 Robustness Checks

	Equity Funds			Hybrid Funds		
	Affiliated Funds	Unaffiliated Funds	(1) – (2)	Affiliated Funds	Unaffiliated Funds	(3) – (4)
Returns (% per month)	(1)	(2)	(1) – (2)	(3)	(4)	(3) – (4)
<i>Panel E. Top-Tier Investment Banks</i>						
Net return (% per month)	-0.22*** (-4.34)	-0.11*** (-2.89)	-0.11*** (-2.48)	-0.27*** (-4.85)	-0.06 (-1.61)	-0.21*** (-5.01)
Gross return (% per month)	-0.13** (-2.47)	-0.04 (-0.89)	-0.09** (-2.03)	-0.15** (-2.61)	0.00 (0.04)	-0.15*** (-3.52)
<i>Panel F. Excluding 1999–2000</i>						
Net return (% per month)	-0.29*** (-6.38)	-0.16*** (-4.08)	-0.13*** (-3.71)	-0.24*** (-5.53)	-0.09** (-2.32)	-0.15*** (-4.05)
Gross return (% per month)	-0.19*** (-4.06)	-0.08** (-2.02)	-0.11*** (-2.86)	-0.12*** (-2.83)	-0.02 (-0.54)	-0.10*** (-2.65)
<i>Panel G. Conditional Alpha</i>						
Net return (% per month)	-0.23*** (-4.55)	-0.11** (-2.63)	-0.12*** (-3.48)	-0.24*** (-5.40)	-0.09** (-2.10)	-0.15*** (-4.69)
Gross return (% per month)	-0.14** (-2.60)	-0.03 (-0.73)	-0.10*** (-2.83)	-0.13*** (-2.95)	-0.02 (-0.46)	-0.11*** (-3.29)

with our previous results, we find that lead underwriter-affiliated funds significantly underperform unaffiliated funds. In contrast, we find no such evidence for comanager-affiliated funds. While comanager-affiliated funds generally underperform unaffiliated funds, none of the differences is statistically significant at conventional levels. Overall, these results are consistent with the hypothesis that the adverse impact of conflicts of interest on fund performance is much more severe for lead underwriters than for other syndicate members.

## 2. Equal-Weighted Portfolios

In Tables 2 and 3 we compare the performance of affiliated funds with that of unaffiliated funds using TNA-weighted portfolios. In this section we test whether our results hold with equal-weighted portfolios. Panel B of Table 7 reports the results. Consistent with our value-weighted results, we find that affiliated funds significantly underperform unaffiliated funds. The underperformance ranges from 4 bp to 6 bp. While these differences are smaller in magnitude than those for value-weighted portfolios, they are still economically meaningful and statistically significant.

## 3. Rolling Regressions

In Tables 2 and 3 we estimate alphas and factor loadings at the portfolio level using the entire time series of returns. In this section we explore whether our results are robust to a fund-level rolling regression approach. Specifically, we estimate factor loadings with respect to the 4-factor model for each equity fund (or the 7-factor model for each hybrid fund) over a rolling window of 36 months. We then use these estimated factor loadings to compute fund alphas.

Results contained in Panel C of Table 7 indicate that our previous findings are robust to the rolling regression approach; we continue to find that affiliated funds underperform unaffiliated funds.

#### 4. Load-Adjusted Fund Performance

Thus far we have examined fund performance net and gross of fund fees. To explore the impact of loads on our results, we assume that on average an investor holds fund shares for 7 years (Ferris and Yan (2007)). We subtract 1/84th of the load fee from the monthly fund return ( $7 \text{ years} \times 12 = 84 \text{ months}$ ). We report the load-adjusted results in Panel D of Table 7. Overall, we find that our results are robust to the adjustment of loads. Indeed, the performance gap between affiliated funds and unaffiliated funds is generally larger and more statistically significant after adjusting for loads. This is consistent with our results in Table 1 that affiliated funds charge higher loads.

#### 5. Family-Level Regressions

Because the affiliation with an investment bank is at the fund family level, we can first pool returns across all funds within a fund family before estimating the cross-sectional regression. Results contained in Panel A of Table 8 indicate that our main finding is robust to this family-level approach; the coefficient on the affiliated fund family dummy variable continues to be significantly negative.

#### 6. Top-Tier Investment Banks

One might be concerned that our findings are driven by funds that are affiliated with less reputable investment banks, as reputable investment banks may be less inclined to take advantage of the shareholders of affiliated funds. To address this concern, we repeat our fund performance analyses using funds affiliated with the top-tier investment banks. We define a top-tier investment bank as one with a Carter and Manaster (1990) rank of 9.<sup>18</sup> The data on investment bank rankings are from Jay Ritter's Web site (<http://bear.warrington.ufl.edu/ritter/ipodata.htm>). We report the portfolio results in Panel E of Table 7 and cross-sectional regression results in Panel B of Table 8.

Overall, we find our results based on funds affiliated with top-tier investment banks to be qualitatively identical to our results based on all affiliated funds. There is no evidence that the adverse effect of conflicts of interest is less severe for funds affiliated with the most reputable investment banks. This finding is not surprising. After all, the 10 investment banks with whom the global settlement was reached are mostly reputable investment banks. Alternatively, one might argue that the reputational concerns are offset by the fact that reputable investment banks, due to their large market shares in the investment banking business, have perhaps the most to gain from exploiting fund shareholders.

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<sup>18</sup>The results are similar if we define a top-tier investment bank as one with a Carter and Manaster (1990) rank of 8 or higher.

TABLE 8  
Cross-Sectional Regressions of Fund Performance: Robustness Checks

Table 8 presents results for the robustness checks on the cross-sectional regressions of fund performance. The sample period is from 1992 to 2004. Fund returns and investment objectives are from the CRSP Survivor-Bias-Free Mutual Fund Database. Investment objectives are based on the ICDI objective reported in the CRSP Mutual Fund Database. We exclude index funds and funds with less than \$15 million in total net assets (TNA) from our sample. We identify investment bank-affiliated mutual fund families by matching the names of fund management companies with the names of investment banks, and by using a variety of sources including *Moody's Bank and Finance Manual*, *Nelson's Directory of Institutional Money Managers*, *Securities Industry Yearbook*, the Thomson SDC M&A database, Factiva news article database, and company Web sites. We regress 1-month-ahead fund returns on various fund characteristics and report the average coefficient on the investment bank (IB)-affiliated fund dummy. Gross returns are calculated by adding back 1/12th of the annual expense ratio to the net return. We calculate both lagged fund flow and lagged fund return using past 1 year's data. We use weighted least squares regressions where the weight is the fund's TNA. We use the Fama and MacBeth (1973) method. Panel A reports fund family-level regression results. The dependent variable is the 1-month-ahead investment objective-adjusted fund return averaged across all funds in a fund family. Panel B excludes mutual funds that are affiliated with an investment bank whose reputation rank is lower than 9. Reputation ranks are downloaded from Jay Ritter's Web site (<http://bear.warrington.ufl.edu/ritter/ipodata.htm>). Panel C excludes the 1999–2000 period from the sample. In Panels B and C, the dependent variable is the 1-month-ahead investment objective-adjusted fund return. In Panel D, the dependent variable is the Carhart (1997) 4-factor alpha. We use the following procedure to estimate the Carhart 4-factor alpha for each fund: First, we sort the sample into 6 groups by fund affiliation (affiliated with investment banks or not) and investment objective (aggressive growth, growth, or growth and income). Then we estimate the Carhart 4-factor loadings separately for each of the 6 groups using the entire time series of portfolio returns. We next assign the Carhart 4-factor loadings of the portfolio to each fund in the portfolio. Finally, we compute the Carhart 4-factor alpha for each fund month using the previous factor loadings along with realized fund returns and factor realizations. Numbers in parentheses are *t*-statistics, which are based on the Newey and West (1987) standard errors, and \*\*\*, \*\*, and \* indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	Net Return (% per month)		Gross Return (% per month)	
	Model 1	Model 2	Model 1	Model 2
<i>Panel A. Family-Level Regressions</i>				
IB-affiliated fund dummy <sub><i>t</i></sub>	-0.09*** (-3.04)	-0.08*** (-2.94)	-0.06** (-2.13)	-0.06** (-2.11)
<i>Panel B. Top-Tier Investment Bank-Affiliated Funds</i>				
IB-affiliated fund dummy <sub><i>t</i></sub>	-0.09** (-2.41)	-0.09** (-2.32)	-0.09** (-2.44)	-0.09** (-2.38)
<i>Panel C. Excluding 1999–2000</i>				
IB-affiliated fund dummy <sub><i>t</i></sub>	-0.07** (-2.51)	-0.07** (-2.52)	-0.07** (-2.53)	-0.07** (-2.56)
<i>Panel D. Dependent Variable = Carhart 4-Factor Alpha</i>				
IB-affiliated fund dummy <sub><i>t</i></sub>	-0.08** (-2.49)	-0.07** (-2.26)	-0.08** (-2.49)	-0.07** (-2.26)

## 7. Excluding the Bubble Period

We also replicate all of our fund performance analyses after excluding the 1999–2000 bubble period, during which stock returns exhibit extremely high volatilities and large cross-sectional dispersions. Panel F of Table 7 presents the results for the portfolio approach. Panel C of Table 8 presents the results for the cross-sectional regression analysis. We continue to find evidence that affiliated funds underperform in both analyses. Overall, we find similar results to the full sample, suggesting that our results are not driven by the bubble period.

## 8. Conditional Factor Models

For our portfolio analyses, we also use a conditional model for performance evaluation. Following Ferson and Schadt (1996) and Ferson and Warther (1996), we allow the market beta to vary with state variables such as dividend yield and

term spread. Specifically, we run the conditional factor model regressions in equations (9) and (10) for equity funds and hybrid funds, respectively:

$$(9) \quad r_{p,t} = \alpha_p + \beta_{1,p} \text{RMRF}_t + \beta_{2,p} \text{RMRF}_t \times \text{DP}_{t-1} \\ + \beta_{3,p} \text{RMRF}_t \times \text{TERM}_{t-1} + \beta_{4,p} \text{RMRF}_t \times \text{DEF}_{t-1} \\ + \beta_{5,p} \text{RMRF}_t \times \text{TB}_{t-1} + \beta_{6,p} \text{SMB}_t + \beta_{7,p} \text{HML}_t \\ + \beta_{8,p} \text{UMD}_t + e_{p,t},$$

$$(10) \quad r_{p,t} = \alpha_p + \beta_{1,p} \text{RMRF}_t + \beta_{2,p} \text{RMRF}_t \times \text{DP}_{t-1} \\ + \beta_{3,p} \text{RMRF}_t \times \text{TERM}_{t-1} + \beta_{4,p} \text{RMRF}_t \times \text{DEF}_{t-1} \\ + \beta_{5,p} \text{RMRF}_t \times \text{TB}_{t-1} + \beta_{6,p} \text{SMB}_t + \beta_{7,p} \text{HML}_t + \beta_{8,p} \text{UMD}_t \\ + \beta_{9,p} \text{GOV}_t + \beta_{10,p} \text{CORP}_t + \beta_{11,p} \text{JUNK}_t + e_{p,t},$$

where  $\text{DP}_{t-1}$  is the lagged value of dividend yield for the S&P 500 index,  $\text{TERM}_{t-1}$  is the lagged value of term spread (the difference between the long-term yield on government bonds and the T-bill),  $\text{DEF}_{t-1}$  is the lagged value of default yield spread (the difference between BAA- and AAA-rated corporate bond yields), and  $\text{TB}_{t-1}$  is the lagged value of the yield on the T-bill. We obtain monthly data on DP, TERM, DEF, and TB from Amit Goyal's Web site (<http://www.hec.unil.ch/agoyal/>). The rest of the variables in equations (9) and (10) are defined the same way as in equations (3) and (6). Panel G of Table 7 reports the results. Our results are unaffected.

## 9. Alternative Dependent Variable in Cross-Sectional Regressions

In our cross-sectional regression analyses presented in Table 4, we use the investment objective-adjusted return as the dependent variable. We consider an alternative dependent variable in this robustness test (i.e., the Carhart (1997) 4-factor alpha). We use the following procedure to estimate the Carhart 4-factor alpha for each fund. First, we sort the sample into 6 groups by fund affiliation (affiliated with investment banks or not) and investment objective (aggressive growth, growth, or growth and income). Then we estimate the Carhart 4-factor loadings separately for each of the 6 groups using the entire time series of portfolio returns. We next assign the Carhart 4-factor loadings of the portfolio to each fund in the portfolio. Finally, we compute the Carhart 4-factor alpha for each fund month using the previous factor loadings along with realized fund returns and factor realizations. Panel D of Table 8 contains the results. We find that the coefficient on the affiliated fund dummy variable continues to be significantly negative in all specifications. Our main results remain intact.

## D. Discussions

### 1. Comparison with Prior Work

#### a. Johnson and Marietta-Westberg (2009)

JM (2009) also examine the performance of IPO client holdings and find that, in some cases, IPO stocks purchased by their underwriter's affiliated funds earn

positive abnormal returns. Significant differences exist between our paper and JM. First, JM use the 13f institutional holdings database, while we use the CRSP mutual fund and Thomson mutual fund holdings databases. A major advantage of using the mutual fund sample is that we are able to gauge the impact of investment banking relationships on the overall fund performance by examining fund returns. JM, in contrast, cannot determine whether the superior skills they have identified in holdings benefit fund investors because fund returns on 13f institutions are not available. Second, JM restrict their sample to only those institutions that have served as IPO underwriters (i.e., affiliated institutions). In contrast, our sample contains all equity mutual funds, including both affiliated funds and unaffiliated funds. Indeed, our primary research question is whether investment bank-affiliated mutual funds perform differently from *unaffiliated* funds.

Third, our study also differs from JM (2009) in terms of the definition of affiliated funds, sample period, abnormal return measurement, and length of the event window. In particular, JM consider both lead underwriters and comanagers in their definition of affiliated institutions, while we focus on lead underwriters. JM's sample period (1993–1998) is much shorter than ours and is characterized by a generally rising market. Our sample includes both bull and bear markets. In addition, JM use market-adjusted returns to measure abnormal performance, and we use the DGTW (1997) adjusted returns. Finally, JM examine the performance of investment banking clients up to 2 years after the IPO date, while we use 3 years.

In an effort to reconcile our results with those of JM (2009), we repeat our analysis by following JM's methodology for our mutual fund sample. Untabulated results indicate that although we are unable to replicate the magnitude of JM's results, the methodological choices of JM tend to produce results more favorable for the superior information hypothesis. We argue that JM's findings are, at least in part, sample period-specific and therefore cannot be easily generalized.

b. Ritter and Zhang (2007)

Ritter and Zhang (2007) examine how investment banks allocate IPOs among affiliated mutual funds and unaffiliated funds. They find some evidence that investment banks allocate hot IPOs to their affiliated funds. Thus, holdings of IPO clients potentially have 2 opposite effects on the performance of affiliated funds: a positive effect due to IPO underpricing and a negative effect due to IPO long-run underperformance. To gauge the relative magnitude of these 2 effects, we perform the following calibration: According to Tables 2 and 3 in Ritter and Zhang, IPOs allocated to affiliated funds earn an average initial return that is 28.6% higher than IPOs not allocated to affiliated funds; the aggregate allocation of IPO client shares as a fraction of an affiliated fund's TNA is 0.45%. Therefore, the impact of IPO underpricing on the relative performance of affiliated funds is approximately 0.13% ( $28.6\% \times 0.45\%$ ). So, on average, affiliated fund performance is boosted by nearly 13 bp on the 1st trading day of IPO stocks.

In the meantime, according to our calibration in Section III.B.3, the long-run underperformance of IPO client holdings contributed to the underperformance of



affiliated funds by about 8.5 bp per quarter in the 3 years following the IPO.<sup>19</sup> This suggests that the positive effect due to IPO underpricing will be quickly (within 2 quarters) eroded by the negative effect of long-run IPO underperformance.

## 2. A Natural Experiment

It is possible that affiliated funds and unaffiliated funds are inherently different. A natural experiment would be to look at the performance of funds after they are acquired or divested by investment banks. We use a variety of sources, including the SDC M&A database, Factiva news article database, CRSP Mutual Fund Database, and companies' Web sites, to carefully identify cases in which fund families are acquired or divested by investment banks during our sample period.

We perform a series of analyses for the sample of funds acquired by investment banks, but not for funds divested by investment banks because the divestiture sample is too small to allow for any meaningful analysis. The conflict of interest hypothesis predicts that fund performance will worsen after the fund is acquired by investment banks. Unreported results are broadly consistent with this prediction, although they are statistically insignificant.

We recognize that several factors limit our ability to find even stronger evidence of conflicts of interest in this natural experiment. First, our sample size is small, which limits the power of our tests. This is an important reason why the changes in performance around acquisitions are generally statistically insignificant. Second, and more importantly, there is potentially a selection bias that works against finding more significant results in favor of the conflict of interest hypothesis. Jayaraman, Khorana, and Nelling (2002), in their analysis of M&As of mutual funds, document significant improvements in post-merger performance for target fund shareholders. Despite this significant countervailing influence, we find evidence that fund performance generally worsens after investment bank acquisitions. We interpret this finding as consistent with the conflict of interest hypothesis.

## 3. Evidence on Strategic Behaviors

It is possible that affiliated fund families might engage in strategic behaviors when allocating shares of underperforming equity issuers. For example, Gaspar et al. (2006) argue that fund families tend to favor high fee funds, young funds, and funds whose flow-performance relation is more convex. To provide evidence on whether investment bank-affiliated fund families exhibit such strategic behaviors, we partition affiliated funds into small and large funds based on the fund's TNA. Everything else being equal, small funds tend to be younger, charge higher fees, and have more convex flow-performance relations (Tufano and Sevick (1997), Ferris and Yan (2007), and Chevalier and Ellison (1997)). Furthermore, small funds are more likely to be newly created and might need more support

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<sup>19</sup>Because Ritter and Zhang (2007) compare the initial returns of the IPOs allocated to affiliated funds with those not allocated to affiliated funds, we similarly compare IPOs held by affiliated funds with those not held by affiliated funds.

(Evans (2010)). In addition, bigger funds are better at absorbing the poor performance of client shares because of their size and because their investors are more captured. Therefore, we conjecture that investment banks have an incentive to allocate poorly performing client shares to large funds rather than to small funds.

The results in Table 9 are broadly consistent with this conjecture. We find that while large funds do not hold a higher fraction of their TNA in client stocks, the client holdings by large funds significantly underperform the client holdings by small funds. This evidence suggests that fund families do treat small and large funds differently when it comes to providing support for investment banking clients. Furthermore, this result is consistent with our previous finding that affiliated funds underperform unaffiliated funds by a greater extent when using value-weighted rather than equal-weighted portfolios.

TABLE 9  
IPO/SEO Client Stock Allocation across Large and Small Affiliated Funds

Table 9 presents the average holdings of IPO and SEO client stocks by large and small investment bank-affiliated funds, conditional on positive holdings. It also presents the average performance of the IPO and SEO client stock holdings. Large (small) funds are funds whose total net assets (TNA) are greater (less) than the median TNA of the affiliated funds in a given quarter. The sample period is from 1992 to 2004. We exclude index funds and funds with less than \$15 million in TNA from our sample. Stockholdings are from the Thomson Mutual Fund Stockholdings Database. Our fund sample includes all domestic equity funds that are affiliated with an investment bank and have an investment objective code of "aggressive growth," "growth," or "growth and income" in the Thomson stockholdings database. We obtain the list of fund management companies from the CRSP Mutual Fund Database and the list of investment banks from the SDC New Issues Database. We identify investment bank-affiliated mutual fund families by matching the names of fund management companies with the names of investment banks, and by using a variety of sources including *Moody's Bank and Finance Manual*, *Nelson's Directory of Institutional Money Managers*, *Securities Industry Yearbook*, the Thomson SDC M&A database, Factiva news article database, and company Web sites. A stock is classified as a client stock for a fund if the company has conducted an IPO or SEO in the past 3 years that was underwritten by the fund's affiliated investment banking firm. The sample of IPOs/SEOs and the associated underwriters are from the Thomson SDC New Issues Database. Total shares outstanding and share prices are from the CRSP stock database. Numbers in parentheses are 2-sided *p*-values, and \*\*\*, \*\*, and \* indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	Large Affiliated Funds	Small Affiliated Funds	(1) – (2)
	(1)	(2)	
<i>Panel A. Fund Characteristics</i>			
Fund's TNA (\$ million)	1,447	126	1,321*** ( $<0.01$ )
Age (years)	10	5	5*** ( $<0.01$ )
Expenses (%)	1.23	1.48	-0.25*** ( $<0.01$ )
<i>Panel B. IPO Clients</i>			
<i>Client Holding Level</i>			
Aggregate holdings (\$ million)	31.6	2.6	29.0*** ( $<0.01$ )
Aggregate holdings / fund's TNA	1.74%	2.19%	-0.45%*** ( $<0.01$ )
Per stock holdings / fund's TNA	0.56%	1.18%	-0.62*** ( $<0.01$ )
Per stock holdings / stock's market cap	0.56	0.19	0.37*** ( $<0.01$ )
No. of IPO clients held	3.1	1.9	
<i>Client Holding Performance</i>			
Raw returns (per quarter)	-2.35%*** ( $<0.01$ )	1.28% (0.34)	-3.63%** (0.02)
DGTW adjusted return (per quarter)	-3.17%*** ( $<0.01$ )	-0.15% (0.89)	-3.02%** (0.02)

(continued on next page)

TABLE 9 (continued)  
 IPO/SEO Client Stock Allocation across Large and Small Affiliated Funds

	Large Affiliated Funds	Small Affiliated Funds	(1) – (2)
	(1)	(2)	
<i>Panel C. SEO Clients</i>			
<i>Client Holding Level</i>			
Aggregate holdings (\$ million)	66.3	5.1	61.2*** ( $<0.01$ )
Aggregate holdings / fund's TNA	3.26%	3.78%	-0.52%*** ( $<0.01$ )
Per stock holdings / fund's TNA	0.75%	1.30%	-0.55*** ( $<0.01$ )
Per stock holdings / stock's market cap	0.37	0.12	0.25*** ( $<0.01$ )
No. of SEO clients held	4.3	2.9	
<i>Client Holding Performance</i>			
Raw returns (per quarter)	-0.31% (0.42)	3.24%*** ( $<0.01$ )	-3.55%*** ( $<0.01$ )
DGTW adjusted return (per quarter)	-1.70%*** ( $<0.01$ )	0.30% (0.48)	-2.00%*** ( $<0.01$ )

#### IV. Conclusions

The purpose of this paper is to empirically examine the net effect of superior information and conflicts of interest on the performance of investment bank-affiliated mutual funds. While affiliation with an investment bank may cause funds to pursue the interests of the bank at the expense of fund shareholders, affiliated funds may also use the superior information acquired through investment banking relationships to benefit fund shareholders.

Using a comprehensive sample of mutual funds for the period from 1992 to 2004, we find strong evidence that affiliated mutual funds significantly underperform unaffiliated funds. The average annualized risk-adjusted returns of the portfolio of affiliated funds are 1.08%–1.68% lower than those of the portfolio of unaffiliated funds. The magnitude is smaller but remains statistically significant when using gross returns or after controlling for various fund characteristics in a cross-sectional regression framework. Our results suggest that the conflict of interest effect dominates the informational advantage effect.

Consistent with the conflict of interest hypothesis, we find that affiliated funds hold a disproportionately large amount of stocks of their investment banking clients who recently conducted an IPO or SEO. We further provide evidence that the client holdings of affiliated funds on average underperform their non-client holdings, the clients not held by affiliated funds, and the “client” or non-client holdings of unaffiliated funds. We do not claim that the underperformance by affiliated funds is completely attributed to their overweighting of recent IPO and SEO clients’ stocks. Indeed, our calibrations suggest that  $\frac{1}{3}$  to  $\frac{1}{2}$  of the performance gap between affiliated and unaffiliated funds could be explained by the affiliated funds’ holdings of IPO client stocks. Other forms of conflicts of interest might also have contributed to the underperformance of affiliated funds. For example, we do not examine the effect of such investment banking relationships as bond underwriting and private placements.

Our results suggest that fund investors are taking a back seat to investment banking profits. This finding is consistent with the idea that investment banks are propping up their underwriting and advisory services, which have lucrative fees (explicit or implicit), at the expense of their fund management business, which is less lucrative. Maintaining long-term relationships with client firms is critical in helping investment banks win their underwriting and advisory mandates. While this view is widely shared by academics and particularly practitioners, there is not much evidence on exactly how investment banks maintain client relationships. In this study, we find evidence that investment banks use their asset management unit to support client relationships.

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