Outsourcing Mutual Fund Management: Firm Boundaries, Incentives and Performance

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First Draft: November 2004
This Draft: October 2007

Abstract:

This paper investigates the effects of managerial outsourcing on the incentives and performance of mutual funds. We first document that many families farm out the management of a sizeable fraction of their funds to unaffiliated advisory firms. We find that funds managed externally significantly under-perform those ran internally. We establish the causality of this relationship by using as an instrument for outsourcing the interaction of the number of funds a family offers (controlling for family size) at the time a fund is started with the proximity of the family's location from financial centers. We then hypothesize that contractual externalities due to firm boundaries make it more difficult to extract performance from an outsourced relationship. We verify two key auxiliary predictions of this hypothesis: compared to counterparts ran internally, (1) an outsourced fund faces higher-powered incentives in that the likelihood that it experiences a closure or managerial termination is more sensitive to poor past performance and absolute deviation of fund risk-taking from the norm; (2) its risk-taking behavior also deviates less from the norm.

We thank Effi Benmelech, Patrick Bolton, Ned Elton, Oliver Hart, Bengt Holmstrom, Steven Grenadier, Dan Kessler, Arvind Krishnamurthy, Burton Malkiel, Oguzhan Ozbas, Clemens Sialm, Jeremy Stein, Jay Wang, Luigi Zingales and seminar participants at Arizona State, Brigham Young University, Georgia State, Harvard-MIT Organizational Economics Seminar, Mitsui Life Symposium at University of Michigan, New York University, SUNY Binghamton, University of Illinois, UCLA, UC Irvine, China International Conference on Finance, and the Western Finance Association Meetings for a number of insightful comments. Hong acknowledges support from an NSF Grant.

I. Introduction

Over the past two decades, mutual funds have been one of the fastest growing institutions in this country. At the end of 1980, they managed less than 150 billion dollars, but this figure had grown to over 4 trillion dollars by the end of 1997---a number that exceeds aggregate bank deposits (Pozen (1998)). From 1988 to 2000, the percentage of American households owning mutual funds rose from 24 percent to 49 percent (Investment Company Institute (2000)). While the flow of new money has leveled off recently in the face of market declines, the mutual fund industry remains among the most important in the economy.[1] Moreover, actively managed funds control a sizeable stake of corporate equity and play a pivotal role in the determination of stock prices (see, e.g., Grinblatt, Titman and Wermers (1995), Gompers and Metrick (2001)).

The economics literature on mutual funds has largely focused on two issues. The first, which dates back to Jensen (1968), is whether managers are able to beat the market. The consensus is that a typical manager is not able to earn enough returns to justify her fee, i.e. funds under-perform the market by about 1% annually (see, e.g., Malkiel (1995), Gruber (1996)). The second is the agency problem (between individual investors and mutual fund companies) arising out of delegated portfolio management. An important message of this literature is that performance-based incentives (whether explicit or implicit incentives related to fund flows) influence the risk-taking behavior of fund managers (see, e.g., Brown, Harlow and Starks (1996), Chevalier and Ellison (1997, 1999)).

Largely ignored is the role of organization in shaping the incentives and performance of mutual funds. There are two main types of firms in this industry. The first is mutual fund companies (i.e. families or complexes) that market and distribute thousands of funds to retail investors. Examples are well-known brand names like Fidelity and Vanguard. The second is investment advisors such as Wellington Capital who manage the portfolios of these funds and

[1] In 2003, the number of households with mutual funds actually fell to 53.3 million from 54.2 million, but the percentage of U.S. households with mutual funds is still near an all time high of 47.9 percent (Investment Company Institute (2004)).

typically has little role in marketing to individual investors. A little recognized fact is that mutual fund companies can outsource the management of their funds to sub-advisory firms. For example, while Vanguard's index funds are managed in-house, a number of their actively-managed funds are run (in part or completely) by investment advisory firms. Importantly, mutual fund investors are typically not aware if the managements of their funds are outsourced. Indeed, these arrangements have also been largely ignored by regulators and economists.

In a typical outsourcing arrangement, the family receives the marketing fee while the external advisor obtains the management fee. Like for any of its funds, the family, through a board of directors for the outsourced fund, keeps track of its performance and importantly whether its risk-taking profile is deviating from the objective of the fund or the norm for the fund's style. The family can fire the external advisor and hire another company or perhaps decide to run the fund internally, while the external advisor can manage outsourced funds for multiple families as well their own funds.[2]

In this paper, we investigate the relationship between firm boundaries, incentives and performance of mutual funds. To do this, we build a unique database from 1994 to 2004 that tracks for each year whether a fund is outsourced or ran internally. We take the CRSP Mutual Fund Database, which has information on fund families and their funds, and merge it with the Spectrum Database, which reports the names of the investment advisory companies managing these funds. In conjunction with an SEC database of filings by investment advisory companies, we are able to identify the relationships between investment sub-advisors and mutual fund families. A fund is categorized as being outsourced if one of its investment advisors is not affiliated with the mutual fund family.[3]

We begin our analysis by comparing the performance of outsourced funds to ones ran internally. Depending on performance benchmarks, we find that outsourced funds under-perform

[2] We thank Burton Malkiel for providing a number of the stylized facts regarding outsourcing arrangements in the mutual fund industry.
[3] The SEC defines affiliated as having either ownership of or some controlling interest in the other party.

other funds between an upper bound of about 7 basis points a month or 84 basis points a year and a lower bound of 3.6 basis points a month or 43.2 basis points a year. These are sizeable effects given that the typical fund under-performs the market by about 96 basis points a year. There are a few potential explanations for this under-performance. First, a fund being outsourced may be a signal that it is being run on the cheap---i.e., the external advisor may not get the same management fees as funds managed in-house. To see if this is indeed the explanation, we include in this cross-sectional performance regression controls for fund size and management fees and find that the under-performance remains. We also add in as controls a fund's family size, past fund flows, turnover and fund age and find that the under-performance result is not driven by such observable characteristics. More generally, we have also included family and advisor fixed effects and found similar results.

To more firmly establish causality, we utilize as an instrument for outsourcing the *interaction* of the number of funds a family offers (controlling for family size) at the time a fund is started with the distance of the family's location from financial centers. The number of funds variable is highly correlated with the number of products (i.e. styles) a family offers.[4] Financial centers are defined as the states of New York, Massachusetts, and California, where the majority of families (especially when weighted by the asset size of these companies) and managers are located. The basic premise behind our instrument is that there are capacity limits (i.e. one manager cannot do everything) and the family has to hire or outsource if it wants to offer a lot of different styles. So families that want to offer a lot of different funds or styles and are located far from these financial centers (and hence far from where most of the labor is) are more likely to outsource the management of their funds since they cannot easily build an array of managerial talent in-house.[5]

[4] Data on styles is unavailable during the inception dates of the many funds in our sample, so we view the number of funds as a proxy for the number of styles or products that a family offers.
[5] In other words, it is profit maximizing for these families to outsource.

The exclusion restriction for our instrument is that the performance of funds from families that offer a lot of funds controlling for family size *and* are not located in one of the financial centers is not lower for any reason other than outsourcing (after controlling for the direct effect of offering a lot of funds and the direct effect of locating in financial centers on performance). Our proposed instrument works quite well. The first stage regression yields a partial-F statistic on our instrument of 25 (or a t-statistic of around 5). Hence, our instrument is not subject to a weak-instrumental variables critique. The second stage regression yields statistically significant and economically larger results (about two to three times bigger than those obtained from the cross-sectional performance regressions).

Having established causality, we then consider an explanation due to Holmstrom (1999) who, in his rendition of the main theories of the firm (see Coase (1937), Williamson (1975), Klein, Crawford and Alchian (1978), Grossman and Hart (1986) and Hart and Moore (1990)), argues that contractual externalities due to firm boundaries make it more difficult to extract output from an outsourced relationship than from an employee within the firm.[6] Moreover, in a multi-task principal-agent setting, the firm optimally wants to use lower-powered incentives to extract output from an employee, but has to rely on higher-powered incentives in an outsourcing relationship due to the inability to coordinate incentives with the other firm.[7]

Our setting maps nicely into the contractual-externalities-due-to-firm-boundaries framework. An external advisory firm owns the technology that produces performance and gets the right to assign their employees or managers to tasks. There is typically no coordination of task assignments or incentives between the principal (e.g. Vanguard) and the sub-advisor (e.g.

[6] Ideas in Holmstrom (1999) build on Holmstrom and Milgrom (1991, 1994). Other papers on the theory of the firm include Bolton and Whinston (1993), Aghion and Tirole (1997), Baker, Gibbons, and Murphy (2002), and Stein (2002).

[7] Implicit in Holmstrom (1999) is measurement costs (i.e. the cost of getting a better measure of how output depends on effort, manipulation, etc…). He discusses other settings that can yield similar predictions. For instance, the firm may have additional information about an employee other than past performance (i.e. how often he shows up to work) and may not need to rely as much on past performance. We do not attempt to distinguish between different alternatives within the contractual externalities characteristic of imperfect information environments.

Wellington). So when a family farms out the management of a fund to an external advisory firm, the family typically does not have any control over a number of crucial variables. These include who the advisory firm assigns to work on its fund or whether the advisory firm is providing enough time and resources to that manager so that she is focused on the family's fund. Indeed, we know that external advisors often manage multiple funds for different families as well as other types of institutional investors such as university endowments. In contrast, if the advisor were inside the firm, the family has control over tasks and hence more levers to motivate the manager. As a result, we should see outsourced funds under-perform in-house ones.

We test two key auxiliary implications of the contractual-externalities-due-to-firm-boundaries hypothesis. First, the family has to lean more heavily on high powered incentives related to performance and other observable measures for outsourced funds than if the advisor was part of the firm.[8] We use two measures of family-fund incentives in the mutual fund literature: the sensitivities of fund closures or managerial termination to past performance and to deviation of fund risk-taking from its peers (see, e.g., Chevalier and Ellison (1999), Sirri and Tufano (1998)). We find that outsourced funds face steeper incentives than in-house funds when it comes to past performance. For instance, a 10% decrease in returns for an outsourced fund increases its chances of being closed by 33% relative to the mean probability of 2.1%. This sensitivity is about twice as much as for a typical fund. And more importantly, we find that outsourced funds are much more likely to be closed down following poor past performance than in-house funds, whereas their closure probabilities are relatively insensitive to good performance.

We also find that closures for outsourced funds are more sensitive to deviations of fund risk-taking from its style average. We use two measures from the literature: the absolute deviation of fund beta or idiosyncratic risk from fund style averages. For instance, a one standard

[8] It may seem counter-intuitive that outsourced funds face steeper incentives and do worse. But the point of Holmstrom (1999) is that outsourced funds would do even worse otherwise. One should view these two auxiliary implications as symptoms that go along with the under-performance of outsourced funds.

deviation increase in the absolute deviation of fund beta from style average for an outsourced fund increases its chances of being closed by 27% relative to the mean probability. This effect is over two times as large as for a typical fund. The magnitudes using the absolute deviation of idiosyncratic risk from style average are similar.

Second, we also expect that outsourced funds, since they face steeper incentives on the downside than funds managed in-house and are more disciplined when it comes to deviations in risk-taking profiles, ought to deviate less in their risk-taking from style norms (see Chevalier and Ellison (1999)). To see if this is true, we compare the deviations in risk-taking of outsourced funds to their in-house counterparts. We find that outsourced funds take less risk than their in-house counterparts. Being outsourced decreases absolute deviations in risk-taking (using either measure) from the norm by about 3% relative to in-house funds.

We have to keep in mind that some of these incentive findings may be driven by other types of heterogeneity. For instance, outsourced funds may be younger funds and younger funds may face steeper incentives or outsourced funds may be from larger families and larger families can more easily replace managers. Fortunately, we have a host of information about funds and families and can use them with past returns to distinguish among alternatives. We find that variations in implicit incentives are not due to other observable fund characteristics or a lack of commitment to a style.

Of course, we cannot rule out all forms of unobserved heterogeneity for the implicit incentives findings. However, the unobserved heterogeneity alternative becomes less compelling relative to the firm boundaries alternative when we consider the performance and incentive results simultaneously, i.e. the importance of firm boundaries becomes more compelling because both the performance and incentive results are consistent with the contractual externalities due to firm boundaries alternative.

Importantly, note that these findings are completely consistent with the fund family being profit-maximizing. We view fund families as making optimal outsourcing decisions taking into

account the need to offer more styles or funds to their clients. By managing in-house, the benefits are that get to keep both the marketing and management fees and have more control over their employees and can more easily extract output or performance; the costs are building an in-house capability, which may be prohibitively high for families located far from financial centers. By outsourcing, they do not get the management fee and have less control over quality and performance but can avoid the costs of building in-house capability. Like the rest of the mutual fund literature, we take as given the preferences on the part of retail investors to hold a variety of high-cost and apparently low performance mutual funds (i.e. the typical active fund under-performs by about one percent a year net of fees).

Our paper proceeds as follows. We describe the data, our identification scheme for outsourced funds and summary statistics regarding them in Section II. We study the performance of outsourced funds in Section III, their incentives in Section IV, and their risk-taking profiles in Section V. We consider robustness checks and alternative explanations in Section VI. We discuss the related literature in Section VII and conclude in Section VIII.

II. Data and Identification Scheme for Outsourced Funds

Our paper utilizes three databases. The first is the CRSP Mutual Fund Database, which goes back to the sixties.[9] It provides information about fund performance along with a host of fund characteristics such as assets under management, expenses, age, and the names of the managers. Importantly, it also gives the name of the fund family or complex that each fund

[9] We first select mutual funds with Investment Company Data, Inc. (ICDI) mutual fund objective of "aggressive growth" or "long-term growth" and categorize these funds as "Aggressive Growth" funds. We then add in mutual funds with Strategic Insight (SI) mutual fund objectives of "aggressive growth", "flexible" or "growth". We categorize funds with ICDI or SI objectives of "small-cap growth" as "Small-Cap Growth" and categorize funds with ICDI or SI objectives of "growth-income" or "income-growth" as "Growth and Income". We classify mutual funds with ICDI or SI objectives that contains the words "bond(s)", "government", "corporate", "municipal" or "money market" as "Bond or Money Market". Mutual funds whose objective contains the words "sector", "gold", "metals", "natural resources", "real estate" or "utility" are considered "Sector" funds. We classify funds whose objective contains the words "international" or "global" or a name of a country or a region as "International" unless it is already classified. Finally, we categorize "balanced", "income", "special" or "total return" funds as "Balanced" funds.

belongs to. The second is the Spectrum Mutual Fund Holdings Database, which goes back to the early eighties. It details the portfolio holdings of each fund; moreover, it provides the names of the investment advisory firms or sub-advisors managing the fund's portfolio. This key piece of information is only available after 1993; therefore, our analysis is limited to the post 1993 period. The third is the SEC's database of disclosures by investment advisors. These disclosures allow us to figure out the relationship between various investment advisors; in particular, these tell us if they are affiliated, which the SEC defines as having ownership or control in the other party.

We merge the first two databases using fund ticker symbols for the period of 1994 to 2004. A mutual fund may enter our database multiple times in the same year if it has different share classes. So we first clean the data by eliminating such redundant observations. We begin categorizing a fund as being outsourced or not by comparing the name of its family complex (provided by CRSP) to the names of its investment advisory firms (provided by Spectrum). The Spectrum Database provides up to two names because a fund may be managed by two or more advisory firms. To the extent that any of the names of the investment advisors does not match the name of the family complex, we identify that fund as a candidate for being outsourced.[10] Note the limitation to "candidate" since advisors with different names may still be affiliated.

We carefully do this matching by hand so as to account for issues such as slight variations of names for the same organization (e.g. Smith Barney LTD versus Smith Barney) and to account for different divisions of the same company having different names (e.g. Morgan Stanley Japan is part of Morgan Stanley). The latter issue is relevant mostly for categorizing international funds. Using this scheme, we identify 19,956 fund-year observations as being managed in-house and 15,546 fund-year observations as candidates for being outsourced.

[10] Since it is difficult to figure out the responsibilities of various sub-advisors on a fund, this is a conservative and sensible categorization.

This method, however, is imperfect because investment advisory names may sometimes be missing. There are 3,452 fund-year observations that are unidentified because of such missing information. We are able to reduce the number of unidentified funds by using an investment advisory firm code that Spectrum provides in addition to the name of the sub-advisor. For instance, Vanguard is given a code of VANG. We supplement our identification scheme by using this code: of the 3,452 missing fund-year observations, 636 can now be identified as managed in-house and 209 as candidates for being outsourced.

Finally, we use the SEC database of disclosures by investment advisors to check the relationship of advisors with different names. The worry is that we might misidentify an advisor who is a part of the same ownership structure as the mutual family because the names vary within the ownership structure. For example, The Dreyfus Corporation is a mutual fund family that is owned by Mellon Financial Corporation and there are funds in Dreyfus whose advisor is Mellon Bank. Similarly, there are other advisors in Dreyfus, such as The Boston Company, who are affiliated with the Mellon Financial Corporation. Fortunately, investment advisors are required by the Investment Advisers Act of 1940 to disclose their ownership structure to the SEC in their registration via Form ADV.[11] We look up the Form ADV of every family complex in our sample and if a fund which we identified as a candidate for being outsourced is contained in the same ownership structure, then we identify the fund as being managed in-house. Otherwise, we identify the fund as being outsourced.

Hence, the funds we identify as being outsourced have an investment advisor whose name differs from the name of the family complex and that advisor does not belong to the same ownership structure as the family complex. In total, we identify 28,571 fund-year observations as

[11] The SEC makes available the most recently available Form ADV to the public via the Internet at Investment Adviser Public Disclosure (IAPD) website, http://www.adviserinfo.sec.gov/IAPD. We look up Schedule A of ADV to identify direct ownerships, Schedule B to identify indirect ownerships, and Schedule C to identify other affiliate relationships. If we cannot find the mutual fund family in IAPD, we search for the investment advisory firm in IAPD.

being managed in-house, 10,767 as outsourced and 2,607 as left unidentified. In addition, we have randomly checked the outcomes of our identification scheme by downloading fund prospectuses from the Internet and found it to be accurate.

Table 1 provides summary statistics regarding our identification scheme. Panel A reports the results by year. The first thing to note is that the fraction of funds left unidentified decreases somewhat during the latter part of our sample (from about 11% at the beginning to 5% during the last year). Our results are robust to different sample periods. So this makes us feel comfortable that the fraction of funds left unidentified is not driving our results.

We delve into this issue further by breaking down the funds left unidentified each year by styles provided by the CRSP Mutual Fund Database. Panel B reports these results by year. The key thing to note is that most of the funds that are unidentified each year are bond and money market funds. The reason is that the Spectrum Database focuses primarily on equity and has spottier coverage of bond funds. Our results, however, hold even if we just considered equity funds. So these missing observations do not appear to be driving our results. Our final sample excludes funds that we are unable to definitively identify as being outsourced or not.

Our sample excluding the unidentified funds is described in Table 2. Panel A presents the number of in-house funds in our sample by style and by year. In Panel B, we look at the fraction of funds that are outsourced by fund style. First, the incidence of the portfolio management of funds being farmed out is uniform across almost every style; for seven of the eight styles, about 28% of funds on average are outsourced. The exception is sector funds; about 20% of these funds are outsourced on average. Thus, outsourcing does not appear to be limited to a few styles. And we see that the incidence of outsourcing has also increased over time across almost every style (except for bond and money market funds). A small part of this increase may be due to identification rates going up slightly over time if we tend to not be able to identify outsourced funds. More plausibly, it appears to reflect that the mutual fund industry (i.e.

families) has grown substantially during this period (as witnessed by the dramatic increase in the number of funds), and they are outsourcing a larger portion of their management in turn.

On average, the managements of about 26% of the funds in our sample are outsourced. This figure is similar to other estimates given by industry practitioners and regulators, which hover anywhere from the mid-teens to twenty-percent.[12] Our figure is slightly higher than these probably because we have the most comprehensive sample of funds since we start with the CRSP Mutual Fund Database. As such, we pick up investment companies that outsource virtually all of their funds. These companies are pure marketing vehicles and are not investment advisors, and therefore they do not have to file disclosures with the SEC. As a result, they do not appear on SEC databases but are in the CRSP mutual fund database.

Table 3 reports by year the characteristics of mutual fund families in our sample. In the first column, we report the number of mutual fund companies in our sample. In 1994, there are 345 companies. This number increases to a peak of 510 in 2000. And following the end of the dot-com bubble, it falls to 468 in 2004. In the second column, we report the average number of funds marketed per family by year. The typical family markets roughly eight funds, though this number has gone up somewhat over time. In the third column, we report the fraction of companies that does any outsourcing. Roughly 38% of families outsource to some degree in the first-half of the sample (1994-1998) and about 46% of families do so in the second-half (1999-2004). In the fourth column, we report the fraction of funds per family that get outsourced. The typical family on average farms out the management of 26% of its funds.

The last two columns of this panel report how concentrated in a style are the families in our sample. For each fund family, we calculate two measures of concentration. The first is its modal style in a given year (among the styles offered by the family in a given year, the one with

[12] For an estimate, see the following press release by Elliot Spitzer, which can be downloaded at the site http://www.oag.state.ny.us/press/2004/jan/jan06b_04.html.

the most of the family's assets under management). The second is its core or initial style (among the styles offered by the family during its first year in the CRSP Mutual Fund Database which goes back the 1960s, the one with the most of the family's assets under management). A fund's modal style is highly persistent across years and is highly correlated with its core style. As the results in these two columns attests, most families' funds are concentrated in one style; around 73% of assets are in the modal style and around 46% of assets in the core style. These two measures indicate that many families, even very big ones, tend to specialize and have a core style in which they have expertise.

In Table 4, we provide monthly descriptive statistics regarding the equity funds in our sample. We report the means and standard deviations for the variables of interest by all funds, in-house funds and outsourced funds. In each month, our sample includes on average about 2725 equity funds. They have average total net assets (TNA) of 559.8 million dollars, with a standard deviation of 1576.63 million dollars. Note that outsourced funds tend to be smaller than in-house funds (323 million compared to 647 million dollars). For the usual reasons related to scaling, the proxy of fund size that we will use in our analysis is the log of a fund's total net assets under management or TNA (LOGTNA). The statistics for this variable are reported in the row right below that of TNA. The funds in our sample have expense ratios as a fraction of year-end TNA (EXPRATIO) that average about 1.22 percent per year. The expense ratios of outsourced funds do not differ markedly from in-house funds (1.19 compared to 1.23 percent). Another variable of interest is LOGFAMSIZE, which is the log of one plus the cumulative TNA of the other funds in the fund's family (i.e. the TNA of a fund's family excluding its own TNA). Outsourced funds tend to be from smaller families than in-house ones. Fund turnover (TURNOVER) is defined as the minimum of purchases and sales over average TNA for the calendar year. The average fund turnover is 72.97 percent per year. Outsourced funds have a lower turnover than in-house counterparts (64.96% compared to 75.54%). The average fund age (AGE) is about 8.30 years. Outsourced funds tend to be younger (5.8 years to 9.16 years). Funds charge a total load

(TOTLOAD) of about 1.92 percent (as a percentage of new investments) on average. Outsourced funds charge a lower total load than in-house ones. FLOW in month t is defined as the fund's TNA in month t minus the product of the fund's TNA at month t-12 with the net fund return between months t-12 and t, all divided by the fund's TNA at month t-12. The funds in the sample have an average fund flow of about 36.22 percent a year. Flow does not appear to depend on outsourcing status. PRET is the past one-year cumulative return of the fund.

III. Outsourcing and Fund Performance

Our empirical strategy utilizes cross-sectional variation to see how fund performance varies with whether a fund is outsourced.[13] There are two major worries that arise when using cross-sectional variation. The first worry is that outsourcing is correlated with observables that affect performance. For instance, funds that are outsourced may be in different styles (international versus domestic equity) or they might be less likely than in-house funds to pursue small stock, value stock and price momentum strategies, which have been documented to generate abnormal returns. Moreover, a fund's outsourcing status might be correlated with other fund characteristics such as fund size, and it may be these characteristics that are driving performance. The analysis above shows that there is roughly the same degree of outsourcing across styles. Hence, whether or not a fund is outsourced is not highly correlated with a fund's style. However, as we show below, smaller funds are more likely to be outsourced, so we have to be careful in dealing with fund size when making performance inferences regarding outsourcing. The second worry is that outsourcing is correlated with unobservables that affect perfomance. We pursue an instrumental variables strategy to address this concern. In the analysis below, we

[13] We could have adopted a fixed-effects approach by looking at whether changes in a fund's performance are related to changes in its outsourcing status (i.e. it went from being outsourced to being run in-house). However, there are few instances of such switches. Moreover, such an approach may be subject to a regression-to-the-mean bias. If funds are outsourced whenever they are unsuccessful, then a fund with a year or two of poor performance will be more likely to be outsourced. But performance will regress to the mean, leading to a spurious conclusion that outsourcing is associated with higher fund returns. Measuring the effect of fund size on performance using cross-sectional regressions is less subject to such biases.

focus only on equity funds since the performance attribution literature has typically only dealt with these funds.

A. Fund Performance Benchmarks

A very conservative way to deal with the first worry about heterogeneity in fund styles is to adjust for fund performance by various benchmarks. In this paper, we consider, in addition to simple market-adjusted returns, returns adjusted by the Capital Asset Pricing Model (CAPM) of Sharpe (1964). Moreover, we also consider returns adjusted using the Fama and French (1993) three-factor model but augmented with the momentum factor of Jegadeesh and Titman (1993). This four-factor model has been shown in various contexts to provide explanatory power for the observed cross-sectional variation in fund performance (see, e.g., Carhart (1997)).[14] To be conservative since we have balanced and international funds in our sample, we consider a six-factor model in augment this four-factor model with the Morgan Stanley Capital International index return (MSCI), which includes Europe, Australia and the Far East, and the Lehman Aggregate Bond Index (LABI) return.

Panel A of Table 5 reports the summary statistics for the various portfolios that make up our performance benchmarks. Among these are the returns on the CRSP value weighted stock index net of the one-month Treasury rate (VWRF), the returns to the Fama and French (1993) SMB (small stocks minus large stocks) and HML (high book-to-market stocks minus low book-to-market stocks) portfolios, and the returns to price momentum portfolio UMD (a portfolio that is long stocks that are past twelve month winners and short stocks that are past twelve month losers and hold for one month). In addition, we also use the Morgan Stanley Capital International index return (MSCI) and the Lehman Aggregate Bond Index return (LABI). The summary statistics for these portfolio returns are similar to those reported in other mutual fund studies.

[14] See Elton and Gruber (1997) for a review of mutli-index models and performance measurement.

Since we are interested in the relationship between outsourcing and performance, we want to sort mutual funds into two portfolios at the beginning of each month, those that are outsourced and those that are not. Fund size is a strong predictor of outsourcing status (see first-stage of instrumental variables regression below). Since fund size strongly predicts performance (see Chen, Hong, Huang and Kubik (2004)), we want to calculate the loadings of outsourced versus in-house funds within fund size quintiles.[15] So we first sort mutual funds at the beginning of each month based on the size quintile rankings of their previous-month TNA.[16] Then within each fund size quintile, we separate funds into outsourced and in-house. We then track these ten portfolios for one month and use the entire time series of their monthly net returns to calculate the loadings to the various factors (VWRF, SMB, HML, UMD, MSCI and LABI) for each of these ten portfolios. For each month, each mutual fund inherits the loadings of one of these ten portfolios that it belongs to. In other words, if a mutual fund stays in the same size quintile by outsourcing status through out its life, its loadings remain the same. But if it moves from one size quintile or from one outsourcing status to another during a certain month, it then inherits a new set of loadings with which we adjust its next month's performance.

Panel B reports the loadings of the ten fund-size (TNA) by outsourcing status sorted mutual fund portfolios using the CAPM:

$$R_{i,t} = \alpha_i + \beta_i \, VWRF_t + \varepsilon_{i,t} \qquad t=1,\ldots,T \qquad (1)$$

where $R_{i,t}$ is the (net fund) return on one of our ten fund-size by outsourcing status sorted mutual fund portfolios in month t in excess of the one-month T-bill return, α_i is the excess return of that portfolio, β_i is the loading on the market portfolio, and $\varepsilon_{i,t}$ stands for a generic error term that is uncorrelated with all other independent variables. Notice that there is not much variation in the market beta (β_i's) between in-house and outsourced funds. However, the alphas of the outsourced

[15] We have also tried sorting first by fund style (the 6 equity styles given by the CRSP Mutual Fund Database) and then by outsourcing status. The results are similar.

[16] We also sort mutual funds by their past twelve-month returns to form benchmark portfolios. Our results are unchanged when using these benchmark portfolios. We omit these results for brevity.

funds appear to be generally smaller. But is difficult to gauge the statistical significance of this difference in this set-up given the lack of controls for other fund characteristics.

Panels C and D report the loadings for two additional performance models, the Fama-French three-factor model and this three-factor model augmented by a momentum factor:

$$R_{i,t} = \alpha_i + \beta_{i,1} VWRF_t + \beta_{i,2} SMB_t + \beta_{i,3} HML_t + \beta_{i,4} UMD_t + \varepsilon_{i,t} \quad t=1,\ldots,T \qquad (2)$$

$$R_{i,t} = \alpha_i + \beta_{i,1} VWRF_t + \beta_{i,2} SMB_t + \beta_{i,3} HML_t + \beta_{i,4} UMD_t + \beta_{i,5} MSCI_t + \beta_{i,6} LABI_t + \varepsilon_{i,t}$$

$$t=1,\ldots,T \qquad (3)$$

where $R_{i,t}$ is the net fund return on one of our ten size-sorted by outsourcing status mutual fund portfolios in month t in excess of the one-month T-bill return, α_i is the excess return, β_i's are loadings on the various portfolios, and $\varepsilon_{i,t}$ stands for a generic error term that is uncorrelated with all other independent variables. Again, outsourced and in-house funds do not have significantly different loadings on the various factors. However, the alphas of outsourced funds appear to be smaller than that of in-house ones.

We have also re-done all of our analysis by calculating these loadings using gross fund returns instead of net fund returns. The results are very similar to using net fund returns. So for brevity, we will just use the loadings summarized in Table 5 to adjust fund performance below (whether it be gross or net returns). Using the entire time series of a particular fund (we require at least 36 months of data), we also calculate the loadings separately for each mutual fund using Equations (1)-(3). This technique is not as good in the sense that we have a much more selective requirement on selection and the estimated loadings tend to be very noisy. In any case, our results are unchanged, so we omit these results for brevity.

B. Cross-sectional Performance Regressions

To deal with the second concern related to the correlation of fund size with other fund characteristics, we analyze the relationship between outsourcing and performance in the regression framework proposed by Fama and MacBeth (1973), where we can control for the

effects of other fund characteristics on performance. Specifically, the regression specification that we utilize is

$$FUNDRET_{i,t} = \mu + \phi\, OUTSOURCED_{i,t-1} + \boldsymbol{\gamma} \mathbf{X}_{i,t-1} + \varepsilon_{i,t} \qquad i=1,\ldots,N \tag{4}$$

where $FUNDRET_{i,t}$ is the return (either gross or net) of fund i in month t adjusted by various performance benchmarks, μ is a constant, $OUTSOURCED_{i,t-1}$ is an indicator for whether or not a fund is outsourced, and $\mathbf{X}_{i,t-1}$ is a set of control variables (in month t-1) that includes $LOGTNA_{i,t-1}$, $LOGFAMSIZE_{i,t-1}$, $TURNOVER_{i,t-1}$, $AGE_{i,t-1}$, $EXPRATIO_{i,t-1}$, $TOTLOAD_{i,t-1}$, $FLOW_{i,t-1}$, and $PRET_{i,t-1}$. Here, $\varepsilon_{i,t}$ again stands for a generic error term that is uncorrelated with all other independent variables. The coefficient of interest is ϕ, which captures the relationship between outsourcing and fund performance, controlling for other fund characteristics. $\boldsymbol{\gamma}$ is the vector of loadings on the control variables. We then take the estimates from these monthly regressions and follow Fama and MacBeth (1973) in taking their time series means and standard deviations to form our overall estimates of the effects of fund characteristics on performance.

In Table 6, we report the estimation results for the regression specification given in Equation (4). We begin by discussing the results for gross fund returns. Notice that the coefficient in front of OUTSOURCED is negative and statistically significant across the four performance measures. The coefficient obtained using market-adjusted returns is -0.058 with a t-statistic of 2.98. This means that an outsourced fund under-performs other funds by about 6 basis points a month or 72 basis points a year. The corresponding coefficient is -0.069 for CAPM-adjusted returns with a t-statistic of 3.47. The magnitudes are somewhat smaller when we use the four- and six-factor models: -0.036 with a t-statistic of 1.86 and -0.039 with a t-statistic of 2.06. So an outsourced fund under-performs other funds by between an upper bound of 7 basis points a month or 84 basis points a year and a lower bound of 3.6 basis points a month or 43.2 basis points a year. To put these magnitudes into some perspective, the typical fund has a gross fund

performance net of the market return that is basically near zero. As a result, a spread in fund performance of anywhere from 43 to 84 basis points a year is quite economically significant.

We next report the results of the baseline regression using net fund returns. The coefficient in front of OUTSOURCED is still negative and statistically significant across the four performance benchmarks. Indeed, the coefficient in front of OUTSOURCED is only slightly smaller using net fund returns than using gross fund returns. The observations regarding the economic significance of outsourcing made earlier continue to hold. If anything, they are even more relevant in this context since the typical fund tends to under-perform the market by about 100 basis points annually, after expenses.

There are a few potential explanations for this under-performance. First, a fund being outsourced may be a signal that it is being run on the cheap---i.e., the external advisor may not get the same management fees as funds managed in-house. This is unlikely to be an explanation since earlier mutual fund studies typically find that funds with higher management fees actually under-perform. Nonetheless, to see if this is indeed the explanation, we include in this cross-sectional performance regression controls for management fees and fund size (since the size of the fund in conjunction of fees determine the incentive package for the advisor). The coefficient in front of fees is negative but is only significant in the net fund returns regressions, consistent with earlier studies.[17] Fund size also attracts a negative coefficient consistent with the results of Chen, Hong, Huang and Kubik (2004) who argue that the fund size finding is associated with liquidity and organizational diseconomies. However, the coefficient in front of outsourcing is robust to these controls. So the under-performance of outsourced funds is not simply due to outsourced funds having lower management fees. We also include as controls a fund's family size, past fund flows, turnover, fund age and past returns. Notably, family size comes in with a significant positive sign consistent with Chen, Hong, Huang and Kubik (2004), as does past

[17] See Elton, Gruber and Blake (2003) for a study of incentives fees and mutual fund performance.

returns. We find that the under-performance result is not driven by such observable characteristics.

B. Cross-Sectional Performance Regressions with Advisor and Family Fixed Effects

More generally, we also include advisor and family fixed effects in these cross-sectional performance regressions. We briefly summarize these results. When we include advisor fixed-effects, we are essentially measuring the outsourcing effect by comparing the performance of funds managed by an advisory firm (e.g. Wellington) on its own behalf to funds that it manages for other families. The results, omitted for brevity, are similar to those in Table 6. For instance, using the six-factor benchmark model, the coefficient in front of OUTSOURCING using gross-fund returns is -0.043 with a t-statistic of 3.04. The economic effect and statistical significance are somewhat larger than those obtained without advisor fixed effects.

When we include family fixed-effects, we are measuring the outsourcing effect by comparing the performance of active equity funds managed by a family (e.g. Vanguard) to those that the family outsources to external advisory firms. The results, omitted for brevity, are again similar to those in Table 6. For example, for the six-factor benchmark model, the coefficient in front of OUTSOURCING using gross fund returns is -0.033 with a t-statistic of 1.65. The economic effect is comparable to that obtained in Table 6 but it is slightly less precisely measured.

Despite this array of controls, we are still unable to address the issue of causality without finding an instrument for outsourcing. For instance, our cross-sectional approach cannot address omitted-variables critiques based on time-varying effects (i.e. whether a family or an advisor is of poor quality changes over time).

C. Instrumental-Variables Performance Regressions

To this end, we propose the following instrument for whether or not a fund is outsourced based on the characteristics of the fund's family at the inception date of the fund. Namely, the instrument is the interaction of the number of funds a family offers (controlling for family size) at

the time a fund is started with the distance of the family's location from financial centers. More specifically, we define an indicator variable LOW DENSITY STATE as being equal to one if a fund's family is not located in either New York, Massachusetts or California and zero otherwise. Then we define NUMBER OF FUNDS AT INCEPTION as a count of the number of funds in the fund family when the fund is created (which includes non-equity funds). In addition, we define LOGFAMSIZE AT INCEPTION as the natural logarithm of one plus the size of the family that the fund belongs to when the fund was created.

The first stage of our instrumental variables regression specification is given by the following:

$$\begin{aligned} OUTSOURCED_{i,t} = {} & \mu + \varphi LOWDENSITYSTATE_{i,t-1} + \kappa NUMBEROFFUNDS_{i,0} + \\ & \vartheta LOWDENSITYSTATE_{i,t-1} \times NUMBEROFFUNDS_{i,0} + \eta LOGFAMSIZE_{i.0} + \\ & \pi LOWDENSITYSTATE_{i,t-1} \times LOGFAMSIZE_{i,0} + \gamma X_{i,t-1} + MONTH \times YEAREFFECTS + \varepsilon_{i,t} \end{aligned} \quad (5)$$

where OUTSOURCED is an indicator variable that equals 1 if the fund is outsourced and zero otherwise. The right hand side variables are defined above and includes time (month x year) effects. Note that $LOGFAMSIZE_{i,0}$ is LOGFAMSIZE AT INCEPTION. Note that our instrument is the interaction of the number of funds a family offers (controlling for family size) at a fund's inception with the family's distance from financial centers. Hence, we include as control variables LOGFAMSIZE AT INCEPTION and this variable interacted with LOW DENSITY STATE. The second stage regression specification is given by:

$$\begin{aligned} FUNDRET_{i,t} = {} & \mu + \phi OUTSOURCED_{i,t-1} + \varphi LOWDENSITYSTATE_{i,t-1} + \eta LOGFAMSIZE_{i,0} + \\ & \lambda LOWDENSITYSTATE_{i,t-1} \times LOGFAMSIZE_{i,0} + \gamma X_{i,t-1} + MONTH \times YEAREFFECTS + \varepsilon_{i,t} \end{aligned} \quad (6)$$

where the variables are defined as above. Note that the only variable from the right-hand side of the first-stage excluded from the right-hand side of the second stage is our instrument NUMBER OF FUNDS AT INCEPTION x LOW DENSITY STATE. Underlying this instrument is the premise that one manager cannot do everything, i.e. there are capacity limits and the family has to

bring in more managers either through hiring or outsourcing if it wants to offer a lot of different styles.

We run these two regression specifications using a pooled-2SLS with standard errors clustered by family. Note that there are a couple of differences in estimation between this pooled-2SLS and the Fama-MacBeth cross-sectional performance regression. First, we have to run the instrumental variables regression by pooling the data. When we run a pooled OLS of the second stage regression, the coefficient in front outsourcing is largely unchanged from that of the Fama-MacBeth. Hence, pooling versus running pure cross-sectional regressions is not changing our estimate of the outsourcing effect. Second, we have additional controls for performance in the second-stage due to the construction of our instrument.

It is worth reiterating at this point our exclusion restriction: the performance of funds from families that offer a lot of funds controlling for family size and are not located in one of the financial centers is not lower for any reason other than outsourcing (after controlling for the direct effect of offering a lot of funds and the direct effect of locating in financial centers on performance). To think through the plausibility of this assumption, imagine that we use the distance of a fund's family from financial centers as the instrument for outsourcing. Empirically, there is a strong positive relationship between being far from financial centers and being outsourced. Then the identification of the outsourcing effect is that funds located far from financial centers under-perform those located in financial centers---lets call this difference A. But one could argue that funds in financial centers have an informational advantage and hence do better for another reason in addition to outsourcing. Similarly, imagine that we use the number of funds the family offers at inception (controlling for family size) as the instrument. In this case, the reduced form of our instrumental variables regression is that the outsourcing effect is due to funds from families with many funds at inception under-performing those from families with little funds (controlling for size)---lets call this difference B. But again one can imagine scenarios

under which this difference in performance is due to reasons of family quality in addition outsourcing. Our instrument is really identifying the outsourcing effect off of the difference in these two differences (A and B). Our assumption is that this interaction is not correlated with fund performance for any reason other than outsourcing. We cannot come up with obvious economic stories for why this assumption would be false and hence we believe that the underlying exclusion restriction behind our instrument is a plausible one.

The result of the first-stage regression is presented in Table 7. Note that the coefficient in front of our instrument (LOW DENSITY STATE x NUMBER OF FUNDS AT INCEPTION) is 0.0046 with a t-statistic 4.88 or a partial-F statistic of around 25. The coefficient implies that a one standard deviation increase in the number of funds in a family at the inception of the fund increases the probability that the fund is outsourced by about 68%. This is a reasonably strong first-stage and is unlikely to suffer from a weak instrumental variables critique. Larger fund size, higher expense ratio, higher turnover, age and good past performance all decrease the probability that a fund is outsourced. Note in particular of these predictors besides our instrument, fund size comes in the strongest. The fact that smaller funds are more likely to be outsourced (along with the fact that fund size is a strong predictor of performance) is one reason why we create the benchmark portfolios using fund size along with outsourcing status.

The result of the second-stage regression is presented in Table 8. Note that the coefficient on outsourcing is bigger (by about 2-3 times) than that obtained from the cross-sectional performance regressions across all the specifications. Moreover, the estimate is significant for our three main specifications (beta-adjusted, 4-factor and 6-factor). It is insignificant for the naïve market-adjusted benchmark but the estimate is still large. However, the right way to evaluate funds is to adjust performance using either of the beta-adjusted, 4-factor or 6-factor models. The coefficients on the other regressors are similar in magnitude to the Fama-MacBeth cross-sectional regressions. The one exception is that the coefficient in front of

LOGTNA is about twice as big---this is due to the difference in weighting associated with running a pooled regression as opposed to pure cross-sectional regression. In sum, we conclude from Tables 7 and 8 that the outsourcing relationship we established in Table 6 is indeed a causal one.

IV. Outsourcing and Family Complex-Fund Incentives

Having more firmly established causality, we now consider an explanation due to Holmstrom (1999) who, in his rendition of the main theories of the firm, points out that contractual externalities due firm boundaries make it more difficult to extract output from an outsourced relationship than from an employee within the firm. The key idea is that in a multi-task principal-agent setting, the firm optimally wants to use lower-powered incentives to extract output from an employee, but has to rely on higher-powered incentives in an outsourcing relationship due to the inability to coordinate incentives with the other firm.

Hence, in conjunction with the under-performance of outsourced funds, this theory has two key and testable auxiliary implications. First, an outsourced fund faces higher-powered incentives---fund closure and managerial termination are more sensitive to poor past performance and another key observable, deviations of fund risk-taking from its style average, than counterparts ran internally. And second, its risk-taking profile should deviate less from its style average.

A. Sensitivity of Fund Closures to Past Performance

We begin by seeing if there is indeed a relationship between firm boundaries and whether the fund complex relies more on higher-powered incentives for outsourced funds. We use a standard measure of complex-fund incentives in the mutual fund literature: the sensitivity of fund closures (controlled by the family) to past performance (due to the advisor or manager). We estimate the following regression specification:

$$CLOSED_{i,t} = \mu + \boldsymbol{\lambda}\, \mathbf{X}_{i,t-1} + \varepsilon_{i,t} \qquad i=1,\ldots,M. \tag{7}$$

$CLOSED_{i,t}$ is a dummy variable that equals one if fund i is closed in year t and zero otherwise.[18] A fund is defined as closed in year t if it does not have a full set (twelve months) of fund returns in that year. μ is a constant and $\mathbf{X}_{i,t-1}$ is a vector of fund characteristics (measured at the end of year t-1) that includes an indicator for whether the fund is outsourced ($OUTSOURCED_{i,t-1}$) and an indicator for whether it is in the modal style of its family ($INMODALSTYLE_{i,t-1}$). The other independent variables of interest in $\mathbf{X}_{i,t-1}$ are $LOGTNA_{i,t-1}$, $LOGFAMSIZE_{i,t-1}$, $TURNOVER_{i,t-1}$, $EXPRATIO_{i,t-1}$, $TOTLOAD_{i,t-1}$, $FLOW_{i,t-1}$ and $PRET_{i,t-1}$. We will also include interactions of these variables as additional independent variables. We also include fund age dummies, year dummies and fund investment style dummies in the regression specification. $\boldsymbol{\lambda}$ is the vector of coefficients on these variables. $\varepsilon_{i,t}$ again stands for an error term that is uncorrelated with all other independent variables. The standard errors are clustered at the family level.

Table 9 reports the results. Column (1) shows the results for the baseline regression specification. In interpreting the results below, it is useful to keep in mind that the mean probability that a fund is closed down in a given year is about 2.1%. The coefficient in front of OUTSOURCED is positive and statistically significant. Being outsourced increases a fund's chances of being closed down by 0.93 percentage points or a 44% (0.0093/0.021) increase relative to the mean probability of being closed. The coefficient in front of PRET is negative (-0.0003) and statistically significant (t-statistic of 6.35). A fund that has a 10% lower past year return increases its probability of closure by 14% relative to the mean closure probability (-0.0003*10/0.021). The other significant predictor of interest is LOGTNA. The coefficient in front of LOGTNA is -0.0399 with a t-statistic of 9.27.

In column (2), we add in an additional explanatory variable in the form of the interaction of OUTSOURCED and PRET to see if outsourced funds face a differential sensitivity of closure to performance. We find that the coefficient on this interaction is negative and statistically

[18] This pooled regression utilizes all funds since we only have to condition on raw past performance and style effects are included in the regression.

significant, indicating that outsourced funds are more likely to be closed down for poor performance. A 10% decrease in returns for an outsourced fund increases its chances of being closed to 33% relative to the mean probability (-0.0007*10/0.021). In other words, outsourced funds face significantly steeper incentives than their in-house counterparts.

In interpreting the regression in column (2), we have to keep in mind that these results may be driven by other types of heterogeneity. For instance, outsourced funds may be younger funds and younger funds may face steeper incentives. Or outsourced funds might be more likely to be part of larger families and large families can more easily replace managers. Fortunately, we have a host of fund characteristics (such as fund size, fund age, family size) and use them along with past fund returns to control for these alternative explanations in the above closure regressions.

We do just this in columns (3) and (4). In column (3), we add in additional interaction terms including PRET*LOGTNA, PRET*LOGFAMSIZE, and PRET*AGE. These three interaction terms should pick up if our effect in column (2) is due to OUTSOURCED being a proxy for LOGTNA, LOGFAMSIZE or AGE. Notice that the coefficient in front of PRET*LOGTNA is positive and statistically significant, indicating that larger funds face flatter incentives. The coefficient in front of PRET*LOGFAMSIZE is negative (indicating that funds from large families face steeper incentives). The coefficient in front of PRET*AGE is not statistically significant. These controls appear to have explanatory power, but the coefficient in front of PRET*OUTSOURCED is still negative and statistically significant. So even with these controls, outsourced funds still face steeper incentives, suggesting that there is an independent outsourcing effect.

We continue along this vein in column (4) by adding in three additional interaction terms including PRET*EXPRATIO, PRET*TOTLOAD, and PRET*FLOW. The coefficient on PRET*EXPRATIO is not statistically significant, but the coefficient on PRET*TOTLOAD comes in negatively while PRET*FLOW comes in positively. However, even in the presence of

these additional variables, the coefficient in front of PRET*OUTSOURCED remains negative and statistically significant at the 10 percent level. It does not appear that our finding in column (2) is driven by obvious omitted fund characteristics.

Our main concern, however, is that what is driving our result in column (2) is that a fund being outsourced might be associated with the family's lack of commitment to a new style. In other words, the fact that the fund is outsourced as opposed to managed in-house is an indication that the family is only dipping its feet in a new style and will pull out at the first sign of trouble. This is a very plausible alternative hypothesis that can explain our key result.

To deal with this alternative, we control for whether or not the fund is in the modal style of the family and interact this with fund size. If it is indeed a commitment issue, we would expect that small funds in non-modal styles face a much higher sensitivity to past performance and for this control to take out the outsourcing effect identified in column (2). To see if this is the case, we add in several new variables in column (5) including PRET*LOGTNA*INMODALSTYLE. Indeed, we find that the coefficient in front of PRET*LOGTNA*INMODALSTYLE is negative (suggesting that small funds not in the modal style of the family are much more likely to be closed down for poor performance) but is not statistically significant. This is very consistent with our lack-of-commitment to new styles alternative. However, the coefficient in front of PRET*OUTSOURCED remains negative and statistically significant. So a lack of commitment to a new style does not appear to be driving our outsourcing effect.

In Panel B, we replace PRET with PRETLOW, which equals PRET if PRET is below average when compared to the average fund performance in the market and equals the average PRET in the market otherwise. The idea here, motivated by the work of Chevalier and Ellison (1999), is to see if fund closures are more sensitive to poor past performance rather than good past performance. And more importantly from our perspective, we see whether outsourced funds' increased closure sensitivity to performance in Panel A is due to the fact that it faces

steeper incentives on the downside. In column (1), we find that the coefficient in front of PRETLOW is negative, is statistically significant, and is significantly larger in absolute value than the coefficient in front of PRET in column (1) of Panel A. This suggests that funds in our sample do in fact face steeper incentives on the downside.

In column (2), we look to see if outsourced funds face steeper incentives on the downside than in-house funds. The coefficient of interest is the one in front of the interaction PRETLOW*OUTSOURCED. This coefficient is negative and statistically significant. More importantly, it is bigger in absolute value than the coefficient in front of PRET*OUTSOURCED in Panel A. This suggests that outsourced funds' sensitivity to past returns is bigger for poor past returns than it is for good past returns. In columns (3) through (5), we check to see if our finding in column (2) is due to omitted variables along the lines discussed earlier. We find that this is not the case.

B. Sensitivity of Fund Closures to Deviations of Fund Risk-Taking from the Norm

Another distinct implication of the firm boundaries-contractual externalities explanation that is less subject to omitted variables is that we should see that the family more closely track other aspects of fund behavior---notably its risk-taking profile and how it differs from the fund style norm. We use two measures of (absolute) risk-taking deviations due to Chevalier and Ellison (1999). The first is the deviation of a fund's beta from the average beta of funds in its class (excluding bond/money market funds). We calculate a fund's beta using the CAPM specification of equation (1) for each calendar year using the twelve monthly returns. For each fund/year regression, we save the estimated $\hat{\beta}_{i,t}$. For each calendar year, we then calculate the average $\hat{\beta}_{i,t}$ for each mutual fund class (every class but Bond/Money Market). The beta deviation risk measure for fund i in year t is:

$$\text{Beta-deviation}_{i,t} = \log(\, 1 + |\ \hat{\beta}_{i,t} \ - \ \text{average}\ \hat{\beta}_{i,t}\ \text{of funds in its style}\ |\,). \qquad (8)$$

The second risk-taking measure is a fund's idiosyncratic risk. Again we run exactly the same regression as for the beta deviation measure. We then save the standard deviation of the residuals from the regression, $\hat{\varepsilon}_{i,t}$, for each fund/year ($\sigma(\hat{\varepsilon}_{i,t})$). For each calendar year, we then calculate the average of this standard deviation for each mutual fund style (except Bond/Money Market). The idiosyncratic risk measure for fund i in year t is:

$$\text{Idio-risk-deviation}_{i,t} = \log(1 + |\sigma(\hat{\varepsilon}_{i,t}) - \text{average } \sigma(\hat{\varepsilon}_{i,t}) \text{ of funds in its style}|). \quad (9)$$

We will call either of these two measures RISKDEV.

With these two measures in hand, we re-estimate equation (7) except that we now include RISKDEV and RISKDEV interacted with OUTSOURCED. The coefficient of interest is in front of RISKDEV*OUTSOURCED, which tells us whether the sensitivity of fund closures to absolute risk-taking deviations is higher for OUTSOURCED funds. The results are reported in Table 10. The first two columns report the results for the beta-deviation risk measure. Column (1) shows the results for the baseline regression specification. In interpreting the results below, it is useful to keep in mind that the mean probability that a fund is closed down in a given year is about 2.2% (this figure differs slightly from the 2.1% number quoted earlier since bond/money market funds are excluded from this analysis since we cannot calculate a risk measure). The coefficient in front of OUTSOURCED is positive and statistically significant. Being outsourced increases a fund's chances of being closed down by 0.35 percentage points or a 16% (0.0035/0.022) increase relative to the mean probability of being closed. The coefficient in front of RISKDEV is positive (0.0022) and statistically significant (t-statistic of 2.96). A fund that has a one standard deviation increase in the absolute beta-deviation measure (1.22) increases its probability of closure by 12% relative to the mean closure probability (1.22*0.0022/0.022).

In column (2), we add in an additional explanatory variable in the form of the interaction of OUTSOURCED and RISKDEV to see if outsourced funds face a differential sensitivity of closure to risk-taking deviations. We find that the coefficient on this interaction is positive and

statistically significant, indicating that outsourced funds are more likely to be closed down for risk-taking deviations. A one standard deviation increase in the beta-deviation for an outsourced fund increases its chances of being closed by 27% relative to the mean probability (1.22*0.0049/0.022). In other words, outsourced funds face significantly steeper incentives than their in-house counterparts.

Columns (3) and (4) report the corresponding results for the idiosyncratic risk deviation measure. We find that the coefficient on this interaction is positive and statistically significant, indicating that outsourced funds are more likely to be closed down for this deviation. A one standard deviation increase in the idiosyncratic-risk deviation measure for an outsourced fund increases its chances of being closed to 20% relative to the mean probability (1.70*0.0026/0.022).

V. Outsourcing and Deviations of Fund Risk-Taking from the Norm

We now look at the relationship between firm boundaries and fund risk-taking. If outsourced funds do in fact face steeper incentives for risk-taking deviations, then they ought to deviate less than other funds (see Chevalier and Ellison (1999)). We see if this is true in this section. Our measures of risk-taking deviations are the beta-deviation and idiosyncratic risk measures. We estimate the following annual regressions using our sample of equity funds to see how outsourcing affects RISKDEV:

$$RISKDEV_{i,t} = \mu + \boldsymbol{\delta}\, \mathbf{X}_{i,t-1} + \varepsilon_{i,t} \qquad i=1,\ldots,M. \qquad (10)$$

$\mathbf{X}_{i,t-1}$ is a vector of fund characteristics (measured at the end of year t-1) that includes an indicator for whether the fund is outsourced ($OUTSOURCED_{i,t-1}$), an indicator for whether it is in the modal style of its family ($INMODALSTYLE_{i,t-1}$), $FUNDSIZE_{i,t-1}$, $LOGFAMSIZE_{i,t-1}$, $TURNOVER_{i,t-1}$, $EXPRATIO_{i,t-1}$, $TOTLOAD_{i,t-1}$, $FLOW_{i,t-1}$ and $PRET_{i,t-1}$. We also include a dummy variable for each mutual fund investment objective as fund style control, fund age dummies and year dummies but do not report their estimates.

The results are presented in Table 11. From column (1), we see that outsourced funds have a lower beta deviation than other funds---the coefficient in front of OUTSOURCING is -

0.0344 with a t-statistic of -2.00. Outsourcing decreases a fund's beta deviation by about 3% (exp(-0.0344)-1). A number of the other variables also have statistically significant coefficients. But the important thing to note is that OUTSOURCED remains statistically and economically significant in spite of these controls. In column (2), we look at how outsourcing affects the fund idiosyncratic-risk deviations. The coefficient on OUTSOURCED is -0.0347 with a t-statistic of 1.85. That means that being an outsourced fund decreases deviation in idiosyncratic risk relative to the style mean by about 3% (exp(-0.0347)-1). The other coefficients remain largely the same.

VI. Robustness Checks and Alternative Explanations

A. Checks for Fund Performance Regressions

We consider a number of additional robustness checks for the fund performance regressions. First, we break the management fee (EXPRATIO) down by the 12B-1 fee, which is typically obtained by the family complex, and the remaining portion which is kept by the fund advisor. The worry here is that total management fees may not accurately capture the incentives on the part of the advisor. Our results remain the same. Second, we also include more conventional advisor quality controls in the form of the number of funds managed by the advisor as opposed to using advisor fixed-effects and find similar results.

We also find that the sensitivity of fund flows to past performance does not differ between in-house versus outsourced funds. Studies typically find, as we do, that fund flows are sensitive to performance. The interpretation given in the literature is that this sensitivity captures the reaction of investors to fund performance. To this extent, this finding is consistent with outside investors not being aware that a fund is outsourced and that the under-performance of outsourced funds is unlikely to be related to differences in incentives provided by outside investors vis-a-vis fund flows.

These results are reported in Panel A of Table 12. The regression specification is the same as the baseline specification of Table 9 except that the dependent variable is $FLOW_{i,t}$. The coefficient of interest is in front of PRET*OUTSOURCED which tells us whether the sensitivity

of fund flows to past performance differs for outsourced funds. It is not statistically different from zero.

B. Checks for Fund Closure Regressions

As a final check regarding the interpretation of the fund closure regressions related to past performance (Table 9), we confront the lack-of-commitment alternative head on by calculating whether when an outsourced fund is shut down it means that the family pulls out of that style. This table (Panel B of Table 12) looks at funds that were closed. The dependent variable is an indicator that the family no longer offers a fund (the next year) in the style of the fund that was closed. The probability that a family shuts a style when they close a fund in the data is 25%. The independent variables are the usual controls we use in other regressions. The coefficient of interest is on OUTSOURCED. The positive coefficient suggests that families are more likely to end a style when they close an outsourced fund compared to when they close other funds. But this coefficient is small and not statistically significant. In other words, it does not appear that outsourcing is a signal of a lack of family commitment toward a new style.

We have also considered a number of other less compelling alternatives. For instance, perhaps the outsourcing effect reflects the fact that there are a lot of other funds in an outsourced fund's style and so it is easy to replace that fund. To deal with this, we introduce a new variable, the number of other funds from the family in a fund's style (NUMBERINSTYLE), as a control and find that our outsourcing effect is not due to this alternative. We have experimented with other proxies including an indicator for whether a fund is the only fund in its style (ONLYFUNDINSTYLE). Again, it does not affect the estimate in front of OUTSOURCED*PRET. (We omit these results for brevity.)

Finally, rather than focusing exclusively on fund closures, we consider managerial terminations more generally. A TERMINATION is defined as one of two things happening: either (1) the fund is closed or (2) if the fund is not closed, there is complete replacement of managers---that is, if none of the managers listed the previous year are listed this year. The

results, omitted for brevity, are similar to that reported in Table 9. The mean probability of replacement is 3.5%. A 10% decrease in return increases the probability of replacement for a typical fund by 11% (0.0004 * 10 / 0.035). A 10% decrease in return increases probability of replacement of outsourced fund by 22% (0.0008 * 10 / 0.035), which is double that of a typical fund.

C. Using MSA's to Measure Financial Center

Instead of using which state a fund is located as the way of classifying whether a family is in a financial center or not, we can use the MSA (Metropolitan Statistical Area) of the fund. MSA offers a potentially cleaner measure of whether a fund is located in a financial center. For instance, a fund family can be located in Syracuse and be classified as being in a financial center and another fund can be located in Hoboken, NJ and be classified as not being located in a financial center. MSAs solve this problem. Syracuse is not located in the New York City MSA but Hoboken is. The results using MSA's are very similar to those reported in the tables. We discuss the results briefly below but omit them for brevity. They are available upon request from the authors.

The first thing we do is to classify funds as being in high density areas if they are in the three largest fund MSAs and low density if they are not in those three largest MSAs. The three largest are Boston, New York City and San Francisco. These three have by far the most funds, and families there make up 45% of all funds in our sample. The coefficient on the interaction of low density fund location * number of funds at inception in the first stage regression (predicting outsourcing) is 0.0047 with a t-statistic of 4.97. When the dependent variable in the second stage regression is net returns adjusted by the four factor model, then the coefficient on outsourcing is -0.2735 with a t-statistic of 2.19. This is very similar to the results we report on the paper using MA, NY and CA as high density states.

We also get similar results when we expand the number of MSAs in our definition of high density. For example, if we define high density as funds in Boston, New York City, San

Francisco, Philadelphia and Chicago (the five biggest MSAs representing 54% of all funds), in the first stage regression we get a coefficient on the interaction of 0.0052 with a t-statistic of 5.17. In the second stage, the coefficient is -0.2005 with a t-statistic of 1.77.

D. Alternative Explanations

As we mentioned in the introduction, we do not attempt to distinguish between different alternatives within the contractual externalities characteristic of imperfect information environments. Holmstrom (1999) considers several different settings within this framework that lead to similar implications. For instance, in a single-task setting, a firm may have additional information about an employee other than past performance (i.e. how often he shows up to work) and may not need to rely as much on past performance. Another interpretation of the findings regarding fund closures is that it is easier to fire someone outside of an organization than within. This fits with the theme of "intra-firm socialism" in the corporate finance literature on internal capital markets. However, it is not clear that this alternative in of itself can also reconcile the finding that in-house funds do better than outsourced funds. However, we view that our set of findings, taken together, plausibly indicate that firms boundaries matter for incentives and performance as opposed to being simply reconcilable with unobserved heterogeneity.

VII. Related Literature

The contributions of our paper are to establish the importance of organizations for the mutual fund industry and, more generally, to clarify the effects of firm boundaries on incentives and performance. A contemporaneous piece by Cashman and Deli (2005) also looks at these outsourcing arrangements. They construct a different dataset using NSAR filings, but only for the year 2002. Their main focus is on how the location of decision rights varies by fund style (equity versus debt, corporate debt versus government debt). Our focus on the relationships between boundaries and incentives and performance is absent from their work.

Our paper is related to other papers that attempt to test the basic Grossman-Hart-Moore insight in particular settings. Notable examples include Baker and Hubbard (2004) whose work

centers on the trucking industry and the question of whether drivers should own the trucks they operate and Simester and Wernerfelt (2005) who look at the ownership of tools in the carpentry industry. Berger, Miller, Petersen, Rajan and Stein (2005) attempt to understand whether small organizations are better at carrying out certain specific tasks than large organizations in the context of banks. Chen, Hong, Huang and Kubik (2004) tackle the same question using mutual funds. The common idea behind these recent studies is that one can learn something useful by examining in detail how different types of organizations behave when faced with similar tasks. This is a different approach than the standard one of trying to explain organizational form (e.g., integration vs. non-integration) based on a variety of industry characteristics.

Our paper is also related to recent work on how the nature of an organization affects both the way that it does business, and the kinds of activities that it can efficiently undertake. Guedj and Scharfstein (2004) and Guedj (2005) look at the strategies and performance of big pharmaceutical firms, start-up firms and joint ventures between the two in comparison to internal projects of big firms. They find that joint ventures (which may be viewed as similar to an outside manager) are less performance sensitive than internal investment and on average have worse outcomes. Their setting is different from ours in a number of ways and hence we would expect different results. First, their joint ventures involve investment on the part of both firms whereas family complexes rely exclusively on the external advisory company to manage the fund. There is more of a principal-agent problem in our context and hence the model of Holmstrom (1999) regarding coordinating incentives is more appropriate for our context. Second, whereas an advisory company manages many different funds, the joint ventures typically involve only one project for the smaller firm and hence the issues of multi-tasking seem more appropriate for our setting. Nonetheless, we sound a cautionary note from this comparison that our findings only hold under certain contexts where the assumptions of Holmstrom (1999) apply.

VIII. Conclusion

In sum, we investigate the effects of managerial outsourcing on the incentives and performance of mutual funds. We first document that many families farm out the management of a sizeable fraction of their funds to unaffiliated advisory firms. Importantly, we document that funds managed externally significantly under-perform those ran internally. We establish the causality of this relationship by using as an instrument for outsourcing the interaction of the number of funds a family offers (controlling for family size) at the time a fund is started with the proximity of the family's location from financial centers. We then argue that contractual externalities due to firm boundaries make it more difficult to extract performance from an outsourced relationship and force the firm to rely more on high-powered incentives.

There are a number of avenues for future work. Namely, we have limited information on the portfolios of external advisory companies. We only know what these companies manage for mutual fund families but not for other institutions such as university endowments. More complete data on the portfolios of these companies might allow us to test other auxiliary implications of firm boundaries. For instance, we might attempt to measure the extent to which an advisory firm faces the multi-tasking trade-offs envisioned by the contractual-externalities-due-to-firm-boundaries framework. The upshot is that our findings are important not only for the mutual fund industry, but they also suggest that this industry is an invaluable laboratory with which to study important issues in organization.

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Table 1: Identification of Mutual Fund Management

This table reports the number of mutual funds we identify as being managed in-house versus being outsourced. We match every mutual fund in CRSP Mutual Fund Database with entries in Spectrum Mutual Fund Database using its ticker symbol. We identify a fund as being managed in-house if the name of its mutual fund family reported in CRSP matches the names of its investment advisory firm reported in Spectrum. We also identify a fund as being managed in-house if the names do not match but they are filed with the SEC's ADV forms as the names of one company that owns another or as the names of two affiliated companies. Otherwise, we identify the mutual fund management as being outsourced. If the names are not provided and we cannot further identify the management using manager abbreviation codes, we label the fund as being unidentified. Panel A reports the distribution of fund management outcomes by year. Panel B breaks down the unidentified mutual funds by style. Percentages of total within each year are reported in parenthesis.

Panel A: Number of funds that are managed in-house, outsourced and left unidentified

Year	In-house	Outsourced	Unidentified
1994	1621 (69%)	479 (20%)	265 (11%)
1995	1785 (68%)	581 (22%)	246 (9%)
1996	2003 (69%)	654 (22%)	257 (9%)
1997	2439 (69%)	782 (22%)	314 (9%)
1998	2536 (67%)	967 (25%)	305 (8%)
1999	2563 (62%)	1371 (33%)	193 (5%)
2000	3040 (70%)	1093 (25%)	192 (4%)
2001	3171 (70%)	1161 (26%)	206 (5%)
2002	3157 (70%)	1149 (26%)	196 (4%)
2003	3144 (69%)	1224 (27%)	206 (5%)
2004	3112 (67%)	1306 (28%)	227 (5%)
Total	28571 (68%)	10767 (26%)	2607 (6%)

Panel B: Breakdown of unidentified funds by style

Year	Aggressive Growth	Small-Cap Growth	Growth and Income	Bond or Money Mkt	Sector	International	Balanced
1994	25	15	22	138	12	26	27
1995	17	13	18	142	10	26	20
1996	17	13	19	150	9	26	23
1997	22	16	20	173	18	41	24
1998	19	19	20	171	19	40	17
1999	4	1	6	164	5	8	5
2000	3	0	6	163	4	11	5
2001	4	0	9	171	5	10	7
2002	5	0	9	163	4	8	7
2003	5	0	10	170	4	7	10
2004	5	0	11	183	5	10	13
Total	126	77	150	1788	95	213	158

Table 2: Investment Styles of Mutual Funds

This table shows the styles of mutual funds identified as managed in-house versus outsourced for our final sample of funds that excludes unidentified funds. Panel A breaks down in-house funds by style. Panel B breaks down outsourced funds by style.

Panel A: Breakdown of in-house funds by style

Year	Aggressive Growth	Small-Cap Growth	Growth and Income	Bond or Money Market	Sector	International	Balanced
1994	232 (79%)	145 (81%)	209 (80%)	340 (63%)	124 (93%)	295 (84%)	266 (78%)
1995	268 (77%)	160 (74%)	223 (77%)	361 (63%)	132 (94%)	344 (83%)	283 (74%)
1996	300 (77%)	184 (73%)	242 (76%)	415 (64%)	147 (90%)	392 (81%)	296 (73%)
1997	371 (77%)	238 (73%)	287 (78%)	526 (66%)	175 (86%)	473 (80%)	339 (75%)
1998	386 (72%)	250 (69%)	293 (75%)	544 (64%)	198 (83%)	499 (77%)	342 (71%)
1999	392 (64%)	261 (63%)	294 (65%)	588 (64%)	193 (70%)	479 (65%)	331 (64%)
2000	483 (72%)	298 (70%)	339 (72%)	721 (75%)	264 (78%)	555 (72%)	353 (72%)
2001	521 (71%)	319 (71%)	357 (71%)	752 (76%)	293 (78%)	569 (71%)	342 (72%)
2002	516 (69%)	332 (71%)	357 (72%)	776 (78%)	303 (79%)	531 (70%)	328 (72%)
2003	524 (68%)	336 (68%)	344 (69%)	789 (76%)	284 (76%)	511 (71%)	344 (72%)
2004	533 (67%)	339 (65%)	337 (67%)	781 (75%)	282 (76%)	485 (69%)	343 (71%)
Total	4526 (71%)	2862 (70%)	3282 (72%)	6593 (70%)	2395 (80%)	5133 (73%)	3567 (72%)

Panel B: Breakdown of outsourced funds by style

Year	Aggressive Growth	Small-Cap Growth	Growth and Income	Bond or Money Market	Sector	International	Balanced
1994	61 (21%)	35 (19%)	53 (20%)	197 (37%)	10 (7%)	57 (16%)	76 (22%)
1995	78 (23%)	55 (26%)	68 (23%)	216 (37%)	9 (6%)	72 (17%)	97 (26%)
1996	88 (23%)	67 (27%)	76 (24%)	235 (36%)	16 (10%)	90 (19%)	109 (27%)
1997	109 (23%)	90 (27%)	82 (22%)	269 (34%)	28 (14%)	120 (20%)	114 (25%)
1998	151 (28%)	111 (31%)	99 (25%)	305 (36%)	40 (17%)	145 (23%)	140 (29%)
1999	224 (36%)	154 (37%)	157 (35%)	334 (36%)	81 (30%)	262 (35%)	184 (36%)
2000	190 (28%)	125 (30%)	135 (28%)	243 (25%)	74 (22%)	215 (28%)	138 (28%)
2001	217 (29%)	132 (29%)	144 (29%)	235 (24%)	82 (22%)	233 (29%)	136 (28%)
2002	230 (31%)	135 (29%)	140 (28%)	218 (22%)	80 (21%)	233 (30%)	127 (28%)
2003	242 (32%)	159 (32%)	158 (31%)	250 (24%)	88 (24%)	208 (29%)	131 (28%)
2004	266 (33%)	185 (35%)	164 (33%)	263 (25%)	87 (24%)	216 (31%)	137 (29%)
Total	1856 (29%)	1248 (30%)	1276 (28%)	2765 (30%)	595 (20%)	1851 (27%)	1389 (28%)

Table 3: Characteristics of Mutual Fund Families

This table reports the characteristics of mutual fund families in our dataset. For each year, we report the total number of distinct mutual fund families in the CRSP Mutual Fund Database, and the average number of mutual funds we have identified as either managed in-house or outsourced in each family. We also report the fraction of mutual fund families that outsource any of its fund management and the average across families of the fractions of funds outsourced within a mutual fund family. We indicate the concentration of mutual fund family business with the fraction of total assets under management in a family's modal style and core style. We define the modal style for each family as the investment style for which the mutual fund family has the most assets under management and define the core style for each family as the investment style for which the mutual fund family has the most assets under management during the earliest year it appears in the CRSP Mutual Fund Database.

Year	Number of Families	Average Number of Funds per Famliy	Fraction with Any Outsourcing	Average Fraction of Outsourced Funds	Average Fraction of Assets in Modal Style	Average Fraction of Assets in Core Style
1994	345	6.090	0.386	0.234	0.751	0.519
1995	354	6.684	0.373	0.207	0.734	0.510
1996	379	7.322	0.375	0.208	0.732	0.478
1997	418	7.708	0.361	0.203	0.730	0.449
1998	436	8.037	0.411	0.240	0.729	0.445
1999	462	8.517	0.483	0.322	0.737	0.448
2000	510	8.106	0.455	0.281	0.731	0.437
2001	494	8.771	0.466	0.287	0.731	0.435
2002	475	9.067	0.472	0.287	0.729	0.442
2003	473	9.237	0.459	0.286	0.727	0.446
2004	468	9.440	0.477	0.301	0.732	0.456
Average	437.6	8.089	0.429	0.260	0.733	0.460

Table 4: Mutual Fund Summary Statistics

This table reports summary statistics for the funds in our sample. Number of Funds is the number of mutual funds in our sample each month. TNA is the total net assets under management in millions of dollars. LOGTNA is the logarithm of TNA. EXPRATIO is the total annual management fees and expenses divided by year-end TNA. LOGFAMSIZE is the logarithm of one plus the assets under management of the other funds in the family that the fund belongs to (excluding the asset base of the fund itself). TURNOVER is fund turnover, defined as the minimum of aggregate purchases and sales of securities divided by the average TNA over the calendar year. AGE is the number of years since the organization of the fund. TOTLOAD is the total front-end, deferred and rear-end charges as a percentage of new investments. FLOW is the percentage new fund flow into the mutual fund over the past year. PRET is the cumulative returns of the fund over the past twelve months. TNA, LOGTNA, LOGFAMSIZE, FLOW and PRET are reported monthly. All other fund characteristics are reported once a year. All variables are winsorized below at the 1% level and winsorized above at the 99% level within each month. The sample is from January 1993 to December 2003. We classify funds with self-reported investment objective of 'Bond' or 'Money Market' as bond funds and all other objectives as equity funds. The table reports the time-series averages of monthly cross-sectional averages and monthly cross-sectional standard deviations (shown in brackets) of fund characteristics across all equity funds, equity funds managed in-house and outsourced equity funds.

	All equity funds	In-house funds	Outsourced funds
Number of Funds	2725.5	1991.3	734.2
TNA ($ million)	559.8 [1576.63]	647.0 [1693.5]	323.1 [1174.1]
LOGTNA ($ million)	4.25 [2.32]	4.45 [2.33]	3.71 [2.21]
EXPRATIO (% per year)	1.22 [0.66]	1.23 [0.65]	1.19 [0.69]
LOGFAMSIZE ($ million)	7.28 [3.61]	7.52 [3.63]	6.62 [3.46]
TURNOVER (% per year)	72.97 [92.70]	75.54 [92.72]	64.96 [89.31]
AGE (years)	8.30 [11.78]	9.16 [12.61]	5.80 [8.53]
TOTLOAD (%)	1.92 [2.42]	2.01 [2.45]	1.61 [2.30]
FLOW (% per year)	36.22 [166.27]	35.86 [161.48]	37.41 [177.88]
PRET (% per year)	11.30 [16.95] [30.0]	11.56 [17.47] [33.3]	10.46 [15.10] [15.6]

Table 5: Summary Statistics for Performance Benchmarks

This table reports the loadings of ten (equal-weighted) fund portfolios on various factors. The ten portfolios are first sorted by TNA and then separated into funds managed in-house and outsourced funds. VWRF is the return on the CRSP value-weighted stock index in excess of the one-month Treasury rate. SMB is the return on a portfolio of small stocks minus large stocks. HML is the return on a portfolio long high book-to-market stocks and short low book-to-market stocks. UMD is the return on a portfolio long stocks that are past winners and short those that are past losers. MSCI is the return on the MSCI EAFE index. LABI is the return on the Lehman Aggregate Bond Index. Panel A reports the means, standard deviations and correlations of the factors. Panel B reports the loadings calculated using the CAPM. Panel C reports the Fama-French (1993) model augmented with the momentum factor (4-Factor model). Panel D reports the 4-Factor model augmented with the MSCI and LABI (6-Factor model). The sample period is from January 1994 to December 2004 and is comprised of equity funds.

Panel A: Summary statistics of the factors

Factor	Mean Return	SD of Return	Cross-correlations					
			VWRF	SMB	HML	UMD	MSCI	LABI
VWRF	0.63%	4.52%	1.00	0.18	-0.54	-0.22	0.79	0.01
SMB	0.22%	4.20%		1.00	-0.52	0.18	0.18	-0.12
HML	0.35%	3.85%			1.00	-0.07	-0.38	0.12
UMD	0.82%	5.51%				1.00	-0.18	0.15
MSCI	0.11%	4.29%					1.00	-0.06
LABI	0.23%	1.13%						1.00

Panel B: Loadings calculated using the CAPM

	In-house funds		Outsourced funds	
Portfolio	Alpha	VWRF	Alpha	VWRF
1(small)	0.11%	0.96	0.00%	0.96
2	0.06%	0.96	-0.08%	1.00
3	-0.05%	1.00	-0.07%	1.04
4	-0.08%	1.01	-0.16%	1.00
5(large)	-0.11%	0.99	-0.10%	1.00

Panel C: Loadings calculated using the 4-Factor model

	In-house funds					Outsourced funds				
Portfolio	Alpha	VWRF	SMB	HML	UMD	Alpha	VWRF	SMB	HML	UMD
1(small)	0.05%	0.96	0.19	0.09	-0.01	-0.05%	0.98	0.19	0.13	-0.05
2	-0.05%	1.00	0.21	0.14	0.00	-0.14%	1.00	0.17	0.10	-0.03
3	-0.14%	1.04	0.23	0.07	0.02	-0.14%	1.02	0.20	0.01	0.04
4	-0.17%	1.00	0.20	0.07	0.02	-0.21%	1.01	0.12	0.05	0.00
5(large)	-0.15%	1.00	0.08	0.03	0.01	-0.11%	1.01	0.05	0.03	-0.02

Panel D: Loadings calculated using the 6-Factor model

	In-house funds							Outsourced funds						
Portfolio	Alpha	VWRF	SMB	HML	UMD	MSCI	LABI	Alpha	VWRF	SMB	HML	UMD	MSCI	LABI
1(small)	0.07%	0.99	0.19	0.10	-0.01	-0.03	-0.17	-0.01%	0.99	0.18	0.14	-0.04	0.00	-0.23
2	-0.02%	1.00	0.20	0.15	0.01	0.00	-0.18	-0.11%	1.02	0.17	0.12	-0.02	-0.01	-0.20
3	-0.12%	1.01	0.22	0.07	0.03	0.00	-0.13	-0.12%	1.02	0.20	0.01	0.03	0.01	-0.09
4	-0.14%	1.01	0.20	0.08	0.03	0.01	-0.15	-0.18%	1.00	0.11	0.05	0.02	0.02	-0.16
5(large)	-0.12%	0.99	0.08	0.03	0.02	0.02	-0.11	-0.07%	0.99	0.04	0.04	-0.01	0.02	-0.15

Table 6: Outsourcing and Fund Performance

This table shows the Fama-Macbeth (1973) estimates of monthly fund returns regressed on fund characteristics lagged one month. Fund returns are calculated before (gross) and after (net) deducting fees and expenses. These returns are adjusted using the market model, the CAPM, the 4-Factor model, and the 6-Factor model. The dependent variable is FUNDRET. OUTSOURCED is an indicator variable that equals one if the fund management is outsourced. LOGTNA is the natural logarithm of TNA. EXPRATIO is the total annual management fees and expenses divided by TNA. LOGFAMSIZE is the natural logarithm of one plus the size of the family that the fund belongs to. TURNOVER is fund turnover and AGE is the number of years since the organization of the mutual fund. TOTLOAD is the total front-end, deferred and rear-end charges as a percentage of new investments. FLOW is the percentage new fund flow into the mutual fund over the past one year. PRET is the cumulative (buy-hold) fund return over the past twelve months. Intercepts have been suppressed. The sample is from January 1994 to December 2004 and is comprised of equity funds. The t-statistics are adjusted for serial correlation using Newey-West (1987) lags of order three and are shown in parentheses.

	Gross fund returns				Net fund returns			
	Market-Adj	Beta-Adj	4-Factor	6-Factor	Market-Adj	Beta-Adj	4-Factor	6-Factor
$OUTSOURCED_{i,t-1}$	-0.058	-0.069	-0.036	-0.039	-0.057	-0.068	-0.035	-0.038
	(2.98)	(3.47)	(1.86)	(2.06)	(2.94)	(3.43)	(1.78)	(2.02)
$LOGTNA_{i,t-1}$	-0.044	-0.048	-0.043	-0.046	-0.042	-0.047	-0.041	-0.044
	(3.94)	(4.53)	(3.90)	(4.25)	(3.80)	(4.37)	(3.76)	(4.09)
$EXPRATIO_{i,t-1}$	-0.010	-0.009	-0.008	0.028	-0.089	-0.089	-0.088	-0.049
	(0.20)	(0.19)	(0.17)	(0.48)	(1.85)	(1.84)	(1.80)	(0.82)
$LOGFAMSIZE_{i,t-1}$	0.011	0.011	0.011	0.023	0.011	0.011	0.012	0.023
	(2.51)	(2.54)	(2.57)	(3.30)	(2.54)	(2.57)	(2.60)	(3.35)
$TURNOVER_{i,t-1}$	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	(0.23)	(0.23)	(0.24)	(1.38)	(0.19)	(0.18)	(0.19)	(1.36)
$AGE_{i,t-1}$	0.000	0.000	0.000	-0.001	-0.001	0.000	0.000	-0.001
	(0.35)	(0.31)	(0.14)	(0.44)	(0.45)	(0.41)	(0.25)	(0.50)
$TOTALLOAD_{i,t-1}$	-0.006	-0.00-6	-0.007	-0.005	-0.006	-0.007	-0.007	-0.006
	(1.32)	(1.37)	(1.38)	(1.16)	(1.37)	(1.41)	(1.42)	(1.26)
$FLOW_{i,t-1}$	0.000	0.000	0.000	0.006	0.000	0.000	0.000	0.006
	(0.05)	(0.04)	(0.06)	(1.54)	(0.04)	(0.04)	(0.06)	(1.54)
$PRET_{i,t-1}$	0.022	0.022	0.022	0.017	0.022	0.022	0.022	0.017
	(2.80)	(2.80)	(2.81)	(2.87)	(2.82)	(2.82)	(2.83)	(2.89)
No. of months	132	132	132	132	132	132	132	132

Table 7: First Stage of 2SLS—The Effect of the Number of Funds in a Family and Family Size at Fund Inception on Whether the Fund is Outsourced

This table shows the estimates of the first stage of the 2SLS estimation of the effect of outsourcing on mutual fund performance. The first stage measures the effect of family characteristics when the fund was created on whether the mutual fund is outsourced. The dependent variable is OUTSOURCED, which is an indicator that equals one if the fund management is outsourced. LOW DENSITY STATE is an indicator that the fund is not located in Massachusetts, New York or California. NUMBER OF FUNDS AT INCEPTION is a count of the number of funds in the fund family when the fund is created. LOGFAMSIZE AT INCEPTION is the natural logarithm of one plus the size of the family that the fund belongs to when the fund was created. LOGTNA is the natural logarithm of TNA. EXPRATIO is the total annual management fees and expenses divided by TNA. LOGFAMSIZE is the natural logarithm of one plus the size of the family that the fund belongs to. TURNOVER is fund turnover and AGE is the number of years since the organization of the mutual fund. TOTLOAD is the total front-end, deferred and rear-end charges as a percentage of new investments. FLOW is the percentage new fund flow into the mutual fund over the past one year. PRET is the cumulative (buy-hold) fund return over the past twelve months. A complete set of Month X Year dummies are also included in the specification. The sample is from January 1994 to December 2004 and is comprised of equity funds. t-statistics are adjusted by allowing for the errors to be correlated across funds within fund families, i.e. the standard errors are clustered by fund families.

LOW DENSITY STATE	0.1416
	(2.39)
NUMBER OF FUNDS AT INCEPTION	-0.0008
	(2.19)
LOW DENSITY STATE X NUMBER OF FUNDS AT INCEPTION	0.0046
	(4.88)
LOGFAMSIZE AT INCEPTION	-0.0005
	(0.07)
LOW DENSITY STATE X LOGFAMSIZE AT INCEPTION	-0.0164
	(1.84)
$LOGTNA_{i,t-1}$	-0.0199
	(3.19)
$EXPRATIO_{i,t-1}$	-0.0212
	(1.77)
$LOGFAMSIZE_{i,t-1}$	-0.0127
	(1.65)
$TURNOVER_{i,t-1}$ / 10000	-0.5911
	(2.56)
$AGE_{i,t-1}$	-0.0038
	(1.84)
$TOTLOAD_{i,t-1}$	-0.0012
	(0.21)
$FLOW_{i,t-1}$ / 10000	0.0029
	(0.27)
$PRET_{i,t-1}$	-0.0003
	(1.62)

Table 8: Second Stage of 2SLS—The Effect of Outsourcing on Fund Performance

This table shows the second stage of the 2SLS estimation of the effect of outsourcing on mutual fund performance. Fund returns are calculated before (gross) and after (net) deducting fees and expenses. These returns are adjusted using the market model, the CAPM, the 4-Factor model, and the 6-Factor model. The dependent variable is FUNDRET. OUTSOURCED is an indicator variable that equals one if the fund management is outsourced. LOW DENSITY STATE is an indicator that the fund is not located in Massachusetts, New York or California. NUMBER OF FUNDS AT INCEPTION is a count of the number of funds in the fund family when the fund is created. LOGFAMSIZE AT INCEPTION is the natural logarithm of one plus the size of the family that the fund belongs to when the fund was created. LOGTNA is the natural logarithm of TNA. EXPRATIO is the total annual management fees and expenses divided by TNA. LOGFAMSIZE is the natural logarithm of one plus the size of the family that the fund belongs to. TURNOVER is fund turnover and AGE is the number of years since the organization of the mutual fund. TOTLOAD is the total front-end, deferred and rear-end charges as a percentage of new investments. FLOW is the percentage new fund flow into the mutual fund over the past one year. PRET is the cumulative (buy-hold) fund return over the past twelve months. A complete set of Month X Year dummies are also included in the specification. The sample is from January 1994 to December 2004 and is comprised of equity funds. t-statistics are adjusted by allowing for the errors to be correlated across funds within fund families, i.e. the standard errors are clustered by fund families.

	Gross fund returns				Net fund returns			
	Market-Adj	Beta-Adj	4-Factor	6-Factor	Market-Adj	Beta-Adj	4-Factor	6-Factor
$OUTSOURCED_{i,t-1}$	-0.1334	-0.2631	-0.2544	-0.2494	-0.1287	-0.2584	-0.2497	-0.2447
	(0.99)	(2.16)	(2.02)	(2.02)	(0.95)	(2.11)	(1.97)	(1.96)
LOW DENSITY STATE	-0.0276	-0.0248	-0.0283	-0.0299	-0.0277	-0.0250	-0.0285	-0.0300
	(0.60)	(0.54)	(0.61)	(0.61)	(0.60)	(0.54)	(0.61)	(0.65)
NUMBER OF FUNDS AT INCEPTION	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006
	(1.74)	(1.79)	(2.00)	(1.72)	(1.68)	(1.73)	(1.94)	(1.69)
LOGFAMSIZE AT INCEPTION	-0.0076	-0.0044	-0.0057	-0.0052	-0.0082	-0.0051	-0.0063	-0.0060
	(1.44)	(0.84)	(1.07)	(0.98)	(1.56)	(0.95)	(1.19)	(1.12)
LOW DENSITY STATE X LOGFAMSIZE AT INCEPTION	0.0010	0.0022	0.0029	0.0034	0.0011	0.0023	0.0030	0.0035
	(0.17)	(0.35)	(0.45)	(0.53)	(0.18)	(0.36)	(0.46)	(0.54)
$LOGTNA_{i,t-1}$	-0.0740	-0.0787	-0.0740	-0.0765	-0.0718	-0.0765	-0.0718	-0.0741
	(7.50)	(7.83)	(7.55)	(7.75)	(7.25)	(7.59)	(7.31)	(7.43)
$EXPRATIO_{i,t-1}$	-0.0249	-0.0091	-0.0078	-0.0069	-0.0915	-0.0756	-0.0743	-0.0730
	(1.59)	(0.44)	(0.37)	(0.37)	(5.98)	(3.75)	(3.64)	(3.52)
$LOGFAMSIZE_{i,t-1}$	0.0161	0.0195	0.0187	0.0187	0.0175	0.0209	0.0201	0.0202
	(2.35)	(2.65)	(2.57)	(2.56)	(2.53)	(2.81)	(2.74)	(2.74)
$TURNOVER_{i,t-1}$ / 10000	0.0591	-0.2001	-0.3014	-0.3342	0.0286	-0.2305	-0.3318	-0.3485
	(0.13)	(0.39)	(0.59)	(0.67)	(0.06)	(0.45)	(0.64)	(0.64)
$AGE_{i,t-1}$	0.0062	0.0049	0.0053	0.0048	0.0060	0.0047	0.0051	0.0046
	(3.01)	(2.32)	(2.46)	(2.27)	(2.88)	(2.20)	(2.34)	(2.34)
$TOTLOAD_{i,t-1}$	-0.0116	-0.0114	-0.0119	-0.0121	-0.0130	-0.0127	-0.0133	-0.0135
	(2.80)	(2.59)	(2.69)	(2.74)	(3.14)	(2.92)	(3.02)	(3.10)
$FLOW_{i,t-1}$ / 10000	0.0185	-0.0014	0.0008	0.0014	0.0186	-0.0014	0.0008	0.0013
	(1.58)	(0.13)	(0.07)	(0.12)	(1.57)	(0.13)	(0.07)	(0.11)
$PRET_{i,t-1}$	0.0039	0.0033	0.0031	0.0030	0.0040	0.0034	0.0032	0.0030
	(3.52)	(2.86)	(2.71)	(2.60)	(3.58)	(2.93)	(2.78)	(2.66)

Table 9: Mutual Fund Closures and Past Performance

This table investigates the determinants of mutual fund closures and reports pooled panel regression estimates of whether a mutual fund is closed on fund characteristics lagged one year. The dependent variable, CLOSED, is an indicator function that equals one if the mutual fund is closed during that year. OUTSOURCED is an indicator variable that equals one if the fund management is outsourced. INMODALSTYLE is an indicator that equals one if the fund is in its family's modal style. The other independent variables include LOGTNA, LOGFAMSIZE, TURNOVER, EXPRATIO, TOTLOAD, FLOW and PRET. PRETLOW equals PRET if it is below average in the year; it equals the average PRET otherwise. All regressions include fund-age effects, year-effects and investment style effects. The sample is from 1994 to 2004 and is comprised of all funds. t-statistics are adjusted by allowing for the errors to be correlated across funds within fund families, i.e. the standard errors are clustered by fund families.

Panel A: Probability of closure and past-year fund return

	$CLOSED_{i,t}$				
	(1)	(2)	(3)	(4)	(5)
$OUTSOURCED_{i,t-1}$	0.0093	0.0125	0.0111	0.0109	0.0108
	(2.72)	(3.02)	(2.64)	(2.59)	(2.58)
$PRET_{i,t-1}$	-0.0003	-0.0003	-0.0014	-0.0015	-0.0017
	(6.35)	(4.58)	(6.70)	(5.54)	(5.23)
$PRET_{i,t-1}$ *$OUTSOURCED_{i,t-1}$		-0.0004	-0.0002	-0.0002	-0.0002
		(3.21)	(1.81)	(1.73)	(1.68)
$INMODALSTYLE_{i,t-1}$	-0.0018	-0.0018	-0.0020	-0.0020	-0.0021
	(0.97)	(0.95)	(1.10)	(1.08)	(0.17)
$LOGTNA_{i,t-1}$	-0.0399	-0.0398	-0.0467	-0.0468	-0.0464
	(9.27)	(9.24)	(9.12)	(9.11)	(8.05)
$LOGFAMSIZE_{i,t-1}$	0.0010	0.0011	0.0014	0.0013	0.0012
	(1.74)	(1.78)	(1.77)	(1.62)	(1.53)
$TURNOVER_{i,t-1}$ / 10000	-0.0252	-0.0269	-0.0366	-0.0369	-0.0369
	(0.59)	(0.66)	(0.86)	(0.87)	(0.88)
$EXPRATIO_{i,t-1}$	0.0005	0.0005	0.0006	-0.0000	0.0001
	(0.20)	(0.22)	(0.25)	(0.01)	(0.02)
$TOTLOAD_{i,t-1}$	0.0006	0.0006	0.0006	0.0010	0.0010
	(1.23)	(1.17)	(1.18)	(1.49)	(1.48)
$FLOW_{i,t-1}$ / 10000	0.0014	0.0013	0.0011	-0.0044	-0.0044
	(2.93)	(2.93)	(2.58)	(2.92)	(2.19)
$PRET_{i,t-1}$ *$LOGTNA_{i,t-1}$			0.0010	0.0010	0.0011
			(6.79)	(6.73)	(5.88)
$PRET_{i,t-1}$ *$LOGFAMSIZE_{i,t-1}$			-0.0000	-0.0000	-0.0000
			(1.81)	(1.34)	(0.96)
$PRET_{i,t-1}$ *$AGE_{i,t-1}$			0.0000	0.0000	0.0000
			(0.12)	(0.47)	(0.39)
$PRET_{i,t-1}$ * $EXPRATIO_{i,t-1}$				0.0001	0.0000
				(0.79)	(0.63)
$PRET_{i,t-1}$ * $TOTLOAD_{i,t-1}$				-0.0000	-0.0000
				(1.97)	(1.94)
$PRET_{i,t-1}$ * $FLOW_{i,t-1}$ / 10000				0.0002	0.0002
				(2.80)	(2.84)
$PRET_{i,t-1}$ *$INMODALSTYLE_{i,t-1}$					0.0004
					(1.16)
$LOGTNA_{i,t-1}$ *$INMODALSTYLE_{i,t-1}$					-0.0002
					(0.03)
$PRET_{i,t-1}$*$LOGTNA_{i,t-1}$ *$INMODALSTYLE_{i,t-1}$					-0.0002
					(1.14)

Panel B: Probability of closure and past-year fund return when below average

	$CLOSED_{i,t}$				
	(1)	(2)	(3)	(4)	(5)
$OUTSOURCED_{i,t-1}$	0.0096	0.0111	0.0104	0.0102	0.0102
	(2.79)	(2.90)	(2.68)	(2.62)	(2.62)
$PRETLOW_{i,t-1}$	-0.0007	-0.0006	-0.0023	-0.0025	-0.0025
	(5.54)	(3.88)	(6.26)	(5.31)	(5.30)
$PRETLOW_{i,t-1}$ *$OUTSOURCED_{i,t-1}$		-0.0006	-0.0004	-0.0004	-0.0004
		(3.00)	(1.77)	(1.72)	(1.71)
$INMODALSTYLE_{i,t-1}$	-0.0022	-0.0021	-0.0025	-0.0024	-0.0005
	(1.17)	(1.16)	(1.35)	(1.32)	(0.04)
$LOGTNA_{i,t-1}$	-0.0402	-0.0402	-0.0415	-0.0416	-0.0411
	(9.34)	(9.30)	(9.02)	(9.00)	(8.15)
$LOGFAMSIZE_{i,t-1}$	0.0011	0.0012	0.0012	0.0011	0.0011
	(1.86)	(1.91)	(1.65)	(1.55)	(1.52)
$TURNOVER_{i,t-1}$ / 10000	-0.0335	-0.0353	-0.0443	-0.0435	-0.0434
	(0.86)	(0.96)	(1.19)	(1.17)	(1.18)
$EXPRATIO_{i,t-1}$	-0.0002	-0.0004	-0.0003	-0.0006	-0.0007
	(0.09)	(0.16)	(0.13)	(0.25)	(0.28)
$TOTLOAD_{i,t-1}$	0.0007	0.0007	0.0007	0.0009	0.0009
	(1.47)	(1.34)	(1.38)	(1.53)	(1.52)
$FLOW_{i,t-1}$ / 10000	0.0014	0.0013	0.0010	-0.0018	-0.0018
	(3.06)	(3.08)	(2.65)	(1.99)	(1.99)
$PRETLOW_{i,t-1}$ *$LOGTNA_{i,t-1}$			0.0016	0.0016	0.0016
			(6.60)	(6.48)	(6.38)
$PRETLOW_{i,t-1}$ *$LOGFAMSIZE_{i,t-1}$			-0.0001	-0.0000	-0.0000
			(1.41)	(0.99)	(0.80)
$PRETLOW_{i,t-1}$ *$AGE_{i,t-1}$			-0.0000	0.0000	0.0000
			(0.15)	(0.13)	(0.10)
$PRETLOW_{i,t-1}$ * $EXPRATIO_{i,t-1}$				0.0001	0.0001
				(0.83)	(0.85)
$PRETLOW_{i,t-1}$ * $TOTLOAD_{i,t-1}$				-0.0001	-0.0001
				(1.90)	(1.90)
$PRETLOW_{i,t-1}$ * $FLOW_{i,t-1}$ / 10000				0.0002	0.0002
				(3.33)	(3.33)
$PRETLOW_{i,t-1}$ *$INMODALSTYLE_{i,t-1}$					0.0001
					(0.56)
$LOGTNA_{i,t-1}$ *$INMODALSTYLE_{i,t-1}$					-0.0018
					(0.28)
$PRETLOW_{i,t-1}$*$LOGTNA_{i,t-1}$ *$INMODALSTYLE_{i,t-1}$					0.0000
					(0.38)

Table 10: Mutual Fund Closures and Absolute Deviations in Fund Risk-Taking from the Norm

This table investigates the determinants of mutual fund closures and reports pooled panel regression estimates of whether a mutual fund is closed on fund characteristics lagged one year. The dependent variable, CLOSED, is an indicator function that equals one if the mutual fund is closed during that year. OUTSOURCED is an indicator variable that equals one if the fund management is outsourced. RISKDEV is either the fund beta-deviation measure or the fund idiosyncratic risk measure. INMODALSTYLE is an indicator that equals one if the fund is in its family's modal style. The other independent variables include LOGTNA, LOGFAMSIZE, TURNOVER, EXPRATIO, TOTLOAD, FLOW and PRET. All regressions include fund-age effects, year-effects and investment style effects. The sample is from 1994 to 2004 and is comprised of equity funds. t-statistics are adjusted by allowing for the errors to be correlated across funds within fund families, i.e. the standard errors are clustered by fund families.

	$CLOSED_{i,t}$			
	Beta Deviation		Idio-Risk Deviation	
$OUTSOURCED_{i,t-1}$	0.0035	0.0079	0.0035	0.0043
	(3.32)	(2.50)	(3.29)	(3.44)
$RISKDEV_{i,t-1}$	0.0022	0.0014	0.0007	0.0001
	(2.96)	(2.03)	(2.04)	(0.39)
$RISKDEV_{i,t-1}$ *$OUTSOURCED_{i,t-1}$		0.0035		0.0025
		(1.89)		(2.33)
$INMODALSTYLE_{i,t-1}$	-0.0004	-0.0005	-0.0003	-0.0003
	(0.43)	(0.73)	(0.46)	(0.47)
$LOGTNA_{i,t-1}$	-0.0026	-0.0026	-0.0027	-0.0027
	(2.21)	(2.15)	(2.21)	(2.22)
$LOGFAMSIZE_{i,t-1}$	0.0001	0.0001	0.0000	0.0000
	(0.40)	(0.33)	(0.24)	(0.29)
$TURNOVER_{i,t-1}/10000$	-0.0104	-0.0107	-0.0091	-0.0085
	(2.43)	(2.44)	(2.33)	(2.20)
$EXPRATIO_{i,t-1}$	0.0000	-0.0000	0.0002	0.0002
	(0.01)	(0.01)	(0.35)	(0.35)
$TOTLOAD_{i,t-1}$	0.0003	0.0003	0.0003	0.0003
	(1.80)	(1.82)	(1.71)	(1.70)
$FLOW_{i,t-1}/10000$	0.0002	0.0002	0.0002	0.0002
	(2.61)	(2.47)	(2.37)	(2.20)
$PRET_{i,t-1}$	-0.0003	-0.0003	-0.0003	-0.0003
	(1.84)	(1.81)	(1.80)	(1.77)

Table 11: Outsourcing and Absolute Deviations in Fund Risk-Taking from the Norm

This table reports pooled panel regression estimates of annual regressions of how outsourcing affects the risk-taking of mutual funds. The dependent variable of the first specification, RISKDEV, is either the beta-deviation measure or the idiosyncratic risk measure. The independent variables are OUTSOURCED, INMODALSTYLE, LOGTNA, LOGFAMSIZE, TURNOVER, AGE, EXPRATIO, TOTLOAD, FLOW and PRET. We also include a dummy variable for each mutual fund investment objective as fund style control, age effects and year effects but do not report their estimates. The sample is from 1994 to 2004 and is comprised of equity funds. t-statistics are adjusted by allowing for the errors to be correlated across funds within fund families, i.e. the standard errors are clustered by fund families.

	$RISKDEV_{i,t}$	
	Beta Deviation	Unsystematic Deviation
$OUTSOURCED_{i,t-1}$	-0.0344	-0.0347
	(2.00)	(1.85)
$INMODALSTYLE_{i,t-1}$	0.0542	0.0243
	(3.10)	(1.23)
$LOGTNA_{i,t-1}$	0.0020	0.0149
	(0.09)	(0.68)
$LOGFAMSIZE_{i,t-1}$	-0.0129	-0.0049
	(3.48)	(1.36)
$TURNOVER_{i,t-1}/10000$	0.7606	0.6357
	(2.29)	(1.25)
$EXPRATIO_{i,t-1}$	0.1154	0.0716
	(7.53)	(2.56)
$TOTLOAD_{i,t-1}$	-0.0109	-0.0058
	(3.33)	(1.34)
$FLOW_{i,t-1}/10000$	-0.0279	-0.0321
	(8.75)	(5.25)
$PRET_{i,t-1}$	0.0006	0.0005
	(2.21)	(1.31)

Table 12: Robustness Checks

Panel A reports the effect of past performance on mutual fund inflows to assets under management. The regression specification is the same as the baseline specification of Table 9 except that the dependent variable is $FLOW_{i,t}$. Panel B looks at funds that were closed. The dependent variable, STYLEENDS, is an indicator that the family no longer offers a fund (the next year) in the style of the fund that was closed. The independent variables are OUTSOURCED, PRET, INMODALSTYLE, LOGTNA, LOGFAMSIZE, TURNOVER, EXPRATIO, TOTLOAD, FLOW and age effects.

Panel A: Mutual Fund Characteristics and Fund Flows

	$FLOW_{i,t}$	
$OUTSOURCED_{i,t-1}$	-0.2639	-0.2343
	(1.48)	(1.69)
$PRET_{i,t-1}$	0.0119	0.0126
	(6.03)	(4.37)
$PRET_{i,t-1}$ *$OUTSOURCED_{i,t-1}$		-0.0033
		(0.69)
$INMODALSTYLE_{i,t-1}$	0.1661	0.1666
	(2.99)	(2.96)
$LOGTNA_{i,t-1}$	-1.775	-1.775
	(1.67)	(1.67)
$LOGFAMSIZE_{i,t-1}$	0.1004	0.1006
	(1.67)	(1.66)
$TURNOVER_{i,t-1}$/10000	0.1905	0.1726
	(0.09)	(0.08)
$EXPRATIO_{i,t-1}$	-0.2731	-0.2727
	(1.68)	(1.68)
$TOTLOAD_{i,t-1}$	-0.0270	-0.0272
	(1.01)	(1.01)

Panel B: Style Closures

	$STYLEENDS_{i,t}$
$OUTSOURCED_{i,t-1}$	0.0053
	(0.24)
$PRET_{i,t-1}$	0.0014
	(1.80)
$INMODALSTYLE_{i,t-1}$	-0.0728
	(2.77)
$LOGTNA_{i,t-1}$	0.0571
	(3.22)
$LOGFAMSIZE_{i,t-1}$	-0.1096
	(24.13)
$TURNOVER_{i,t-1}$	-0.0000
	(0.48)
$EXPRATIO_{i,t-1}$	-0.0562
	(2.86)
$TOTLOAD_{i,t-1}$	-0.0015
	(0.31)
$FLOW_{i,t-1}$	0.0019
	(0.11)