The Selection and Termination of Investment Managers by Plan Sponsors*

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Abstract

We examine the selection and termination of investment managers by plan sponsors, representing public and corporate pension plans, unions, foundations, and endowments. We build a unique dataset that comprises hiring and firing decisions by approximately 3,700 plan sponsors over a 10-year period from 1994 to 2003. Our data represent the allocation of over $730 billion in mandates to hired investment managers and the withdrawal of $110 billion from fired investment managers. We find that plan sponsors hire investment managers after these managers earn large positive excess returns up to three years prior to hiring. However, despite general persistence in investment manager returns, this return chasing behavior does not deliver positive excess returns thereafter; post-hiring excess returns are indistinguishable from zero. Plan sponsors terminate investment managers after underperformance but the excess returns of these managers after being fired are frequently positive. Finally, using a matched sample of firing and hiring decisions, we find that if plan sponsors had stayed with fired investment managers, their excess returns would be larger than those actually delivered by newly hired managers.

1. Introduction

Allen (2001) argues that financial institutions matter for asset pricing and laments the lack of attention to their behavior. Despite this clarion call, academic research has focused largely on two types of institutions, banks and mutual funds. There are good reasons for this. Banks have been a historically important component of the economy, and mutual funds are a relatively new but sizeable channel for retail investors to participate in capital markets. In addition, good data for both these types of institutions are widely available, permitting researchers to tackle issues with precision. However, another category of institutions, plan sponsors is equally if not more important. At the end of 2003, there were 47,391 plan sponsors in the United States, responsible for investing over $6.3 trillion in assets (Money Market Directory, 2003). By comparison, at the same point in time, there were 7,153 equity, bond and hybrid funds with total assets of $5.4 trillion (Investment Company Institute, 2004). The sheer enormity of the assets under the jurisdiction of plan sponsors and their potential impact on asset prices are compelling reasons to examine their behavior. Moreover, the fact that the assets managed by plan sponsors fund the retirement incomes of their beneficiaries makes studying their behavior important from a personal and public policy perspective.

There are some notable exceptions to the general lack of academic attention to this area. The first foray is an investigation into the performance of a sample of equity pension funds by Lakonishok, Shleifer and Vishny (1992). Lakonishok *et al.* persuasively argue that there are significant conflicts of interest in the money management industry and use proprietary data to examine the performance of 769 all-equity funds run by 341 investment managers.[1] They paint a bleak picture of performance and argue, "(that) when all is said and done, we doubt that an industry that has added little if any value can continue to exist in its present form." The industry has continued to exist in the same form, and despite the provocative agenda set by Lakonishok *et al.*, the remaining studies in this area are few and far in between. Coggin, Fabozzi and Rahman

[1] Lakonishok *et al.*'s (1992) prescience regarding conflicts of interest is noteworthy; the Securities and Exchange Commission recently launched an investigation into the manner in which pension consultants recommend investment managers to plan sponsors (*Wall Street Journal*, January 13, 2004, *Wall Street Journal*, October 25, 2004 and *New York Times*, March 21, 2004). A central theme in this investigation is to determine if consultants recommend certain investment managers to plan sponsors because they receive direct or indirect payments from investment managers (*Wall Street Journal*, November 9, 2004).

(1993) use proprietary data to study a limited sample of pension fund managers and find that they have limited skill in selecting stocks. Almost a decade later, Del Guercio and Tkac (2002) and Heisler, Knittel, Neumann and Stewart (2004) estimate asset flow and performance regressions for investment managers, and conclude that the flow-performance relationship is different for pension funds than mutual funds.

There are largely two types of plan sponsors, those that manage retirement assets such as public pension funds, corporate pension funds, unions and multi-employer funds, and those that manage non-profit assets such as endowments and foundations. The fiduciary obligation of all plan sponsors is to safeguard and grow the assets under their administration such that they can achieve their purposes. Most plan sponsors do not make specific investments themselves but instead delegate portfolio management to professional investment managers.[2] As such, the raison d'être of a plan sponsor is to hire managers to deliver benchmarked returns, monitor, and if necessary fire, underperforming investment managers. It is this specific task(s), viz., the hiring and firing of investment managers by plan sponsors that we focus on in this paper. Our central objective is to determine the efficacy of this process; to wit, do plan sponsors satisfy their raison d'être?

To achieve our objective, we compile a unique database of hiring and firing decisions from three sources. We start with the "Tracker" database developed by Mercer Investment Consulting that contains information on investment managers hired by plan sponsors. To this, we add information on both hiring and firing from the "iisearches" database provided by Institutional Investor. Finally, we augment these databases with textual information from extensive searches in trade publications such as Pensions and Investments, Investment Management Weekly, Money Management Letter and Dow Jones Money Management Alert. From these three different sources, we create three samples: (i) a sample of hiring decisions, (ii) a sample of firing decisions, and (iii) a sample of "round-trip" firing and hiring decisions.

[2] In the case of retirement assets this is done through defined benefit or defined contribution plans. In the former, the beneficiaries receive pre-determined fixed payments upon retirement that are funded by the defined benefit plan. In the latter, beneficiaries receive variable payments upon retirement that are a function of the performance of defined contribution plan. In both types of plans, portfolio management is typically delegated to investment management firms, either centrally through the plan's administrators or individually by the beneficiaries.

Our hiring sample consists of 9,581 decisions by 3,715 plan sponsors between 1994 and 2003. A total of $730 billion is allocated in these hiring decisions. Over half of all hiring decisions are for active mandates in domestic equity, running the gamut from small-cap value to large-cap growth portfolios. Consultants are employed to advise in the selection of investment managers in approximately 63 percent of all hiring decisions, often by smaller plan sponsors. To examine the performance of hired investment managers, we benchmark raw returns against widely used indices for the investment mandate designated by plan sponsors. We examine excess returns one, two and three-years before and after the hiring decision to mirror the typical evaluation intervals used by plan sponsors.

The results are striking. The average excess holding period return of hired investment managers from three years (one year) prior to the hiring quarter is 14.1 (4.1) percent with a heteroskedasticity, serial, and cross-correlation consistent standard error of 2.3 (1.3) percent. Three years (one year) after the hiring decision, the corresponding excess return is 1.6 (0.6) percent with a standard error of 1.6 (0.8) percent. Cross-sectional regressions of post-hiring returns reveal several interesting patterns. Post-hiring returns are negatively related to pre-hiring returns, indicating considerable return reversal. Plan sponsor size is positively related to post-hiring returns, perhaps because larger plan sponsors have greater expertise in selecting investment managers. On the other hand, the size of the investment mandate is negatively related to post-hiring returns, suggestive of diseconomies of scale in investment management. On average, excess returns of consultant-supported hiring decisions are larger, consistent with the notion that consultants provide expertise in manager selection.

Our sample of investment manager terminations consists of 902 firing decisions involving almost $110 billion by 505 plan sponsors between 1996 and 2003. The number of termination decisions is substantially smaller than hiring decisions because data sources are geared towards assisting investment managers in obtaining new business, and because there is a natural disinclination to report terminations by both investment managers and plan sponsors. In addition, the increase in the assets under the jurisdiction of plan sponsors over time implies that the number of hiring decisions endogenously exceeds the number of firing decisions.

Over 65 percent of all termination decisions are for investment mandates in domestic equity. Investment manager contracts are terminated for a variety of reasons including poor performance, organizational reasons such as the departure of a key (star) employee or merger, or a plan sponsor decision to reallocate assets from one investment mandate to another. Out of 902 termination decisions, we can clearly identify 292 (32 percent) as being related to the performance of the investment manager, 115 (13 percent) as due to organizational reasons, 105 (12 percent) as asset reallocations, and we are unable to identify reasons for the remaining.

The average excess holding period return of fired investment managers from three years (one year) prior to the firing quarter is –1.4 (-1.0) percent, with a standard error of 0.9 (0.9) percent. Three years (one year) after the firing decision, the corresponding excess returns are positive, 5.5 (1.4) percent with a standard error of 1.5 (0.7) percent. For firing decisions clearly identified as due to the performance of the fired firm, the return differentials are larger. For such decisions, the three-year pre-firing return is –5.4 percent with a standard error of 1.2 percent and the three-year post-firing return is 6.3 percent with a standard error of 2.9 percent. Unlike post-hiring returns, post-firing returns are not related to plan sponsor size or the use of consultants in the firing process. They are, however, negatively related to mandate size and pre-firing returns.

One might argue that hired managers' post-hiring returns should not be judged against their own pre-hiring returns, and similarly, fired managers' post-firing returns should not be judged against their own pre-firing returns. A more precise estimate of the economic loss (or gain) to the plan sponsor could be generated by comparing the post-hiring return of hired investment managers, to the post-firing return that would have been delivered by fired investment managers. A mere blending of our firing and hiring subsamples is inadequate for this purpose because there are a multitude of complicated mechanisms by which firing and hiring decisions are coordinated. For example, some plan sponsors can (and do) fire multiple investment managers and hire one or more managers. Mandate types can be the same, or the plan sponsor could decide to change asset classes. Similarly, mandate sizes can be the same, or the plan sponsor could decide to increase or trim the mandate. Given the variety of different ways in which firing and hiring decisions are coordinated, we build a sample of "round-trip" firing and hiring decisions from scratch. We start by identifying a candidate sample of round-trips by isolating firing and hiring decisions by a plan sponsor within 90 days (one quarter) of each other. We then search for entries related to these hiring and firing decisions in trade journals and precisely identify round-trips.

Using this manual procedure, we identify 655 round-trip firing and hiring decisions between 1996 and 2003. For these decisions, pre-hiring and pre-firing returns are similar to those described above; in general, pre-firing returns are negative and pre-hiring returns are positive. On average, post-firing returns are positive and in some cases, statistically significant. Post-hiring returns are statistically indistinguishable from zero. The implied opportunity cost of firing and hiring decisions (the post-hiring return minus post-firing return) is positive.

As is true of all studies that seek to investigate performance, one could always quibble with our benchmarks, evaluation horizons, sample identification, methods of statistical inference and a host of other technical issues related to the measurement of investment performance. Holding that aside (and deferring a discussion of robustness issues to the body of the paper), the conclusion to be drawn from our work depends largely on the aspects of our results that the reader chooses to focus on, and on his/her view of the frictional costs of the hiring and firing process. Take, for example, hiring decisions that are necessitated by the growth of plan sponsor assets. For such decisions, one may take the view that since post-hiring excess returns are zero, plan sponsors appropriately achieve their (benchmarked) objective. This is especially the case if there is little or no persistence in the performance of investment managers to begin with – in that case, hiring simply represents selection from a random time-series sample, implying that post-hiring returns should be zero.[3] We pursue this logic further by performing a persistence test on all investment managers (unconditional on hiring or firing). We classify each investment manager into a performance quartile over one, two and three-year evaluation periods, and examine quartile composition in matching post-evaluation periods. Transition matrices from this analysis indicate considerable performance persistence over a one-year horizon across all investment classes. For domestic equity mandates, the probability that an investment manager in the best performing quartile one year stays in the best performing quartile in the following year is 34 percent, well above the expected value of 25 percent. Persistence declines over longer

[3] This also implies that post-firing returns should also be zero, which is counterfactual.

evaluation periods for domestic equity investment mandates but increases for fixed income mandates. These data suggest that, at the minimum, hiring and firing investment managers *could* generate excess returns, if timed correctly.

For hiring decisions necessitated by the termination of investment managers, one has to judge the hired manager's returns against the returns that the fired manager would have delivered, as well as frictional costs in moving portfolios. In such situations, one might argue that since pre-firing returns are negative and post-hiring returns are indistinguishable from zero, plan sponsors appropriately fire underperforming investment managers and hire managers that deliver their benchmark performance. In a world with no transaction costs and no opportunity losses, this is a zero net present value proposition, and an outcome that should be acceptable to the plan sponsor's beneficiaries. However, our round-trip sample suggests that post-firing returns are larger than post-hiring returns, implying an opportunity loss. Addressing the issue of transaction costs is a more difficult problem. Unfortunately, there are no publicly available data on the transaction costs associated with investment manager terminations and firings. Frequently, the process of moving assets from the legacy portfolio of the fired investment manager to the target portfolio of the hired manager is outsourced to "transition managers" that attempt to minimize the costs associated with the transition. Estimates of transition costs by practitioners in the public press suggest that average costs range between 2 and 5 percent of the portfolio, with a standard deviation of 1 percent (see, for example, Proszek (2002), Bollen (2004) and Werner (2001)). Private estimates of transition costs provided to us by an anonymous large transition management firm range from 0.5 percent to 1.0 percent. This firm also indicates that transition costs are typically higher for international, fixed income and small-cap transitions, and particularly so when the transition is across asset classes. Regardless of the actual magnitude, the size of this transition business, estimated by some observers to be almost $2 trillion annually, suggests that transaction costs are non-trivial.

Overall, in light of such large transactions costs and positive opportunity costs, our results suggest that the termination and selection of investment managers is an exercise that is costly to plan beneficiaries. How can this be equilibrium? Or to paraphrase Lakonishok *et al.* (1992), how can this industry continue to (still) exist in its present form? One possibility is that the rampant agency problems described in Lakonishok *et al.* are so embedded in industry structure that the cost of changing the investment allocation process is too high. Another possibility is that some of these costs have compensating benefits that we are unable to measure. For instance, it may be that terminating underperforming investment managers is critical to maintaining discipline among existing investment managers. In such a scenario, these costs can be regarded as the price of enforcing discipline. The issue of whether the potential benefits associated with this activity are commensurate with the magnitude of these costs is a worthy one, and one that we leave for future research.

Our paper proceeds as follows. In section 2, we provide some a brief description of the institutional process by which investment manager's are selected and terminated by plan sponsors. In section 3, we describe our data sources and sample construction procedures. We present results on the selection of investment managers in section 4, and the termination of investment managers in section 5, and round-trip termination and selection decisions in section 6. Section 7 discusses robustness checks. Sections 8 and 9 provide a discussion and conclusion to the paper.

2. Institutional details

In this section, we present a brief description of the institutional marketplace, after which we lay out the process by which investment managers are selected, evaluated and terminated by plan sponsors. A more detailed description of the pension fund industry can be found in Fabozzi (1997), Lakonishok *et al.* (1992), Logue and Rader (1998), and Travers (2004).

2.1 The Institutional Marketplace

Plan sponsors include organizations that manage retirement assets as well as those that manage non-profit endowments. The former include local (city and county) and state pension plans, corporate plans, single-employer union plans, and Taft-Hartley multi-employer plans that provide health and welfare benefits for organized labor.[4] Government and corporate plan

[4] Such plans are typically set up under Section 302(c)(5) of the Taft-Hartley Act, passed by Congress in 1947. The assets of such plans are jointly managed by a board of trustees that represents labor and management.

sponsors can operate defined benefit plans, defined contribution plans or both. In a defined benefit plan, beneficiaries receive a fixed set of payments upon retirement. The trustees of the plan are responsible for investing the beneficiaries' contributions. If a corporate defined benefit plan is overfunded, the excess funds belong to the corporation but if the plan is underfunded, the shortfall is the most senior claim on the corporation in the event of bankruptcy. The Pension Benefit Guarantee Corporation insures the benefits if the corporation has insufficient assets to cover its obligations. The treasurer's office (or the trustees, in the case of government plans) is (are) responsible for asset allocation, and as Lakonishok *et al.* (1992) note, this produces a bias against passive investment management (since it reduces the potential power of the office) and against internal investment management (since it is easier to blame another individual or an organization for poor performance).

In defined contribution plans, beneficiaries receive variable payments upon retirement that are a function of the performance of the plan. The plan sponsor typically selects providers of various investment options (such as Vanguard or Fidelity) who then allow beneficiaries to invest their assets in various funds. Thus, defined contribution plans are largely employee directed because the size of the mandate is a function of choices made by beneficiaries themselves rather than the trustees of the plan. Some plans sponsors offer both defined benefit and defined contribution plans. For example, the Seattle Times has a $185 million defined benefit plan as well as a $85 million employee directed defined contribution plan.

Plan sponsors also include charitable foundations, university and research foundations, endowments and other such non-profit organizations. In such entities, the board of trustees oversees an investment committee that is responsible for investment decisions. The "beneficiaries" of such organizations are, in essence, the intended recipients of the generosity of the non-profit organization.

2.2 The Hiring and Firing Process

The investment process at most plan sponsors typically starts with an investment policy statement drafted by the administrative head of the office responsible for the investment (the treasurer's office or Chief Investment Officer). The investment policy statement contains broad recommendations about asset allocation and specifies the fraction of assets to be allocated in various investment categories. This is done in conjunction with actuarial projections of projected cash outflows (based on employees ages, retirement patterns, foundation demands etc.). If a plan sponsor changes its actuarial projections as part of an asset-liability study (often conducted by a consultant), it may revise the long-term asset allocation recommendations.

Once broad asset allocations for the plan have been established, manager searches begin. The plan sponsor puts out an RFP (request for proposals) and many plans retain pension consultants to assist them in these manager searches. The process involves screening investment managers who provide investment products in the mandate stated by the plan sponsor.[5] The mandate can be either broad (e.g., domestic equity) or narrow (e.g., small-cap equity value), depending on the specificity of the investment policy statement and the peculiarities of the plan sponsor. The list of candidate managers is then culled based on performance relative to their peers, and relative to a benchmark. The list is further trimmed with written questionnaires and interviews, and the investment committee or trustees makes a final choice.

For an investment manager, being part of the initial list of managers is a critical hurdle. As a result, most organizations voluntarily provide information to various databases that record performance and other characteristics. Such databases are produced by independent organizations, such as iisearches (affiliated with Institutional Investor publications) or Nelson's Directories (affiliated with Thomson Financial), as well as by pension consultants such as Mercer Investment Consulting. A list of common databases is contained in Travers (2004).

Plan Sponsor Magazine (2003) reports that approximately 60 percent of all searches employ consultants. It is possible that since different plan sponsors conduct manager searches that are correlated in time and investment mandate, pension consultants can reap economies that plan sponsors cannot. It is also possible that pension consultants provide independent certification for the hired investment manager so that treasurer or Chief Investment Officer is not held responsible for poor selection. Regardless, the role of consultants has come into scrutiny

[5] We use the term investment managers to include independent investment counselors as well as the money management arms and affiliates of banks and insurance companies. All such entities provide products that cater to the plan sponsor marketplace.

recently with the launch of an SEC investigation into the manner in which investment managers are recommended to plan sponsors.

Once an investment management firm has been hired, the firm's performance is monitored on a quarterly basis. If performance relative to the benchmark deteriorates over consecutive evaluation horizons, the firm may be put on a "watch list". If performance improves, the firm is removed from the watch list. If performance continues to deteriorate, the firm can be terminated. If the firm is terminated, the assets are either held in place, "parked" in an index fund, or transferred to newly hired investment manager's portfolio by a transition organization. Large investment houses, such as State Street Global Advisors and Barclays Global Investors provide such transition management services, the aim of which is to minimize the frictional loss in transitioning between the legacy and target portfolios.

Aside from performance, there are at least two other reasons why an investment management firm can be terminated. The plan sponsor may view the performance of the investment manager's portfolio as being directly attributable to an individual or team at the investment management firm. If such an individual(s) leaves the firm, the plan sponsor may decide to terminate its relationship with the investment management firm. For example, in 1996 the two principal partners of Apodaca-Johnston Capital Management separated to start their own investment management firms. As a result, the Los Angeles County Employees Retirement Association terminated its contract with the firm. Alternatively, if the plan sponsor decides to make broad changes in asset allocation, it may terminate investment managers in mandates that are downsized.

Hiring of investment managers also takes place for several reasons. The replacement of a fired manager or an increase in asset allocation to a particular mandate can trigger hiring. Additionally, if the size of the plan sponsor's asset base increases, it may hire new investment managers rather than increase allocations to existing managers.

The above description of the selection and termination of investment managers seems somewhat linear. In reality, the process is not. It is a continuous and circular process of hiring, monitoring and firing investment managers.

3. Data Sources and Sample Construction

3.1 Selection and Termination Data

We obtain data on the selection and termination of investment managers from three different sources: the "Tracker" database developed by Mercer Investment Consulting, the "iisearches" database created by Institutional Investor Publications, and from electronic searches of articles published in Pensions and Investments (P&I). The tracker and iisearches databases are used by investment managers to obtain leads and market their services to plan sponsors. The following information is included in these data sources: the name of the plan sponsor, the type of the plan sponsor (public plan, corporate plan, endowment etc.), the name of the investment manager hired, the name of the consultant(s) involved, the type of investment mandate, the amount of the mandate, and a hiring date. Although similar in spirit, the two databases differ in four key ways. First, the tracker database provides a hiring date whereas iisearches updates information in its records after the hiring, and replaces its hire date with the date the data was last updated. This dating convention is important for matching records and for identifying the quarter in which hiring takes place. Second, the tracker database does not record the termination of investment managers. The iisearches database does record parallel information on investment managers that are fired but the firing data are sparse and record only single matching firing and hiring decisions. For example, if a plan sponsor fired two investment managers (A and B) and hired three (X, Y and Z), the data base records X as hired to replace A, Y to replace B, and Z as a only a hiring. Thus, a sample of firing decisions (A and B) and a sample of hiring decisions (X, Y and Z) can be constructed, but a sample of round-trip firing/hiring decisions cannot. We return to round-trip decisions later in the paper and use a different approach to construct that sample. Third, iisearches provides a column containing textual information about the hiring/firing that can help in identifying the reason for the termination. Here again, the data are sparse – only some records contain textual information. As a result, we use manual searches in trade journals to fill in the gaps. Fourth, the tracker database contains data from 1994 to 2003 whereas the iisearches database starts in 1995.

In addition to the above, we perform electronic searches for articles in P&I, a weekly trade publication. P&I is a widely used and respected source of information for this industry. It reports on searches and terminations by major plan sponsors, often providing contextual information that is not recorded in the Tracker or iisearches databases. We perform keyword searches all issues of P&I between 1996 and 2003 using the following phrases: “hiring”, “firing”, or “termination”. We then read these articles and manually record the same data elements as Tracker and iisearches. In all, we read approximately 2,700 pages to record these data.

We remove all non-U.S. plan sponsors from each of these databases and discard observations where the hiring (or firing) concerns custodians, record keepers or providers to employee directed (mostly defined contribution) retirement plans. This results in 15,940 hiring observations from Tracker, 11,537 hiring observations from iisearches and 1,184 observations from P&I. The manually built P&I database contains a dramatically smaller number of observations because P&I only reports on major plan sponsors and their searches.

We use these three data sources because we want our sample to be as comprehensive as possible and so that we can crosscheck information across the data sources. However, this benefit comes at a cost; we now have the unenviable task of identifying and eliminating duplicate observations, and filling data holes from one data source to another. To do this, we first create master files that uniquely identify different permutations and spellings of plan sponsor, investment manager and consultant names. We then splice the datasets together, regarding observations in which the same plan sponsor hires/fires the same investment manager within 90 days of each other, as duplicates. Where data sources disagree on hiring/firing dates, we regard the earliest recorded date as being accurate. We use this convention because iisearches updates its date field as it collects more information on the hiring/firing. Similarly, when data sources disagree on other aspects of the hiring/firing, we use a reasonable algorithm to determine the final value for the field (for instance, taking the minimum value of the mandate amount). In situations where the data sources disagree on the investment mandate, we treat the mandate as unknown. The intersection of these three databases produces 19,975 hiring decisions and 1,737 firing decisions.

3.2 Returns Data

We obtain information on the returns of various products or mandates offered by investment managers from Mercer's Manager Performance Analytics database. This database contains quarterly returns on approximately 9,000 products offered by 1,200 investment managers for the period 1981 to 2003. Returns information is sorted by product category. For example, returns for all small-cap products of investment managers are group together. With each grouping, Mercer provides index returns appropriate for each product category. Often, multiple indices are provided for each product. For example, for the small-cap product category, Mercer provides 13 different indices. The correlation coefficients between these different indices are generally very high. Therefore, we select one index for each product category that we believe best describes the investment objective of that category. A list of each product category and the chosen index, along with a brief description, is provided in Table A1.

3.3 Sample Construction

We match the hiring/firing database with the returns data in two steps. We first match the names of investment managers across the two databases. We use Nelson's Directory of Investment Managers (2004), the Money Market Directory of Investment Managers and Plan Sponsors (2004), and Internet searches to ensure that acquisitions of investment management firms are correctly accounted for in both the returns as well as the hiring/firing database.

We then match information on the type of the investment mandate from the hiring/firing database to one of the product types in the returns database. This process results in a loss of data for two reasons. First, Mercer's return database may not have returns for an investment manager hired or fired. Second, Mercer's return database may not have returns for the mandate for which the investment manager was hired or fired. This is often the case for mandates referred to as "alternative assets" by plan sponsors that include venture capital and private equity.

Frequently, mandate information in the hiring/firing database is available only at a broad level while the returns are available at a refined level. For instance, a hiring record may indicate that XYZ Investment Partners was hired for a large cap equity mandate. Our returns database may record return information for XYZ Investment Partners for large-cap growth, large-cap value and large-cap core products. In such situations, we use an equally weighted average return across all the relevant products and match it to the investment mandate.

We construct the final sample by merging the hiring/firing database with the returns information. This intersection produces a sample of 9,581 hiring decisions by 3,715 plan sponsors. These hiring decisions involve 597 investment managers hired to manage a total of $730 billion between 1994 and 2003. The firing database consists of 902 decisions by 505 plan sponsors between 1996 and 2003. These decisions involve the withdrawal of $110 billion from 251 investment managers.

4. The Selection of Investment Managers

4.1 Sample Distribution

Panel A of Table 1 describes the distribution of hiring decisions categorized by the type of plan sponsor. We also provide the average size of the plan sponsor and the size of the investment mandate, both in millions of dollars. Since size statistics for both the plan sponsor and mandate are skewed by the presence of some very large organizations, we also report medians.

Of the 9,581 hiring decisions, 21 percent (2,034) originate from corporate plan sponsors. The average size of such sponsors is $1.4 billion and the average mandate is for $42 million. Public plans represent a larger proportion of the sample (41 percent or 3,934 observations), are over ten times larger than their corporate counterparts ($10.7 billion) and have substantially larger mandates ($136 million). Endowments and foundations are smaller than corporate and public plans with an average size of only $497 million. Not surprisingly, their average mandate size is also smaller at only $23 million. Insurance plans represent less than 2 percent of the entire sample. The miscellaneous category includes 1,639 hiring decisions by anonymous corporate plans, Taft-Hartley defined benefit plans, multi-employer plans and trusts. They are about half the size of public plans and their average mandate size is also smaller ($66 million).

The variation is size is important because there may be economies of scale in the evaluation and selection of investment managers. Larger plan sponsors may have a higher degree of sophistication in asset allocation and in the selection of investment managers.

Retaining a consultant to assist in the evaluation and selection process can overcome this size disadvantage. Panel B shows frequency and size distribution for hiring decisions in which consultants were employed versus those in which no consultant was engaged. Both the average and median size of plan sponsors employing consultants is smaller than those that did not employ consultants. The average mandate size is also smaller, but the median mandate sizes are similar. P-values of t-tests of differences in means for plan sponsor size and mandate size are 0.00 and 0.03 respectively.

The geographic distribution of plan sponsors and investment managers may also influence hiring decisions. It is possible that proximity reduces search costs, causing plan sponsors to be more likely to hire local investment managers. We tabulate in-state hiring decisions as those in which the plan sponsor and investment manager are headquartered in the same state. Panel C shows that approximately 14 percent (1,296) of all hiring decisions show such a home bias.

We provide further information on the distribution of investment mandates in Panel A of Table 2. We categorize each investment mandate in two four broad categories: domestic equity, fixed income, international and others. The vast majority of all hiring decisions, almost 55 percent, are for domestic equity mandates. Frequently, plan sponsors are more precise in the investment mandate provided to an investment manager. To describe this, we subcategorize equity mandates using a size and growth-value grid. In the interest of parsimony, we show only extremes of this 3 by 3 grid (small versus large, and growth versus value). Mid-cap and core mandates are placed in a "remainder" category and we use a separate category for passive (indexation) mandates. Although a significant fraction of hiring decisions are for mandates that are not on the extremes of the size and growth-value grid (and fall into the remainder group), the data still show a rich distribution across the different sub-categories. With the exception of one cell, each subcategory contains approximately 5 percent of the total number of hiring decisions. Interestingly, passive mandates represent only 2.7 percent of all hiring decisions, consistent with the argument by Lakonishok *et al.* (1992) that plan sponsors have a predilection for active mandates.

Panel B shows the number and percentage of hiring decisions in each calendar year to determine if there are any important time-series patterns in hiring decisions. For the most part, the data appear to be relatively evenly distributed across time. However, there is a drop in hiring decisions starting in 2001 and continuing thereafter. This may be because a large number of hiring decisions in this later period are in alternative assets (such as private equity partnerships, venture capital, real estate ventures etc.) for which we have no returns information, and therefore disappear from our sample. To check this, we examine the time series distribution of our original hiring sample, prior to its intersection with the returns database. We find that the time series distribution of the original sample is more uniform, indicating that it is investments in these more esoteric products for which there are no publicly available returns that reduces the sample between 2001 and 2003.

4.2 Pre and Post-Hiring Performance

We identify quarter zero as the quarter in which the hiring takes place and then calculate excess buy and hold returns for each hiring decision as:

$$AR_i(t,H) = \prod_{s=t}^{t+H-1}\left(1+R_{i,s}\right) - \prod_{s=t}^{t+H-1}\left(1+R_{b,s}\right)$$

where $R_{i,s}$ is the return on the mandate type by the investment manager i in quarter s, and $R_{b,s}$ is the return on the benchmark in quarter s. Plan sponsors typically select investment managers by screening performance relative to other investment managers and stated benchmarks up to three years prior. Therefore, we compute excess returns for one, two and three years before and after the hiring quarter. Since the identification of the hiring quarter is relatively imprecise, we do not place that quarter in the pre or post period, but show returns for it separately.

The selection of a benchmark is important and difficult. Since investment mandates span various types of asset classes, it is clearly inappropriate to adjust raw returns with conventional CAPM or Fama and French (1993) benchmarks. In addition, the degree of heterogeneity across the types of mandates is quite large. As described in section 3.2, the returns data that we obtain from Mercer Performance Analytics contains benchmark indices for various investment products/mandates. Indices are produced by numerous organizations. For example, for small-cap value mandates, we have index information from Russell, Standard & Poors, and Wilshire Associates. We select one index that we believe is appropriate for the mandate, and for the sake of consistency, try to use as many indices from that organization across investment mandates (see Travers (2004) for a list of commonly used benchmark indices). We provide a list of benchmark indices for each investment mandate in Table A1.

The assessment of the statistical significance is also a non-trivial matter. Plan sponsors and investment managers hire and are hired repeatedly in our sample period. This repetition, in combination with overlapping periods in long-horizon buy and hold returns, introduces cross-sectional and time-series dependencies that render typical standard errors unreliable. We follow Jegadeesh and Karceski (2004) and calculate standard errors based on a calendar time procedure that accounts for cross-correlations, heteroskedasticity and serial correlation. These standard errors are conservative and we use them to conduct statistical inference in the remainder of the paper. Details of the calculations of standard errors are contained in appendix A.

Table 3 shows average pre and post-hiring excess returns, sample sizes and standard errors. Panel A shows results for the entire sample. The pre-hiring excess returns are strikingly positive and statistically significant: the three, two and one-year pre-hiring excess returns are 14.1, 8.5 and 4.1 percent respectively and the standard errors are 2.3, 2.1 and 1.3 percent respectively. Clearly, plan sponsors hire investment managers after a sustained period of superior performance. Performance subsequent to the quarter in which the investment manager is hired is flat; excess returns one, two and three years after hiring are 0.6, 1.1 and 1.6 percent respectively with standard errors of 0.8, 1.2 and 1.6 percent respectively.

Since our hiring and returns data end in 2003, one, two and three-year excess returns cannot be calculated for hiring decisions after 2003, 2002 and 2001 respectively. This means that the sample in the pre-hiring is different from the post-hiring period. To ensure that changing sample sizes do not drive our results, we also compute excess returns where the pre-hiring observation is only retained if we also have post-hiring return data. The results for this balanced sample are provided in Panel B. As in the unrestricted sample, the pre-hiring excess returns are positive and statistically significant, and the post-hiring returns are statistically indistinguishable from zero. For example, the three-year excess return prior to hiring is 13.8 percent with a standard error of 2.7 percent. The matched three-year return subsequent to hiring is 1.4 percent with a standard error of 1.8 percent.

It is possible that post-hiring returns are systematically related to particular characteristics of plan sponsors or the hiring decision. To determine if that is the case, we estimate cross-sectional regressions of post-hiring excess returns. The dependent variables in these regressions are the one-, two- and three-year post hiring excess returns. The independent variables are designed to detect particular attributes that may be related to post-hiring returns. We include the matched horizon pre-hiring return as an independent variable to determine the importance of return reversal. Dummy variables for corporate and public plan sponsors are included because these plan sponsors reflect different institutional structures. In the case of a corporate plan sponsor, the assets of an over-funded plan belong to the corporation and are under the jurisdiction of the managers of the plan. As a result, there is an incentive to generate superior performance, although downside liability is somewhat protected by the Pensions Benefit Guarantee Corporation. The residual claimant in a public plan sponsor is the taxpayer and one might anticipate greater agency problems in such organizations.[6] Since large plan sponsors may have greater expertise in manager selection because of economies of scale, we also include the logarithm of plan sponsor size as an independent variable. It is possible that larger mandates may generate smaller post-hiring returns because of diseconomies of scale in investment management (Perold and Salomon (1991) Berk and Green (2003)). To account for this, we include the logarithm of mandate size as an independent variable. Finally, we add two variables that capture the nature of the hiring process. A consultant indicator, equal to one if a consultant is used to facilitate the hiring, is included to determine if consultant expertise is associated with higher post-hiring returns. Also, an in-state indicator (equal to one if the plan sponsor and investment manager are headquartered in the same state) assesses whether home bias influences post-hiring returns.[7]

[6] We do not include dummy variables for other types of plan sponsors because there are no reasons to expect performance differentials between foundations, endowments, insurance plans and other plan sponsors.
[7] We also measure distance between the zip code of the plan sponsor and that of the hired investment manager following Coval and Moskowitz (1999). This reduces the sample size but our results are largely unchanged.

Since our data are aligned in event rather than calendar-time, the regressions can be estimated via standard OLS procedures (instead of panel methods). However, since the observations are not independent, we use Newey and West (1987) standard errors that account for hetersokedasticity, serial and cross-correlation. The results are reported in Table 4 with standard errors in parentheses below the coefficient estimates.

The regressions show strong evidence of return reversal over all three horizons. There is no evidence of underperformance for corporate plan sponsors but the post-hiring returns of public plan sponsors are more negative than those of other plan sponsors over two- and three-year horizons. Plan sponsor size is positively related to post-hiring returns, consistent with the notion of economies of scale at the plan sponsor level. On the other hand, mandate size is negatively related to post-hiring returns, consistent with diseconomies of scale at the investment manager level. The in-state indicator is not statistically significant, indicating that geographical biases do not play a deleterious role in the hiring process. The consultant indicator is positive and significant for two and three year returns, suggesting that consultant's expertise in investment manager selection is valuable.

The economic magnitudes of some of these coefficients are large. The average impact of a one standard deviation increase in pre-hiring returns implies a decrease in post-hiring returns of 1.6, 4.3, and 3.9 percent at one-, two- and three-year horizons, respectively. Similarly, one standard deviation increase in plan sponsor size leads to an increase of 3.6 percent in three-year post-hiring returns while one standard deviation increase in mandate size leads to a decrease of 1.7 percent in three-year post-hiring returns. The use of a consultant leads to increase in two-year (three-year) post-hiring returns by 1.1 (2.5) percent.

5. The Termination of Investment Managers

As described in section 2, at least some hiring decisions are replacements for terminated investment managers. Investment manager contracts with plan sponsors can be terminated due to poor performance, organizational reasons (such as mergers or personnel turnover), or a reallocation of assets from the mandate entrusted to the investment manager.

5.1 Sample Description

Our firing sample consists of a total of 902 termination decisions. The number of termination decisions captured by our data collection process is substantially smaller for three reasons. First, the data sources that we use (that to our knowledge, are the only available sources) serve a marketing function, designed to inform investment managers that a particular plan sponsor is searching for an investment manager in a particular asset class / mandate. These sources are not designed to track performance, or in any way assign blame. As such, the emphasis is on new accounts and revenue. Second, termination decisions are generally viewed with some distaste and there is a natural disinclination to report terminations. Certainly, investment managers have no incentive to report their own terminations. Plan sponsors may choose not to publicize terminations because they may employ the same manager for another mandate, either currently, or in the future. Third, there has been a steady increase in the assets under the administration of plan sponsors over the sample period. Ergo, the number of hiring decisions in the population is likely to be larger than that of firing decisions.

Table 5 shows simple descriptive statistics for termination decisions. Panel A shows the time series distribution, which starts in 1996 and ends in 2003. Unlike hiring decisions, the time series of firing observations increases over time. This is because our data sources do a better job of capturing such decisions in the later years. Panel B shows the distribution of termination decisions by investment style. As with the hiring decisions, the majority of the firing decisions are for (domestic) equity mandates. This is not surprising – the investment class that can, on average, generate the highest alpha is also more likely to be the investment class that can generate the largest negative alpha and hence trigger termination.

We use the textual information in our data sources to characterize the reasons for the termination of the investment manager. We categorize firing decisions into three categories. The “organizational” category included decisions due to personnel turnover, mergers or regulatory actions against the investment management firm. About 13 percent of all termination decisions are identified as such. A termination decision is placed in the “performance” category if the reporting of the termination clearly indicates that the plan sponsor was unhappy with the return performance of investment manager. There are 295 termination decisions (32 percent) that fall into this category. There are 104 termination decisions that fall in the "reallocation" category, which take place because the plan sponsor has decided to reduce or eliminate its position in the asset class that the investment manager is responsible for. For 391 termination decisions (43 percent of the total), we do not have enough information to place the termination decision in any of these categories.

It is important to recognize that the above termination reasons are not homogenous or mutually exclusive. For example, terminating an investment manager because of personnel turnover (i.e., the departure of a key portfolio manager or founder) is quite different from a termination because of regulatory action against the firm. Similarly, elements of current or future underperformance can easily creep into non-performance categories. An acquisition of one investment management by another can take place after underperformance. Alternatively, a plan sponsor may terminate an investment manager after the departure of key personnel because it believes that the departure will cause underperformance in the future. Thus, we interpret these reasons with caution. When underperformance is identified as the reason for the termination in our source data, we are certain that that is the true reason for the termination; in other cases, we cannot be sure.

Panel D shows the geographic distribution of firing decisions. Similar to hiring data, about 12 percent of all firing decisions are for investment managers with headquarters in the same state as the plan sponsor. Panel E shows the mean and median size of plan sponsors for the subsample of termination decisions. The average size of the plan sponsor is $7.6 billion, about $2 billion larger than that for hiring decisions. This is most likely because our data sources do a better job of covering the firing decisions of larger plan sponsors. The mean (and median) mandate size for terminated managers is substantially larger than that for hired managers, $147 million ($50 million) compared to $90 million ($25 million).

5.2 Pre and Post-Firing Performance

The methodology that we employ to measure pre and post-firing returns is identical to that used for hiring decisions and the results are presented in a manner that parallels the hiring decisions. Table 6 shows average pre and post-firing returns, sample sizes and standard errors.

Panel A shows results for the entire sample. The average three-year (one-year) excess return prior to a termination decision is –1.4 percent (-1.0) but its standard error is 0.9 percent (0.9), rendering it statistically insignificant. The two-year excess return is –2.6 percent and statistically significant with a standard error of 1.3 percent. Subsequent to the firing decision, the excess returns are positive for all three horizons: 1.4, 1.8 and 5.5 percent for one, two and three years after firing, and two of these three returns are statistically significant.

Two features of the sample complicate the interpretation of these results. First, some of the sample sizes are small. This is especially problematic for post-firing returns; since the majority of the termination decisions occur in 2002 and 2003, we lose all the termination decisions that occur in 2003 and can only compute one-year returns for the termination decisions that occur in 2002. Second, as before, pre and post-firing return comparisons could be influenced by the different sample sizes. For this problem, we follow the same procedure as for hiring decisions and compute excess returns for a balanced sample only (where excess returns are available before and after firing).

The results for the balanced sample are shown in Panel B. As in Panel A, the three and one-year pre-firing returns are negative (-3.5 and –0.7 percent) and while the three-year return is statistically significant, the one-year return is not. Again, the post-firing returns are positive and two are statistically significant. One year after firing, the excess return provided by the fired investment manager is 1.5 percent with a standard error of 0.8 percent. Three years after firing, the corresponding excess return is 5.0 percent with a standard error of 1.8 percent.

There are two possible reasons why the standard errors associated with pre-firing returns are, in some cases, large. First, it may be that our data do not accurately identify the firing quarter. If the delay in reporting is more than one quarter, then the one-year pre-firing returns are likely to be noisier than the three-year pre-firing returns. Unfortunately, there is nothing we can do about this possible problem. Second, it may simply be that pre-firing returns are not negative because they are not expected to be – after all, as shown in Panel C of Table 5, not all terminations are due to underperformance. Ex ante, we expect that average pre-firing excess returns for investment managers terminated due to performance be negative. But it is not obvious that pre-firing returns should be negative for other categories. A termination due to a reallocation decision by the plan sponsor may occur because the investment style is out of favor, or because the plan sponsor desires an asset allocation shift to accommodate accelerated or decelerated retirement payments (i.e., asset-liability mix reasons may be responsible for the reallocation decision). In the former case, if a style is out of favor, this should also be reflected in the benchmark return, so that pre-firing excess returns should be zero. In the latter, asset-liability mixes should be unrelated to performance, implying that pre-firing returns should be zero. Finally, it is also difficult to predict pre-firing excess returns for terminations due to organizational reasons. On the one hand, it is possible that organizational restructuring (a merger or personnel turnover) takes place after poor performance. One the other hand, it is also possible that such restructuring takes place because of superior performance (e.g., a star portfolio manager is hired by another firm or decides to start his/her own firm).

We break up the returns of terminated investment managers by the reason for the firing and present the results in Table 7. As before Panel A provides results for the unbalanced sample, and Panel B contains results for a balanced sample allowing pre-post comparisons. Pre-firing returns for all reasons and across all horizons are negative but the standard errors vary widely. Most notably, the largest negative returns are for performance-related termination, varying from a low of –2.7 percent to a high of -8.7 percent, and all are statistically significant. In contrast, the standard errors of pre-firing returns associated with other terminations are quite large.

We also estimate cross-sectional regressions for post-firing returns, analogous to those for hiring returns reported in Table 4. We make two modifications to the regression specifications. First, we estimate models with and without plan sponsor size as an independent variable. This is because requiring plan sponsor size significantly reduces the employable sample size. Second, we add three indicator variables that capture the reason for the firing.

The results of these regressions are reported in Table 8. The pre-firing return continues to be negative and is statistically significant in four out of six specifications. Its economic magnitude is also large; for the two-year return horizon models, the average impact of a one standard deviation decrease in pre-firing returns implies a increase in post-firing returns of 5.4 percent. Mandate size is also negative in all models but only statistically significant in three of them. The rest of the independent variables are not statistically significant, perhaps because sample sizes shrink considerably.

As a whole, our data appear to indicate that plan sponsors show limited timing ability in terminating investment managers. In some cases, they fire investment managers after a sustained period of underperformance, but subsequent to that, returns rebound. The extent to which such (mis) timing damages the performance of the plan sponsor depends on their true economic loss, which in turn, depends on the performance of investment managers hired to replace terminated managers. Although it tempting to simply compare post-hiring returns with post-firing returns, we refrain from doing so because, as described earlier, firing and hiring decisions are coordinated using complicated mechanisms. Therefore, we proceed to an analysis of such "round-trips" below.

6. Round-trip Termination and Selection of Investment Managers

The best way to illustrate the complexity of a round-trip termination and selection decision is by way of examples.

Example 1

In the first quarter of 2000, the St. Louis Employees Retirement System terminated 1838 Investment Advisors for its core long-term fixed income portfolio, reportedly because of poor performance. It then hired Reams Asset Management to handle this $45 million portfolio. Watson Wyatt Investment Consulting assisted in the search.

Example 2

In the first quarter of 2002, the Arapahoe County Employees Retirement System hired Barclays Global Investors to manage $15 million in passive global large-cap equity, Artisan Partners for a $10 million active international all-cap equity mandate, Brazos for $9 million in active domestic micro-cap equity and Royce for $5 million in active domestic small-cap equity. The Barclays' hiring was funded by reallocating $15 million from a $44 million active domestic large cap growth equities portfolio managed by Fayez Sarofin. Artisan's allocation came from terminating a $10 million active international all-cap equities portfolio managed by Brinson Partners. Brazos and Royce were funded by terminating a $14 million active domestic madcap growth equities portfolio managed by Denver Investment Advisors.

The first example is a straightforward round-trip firing and hiring decision in which the mandate size and type is the same, and the reason for the decision clearly delineated. The second contains two round-trip observations: (i) Denver Investment Advisors is terminated and replaced by Brazos and Royce. The mandates for the hired investment managers are different from the terminated investment manager and the allocation of the $14 million portfolio is not even. (ii) Brinson Partners is terminated and replaced by Artisan Partners in the same mandate. Note that the Barclays Global Investors hiring does not create a round-trip observation since it is not the result of a termination but an allocation adjustment for an ongoing investment manager.

In both of the above examples, the fired and hired investment managers are clearly identified. Some plan sponsors can replace terminated investment managers relatively quickly, particularly if the terminated manager was "on watch" prior to the termination. If terminations are abrupt or unplanned, however, plan sponsors often "park" assets in index funds until the search process is completed. This makes the identification of round-trip decisions more difficult, since the hired manager (an index provider) is only temporarily managing the assets.

6.1 Sample Construction and Description

Because of the complexity of the process described above, we cannot mechanically associate hiring and firing decisions, and must therefore build a sample using manual procedures. We start with the sample of firing decisions described above. For each plan sponsor and firing decision, we match hiring decisions by the same plan sponsor up to one quarter after the firing date.[8] This produces 2,206 candidate firing-hiring decisions, which contain duplications. The duplications occur because of two reasons. First, a hiring decision can be associated with more than one firing decision and vice-versa. Second, some round-trip decisions can involve the use of transition managers that hold parked assets while a new manager search is conducted.

For each candidate observation, we then search for articles detailing the decisions in the following trade journals: Pensions and Investments (P&I), Investment Management Weekly (IMG), Money Management Letter (MML) and Dow Jones Money Management Alert (DJMMA). We mark each round-trip that we are able to identify with an ID that allows us to track these decisions and eliminate duplications. This process identifies 729 round-trip firing-hiring decisions. We then match these round-trip decisions with our returns database, keeping

[8] We restrict our search for matching hiring decisions to one quarter after the firing to limit the amount manual data collection required.

only decisions for which we have some returns information. As before, this eliminates decisions involving investments in hedge funds, venture capital funds and private equity. Our final sample consists of 655 round-trip firing-hiring decisions between 1996 and 2003.

On average, each round-trip decision is associated with the firing and hiring of 1.1 investment managers, with a maximum of 11 investment managers hired or 7 investment managers fired in a particular decision. The average mandate size for firing is $116 million while the average mandate size for hiring is $102 million.

6.2 Round-trip Performance

If more than one firm is fired (or hired), we compute the excess return for that round-trip observation is the average across the fired (or hired) firms. In example 2 described above, pre and post-firing returns for Denver International Advisors would be compared to the average of the pre and post-hiring returns of Brazos and Royce.

Panel A of Table 9 shows the pre and post-event returns for fired and hired firms separately for the entire sample. We ensure that the sample is balanced across hired and fired firms in the sense that both hired and fired firms are required to have returns over a particular evaluation horizon. Consistent with the results in tables 6, 7 and 8, the pre-firing returns of fired firms are negative, and the post-firing returns are positive. Also, consistent with the results in Table 3, pre-hiring returns are large and positive prior to hiring, and statistically insignificant after hiring. This is reassuring because it suggests that our round-trip sample is similar to that of the earlier (larger) hiring and firing samples. In addition to hired and fired firm's returns, we also report return differences (hired firm's excess returns minus fired firm's excess returns) with corresponding standard errors.[9] Prior to the firing/hiring decision, the return differences are large, positive and statistically significant. The three-year (one year) return difference prior to the firing/hiring is 17.6 percent (5.5 percent) with a standard error of 3.9 percent (1.4 percent). After the hiring/firing decision, the performance of the fired firms' exceeds that of the newly

[9] Note that return differences can be directly computed from the fired and hired firm's returns but the standard errors of these return differences cannot.

hired firms' over all three horizons but with larger standard errors; the two-year (three year) return difference is –2.1 percent (-3.3 percent) with a standard error of 1.1 (2.1 percent).

In Panel B, we restrict the sample further by requiring symmetric data on hired and fired firms over comparable pre and post-event evaluation horizons. In other words, for the one-year horizon, we retain only observations where we have return information on the fired firm one year before and after firing and return information on the hired firm one year before and after firing. For this subsample, the return differences are larger, and in some cases, the standard errors are smaller. For example, the two-year (three-year) post-event average return is –2.1 percent (–3.7 percent) with a standard error of 1.1 percent (2.1 percent).

7. Robustness

As we point out in the introduction, our tests involve numerous decisions regarding empirical design and performance measurement. We perform a battery of tests to determine if our results are sensitive to these decisions. Although all the tests are too numerous to report, we discuss the important ones below.

First, our data identify hiring and firing dates with some imprecision, but the imprecision is likely to be in one direction – there can only be a delay in reporting the decision date. If the delay is more than one quarter for hiring decisions, then our post-hiring returns are biased downward. Similarly, if the delay is greater than one quarter, the post-firing returns are upward biased but the pre-firing returns should not be affected. To determine if these effects are important in our data, we shift our hiring/firing date back by one quarter and retabulate our results. The post-hiring excess returns one, two and three-years after hiring for the balanced sample are 0.9, 1.0, and 1.4 percent respectively (and can be compared to the estimates in Panel B, Table 3). The standard errors of these estimates are all large. The post-firing returns for the same sample and horizons are 1.0, 1.8, and 4.4 percent respectively, and are similar to the results reported in Panel B of Table 6. On average, it does not appear that event time misalignment significantly influences our results.

Second, our excess returns could be sensitive to our choice of benchmarks. To determine if that is the case, we repeat all our analysis by randomly choosing a benchmark from the feasible set of benchmarks provided by Mercer, not including our originally chosen benchmark. These alternative benchmarks do not significantly influence our results for hiring, firing and round-trip decisions.

Third, if an investment manager has more than one product in an investment mandate, we average the returns across products in our analysis. To determine if this averaging procedure influences our results, we redo our analysis using only data that are uniquely matched between the investment mandate and product returns. The post-hiring excess returns one, two and three-years after hiring for the balanced sample are 0.9, 1.6, and 2.2 percent respectively while the post-firing returns for the same sample and horizons are 1.8, 3.5, and 7.6 percent respectively. These results are again similar to the results reported in Tables 3 and 6.

8. Discussion

To summarize our results, plan sponsors hire investment managers after superior performance but post-hiring excess returns are zero. Plan sponsors fire investment managers (mostly) after sub-standard performance but post-firing excess returns are frequently positive.

How does one interpret this evidence? One way to think about this is in terms of opportunity costs and frictions. For hiring decisions that are necessitated by the termination of an existing investment manager (due to performance, organizational or reallocation reasons), the opportunity costs of hiring can be identified as the returns that the fired manager would have delivered relative to what the hired manager actually delivers. Our round-trip results suggest that these opportunity costs are positive. If one adds transition costs discussed in the introduction (in range of 0.5 percent to 2.0 percent) to these opportunity costs, the overall costs of firing and hiring investment managers rise further.

For hiring decisions necessitated by necessitated by the growth of sponsor assets (i.e., where there is no corresponding reduction in assets from another investment manager), the identification of opportunity costs is more difficult.[10] One way to approach the problem is to consider the role of persistence in investment manager returns. If there is little or no persistence

[10] Although there are no transition costs in such cases, there are still search costs. For the sake of simplicity, we largely ignore search costs.

in the performance of investment managers in general, then on average, hiring decisions should produce zero excess returns. This implies that plan sponsors achieve their objectives, since on average, hired investment managers deliver benchmark returns.

We pursue this argument further by investigating the persistence in returns across all investment managers for our sample period. Our tests replicate the procedure followed by Lakonishok *et al.* (1992). Since all investment managers are presumably candidates for hiring, we employ the entire returns database described in section 3.2, not just those involved in hiring decisions. We divide each investment manager's product into quartiles based on one, two or three-year excess returns. Quartile 1 is the worst performing quartile and quartile 4 is the best performing quartile. We then determine whether that manager stays in the performance quartile over the subsequent (matched) evaluation period. We do this rolling forward a quarter at a time, from 1994 to 2003. Thus, we produce transition matrices between performance quartiles. We do this for each broad investment style, domestic equity, fixed income, international and others and show the results in panels A through D of Table 10.

Diagonal entries greater than 25 percent suggest performance persistent. At the annual horizon, there is clear evidence of performance persistence in all investment classes. For domestic equity, persistence disappears over two year horizons. For the extreme portfolios, there is evidence of reversals at three-year intervals. For the other three assets classes, the persistence in one-year returns continues over long horizons.[11]

These results are undoubtedly biased because of survival – investment managers that continue to underperform are likely to disappear over time. Nonetheless, overall, these results suggest that there is indeed persistence in investment manager returns. There are two ways to view this result. On the one hand, ex ante, persistence provides a rational reason for plan sponsors to condition hiring on observed returns. On the other hand, the fact that plan sponsors *could* generate excess returns by appropriately timing hiring decisions indicates that opportunity cost of zero post-hiring returns is positive.

[11] These results differ from those of Lakonishok *et al.* (1992) who find no evidence of persistence in annual horizons but greater persistence in two and three year returns. This could be because of different sample of investment managers and/or different sample period.

Although these results paint a bleak picture of the hiring and firing process, it could be that the costs documented and discussed above have compensating benefits that we are unable to measure. From an efficiency perspective, terminating investment managers could be critical to maintaining discipline among incumbents and maintaining a competitive marketplace. It is also possible that the agency relationships described by Lakonishok *et al.* (1992) create such high barriers to change so as to make it impossible to eliminate the costs. These issues are especially important from a public policy perspective and are relevant to debates on the governance and structure of the investment management industry, the solvency of the Pension Benefit Guarantee Corporation, and social security proposals that allow workers to invest in stocks and bonds. Our study is relevant for these issues.

9. Conclusion

In this paper, we examine the selection and termination of investment managers by plan sponsors. To do so, we build a dataset that comprises hiring and firing decisions by 3,600 plan sponsors over a 10-year period from 1994 to 2003. We find that plan sponsors hire investment managers after these managers earn significant excess returns. Post-hiring returns, however, are statistically indistinguishable from zero. In contrast, plan sponsors terminate investment managers after poor performance but the performance of these investment managers appears to rebound after firing. We also examine a set of round-trip firing and hiring decisions and find that the post-firing returns of fired investment managers are generally larger than the post-hiring returns of hired investment managers. Given the magnitude of the return differences, and the transactions costs associated with transitioning portfolios from fired investment managers (legacy portfolios) to hired investment managers (target portfolios), our results suggest that the termination and selection of investment managers is a costly endeavor.

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Table 1

Distribution of Hiring Decisions by Plan Sponsors

Each plan sponsor is categorized into one of the categories listed below. Public plans include state, county and city plans. The "miscellaneous" category includes anonymous corporate plans, Taft-Hartley, multi-employer union plans and trusts. The size of the mandate in the hiring decision and the size of the plan sponsor are in millions of dollars as of year of the hiring decision. Panel B shows the distribution of hiring decisions classified by whether the plan sponsor employed a consultant in the decision. Panel C shows the geographic distribution of hiring decisions. If a plan sponsors is (not) in the same state as the hired manager, the decision is considered in-state (out-of-state).

	Number of	Plan Sponsor Size ($M)			Mandate Size ($M)		
	Hirings	Mean	Median	N	Mean	Median	N
Panel A: Distribution by type of plan sponsor							
Corporate	2,034	1,364	309	1,722	42	20	1,761
Public	3,934	10,630	1,300	3,832	136	40	3,718
Endowments & Foundations	1,790	497	175	1,476	23	12	1,585
Insurance	184	4,156	1,100	112	220	60	131
Miscellaneous	1,639	4,964	350	1,228	66	20	1,296
All	9,581	6,083	469	8,370	86	25	8,491
Panel B: Use of consultant							
Consultant employed	6,120	4,973	450	5,684	79	25	5,623
No Consultant employed	3,461	8,431	500	2,686	98	23	2,868
Panel C: Geographic Distribution							
In-state hiring	1,296	5,406	280	1,133	63	18	1,168
Out-of-state hiring	8,285	6,189	500	7,237	90	25	7,323

Table 2

Distribution of Hiring Decisions

Panel A shows the distribution of hiring decisions by the investment style of the mandate for which the hiring took place. Domestic equity mandates are further classified by whether they represent growth/value of capitalization (small/large). As a result, "core" mandates (with an overlap of growth and value or small, middle and large capitalization), fall into the remainder category. Hiring for indexed portfolios are placed in the passive category. The fixed income category includes active and passive fixed income portfolios, mortgage-backed securities, government and corporate debt. International fixed income portfolios are placed in the fixed income category. The international category includes only equity portfolios. The others category includes real estate and tactical asset allocation. When the reported investment style across the three data sources is in conflict, we place the mandate in the "not available" category.

	Number of Hirings	Percent
Panel A: Distribution of hiring decisions by investment style		
All Domestic Equity	5,256	54.9
Domestic Equity Growth	369	3.9
Domestic Equity Large	118	1.2
Domestic Equity Large Growth	433	4.5
Domestic Equity Large Value	572	5.9
Domestic Equity Passive	266	2.8
Domestic Equity Small	637	6.7
Domestic Equity Small Growth	446	4.7
Domestic Equity Small Value	445	4.6
Domestic Equity Value	494	5.2
Domestic Equity Remainder	1,476	15.4
Fixed Income	1,994	20.8
International	1,494	15.6
Others	713	7.4
Not Available	124	1.3
Panel B: Distribution of hiring decisions by calendar year		
1994	944	9.9
1995	993	9.7
1996	1,058	11.0
1997	1,003	10.5
1998	1,013	10.6
1999	1,153	12.0
2000	1,177	12.3
2001	803	8.4
2002	783	8.2
2003	714	7.4

Table 3

Buy and Hold Returns of Investment Managers Before and After Hiring

Average multi-period buy and hold returns are calculated by compounding quarterly returns over the appropriate horizon. Excess returns are calculated by subtracting the matched benchmark buy and hold return from the raw buy and hold return over the same period. Information on benchmarks is provided in Table A1. Heteroskedasticity, serial and cross-correlation consistent standard errors standard errors are calculated using the procedure described in Jegadeesh and Karceski (2004). Panel A shows results for unbalanced samples in which the number of observations in the pre and post-hiring period differ. Panel B shows returns for balanced samples in which the number of observations for pre and post-hiring are the same for a given horizon.

	Pre-Hiring Period (years)			Hiring Quarter	Post-Hiring Period (years)		
	-3 to 0	-2 to 0	-1 to 0	Qtr 0	0 to 1	0 to 2	0 to 3
Panel A: Unbalanced sample							
Excess Returns	14.07	8.85	4.05	0.39	0.62	1.12	1.59
Standard Error	2.30	2.06	1.29	0.24	0.82	1.19	1.64
N	8,596	8,985	9,229	9,364	8,615	7,769	6,881
Panel B: Balanced (pre and post-hiring) sample							
Excess Returns	13.76	9.55	4.23	0.39	0.57	0.90	1.35
Standard Error	2.65	2.50	1.39	0.24	0.82	1.16	1.77
N	6,180	7,392	8,464	9,364	8,464	7,392	6,180

Table 4

Post-Hiring Return Regressions

The dependent variables in the regressions below are the one-year, two-year and three-year post-hiring excess return. The pre-hiring return corresponds to the horizon of the dependent variable. For example, when the dependent variable is the two-year post hiring return, the pre-hiring return is the measured over the two-year period prior to the hiring decision. Plan sponsor and mandate size are measured in millions of dollars. The consultant indicator is equal to one if a consultant is employed in the hiring decision. The in-state indicator is equal to one if the headquarter state of the plan sponsor and investment manager are the same, zero otherwise. The corporate plan sponsor and public plan sponsor indicators are equal to one if the plan sponsor is a corporate or public entity respectively. The intercept captures the remaining plan sponsor categories. Standard errors appear in parentheses below the coefficients. The standard errors heteroskedascity, serial and cross-correlation consistent with eight Newey-West lags.

	Post Hiring Return Horizon		
	One-Year	Two-Year	Three-Year
Constant	0.565	-2.903	-5.256
	(0.679)	(1.106)	(1.570)
Pre-Hiring Return	-0.118	-0.182	-0.129
	(0.019)	(0.013)	(0.013)
Corporate Plan Sponsor Indicator	0.312	0.412	-0.427
	(0.396)	(0.665)	(1.053)
Public Plan Sponsor Indicator	0.436	-0.601	-1.647
	(0.404)	(0.529)	(0.887)
Log (Plan Sponsor Size)	0.323	1.193	1.699
	(0.101)	(0.184)	(0.270)
Log (Mandate Size)	-0.523	-0.939	-1.221
	(0.165)	(0.263)	(0.360)
In-state Indicator	0.576	1.083	1.071
	(0.524)	(0.817)	(1.384)
Consultant Indicator	0.058	2.252	4.288
	(0.351)	(0.502)	(0.713)
Adj-R^2	0.02	0.07	0.05
Sample Size	6,725	5,795	2,902

Table 5

Descriptive Statistics for Firing Decisions

Panel A shows the distribution of firing decisions for each calendar year. Panel B shows the distribution of hiring decisions by the investment style of the mandate for which the firing took place. Style definitions are the same as those in Table 2. Panel C shows the distribution of firing decisions by the stated reason for the firing. The "organizational" category includes firing of investment managers because of personnel turnover, regulatory action and acquisitions. The "reallocation" category refers to firings because the plan sponsor has decided to move away from the asset allocation / investment style offered by the investment manager. Panel D shows the geographic distribution of hiring decisions. If a plan sponsors is (not) in the same state as the hired manager, the decision is considered in-state (out-of-state).

	Number of Firings	Percent
Panel A: Distribution of hiring decisions by calendar year		
1996	22	2.4
1997	43	4.8
1998	20	2.2
1999	57	6.3
2000	140	15.5
2001	108	12.0
2002	234	25.9
2003	278	30.1
Panel B: Distribution of firing decisions by investment style		
All Domestic Equity	591	65.5
Fixed Income	202	22.4
International	74	8.2
Others	35	3.9
Panel C: Distribution of firing decisions by stated reason		
Organizational	115	12.7
Performance	292	32.3
Reallocation	104	11.5
Not Available	391	43.3
Panel D: Geographic Distribution		
In-state	104	11.5
Out-of-state	798	88.5

Panel E: Descriptive statistics of plan and mandate size

	Mean	Median	N
Plan Size	7,651	700	709
Mandate Size	147	50	747

Table 6

Buy and Hold Returns of Investment Managers Before and After Firing

Average multi-period buy and hold raw returns are calculated by compounding quarterly returns over the appropriate horizon. Excess returns are calculated by subtracting the matched benchmark buy and hold return from the raw buy and hold return over the same period. Information on benchmarks is provided in Table A1. Heteroskedasticity, serial and cross-correlation consistent standard errors standard errors are calculated using the procedure described in Jegadeesh and Karceski (2004). Panel A shows results for unbalanced samples in which the number of observations in the pre and post-hiring period differ. Panel B shows returns for balanced samples in which the number of observations for pre and post-hiring are the same for a given horizon.

	Pre-Firing Period (years)			Firing Quarter	Post-Firing Period (years)		
	-3 to 0	-2 to 0	-1 to 0	Qtr 0	0 to 1	0 to 2	0 to 3
Panel A: Unbalanced sample							
Excess Returns	-1.41	-2.60	-1.01	0.27	1.41	1.83	5.47
Standard Error	0.96	1.32	0.89	0.22	0.78	1.70	1.54
N	822	834	841	838	551	338	230
Panel B: Balanced (pre and post-firing) sample							
Excess Returns	-3.54	-0.33	-0.68	0.27	1.47	2.09	5.03
Standard Error	0.87	1.51	1.02	0.22	0.77	1.74	1.79
N	216	327	541	838	541	327	216

Table 7

Buy and Hold Returns of Fired Investment Managers by Stated Reason

Average multi-period buy and hold raw returns are calculated by compounding quarterly returns over the appropriate horizon. Excess returns are calculated by subtracting the matched benchmark buy and hold return from the raw buy and hold return over the same period. Information on benchmarks is provided in appendix A. Panel A shows results for unbalanced samples in which the number of observations in the pre and post-hiring period differ. Panel B shows returns for balanced samples in which the number of observations for pre and post-hiring are the same for a given horizon. Heteroskedasticity, serial and cross-correlation consistent standard errors are reported in parentheses. Sample sizes appear in square brackets.

	Pre-Firing Period (years)			Firing Quarter	Post-Firing Period (years)		
	-3 to 0	-2 to 0	-1 to 0	Qtr 0	0 to 1	0 to 2	0 to 3
Panel A: Unbalanced sample							
Organizational	1.42	0.42	0.94	0.46	1.67	4.51	12.01
	(1.85)	(1.68)	(1.37)	(0.35)	(1.44)	(2.15)	(4.11)
	[97]	[99]	[99]	[99]	[59]	[35]	[26]
Performance	-5.43	-5.81	-2.88	0.49	1.27	1.64	6.32
	(1.16)	(1.49)	(0.96)	(0.32)	(0.97)	(1.95)	(2.90)
	[266]	[270]	[277]	[273]	[179]	[108]	[71]
Reallocation	-3.79	-2.85	-0.63	-0.55	1.62	1.87	6.56
	(1.70)	(1.01)	(0.74)	(0.48)	(2.22)	(1.99)	(3.12)
	[94]	[96]	[96]	[96]	[75]	[62]	[48]
Not Available	1.37	-1.00	-0.22	0.28	1.38	1.26	2.15
	(1.34)	(1.78)	(1.38)	(0.33)	(0.87)	(2.05)	(2.63)
	[365]	[369]	[369]	[370]	[238]	[133]	[85]
Panel B: Balanced (pre and post-firing) sample							
Organizational	-1.84	3.96	1.04	0.46	2.01	4.83	6.13
	(4.24)	(3.96)	(1.96)	(0.35)	(1.04)	(2.04)	(4.04)
	[22]	[33]	[56]	[99]	[56]	[33]	[22]
Performance	-8.69	-3.53	-2.74	0.49	1.53	2.39	7.09
	(3.58)	(1.82)	(1.09)	(0.32)	(1.12)	(2.14)	(3.47)
	[65]	[101]	[175]	[273]	[175]	[101]	[65]
Reallocation	-2.68	-2.20	-0.32	-0.55	1.62	1.87	6.55
	(1.04)	(0.97)	(0.78)	(0.48)	(2.22)	(1.99)	(2.70)
	[46]	[62]	[75]	[96]	[75]	[62]	[46]
Not Available	-0.43	1.95	0.32	0.28	1.25	1.26	2.28
	(1.60)	(2.49)	(1.60)	(0.33)	(0.87)	(2.07)	(2.69)
	[83]	[131]	[235]	[370]	[235]	[131]	[83]

Table 8

Post-Firing Return Regressions

The dependent variables in the regressions below are the one-year, two-year and three-year post-hiring excess return. The pre-firing return corresponds to the horizon of the dependent variable. For example, when the dependent variable is the two-year post firing return, the pre-firing return is the measured over the two-year period prior to the firing decision. Plan sponsor and mandate size are measured in millions of dollars. The consultant indicator is equal to one if a consultant is employed in the hiring decision. The in-state indicator is equal to one if the headquarter state of the plan sponsor and investment manager are the same, zero otherwise. The corporate plan sponsor and public plan sponsor indicators are equal to one if the plan sponsor is a corporate or public entity respectively. The intercept captures the remaining plan sponsor categories. Standard errors appear in parentheses below the coefficients. The standard errors heteroskedascity, serial and cross-correlation consistent with 5 Newey-West lags.

	Post-Firing Return Horizon					
	One-Year		Two-Year		Three-Year	
Constant	3.080	4.417	7.328	6.185	12.841	10.717
	(1.967)	(1.924)	(4.201)	(3.306)	(4.803)	(5.508)
Pre-Firing Return	-0.044	-0.049	-0.309	-0.249	-0.270	-0.184
	(0.052)	(0.054)	(0.116)	(0.095)	(0.095)	(0.086)
Corporate Plan Sponsor Indicator	0.406	0.034	2.615	2.520	3.332	3.432
	(1.470)	(1.434)	(2.773)	(2.484)	(6.283)	(6.621)
Public Plan Sponsor Indicator	-1.018	-1.251	-0.353	-1.044	-3.516	-2.685
	(1.266)	(1.064)	(2.394)	(1.834)	(3.517)	(2.445)
Log (Plan Sponsor Size)	-0.091	-	-0.265	-	2.819	-
	(0.316)		(0.795)		(1.346)	
Log (Mandate Size)	-0.226	-0.512	-1.248	-1.113	-5.823	-2.231
	(0.412)	(0.330)	(0.793)	(0.587)	(1.530)	(1.178)
In-state Indicator	1.198	0.423	2.123	1.895	4.134	-0.700
	(1.768)	(1.530)	(2.802)	(2.291)	(3.673)	(4.106)
Consultant Indicator	-0.564	-0.508	2.957	2.224	-4.125	3.522
	(1.119)	(1.154)	(2.418)	(1.992)	(5.068)	(3.274)
Organizational Indicator	3.110	1.769	6.348	2.520	3.395	4.331
	(1.400)	(1.203)	(3.450)	(2.484)	(4.489)	(4.558)
Performance Indicator	0.865	-0.612	-2.111	-2.237	3.729	3.013
	(1.123)	(0.995)	(2.445)	(2.063)	(4.001)	(3.665)
Reallocation Indicator	0.613	1.071	-1.454	-1.040	3.853	3.635
	(1.174)	(1.968)	(1.970)	(2.088)	(3.972)	(4.760)
Adj-R^2	0.003	0.000	0.184	0.075	0.286	0.045
Sample Size	359	476	191	294	105	196

Table 9

Buy and Hold Returns of Investment Managers Before and After Firing and Hiring

Average multi-period buy and hold raw returns are calculated by compounding quarterly returns over the appropriate horizon. Excess returns are calculated by subtracting the matched benchmark buy and hold return from the raw buy and hold return over the same period. Information on benchmarks is provided in appendix A. Heteroskedasticity and serial correlation consistent standard errors (HSC_V) standard errors are calculated using the procedure described in Jegadeesh and Karceski (2004) and appear in parentheses. Sample sizes appear in square brackets. Panel A shows results where both sides of the round-trip (hired and fired firms) are required. Panel B shows results for a fully balanced sample that requires both sides of the round-trip and that pre-and post-event returns be available for a given horizon.

	Pre-Event Period (years)			Event Quarter	Post-Event Period (years)		
	-3 to 0	-2 to 0	-1 to 0	Qtr 0	0 to 1	0 to 2	0 to 3
Panel A: Sample Balanced on fired and hired firms							
Fired Firms	-1.05	-2.01	-0.33	0.35	1.40	2.47	4.99
	(1.11)	(1.30)	(0.91)	(0.20)	(0.97)	(1.43)	(1.35)
Hired Firms	16.53	10.08	5.20	0.42	0.74	0.33	1.73
	(3.70)	(2.98)	(2.16)	(0.25)	(0.75)	(1.34)	(2.48)
Return Diff.	17.58	12.10	5.52	0.08	-0.67	-2.14	-3.27
(Hired-Fired)	(3.97)	(2.33)	(1.44)	(0.29)	(1.06)	(1.29)	(2.07)
N	413	425	433	434	318	196	129
Panel B: Sample Balanced on fired and hired firms and pre and post-event							
Fired Firms	-1.99	0.49	0.23	0.42	1.37	2.94	5.58
	(2.35)	(1.41)	(1.09)	(0.24)	(0.98)	(1.41)	(1.49)
Hired Firms	18.52	13.05	6.34	0.67	0.75	0.83	1.84
	(6.12)	(3.73)	(2.69)	(0.30)	(0.76)	(1.04)	(1.96)
Return Diff.	20.50	12.56	6.11	0.08	-0.62	-2.11	-3.74
(Hired-Fired)	(7.89)	(2.20)	(1.73)	(0.29)	(1.13)	(1.13)	(2.09)
N	120	186	311	434	311	186	120

Table 10

Transition Matrices for Performance Quartiles

Each investment manager's excess returns (within a style category) are placed in a performance quartile for annual, biannual and triennial horizons. We then determine if the fund stays in the same performance quartile over the next annual, biannual or triennial horizon. The worst performing quartile is labeled 1 and the best performing quartile is labeled 4. Transition matrices are constructed using the entire returns database, separately for domestic equity, fixed income, international and other mandates.

	Annual				Biannual				Triennial			
Panel A: Domestic Equity												
	1	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*1*	*2*	*3*	*4*
1	31	24	22	23	23	23	24	29	16	18	27	39
2	25	30	25	20	21	29	29	21	18	26	29	26
3	21	27	29	23	22	27	26	25	26	31	26	18
4	23	19	24	34	33	21	21	25	40	25	18	17
Panel B: Fixed Income												
	1	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*1*	*2*	*3*	*4*
1	27	20	22	31	41	21	17	22	43	27	19	11
2	19	29	32	20	30	33	29	17	21	34	29	15
3	22	31	29	18	15	29	35	20	13	27	36	25
4	32	20	17	30	24	17	19	40	23	12	16	49
Panel C: International												
	1	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*1*	*2*	*3*	*4*
1	32	24	21	23	23	27	25	25	18	30	26	27
2	21	31	31	17	24	31	25	20	25	30	26	19
3	22	27	27	22	25	26	26	23	26	26	25	24
4	25	18	18	36	29	16	23	32	31	16	23	29
Panel D: Others												
	1	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*1*	*2*	*3*	*4*
1	39	23	20	18	32	25	21	23	24	23	25	29
2	26	33	28	13	26	32	31	11	24	28	33	14
3	21	29	32	17	23	30	31	16	27	33	26	14
4	13	14	21	52	19	13	18	50	26	16	16	42

Table A1

Investment Mandates and Indices

Investment Mandate	Description	Index
Domestic Equity		
Largecap	Large-cap equity	S&P 500
Largecapcore	Large-cap – between growth & value	S&P 500
Largecapgrowth	Large-cap – growth	S&P 500/BARRA Growth
Largecapindex	Large-cap – indexed	S&P 500
Largecapvalue	Large-cap – value	S&P 500/BARRA Value
Midcap	Mid-cap equity	S&P Midcap 400
Midcapcore	Mid-cap – between growth and value	S&P Midcap 400
Midcapgrowth	Mid-cap – growth	S&P/BARRA Mid Cap Growth
Midcapindex	Mid-cap – indexed	S&P Midcap 400
Midcapvalue	Mid-cap – value	S&P/BARRA Mid Cap Value
Smallcap	Small-cap equity	S&P Small Cap 600
Smallcapcore	Small-cap – between growth and value	S&P Small Cap 600
Smallcapgrowth	Small-cap – growth	S&P/BARRA Small Cap Growth
Smallcapindex	Small-cap – indexed	S&P Small Cap 600
Smallcapmicro	Small-cap – value	S&P Small Cap 600
Smallcapvalue	Small-cap equity	S&P/BARRA Small Cap Value
Smid	Small to mid-cap equity	Russell 2500
Smidcapcore	Small to mid-cap – between growth and value	Russell 2500
Smidcapgrowth	Small to mid-cap – growth	Russell 2500 Growth
Smidcapvalue	Small to mid-cap – indexed	Russell 2500 Value
Equitygrowth	All equity - growth	Russell 3000 Growth
Equityvalue	All equity – value	Russell 3000 Value
Equitycombined	All equity	Russell 3000
International equity		
Emergmkteq	Emerging market equity	MSCI Emerging Mkts Free
Europeincuk	Europe incl. U.K.	MSCI Europe 15
Europeincuksm	Europe incl. U.K. – small-cap	MSCI Europe S/C
Globaleq	Global equity (incl. U.S.)	MSCI World Free
Intleq	International equity	MSCI EAFE Free
Intleqsmall	International equity – small-cap	MSCI EAFE S/C
Intlpassive	International equity – passive	MSCI EAFE
Pacbasinincj	Pacific basin incl. Japan	MSCI AC Pacific Free
Fixed income		
Convertibles	Convertibles	Merrill Lynch Inv Grade Convertible
Fixed1-3yrs	Duration between 1 and 3 years	Merrill Lynch Govt/Corp 1-3 Years
Fixedcore	Inv. and non-inv. grade, duration 3-7 years	Lehman Aggregate
Fixedcoreinvest	Inv. grade, duration 3-7 years	Lehman Aggregate

Fixedcoreopportun	Non-inv. grade, duration 3-7 years	Lehman Aggregate
Fixedhighyield	High yield securities	Lehman High Yield Composite
Shortterm	Duration between 1 and 2.4 years	Citigroup 3-Month T-Bill
Fixedintermed	Duration between 2 and 4.6 years	Lehman Int. Aggregate
Fixedlongdura	Duration greater than 6 years	Lehman Long Govt/Credit
Mortgageb	Mortgage-backed securities	Lehman Mortgages
Fixedcombined	All fixed income	Lehman Aggregate
Emergmktdebt	Emerging market debt	JP Morgan ELMI+
Globalfixhedg	Global fixed income - hedged	Lehman Global Aggregate (Hedged)
Globalfixunhedg	Global fixed income - unhedged	Lehman Global Aggregate (Unhedged)
Intlfixedhedg	International fixed income – hedged	Citigroup Non-US WGBI (Hedged)
Intlfixedunhedg	International fixed income - unhedged	Citigroup Non-US WGBI (Unhedged)
Others		
Realestate	Real estate	NCREIF Property
Realestateselect	Real estate select	NCREIF Property
Reits	Reits	NAREIT
Taa	Tactical asset allocation	S&P 500
Balanced	Balanced	S&P 500

Appendix A: Standard Error Calculation

The sample comprises *N* hiring/firing decisions of investment managers by plan sponsors ("events"). We wish to test whether the event managers exhibit abnormal return performance from the event date through a *H*-quarter holding period. We define the *H*-quarter abnormal return for investment manager *i* that starts at the beginning of the event quarter *t* as:

$$AR_i(t,H) = \prod_{s=t}^{t+H-1}\left(1+R_{i,s}\right) - \prod_{s=t}^{t+H-1}\left(1+R_{b,s}\right) \; ,$$

where $R_{i,s}$ is the return on the mandate type by the investment manager *i* in quarter *s*, and $R_{b,s}$ is the return on the benchmark in quarter *s*. Define:

$$\overline{AR}_{\text{sample}}(H) = \frac{1}{N}\sum_{i=1}^{N} AR_i(t,H)$$

Let N_t equal the number of events in the sample in qurter *t*, and let *N* be the total number of events in the sample. Therefore $N = \sum_{t=1}^{T} N_t$. Define the average abnormal return for each event quarter *t* across all events in the that quarter (we refer to this group of events as a quarterly cohort) as:

$$\overline{AR}(t,H) = \begin{cases} \dfrac{1}{N_t}\displaystyle\sum_{i=1}^{N_t} AR_i(t,H) & \text{,if } \; N_t > 0 \\ 0 & \text{otherwise} \end{cases}$$

Let $\overline{AR}(H)$ be a $T \times 1$ column vector where the t^{th} element equals $\overline{AR}(t,H)$. $\overline{AR}(H)$ is the average long-run abnormal return of each quarterly cohort. Define *w* as a $T \times 1$ column vector of weights where the t^{th} element is the ratio of the number of events that occur in quarter *t* divided by *N*. Specifically, $w(t) = N_t / N$. Note that the sample average abnormal return is equal to the quarterly weight vector *w* times the average abnormal return of each quarterly cohort:

$$\overline{AR}_{\text{sample}}(H) = w'\,\overline{AR}(H)$$

The variance of $\overline{AR}_{\text{sample}}(H)$ is given by:

$$\sigma^2\left(\overline{AR}_{\text{sample}}(H)\right) = w'Vw$$

where *V* is the $T \times T$ variance covariance matrix of $\overline{AR}(H)$.

Our estimator for V allows for heteroskedasticity as well as serial correlation and is denoted as HSC. The st^{th} element of HSC_V is

$$hsc_{st} = \begin{cases} \dfrac{(H-l)}{l}\overline{AR}(s,H)\,\overline{AR}(t,H), & \text{if } \; l = |s-t| < H \\ 0 & \text{otherwise} \end{cases}$$

This estimator uses Newey and West (1987) weighting scheme that ensures that HSC_V is positive definite.