The Determinants of the Flow of Funds of Managed Portfolios: Mutual Funds versus Pension Funds

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Abstract

This paper provides evidence that the criteria used to select portfolio managers differs substantially across retail mutual fund and fiduciary pension fund clients. Due to differences in client financial sophistication and agency relationships, we expect the relation between asset flow to a manager and performance to differ in the two industries. Our cross-sectional analysis over the 1987 to 1994 period generally supports our predictions. Consistent with previous research, mutual fund investors use less sophisticated performance measures to choose managers, and flock disproportionately to recent winners. In contrast, pension fund clients use measures such as Jensen's alpha and tracking error, and punish poorly performing managers by withdrawing assets. Based on differences in the shape of the flow-performance relation, pension fund managers have much less incentive to risk-shift than mutual fund managers.

I. Introduction

The mutual fund and pension fund management industries are similar in many basic ways. Both deliver portfolio management services to its clients; choose investments from the same universe of risky assets; and employ both passive and active fund managers. Due to the expansion of the mutual fund industry over the past decade, the industries are now also comparable in terms of total assets under management and the total number of portfolio products.[1] One important difference in these two industries, however, is their disparate clienteles. The typical retail mutual fund investor differs substantially from the typical pension trustee in their investment needs and financial background. As a result, these two client types are likely to use different criteria when selecting a money manager. Because portfolio managers are typically compensated as a percentage of assets under management, they have strong incentives to focus their efforts on attracting clients; delivering the dimension of performance or service that result in increased assets. To better understand these implicit incentives deriving from client behavior, we compare the relation between asset flow to a manager and manager characteristics. Specifically, we analyze whether differences in client characteristics between these two industries translate into differences in the relation between manager asset flow and performance.

Our work builds on earlier papers by Sirri and Tufano (1998), Ippolito (1992), and Patel, Zeckhauser and Hendricks (1994) who present evidence that a flow-performance relation exists in the mutual fund industry, and Lakonishok, Shleifer, and Vishny (1992) who provide an overview of the less-studied pension fund industry. We focus on two main differences in client characteristics across the two industries: the existence of agency problems and financial sophistication. Using a compilation of survey evidence, practitioner sources, and academic studies, we argue that pension fund sponsors are much more financially sophisticated than mutual fund investors. In addition, we argue that the selection of managers in the pension fund industry takes place in an environment characterized by agency problems, consistent with Lakonishok, Shleifer, and Vishny (1992). Because mutual fund clients invest on their own behalf, the mutual fund industry provides a sharp contrast to the layers of agency relationships inherent in the pension industry.

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[1] The 1995 *Pensions and Investments* magazine Top 1000 money managers issue covered 7953 pension fund products collectively controlling $3.1 trillion. In the same year, ICI's Mutual Fund Factbook lists 5357 mutual funds controlling $2.1 trillion in aggregate.

We document several differences in the relation between flow and manager characteristics consistent with these fundamental differences in clients. First, we find evidence that the importance of agency relationships induce pension fund sponsors to value manager characteristics that can be justified to superiors or a trustee committee. For example, we find that beating the S&P 500 attracts an additional $123.86 million in flow to the average pension manager and boosts his asset growth rate by 16.4 percentage points. Furthermore, we find that it is whether or not a manager beats the S&P 500 that is important; the magnitude of the excess returns is unrelated to flow. In contrast, we find that mutual fund manager flow is positively related only to the magnitude of the excess returns. This suggests that beating the S&P 500 is a discrete event only in the pension industry, possibly because it serves to validate the manager's competence. In addition, we find that the relation between manager flow and performance is noisier in the pension fund industry. This supports the characterization of that industry as relatively more individualized and influenced by non-performance manager characteristics, such as Lakonishok, Shleifer, and Vishny's (1992) "schmoozing ability."

Second, we find that pension fund sponsors appear to be more sophisticated than mutual fund investors. For example, we find that pension manager flow is significantly related to quantitative performance measures such as Jensen's alpha and tracking error. Mutual fund manager flow, on the other hand, has a stronger relation with raw return performance. Consistent with previous research, this relation is highly convex, implying that mutual fund investors disproportionately flock to good performers, but do not punish poor performers by withdrawing assets. In contrast, we find that the flow-performance relation is approximately linear in the pension fund industry. Pension sponsors withdraw assets from managers with poor alpha performance, as well as allocate flow toward good performers, consistent with being a more sophisticated clientele.

By documenting differences in the flow-performance relation, we contribute to the growing literature linking fund manager behavior to their implicit incentives to increase assets under management. The shape of the flow-performance relation in the mutual fund industry, whereby top performers experience large flow gains, but poor performers do not lose assets, implies that winners take all in this industry. As a result of the convexity in rewards, mutual fund managers have an incentive to alter the risk of their portfolios to increase the chances that they are among the winners. Brown, Harlow, and Starks (1996) and Chevalier and Ellison (1997) find empirical support for this prediction. We show that several forces combine to weaken the incentive for pension fund managers to engage in this same type of risk-

shifting behavior. In addition to the lack of convexity in the flow-performance relation and the withdrawal of assets for poor performance, pension fund sponsors appear to explicitly punish this type of behavior. Specifically, we find a significantly negative relation between pension manager flow and tracking error, a measure of diversifiable risk. In addition, survey and anecdotal evidence suggests that pension sponsors commonly fire managers who substantially deviate from their stated investment policies. All together, we argue that pension managers do not have the same incentive to risk-shift that mutual fund managers do.

As a result of our industry comparison we provide new insights into previous studies that focus only on mutual funds. In stark contrast to pension fund flows, we find that mutual fund flows are highly autocorrelated. We provide some evidence that the high degree of autocorrelation in mutual fund flows, also reported in Patel et al (1994) and Gruber (1996), appears to be driven by the behavior of participants in defined contribution (401k) retirement plans. Another interesting industry contrast is the importance of asset size in attracting flow. Large mutual funds attract more dollars than smaller funds, but less than proportionally so that their growth rates are smaller. We find that this result is unique to mutual funds, and not a universal characteristic of managed funds. Large pension funds attract much less dollar flow than smaller funds, with the top 10% of managers ranked by asset size actually losing assets on average. We conjecture that this too is related to differences in agency relationships and sophistication across the two industries. For example, the importance of personal relationships and face-to-face contact between managers and clients in the pension industry may induce decreasing returns to scale in this industry.

In a broader sense, this paper also contributes conceptually to the large literature on fund performance evaluation. The focus in this literature has traditionally been, "do mutual funds exhibit superior risk-adjusted performance?" The puzzle of active portfolio management whereby mutual fund managers underperform passive benchmarks, yet continue to attract assets to manage, may be reconciled by shifting the focus to "do mutual funds exhibit superior performance in the eyes of their investors?" Our results suggest that the answers to these questions might be quite different.

II. Comparison of the Pension Fund and Mutual Fund Management Industries

In a given year there is a fair amount of hiring and firing activity in both the mutual fund and pension fund industries, resulting in a large volume of inflows and outflows. Twenty-nine percent of mutual fund owners surveyed in 1995 indicated that they had conducted an exchange (transferred out of one fund and into another within the same mutual fund company) and 14% closed an account. During

that same year, 22% of pension plan sponsors terminated a manager, 28% hired a manager and 15% terminated and hired a manager within the year.[2]

Previous evidence suggests that past performance influences the manager selection and termination decision, and is thereby an important determinant of flow. Despite different sample periods, methodologies, and performance measures, Chevalier and Ellison (1997), Gruber (1996), Patel, Zeckhauser, and Hendricks (1994), Ippolito (1992), and Sirri and Tufano (1998) all find that past performance is an important determinant of flow in the mutual fund industry. Lakonishok et al (1992) provide some evidence that performance is related to the growth in the number of clients in the pension fund industry as well. Although these studies establish the importance of a manager's track record in determining the amount of assets he controls, there has been relatively little discussion of which performance measures and manager characteristics matter most. A careful comparison of a typical client in the two industries will shed light on how and why the flow-performance relation is likely to differ across these groups.

As of 1995, the mutual fund industry served more than 30 million households while the pension fund industry served around 45,000 corporate and public plan sponsors and endowments. The median mutual fund assets per household is $18,000 while the average pension fund assets is in the range of $67 million.[3] Individuals typically have a much smaller portfolio of managers to monitor: the median household owns three mutual funds with two different fund families. The average number of portfolio managers per plan sponsor is 8.9, with plans over $1 billion in assets employing as many as 20 managers. These basic differences imply that a pension fund manager's flows will be much more discrete, as the loss of one or two clients may mean millions of dollars in withdrawals. In addition, by controlling a large amount of assets pension fund sponsors have more market power in contracting for portfolio management services than mutual fund investors. Indeed, Halpern and Fowler (1991) report that fees vary considerably by pension fund client for the same manager.

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[2] Unless otherwise noted, the sources for the survey information on mutual fund investors comes from various publications from the Investment Company Institute including: the 1996 national survey of mutual fund investors *The People Behind the Growth*, the 1993 survey *Understanding Shareholder's Redemption Decisions*, the 1997 survey *Understanding Shareholder's Use of Information and Advisors*, and the 1996 survey *Shareholder Assessment of Risk Disclosure Methods*. (All available at www.ici.org.) Unless otherwise noted, the survey information on pension fund sponsors comes from various surveys by Greenwich Associates (compiled in Investment Management Report 1996 and 1997).

[3] McGraw-Hill's 1995 *Money Market Directory* and the 1995 *Directory of Pension Funds and their Investment Managers* (McGraw Hill).

The question of interest is how these two very different client pools allocate money to the managers competing for their assets. In this section we focus on two client differences that will guide our empirical analysis of the relation between flow and performance in these two industries.

A. Client Differences: Agency Relationships

Mutual fund investors make investment allocation decisions on their own behalf, while pension fund sponsors are fiduciaries acting on the behalf of others. In particular, the majority of pension fund assets are in defined benefit plans, where typically a corporate treasurer is responsible for investing the pension assets.[4] Lakonishok, Shleifer and Vishny (1992) argue that an agency problem between senior corporate management, the corporate treasurer, and the outside portfolio managers can account for many facts about the pension fund industry. Specifically, since the corporate treasurer must answer to senior management in the event of inferior plan performance, he may choose managers and strategies that reduce his own job risk. As a result, he may tend to choose strategies where blame can be easily transferred to others and his decisions can be defended ex-post. For example, Lakonishok, et al argue that the common practices of externally managing pension assets and hiring professional pension consultants are popular because they provide convenient scapegoats in the event of an unpleasant outcome.[5]

Several aspects of the manager selection process differ between the two industries. The majority of pension sponsors retain consultants such as Wilshire Associates, Frank Russell, or RogersCasey to monitor the performance of current managers and make hiring and firing recommendations. Selecting a new manager is often a lengthy and costly process with consultants charging fees upwards of $100,000 to conduct a full search. Greenwich Associates reports that "for every manager actually selected by the average fund, 22 are screened by pension fund consultants, 16 complete a written questionnaire, 5 are interviewed personally, and 4 reach the "finals." Thus, a strong track record is only a starting point in attracting clients as presumably only those with good records make it to the interview stage of the process.

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[4] According to Greenwich Associates, 86% of corporate pensions managed 63.2% of their pension assets via defined benefit plans in 1994.

[5] Eighty-six percent of pension plans surveyed by Greenwich Associates managed less than 5% internally in 1994. Sixty percent of pension plans surveyed by Greenwich Associates used the services of a pension fund consultant in 1994 and 84% of those used their consultant to monitor current managers in addition to providing other services.

Survey and anecdotal evidence suggest that non-performance manager characteristics such as personality, credibility, reputation, and attentiveness are very important in the ultimate hiring and retention decision. For example, 25% of plan sponsors listed a "lack of credibility with investment committee or trustees" as the reason for termination of their manager. According to scoring sheets from CalPERS' recent manager search, only ten points out of 550 were allocated to performance for those managers making it past the initial screening, while 150 points were allocated to the "investment committee interview."[6] Most sponsors frequently meet one-on-one with their managers to ask questions, examine holdings, and assess performance. For example, 78% of sponsors meet at least once a year with the most important managers and apparently value personal contact highly.[7] Overall, the picture emerging from this industry is that manager characteristics unobservable to a researcher play an important role in attracting pension assets. In contrast, mutual fund investors have little opportunity for personal contact with portfolio managers, and are more likely to rely on a track record or a fund analyst's report to guide their decision. Even Morningstar inputs only quantitative variables into its star ratings even though they are clearly influential enough to gain personal access to fund management.

As in Lakonishok et al, pension sponsors' reliance on qualitative manager characteristics and outside consultants can be interpreted as evidence of an agency problem. Alternatively, these practices might be considered optimal from the beneficiary's perspective if they are a cost-effective method of handling the complex task of monitoring large sums of pension liabilities. Whichever the interpretation, client differences in the way managers are selected in the two industries suggest differences in the relation between flow and performance.[8] First, we should observe a weaker relation between flow and quantitative performance measures in the pension fund industry, because qualitative manager characteristics are generally more important to pension fund sponsors than to mutual fund investors. We recognize that non-performance factors such as fund reputation or services may be important to mutual fund investors as well. However, they are unlikely to greatly weaken the cross-sectional relation between flow and performance because reputation in the mutual fund industry is largely based on marketing, which also tends to focus on performance. In addition, there is a great deal of homogeneity in services offered across fund complexes, implying little cross-sectional dispersion along this dimension.

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[6] http://www.calpers.ca.gov/invest/invest.htm

[7] According to a Nelson/Wilshire poll, a recent trend toward the introduction of client service personnel to interact with sponsors in place of the portfolio management team is viewed negatively by 65% of the plan sponsors surveyed.

Second, we would expect manager characteristics that reduce a corporate treasurer's job risk to be valued by sponsors, and therefore related to flow in the pension industry. Some aspects of these characteristics are difficult to measure directly, such as the "schmoozing ability" discussed by Lakonishok, et al. However, there are observable variables that are anecdotally, and plausibly, related to a manager's "safety" from the treasurer's perspective: the existence of a three- or five-year track record, returns in excess of a market benchmark, and tracking error. Many pension funds require the existence of a three-year performance track record to even be considered in the initial phases of a manager search, and some sponsors require a minimum of five years.

Outperforming a market benchmark may be convincing evidence of competency to trustees, even if the manager was not a top performer among peer managers. Indeed, a recent survey of sponsors ranked performance relative to market indices as more important than the investment performance of other managers.[9] In this environment, managers who take concentrated bets on stocks and consequently deviate substantially from market benchmarks take a risk of being "wrong and alone."[10] Tracking error, a measure of diversifiable risk, captures this idea because it dynamically measures the volatility of a portfolio's deviation from benchmark returns.[11] Bernstein (1998) discusses this issue, stating that "clients love affair with benchmarks has made large tracking errors extremely perilous for [pension] managers." Tracking error is distinctly tied to the agency relationships prevalent in the pension industry because it focuses on diversifiable risk as the cost of manager investment decisions, while ignoring the benefits in terms of increased return. Mutual fund investors do not need to justify hiring decisions to superiors or beneficiaries, and are less likely to be concerned with these measures of manager credibility and competence.

B. Client Differences: Financial Sophistication

The typical pension fund client is arguably more financially sophisticated than the typical mutual fund investor. Pension fund sponsors are often finance professionals with expertise in the area of investment management. In addition most pension sponsors rely heavily on the recommendations of

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[8] For simplicity, we refer to evidence consistent with either interpretation as evidence of agency problems throughout the paper.

[9] "Time Horizons of Pension Fund Managers," by Financial Executives Research Foundation, 1993.

[10] Mark Kritzman, "Wrong and Alone," *Economics & Portfolio Strategy* (New York: Peter L. Bernstein, Inc. :1998)

[11] Tracking error is defined as the standard deviation of the residuals in a time-series regression of portfolio returns on market benchmark returns.

consultants when deciding which managers to hire or retain. As a result, the performance evaluation measures favored by consultants likely influence the relation between flow and performance in this industry.

A consultant's screening service generally includes a high degree of quantitative analysis including risk-adjusted measures such as Jensen's alpha and the Sharpe measure. These measures are also commonly found in many of the available pension manager databases and evaluation software packages. In addition, firms such as BARRA, Mobius, and Wilshire Associates market software that performs sophisticated return attribution analysis that decomposes portfolio returns into exposure to various passive indices. Managers are often selected and evaluated according to their investment style or specialty. For example, a sponsor may conduct a search for a manager that invests only in large-capitalization value stocks. As a result, the sponsor would compare a potential manager's track record to an index of value stocks or other large-cap value managers. Virtually all pension managers state their investment style and benchmark when marketing themselves to potential clients. Despite the widespread use of style-specific and customized benchmarks in this industry, managers are almost always compared to the S&P 500 index as well. In 1996, 47.1% of all pension fund managers chose the S&P 500 as their primary benchmark.[12]

The more sophisticated methods of style analysis, risk adjustment and benchmarking that are commonplace in the pension fund industry do not appear to be common among mutual fund owners.[13] Capon et al (1996) report that 75% of recent mutual fund purchasers surveyed did not know the investment style of their funds, and 39.3% did not know whether their fund was a load or no-load fund. When choosing a fund or monitoring a current investment, mutual fund investors typically rely on sources of investment advice or information less likely to endorse sophisticated risk-adjusted measures of fund performance. Most use the media for information: 53% use newspapers, magazines or investment newsletters (most frequently mentioned are the Wall Street Journal and Money magazine) and only 19% consult a ratings service like Morningstar or Lipper. According to a 1995 Money magazine poll of mutual fund investors, only 26.7% said they compared their fund's return to a benchmark.[14]

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[12] *Nelson's 1998 Survey of Performance Benchmarks*

[13] Admati and Pfleiderer (1997) present a model in which tying manager compensation directly, or indirectly through flow, to observed benchmark-adjusted performance does not lead to optimal portfolios, or aligned incentives between the manager and client. Nevertheless, we refer to the use of benchmarks as sophisticated in the sense that they are quantitative measures endorsed by pension consultants and portfolio theory.

[14] "Why Funds Don't Beat the Market," *Money* (August 1995, pp. 58-67)

A confounding factor in a characterization of mutual fund investors as unsophisticated is that 59% of mutual fund owners consult with a financial advisor such as a broker or financial planner before purchasing mutual funds. In addition, fund recommendations in newspapers and magazines are typically based on performance measures that incorporate some form of risk adjustment. Many fund advertisements feature Morningstar star ratings based on fund rankings on both risk and return. Together, these factors may implicitly introduce an element of more sophisticated decision making into the fund selection process. However, the magnitude of this effect is an empirical question.

These differences in the level of client financial sophistication suggest that different performance measures may be important in each industry. We expect flow in the pension fund industry to be related to risk-adjusted measures of performance such as Jensen's alpha, the Sharpe measure, and style-adjusted returns. Tracking error and performance relative to the S&P 500 index are also likely to be more strongly related to pension fund flows both because of agency reasons and because of their reliance on sophisticated concepts like benchmarking. Flow in the mutual fund industry is likely to be more closely related to raw returns and summary performance measures, such as popular rankings (e.g., Morningstar "stars"). Differences in the attention paid to monitoring managers suggest that pension fund sponsors are more likely to punish poorly performing managers by withdrawing assets than mutual fund investors.

III. Description of the Sample

A. Pension Fund Sample

Data on pension fund money managers are from the June 1995 *M-Search Database* compiled and distributed by Mobius, Inc. This database contains numerous firm and manager characteristics for 1320 management firms offering approximately 4500 portfolio products over the period 1985 to 1994. Each management firm typically offers more than one investment product, each with a given style or objective. As in studies of the mutual fund industry, the unit of analysis is the individual fund product (e.g., the analog of Fidelity Magellan). Although other terms such as "fund" or "product" are often used, we will refer this unit of analysis as the fund manager.

For each manager we have an annual time-series of assets under management and the number of distinct clients, and quarterly returns. Assets and client numbers are broken down by tax treatment of the client account (tax-exempt, taxable) so that we are able to isolate the flows from tax-exempt, fiduciary clients. Tax-exempt clients, who control approximately 88% of total sample assets, include university

endowments and non-profit foundations in addition to public and corporate pension sponsors. We collectively refer to this client group as pension fund sponsors.

The Mobius database is sold primarily to sponsors to aid in selecting and monitoring portfolio managers. Managers do not pay to be included in *M-Search*, and Mobius does not provide any consulting services for manager selection or evaluation. A typical use of the Mobius database is to do an initial screening of managers with a certain investment style. The data are provided to Mobius via self-reported manager surveys. While this may cause some concern regarding the quality of the data, management firms do have an incentive to provide Mobius with complete, accurate, and timely information. Managers obviously have an incentive to participate since they cannot make the screen if they are not in the database, and since the median firm in our sample gets 40% of its new clients through direct marketing. Managers have an incentive to be complete since *M-Search* screens will exclude a manager from a search if data are missing. They arguably have an incentive to be accurate, since clients may check the data of the managers who make their final screen against alternative sources (e.g., *Nelson's Directory of Investment Managers*, *Pensions and Investments*, private consultants, etc.) and may use Mobius ex post to evaluate manager performance.[15] Finally, they have an incentive to be timely since Mobius will drop a firm after failing to report returns for three consecutive quarters.

To focus on a set of relatively homogeneous managers, we analyze only active domestic equity managers who invest according to a growth, value, or general equity investment style. As a result, we exclude all non-equity, international, and passive index managers. Investment style is determined as of December 1994, and applied to the historical data for each manager. We use product names and supplementary manager-supplied style information on *M-Search* to assign each pension fund manager to a style category. Using a similar style classification on this same data set, Horan (1998) reports that the Mobius growth and value style categories are consistent with a classification using loadings on the Fama-French book-to-market factor (HML).

Due to data requirements and quality reasons, we impose four additional screens. First, because we use three-year performance measures in our empirical tests we require portfolio returns to be available for three consecutive years. Second, we require returns to be total returns, including cash holdings, gross

[15] *Nelson's Directory* is a comprehensive print directory based on the survey responses of approximately 2500 money management firms with U.S. institutional clients, including those firms based outside of the U.S. To check the accuracy of our data, we compared a subsample to numbers presented in *Nelson's directory.* Ninety percent of this subsample either

of management fees. We analyze gross returns because they are reported more frequently than net returns, resulting in a larger sample, and because, unlike the mutual fund industry, fees vary considerably by client.[16] Third, we require each set of returns to be the composite of all fully discretionary portfolios managed by the firm in a given style, including the performance of any portfolios terminated during the measurement period. This ensures that the analyzed returns measure the manager's actual performance, as opposed to the performance of a self-selected "representative" composite of his portfolio.[17] Finally, to reduce the noise in our tests we exclude managers that control less than $20 million in tax-exempt assets.[18] These restrictions leave a final sample of 562 pension fund managers from 388 management firms, for a total of 2,544 manager-year observations over the 1987 to 1994 period. These 562 managers control assets that aggregate to $634 billion at the end of 1994, which represents 47% of the 1994 actively managed domestic equity industry assets according to figures from the 1996 *Nelson's Directory.*

Data availability limits us to analyzing only annual measures of flow, which implies that we effectively ignore the short-term dynamics of investment and redemption behavior. However, while managers are clearly affected by daily and weekly flows that require efficient cash management, it is not clear that the overall industry picture that we are studying here would benefit from higher frequency flow measurement. For example, monthly flows are largely due to sponsor-specific cash needs and the desire to rebalance the overall sponsor portfolio, and less likely to be due to the hiring and firing of managers for performance reasons. In addition, most other cross-sectional studies of the flow-performance relation use annual data, so this allows us to better compare our results.

B. Mutual Fund Sample

All data on mutual fund managers are from Morningstar, Inc.'s July 1995 *Mutual Funds OnDisc*. By using the same data availability criteria and screens described above, we arrive at a sample of 483

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matched exactly or were within 10% of the values reported in *Nelson's.* In addition, Coggin and Trzcinka (1995) report that checks of the Mobius data against the March 1993 PIPER database confirmed the accuracy of the Mobius data.

[16] Other studies of pension fund manager performance such as Lakonishok, Shleifer and Vishny (1992) and Coggin, Fabozzi, and Rahman (1993) also use returns gross of fees. Christopherson, Ferson, and Glassman (1998) conduct their tests using returns gross of fees, and with an estimate of fees subtracted out. As we describe later, our solution to the issue of comparability of mutual fund and pension fund managers is to add back fees and expenses to mutual fund returns to check the robustness of the results.

[17] In most cases, the composite is the market-value weighted average of portfolios managed in a given style. In a few instances, an equally weighted composite was used when market-value weighted composite returns were unavailable.

mutual fund managers in 352 different fund families for a total of 2,676 manager-years. Specifically, we require the funds to be all-equity mutual funds in the growth, value, or domestic equity styles with three years of consecutive returns data. We also exclude funds that are closed to new investors and institutional funds that have investment minimums greater than $25,000. In addition, we exclude the manager-years where the fund merged with another fund, since the flow measures may be distorted.[19] We restrict our sample to annual observations in the period from 1987 to 1994 to be directly comparable to the pension fund sample. Our final sample of 483 managers aggregate to $389 billion at the end of 1994, which represents approximately 55% of the 1994 domestic equity mutual fund industry assets according to figures from the 1996 Mutual Fund Factbook. We use the Morningstar-assigned style code (nine categories broken down by market capitalization and by growth, value, or blend) to classify mutual funds into style categories similar to those in the pension fund sample. As in the pension manager sample, investment style is determined as of December 1994 and applied to the historical data for each manager.[20]

C. Potential Biases

Our sample of fund managers contains only the firms existing or included in the Mobius or Morningstar databases as of June 1995. If poorly performing firms and/or managers have dropped out of the database during the sample period, this may induce survivorship bias. Several recent studies, including Grinblatt and Titman (1989), Brown and Goetzmann (1995), Malkiel (1995), Carhart (1995), and Elton, Gruber, and Blake (1996), have confirmed the economic significance of survivorship bias in equity mutual fund performance studies. We are not aware of any evidence on survivorship bias in the pension fund industry, but we have reason to believe that it is less prevalent in the data than for the mutual fund industry.[21] More importantly, three studies have confirmed that survivorship bias does not affect

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[18] For example, the standard deviation of percentage flow is 40 times greater in the sample funds with less than $20 million in assets than in the rest of the sample.

[19] We thank Judy Chevalier for providing a list of merged mutual funds and merger dates. We supplemented this list with the list of fund mergers in Wiesenberger to completely cover the 1987-1994 period.

[20] Chan, Chen, and Lakonishok (1998) report that the mutual funds in their sample generally had consistent styles over time.

[21] Not all funds deleted from Mobius are poor performers. According to sources at Mobius, funds are deleted from the Mobius database when they are successful and closing to new clients, or when they do not find Mobius to be a productive source of client contacts. In addition, due to the importance of client contact and servicing discussed in Section 2, poor performance is not the sole reason for a firm to go out of business in the pension fund management industry. To assess the potential severity of the survivorship bias in our sample we obtained from Mobius a list of firms deleted in 1995. Of 89 deleted firms we were able to find 71 (80%) listed in *Nelson's 1995 Directory* indicating that they had not gone out of business. Of these, 31 (35%) were also listed in *Nelson's 1996 Directory*. Of the 71 firms, 52 had returns listed in Nelson's

inferences on the flow-performance relation. Sirri and Tufano (1998), Chevalier and Ellison (1997), and Goetzmann and Peles (1997) repeat their analyses on samples free of survivorship bias and report no changes in inferences.

Finally, because managers join the databases at different times in their history (i.e., not just when the fund starts up initially), our results may also suffer from back-fill bias. For example, managers may have a greater incentive to volunteer information to Mobius after a period of good performance. Since Mobius began selling its database in 1989, the number of covered manager products has grown by 500%. Again, however, any survivorship or back-fill bias is likely to be less severe in our study of the relation between flow and performance than in a study that attempts to characterize the average performance of fund managers.

D. Measures of Flow and Performance

We use three measures of net manager flows used in previous studies. The first is the annual net dollar flow in or out of a fund, defined as the annual change in total net assets minus appreciation.

$$F_{it} = TNA_{it} - TNA_{it-1}(1 + R_{it})$$

The second measure, net percentage flow, scales net dollar flow by the total net assets in year t-1 and can be interpreted as an asset growth rate net of appreciation. In robustness checks, we also analyze the percentage change in the number of pension clients as an alternative measure of flow. Client data are useful for studying the more discrete pension fund flows, where gaining or losing one client results in millions of dollars in flow.

There are clearly many issues that surface when deciding on a set of performance measures to study. The performance evaluation literature is large, and there is considerable debate as to which measures are most appropriate. Since a goal of this paper is to infer which measures are important to clients in each industry, we focus on the measures suggested by our study of client characteristics outlined in Section II. Specifically, measures expected to be important to pension sponsors as a result of

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and our version of Mobius contains data on 7 firms that were deleted later that year. The average 1994 return on sample products is .2% while the average for deleted firms is -2.9%. However, the distribution of 1993 returns for the sample and

their financial sophistication, use of consultants, and agency problems include: performance relative to the S&P 500 market benchmark, style-adjusted performance, tracking error, and risk-adjusted measures such as a one-factor Jensen's alpha. Measures expected to be important to mutual fund investors include historical raw returns and summary rankings within their style objective (a proxy for media rankings). All of these performance measures are lagged so as to be observable to the client before a hiring decision is made. The appendix contains detailed definitions of these variables.

E. Comparative Summary Statistics

Table I contains manager-year statistics that highlight some of the basic similarities and differences across the industries. The distribution in assets under management indicates skewness in both industries, but there are clearly larger asset pools in the pension manager sample. As mentioned earlier, pension manager flows are expected to be relatively lumpy, as the median number of client accounts is only 14 versus 12,609 for mutual fund managers. Combining these client statistics with the median assets under management in each industry implies that the typical pension client has a $21 million investment with the median manager, while the typical mutual fund client has $13,000.

Comparing the flow distributions provide the first indication that there are interesting differences between the two industries. Although both distributions are centered approximately at zero, the tails appear to be quite different. Consistent with previous studies, the distribution of mutual fund flows appears to be asymmetric. The top 5% experience net inflows nearly three times larger than the outflows at the bottom 5% ($302 million in inflows versus $109 million in outflows). In contrast, the distribution of pension manager flows is more symmetric; the bottom 5% of pension managers actually suffer larger dollar outflows than the top 5% gains, $524 million in outflows versus $400 million in inflows. These statistics, along with the results of Sirri and Tufano (1998) and Chevalier and Ellison (1997), suggest that the shape of the flow-performance relation may differ in the two industries. We explore this possibility in section V.

Unlike the flow distributions, the distributions of performance measures are similar, especially if returns are measured gross of management fees for both industries (not reported). We also find that the distribution of manager-years in the broad domestic equity, growth and value style categories is roughly

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deleted groups are not statistically different. Deleted firms are much smaller than sample firms (median assets under

similar in both samples. Panels B and C of Table I contain pairwise correlation coefficients of our flow and performance variables, estimated separately for each industry.

IV. Relating Flow and Performance in the Two Industries

In section II we argued that differences in the typical client in the mutual fund and pension fund industries imply differences in the expected relation between flow and performance. In this section, we test for these differences using a linear regression framework relating both dollar and percentage cross-sectional flows, pooled over eight years, to lagged performance measures.[22] We have also conducted numerous robustness checks of the data.[23] For simplicity we report only the results of the robustness checks that affect our inferences. Thus, all other results can be assumed to be robust to alternative specifications. We begin with an analysis of the relative financial sophistication of the two client groups. Next, we consider the role of performance benchmarks in each industry. Finally, we explore whether the lack of punishment for poor performance documented for mutual funds extends to the pension fund industry. This has particular importance for determining the impact of flow on managerial incentives.

A. Which Type of Performance Matters?

Given the relative financial sophistication of pension sponsors, we expect to find that risk-adjusted performance measures are more important in explaining pension manager flow relative to mutual funds. Similarly, consistent with previous research, we expect to observe that unadjusted raw returns explain mutual fund manager flows. We begin our analysis with the simplest possible test of this hypothesis. Specifically, we regress flows on lagged returns, one-factor Jensen's alpha, and tracking error, pooling eight years of cross-sectional data from the mutual fund and pension fund industries from 1987-1994. To test for the relative importance of these performance variables, we compare the coefficients on these variables in the two industries. Specifically, we include a dummy variable equal to one if the manager is from the pension industry, and interact this dummy with each performance measure. These regressions

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management in 1994 is $324 million for deleted firms vs. $2282 million for sample firms).

[22] Given that the assumption of independent errors in the pooled regression may be invalid, we also run Fama-MacBeth (1973) regressions for each cross-section. This methodology has its limitations as well since coefficient averages are over only eight estimates. We report any instances where our inferences change under the two methodologies.

[23] We repeated our tests using mutual fund returns gross of management fees and expenses (adding annual fees and expenses back in to annual returns.) For the pension fund sample, we repeated all tests using the percentage change in number of clients as the dependent variable flow measure.

also include control variables for asset size, lagged flow, industry growth, fund age, and interactions of these controls with the pension fund dummy (not reported). Table II contains the results of separate regressions for percentage and dollar flows. All t-statistics reported in the tables are based on a correction for heteroskedasticity using the method of White (1980).

Contrary to our hypothesis, both alpha and lagged return are positively and significantly related to flow in both industries. We do, however, find some evidence supporting a more sophisticated pension manager clientele. First, the coefficient on the pension fund-alpha interaction term in the dollar flow regression is positive and significant, indicating that pension sponsors reward Jensen's alpha performance more than mutual fund investors do. Specifically, a 1% higher alpha implies an additional $9.39 million to a pension fund manager relative to a mutual fund manager. Second, the coefficients on the tracking error interaction terms are negative at the 1% significance level in both the dollar and percentage flow regressions.[24]

The signs and significance of the alpha and tracking error coefficients in Table II are consistent with a sophisticated pension fund clientele. One performance measure advocated by pension consultants and investments textbooks is the appraisal ratio.[25] This measure is defined as Jensen's alpha divided by diversifiable risk, and can be interpreted as a benefit-to-cost ratio of an actively managed portfolio. Since tracking error is a measure of diversifiable risk, the proper application of an appraisal ratio implies that after controlling for alpha, a sponsor should optimally allocate capital to managers with lower tracking error. Under either the agency or sophistication interpretations, we would not expect tracking error to be important to mutual fund investors, which is consistent with what we find.

We find that the coefficients on lagged return interaction terms are insignificant, implying no statistical difference between the pension fund and mutual fund coefficients. This result, along with the significance of alpha for mutual fund managers, indicates that both unadjusted and risk-adjusted returns are related to manager flow in both industries. While this appears inconsistent with our hypothesis, this test may be too simplistic to draw conclusions. For example, the significance of raw returns for pension managers may be due to the high correlation between lagged return and lagged return in excess of the S&P 500. Similarly, the importance of Jensen's alpha to mutual fund investors may be due to a

[24] This coefficient is not significant in the dollar or percentage flow Fama-MacBeth regressions.
[25] For example, see Bodie, Kane, and Marcus (1999), p. 759.

correlation with summary ranking measures, such as Morningstar star ratings. We provide some evidence supporting these conjectures in the next sections.

B. Do Market Benchmarks Matter?

Due to the importance of the S&P 500 in the practitioner literature and surveys, we use the S&P 500 as the benchmark in all the tests that follow. Although we expect style-adjusted measures, such as returns in excess of style benchmarks, to be important to relatively sophisticated pension clients, our study design does not allow for an independent test of this hypothesis. Specifically, we study only three broad style categories in order to keep the two industry samples as homogeneous as possible. As a result, the style-adjusted measures are too highly positively correlated with market-adjusted measures to disentangle their influence.

We make several methodological changes from the Table II regression to investigate the importance of benchmarks. First, we replace lagged return with lagged return in excess of the S&P 500 since the high correlation, reported in Panels B and C of Table I, does not allow for both in the same regression. We also include a dummy variable equal to one if the manager outperformed the S&P 500 in the previous year, and zero otherwise. Including both a dummy and continuous variable allows us to test whether flow is affected by the level of performance relative to the S&P 500 (excess returns), or the discrete event of beating the benchmark. Second, to test for the asymmetric effects of good and poor performance suggested in earlier research, we estimate the effects of the performance variables separately for managers with returns both above and below the S&P 500 Index. To better illustrate these asymmetries and to more thoroughly analyze agency effects in the pension fund industry, we present separate regressions for each industry in Table III. Table IV presents the results of the same specification, but with the industries estimated jointly, allowing for a statistical comparison of coefficients.

The industry regressions in Table III Panel A support the hypothesis that outperformance of the S&P 500 is a discrete event for pension managers. The coefficient on the outperformance dummy is both statistically and economically significant. Irrespective of the magnitude of the outperformance, beating the S&P 500 attracts an additional $123.86 million to the average pension manager and boosts his asset

growth rate by 16.4 percentage points. The insignificant coefficients on excess returns further support the idea that beating the S&P500 is an important, but discrete event. This result has at least two interpretations. First, the importance of agency relationships implies that sponsors may prefer a manager that outperforms the S&P 500 because it is easier to justify his hire to superiors. Thus, beating the S&P 500 provides validation of skill. Alternatively, since the hiring process in the pension industry typically involves several stages including an initial performance screen that narrows the available choices to an acceptable set, it may be that beating the S&P 500 elevates the manager to a pool of potential hires. Both explanations imply that pension managers who outperform the S&P 500 will have higher average flow, all else equal. These results also suggest that the anomalous significance of raw return in the regression of Table II may be due to an "S&P 500 effect".

The lack of financial sophistication and agency relationships implies that mutual fund flow is unrelated to a manager's performance relative to a benchmark. However, since return in excess of a benchmark is highly correlated with raw return performance (perfectly correlated in each cross-section), we expect excess returns to be significantly related to mutual fund flows. We find no reason to suspect, however, that the mere presence of outperformance acts as a discrete event affecting mutual fund flows. Consistent with this, Table III Panel B shows that the coefficient on the outperformance dummy is insignificantly different from zero. In this industry it is the magnitude of the excess returns that matters as evidenced by the positive and highly significant coefficients on excess returns in all specifications. The magnitudes of the estimated coefficients are similar in magnitude for performance both above and below the S&P 500, which again supports the view that outperformance, as an event, does not matter for mutual funds.

The industry differences on the effects of performance relative to the S&P 500 are confirmed in the joint regression reported in Table IV. The coefficients on the outperformance dummy-pension fund interaction terms are positive and significant, indicating this event is important only to pension managers. Furthermore, the magnitude of excess returns is less important in the pension industry as evidenced by the negative, although not always significant, coefficients on all excess return-pension fund interaction terms.

C. The Role of Jensen's Alpha in Explaining Flow in the Two Industries

Table II showed that Jensen's alpha is significantly positively related to flow in both industries, a result seemingly inconsistent with differences in financial sophistication across the two clienteles. Additional evidence in Table III sheds light on this puzzling result by highlighting the differences in symmetry for managers performing above and below the S&P 500 Index in the two industries. Panel A shows that the relation between pension manager flow and Jensen's alpha is positive, highly statistically significant, and remarkably symmetric across good and bad performance. Specifically, an additional 1% of alpha performance implies an additional 1.9% growth rate for pension managers performing both above and below the S&P 500.[26] The dollar flow regression also indicates a positive relation with alpha, but the coefficient on alpha performance below the S&P 500 is more than three times as large than the one above the S&P 500. This result, coupled with the highly symmetric coefficients in the percentage flow regression, suggests that it is the larger managers among those underperforming the S&P 500 that are attracting flow based on higher alphas.

Panel B shows that the symmetric impact of alpha in the pension industry does not extend to the mutual fund industry. For example, in the percentage flow regression, the coefficient on alpha is five times larger in the subsample of funds outperforming the S&P500 than in the underperforming subsample. Alpha performance apparently contributes positively and significantly to fund flows primarily when mutual fund managers outperform the S&P 500, and do not seem to matter much for managers that underperform. Table IV further certifies this result since it shows that alpha is only more important in the mutual fund industry relative to the pension industry for managers outperforming the S&P 500. In other words, the result of Table II where we find no statistical differences in the impact of alpha in the two industries appears to be driven by the huge impact of alpha at the top end of the mutual fund alpha distribution.

The statistical significance of a risk-adjusted performance measure in explaining mutual fund flow is also reported in Sirri and Tufano (1998) and Gruber (1996). Both studies report a significant relation between mutual fund flow and Jensen's alpha, even after controlling for other performance measures. Furthermore, Sirri and Tufano report a significantly higher coefficient in the top quintile of alpha

[26] We find a very similar result when we use the same specification for a regression of flow measured by growth in the number of clients. Specifically, an additional 1% of alpha performance implies an additional 2% client growth rate for pension managers both above and below the S&P 500, and this result is robust to the Fama-MacBeth specification. However, the percentage flow regression coefficient on alpha for managers performing above the S&P 500 is not statistically significant (t=1.39) under the Fama-MacBeth specification. The percentage flow coefficient on alpha for managers performing below the S&P 500, however, is robust to Fama-MacBeth.

performance relative to the other quintiles, but provide little explanation for this result. Our focus on client sophistication identifies the importance of Jensen's alpha to mutual fund investors as an anomaly and prompts us to investigate it further.

One way to reconcile the lack of sophistication on the part of mutual fund investors with the significance of a risk-adjusted measure such as Jensen's alpha is to explore its relation with a commonly used summary ranking measure—Morningstar's coveted star rating. For 1994, the only year for which we have star ratings data, the correlation between stars and Jensen's alpha is 0.51.[27] Furthermore, there is a much higher correlation of stars and alpha for funds outperforming the S&P 500 than for those underperforming (0.48 versus 0.16), suggesting that alpha is a better proxy for stars within this group. Thus, the highly asymmetric importance of alpha reported in Table III panel B supports the idea that star ratings may be driving the relation between flow and alpha.

As further evidence, using 1994 data we repeat the regression of Table II for mutual funds and find that the effect of alpha is subsumed by Morningstar's star rating. Consistent with anecdotal evidence, the impact on fund flow appears to be economically significant as an additional star implies a higher growth rate of 16.5 percentage points, while alpha is no longer statistically significant. In a test reported later in the paper, we compare the importance of explanatory variables in the first and second half of the sample period. Given the more recent prominence of Morningstar ratings, we might also expect a time period difference in the impact of star ratings on fund flow. We find that alpha is significantly related to mutual fund flows only in the last half of the sample period (1991-1994). All together these results provide preliminary evidence that the anomalous importance of risk-adjusted performance measures is the result of a correlation with influential summary ranking measures.

D. Evidence on the Importance of Agency Relationships in the Pension Industry

The presence of agency problems in the pension industry should affect the flow-performance relation in two distinct ways. First, manager characteristics that validate a manager as a safe choice to superiors should be related to flow in the pension industry and not in the mutual fund industry. We have already discussed one finding that can be interpreted as evidence of agency problems. Specifically, beating

[27] Sharpe (1997) reports even higher correlations between other sophisticated performance measures and Morningstar star ratings.

a benchmark may provide justification for choosing a certain manager if questioned by superiors. Second, due to the relative importance of "schmoozing" and agency relationships in the pension industry, we also expect to see a generally weaker relation between manager flow and quantitative performance measures relative to the mutual fund industry. We address each of these hypotheses in turn.

Another performance measure that is potentially related to agency issues is tracking error. Table II reports that the coefficient on tracking error is significantly lower for pension managers than for mutual fund managers, and in separate industry regressions we find that the coefficient on tracking error is always negative only for the pension industry. Table III sharpens the picture by indicating that tracking error is punished significantly for pension fund managers that outperform the S&P 500, and not for those that underperform.[28] While this result can be interpreted as evidence that pension sponsors use a sophisticated risk-adjusted performance measure in the appraisal ratio, it also has an agency interpretation.

Tracking error may serve as a safety indicator since it measures the manager's deviation over time from the passive market benchmark. In this sense it identifies managers unlikely to perform very differently than the passive benchmark. These managers may be considered safe choices since they are less likely to underperform the benchmark. Directing flow away from high tracking error managers suggests that sponsors desire to avoid bad surprises at the cost of forgoing the possibility of good surprises. Under either a sophistication or agency interpretation, tracking error should not matter to mutual fund investors. Consistent with this, tracking error is insignificant for all mutual fund regressions and performance groups in Tables II and III.

Another variable that may serve to validate a manager as a safe choice is the length of his track record. Specifically, some sponsors have explicit policies that remove from consideration managers with less than a five-year track record. We test this by including a dummy variable that equals one if we have five or more consecutive annual returns for the manager, and zero otherwise. We expect to find a positive and significant coefficient on this dummy variable for pension managers, but not for mutual fund managers. Instead, we find insignificant results in both industries. This is possibly due to a lack of power

[28] While the coefficient on tracking error is always negative for pension managers in all Table II, III and IV alternative specifications, it is not always significant. For example, the coefficient on the pension fund-tracking error interaction terms are not significantly different from the coefficients for mutual funds in the Fama-MacBeth regressions (Table IV specification). However, in the percentage flow regression, the coefficient becomes significantly lower than mutual funds when fees and expenses are added back to the mutual fund returns.

in this test. Since we require three years of data to compute alpha and tracking error, the overwhelming majority of our sample has a track record of five years or longer.

Consistent with the importance of agency relationships in the pension industry, we find that quantitative performance measures explain less of the variation in pension manager flow relative to that of mutual fund managers. The first row of Table V shows that with the same right hand side performance variables, the mutual fund regression adjusted R^2 estimates are nearly three times higher than the comparable pension fund estimates. Performance variables alone explain only 2% of the cross-sectional variation in pension fund dollar flows and only 5.6% of the variation in percentage flows. The importance of client servicing in the pension fund industry and the fact that performance measures are often used for screening purposes only, are both consistent with this result. There are, however, other potential reasons for the weak statistical relation that we cannot dismiss. For example, noise may be introduced in the flow-performance relation by the liquidity needs of clients, differing investment horizons, data quality issues, and tax considerations (mutual funds only since the pension managers invest tax-exempt assets).

E. The Role of Non-Performance Variables in Explaining Flow

Non-performance control variables, such as asset size, industry growth, and lagged flow have not received much attention in the mutual fund flow-performance literature. Differences in the importance of these variables across the pension fund and mutual fund industries offer interesting insights into the inner workings of these industries and, as we will argue in Section VI, have important implications for managerial incentives. Table V reports the proportion of flow explained solely by non-performance control variables in the two industries. As a group, these variables appear to be very important in explaining flow, with adjusted R^2 coefficients comparable to, or exceeding, the explanatory power of performance variables. Panel B reports the estimated coefficients for these variables in separate industry regressions, and also reports the statistical significance of coefficient comparisons across the two industries.

The industry differences in the autocorrelation of flows, and the relation between flow and asset size, are economically significant and highly robust. Mutual fund flows are highly autocorrelated, while pension fund flows display little to no autocorrelation. For example, the last line of Panel A shows that lagged flows explain a negligible amount of the variation in pension dollar flows, while they explain nearly

half of the cross-sectional variation in mutual fund dollar flows. This implies that on average mutual funds that have attracted a high level of dollar flow, or a high asset growth rate, will continue to do so in the future, all else equal. There is no such expectation for pension fund managers.

The pension fund coefficients on asset size are negative, significant, and highly robust to alternative specifications for both dollar and percentage flow. This indicates that pension managers that manage a large amount of assets receive less flow and grow less quickly, all else equal. The mutual fund coefficients on asset size are statistically and economically different, and are likely related to the same phenomena as the autocorrelation results. While large mutual fund managers experience statistically significant higher dollar flow, large pension fund managers actually attract fewer dollars. In fact, the largest 10% of pension fund managers in our sample experience large outflows while the largest 10% of mutual fund managers experience large inflows. We argue that differences in client behavior in the two industries are behind these results.

One explanation for the difference in autocorrelation is that there is some "herding" toward specific managers in the mutual fund industry, but not in the pension industry. Alternatively, this difference may be related to how managers are chosen and monitored over time in the two industries. Survey evidence shows that most mutual fund investors are saving for retirement, holding funds for relatively long periods, and are net contributors to their mutual fund accounts. Anecdotally, mutual fund investors tend to choose a fund, and then continue to invest automatically for a number of years without much further scrutiny. If true, this effect would be amplified by the growth in defined contribution (401k) plans that typically lock investors into a menu of funds or complexes.[29] In contrast, pension fund sponsors are not net contributors to their accounts, and are purported to be more vigilant monitors, and so will not be shuttling money to the same managers year after year. Below, we present some evidence to support these conjectures.

Barron's reports that 401k assets have grown at a compound annual rate of 18% since 1986—from $155 billion to $810 billion, with mutual fund companies getting an increasing share of this market over time.[30] Dominant players in this market tend to be large fund complexes such as Fidelity and

[29] Gruber (1996) conjectures that constraints on choices in retirement accounts contribute to autocorrelated flows in the mutual fund industry. He also argues that the autocorrelation in flows may reflect unobservable differences in fund reputation and services, or marketing effort.

[30] July 14, 1997, p. 39-40

Vanguard that market their products directly to individuals rather than through sales forces.[31] These fund companies have the technological and informational infrastructure necessary to service the needs of a disperse group of 401k participants. The growth in 401k business for mutual funds over our sample period, especially for large funds or fund complexes, suggests a test to link participant behavior to the observed autocorrelations. If 401k participant behavior is related to the autocorrelations, we might expect the autocorrelations to be higher in the latter half of our sample period, and higher for those funds with a large amount of 401k business.

Table VI reports industry regressions that include the performance and control variables of Table II, with the addition of a dummy variable for the latter half of the sample, 1991-1994. This dummy is interacted with all included regressors. The results for the mutual fund industry indicate that lagged flow is significantly more important in the later period, as is fund size. Controlling for performance, large mutual funds attract higher dollar flow only in the later period. In contrast, there is no difference in the coefficients on lagged flow or asset size for the pension fund sample. As an additional test, we supplement our data with *Pensions and Investments* data on the funds with the largest 401k assets under management.[32] We find that, on average, mutual funds attracting the most 401k dollars are five times larger, and exhibit higher simple autocorrelations between flow and lagged flow, than the rest of the sample. Thus, the limited menu of choices typical of 401k plans, together with mechanical investment behavior on the part of participants, may be the primary reason behind the positive autocorrelation and positive relation between dollar flow and fund size.

The highly robust negative relation between pension manager asset size and flow may also be driven by client behavior. For example, pension sponsors may believe that managers with large assets under management will be unable to provide the level of service and personal attention individual sponsors require (e.g., "handholding"). Thus, the importance of agency relationships and client servicing drives the negative relation between flow and asset size, inducing either clients to avoid large managers, or managers to stop taking clients above some threshold. Alternatively, decreasing returns to scale may be driven by performance considerations. It may be more difficult for managers to post good performance when assets under management grow too large due to price pressure when buying and selling stocks. Pension fund sponsors may be aware of this indirect effect of size on performance and steer money away

[31] *Business Week*, 7/24/95, p. 76, "What's Pumping Up Mutual Funds"
[32] *Pensions and Investments* magazine annual special report on mutual funds (2/8/93 p. 17, 2/7/94 p. 13, 3/6/95 p. 17).

from large managers. Mutual fund investors, on the other hand, may be directing flow toward large funds due to a perception that there are economies of scale that translate into lower fees. Whichever the reason for the relation, it appears that an individual pension manager's potential for asset growth has definite limits relative to mutual fund managers.

V. Do Pension Fund Sponsors Punish Poor Performance with Outflows?

Sirri and Tufano (1998) document that the flow-performance relation in the mutual fund industry is highly convex. They conclude, "Mutual fund consumers chase returns, flocking to funds with the highest recent returns, though failing to flee from poor performers (p. 1590)." In other words, managers appear to receive large rewards in terms of increased flow for posting high returns, and little punishment even for severe underperformance. This convexity of the flow-performance relation in the mutual fund industry has spawned a growing literature including Chevalier and Ellison (1997), Brown, Harlow, and Starks (1996), Busse (1998), Koski and Pontiff (1999), Karceski (1999), and Chen and Pennachi (1999), some of which we discuss in the next section. Adding pension fund manager data not only allows for a test of convexity on a new set of managers, but also is an interesting test of client differences. Because pension sponsors are hypothesized to be more vigilant and sophisticated monitors, we expect the shape of the flow-performance relation to be significantly different from mutual funds. Specifically, we expect pension sponsors to withdraw assets from poorly performing managers, and not to flock to last year's winners.

We first present evidence on convexity in the relation between flow and performance in the form of the graphs depicted in Figures 1 through 4. Our methodology differs somewhat from that of Sirri and Tufano (1998)'s Figure 1, which is a univariate plot of the relation between lagged return ranking and percentage flow. Since we have shown that other performance and control variables are important, we use a multivariate framework in creating the data for our graphs. Specifically, we separate funds into deciles according to a performance measure, either Jensen's alpha or lagged return, and then run a piecewise linear regression over these deciles, while controlling for all variables included in the regression of Table II.[33] For example, to create Figure 1 depicting the relation between lagged return percentile

[33] We also tested a model with decile dummies that allow for the intercept to change across deciles. The decile dummies were insignificantly different from zero, so we dropped them from the final specification. We also repeated the analysis using quintile and quartile specifications and find the deciles to be the most illustrative.

ranking and percentage flow, we first estimate coefficients on the lagged return deciles while controlling for alpha, tracking error, asset size, etc. We then substitute average values for all included variables into the estimated regression equation. Thus, Figure 1 depicts the relation between expected flow and lagged return ranking for the average manager observation.

Figure 1 displays the familiar convexity result for the mutual fund industry. Top performing mutual funds have large growth rates and poor performers have small, but positive growth rates. Figure 2 depicts the analogous results for alpha performance deciles and looks quite similar to Figure 1. The top 10% of mutual fund managers ranked by lagged return performance, and the top 20% of managers ranked by alpha performance attract disproportionate amounts of flow. Compared to mutual funds, the flow-performance relation for pension funds appears much less convex. Larger percentage growth rates start with funds above the 60th percentile according to either performance measure, and flow is relatively more symmetric around zero across good and bad performance. For example, pension managers appear to experience asset shrinkage when among the bottom 20% of alpha performers.[34]

Several interesting comparisons emerge when we repeat the analysis for dollar flows. Figure 3 shows a weakly convex pattern for mutual fund flows, with poor performers experiencing low dollar flow, and managers above the 80th return percentile experiencing higher dollar flow. A "lack of punishment" view is still evident for mutual funds since poorly performing managers show small, but positive, inflows rather than outflows.[35] The interesting contrast is for the pension fund sample. The relation between dollar flow and performance in this industry appears highly linear, with poor performers losing assets and top performers gaining assets. Both the linear shape of this relation and the dollar outflows for poor performance are robust to repeating the analysis on various subsamples of the data.[36] Pension fund sponsors apparently do punish managers of poorly performing funds by withdrawing assets.

Figures 3 and 4 aid in interpreting the results of Table III Panel A as evidence of punishment. Specifically, this table shows that the coefficient on alpha is significantly positive for both managers that performed above and below the S&P 500. Moreover, a significantly positive coefficient on alpha is robust

[34] This result is strengthened if we delete the largest managers (the top 10% of managers ranked by asset size) suggesting that the result is not merely a case of large funds losing assets.

[35] Low dollar growth, and therefore a low growth rate, may possibly be interpreted as punishment since these funds would clearly be growing at a rate below the mutual fund industry during our sample period. Nevertheless, the interpretation in the literature has been to equate punishment with outflows.

[36] Specifically, the mutual fund and pension fund graphs respectively look very similar when we delete the top 10% of mutual and pension managers ranked by asset size. In addition, we repeated the test on managers with $250 million or

to an analysis of the percentage change in the number of clients (client growth). This implies that higher alpha always increases dollar flow, percentage flow, and client growth; while lower alpha results in less dollar flow, percentage flow, and client growth. Figures 3 and 4 tell us that this result is not just a relative flow result, but rather it implies that poor alpha performance results in outflows and asset shrinkage. To confirm this, we analyzed the subset of managers that underperformed the S&P 500 and divided this sample into the bottom-third and top-third alpha performers. On average the low alpha group lost 3.6 clients while the top alpha group gained 0.4 clients. As a group, the low alpha group experienced a net loss of 1,951 clients while the high alpha group experienced a net gain of 152 clients.

VI. Implications for Managerial Incentives and Risk Shifting

Our empirical findings have implications for the incentives facing fund managers. Because fund managers in both industries are primarily compensated based on assets under management, they have an incentive to increase assets via their portfolio management actions. Several recent papers have tested one dimension of managerial incentives that derive from the flow-performance relation—the alteration of risk over the course of the year. Brown, Harlow and Starks (1996) and Chevalier and Ellison (1997) use the convexity of the flow-performance relation, documented in Sirri and Tufano (1998) and confirmed in Section V, as the fundamental feature of the tournament played by mutual fund managers seeking to attract assets. Specifically, given the observed lack of punishment for poor performance in conjunction with large flow gains for top performers, fund managers have an incentive to alter the risk of their portfolios to maximize the payoffs from this implicit contract.

While the empirical identification of risk-shifting behavior is somewhat controversial, the theoretical argument for the incentive effect is strong.[37] Managers who have performed poorly relative to other managers over the earlier portion of the year have an incentive to increase the risk of their portfolio in an attempt to improve their relative standing. Conversely, managers who are outperforming other managers have less incentive to increase their risk exposure and may even act to decrease it, in order to

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greater in assets to have comparably sized managers for the mutual fund and pension fund samples. These graphs also do not appear materially different.

[37] Brown, Harlow and Starks (1996) and Chevalier and Ellison (1997) find some evidence of risk-shifting while Busse (1998) and Koski and Pontiff (1998) argue that the empirical relation between performance and risk are driven by methodology or mechanically by flows, and is not the result of incentives. Chen and Pennachi (1999) claim that current tests are misspecified and provide an alternative test based on tracking error.

lock in their high relative standing. Assuming that this tournament occurs at year-end, these two studies find evidence that managers behave as predicted and systematically alter the riskiness of their funds during the last part of the year.

Do pension fund managers have the same incentive to risk shift? The bulk of our evidence indicates that they do not. Figures 1 through 4 show that pension fund managers risk losing a significant amount of flow if they take on diversifiable risk that does not pay off, but instead results in low returns. Increasing systematic risk is a similarly unattractive strategy since we find that outflows result from poor market risk-adjusted performance. In contrast to mutual funds, there is no disproportionate reward of increased flow for being at the very top of the performance distribution. In short, the linear and symmetric relation between flow and performance implies little incentive to risk-shift. Consistent with this, the theoretical model in Chen and Pennachi (1999) predicts that managers under a linear compensation scheme do not change their portfolio's riskiness based on recent performance.

One of the strongest and robust performance results of Section IV is the contrast between industries in the significance of outperforming the S&P 500. Beating the S&P 500 implies an additional $124 million to the average pension manager, increasing his growth rate by 16.4%. This provides a strong incentive for pension fund managers to focus on beating the S&P 500, or equivalently, on not underperforming it. This implies an incentive for active managers to closet-index at least some portion of the portfolio. Reinforcing this incentive is the symmetric relation observed in Figures 1 through 4. If sponsors avoid underperformers and at the same time do not reward stellar performers with more flow, managers have an incentive to minimize deviations from the benchmark, regardless of stock picking skill.

Pension fund sponsors also appear to be more sophisticated than mutual fund investors in the management of managerial incentives through flow. In addition to punishing poorly performing managers, they appear to discipline managers that perform well as a result of taking on diversifiable risk. Specifically, consistent with the conjecture in Bernstein (1998), we find evidence that tracking error is negatively related to flow. As Table III panel A shows, this is primarily true for managers that outperform the S&P 500. Thus, the incentive to take on idiosyncratically risky positions in the hopes of posting high performance numbers is tempered by sponsors that appear to specifically punish this manager behavior with lower flow. In contrast, the outsized rewards for high alphas coupled with the insignificance of tracking error in the mutual fund industry implies a much greater incentive to take on diversifiable risk (for which they are not penalized).

The high level of monitoring common in this industry provides pension managers with another disincentive for taking on idiosyncratic risk. Anecdotal and survey evidence suggest that sponsors and their hired consultants monitor their managers closely once hired, including checks on whether the manager has deviated from his investment philosophy or style. It is not uncommon to dismiss a manager for failing to stay within their investment guidelines, even when their performance is strong. Consistent with this, according to a Greenwich Associates survey of sponsors terminating a manager in 1994, 26% reported doing so for violation of a specific investment restriction.

The relatively weak statistical relation between performance variables and flow documented in Table V also weakens any of these performance-based incentives present for pension fund managers. With only 2% of the variation in dollar flows explained by performance, managers do not have a large incentive to pursue any effort intensive policies in an attempt to post good performance numbers. The unobservable, qualitative manager characteristics that dominate the attraction of clients and assets likely motivate managers to excel along these dimensions. Manager actions that fit this category include increasing client services, such as the timeliness of reporting, and increasing personal contact with clients.[38]

Finally, the documented difference in the autocorrelation of flows in the two industries has implications for managerial incentives. The lack of autocorrelation for pension managers implies that they are engaged in independent yearly tournaments to perform well and attract new business. In contrast, high positive autocorrelation in mutual fund flows magnifies the effect of performance since good performance in the current year not only translates into higher flow next year, but via the autocorrelation, in future years as well. This may strengthen mutual fund managers' incentives to pursue portfolio strategies that post high returns, high alphas, or Morningstar ratings. On the other hand, a steady stream of flow may provide a manager with a cushion and therefore may reduce their incentive to undertake effort-intensive portfolio strategies. This may be especially true for fund managers that cater to the fast-growing 401K market.[39] The opposing effects on incentives are not necessarily contradictory, but rather imply that fund managers may face different incentives at different stages in the life of the fund.

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[38] Nelson/Wilshire Survey on Plan Sponsor Attitudes Toward Investment Manager Client Servicing, June 1997, http://www.nelnet.com.

[39] According to *Business Week*, Stephen R. Petersen, portfolio manager of the $9 Billion Fidelity Equity-Income fund, estimates that 75% of the monthly inflows to his fund come from retirement plans. This steady source of flow has allowed him to operate with fewer cash holdings since "I don't get wild swings in cash flows or redemptions." (*Business Week*, 7/24/95, p. 76, "What's Pumping Up Mutual Funds")

Consistent with this, the empirical risk-shifting literature incorporates the age and size of the funds in their analysis. We point out that these fund attributes are positively related to a possibly more fundamental driver of incentives, the autocorrelation in flow.

VII. Conclusion

The empirical differences in the flow-performance relations that we document in this paper underscore the idea that mutual and pension fund managers operate in fundamentally different environments. The results also paint an intriguing picture of the tournament structures under which managers make portfolio decisions. We find striking differences in the degree to which clients punish poorly performing managers by withdrawing assets, suggesting that the two types of managers will structure their portfolios in very different ways. Although we provide reasons to believe that pension managers do not have a strong incentive to risk-shift, a direct test for this behavior is necessary to resolve this issue. The contrast in incentives across the two industries may lead to more powerful theories and tests of their effect on managerial behavior. Such efforts could build on recent contributions by Admati and Pfleiderer (1997), Chen and Pennachi (1999), and Cuoco and Kaniel (1998).

There is much work left to be done in understanding the money management industry. This paper leaves some issues unresolved, such as the underlying reason behind the observed negative relation between pension manager flow and asset size. Goetzmann, Ingersoll and Ross (1998) interpret the same negative relation in the hedge fund industry from a supply-side perspective. They argue that managers of large hedge funds are unwilling to accept new clients due to the decreasing returns to scale feature of arbitrage strategies. We suggest an alternative, demand-side interpretation. It may be that investors consciously avoid large managers since they do not provide the desired level of servicing or return performance.

Through our industry comparison study design we uncovered some issues in the mutual fund industry that deserve further study. For example, we find evidence to support the conjecture that the significant relation between mutual fund flow and risk-adjusted performance measures is likely due to a correlation with summary ranking measures, such as Morningstar's star rating. Our comparison with the pension industry led us to identify the significance of Jensen's alpha to mutual fund investors as an anomaly. Similarly, we provide some evidence that the high degree of autocorrelation in mutual fund flows is driven by the behavior of 401k plan participants. Given the recent growth of 401k and other defined contribution plans, and the increasing prominence of Morningstar ratings, a more careful study of

these issues is needed. Our results suggest that these two influences are likely to significantly impact mutual fund flows, and as a result, managerial incentives.

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Appendix: Description of Variables Used in the Regressions

Variable	Description
Annual Dollar Flow	The annual net flow in or out of a fund, where net flow is defined as the annual change in total net assets minus the appreciation in the funds assets. Assumes cash flow occurs at the end of the year. $F_{it} = TNA_{it} - TNA_{it-1}(1 + R_{it})$
Annual Percentage Flow	The annual net flow as a percentage of the total net assets of the fund at the beginning of the year.
Annual Percentage Change in Number of Clients	The number of clients in year t minus the number of clients in year t-1, divided by the number of clients in year t-1.
Lagged return	Total annual return including reinvested dividends and capital gains, lagged one year. For mutual fund managers, the returns are net of management fees and expenses, but gross of any load charges. For pension fund managers, the returns are net of expenses but gross of management fees.
Jensen's alpha	The annualized alpha observable at the beginning of the year in which the flow is measured, computed over the previous three year period using quarterly returns for pension funds and monthly returns for mutual funds.
Excess Return	Total annual return minus the return on the S&P 500 Index, lagged one year.
Tracking error	Tracking error is the standard deviation of the residuals from a market model regression of portfolio excess returns (versus the risk-free rate) on the excess S&P500 return. This measure is computed over the previous three year period, using quarterly returns for pension funds and monthly returns for mutual funds.
Dummy = 1 if outperformed the S&P500	Dummy equals one if the lagged annual return is higher than the S&P500 return over the same period. Otherwise the dummy equals zero.
Asset size	Total assets of the fund at the beginning of the year in which flow is measured (TNA_{it-1}).
Length of track record (age)	The number of years of previous consecutive returns.
Dummy = 1 if fund is five or more years old	Dummy equals one if our sample contains five or more consecutive years of return data at the beginning of the year in which flow is measured, equals 0 otherwise.
Industry asset growth rate	Percentage change in total industry equity assets, as reported by the 1996 Mutual Fund Fact Book for mutual funds and Pensions and Investments Top 1000 Money Manager Issues for pension funds.

Table I. Summary Statistics of Performance and Non-performance Manager Characteristics in the 1987-1994 Sample Period.

Panel A. The 95th through 5th Percentiles in the Pension Fund Manager and Mutual Fund Manager Distributions

This panel contains the distribution of manager characteristics in the pension fund and mutual fund industries over all manager-years used in the analysis of Tables II-VI. The pension fund data is from the June 1995 *M-Search Database*, distributed by Mobius, Inc. The mutual fund database is from the July 1995 *Mutual Funds OnDisc* CD distributed by Morningstar, Inc. These managers are from the actively managed domestic equity, domestic growth, and domestic value style categories only. There are 2,544 manager-years in the pension sample and 2,676 manager-years in the mutual fund sample. There are 562 individual pension managers and 483 individual mutual fund managers. All flow and performance variables are on an annual basis and are defined in the Appendix. Due to a lack of pension fund fee data, pension manager returns are gross of management fees, while the mutual fund manager returns are net of management fees and expenses.

	Pension fund manager distribution					Mutual fund manager distribution				
	95th	75th	Median	25th	5th	95th	75th	Median	25th	5th
Assets Under Management in $Millions (asset size)	4465	936.5	299	102	29.5	2060.1	492.9	167.9	66.12	26.5
Number of clients	116	34	14	6	1	214332*	42613*	12609*	2562*	168*
Flow measures:										
Dollar Flow ($Millions)	399.76	57.35	0.61	-50.49	-523.61	301.62	26.00	-1.74	-19.59	-108.95
Percentage Flow	1.104	0.213	0.004	-0.143	-0.490	0.825	0.152	-0.018	-0.112	-0.273
Percentage change in number of clients	1.00	0.25	0.021	-0.043	-0.344	N/A	N/A	N/A	N/A	N/A
Performance measures:										
Annual returns	0.451	0.256	0.151	0.064	-0.057	0.420	0.228	0.132	0.047	-0.076
Three-year returns	1.195	0.718	0.554	0.439	0.299	1.016	0.637	0.477	0.355	0.215
Jensen's alpha	0.094	0.034	0.006	-0.018	-0.063	0.088	0.020	-0.006	-0.033	-0.085
Tracking error	0.143	0.084	0.058	0.041	0.023	0.129	0.085	0.060	0.043	0.028
Excess Return (S&P500)	0.190	0.067	0.015	-0.033	-0.111	0.167	0.048	-0.005	-0.055	-0.135

	Pensions	Mutuals
Percentage Outperforming the S&P 500 Index:	58.4%	47.2%
Percentage with a five-year or longer track record:	78.9%	90.2%

* Based on 1994 data only due to availability.

Table I. Summary Statistics (continued)

Panel B. Pearson Correlation Coefficients in the Pension Fund Industry

	Dollar Flow	% Flow	% Change in number of clients	Lagged Return	Jensen's Alpha	Tracking Error	Excess Return (S&P 500)	Outperform S&P 500 Dummy	Asset size
Percentage Flow	0.3520								
% Change in number of clients	0.1258	0.3034							
Lagged return	0.0867	0.1268	0.0695						
Jensen's Alpha	0.1270	0.2116	0.1723	0.2972					
Tracking error	0.0600	0.0899	0.0607	0.1710	0.3056				
Excess Return (S&P500)	0.1083	0.1846	0.1259	0.6939	0.5366	0.35194			
Outperform S&P 500 dummy	0.1173	0.1654	0.1023	0.3917	0.3772	0.1550	0.6610		
Asset Size	-0.314	-0.110	-0.0611	-0.0232[a]	-0.0345	-0.2024	-0.0514	-0.0117[a]	
Five-year track record dummy	0.0433	0.0692	0.0669	0.0780	0.1275	0.1237	0.1478	0.1400	0.0433

Panel C. Pearson Correlation Coefficients in the Mutual Fund Industry

	Dollar Flow	% Flow	Lagged Return	Jensen's Alpha	Tracking Error	Excess Return (S&P 500)	Outperform S&P 500 Dummy	Asset size
Percentage Flow	0.3534							
Lagged return	0.1281	0.1944						
Jensen's Alpha	0.2272	0.3419	0.2916					
Tracking error	-0.001[a]	0.1444	0.1016	0.1345				
Excess Return (S&P500)	0.2048	0.3359	0.6879	0.5578	0.1783			
Outperform S&P 500 dummy	0.1605	0.2611	0.4427	0.4391	0.1290	0.7117		
Asset Size	0.4935	-0.019[a]	0.0241[a]	0.098	-0.1342	0.0437	0.0437	
Five-year track record	0.0272[a]	-0.059	0.0046[a]	-0.0448	-0.0457	0.0054[a]	-0.0117[a]	0.0829

[a]This correlation coefficient is not significantly different from zero. All others are significantly different from zero at conventional levels.

Table II. Joint OLS Regressions of Pension Fund and Mutual Fund Flows on Performance Measures

This table reports the results of pooled time-series cross-sectional regressions of annual percentage flows (fund growth rates) and annual dollar flows on manager characteristics for the sample of 562 pension fund managers and 483 mutual fund managers over the sample period 1987-1994. These managers are from the actively managed domestic equity, growth, and value style categories only. The pension fund dummy (PF) is equal to one if the manager is from the pension fund industry, and zero otherwise. All flow and performance variables are on an annual basis and are defined in the Appendix. We include in the regressions, but do not report, asset size, industry growth, lagged flow, and fund age as control variables. We use the natural log of asset size in the percentage flow regression and asset size in the dollar regression. We also include all control variables interacted with the pension fund dummy. T-statistics based on White standard errors are in parentheses and N represents the number of manager-year observations. *, **, *** indicate statistical significance at the 10, 5, and 1% level.

	Dependent variable Percentage flow	Dependent variable Dollar flow
Intercept	0.014	-64.82***
	(0.26)	(-4.61)
Pension fund dummy (PF)	0.534***	86.450**
	(5.49)	(2.21)
Jensen's alpha	2.431***	239.16**
	(7.39)	(2.32)
Lagged return	0.570***	211.20***
	(9.38)	(8.10)
Tracking error	0.954**	138.64
	(2.49)	(1.30)
Pension fund interaction terms:		
Jensen's alpha*PF	-0.056	939.108***
	(-0.12)	(3.55)
Lagged return*PF	-0.179	-1.035
	(-1.38)	(-0.02)
Tracking error*PF	-1.489***	-842.944***
	(-2.82)	(-3.32)
Control variables included:	Fund age, asset size, industry growth, lagged flow	
Adjusted R-squared	0.139	0.224
N	5220	5220

Table III. The Importance of Market Benchmark Performance Measures

Panel A: The Pension Fund Industry

This panel reports pooled, cross-sectional time-series regressions of percentage and dollar flows on excess market returns and other performance measures for the pension fund sample only. The outperform the S&P 500 dummy is equal to one if the manager's lagged return (gross of management fees) is greater than the lagged return on the S&P 500, and zero otherwise. To analyze potential asymmetries in the flow-performance relation, for each performance variable we estimate separate coefficients for those managers outperforming the S&P 500 (above S&P500) and for those underperforming the S&P 500 (below S&P 500). Excess return is defined as the manager's lagged return less the lagged return on the S&P 500. We include in the regressions, but do not report, asset size, industry growth, lagged flow, and fund age as control variables. We use the natural log of asset size in the percentage flow regression and asset size in the dollar regression. T-statistics based on White standard errors are in parentheses and N represents the number of manager-year observations. *, **, *** indicate statistical significance at the 10, 5, and 1% level.

	Dependent variable Percentage flow	Dependent variable Dollar flow
Intercept	0.582***	19.902
	(7.27)	(0.56)
Outperform S&P500 Dummy	0.164***	123.857***
	(3.21)	(2.69)
Excess return (above S&P 500)	0.155	124.866
	(0.52)	(1.20)
Excess return (below S&P500)	0.164	-25.413
	(0.40)	(-0.07)
Jensen's alpha (above S&P500)	1.905***	599.877***
	(3.96)	(2.67)
Jensen's alpha (below S&P500)	1.859***	1910.562***
	(3.85)	(2.76)
Tracking error (above S&P500)	-0.661	-955.397***
	(-1.35)	(-3.63)
Tracking error (below S&P500)	-0.299	-131.795
	(-0.57)	(-0.29)
Control variables included:	Fund age, asset size, industry growth, lagged flow	
Adjusted R-squared	0.105	0.122
N	2544	2544

Table III. The Importance of Market Benchmark Performance Measures (continued)

Panel B: The Mutual Fund Industry
This panel contains pooled, cross-sectional time-series regressions of percentage and dollar flows on excess market returns and other performance measures for the mutual fund sample only. The outperform the S&P 500 dummy is equal to one if the manager's lagged return (net of management fees) is greater than the lagged return on the S&P 500, and zero otherwise. To analyze potential asymmetries in the flow-performance relation, for each performance variable we estimate separate coefficients for those managers outperforming the S&P 500 (above S&P500) and for those underperforming the S&P 500 (below S&P 500). Excess return is defined as the manager's lagged return less the lagged return on the S&P 500. We include in the regressions, but do not report, asset size, industry growth, lagged flow, and fund age as control variables. We use the natural log of asset size in the percentage flow regression and asset size in the dollar regression. T-statistics based on White standard errors are in parentheses and N represents the number of manager-year observations. *, **, *** indicate statistical significance at the 10, 5, and 1% level.

	Dependent variable Percentage flow	Dependent variable Dollar flow
Intercept	0.118**	-57.153***
	(2.19)	(-3.45)
Outperform S&P500 Dummy	0.017	33.38
	(0.36)	(1.56)
Excess return (above S&P 500)	0.732***	270.398***
	(3.42)	(3.56)
Excess return (below S&P500)	0.579***	239.541**
	(3.28)	(2.53)
Jensen's alpha (above S&P500)	3.340***	603.289***
	(5.76)	(3.42)
Jensen's alpha (below S&P500)	0.668***	-401.514***
	(2.64)	(-2.96)
Tracking error (above S&P500)	0.757	-151.204
	(1.08)	(-0.76)
Tracking error (below S&P500)	0.195	69.696
	(0.55)	(0.52)
Control variables included:	Fund age, asset size, industry growth, lagged flow	
Adjusted R-squared	0.226	0.511
N	2676	2676

Table IV. Joint OLS Regressions of Pension Fund and Mutual Fund Flows on Excess Market Returns and other Performance Measures

This table reports the results of pooled time-series cross-sectional regressions of annual percentage flows (fund growth rates) and annual dollar flows on manager characteristics for the sample of 562 pension fund managers and 483 mutual fund managers over the sample period 1987-1994. All performance and control variables included in Table III are included here but not reported. The pension fund dummy (PF) is equal to one if the manager is from the pension fund industry, and zero otherwise. T-statistics based on White standard errors are in parentheses and N represents the number of manager-year observations. *, **, *** indicate statistical significance at the 10, 5, and 1% level.

	Dependent variable Percentage flow	Dependent variable Dollar flow
Intercept	0.140***	-31.446**
	(2.99)	(-1.96)
	Performance variables of Table III included in regression (not reported)	
Pension fund interaction terms:		
Outperform S&P500 Dummy*PF	0.166**	108.203**
	(2.37)	(2.21)
Excess return (above S&P 500)*PF	-0.622*	-163.022
	(-1.70)	(-1.28)
Excess return (below S&P500)*PF	-0.404	-236.37
	(-0.92)	(-0.66)
Jensen's alpha (above S&P500)*PF	-1.286*	11.496
	(-1.72)	(0.04)
Jensen's alpha (below S&P500)*PF	1.211**	2281.819***
	(2.27)	(3.30)
Tracking error (above S&P500)*PF	-1.329	-787.514**
	(-1.51)	(-2.40)
Tracking error (below S&P500)*PF	-0.298	-17.162
	(-0.47)	(-0.04)
Control variables and pension fund interactions with controls included:	Fund age, asset size, industry growth, lagged flow	
Adjusted R-squared	0.146	0.229
N	5220	5220

Table IV. Joint OLS Regressions of Pension Fund and Mutual Fund Flows on Excess Market Returns and other Performance Measures

This table reports the results of pooled time-series cross-sectional regressions of annual percentage flows (fund growth rates) and annual dollar flows on manager characteristics for the sample of 562 pension fund managers and 483 mutual fund managers over the sample period 1987-1994. All performance and control variables included in Table III are included here but not reported. The pension fund dummy (PF) is equal to one if the manager is from the pension fund industry, and zero otherwise. T-statistics based on White standard errors are in parentheses and N represents the number of manager-year observations. *, **, *** indicate statistical significance at the 10, 5, and 1% level.

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Pension fund interaction terms:		
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Tracking error (above S&P500)*PF	-1.329	-787.514**
	(-1.51)	(-2.40)
Tracking error (below S&P500)*PF	-0.298	-17.162
	(-0.47)	(-0.04)

Table V. The Importance of Non-Performance Manager Characteristics

Panel A. An Industry Comparison of the Explanatory Power of Performance and Non-Performance Manager Characteristics to explain Cross-sectional Flows

This panel contains the adjusted R-squared under various regression specifications for the Pension Fund and Mutual Fund industries (regressed separately). Column two lists the variables included in the regression. We use the natural log of asset size in the percentage flow regressions and asset size in the dollar regressions.

		Pension managers		Mutual fund managers	
	Variables included in the regression:	Percentage Flow	Dollar flow	Percentage flow	Dollar flow
Quantitative performance variables only:	Jensen's alpha, lagged return, tracking error, Outperform S&P500 Dummy	0.056	0.020	0.143	0.058
Control Variables only:	Asset size, industry growth, lagged flow, length of track record (age)	0.056	0.099	0.112	0.493
Quantitative performance and control variables:	Both sets of performance and control variables listed above.	0.107	0.121	0.218	0.508
Lagged flow only:	Lagged percentage and dollar flow respectively	0.019	0.0004	0.078	0.473

Table VI. The Relation of Dollar Flows to Performance and Non-Performance Manager Characteristics in the Early (1987-1990) versus Later (1991-1994) Period

For each industry, this table contains an OLS regression of dollar flow on the performance and control variables included in Table II, in addition to a dummy variable for the 1991-1994 period. T-statistics based on White standard errors are in parentheses and N represents the number of manager-year observations. *, **, *** indicate statistical significance at the 10, 5, and 1% level.

	Pension fund Managers	Mutual fund managers
Intercept	-1.444	-43.478***
	(-0.02)	(-3.69)
Jensen's alpha	1580.991**	-39.673
	(2.52)	(-0.50)
Lagged return	461.574**	231.196***
	(2.38)	(7.48)
Tracking error	-1046.991	-94.392
	(-1.32)	(-0.95)
Lagged flow	-0.030	0.254***
	(-0.28)	(3.04)
Asset Size	-0.078*	-0.002
	(-1.81)	(-0.12)
Industry growth	-297.106	63.339**
	(-0.82)	(2.29)
Age	5.263	0.052
	(0.37)	(0.06)
1991-1994 period dummy (Later)	49.897	-55.066*
	(0.49)	(-1.99)
Jensen's alpha*Later	-608.349	733.650***
	(-0.89)	(3.79)
Lagged return*Later	-280.45	10.693
	(-1.39)	(0.22)
Tracking error*Later	454.392	4.849
	(0.557)	(0.03)
Lagged flow*Later	0.073	0.395***
	(0.38)	(2.77)
Asset Size*Later	-0.010	0.046*
	(-0.21)	(1.67)
Industry growth*Later	675.20	199.785***
	(1.59)	(3.83)
Age*Later	-7.298	-2.066
	(-0.41)	(-1.21)
Adjusted R-squared	.119	.535

Figure 1. The Estimated Relation Between Percentage Flow and Return Ranking
Piecewise Linear Regression Using Return Percentile Ranking Deciles and
Controlling for Other Performance and Non-Performance Manager Characteristics

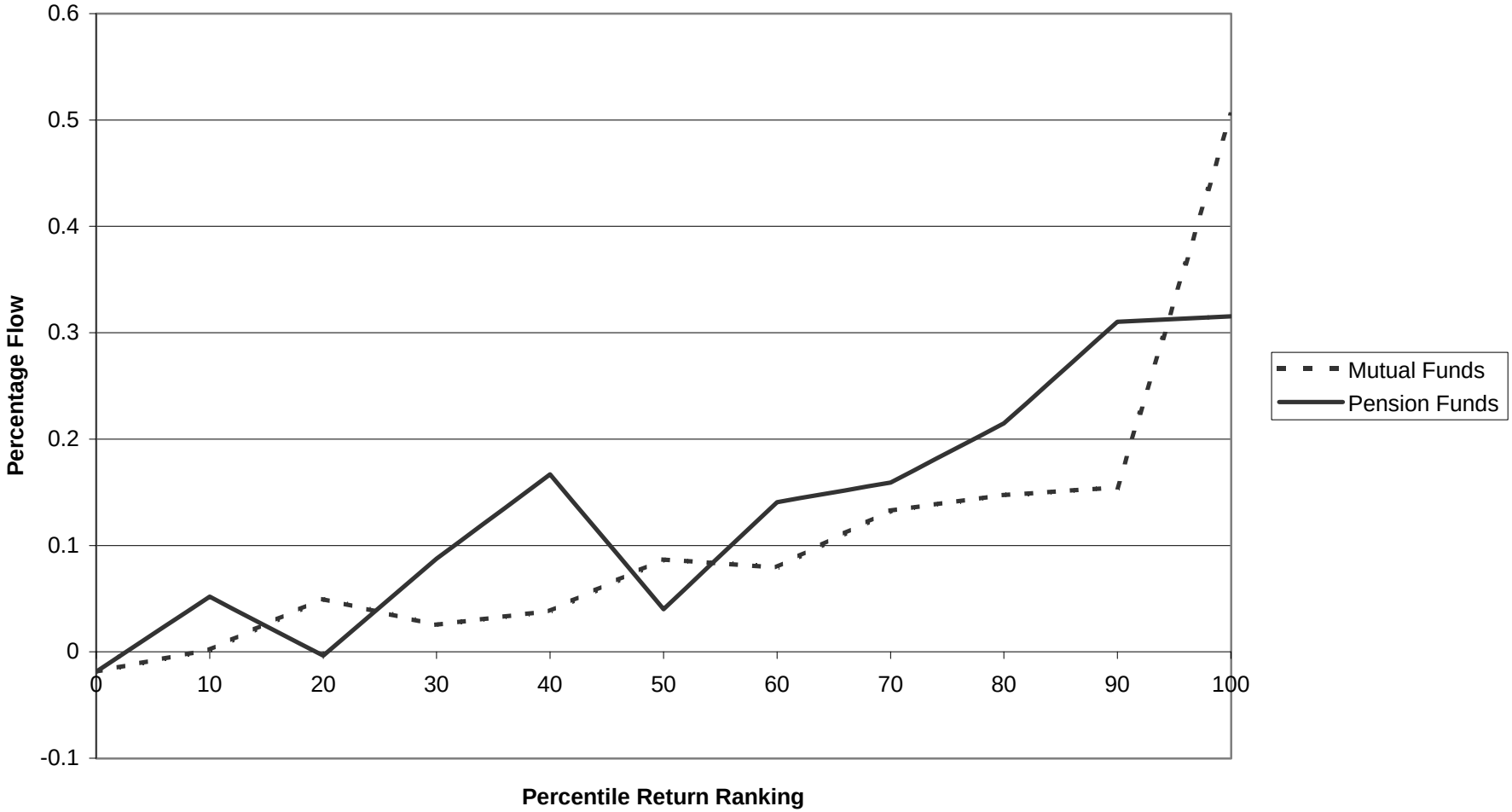

Figure 2. The Estimated Relation Between Percentage Flow and Jensen's Alpha Ranking
Piecewise Linear Regression Using Alpha Ranking Deciles and
Controlling for Other Performance and Non-Performance Manager Characteristics

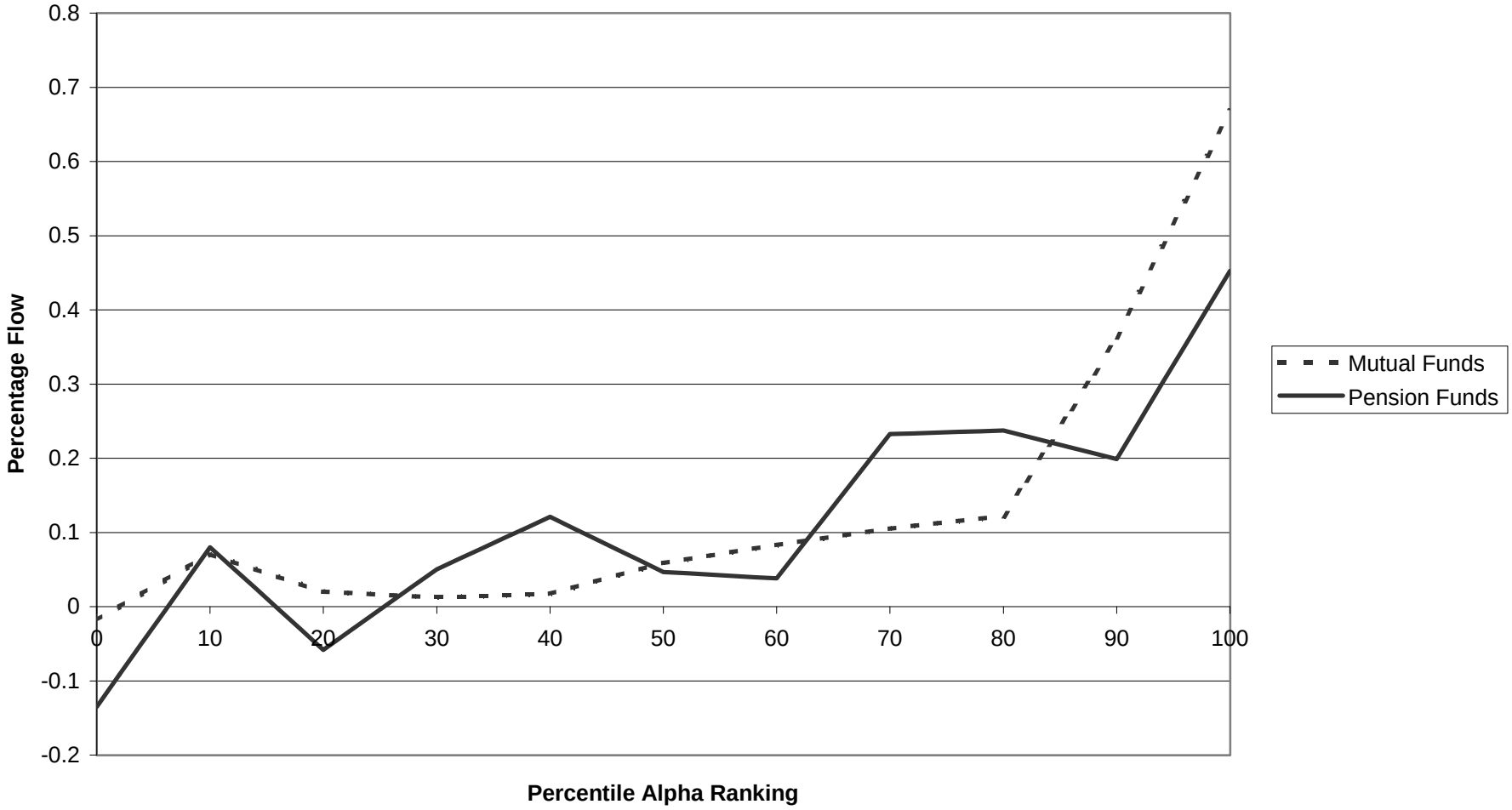

Figure 3. The Estimated Relation between Dollar Flow and Return Percentile Ranking
Piecewise Linear Regression Using Return Ranking Deciles and Controlling for Other Performance and Non-Performance Manager Characteristics

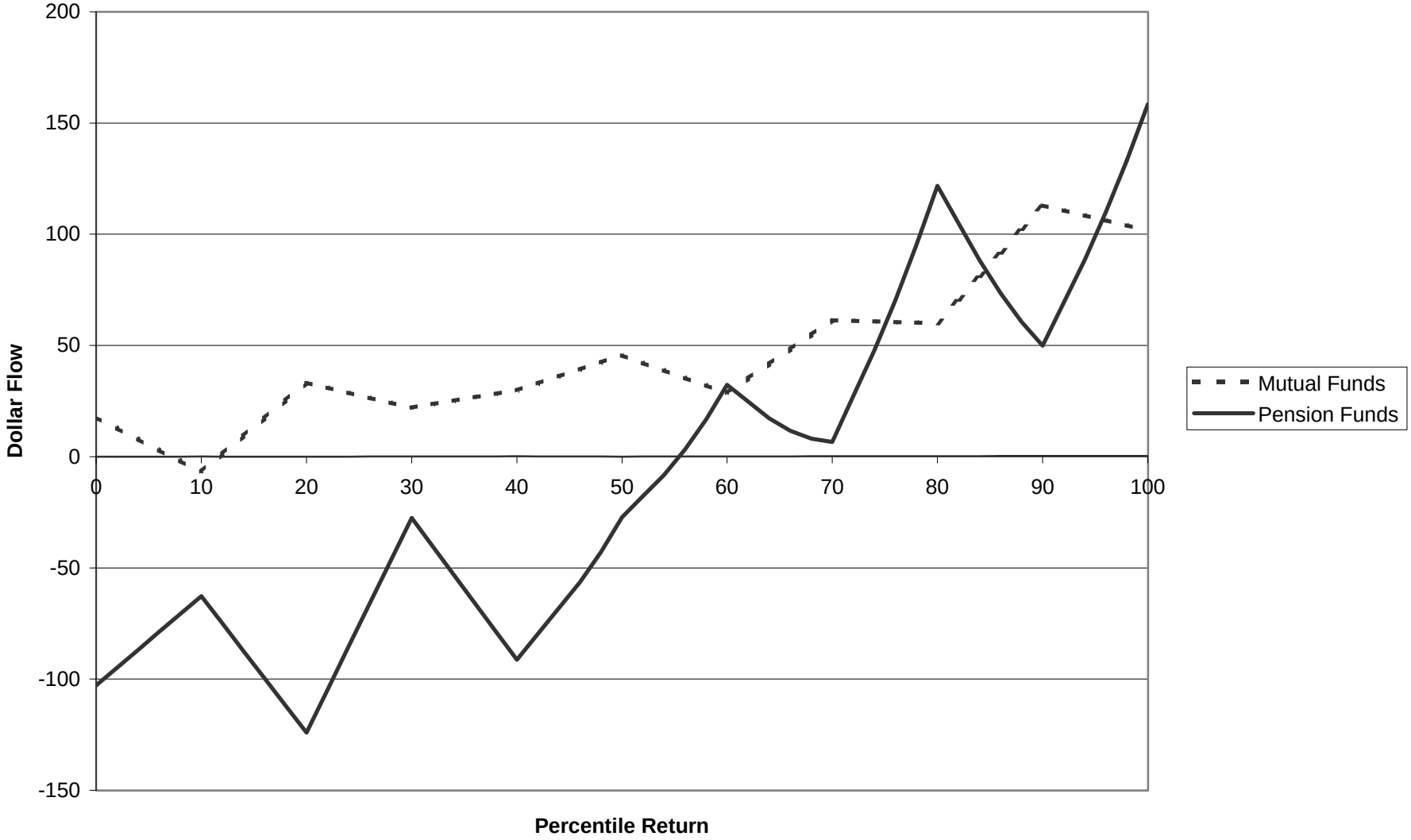

Figure 4. The Estimated Relation Between Dollar Flow and Jensen's Alpha Ranking
Piecewise Linear Regression Using Alpha Percentile Ranking Deciles and Controlling for Other Performance and Non-Performance Fund Characteristics