

CAREER CONCERNS OF MUTUAL  
FUND MANAGERS

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Career Concerns of Mutual Fund Managers  
Judith Chevalier and Glenn Ellison  
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### ABSTRACT

This paper examines the labor market for mutual fund managers and managers' responses to the implicit incentives created by their career concerns. We find that managerial turnover is sensitive to a fund's recent performance. Consistent with the hypothesis that fund companies are learning about managers' abilities, managerial turnover is more performance-sensitive for younger fund managers. Interpreting the separation-performance relationship as an incentive scheme, several of our results suggest that a desire to avoid separation may induce managers at different stages of their careers to behave differently. Younger fund managers appear to be given less discretion in the management of their funds; i.e. they are more likely to lose their jobs if their fund's beta or unsystematic risk level deviates from the mean for their fund's objective group. We also show that the shape of the job separation-performance relationship may provide an incentive for young mutual fund managers to be risk averse in selecting their fund's portfolio. Consistent with these implicit labor market incentives, younger fund managers do take on lower unsystematic risk and deviate less from typical behavior than their older counterparts. Finally, additional results on the flow of investments into mutual funds suggest that rather than just being due to a screening process, firing decisions may also be influenced by a desire to stimulate inflows of investment into the fund.

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# 1 Introduction

A side effect of the growth of the mutual fund industry in recent years has been increased attention paid to the internal workings of fund companies. Among the most dramatic stories of the last several years was the the wholesale shakeup of portfolio managers at Fidelity Investments: 26 managers were reassigned in a single day in March of 1996. The recent public attention paid to the hiring and firing of mutual fund managers suggest that fund managers work in an environment in which their actions and performance greatly affect their future career prospects. This leads to the question of whether fund managers' investment decisions are affected by their career concerns.

It has long been recognized in and out of academia that the relationship between mutual fund companies and their investors involves significant agency problems. The organization of the industry under the 1940 Investment Company Act is designed to allow investor monitoring of management companies, and later regulations prohibiting option-like compensation schemes for fund companies were directly motivated by concerns that such schemes might lead to undesirable behavior. The subsequent academic literature (following Modigliani and Pogue (1975)) has noted that there remain a number of ways in which investment decisions may be affected both by the explicit compensation schemes of fund companies, and by implicit incentives which derive from a desire to attract new customers. However, to our knowledge, the literature has focused exclusively on incentive issues arising from the agency relationship between fund companies and fund investors. Agency issues within the fund companies and, in particular, the possible effects of managerial career concerns have not been studied in applied work. In this paper, we look at how the behavior of mutual fund managers may be affected by their desire to avoid losing their jobs. In particular, we look at how the likelihood of a manager separating from his or her current position is affected by the manager's actions, past performance, etc., discuss how aspects of the relationship might cause behavior to vary systematically across managers, and then examine these predictions by looking at how behavior actually differs between younger and older managers.

In the theory literature, the idea that manager's behavior might be influenced by career

concerns was introduced by Fama (1980) and Lazear and Rosen (1981) who focused on how career concerns might solve agency problems. The focus of the literature shifted with Holmstrom's (1982) analysis of the nature of career concerns which arise when a competitive labor market is trying to learn about managers' abilities despite the presence of unobserved effort and random noise. Holmstrom noted that, while career concerns can overcome agency problems in particular cases, a number of distortions typically remain, *e.g.* managers may exert excessive effort when young and slack off when old. A number of more recent papers have followed Holmstrom in looking at the types of distortions which career concerns may induce in a variety of circumstances when managers make investment decisions, select between projects, etc. Of late, particular interest has centered on whether career concerns may lead to "herd behavior" (Scharfstein and Stein (1990); Zwiebel (1995); Prendergast and Stole (1996); Morris (1997)).

In this paper, we examine managerial turnover and patterns in investment decisions in a dataset which contains information on 453 portfolio managers who had primary responsibility for a growth or growth and income mutual fund at the start of 1992, 1993 or 1994. We begin with an investigation of the relationship between a manager's performance and the probability of his separation from his current position. As one would expect from models like those of Jovanovic (1979) and Holmstrom (1982) where fund companies are learning about managers' abilities from observations on returns, we find that a manager's probability of retaining his current position is increasing in the risk-adjusted return he achieves, and that managerial separation is more performance sensitive for younger managers. We note also an apparent short-term bias in performance evaluation, which may reflect companies holding managers of larger funds to a higher standards (as in Ross, Taubman and Wachter (1981) and Murphy (1986)) and/or a desire to attract investment flows.

Examining the determinants of separation in a bit more detail, we find some interesting features of the relationship which would be expected to lead to cross-sectional differences in behavior if managers are influenced by a desire to avoid separation. First, we find that, for young managers, the probability of retaining one's job is a concave function of performance. Specifically, the probability increases steeply with performance when managers have nega-

tive excess returns, but it is fairly insensitive to differences at positive excess return levels. As a result, young managers may have an incentive to be risk averse in selecting their portfolios. Second, we look at how a manager's actions may affect the probability of his retaining his position (controlling for performance). Here, we find that young managers are more likely to lose their jobs if their investment decisions were "bold" or unusual in terms of the fund's beta or unsystematic risk level deviating from the mean of the fund's objective group or in terms of the fund having an unusual pattern of returns which suggests that they were invested in different sectors and/or took large idiosyncratic risks. Young managers may thus also have an incentive to herd, as has been suggested in the theoretical literature.

Clearly, a desire to avoid separation is only one of the incentives a manager faces. Managers may also have explicit incentive contracts (on which no data is available) and may be concerned about possible promotions (although, as we discuss later, we think this is probably not so important in our sample). While we thus might not have been surprised to find no clear effects, we look next for evidence of the age-related differences in behavior mentioned above. Consistent with the incentives created by the nonlinearities in firing probabilities, we find that younger managers do indeed take on less unsystematic risk than their older counterparts. Consistent with our results on discretion, we find also that younger managers appear to deviate less from the mean risk levels and return patterns of funds with their objective.

Finally, we look at how investment flows react to managerial turnover. If consumers believe that managerial ability exists, one might imagine that they will reallocate their investments in response to changes in a fund's management, and this might well provide an additional motivation for funds to fire or retain managers (and hence provide an explanation for the short-term bias in evaluation). We find some weak evidence of such behavior on the part of consumers.

The first part of our paper is similar to Khorana (1996) which examines the relationship between fund returns (and growth) and managerial replacement in a sample of stock and bond funds which contains 339 instances of managerial turnover between 1979 and 1992.

Khorana finds that the probability of separation is negatively related to returns in the current and previous year. Our work considers the impact of behavior and looks at age-related variation in the determinants of separation, and then adds to that analysis an examination of whether behavior appears to respond to the differential career concerns which our analysis uncovers.

While unique in its focus on career concerns, our work is also related to a number of other papers on the distortions which delegated portfolio management can produce. Modigliani and Pogue (1975), Starks (1987), Grinblatt and Titman (1989) and Admati and Pfleiderer (1997) consider the incentive effects of explicit performance contracts between a mutual fund company (or manager) and mutual fund investors. As Berkowitz and Kotowitz (1993) note, fixed percentage fee contracts also implicitly contain a performance compensation element which stems from the fact that new money flows into a fund when the fund does well, and money flows out of funds when the fund does poorly. Chevalier and Ellison (1997a) and Roston (1997) examine empirically how such implicit incentives may affect risk-taking by mutual funds, looking at how changes in portfolio composition toward the end of the year relate to the shape of the flow-performance relationship, and Huddart (1997) discusses the relationship theoretically. Lakonishok, Shleifer, Thaler and Vishny's (1991) study of window-dressing among pension fund managers is similarly motivated by the idea that an incentive to attract customers may lead managers to alter their portfolios.

Despite the theoretical interest in career concerns, there has been very little empirical work on any industries documenting how career concerns affect managerial behavior.<sup>1</sup> There is a literature which shows that, in general, poor job performance leads to poor labor market outcomes for managers. The largest branch of this literature, following Coughlan and Schmidt (1985), Warner, Watts and Wruck (1988), and Weisbach (1988), has clearly demonstrated that CEO turnover tends to follow poor stock market performance. Kaplan and Reishus (1990) can be thought of as providing some evidence that promotion-like incentives in showing that CEOs who perform poorly are less likely to become outside

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<sup>1</sup>This contrasts with a substantial number of papers which examine the effects of contractual incentive schemes in a variety of settings. See Healy (1985), Bronars (1987), Asch (1990), Ehrenberg and Bognanno (1990a, 1990b), Knoeber and Thurman (1994) and Chevalier and Ellison (1997a).

members on the Boards of Directors of other firms. Gibbons and Murphy (1992) provide some indirect evidence of the incentive effects of career concerns in showing that firms make explicit compensation more performance-sensitive for CEOs who are closer to retirement.<sup>2</sup> Gompers and Lerner (1994) offer similar results for venture capitalists. In contrast to Gibbons and Murphy, Kahn and Sherer (1990) examine managers in a single industrial company and show that bonuses are more sensitive to performance evaluations for managers with lower seniority.

While these papers shed light on the effort incentives generated by career concerns, we are aware of no direct empirical evidence which links career concerns to other aspects of managerial decision-making. As a context in which to study the effects of career concerns, the mutual fund industry is attractive for a number of reasons: the set of portfolio managers provides a large sample of managers in similar positions; the managers are sufficiently public figures so as to allow us to identify when turnover occurs and to obtain such information as the managers' ages; performance in terms of fund returns are readily observable; and some elements of behavior such as risk-taking can also be observed or inferred from the time-series of returns.

The remainder of the paper proceeds as follows. In Section 2, we describe the data used in the paper and provide background information on the post-separation careers of fund managers. In Section 3, we examine the basic separation-performance relationship. We investigate the relationship between separation and a manager's decision to choose systematic or unsystematic risk levels which deviate significantly from the mean for the fund's objective group in Section 4. Section 5 examines nonlinearities in the separation-performance relationship that may generate incentives for young managers to be risk averse in the management of their funds. We examine managerial responses to these implicit career concerns in Section 6. Section 7 examines the effect of managerial turnover on investment flows. Section 8 provides discussion and conclusions.

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<sup>2</sup>Dewatripont, Jewitt and Tirole (1997) note that, depending on how one specifies relationships between ability, effort, and output, it is possible for career concerns incentives and explicit incentives to be complements, and thus the reverse finding might also have been consistent with a career concerns model.



## 2 Data

Most of the data in the paper are obtained from Morningstar Incorporated. We gather data on fund characteristics, returns, and manager identities for growth and growth and income mutual funds from the Morningstar *Mutual Funds OnDisc* compact discs. We use multiple CDs of approximately annual frequency to construct a sample of funds which are in operation in 1992, 1993, or 1994. We follow all funds through 1995, unless they expire earlier, in which case we follow them through their last appearance in the data. The dataset contains data for all new growth and growth and income funds which appear over the 1992-1994 time period. Thus, our dataset eliminates some of the common survivorship difficulties.

We consider the characteristics and performance of the manager in charge of the fund on January 1st of year  $t$  in determining whether the manager separates from the fund between year  $t$  and year  $t + 1$ . Thus, for a fund manager to be included in our sample, the manager must have been the sole manager of a growth or growth and income mutual fund on January 1st of 1992, 1993, or 1994.<sup>3</sup> While the data sometimes lists the names of each member of a management team, it is often not clear whether all of the managers listed contribute equally to the management of the fund, or whether one of the listed managers is the lead manager, and we thus felt that it would be problematic to generate metrics of manager characteristics and follow manager careers in the case of multiple managers.

The one characteristic of a manager on which we will focus most is his age. While manager ages are not reported in Morningstar, Morningstar does report the dates on which a manager received college and advanced degrees. Our manager age variable is calculated by assuming that the manager was 21 upon college graduation. Occasionally, the graduation data is missing, but the manager's birth year is reported. In those cases, we use the birth year to calculate the manager's age. We view the manager's age as being the best available proxy for the manager's stage in his career and for the amount of information that the market has about the manager.

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<sup>3</sup>Because Morningstar often provides incomplete or inaccurate information about the start dates of managers, we verified the manager identities CD by CD, rather than inferring the manager identities for an older CD by using the tenure of a manager reported on a newer CD.

We construct annual measures of the funds' risk-taking and performance using monthly return data for the year in question. Betas are derived by regressing the difference between a fund's return and the risk-free rate on the difference between the return on a market index and the risk-free rate.<sup>4</sup> Our measure of fund  $i$ 's unsystematic risk in year  $t$ ,  $UnsysRisk_{it}$ , is the square root of the estimated residual variance in this regression, rescaled so that its units are percentage points of idiosyncratic risk per year. Our standard measure of performance,  $Alpha_{it}$ , is Jensen's alpha, the constant term in this regression, rescaled so that its units are percentage points per year. Table 1 provides summary statistics for the variables that will be used in the subsequent analysis.

Our main concern will be to examine separations between a manager and his position. There are two ways that a "separation" can occur in our dataset. First, our definition of separation includes any situation in which the sole manager of a fund is replaced, either by a team of managers, or by a new manager. Second, a separation occurs when a fund ceases to exist in our data. A manager in our data is said to retain his position if a separation does not occur.

In principle, separations could represent promotions, firings, demotions, or lateral moves. However, because the management of a growth or growth and income fund is among the pinnacle positions for portfolio managers within a fund company, we would expect that few of the separations in our sample are likely to reflect promotions. Were we to examine a sample of specialty or sector funds, we would have expected promotions to be much more important. Our presumption is also supported by a couple of empirical observations. First, as we will later see, very few of the separations follow outstanding performance. Second, it is rare for one of our separated managers to later reappear in Morningstar's database managing a larger fund.

To provide a sense of the effect of separation on manager's careers, Table 2 examines the subsample of 348 fund managers who are the sole managers of growth or growth and income mutual funds on the April 1993 Morningstar CD. By the end of 1995, 158 of these managers

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<sup>4</sup>The "market" return is a value-weighted NYSE/AMEX/NASDAQ composite. Our data on market returns and risk-free rates were obtained from Kent Daniel and their construction is described in Daniel and Titman (1996).

had “separated” from their funds, either via fund death or managerial turnover. We can crudely measure the effect of the separation on the manager’s career for some of these managers by examining the total assets that the manager managed prior to the separation and after the separation. We calculate the total assets that the manager manages in each period by searching for all funds in the *entire* Morningstar database which list the fund as a manager. In cases in which  $N$  managers were listed as managing a fund,  $1/N$  of the fund assets were attributed to each manager. As a very crude proxy for changes in the manager’s compensation, we looked to see how the total assets which the manager controlled changed in the year in which separation occurred.<sup>5</sup> This proxy could be misleading if, for example, a small fund brings in a “star” manager at a high salary in order to attract money into a new fund.

Ninety-eight of the one hundred fifty eight managers managed some fund in the year following their separation. Of these, 17 managers controlled more assets post-separation while 81 controlled fewer total assets post-separation. Consistent with our expectation about performance, separators had performance which was below the average performance for their fund’s objective (the objective group being the group of all growth funds or the group of all growth and income funds). Managers who resurfaced in the dataset managing greater total assets had very close to the mean performance for their funds’ objective categories.

The other sixty separated managers managed no assets in the Morningstar database in the year of their separation. Only two of them were greater than sixty years old, so it seems unlikely that many of these moves are simply retirements. Some of the exits could be “promotions”, for example, to a more desirable position at hedge fund. The anecdotal evidence in the press, however, suggests that this is not common for our sample period. For example, when Jeff Vinik (who earlier left Fidelity’s flagship Magellan fund) opened a hedge fund in November of 1996, the New York Times quoted an expert on hedge funds as saying that “I think he will be the first of many high-profile money managers with great

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<sup>5</sup>That is, if the manager ceased managing a growth and growth and income fund in year  $t$ , we examined whether or not he could be found elsewhere on the Morningstar CD in year  $t$ . We adjusted the total assets managed before and after separation to control for total growth in the mutual fund industry during that year using data from the Investment Company Institute).

reputations who cross over into the hedge fund field,” which suggests that in the period we are looking at this had not been a common move.<sup>6</sup> In our sample, the group of sixty managers who disappear from the fund industry after separation also had, on average, a worse pre-separation performance than any of the other groups of separators.

### 3 The basic separation-performance relationship

In this section, we examine the determinants of managerial separation. Our empirical specification is motivated by the idea that separations may result from of a learning process similar to those described in Jovanovich (1978), Holmstrom (1982) and Murphy (1986). Presumably, actively managed mutual funds exist because investors believe that some managers have an ability to gather information and pick stocks that will have an above average return. We would imagine that firms and managers will initially be uncertain about each manager’s ability, and will learn over time by observing the returns that the manager achieves. To obtain a theory of separation (as opposed to a model in which wages adjust to the level of a manager’s expected ability), Jovanovich notes that one could assume that a manager’s productivity has a match-specific component. While the skills of a mutual fund manager seem unlikely to be company-specific, separations could similarly be generated by assuming that there are a limited number of positions for fund managers and a large pool of potential managers of unknown ability.

With a competitive labor market, separations will occur in such a model whenever firms’ assessments of a manager’s ability become sufficiently low so as to make it efficient to incur the transaction costs involved in replacing him with a new manager. Separation will thus be expected to follow poor performance.<sup>7</sup> We would expect that the sensitivity of separation to performance will decrease with the manager’s experience for two reasons. First, when firms have more observations of a manager’s performance they will update their assessment

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<sup>6</sup>New York Times, November 1, 1996, p. D1.

<sup>7</sup>Note that the cutoff level of current performance necessary to retain one’s position varies with a manager’s past performance. In the presence of hiring/firing costs, there is an option value to retaining a manager of unknown ability which decreases over time as his ability is known more precisely. Hence, the threshold level of expected ability below which a manager would be replaced increases over time, and the cutoff level of current performance necessary for a manager to retain his position can in some circumstances be average or above average rather than “poor”.

of his ability less in response to a single observation. Second, because more experienced managers are survivors of a selection process, market assessments of their ability may on average be further above the cutoff level at which a manager will be replaced.

To analyze the separation-performance relationship empirically, we perform probit regressions using as the dependent variable a dummy,  $MStay_{it}$ , which is set to one if the manager responsible for fund  $i$  in January of year  $t$  is still in charge of the fund at the end of year  $t + 1$ :

$$\begin{aligned}
 MStay_{it}^* &= \beta_0 + \beta_1 Alpha_{it} + \beta_2 Alpha_{it} \times (MgrAge_{it} - \overline{Age}) + \beta_3 Alpha_{it-1} \\
 &\quad + \beta_4 Alpha_{it-2} + \beta_5 ManagerAge_{it} + \beta_6 Age60+_{it} \\
 &\quad + \beta_7 GrowIncDummy_{it} + \beta_8 Year92_t + \beta_7 Year93_t + \epsilon_{it}, \\
 MStay_{it} &= \begin{cases} 1 & \text{if } MStay_{it}^* > 0 \\ 0 & \text{otherwise.} \end{cases}
 \end{aligned}$$

Our measure of a fund's performance in given year is Jensen's alpha, risk-adjusted excess returns. We allow separation to be affected differentially by performance in the current year,  $Alpha_{it}$ , and in each of the previous two years,  $Alpha_{it-1}$  and  $Alpha_{it-2}$ . To allow the performance-sensitivity of separation to vary with a manager's experience we include also an interaction between  $Alpha_{it}$  and the difference between the manager's age and the mean age in the sample (which is about 44.) The manager's age is also entered additively, and to allow for the possibility of normal retirements we include a dummy variable,  $Age60+$  which takes the value of one if the manager is 60 years old or greater, and zero otherwise. Our specification so far implicitly assumes that managers are evaluated based on their performance relative to the market. Evaluations based on absolute performance or changes in the tightness of the market for fund managers would cause separation probabilities to change from year to year. We have thus included year dummies in our specification. The omitted year is 1994. A dummy for growth and income funds (as opposed to growth funds) is also included.

The results from the basic specification are presented in column one of Table 3. Standard errors are adjusted to account for the possibility that multiple observations for the same fund may be correlated. As expected, the coefficient on  $Alpha_{it}$  is positive, and it is statistically

different from zero at the 1 percent confidence level. The point estimate suggests that a manager of the mean age in the sample who has performance 10 percentage points worse than the mean manager experiences a decrease in the probability of maintaining his position of about 6.2 percentage points. (The mean turnover probability is 18.6 percent.)

From the perspective of learning about career concerns, the most interesting result in the table is that the sensitivity of separation to performance is greater for younger managers. If a manager who underperforms the market is ten years younger than the mean manager in the sample, then the probability of maintaining his position decreases by 12 percentage points rather than 6.

The one other result to which we'd like to draw attention is that while the coefficient estimates for the lagged alpha values,  $Alpha_{it-1}$  and  $Alpha_{it-2}$ , are positive as expected, they indicate that separation is much less sensitive to lagged alphas than to the current alpha. The point estimates are that if a manager with otherwise mean characteristics had an alpha 10 points worse than the mean in one of the prior two years, then the probability of his retaining his position would be reduced by 1.8 to 2.0 percentage points. The estimates are also not statistically different from zero at standard confidence levels.

A "short-term bias" in evaluation has been argued to be a plausible assumption in a number of papers, *e.g.* Fudenberg and Tirole (1995) and Brandenburger and Polak (1996). It also often seems consistent with our intuition. For example, we would not regard it as surprising that Robert Beckwitt was replaced as the manager of Fidelity Asset Manager in March of 1996 after producing a -7% return in 1994 and trailing the S&P 500 by 19 percentage points in 1995, even though his overall career record was good. A short-term bias, however, would not be expected in a model like that we've suggested so far. To the extent that a manager's ability does not change over time (either randomly or with changing market conditions) we would expect firms to weight all previous observations equally in assessing a manager's ability.

One plausible explanation for why separation might depend most strongly on current performance is that the assignment of managers to funds may involve task assignment/resource allocation considerations like those in Ross, Taubman and Wachter (1981), Mac-

Donald (1982), and Murphy (1986). The funds in our sample vary in size, and fund companies should want to assign better managers to larger funds.<sup>8</sup> If a manager's superior past performance has led to his being assigned to a larger fund (or to his fund growing larger), the effect of the market's assessment of his ability being higher may be offset by his needing the market to have a higher assessment in order to retain his current position. Hence, past performance might not be expected to have a large effect on the likelihood of a manager being replaced. We investigate another potential reason for the apparent short-term bias in section 7.

The coefficient on the additive age variable is small and statistically insignificant. This suggests that, for managers who just match the market, age is not a significant determinant of separation. The exception to this finding is that managers of retirement age are more likely to separate from their positions than younger managers; the coefficient for the *Age60+* dummy variable is negative and statistically different from zero at the 6 percent confidence level. We find also that managers of growth funds are more likely to separate from their positions than the managers of growth and income funds, and that separation was least likely in 1993 and most likely in 1994. The latter results are consistent with our expectations; 1993 was the best year of the three for the mutual fund industry and 1994 was the worst, both in terms of the raw return of the mean fund and in terms of industry growth due to inflows of new investment.<sup>9</sup>

Columns 2-5 of Table 3 examine other factors which might affect the sensitivity of separation to performance. Column 2 adds the mutual fund's expenses to the right hand side. The results are not precise enough to allow us to determine whether managers are implicitly evaluated on a pre-expense basis or on a post-expense basis.

Column 3 adds fund size and a fund size-performance interaction to the specification. One might imagine that the managers of larger funds are those who are most highly re-

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<sup>8</sup>Chevalier and Ellison (1997a) note that the flow of investments into a fund appears to be proportional to its initial size. Hence, both because of its effect on investment flows and because of its effect on the internal asset growth, superior performance is more valuable in a larger fund.

<sup>9</sup>For example, on February 18, 1995 the New York Times reported that Stein Roe laid off two fund managers and eliminated their positions by assigning responsibility for their funds to other fund managers at the company, and quoted analysts as saying that "with less money moving into mutual funds, fund groups are likely looking at ways to cut costs."

garded by their current employers, and thus they might be less likely to be fired following a poor performance. At the same time, however, it may be more costly in terms of forgone investment flows to retain a poorly performing manager at a large fund. While manager turnover tends to be higher unconditionally for larger funds, we do not find a significant effect of fund size on the performance sensitivity of separation.

Another issue which might affect the basic relationship is the possibility that different fund organizations may respond very differently to poor performance. For example, small fund organizations might be family run, with turnover limited by personal relationships. To examine this, we check whether separation is more sensitive to performance for larger or smaller fund organizations by including (separately and interacted with  $Alpha_{it}$ ) the logarithm of  $FamilySize_i$ , the total assets of all funds within the fund family at the start of the sample period. The results suggest that separation is more sensitive to performance at the larger fund organizations in our sample. Inclusion of the fund family size does not, however, significantly affect our estimates of the relationship between age and performance sensitivity.

Finally, in the preceding specifications, we chose manager age as our proxy for the manager's experience in the industry. Another proxy is available to us; Morningstar provides a variable which is the manager's start date at the fund. We believe that the age variable is a better measure of the manager's experience in the industry than a tenure variable constructed from the manager's start date for two reasons. First, because mutual fund managers change positions frequently and the available tenure variable is fund-specific rather than company-specific, such a tenure variable provides only very limited information on a manager's career history. Second, the tenure variable seems to be reported somewhat inconsistently; in looking back through old Morningstar references, we find many inconsistencies in the managers' reported start dates. In contrast, the reported birth year or graduation year for a given manager very rarely changes when one examines Morningstar records generated at different times. Column 5 of Table 3 presents the basic specification when tenure and a tenure-performance interaction are included as regressors along with age and the age-performance interaction. The age-performance interaction survives in magni-



tude and significance, while the tenure-performance interaction coefficient is very small and statistically insignificant. In unreported regressions, we also examine the effect of including tenure measures while excluding age measures. Not surprisingly, a specification which includes the tenure variables and excludes the age variables gives coefficients for tenure and for tenure interacted with performance which are similar in magnitude and significance to the coefficients for the corresponding age coefficients in a regression with age measures and without tenure measures.

#### **4 Career concerns: deviations from the herd**

In this section and the one which follows, we explore further aspects of the separation-performance relationship which may provide managers with an incentive to alter their behavior. Here we examine incentives to “herd” (or anti-herd), asking whether, controlling for performance, a manager’s likelihood of retaining his position depends on how bold or unconventional of the actions he took were.

A number of recent papers have argued that managers’ career concerns may at times induce them to ignore private information and follow the herd (or to try to avoid following it). In Scharfstein and Stein (1990), Prendergast and Stole (1996) and Morris (1997), this occurs because observable actions serve as signals of the quality of the manager’s private information. In Scharfstein and Stein, “smart” managers receive correlated information, while “dumb” managers receive uncorrelated noise. Thus, if a manager learns that his private information about an investment opportunity differs from the information that another manager has received, he learns that it is more likely that he is “dumb.” Because taking the action that his information suggests is optimal would signal to the market that his ability is low, the manager ignores his information and herds. In Prendergast and Stole (1996), managers have private information about the precision of the information they possess. A bolder action signals that a young manager knows his information to be good, and hence young managers have an incentive to take excessively bold actions. Older managers, in contrast, have an incentive to become “jaded” and not change their actions a great deal from period to period, because when the optimal actions are correlated over

time this signals ability. In Morris (1997), agents may take standard “politically correct” actions in order to avoid being thought to have racist or other motivations. Zwiebel (1995) focuses on an alternate motivation for herding/anti-herding in a model where taking an unconventional action (which is itself unobserved) increases the variance of the market’s ex post assessment of a manager’s ability. In his model, average managers prefer the conventional action because it reduces the risk of their being fired, while high or low ability managers may prefer unconventional actions.

In the mutual fund industry it seems plausible that firms might judge managers not only on their performance, but also, in part, on the portfolio decisions that they made. For example, Jeff Vinik’s departure from Fidelity followed extensive criticism in the press of his concentration in technology stocks in 1995 (a year in which Magellan outperformed 80% of growth funds) and of his 1996 move into cash and bonds. While Vinik did trail the market in the 1996 by six percentage points, his overall performance was outstanding, and the New York Times’ analysis was that “What got Mr. Vinik in trouble was not his underperformance, but how he did it.”<sup>10</sup> We try here to see whether managers do seem to be judged on actions as well as on performance, and to explore whether a desire to avoid separation might lead some managers to herd (or do the opposite), by examining whether taking “bold” actions has an effect on the probability that a manager retains his position.

We construct three variables to reflect different senses in which a manager’s portfolio choices might be bold or unconventional. Our first variable, *BetaDeviation<sub>it</sub>*, measures boldness in the sense of having taken a large bet on the direction of the market. The variable is the absolute value of the difference between fund *i*’s beta in year *t* and the average beta in that year of the funds in fund *i*’s objective class (growth or growth and income). Our second measure, *UnsysDeviation<sub>it</sub>*, again measures boldness in terms of a departure from a typical portfolio; this time involving an unsystematic risk level which differs from that of the typical fund. Specifically, the variable is the difference between *Unsys<sub>it</sub>* and the mean of this variable over all funds in fund *i*’s objective class in year *t*. Finally, in an attempt to get at whether a manager may have concentrated his portfolio

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<sup>10</sup>See New York Times, May 26, 1996, sec. 3 p. 5.

in sectors or groups of stocks with differ from those held by the typical fund, we define  $ResidStdDev_{it}$  to be the square root of the sum of squared differences between a fund's monthly returns and the mean monthly returns of funds in the objective class (scaled in terms of percentage points). Note that boldness according to this measure is increased both by having an unusual mix of sectors and by holding a very risky portfolio.

Our results on whether a manager's actions have a separate effect on the probability of his continuing in his position are presented in Table 4. Each column reports estimates from a probit model which is like our basic model of the separation-performance relationship, but which includes two extra explanatory variables: one of our measures of the boldness of the manager's actions, and that measure interacted with the difference between the manager's age and the mean age in our sample. The inclusion of the latter variable is motivated by the idea that firms will update their assessment of a manager's ability less in response to any one signal when more is known about the manager. Recall that the dependent variable in these regressions,  $MStay_{it}$ , is an indicator for whether the manager in charge of a fund at the start of year  $t$  retains his position at the start of year  $t + 1$ , and the right hand side variables include year  $t$  and lagged alpha's, an alpha-manager age interaction, the manager's age, and dummies for the fund objective and year.

The first column considers the effect of taking large bets on the direction of the market. The negative coefficient estimate on  $BetaDeviation_{it}$  indicates that manager's who take a larger bet relative to the market are more likely to separate from their current position, although the effect is not statistically significant at standard levels. The positive coefficient on  $BetaDeviation_{it} \times (MgrAge_{it} - \overline{Age})$  is significant at the 6% level and indicates that younger managers are more likely to be separated after taking a bold position. Consider a manager whose objective group has a mean beta of 1.0 for the year. If this manager has the mean characteristics, but chooses a beta of 0.75 or 1.25 (a 0.25 change in  $BetaDeviation$  is about 1.5 standard deviations), the point estimate is that his probability of separation rises by 0.7 percentage points. If the manager is ten years younger than the mean manager, his probability of separation rises by 4.0 percentage points.

Our results on the effect of holding unusual levels of unsystematic risk are given in

column 2 of Table 4. The point estimate on  $UnsysDeviation_{it}$  again suggests that managers whose actions deviate from the norm are more likely to separate from their positions than managers who deviate less, although it is significantly different from zero at only the 14 percent confidence level. A manager with the mean characteristics whose unsystematic risk level is 3 points higher or lower than that of the mean manager is estimated to have an increased probability of separation of 2.7 percentage points. (A 3 point increase in  $UnsysDeviation$  is again a little more than 1.5 standard deviations.) Separations appear to be more sensitive to deviations for younger managers: a manager who is ten years younger than the mean is estimated to increase his separation probability by 5.2 percentage points with a 3 point larger deviation in unsystematic risk. The coefficient estimate on the  $UnsysDeviation_{it} \times (MgrAge_{it} - \overline{Age})$  interaction is statistically different from zero at the 7% level.

Column 3 contains estimates from a model which includes our third measure of boldness,  $ResidStdDev_{it}$ . The point estimates is again that managers whose actions deviate from the norm are more likely to separate from their positions than managers who deviate less, although the coefficient for  $ResidStdDev_{it}$  is small and not significantly different from zero at standard confidence levels. The point estimate is that a manager with the mean characteristics for whom  $ResidStdDev_{it}$  is 1.5 standard deviations higher than the mean will have a separation probability which is 0.8 percentage points above the mean. Separations again appear to be more strongly affected by the actions of younger managers: a manager who is ten years younger than the mean would increase his separation probability by 3.2 percentage points with a 1.5 standard deviation point increase in  $ResidStdDev_{it}$ . The coefficient estimate on the  $ResidStdDev_{it} \times (MgrAge_{it} - \overline{Age})$  interaction is statistically different from zero at the 12% level.

We should note that we cannot rule out an endogeneity story where the correlation between deviations from the norm and separation comes from managers who are about to be fired trying to differentiate themselves, although we see no obvious reason why this would be expected to lead to the differential effects we find for managers of different ages.

Another possible objection to our econometric model is that we have specified the effect

of the boldness of the manager’s action on separation as being independent of whether the manager does well or poorly. One could imagine that managers who have done poorly will be criticized for taking unusual actions, while managers who have done well may not. We examine this possibility in the fourth column of Table 4. We again estimate the probability of separation as a function of  $ResidStdDev_{it}$  and  $ResidStdDev_{it} \times (MgrAge_{it} - \overline{Age})$ . However, we allow the coefficients for each of these variables to take on different values for managers who have a positive alpha in year  $t$  and for managers who have a negative alpha in year  $t$ . While the point estimates are that managers who have performed badly are more likely to separate when their action is bolder, the differential effect is not statistically significant. The two coefficients for the deviation-age interactions are essentially identical for managers who underperform and outperform, suggesting that our original specifications are adequate. In unreported regressions, we examined similar specifications using the other measures of boldness. In each case, the coefficients on the boldness measures were not statistically different for underperforming and outperforming managers.

On the whole, we regard the results in this section as providing some evidence that younger managers are evaluated not only on their performance, but also on the extent to which their actions deviate from the actions undertaken by other managers. In order to avoid separation, our results suggest that young managers may have an incentive to herd. In section 6, we will return to this issue by examining whether younger managers do indeed appear to respond to this by choosing unsystematic and systematic risk levels which are close to those chosen by other managers in their objective group.

## 5 The shape of the separation-performance relationship

In this section, we examine in more detail how the likelihood of managerial separation varies with the manager’s recent performance, estimating the shape of the separation-performance relationship. We do so both to understand better when managers are replaced and because nonlinearities in the separation-performance relationship might alter the manager’s incentives to undertake risk.

The idea that the shape of the performance contract facing a mutual fund manager may

have incentive effects is not new. For example Starks (1987) and Grinblatt and Titman (1989) show that mutual fund fee schedules which are nonlinear in fund performance may distort the fund's risk incentives. Chevalier and Ellison (1997) suggest that nonlinearities in the relationship between the flow of new funds into mutual funds and fund performance may also lead to distortions in the fund's risk incentives. However, this literature does not consider incentives of the fund managers; these could well differ from those of the fund company.

We focus our analysis on the relationship between the likelihood of a manager keeping his job throughout year  $t$  and the excess return he achieves in that period, estimating the model

$$MStay_{it} = f(Alpha_{it}) + \beta_1 Alpha_{it-1} + \beta_2 Alpha_{it-2} + \beta_3 ManagerAge_{it} + \beta_4 GrowIncDummy_{it} + \beta_5 Age60+_{it} + \beta_6 Year92_t + \beta_7 Year93_t + \epsilon_{it},$$

with  $\epsilon_{it}$  assumed to have expectation zero conditional on the right hand side variables. We apply the procedure of Robinson (1988) to obtain estimates of the coefficients  $\beta$  on the control variables and an estimate of the function  $f$ .<sup>11</sup> To allow for differences depending on the manager's age we estimate the equation separately on two subsamples: the 651 fund-years for which the manager is less than forty five years of age and the 669 fund-years for which the manager is at least forty five.

The estimates of the function  $f$  obtained from the young manager and old manager subsamples are shown in Figure 1. The primary observation we'd like to make from the figure is that for young managers the relationship between keeping one's job and excess return appears to be much steeper to the left of zero than to the right of zero. As a result, the overall relationship for young managers appears to be somewhat concave. For older managers the relationship is much flatter and has no apparent concavity/convexity.

The figures also seem consistent with our earlier statements that we believe that most of the separations can be regarded as events which the managers would like to avoid. In both

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<sup>11</sup>The estimates presented below were obtained using an Epanechnikov kernel with the window width around a particular value of  $Alpha$  in a regression involving  $n$  observations being  $(0.03 + 0.3|Alpha|)(n/500)^{-1/5}$ .

subsamples, there is no apparent increase in the frequency of separation among managers with very good performances. It is, however, possible that there is some increase in the probability of being promoted with good performance which is not apparent in the figure because it is offset by a lower probability of being fired.

To provide a formal test of the significance of the differential sensitivity of separation to excess returns for young managers with high and low performance levels, we estimated a simple linear probability model allowing the coefficient on  $Alpha_{it}$  to take on different values to the left and to the right of zero, *i.e.* we estimated

$$\text{Prob}(MStay_{it}|Alpha_{it}, X_{it}) = \gamma_0 + \gamma_1 Alpha_{it}(Alpha_{it} < 0) + \gamma_2 Alpha_{it}(Alpha_{it} \geq 0) + \beta X_{it},$$

with  $X_{it}$  the vector of control variables from the semiparametric specification.

The coefficient estimates from this regression on the young manager and old manager subsamples are reported in Table 5. In the young manager subsample we estimate the slope of the nonseparation-performance relationship to be 1.74 at negative values of  $Alpha$  and 0.29 at positive values of  $Alpha$ . The difference between these coefficients is significant at the 5% level. In the old fund subsample, the estimated slopes 0.15 and 0.32 are not significantly different from each other.

At first glance, our results on the incentives to undertake unsystematic risk obtained in this section may seem extremely similar to the results on deviations in unsystematic risk obtained in Section 4. In Section 4, we showed results which suggested that younger managers are “punished” by fund companies for choosing risk levels which are substantially higher or lower than the mean for their objective category. However, in this section, we have suggested a different incentive facing younger fund managers. The probability of maintaining one’s position is concave in risk-adjusted performance; this potentially provides an incentive for younger fund managers to deviate from the norm of their objective category in the direction of indexing the market portfolio.

## 6 Does behavior reflect career concerns?

In this section we explore whether there is systematic variation in the behavior of mutual fund managers of different ages. Any such variations may be of independent interest, although our primary motivation is to see whether differences in behavior are suggestive of managers reacting to the career concerns we've identified.

In discussing what incentives managers might have, we will equate career concerns with a desire to avoid separation. A model of the industry which would support this is one in which all separations can be regarded as firings, where managers have no incentives other than not being fired, and where the total lifetime cost of being fired is independent of both the manager's characteristics and of his/her performance before being fired. Clearly there are a number of reasons why such a model might not predict behavior accurately: some separations in our data may be promotions rather than firings; a manager's job prospects after being fired may depend on his past record; and managers may be greatly influenced by explicit or implicit incentive pay. As Gibbons and Murphy (1992) suggest in their study of CEO compensation, it certainly seems reasonable to imagine that firms might adjust the form of incentive pay to counteract differences in career concerns. For all these reasons, we would not want to regard a failure to find predicted behavioral differences as indicating that managers do not pay attention to career concerns or that these concerns do not exist. With all these caveats, we proceed now to discuss what actions managers might be expected to take to avoid getting fired in light of our previous results on the separation-performance relationship.

First, we saw in the previous section that for young managers, the probability of keeping one's job appears to be a concave function of excess returns. For older managers, the relationship was fairly flat. Regarding the nonseparation-performance relationship as an implicit incentive scheme, the natural prediction is then that younger managers would be expected to behave as if they were more risk averse in selecting their portfolio.<sup>12</sup>

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<sup>12</sup>Given the greater performance sensitivity of firing, one might also expect younger managers to work harder to achieve good returns. We leave exploration of this topic to a separate paper (Chevalier and Ellison (1997b)).



To examine this hypothesis we estimated the regression

$$\begin{aligned} UnsysRisk_{it} = & \gamma_0 + \gamma_1 ManagerAge_{it} + \gamma_2 \log(Assets_{it}) + \gamma_3 GrowIncDummy_{it} \\ & + \gamma_4 Year92_t + \gamma_5 Year93_t + \gamma_6 Year94_t + \epsilon_{it}, \end{aligned}$$

on the universe of the 1835 fund-years within the 1992 - 1995 period for which all of these variables were available. The dependent variable which we use as our measure of a portfolio's riskiness is again the square root of the estimated residual variance from a regression of monthly portfolio returns on the difference between the market return and the risk free rate, rescaled so that the units are percent per year.

Coefficient estimates are presented in the first column of Table 6 along with standard errors which allow for the possibility of within-fund correlations in the errors. The primary observation which we make from the table is that the coefficient on the *ManagerAge* variable is positive and significant at the 1% level as predicted. The magnitude of the coefficient estimate is such that a manager who is ten years older than the sample mean would be expected to hold a portfolio which is about 7% riskier than average. Other coefficients in the regression indicate that growth and income funds hold substantially less unsystematic risk than growth funds, that small funds tend to be riskier than large funds, and that on average measured risk levels were highest in 1992.<sup>13</sup>

Our second set of hypotheses about behavior in response to career concerns derive from our results on discretion in Section 4. There, we found that a manager is more likely to be fired if his monthly return pattern departs significantly from other funds in the fund's objective group or if the beta or unsystematic risk level of his portfolio departs from the mean beta or unsystematic risk level of other funds in the fund's objective group in the year in question. This effect was significantly more pronounced for younger managers. As a result, we might expect that young managers will be less likely to take such "bold" positions, or, to use language which has become popular in the literature, younger managers may be more likely to "herd" with the other managers in their objective category.

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<sup>13</sup>The last result could be attributable to a number of factors: funds may have been least diversified or held smaller cash positions, realized monthly returns on individual stocks may have been more volatile, the sectors favored by growth and growth and income funds may have been particularly volatile, etc.

To examine this hypothesis, we regressed the each of our measures of the boldness of a manager's action in a given year on the manager's age and several control variables, estimating

$$\begin{aligned} \text{BetaDeviation}_{it} = & \gamma_0 + \gamma_1 \text{ManagerAge}_{it} + \gamma_2 \log(\text{Assets}_{it}) + \gamma_3 \text{GrowIncDummy}_{it} \\ & + \gamma_4 \text{Year92}_t + \gamma_5 \text{Year93}_t + \gamma_6 \text{Year94}_t + \epsilon_{it} \end{aligned}$$

$$\begin{aligned} \text{UnsysDeviation}_{it} = & \gamma_0 + \gamma_1 \text{ManagerAge}_{it} + \gamma_2 \log(\text{Assets}_{it}) + \gamma_3 \text{GrowIncDummy}_{it} \\ & + \gamma_4 \text{Year92}_t + \gamma_5 \text{Year93}_t + \gamma_6 \text{Year94}_t + \epsilon_{it} \end{aligned}$$

$$\begin{aligned} \text{ResidStdDev}_{it} = & \gamma_0 + \gamma_1 \text{ManagerAge}_{it} + \gamma_2 \log(\text{Assets}_{it}) + \gamma_3 \text{GrowIncDummy}_{it} \\ & + \gamma_4 \text{Year92}_t + \gamma_5 \text{Year93}_t + \gamma_6 \text{Year94}_t + \epsilon_{it}. \end{aligned}$$

Recall that the first two measures of boldness are a fund's a fund's deviations from the mean standard beta and standard deviation of the funds in a fund's objective class in that year, and the third, *ResidStdDev*, the sum of the squared differences between a fund's monthly returns in given year and the mean monthly returns for all funds in the fund's objective category in that year.

Coefficient estimates and standard errors from these regressions are reported in the second through fourth columns of Table 6. In each case we find that, as predicted, the portfolios of younger managers are closer to those of the typical fund with their objective. In the regression examining deviations in betas, the age coefficient is significant at the 1% level with the estimate being that a manager who is ten years younger than the mean will be 11% closer to the mean beta than the average fund. In the regression examining deviations in unsystematic risk, the age coefficient is significant at the 5% level with the estimate being that a manager who is ten years younger than the mean will be 12% closer to the mean riskiness than the average fund. In the regression examining the standard deviation of a manager's departures from the mean return for his objective group, the age coefficient is statistically significant at the 1% level, with the coefficient estimate indicating that a manager who is 10 years younger than the mean manager will have a residual standard deviation approximately 9% smaller than the mean manager in the dataset.

The other coefficient estimates from these regressions indicate that large funds tend to

stick closer to the mean characteristics of funds in their objective, and that growth and income funds are a more homogeneous class than are growth funds.

At the broadest level, the results could be characterized as supporting the predictions of the theoretical models of Scharfstein and Stein (1990) and Zwiebel (1995). Both of these models predict that, in particular environments, managers' career concerns may lead them to herd on a common action. Our finding is that younger managers are more likely to be punished for deviating from the herd and are less likely to deviate from the herd than their older counterparts. Our findings appear less consistent with Prendergast and Stole (1996), who argue that younger managers may have an incentive to undertake bold actions.<sup>14</sup> Furthermore, our results resemble the empirical results of Lamont (1995). Lamont examines a sample of macroeconomic forecasters over the 1971 - 1989 period and shows that, as a forecaster ages, he tends to produce forecasts which deviate more significantly from the consensus forecast.

## 7 Market reactions to managerial turnover

In this section we investigate the reaction of investors to managerial turnover. We have two motivations for this exercise.

First, understanding market reactions to managerial turnover may provide a more complete understanding of why firing patterns are what they are. We noted earlier that the one aspect of the separation-performance relationship which stood out as inconsistent with the simplest learning model was the apparent short-term bias in performance evaluation. An additional potential explanation we could imagine is a "market incentives" story where firings are influenced by a desire to do whatever will attract new investors (and keep old ones). Because it is more difficult for individual investors to keep track of managerial histories, it seems plausible that consumers might react most strongly to a manager's short-term performance, and hence firms may have an incentive to use such a criterion in firing deci-

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<sup>14</sup>The difference between our findings and the predictions of Prendergast and Stole are not entirely surprising. There is a model in which younger managers undertake bold actions in order to convince their evaluators that they are confident that they have received precise information. If young managers do not in fact know their own type but learn it along with their evaluators, as we think plausible for this industry, then our empirical setting does not closely resemble the theoretical framework envisioned in their model.

sions.

Second, the literature on the performance of mutual funds finds little evidence that fund performance is persistent through time. This evidence has been interpreted as implying that stock-picking ability does not exist in this industry.<sup>15</sup> This view of the industry is somewhat at odds with evidence that fund companies sort managers as if they are trying to learn about the inherent “ability” of portfolio managers. Given this contrast, it seems valuable to investigate further whether the market seems to believe that ability exists and whether firing decisions might be explained other than by a learning model.

It is a well-established fact in the mutual fund literature that investment flows react strongly to past performance.<sup>16</sup> One could in principal assess both the nature of market incentives and consumers’ views on ability by extending previous studies on investment flows to discuss how consumers react to managerial turnover in a variety of circumstances. Unfortunately, there is a lot of noise in data on investment flows, and hence the short time span and limited number of managerial separations in our data preclude our doing this. Instead, we will be satisfied here just to explore the most basic market incentives question: do mutual fund investors react to managerial turnover?

To examine this question we look at how managerial turnover affects the net flow of investment into a mutual fund using a specification based on a simplified parametric version of the specification in Chevalier and Ellison (1997a):

$$\begin{aligned}
 Flow_{it+1} = & (1 + \kappa_0 MChange_{it}) \left( \sum_k \gamma_k FundAge_{k_{it}} Alpha_{it} + \beta_1 Alpha_{it-1} + \beta_2 Alpha_{it-2} \right) \\
 & + \sum_k \delta_k FundAge_{k_{it}} + \alpha_0 + \alpha_1 \log(Assets_{it}) + \alpha_2 Alpha_{it+1} \\
 & + \alpha_3 IndustryGrowth_{t+1} + \epsilon_{it+1}.
 \end{aligned}$$

The dependent variable,  $Flow_{it+1}$ , is the proportional growth in total assets under management for the fund between the start and end of year  $t + 1$ , net of internal growth (assuming

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<sup>15</sup>See, for example, Grinblatt and Titman (1992), Hendricks, Patel and Zeckhauser (1993), Goetzmann and Ibbotson (1994), Malkiel (1995) and Carhart (1997). For a somewhat different perspective on this question, see Chevalier and Ellison (1997b).

<sup>16</sup>See Ippolito (1992), Sirri and Tufano (1993), and Chevalier and Ellison (1997a).

reinvestment of dividends and distributions), i.e.

$$Flow_{it+1} = (Assets_{it+1} - Assets_{it}) / Assets_{it} - r_{it+1}.$$

Excess returns in year  $t$  are the most important determinant of investment flows in year  $t + 1$ , so in recognition of the fact that consumers, updating their beliefs about the quality of a mutual fund from noisy observations, may treat young and old funds quite differently, we allow the relationship between flows and excess returns to vary with the age category,  $FundAge_k$ , to which the fund belongs. We allow also for separate intercepts for each fund age category, and include the excess return of the fund in years  $t - 1$ ,  $t - 2$ , and  $t + 1$ , the growth in total assets under management by the equity mutual fund industry and the natural logarithm of assets under management at the fund in question at the end of year  $t$  as control variables.<sup>17</sup>

In a world where consumers were trying to assess the abilities of managers as well as the qualities of funds, the primary effect we would imagine managerial turnover to have would be to make the investment flow into a fund less sensitive to past performance. We have thus specified the flow relationship so that the terms involving past performance are interacted with the term  $(1 + \kappa_0 MChange_{it})$ , where  $MChange_{it}$  is again an indicator for whether the manager in charge of the fund on January first of year  $t$  is still managing the fund at the beginning of year  $t + 1$ . At one extreme, a value of -1 for  $\kappa_0$  would indicate that consumers completely disregard the past performance of a fund which has just changed managers, and a value of 0 would indicate that investment flows are unaffected by managerial turnover.

The data available to us for this test include all growth and growth and income funds in Morningstar from the 1992-1995 period, including funds which are “born” or “die” during that time period. We treat this panel as a cross-section with one observation for each fund’s growth during each of the three years: 1992-1993, 1993-1994, and 1994-1995. Complete data are available for 1072 fund-years.

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<sup>17</sup>The age categories used are 0-1, 2-3, 4-6, 7-9, and more than nine years old. The lagged returns are set to zero for very young funds. Total assets under management by the industry is obtained from the Investment Company Institute. As in our previous paper, we drop mutual funds from the sample with less than \$10 million in assets, because very small funds may be “incubator” funds which are not being marketed to the public.

Nonlinear least squares estimates of the coefficients in the flow equation are presented in column 1 of Table 7. The results are in most ways similar to those in the previous literature. Flow reacts quite strongly to past performance and the relationship is strongest for young funds. Flows react more strongly to performance in the previous year than to performance in past years. The point estimate on the effect of manager change is -0.25 which would indicate that flow is approximately 25% less sensitive to past performance when the manager has just been changed, but the estimate is not statistically significant at standard levels.

Because a firm can choose to heavily advertise the fact that it has replaced the manager of a fund with a poor track record, and can avoid drawing attention to the fact that an outstanding manager has left, one might imagine that managerial turnover would have a much larger effect on flows into funds which have performed poorly. To investigate this, we estimated also a model of flow nearly identical to that above, but with separate coefficients on  $MChange_{it}$  for funds with positive and negative excess returns in year  $t$ . The results of this estimation are presented in the second column of Table 7. The coefficient on the interaction between  $MChange_{it}$  and a dummy for  $Alpha_{it}$  being negative is now -0.46 and is significant at the 5% level, indicating that firing a manager who has performed badly may reduce the resulting outflow of funds by about one-half. Such a market reaction would clearly provide a significant motivation for replacing poorly performing managers. The estimate on the interaction between  $MChange_{it}$  and a dummy for  $Alpha_{it}$  nonnegative is positive but not statistically significant (as is not surprising given that we have fewer observations of replacements following good performance).

One potential problem with these regressions is that managerial change may be endogenous: firms may be more likely to replace a manager when he/she has received unfavorable publicity or is otherwise likely to be regarded as unattractive by potential investors. What effect this might have on the estimated response to managerial change in our first regression is not clear. Presumably, managerial change would be associated with lower net flow, but there is no a priori reason to expect that this effect would be greater when past performance is good or bad. In the second specification, we can make somewhat better guesses about the

bias. If managerial change is associated with lower expected flow, the bias might be toward finding a positive coefficient on  $MChange_{it} \times (Alpha_{it} < 0)$  and a negative coefficient on  $MChange_{it} \times (Alpha_{it} \geq 0)$ . In each case this is the opposite of what we find, so we do not think that there is great cause to worry that our results are driven by the endogeneity problem.

One way in which one might be able to correct for the potential endogeneity problem is to assume that the manager age-return interactions which are so important in predicting firings do not affect investment flows. The assumption is somewhat plausible because consumers are surely less informed about a manager's age/experience than are fund companies (although in the extreme, this assumption is at odds with consumers being concerned with managers' abilities.) The third and fourth columns of Table 7 report nonlinear two stage least squares estimates using as instruments interactions between  $Alpha_{it}$  and the manager's age and a dummy for the manager being at least sixty years old. The estimates are fairly similar to those in the first two columns, although the result that suggests that flows are less sensitive to past performance when the manager changes and  $Alpha_{it} < 0$  is now statistically significant only at the 10% level.

## 8 Conclusion

We view our paper as a first attempt to exploit the opportunity which the mutual fund industry provides to examine career concerns in an environment in which both managerial performance and specific aspects of managerial behavior are observable.

The first goal in our paper is to obtain information about the implicit incentives generated by the fund managers' career concerns. In general, our results seem consistent with firing being the result of fund companies updating their beliefs about managers' abilities over time, although we find some evidence that evaluation may have a short-term bias. Furthermore, we find that, after controlling for a manager's performance, the manager's portfolio choices can be a predictor of whether the manager loses a position. In particular, we find that, even controlling for fund performance, younger managers are punished for deviating widely from the average monthly return pattern in their objective group, or from the

consensus beta, unsystematic risk level, and return pattern of their fund objective. These results are consistent with the idea in Scharfstein and Stein (1990) that managers who undertake the same action as other managers are perceived to be of higher ability. Finally, we find that the probability of maintaining one's position may be concave in performance for younger fund managers.

The second goal of our paper is to examine whether fund managers appear to respond to their incentive to avoid separation. We first consider the incentive implications of our finding that younger managers are more likely to separate from their positions when they deviate widely from the mean monthly return patterns of their objective group or from the mean beta or unsystematic risk level of their fund objective. Consistent with the view that career concerns do provide incentives, we show that younger managers are less likely to deviate from the herd than older managers. Second, we consider the incentive implications of our finding that the probability of maintaining one's position may be concave in performance for younger (but not older) managers. Consistent with the hypothesis that younger managers respond to these implicit career incentives, we find that younger managers take on less unsystematic risk than older managers.

These results have implications not only for the career concerns literature, but also for the literature on delegated portfolio management. The results of this paper suggest that a complete discussion of the incentives facing mutual funds must consider both the agency relationship between the fund company and fund investors *and* the agency relationship between the fund company and fund management. Analysis of the explicit incentive effects of the fund's compensation or the manager's compensation would ideally be paired with analysis of the implicit incentive schemes facing those agents.

One important area for future research is the consideration of fund managers at lower positions in the organization. Mutual fund managers often start out managing smaller sector funds, and then are promoted to managing a growth or growth and income fund such as one of the funds in our sample. In our paper, the risk incentives may stem in part from the fact that the managers have reached a relatively high position in the industry, and are motivated by their desire to maintain that position. For managers at lower positions



in the industry, the incentive to move up to a higher position may create very different incentives than those that we have analyzed here.

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Table 1: Summary statistics.

Variable	Mean	St. Dev.
<i>MStay</i>	0.814	0.390
<i>Alpha</i>	-0.0062	0.070
<i>UnsysRisk</i>	4.743	2.777
<i>Beta</i>	0.992	0.261
<i>ManagerAge</i>	44.220	9.78
<i>ExpenseRatio</i>	0.013	0.0093
<i>GrowIncDummy</i>	0.361	0.480
$\log(\text{Assets})$	4.47	1.94
$\log(\text{FamilySize})$	7.06	2.51
<i>Age60+</i>	0.067	0.250
<i>ResidStdDev</i>	4.72	2.48
<i>UnsysDeviation</i>	1.817	1.816
<i>BetaDeviation</i>	0.182	0.170

Table 2: The post-separation careers of mutual fund managers. Summary statistics.

Category	Number	Mean Adj. Alpha
Managers of growth and growth and income funds in 9304	348	
Total separations	158	
Instances in which fund disappeared	47	-1.28
Instances in which fund survived but manager did not remain with fund	111	-2.25
Separations in which manager disappears from data	60	-3.05
Separations in which manager reappears in data, managing fewer total assets	81	-1.56
Separations in which manager reappears in data, managing greater total assets	17	-0.01
Separations in which manager disappears from data and manager is >60 years old	2	-9.75
Fraction of total separations of managers $\geq 45$ in which manager disappears.	0.38	-3.03
Fraction of total separations of managers $\geq 45$ in which manager reappears managing fewer total assets	0.55	-1.05
Fraction of total separations of managers $\geq 45$ in which manager reappears managing greater total assets	0.07	-1.56
Fraction of total separations of managers <45 in which manager disappears.	0.38	-3.08
Fraction of total separations of managers <45 in which manager reappears managing fewer total assets	0.47	-2.23
Fraction of total separations of managers <45 in which manager reappears managing greater total assets	0.15	0.83

Asset values across time are adjusted to correct for overall growth in fund industry assets. Mean adjusted alpha is the mean of the difference between each fund's alpha in year  $t$  and the mean alpha of the funds' objective category in year  $t$ .

Table 3: Basic separation-Performance Relationship. Dependent variable for Probit is 1 if manager retains his position, 0 otherwise.

Variable	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient
$\text{Alpha}_t$	2.41 (0.692)	2.78 (0.746)	2.95 (0.737)	2.44 (0.723)	2.38 (0.706)
$\text{Alpha}_t \times (\text{Mgr Age} - \overline{\text{Age}})$	-0.214 (0.060)	-0.215 (0.069)	-0.174 (0.064)	-0.202 (0.064)	-0.218 (0.075)
$\text{Alpha}_{t-1}$	0.684 (0.612)	0.559 (0.620)	0.673 (0.624)	1.047 (0.645)	0.614 (0.622)
$\text{Alpha}_{t-2}$	0.749 (0.723)	1.082 (0.789)	1.010 (0.760)	0.968 (0.729)	0.783 (0.736)
<i>Manager Age</i>	0.008 (0.005)	0.006 (0.005)	0.007 (0.005)	0.010 (0.005)	0.006 (0.005)
<i>Age60+</i>	-0.354 (0.185)	-0.297 (0.191)	-0.286 (0.192)	-0.419 (0.184)	-0.406 (0.184)
<i>GrowIncDummy</i>	-0.178 (0.084)	-0.205 (0.086)	-0.204 (0.087)	-0.159 (0.086)	-0.183 (0.084)
<i>ExpenseRatio</i>		3.131 (4.728)			
$\log(\text{Assets})$			-0.039 (0.022)		
$\log(\text{Assets}) \times \text{Alpha}_t$			-0.174 (0.339)		
$\log(\text{FamilySize})$				-0.027 (0.172)	
$\log(\text{FamilySize}) \times \text{Alpha}_t$				0.725 (0.281)	
<i>ManagerTenure</i>					0.014 (0.009)
$\text{Alpha}_t \times (\text{MgrTen} - \overline{\text{Ten}})$					-0.015 (0.12)
<i>Year92</i>	0.180 (0.100)	0.167 (0.101)	0.143 (0.103)	0.351 (0.106)	0.173 (0.101)
<i>Year93</i>	0.302 (0.102)	0.431 (0.108)	0.440 (0.108)	0.294 (0.102)	0.310 (0.103)
Constant	0.519 (0.236)	0.564 (0.248)	0.778 (0.262)	0.632 (0.285)	0.559 (0.241)

Table 4: Deviations from behavioral norms. Dependent variable for Probit is 1 if the manager retains his position, and is 0 otherwise.

Variable	Coefficient	Coefficient	Coefficient	Coefficient
$Alpha_t$	2.42 (0.694)	2.39 (0.675)	2.38 (0.681)	3.00 (1.086)
$Alpha_t \times (MgrAge - \overline{Age})$	-0.210 (0.066)	-0.205 (0.063)	-0.203 (0.066)	-0.199 (0.110)
$Alpha_{t-1}$	0.699 (0.616)	0.673 (0.613)	0.722 (0.614)	0.719 (0.616)
$Alpha_{t-2}$	0.767 (0.726)	0.778 (0.725)	0.821 (0.729)	0.814 (0.731)
<i>Manager Age</i>	-0.001 (0.007)	0.002 (0.006)	-0.002 (0.008)	-0.003 (0.009)
<i>Age60+</i>	-0.384 (0.188)	-0.368 (0.184)	-0.393 (0.186)	-0.392 (0.186)
<i>GrowIncDummy</i>	-0.190 (0.086)	-0.215 (0.088)	-0.202 (0.093)	-0.203 (0.093)
<i>BetaDeviation</i>	-0.101 (0.269)			
$BetaDeviation \times (MgrAge - \overline{Age})$	0.051 (0.027)			
<i>UnsysDeviation</i>		-0.035 (0.024)		
$UnsysDeviation \times (MgrAge - \overline{Age})$		0.0032 (0.0018)		
<i>ResidStdDev</i>			-0.0084 (0.020)	
$ResidStdDev \times (MgrAge - \overline{Age})$			0.0024 (0.0015)	
$ResidStdDev(Alpha > 0)$				-0.018 (0.024)
$ResidStdDev(Alpha < 0)$				0.0005 (0.025)
$ResidStdDev \times (MgrAge - \overline{Age})(Alpha > 0)$				0.0025 (0.0021)
$ResidStdDev \times (MgrAge - \overline{Age})(Alpha < 0)$				0.0025 (0.0019)
<i>Year92</i>	0.186 (0.100)	0.211 (0.103)	0.191 (0.103)	0.191 (0.103)
<i>Year93</i>	0.306 (0.104)	0.314 (0.102)	0.303 (0.103)	0.298 (0.102)
Constant	0.926 (0.318)	0.837 (0.297)	1.030 (0.415)	1.040 (0.415)



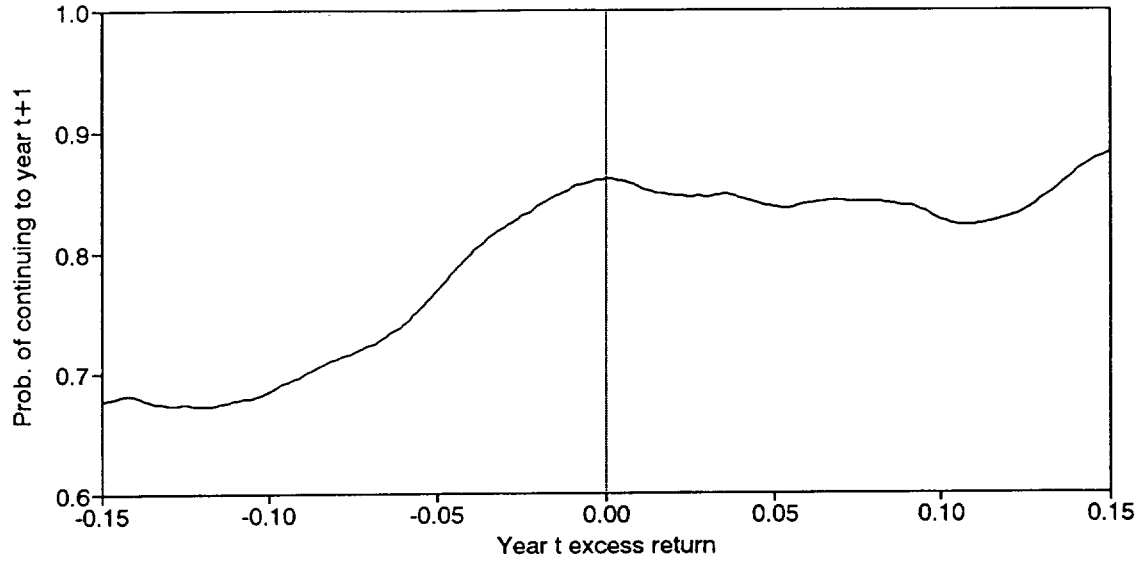
Table 5: Probability of retaining position for younger and older managers. Linear regression with dependent variable equal to 1 if manager retains his position, zero otherwise.

Variable	Manager Age group	
	Age < 45	Age ≥ 45
$\alpha_t(\alpha_t < 0)$	1.74 (0.51)	0.15 (0.38)
$\alpha_t(\alpha_t > 0)$	0.29 (0.32)	0.32 (0.29)
$\alpha_{t-1}$	-0.23 (0.27)	0.54 (0.18)
$\alpha_{t-2}$	0.26 (0.27)	0.16 (0.21)
<i>Manager Age</i>	0.013 (0.003)	0.006 (0.004)
<i>Age60+</i>		-0.10 (0.07)
<i>GrowIncDummy</i>	-0.05 (0.03)	-0.07 (0.03)
<i>Year92</i>	-0.0025 (0.039)	0.116 (0.033)
<i>Year93</i>	0.046 (0.036)	0.122 (0.038)
Constant	0.37 (0.13)	0.46 (0.19)
NOBS	651	669
$R^2$	0.06	0.05

Standard errors in parentheses adjust for within-fund error correlation.

## Effect of return on survival

Year t return -- Manager's age < 45



## Effect of return on survival

Year t return -- Manager's age  $\geq 45$

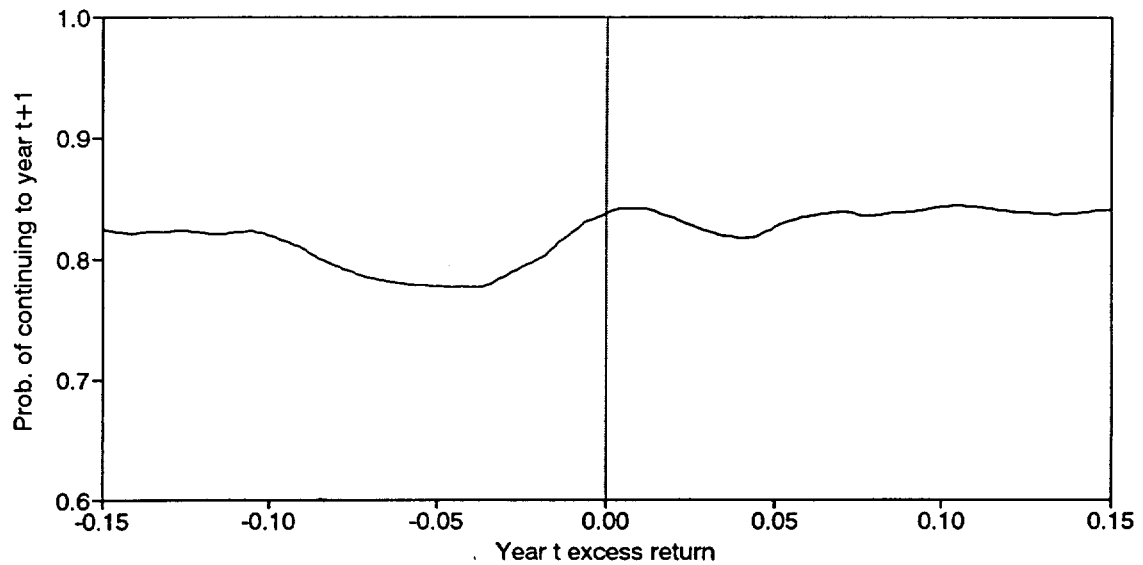


Figure 1: Shape of Separation-Performance Relationship. Kernel regressions have nonseparation dummy as the dependent variable.

Table 6: Patterns in Managerial Behavior. Linear regressions with various dependent variables.

Independent Variables	Dependent Variable			
	<i>UnsysRisk</i>	<i>BetaDeviation</i>	<i>UnsysDeviation</i>	<i>ResidStdDev</i>
Constant	4.78 (0.54)	0.178 (0.027)	1.65 (0.39)	4.14 (0.53)
<i>ManagerAge</i>	0.035 (0.012)	0.002 (0.0006)	0.022 (0.010)	0.043 (0.013)
$\log(\text{Assets})$	-0.21 (0.04)	-0.008 (0.002)	-0.10 (0.03)	-0.22 (0.04)
<i>GrowIncDummy</i>	-1.81 (0.17)	-0.053 (0.010)	-0.71 (0.12)	-1.55 (0.17)
<i>Year92</i>	0.76 (0.18)	-0.024 (0.011)	0.34 (0.13)	0.75 (0.15)
<i>Year93</i>	0.28 (0.12)	0.014 (0.012)	-0.14 (0.09)	0.46 (0.11)
<i>Year94</i>	-0.78 (0.10)	-0.074 (0.09)	-0.46 (0.07)	-0.37 (0.08)
NOBS	1835	1835	1835	1835
R-squared	0.18	0.08	0.10	0.19

Standard errors adjusting for within-fund error correlation in parentheses

Table 7: Determinants of Mutual Fund asset flows. Dependent variable is net inflow into the fund.

Parameter	Independent Variables	Estimation			
		NLS	NLS	NL2SLS	NL2SLS
$\kappa_0$	$MChange_t$	-0.247 (0.185)		-0.247 (0.192)	
$\kappa_1$	$MChange_t \times (Alpha_t < 0)$		-0.456 (0.209)		-0.403 (0.246)
$\kappa_2$	$MChange_t \times (Alpha_t > 0)$		0.414 (0.382)		0.410 (0.405)
$\gamma_{01}$	$FundAge01 \times Alpha_t$	7.133 (0.811)	6.868 (0.801)	7.135 (0.806)	7.342 (0.802)
$\gamma_{23}$	$FundAge23 \times Alpha_t$	3.278 (0.809)	3.358 (0.815)	3.286 (0.804)	4.021 (0.816)
$\gamma_{46}$	$FundAge46 \times Alpha_t$	6.135 (0.742)	6.155 (0.744)	6.141 (0.737)	6.682 (0.746)
$\gamma_{79}$	$FundAge79 \times Alpha_t$	3.303 (0.782)	3.362 (0.778)	3.307 (0.776)	3.947 (0.778)
$\gamma_{10+}$	$FundAge10+ \times Alpha_t$	2.048 (0.490)	2.097 (0.475)	2.052 (0.486)	2.811 (0.478)
$\beta_1$	$Alpha_{t-1}$	1.125 (0.265)	1.190 (0.259)	1.127 (0.264)	1.267 (0.259)
$\beta_2$	$Alpha_{t-2}$	1.650 (0.303)	1.627 (0.299)	1.653 (0.301)	1.717 (0.298)
$\delta_{01}$	$FundAge01$	0.506 (0.059)	0.494 (0.059)	0.506 (0.059)	0.502 (0.059)
$\delta_{23}$	$FundAge23$	0.168 (0.054)	0.166 (0.054)	0.168 (0.053)	0.169 (0.054)
$\delta_{46}$	$FundAge46$	0.220 (0.054)	0.214 (0.054)	0.221 (0.054)	0.227 (0.054)
$\delta_{79}$	$FundAge79$	0.053 (0.057)	0.046 (0.057)	0.053 (0.056)	0.046 (0.057)
$\alpha_0$	<i>Constant</i>	0.000 (0.090)	0.005 (0.090)	-0.001 (0.090)	0.005 (0.090)
$\alpha_1$	$\log(Assets_t)$	-0.030 (0.013)	-0.031 (0.013)	-0.030 (0.013)	-0.034 (0.013)
$\alpha_2$	$Alpha_{t+1}$	0.843 (0.215)	0.834 (0.215)	0.845 (0.213)	0.895 (0.214)
$\alpha_3$	$IndustryGrowth_{t+1}$	0.499 (0.107)	0.489 (0.107)	0.498 (0.106)	0.432 (0.106)

Standard errors in parentheses