# Unsuccessful Teams

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**Abstract**

The consequences of failed teamwork may not be shared equally if more blame is allocated to team members for whom performance expectations are ex ante low—a phenomenon called attributional rationalization. Using the mutual fund industry as our laboratory, we provide evidence that attributional rationalization has important labor market consequences. Following fund closures, female team managers are more likely to exit the fund family and the industry than male team managers. This result is not driven by a gender gap in skill. Attributional rationalization helps explain why the fraction of female fund managers declined by 3.8% between 1999 and 2015.

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# 1. Introduction

A notorious problem with teamwork is that it is difficult to infer individual inputs from group outputs. This can lead to inefficient labor market outcomes in settings in which teamwork is ubiquitous and it is common for individuals to be members of different groups. Academic research is one obvious example of such a setting. But, there are many others, e.g. corporate R&D, corporate boards and management consulting. When making individual hiring, pay, promotion, and firing decisions in these settings, an important question is how much weight to put on the group outcome. Research in psychology suggests that credit or blame for team outcomes may be over- or under-attributed to some team members based on prior performance expectations, a phenomenon Heilman and Haynes (2005) call attributional rationalization. Using the U.S. mutual fund industry as our laboratory, we provide the first field evidence that attributional rationalization in the context of failed groupwork can have important labor market consequences.

The mutual fund industry is an ideal setting in which to test the importance of attributional rationalization for several reasons. First, unlike other settings, e.g. corporate boards, team-managed funds coexist with sole managed funds. This allows us to contrast labor market outcomes for team members with those of individuals. Second, while opinions on the characterization of a successful mutual fund team may vary, we can identify an observable and intuitive proxy for fund failure: the closure of a fund. This contrasts with other settings in which unsuccessful tasks are not publicly-observed. For example, unsuccessful academic projects are not published, unsuccessful pharmaceutical research does not result in the production of a drug, etc. Third, fund managers' names and management periods for each fund are public information, which allows us to construct measures of labor market outcomes. Fourth, fund management is a relatively homogenous task with easy to measure outcomes. The mutual fund industry also has other features that we can exploit to help rule out competing explanations, such as variation in the types of funds.

Attributional rationalization attributes more of a team's success and failure to a team member for whom success and failure is ex ante expected. In our setting, it is natural to consider the mutual fund manager's gender to be an important determinant of attributional rationalization. Since there are relatively fewer women than men in the finance industry (Lutton and Davis, 2015; Adams, Barber, and Odean, 2016; Dunleavey, 2017; Lerner et al., 2017), employers might consider finance to be more of a male domain. According to Heilman and Haynes (2005), if a task is considered male sex-typed, males are expected to succeed while females are expected to fail. This suggests that following an unsuccessful outcome in the finance industry, evaluations of women's performance in mixed gender teams will be more negative than those of men.

We test for the presence of attributional rationalization using Morningstar data from 1990-2015. We first document a striking negative correlation between the number of fund closures and gender diversity in the industry. We then regress measures of a manager's exit from the fund family and industry on the manager's gender interacted with fund closures. Our main identification strategy comes from contrasting team with sole managed funds. While one may argue that there are general reasons why women might have different exit behavior than men (family considerations, preferences, networking ability, etc.), these reasons are unlikely to vary across management structure (solo vs. team). Thus, any gender differences we observe in exit outcomes across fund structures should be due to the nature of the structure, not the managers' gender per se.

We find that female managers working in teams are more likely to leave the fund family and the industry following fund closures than their male counterparts. But, there is no gender gap in exit for managers who manage at least one fund alone, whether they are new or existing employees. These contrasting results suggest that employers allocate more blame for unsuccessful teamwork to female managers when individual-level assessments are unavailable.[1]

Our results do not seem to be driven by a "Glass Cliff" phenomenon (Ryan and Haslam, 2005), in which female managers are more likely to end up in funds that fail. Our results also do not seem to be driven by a "Last In, First Out" rule. New male employees are generally less likely to leave the fund family than their existing counterparts, but there is a significant gender gap in exit for new hires following fund closures. Thus, attributional rationalization in the mutual fund industry appears to be a form of statistical discrimination. Employers may not consciously discriminate against women, but in the absence of signals of individual performance, they use group identity to infer skill. Although we show that on average women do not underperform men in our data, the absence of independent signals on team managers and the decline in women's representation in the mutual fund industry may allow inaccurate priors to persist (see e.g. Arrow, 1998, and Altonji and Pierret, 2001).

To identify the importance of individual performance signals, we contrast labor market outcomes for sole-managers and team managers. Using risk-adjusted returns of funds of each manager as proxies for skill, we find that the distribution of the alphas of solo managers who

[1] Egan, Matvos, and Seru (2017) also provide evidence consistent with differential punishment for women in the context of financial advisor misconduct. Their setting is different from ours since individual-level assessments are observable in their setting.

remain in the industry dominate those of solo managers who exit the industry, regardless of gender. For solo managers, skill is correlated with labor market outcomes as in, for example, Chevalier and Ellison (1999). But, the distribution of alphas of team managers who remain in the industry and team managers who exit the industry are similar, regardless of gender. Basically, the skills of individual team managers are indistinguishable from the skills of the teams they are members of. In the absence of a signal of individual skill, such as sole-managed fund performance, skill differences are an unlikely explanation for the higher exit rates of female managers of team managed funds.

While it is notoriously difficult to distinguish between quits and fires, our evidence suggests that the gender gap in exit following the closure of a team fund is more likely to be due to dismissal rather than resignation. For example, there is no gender gap in exit following the closure of sub-advised funds, for which the fund family has no staffing authority. This is consistent with Kostovesky and Werner (2015) who suggest that factors other than performance play a more important role in explaining own managers' exit than sub managers' exit from the fund family. There is also no gender gap in exit when the decision to exit is more likely to be voluntary, which we argue was the case during the 2003 mutual fund scandal. Following the 2003 scandal, tainted fund families experienced large outflows of investors' money from their funds. Since managers' pay depends on assets under management, we hypothesize that managers employed by the tainted fund families would try to move to other fund families. Such a move is unlikely to be initiated by the tainted fund family; it should be voluntary. Our results show that the probability of exit of managers from the tainted fund families increased significantly following the scandal. But, the increased probability of exit was the same for male and female managers.[2]

To our knowledge, the literature on attributional rationalization is relatively small, presumably because it is difficult to find good settings in which to test its presence. Heilman and Haynes (2005) introduced the theory and terminology of attributional rationalization and provided evidence of its existence in a laboratory setting. In their experiments, participants allocate less credit for successful group outcomes to female team members than their male counterparts unless individual-level assessments are available. Heilman and Haynes argue that source ambiguity results in attributional rationalization in the context of successful group outcomes. Haynes and Lawrence (2012) extend the idea to unsuccessful group outcomes. They document that participants in experiments allocate more blame to female team members than to male team members in the absence of individual-level assessments. More recently, Sarsons (2017) shows that women and men have different labor market outcomes following successful group work. She finds that gender plays a role in tenure decisions of economists who work in teams. Unlike male economists, female economists are less likely to be tenured when they publish papers with male coauthors than when they solo author.

Our paper contributes to the literature on attributional rationalization by showing that it can have important labor market consequences. Gender diversity in the mutual fund industry is low (Sargis and Lutton, 2016; Barber, Scherbina, and Schlusche, 2017; Dunleavey, 2017; Lerner et al., 2017). In the second quarter of 2015, the fraction of female fund managers was only 9%, decreasing from its peak level of 13% in the third quarter of 1999. In the 1990s, gender diversity increased because more female managers were hired than male managers.

[2] Mutual fund managers might also exit the industry for better jobs. However, in the sample of mutual fund managers who left for hedge funds between 1993 and 2006, only about 7% were women (see Kostovetsky, 2017).

While the hiring rates of male and female managers eventually equalized, female managers started exiting the industry at a higher rate. It is noticeable that this happened precisely when funds started experiencing a higher rate of closure. Even more noticeable is the higher exit rate of female fund managers following fund closure. Female managers are about 30% more likely to leave the industry than male managers following team fund closures. If the gender gap in exit continues and a quarter of managers experience fund closures every year, we estimate gender diversity will decrease from 9% to less than 7% in 15 years.

To our knowledge we are among the first to examine the implications of fund closures and the ensuing reallocation of managers for the fund management industry. Berk, van Binsbergen, and Liu (2017) highlight the importance of skill by showing that fund families add value by promoting and demoting fund managers according to their assessment of managers' skills and ability. Because they focus on the internal allocation of managers, they do not examine exit from the fund family. Niessen-Ruenzi and Ruenzi (2017) provide evidence that female sole-managed funds have lower inflows and argue this is due to taste-based discrimination by investors. Barber, Scherbina, and Schlusche (2017) find that skill alone does not seem to explain managers' career paths. Instead, manager characteristics, such as gender and education, play a role. Our paper complements these papers by highlighting the different effects of unsuccessful group outcomes on fund managers' careers by gender.

Teams are becoming increasingly important in organizing work. In its 2016 report on human capital trends, Deloitte (2016) argues that the digital economy has shifted organizational structure from a traditional functional hierarchy to a "network of teams." With its preponderance of fund families and team managed funds, the mutual fund industry may be a prime example of an industry characterized by "network of teams." While it is well-known that work done by individuals may be prone to statistical discrimination or miscalibrated beliefs—see e.g. the surveys by Blau and Kahn (2017) and Neumark (2018) and recent evidence for the finance industry by Egan, Matvos, and Seru (2017)—our evidence highlights that work done in teams may be particularly susceptible to discrimination due to the absence of individual performance signals. In our setting, it was natural to examine gender, but such discrimination could occur along other dimensions, such as race, ethnic background, and age, as well.[3]

## 2. Data and variable description

Our sample consists of Morningstar Direct's survivorship-bias-free data on managers and fund families of U.S. open-end equity mutual funds from the first quarter of 1990 to the third quarter of 2015. The database provides names of managers and the first and the last date of management of each fund manager for a given fund. We create a panel data set of observations on mutual fund managers at the end of each quarter. We exclude 1) self-employed fund managers, who manage fund families by themselves, "one managers," from our analysis and 2) managers who used to be "one managers," as they are likely to be founders of fund families with different career concerns than other managers. The results are similar if we include them.

We use U.S. Census Bureau data to identify the gender of fund managers. We classify a fund manager as female if at least 90% of the population with the same first name is female.

[3] In our data, fund managers that are classified as non-white are too few (about 6%) to conduct meaningful tests on attributional rationalization for non-whites. Using data on the prevalence of last names by non-white racial and ethnic groups (at least 75% of the population with the same last name according to the 2010 U.S. Census), we classify managers' names as 4.8% Asian, 0.08% Black and 1.1% Hispanic. We were unable to classify 14% of managers as belonging to a specific racial/ethnic category.

Otherwise, we classify the manager as male. We search for the gender of names that do not appear in U.S. Census Bureau data in Facebook user data and baby name guessers. If we have no gender information, we set the gender of managers to missing. Overall, we classify the gender of about 97% of the mutual fund managers. Our sample contains 12,995 unique managers, of which 12.3% (1,603) are women.[4] We define diversity of a fund family as the ratio of the number of female managers to the total number of managers. When a fund family does not employ any female fund manager, i.e., diversity is zero, we call the fund family a "male-only" family.

–Insert Figure 1 about here–

Figure 1 (A) plots the number of male (solid line) and female managers (dashed line) over time. Figure 1 (B) shows the evolution of gender diversity. Gender diversity improved until the late 1990s and reached a peak level of about 13.2% in the third quarter of 1999. Starting from the fourth quarter of 1999, the fraction of female managers decreased to about 9.4% by the end of the third quarter of 2015, which is consistent with Morningstar (2015) and the patterns documented in Barber, Scherbina and Schlusche (2017). The figure also shows that in 2015 over 60% of fund families employ no female fund managers. These trends are in stark contrast to trends in diversity in the workforce more generally (e.g. Goldin, 2014) and other positions in finance, e.g. director positions (Adams and Kirchmaier, 2016).

Figure 2 illustrates the structure of fund families, fund managers, and sub advisors. We

[4] We also obtained a separate data set from Morningstar containing some gender information. Gender diversity is lower in this data set than in our data: about 10.7%. The reason is that gender information is missing for about 12.7% of the managers (1,652 out of 12,995 managers) and gender diversity among missing managers is higher, 14.6%, according to our classification. Our classification of gender is the same as Morningstar's classification 98.5% of the time when its gender information not missing. Not surprisingly, our results are qualitatively similar if we use the Morningstar gender classification although the sample size decreases due to the missing observations.

define a team-managed fund as a fund with at least two managers. A fund becomes team-managed when the number of managers is more than one. A mutual fund family often employs other advisor(s) for fund management. Morningstar Direct provides data about whether the fund is sub-advised or own-advised. We classify managers of own-advised funds as own managers and those of sub-advised funds as sub managers. Note that sub managers are employees of the fund's sub advisor, not of the advisor. Some fund managers manage own-managed funds for their own fund family and sub-advised funds for other fund families at the same time. In these instances, we classify them as own managers. In other words, sub managers are those who manage only sub-advised funds. We cannot identify the employers of sub managers because sub advisors' names are often missing. The database also does not provide enough data to map managers to different sub advisors when fund management is outsourced to multiple sub advisors.

A manager employed by the fund family can manage multiple funds solely or in teams. A sub manager can also manage funds for different fund families solely or in teams. We classify managers according to the management type and employment status: own team, own solo, sub team, and sub solo. Our main sample is own team managers. Most male managers are either solo (16%) or team (76%) managers. Only 8% of male managers are both solo and team managers. Women are slightly more likely to be in teams (78%), and less likely to be solo managers (15%) or both solo and team managers (7%).

–Insert Table 1 about here–

Table 1 (A) provides descriptive statistics for the mutual fund industry. We divide the sample period into the period before the third quarter of 1999, when diversity reached its peak, and the period after. Average gender diversity is around 11% in both periods. However, as Figure 1 (B) shows, diversity increased over time in the first period and then decreased in the latter period. Female managers joined fund families at a higher rate than male managers in the first period but exited fund families at a higher rate in the second period. Figure 3 (A) shows the time series of the difference of the new hire rate by gender and (B) shows the difference of the exit rate. Females have a higher hire rate prior to the third quarter of 1999 and a higher exit rate after that. The number of fund families, funds, and managers increases in the latter period. The fraction of own team-managed funds also rose from 64% to 82%. The majority of managers work for diverse fund families.

Table 1 (A) also provides descriptive statistics for fund closures and births in our sample. While more funds were newly offered than closed during both periods around the third quarter of 1999, many more funds were closed in the second period than in the first period. The Morningstar database provides "inception dates" and "obsolete dates" of fund share classes. We use "inception dates" to proxy for fund birth. We use "obsolete" dates associated with liquidations or mergers to proxy for fund closure. The liquidation date is the date on or after which the fund will distribute all its remaining assets pro rata to shareholders of record. The date serves as the record date for determining the shareholders who are entitled to receive the fund's liquidation proceeds. However, upon the approval of liquidation by the board of directors or trustees of the fund (and the shareholders of the fund in some cases), the fund effectively ceases its business as an investment company. At that time, mutual funds typically suspend the sale of fund shares and the fund managers begin the process of paying debt, setting aside reserves and converting its portfolio securities to cash and cash equivalents. In a case of a merger, the acquiring fund takes the assets and assumes the liabilities of the acquired fund in exchange for shares of the acquiring fund. The acquired fund then makes a liquidating distribution of acquiring fund shares to its shareholders and ceases to exist on the merger date.

## 2.1. Measuring an unsuccessful group outcome

We use the closure of a mutual fund through liquidation or merger to another fund as a proxy for an unsuccessful fund outcome. Mutual funds are liquidated for a variety of reasons. However, it is implausible that fund families would voluntarily liquidate successful funds. It is also implausible that a fund family would terminate a successful fund through merger to another fund. The Investment Company Institute reports that mutual funds routinely liquidate and merge funds because funds fail to maintain or attract sufficient assets to stay competitive and viable from a business perspective (see Stadler and Graham, 2014).

To increase confidence that a mutual fund's closure due to liquidation or merger can be considered an unsuccessful outcome with potential labor market consequences, we examine factors related to fund closure. We run the following regression:

$$Fund\ closure_{i,j,t} = \beta' X_{i,j,t-1} + \gamma' Z_{j,t-1} + \zeta I_t + \alpha_j + \epsilon_{i,j,t}. \tag{1}$$

Here $Fund\ closure_{i,j,t}$ is a dummy variable that takes the value of one if fund $i$ of fund family $j$ is closed in quarter $t$, $X_{i,j,t-1}$ is a vector of the control variables at the fund level at time $t-1$, $Z_{j,t-1}$ is a vector of family-level variables of the fund family $j$ at time $t-1$, $I_t$ is the industry closure ratio at time $t$, and $\alpha_j$ is fixed effect of fund family $j$. Section 2.3. presents descriptions of the control variables. We cluster the standard errors by year-quarter.

–Insert Table 2 about here–

Table 2 shows the results. We find profitable funds are less likely to be terminated. Mutual fund families charge fund shareholders on a fixed-ratio basis, i.e., expense ratio times assets under management. Positive money flows increase assets under management. Therefore, higher assets under management (size), higher expense ratios, higher investors' flows, and higher fund returns generate more revenues. The results show that funds with such characteristics are less likely to close. For example, a 1% increase in the expense ratio is associated with a 13%-18% reduction in the likelihood a fund closes. A 10% increase in fund returns (after expenses) is associated with a 11%-14% reduction in the probability a fund closes. Funds are also more likely to close when more peer funds are closed within the fund family or in the industry. On the other hand, the gender diversity of a fund (i.e., the fraction of female managers) is neither statistically nor economically related to fund closure. Since diversity may not vary much over time, it is possible that the insignificance of diversity is a result of near multi-collinearity between diversity and the fund family fixed effect. However, the coefficients on diversity from regressions excluding the fixed effects are also insignificantly different from zero. Most fund and family characteristics are not significantly related to fund closures. For example, if the number of fund managers increases by 10, the probability of fund closure decreases by 1-3%. But, an increase by 10 is a rare event since the average number of fund managers is two to three (Table 1 (B)). So, the coefficient on the number of fund managers is not economically significant. This also suggests that fund closure is not related to whether the fund is solo or team managed.

We also re-estimate model (1) at the fund-manager level, i.e., the number of observations for each fund in a given quarter is the same as the number of managers for the fund. In these specifications, we replace diversity with a dummy variable that takes the value of one if the manager is female (i.e., female dummy). We find that the probability of fund closures is not related to the manager's gender. The coefficient on the female dummy is zero (up to the third decimal) and statistically insignificant at the 10% level (not tabulated). This seems inconsistent with the idea that female managers tend to manage funds that fail (i.e., the "Glass Cliff" hypothesis).

Given that fund families tend to close funds that generate low revenues, our evidence suggests that fund closures should be viewed as unsuccessful outcomes that are likely to have labor market consequences for fund managers.

## 2.2. Measuring manager exit

The database does not provide dates that fund managers join and leave the fund family. We use the first and the last dates that the fund manager manages any fund belonging to the fund family to proxy for the dates they join and leave the fund family, respectively. In the case of own managers, the "joining" date can be considered to be a proxy for the hiring date and the "leaving" date can be considered to be a proxy for the date they are fired when leaving is involuntary. Since sub managers cannot be directly hired or fired by the fund family, "joining" and "leaving" dates simply measure the dates that the manager starts or stops managing a sub-advised fund for the fund family.

When managers leave a fund family, they either quit the industry entirely or move to another fund family. In the first scenario, we no longer observe the manager in the mutual fund database. In the second scenario, the manager manages at least one fund for a different fund family. Thus, we use the last quarter that the fund manager manages any fund belonging to the fund family to proxy for the quarter they leave the fund family. We use the last quarter that the fund manager manages any fund in the Morningstar database to proxy for the quarter they leave the fund industry. Factors unrelated to performance, such as maternity leave, can also lead to exit from the industry.

We examine the differences in the (linear) probability that female and male managers leave or join a fund family in a given quarter as descriptive analyses. To estimate a manager's probability of leaving a fund family, we run the following panel regression:

$$leave_{i,j,t} = \beta female_i + \gamma m_{i,j,t} + \rho s_{i,j,t} + q_t + \epsilon_{i,j,t}, \tag{2}$$

where $leave_{i,j,t}$ is a dummy variable that takes the value of one if manager $i$ stops working for the fund family in quarter $t$, i.e., $t$ is the last quarter that manager $i$ manages at least one fund for fund family $j$, and $female_i$ is a dummy variable that takes the value of one if manager $i$ is female. The term $m_{i,j,t}$ is a dummy variable that takes the value of one if fund family $j$ has only male managers. On average, about 65% of fund families employ no female fund managers. We include $s_{i,j,t}$, a dummy variable equal to one if the manager manages only sub-advised funds for fund family $j$ in quarter $t$, since these managers are not employees of the fund family. The term $q_t$ represents time (year-quarter) fixed effects.

The coefficient $\beta$ captures the difference in exit probabilities for female and male managers. To examine differences in joining probabilities, we replace the dependent variable in (2) with a dummy variable, $join_{i,j,t}$, which is one if quarter $t$ is the first quarter that manager $i$ manages at least one fund for fund family $j$. Since gender diversity in the mutual fund industry began to decrease in the fourth quarter of 1999 (Figure 1), we run the regressions for the full sample as well as the periods before and after the fourth quarter of 1999.

–Insert Table 3 about here–

Table 3 shows the results for the quarterly probability (in %) of leaving the fund family and joining the fund family. On average, female managers are more likely to exit the fund family than male managers. The difference in probability is about 0.54% per quarter, i.e., roughly 2% per year. Most of this gender gap in exit is driven by the second period of the sample. After the fourth quarter of 1999, the difference in the exit probability is above 2.5% per year. This difference is statistically significant (at the 1% level) and economically sizeable. Suppose, for example, that 2% of male managers leave diverse fund families every year and the initial ratio of the number of female managers to the total number of managers is 10%. If 2.5% more women leave per year than men, the gender diversity of 10% would drop to 7.7% in a decade. Managers of sub-advised funds are more likely to stop managing funds for the fund family than own managers, who are employed by the fund family. The magnitude of the effect is about 2.6% per year.

Perhaps surprisingly, female managers also have a higher probability of joining a fund family. This result is driven by the period before the fourth quarter of 1999, where the difference in probabilities is about 1.1% per quarter. However, this difference decreases and is no longer significantly different from zero in the second period of the sample. Also, the magnitude is reduced to 0.13%.

The difference in the patterns for leaving and joining suggests that gender diversity is much lower after the fourth quarter of 1999 primarily because women are much more likely to exit the fund family than men, not because they are less likely to join. This is motivation for our focus on managers' exit.

## 2.3. Definition of control variables

In our regressions we use variables at the fund level, the fund family level, the industry level, and the manager level. Fund closure is a dummy equal to one if the fund is closed due to liquidation or merger. Fund diversity is the ratio of the number of female managers to the total number of managers. Other fund-level control variables include the total number of managers, total net assets under management (TNA), a dummy variable that takes the value of one if the fund is an index fund, the annual expense ratio as disclosed in the most recent annual report, fund returns after expenses, net money flows for the fund (growth of TNA net of the returns), and the fund's age (time since the inception date).

At the fund family level, our controls are family diversity, the total number of funds, the total number of managers of the family, the family TNA, and family's age (the maximum age of the family's funds). For each fund, we define the family closure ratio as the ratio of the number of closed funds to the total number of funds in the fund family excluding the fund in question. The industry closure ratio is defined similarly except that we consider all funds, not only the funds in the fund family.

At the manager level, we define fund closure to be the ratio of closed funds of the manager to the total number of the manager's funds. Diversity is the average diversity of the manager's funds. Number of managers is the average number of managers of the manager's funds. We sum TNA of the funds under management of the manager to define the manager's TNA. The number of managing funds is the total number of the funds under management of the manager. Age at the manager level is the average age of the manager's funds. Tenure with the employer is the length of time since the first date that an own manager manages a fund of the fund family. Since we cannot identify the employers of managers of sub-advised funds, we cannot construct an equivalent measure of tenure for managers of sub-advised funds. Thus, we exclude tenure from regressions with sub-advised funds.

Panel (B) of Table 1 shows summary statistics for our control variables. Our sample funds are comparable to sample funds in the mutual fund literature. The average fund size is about 1.3 billion dollars. On average, a fund is about 10 years old and managed by two to three managers. The median expense ratio is about 1.7% (an expense ratio could be negative when management fees are refunded). A typical fund has about 10% returns and net flows of 32% per year. A fund family has about 12 funds, 19 fund managers, and TNA of about 12 billion dollars on average. Diverse fund families tend to be larger than male-only fund families in terms of TNA and the total number of managers. A typical fund manager manages between 1 and 2 funds and TNA of more than 2 billion dollars. The average tenure with the current fund family is almost 5 years. The tenure of managers in diverse fund families is slightly shorter, because female managers' average tenure is about one year shorter than that of male managers. For example, male solo managers' tenure is on average 5.8 years, whereas it is 4.7 years for female solo managers.

## 3. Identification of gender gaps

Figure 4 illustrates that female managers' higher rate of exit may be related to closures of team-managed funds. The time-series of yearly fund closures in the U.S. equity mutual fund industry is shown in Figure 4 (A). Almost no mutual funds were closed in the 1990s, when the industry was booming. Fund closures became more common in the 2000s with more than 500 liquidations and mergers occurring in 2009 alone. As team management became more common (dashed line), the fraction of closed funds that were team-managed (solid line) also increased. For example, about 70% of closed funds in 2009 were managed by teams. Figure 4 (B) plots the ratio of female managers who exit the industry to all managers who exit the industry (dashed line). The female exit ratio is almost always greater than the gender diversity ratio (solid line). Thus, the fraction of women who exit is almost always higher than the fraction of men who exit. The downward trend in diversity occurs as team management increases and fund closures become increasingly common.

Our main sample is managers employed by the fund family and working in teams only. We discuss our strategy to identify employers' tendency to dismiss female managers working in teams more than their male counterparts amid failure in the next section. Then we discuss how we relate such gender gaps to employers' attributional rationalization.

## 3.1. Employment outcomes by gender

Our goal is to examine whether blame for unsuccessful outcomes, or failure, is allocated unequally by gender when individual-level assessments are unavailable. Our proxy for "blame" is the manager's exit from the fund family amid unsuccessful outcomes. Exit following an unsuccessful outcome is more likely to be due to dismissal than voluntary resignation. We also examine events where exit is more likely to be voluntary in Section 4.3.

We exploit the contrast between own managers and sub managers to identify a gender gap in the effect of failure on employment outcomes. If we find a gender difference in exit from the fund family for own managers but not for sub managers, we argue that the gender difference should be due to employers' decisions, rather than behavioral differences between male and female managers. The reason is that sub managers are not employed by the fund family, so they cannot be "blamed" for unsuccessful outcomes by the fund family. In contrast, if female managers are more or less likely to exit from the fund family than male managers for other reasons than employers' dismissals, then we should expect to see a similar gender gap among sub managers. Unobservable managerial characteristics that are correlated with gender and a manager's propensity to exit should be similar for own and sub managers.

We use fund closures to proxy for failure. Because the date that the liquidation or merger of a fund is approved is not public, we use a window of four quarters prior to and including the quarter of the liquidation or merger date, i.e. between quarter $t$ and quarter $t+3$, to analyze fund closure. Fund managers might leave the fund family or industry before the closure date of a fund, e.g. as soon as the liquidation of the fund has been approved, or several months later. Thus, we relate manager exit to closures of the manager's funds over the same period as we examine fund closure, i.e., between quarter $t$ and quarter $t+3$. To measure exit from fund families, we define $leave_{i,j,t+3}$ as a dummy variable that takes the value of one if manager $i$ leaves fund family $j$ in any quarter between $t$ and $t+3$ and is zero otherwise. To measure exit from the fund industry, we define $leave_{i,t+3}$ as a dummy variable that takes the value of one if manager $i$ leaves the fund industry between $t$ and $t+3$.

Our empirical tests take the form

$$leave_{i,j,t+3} = \beta female_i + \gamma closure_{i,j,t+3} + \delta female_i * closure_{i,j,t+3} + \zeta I_{t+3} + \alpha_j + \varphi' Y_{i,t} + \upsilon' Z_{j,t} + \epsilon_{i,j,t+3}, \tag{3}$$

where the dependent variable $leave_{i,j,t+3}$ takes the value of one if the manager $i$ departs fund family $j$ (or the industry) between quarter $t$ to quarter $t+3$. The explanatory variables are as follows: $female_i$ is a dummy variable that takes the value of one if manager $i$ is female; $closure_{i,j,t+3}$ is the fraction of closed funds of manager $i$ of fund family $j$ between quarter $t$ and quarter $t+3$; $I_{t+3}$ is the fraction of managers who leave the fund industry between quarter $t$ and quarter $t+3$ (to control for industry-level shocks affecting employment); and $\alpha_j$ is fixed effect of fund family $j$. Standard errors are clustered by fund family and time (year-quarter). The vector $Y_{i,t}$ contains control variables at manager $i$'s level, such as $i$'s TNA, $i$'s total number of funds under management, $i$'s tenure and the average diversity and the average number of managers of the funds manager $i$ manages (see Section 2.3 for variable definitions). The vector $Z_{j,t}$ consists of related variables at the family level, such as family diversity, TNA, and age. We measure all control variables at the beginning of the quarter $t$.

Some fund families may have stricter policies about performance or more flexible employment contracts for termination. To control for unobservable firm characteristics that might affect managers' departure from the fund family, we include fund family fixed effects $\alpha_j$ in regression (3). To control for common, industry-wide factors that might affect fund managers' departure from their fund family, we include a measure of industry wide exit behavior $I_t$. Since $I_t$ is a time-series variable, we do not include time fixed effects in the panel regressions. Our conclusions do not change with time fixed effects.

With an estimate of the coefficient $\beta$ on the female dummy we can test the null hypothesis that female managers have the same average exit likelihood as male managers controlling for unsuccessful outcomes and other factors. The coefficient $\delta$ on the interaction term of $closure_{i,j,t+3}$ with the female dummy captures the gender difference in the effect of fund closures on the probability of leaving the fund family. The null hypothesis is that there is no gender gap. If the coefficient estimate $\delta$ is positive (negative) and statistically significant, then this would suggest female managers are more (less) likely to exit the fund family than male managers amid unsuccessful outcomes. To better identify the interaction, we also include interactions between control variables and $female_i$ in some specifications.

If fund families follow a "Last In, First Out" rule, fund families might generally be more likely to fire women since women have, on average, lower tenure in our sample. To account for this possibility, we include interactions between fund closure and manager tenure (and the female dummy) in some specifications. Since tenure may be correlated with unobservable manager effects, tenure might be endogenous in these regressions. Since our objective is simply to see whether tenure drives our results, we believe these regressions are still informative. In addition, we obtain similar regression results after controlling for unobservable manager-specific effects as shown in the Appendix. We also control for the effect of tenure by restricting our sample to new hires—managers who have been with the fund family for less than three years (below the median tenure of 3.7 years).

### 3.2. Causes of employment outcomes by gender

The previous section discusses our strategy to distinguish a gender gap in employment outcomes due to behavioral differences by gender and due to employers' decision making. We now discuss how to pin down the underlying causes of employers' discrimination by gender. Demographic factors, such as age, sex, race, and education level, might have significant effects on employers' decisions for various reasons. The socioeconomic literature proposes taste-based discrimination (e.g., Becker, 1957) and statistical discrimination (e.g., Phelps, 1972, and Arrow, 1973). The first source generally refers to employers' preference bias toward a particular gender. The second cause, statistical discrimination, is said to occur when employers use observable characteristics of individuals, such as gender, as a proxy for unobservable characteristics that are relevant for the outcome. In particular, group averages or stereotypes are used.

The psychology literature proposes another cause, attributional rationalization. It refers to a situation where in the absence of direct information about individual contributions, credits or blames for group outcomes are allocated to team members based on observable individual characteristics. The underlying sources of attributional rationalization could be taste-based but the literature finds that the phenomenon is prevalent when one group (e.g., males) is dominant so perceived to be superior. An important distinction between attributional rationalization and stereotyping or taste-based discrimination is that the first applies to individuals working in teams only whereas the latter can also apply to workers with individual-level assessments.

Our identification strategy is to contrast own team managers and own solo managers. Provided that the fund family is biased against female managers or uses group averages to evaluate individuals, we should expect to see similar gender gaps among managers for whom individual assessments are available. In contrast, if the absence or presence of individual-level assessments matters, attributional rationalization helps explain the gender gap. It refers to a phenomenon that when the source of team failure is ambiguous, more blame (credit) is allocated to team members for whom performance expectations are ex ante low (high).

A challenge with comparing team and solo managers comes is that the choice of solo versus team management is not exogenous. Managers' unobservable ability matters, in particular, more skilled managers are more likely to manage funds alone rather than in teams. Therefore, we run regressions separately for own team and own solo managers. Because of the nature of our empirical design, it might not be reasonable to use manager fixed effects in Equation (3).[5] Following their exit from the fund family or the industry, managers drop out of the sample. This leads manager fixed effects estimates to be biased because the error term in each period would be correlated with the explanatory variables in subsequent periods (Nickell, 1981). On the other hand, manager fixed effect regressions can control for unobservable manager-specific heterogeneity. Therefore, we include manager fixed effects and run regressions for both team and solo managers. We find that controlling for the effect of time-invariant individual characteristics does not change the interpretation of our results.

We first examine whether the choice of solo versus team management is systematically correlated with gender and past performance to help rule out the possibility that worse female managers end up in teams than their male counterparts. We run panel regressions of a dummy variable, "solo manager," on past performance, other control variables, and manager dummies. The dependent variable takes the value of one if the manager manages at least one fund alone and zero if the manager manage only team-managed funds. Table 4 shows that the propensity to become solo managers mostly depends on manager fixed effects. The explanatory power is almost 60%. When we control for manager fixed effects, the observable variables explain only 3% of the likelihood that a manager manages at least one fund alone. We also find that manager's past performance increases the likelihood,

[5] Manager fixed effect regressions can control for unobservable manager-specific heterogeneity, which might be correlated with the explanatory variables. Removing the effect of time-invariant individual characteristics does not change the main results of our paper (see the Appendix).

whether we control for manager fixed effects or not. The results are consistent with a view that unobservable manager-specific heterogeneity is an important determinant of managers' choice of solo versus team management.

# 4. Labor market outcomes of fund managers

We present empirical results of managers' employment outcomes amid failure by gender. We focus on team managers employed by the fund family and examine their exit from the fund family and the fund industry amid fund closures in Section 4.1. We compare the results with the results for team managers who manage funds for the fund family but are employed by the subadvisor, not the fund family. Section 4.2 provides results that help us identify the underlying causes of gender gaps in team managers' exit amid failures. We contrast team managers' employment outcomes to solo managers' employment outcomes. As discussed in Section 3.2, individual assessments are available only for solo managers, not for managers working in teams only.

## 4.1. Team managers' exit amid fund closures

–Insert Table 5 about here–

Table 5 A presents results of the regressions in Equation (3) for team managers employed by the fund family. Columns (1)-(3) show results for the full sample; columns (4)-(6) show results for new hires (tenure <3 years). For benchmarking purposes, we show results without $female_i * closure_{i,j,t+3}$ in columns (1) and (4). It is noticeable that the coefficient on $female_i$ is not significant after controlling for variables at the manager and the family levels.

Unconditionally, women are not more likely to exit the fund family. The coefficient on the fund closure ratio is positive across all specifications. For example, a male team manager whose funds are all closed has a 50% higher (linear) probability of leaving the fund family than a male team manager with no closed funds (with family fixed effect). The effect of fund closures is slightly larger without family fixed effect (column (3)).

The effect of fund closures is more pronounced for female team managers. A female team manager whose funds are all closed is roughly 10% more likely to leave the family than a male team manager (column (2)). The coefficient estimates are also economically significant. Suppose gender diversity of team managers is now 10% and all their funds are closed over the next one year. Then diversity decreases to 8.2% in one year assuming a gender gap of 10% in the effect of fund closures. In contrast to fund closures, none of the other coefficients on the interaction terms with the female dummy are statistically significant (column (2)). The last three columns show that the gender gap among new hires remains similar to the gap in the full sample of managers.

Panel B replicates Panel A with the dummy variable measuring exit from the industry instead of from the family as the dependent variable. Consistent with Barber, Scherbina, and Schlusche (2017), female managers are unconditionally more likely to exit the industry (columns (1) and (4)). However, as in Barber, Scherbina, and Schlusche (2017), this effect disappears when conditioning exit on low performance. As in Panel A, the effect of fund closure on team managers' departure from the fund industry appears to be gender specific. The effect of fund closures on male team managers' exit from the industry is only the half of the effect on their exit from the fund family. However, female managers are about 8-9% more likely to leave the fund industry than male managers when all their funds are closed (column (2)). This is of a similar magnitude as the gender gap in the effect of fund closures on managers' exit from the fund family. Female team managers are less likely to find another job in the industry once they leave the fund family. We also find a similar gender gap in the effect of fund closures on new hires' departure from the industry even though new employees are slightly less likely to quit the industry amid fund closures.

–Insert Table 6 about here–

Table 6 presents results for managers who are not employed by the fund family but by sub advisors. In contrast to the results for own team managers, we find no gender differences in the effect of fund closures on the probability that sub managers working in teams stop managing funds for the family amid fund closures. Both male and female sub managers working in teams are about 50% more likely to quit managing funds for the fund family when all their funds belonging to the family are closed. Since sub managers have no employment relation with the fund family, these results suggest that the gender differences in exit amid fund closures shown in Table 5 are driven by terminations of employment relations by the employers as opposed to supply-side factors that might lead female managers to exit the family more than male managers. We also find no gender gap in the effect of fund closure on the probability that sub managers leave the fund industry.

## 4.2. Comparing with solo managers' exit amid fund closures

Panel A of Table 7 presents the results for own solo managers. Fund closures increase the probability a solo manager leaves the fund family by as much as 54-65%, regardless of whether the manager is male or female. We find no gender gap in exit of solo managers from their employers amid fund closures. Similarly, we also find no gender gap in solo managers exit from the fund industry. The effect of fund closures on managers' departure from the fund industry is about half, 30%, for solo managers employed by the fund family. We also arrive at similar conclusions for new hires' departure from the fund family and the industry when they manage at least one fund solely (not tabulated).

Taken together the results in Tables 5 and 7 suggest that following fund closures, female managers are more likely to leave the fund family than male managers when they work in teams but not when they manage funds alone. Both types of managers are employed by the fund family. As shown in Table 4, choices between team and solo managements mostly depend on managers' unobservable effects, such as characteristics and ability. As a result, the gender gap among team managers might be due to female team managers' unobservable characteristics and ability that are relevant for employment outcomes. Therefore, we run the regression (3) for all own managers and include manager fixed effects instead of family fixed effects. The results are presented in Panel B of Table 7. We find a gender gap for own team managers but not for own solo managers. The effects of fund closures on managers' exit from the fund family and the fund industry remain similar whether we control for manager fixed effects or not.

The asymmetric results between team and solo managers employed by the fund family seem inconsistent with taste-based discrimination and stereotyping in general. Both explanations predict a similar gender gap whether the managers work in teams or alone. Rather, we find our results best explained by employers' tendency to blame female managers working in teams more than their male counterparts. The results support a view that when work is a male-sex-typed task, more blame is attributed to females for unsuccessful teamwork when individual measures of performance are unavailable (Haynes and Lawrence, 2012).

### 4.3. Using the mutual fund scandal to proxy for voluntary resignations

Our evidence suggests that the gender gap in exit is driven by demand-side factors, i.e. dismissal, rather than supply-side factors, i.e. voluntary resignation. For example, there is no gender gap in the exit of sub managers amid closures of sub-advised funds, for which the fund family has no staffing authority. To increase confidence in this interpretation, we examine managers' exit behavior following the 2003 mutual fund scandal. In 2003, New York State Attorney General Eliot Spitzer alleged that several mutual fund families allowed specific investors to engage in improper trading of their fund shares. The scandal eventually led to investigations and regulatory interventions at about 26 mutual fund families, which we label "scandal" fund families.[6]

Following the scandal, the accused fund families also experienced large abnormal net outflows of investors' money from their funds.[7] Since management fees are proportional to assets under management, managers had strong incentives to move to other mutual fund families. In fact, we argue that we can interpret the scandal as an exogenous shock to voluntary resignation. We have no reason to expect that the scandal was a shock to supply-side factors that might lead to different exit decisions for men and women. Thus, we expect

[6] Our list of mutual fund families involved with the scandal is similar to the list in Houge and Wellman (2005) except that we add Pilgrim.

[7] See Houge and Wellman, 2005; Choi and Kahan, 2007; and McCabe, 2009, for example. Houge and Wellman (2005) estimate, "The average fund managed by an investigated firm lost approximately $14 million in assets over the 6-month window after announcement. These redemptions translate into more than $844 million in lost fee income across all funds managed by these companies over the 6-month period."

no gender difference in voluntary terminations of employment following the mutual fund scandal. Examining exits following the scandal can shed some light on the role of supply-side factors in explaining exit patterns by gender.

To examine whether there are fundamental gender differences in voluntary exit, we add a "scandal" dummy variable to Equation (3) that takes the value of one if the fund family is one of the scandal fund families and the year is between 2003 and 2005. We also add the interaction term between "scandal" and the fund closure ratio and also interact the term with the female dummy. The female dummy takes the value of one for about 15% of the scandal observations (i.e., scandal dummy equal to one) whereas it is equal to one for only 11% of the non-scandal observations (i.e., scandal dummy equal to zero).

–Insert Table 8 about here–

Table 8 presents the results for own team managers, own solo managers, and sub team manager in Panels A, B, and C, respectively. All regressions include family fixed effects. We find that fund managers employed by scandal fund families are more likely to exit the fund family during the scandal, whether they manage funds in teams or alone (Panels A and B). But, the increased probability of exit is the same for male and female managers. In addition, the scandal has insignificant effects on managers' exits from the fund industry, irrespective of gender. In other words, those managers, whether male or female, who leave the scandal fund families during the scandal move to another fund family. This suggests that when exit is voluntary, men and women make unconditionally similar decisions to leave their employers.

Panel C shows the results for sub managers working in teams. The scandal does not seem to have affected the managers who are employed by sub advisors because the coefficients are not statistically significant at the 10% level (column (2) and (4)). If anything, female sub managers' probability to stop managing sub-advised funds for the scandal families decreases in the scandal. It is possible that the exit of employees led to a higher demand for sub managers by the scandal fund families, which decreases sub managers' exit. However, we do not have a good reason to expect such a positive effect for female sub managers, not for male sub managers. This could be examined in further research.

We also examine the effect of fund closures on employment termination during the scandal. In Panel A, the coefficients on the interaction term $scandal * closure$ are not statistically different from zero. This result suggests that the sandal does not have a significant effect on the sensitivity of managers' exit to fund closures. However, the triple interaction $scandal * closure * female$ is significantly negative. It is comparable with the positive coefficients on $closure * female$. In other words, the gender gap in the effect of fund closures on employment termination is reduced or even reversed in scandal. The scandal fund families experience loss of their human capital during the scandal time. As a result, it is reasonable to argue that the fund families have less incentive to discriminate female team managers amid failure. The results are consistent with a view that the gender gap in the effect of fund closures on managers' exit from the fund family is driven by the demand-side factors rather than supply-side factors.

In Table 8, we also present results for the dependent variable that is one if the manager leaves the industry (Columns (3) and (4)). The scandal does not seem to affect the probability that managers leave the fund industry, whether they manage funds in teams or alone and whether they are employed by scandal fund families or sub-advisors (at the 5% significance level). This reinforces the interpretation that exit from scandal families is driven by a temporary shock to employment conditions. There is no gender difference in exit from the industry following the scandal.

# 5. Gender and performance

Our results do not appear consistent with taste-based discrimination by fund families because there is no gender difference in exit for solo managers for whom individual performance signals exist. Instead, it appears more consistent with statistical discrimination. In the absence of individual performance signals for team managers, fund families presumably rely on group averages to infer individual performance. If fund families share a common prior that female managers' skills are inferior to male managers' skills, they will be more likely to dismiss female team managers following team failures. If the priors are accurate, such statistical discrimination would be rational. To better understand the mechanism driving our results, we analyze whether there are systematic performance differences between male and female managers. Since understanding priors is important for understanding if discrimination exists, we first compare the performance of all male and female managers without conditioning on the management type (solo vs. team) or employment status (own vs. sub). Then we restrict our analyses to own managers in diverse fund families and own team managers in diverse fund families. We estimate managers' skills by estimating abnormal returns on value (fund TNA)-weighted (or equal-weighted) portfolios of funds using both Fama and French's (1993) three factor and Carhart's (1997) four factor models for the period January 1990 to September 2015, i.e. we estimate variations of the following equation:

$$R_{p,t} - R_{f,t} = \alpha_p + \beta_{p,1} MKT_t + \beta_{p,2} SMB_t + \beta_{p,3} HML_t \ (+\beta_{p,4} MOM_t) + \epsilon_{p,t}, \qquad (4)$$

where $R_{p,t} - R_{f,t}$ is the excess return on the portfolio of funds over the one-month U.S. Treasury Bill rate in month $t$. We use both value (total net assets)-weighted and equal-weighted portfolio returns and returns before expenses (gross returns) and after expenses (net returns). We focus on non-index funds. The independent variables are either the three factors (market excess return MKT, size return SMB, and book-to-market return HML) or the four factors including the momentum return MOM. The benchmark returns are from Kenneth French's website. The estimate of the intercept $\alpha_p$ is our measure of skills.

## 5.1. Aggregate performance

To compare the skills of male and female managers, we first construct two aggregate portfolios of funds that vary in the diversity of their funds' management. One portfolio consists of male-only funds (managed by only male managers). The other is a portfolio of diverse funds (managed by at least one female manager). We regress the returns on these aggregate portfolios on a gender dummy variable in addition to the three or four factors in Equation (6). The gender dummy variable $g_p$ is one if the aggregate portfolio consists of diverse funds and zero if it is the portfolio of male-only funds. We also interact the gender dummy variable with the factors, i.e. we estimate:

$$\begin{aligned} R_{p,t} - R_{f,t} \;\; = \;\; & \alpha_p + \delta g_p + \beta_{i,1} MKT_t + \beta_{i,2} SMB_t + \beta_{i,3} HML_t \; (+\beta_{i,4} MOM_t) \\ & + \gamma_{i,1} MKT_t * g_p + \gamma_{i,2} SMB_t * g_p + \gamma_{i,3} HML_t * g_p \; (+\gamma_{i,4} MOM_t * g_p) + \epsilon_{i,t} \end{aligned} \quad (5)$$

The estimate of the intercept $\alpha_p$ represents the average return on the portfolio of male-only funds that is left unexplained by the factors. The coefficients on the interaction terms between the factors and the gender dummy variable represent differences in the factor loadings between the aggregate portfolio of funds with only male managers and the aggregate portfolio of diverse funds. Our main interest is in the estimate of the coefficient $\delta$ on the gender dummy variable. The estimate represents the additional average return on the aggregate portfolio of diverse funds.

–Insert Table 8 about here–

Table 8 presents the results for value-weighted aggregate portfolios of funds. The results show no statistically significant differences in the alphas between the aggregate portfolios of male-only funds and diverse funds. The estimated Fama-French alpha of male-only funds is about -0.2% per annum and not statistically significantly different from zero, similar to the results in Fama and French (2010). The alpha of the portfolio of diverse funds is 0.02% lower, but this difference is not statistically significantly different from zero. When we restrict the sample of funds to own-advised funds in diverse fund families (Panel (B)) and own team-managed funds in diverse families (Panel (C)), the results are similar. We cannot reject the null that the mean return that is left unexplained by the factors is the same between male-only funds and diverse funds. With regard to the factor loadings, we find that the portfolio of diverse funds generally has a slightly lower loading on the market excess return. We find similar results when we use equal-weighted portfolios of funds as presented in Table 8. We also examine the aggregate portfolio of funds managed by only female managers, which account for only 2% of the monthly observations. The results are similar, i.e., the aggregate portfolio of funds managed by only female managers does not have a significantly different alpha from that of the portfolio of funds managed by only male managers (results not tabulated, but available on request).

–Insert Table 9 about here–

As an alternative approach to aggregating funds into portfolios, we first construct each manager's value-weighted portfolio of funds and then aggregate the portfolios for women and men on a value-weighted or an equal-weighted basis. A team-managed fund is a part of the portfolio of funds of each team manager. In this case, the gender dummy variable in the regression (7) takes the value of one if the return is for the aggregate portfolio of female managers' funds. Table 9 shows the results for the value-weighted and equal-weighted portfolios, respectively. While the estimates of the coefficient on the gender dummy variable are between -0.03% and -0.3% per annum for a value-weighted portfolio, as before we cannot reject the null hypothesis that the true difference is zero. Similar results hold for the equal-weighted portfolio. We find no supporting evidence that female managers underperform male managers. This suggests that one explanation for our results is that the lack of performance signals allows potentially inaccurate priors to persist.

## 5.2. Individual performance

The performances of aggregate portfolios do not reflect a gender gap in skills. Since there is a gender difference in exit, it is worth comparing the performance of managers who exit or stay amid fund closures. Following Fama and French (2010), we estimate Equation (6) for the value-weighted portfolio of funds under management of each manager who experiences fund closures. After obtaining the estimated intercept $\alpha_i$ in Equation (6), we examine the distribution of the t-statistics of the intercept by gender and exit decision.

–Insert Figure 3 about here–

Figure 3 plots the distribution of the t-statistics of abnormal returns relative to Carhart's (1997) four factors at the percentiles of 1, 5, 10, 25, 50, 75, 90, 95, and 99. Figure 3 (A) shows that the distribution of the t-statistics for solo managers who stay in the equity fund industry amid fund closures clearly dominates the distribution for solo managers who leave the industry amid fund closures. In contrast, Figure 3 (B) shows that the distribution of t-statistics of team managers who stay in the equity fund industry does not necessarily dominate that of team managers who leave the industry amid fund closures. The patterns in the estimates of individual managers' skills are consistent with the idea that the performance of solo managers can be measured much more accurately than the performance of team managers. Work in teams suffers from the lack of individual performance signals.

Figures (C) and (D) provide the same comparisons as in Figure (B) by gender. Figure 3 (C) shows the distributions of t-statistics for male managers who stay in the industry amid fund closures and female managers who exit amid fund closures. Similarly, Figure 3 (D) compares the distributions of t-statistics for female managers who stay in the industry amid fund closures and male managers who exit amid fund closures. The distribution of the t-statistics for men and women are fairly similar, whether they stay in or exit the industry amid fund closures. The results suggest that the lack of performance signals for team managers may make it difficult for priors to be updated, which allows statistical discrimination to persist.

## 6. Conclusions

We document that women experience different consequences for failure in a setting in which there is no evidence that women perform differently than men and individual performance signals are unavailable. Female team managers in the mutual fund industry are about 10% more likely to lose their jobs amid fund closures than male team managers. Female managers working in teams are about 8% more likely to leave the industry amid fund closures than their male counterparts. We interpret our results as consistent with the idea that fund families engage in attributional rationalization, i.e. they allocate more blame to team members for whom they might have ex ante low performance expectations.

While it is well-known that work done by individuals may be prone to statistical or taste-based discrimination, our evidence highlights that work done in teams may be particularly susceptible to discrimination due to the absence of individual performance signals. Our results suggest that the consequences of attributional rationalization can be economically large. The fraction of female fund managers decreased from 13.2% in 1999 to 9.4% in 2015. It will decrease to less than 7% by 2030 if the gender gap continues and a quarter of managers experience fund closures every year.

While teamwork is becoming more and more important, a drawback of teamwork is that it is difficult to measure the performance of the individuals comprising the team. Since this may work against individuals for whom performance expectations might be low due to their group affiliation, firms may need to either take care to evaluate all team members the same or ensure that team members have sufficient opportunities to work on their own.

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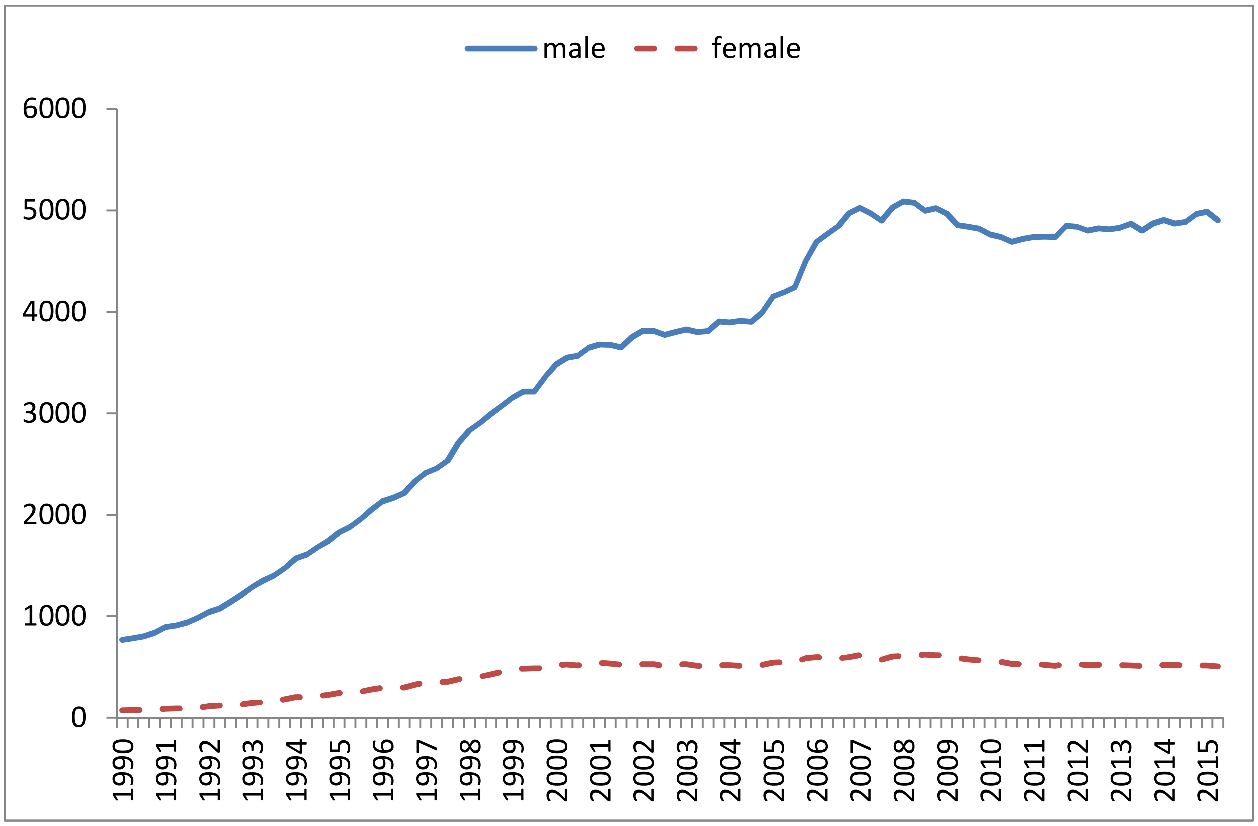
**Figure 1**
**Number of managers and gender diversity**

Figure (A) plots a time series of the number of male and female managers represented by a solid line and a dashed line, respectively. Figure (B) plots a time series of the fraction of female managers (gender diversity) in a solid line on the left axis and the fraction of male-only fund families (own managers' gender diversity of zero) in a dashed line on the right axis. The data period is from 1990 Q1 to 2015 Q3.

(A) Number of managers by gender



(B) Gender diversity and male-only family fraction

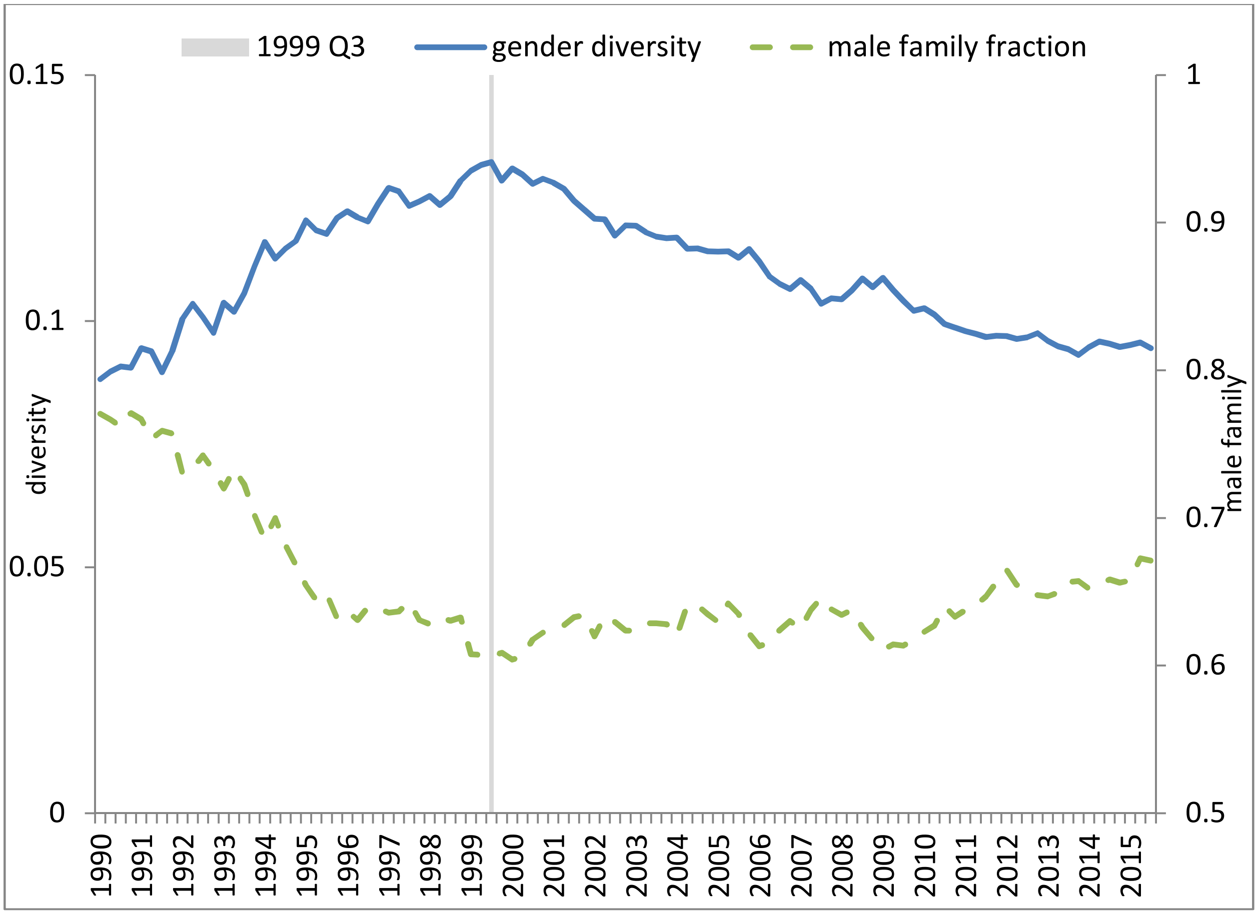


**Figure 2**
**Structure of families, managers, and funds**

Figure 2 illustrates structures of fund families, fund managers, and funds. Fund families have their managers who manage their own funds either solely or in teams. Arrows indicate team management and dashed arrows indicate solo management. Fund families might also have funds managed by managers employed by subadvisors, either solely or in teams.

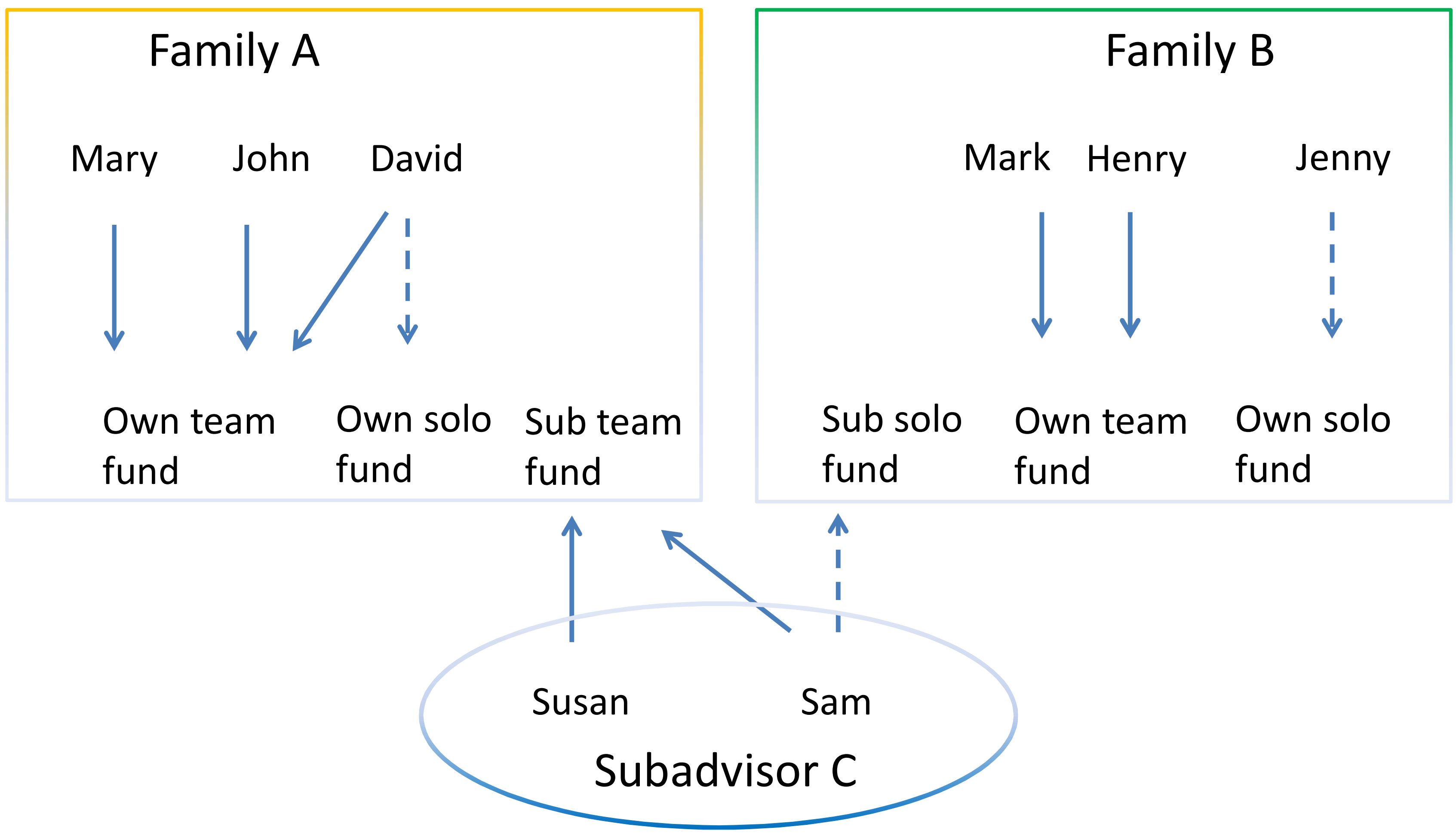
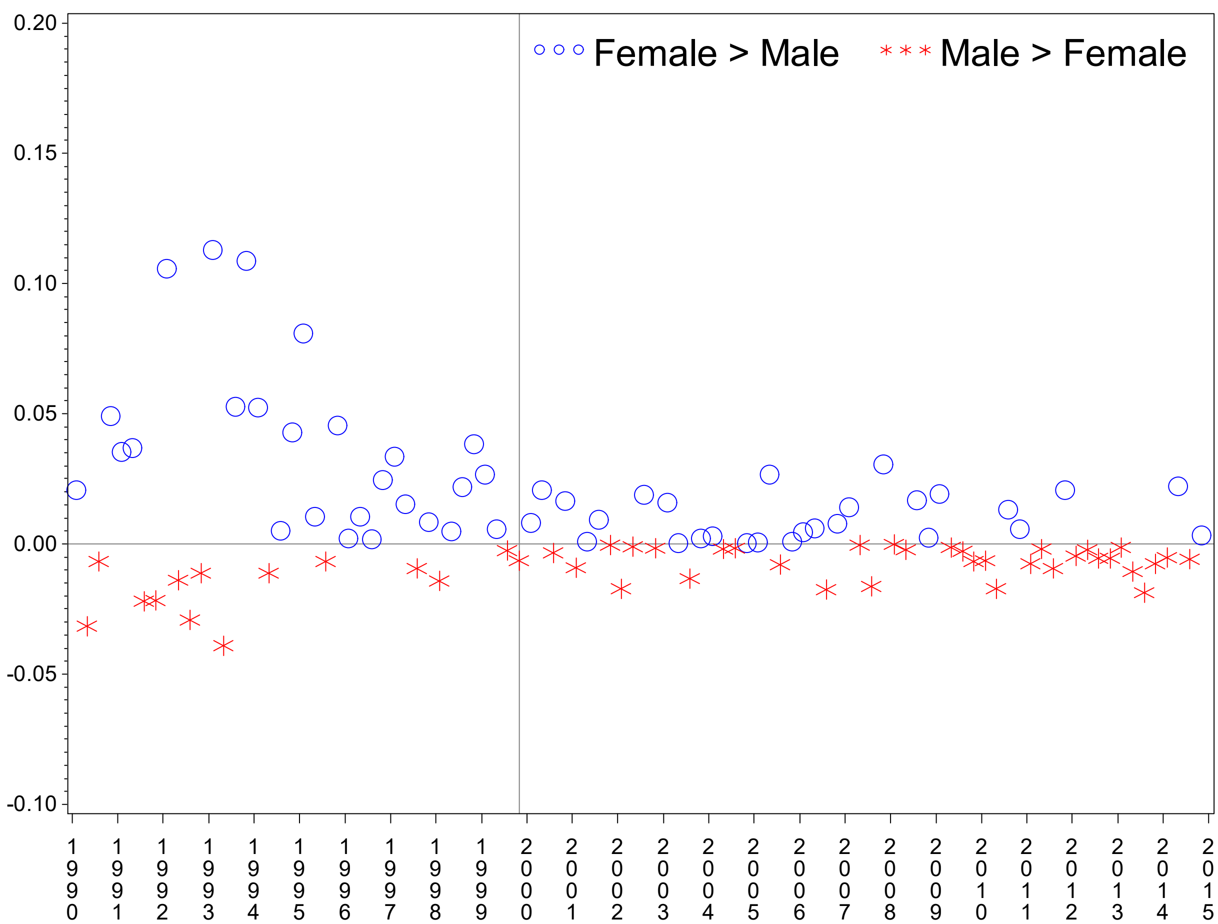


**Figure 3**
**Gender difference of hire and exit rates**

Figures (A) and (B) plot time-series of the difference of hire and exit rates by gender (female-male), respectively. Hire and exit rates are defines as the number of managers who join (leave) the U.S. equity mutual fund industry in the current quarter divided by the number of managers at the end of the last quarter. The circles represent positive differences, i.e., female rates>male rates, and the stars represent negative differences, i.e., female rates < male rates. The vertical line is the fourth quarter of 1999.

(A) Difference of hire rates between female and male managers



(B) Difference of exit rates between female and male managers

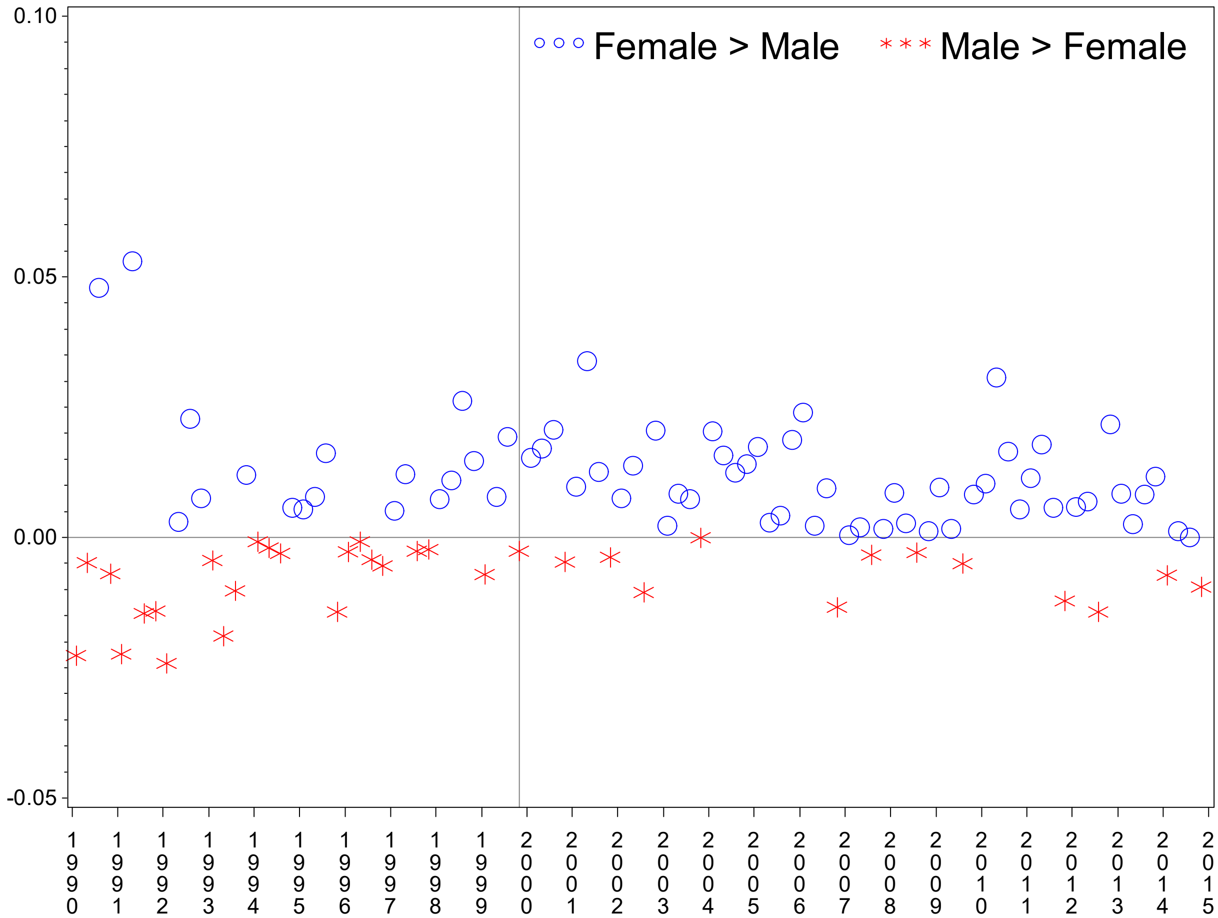
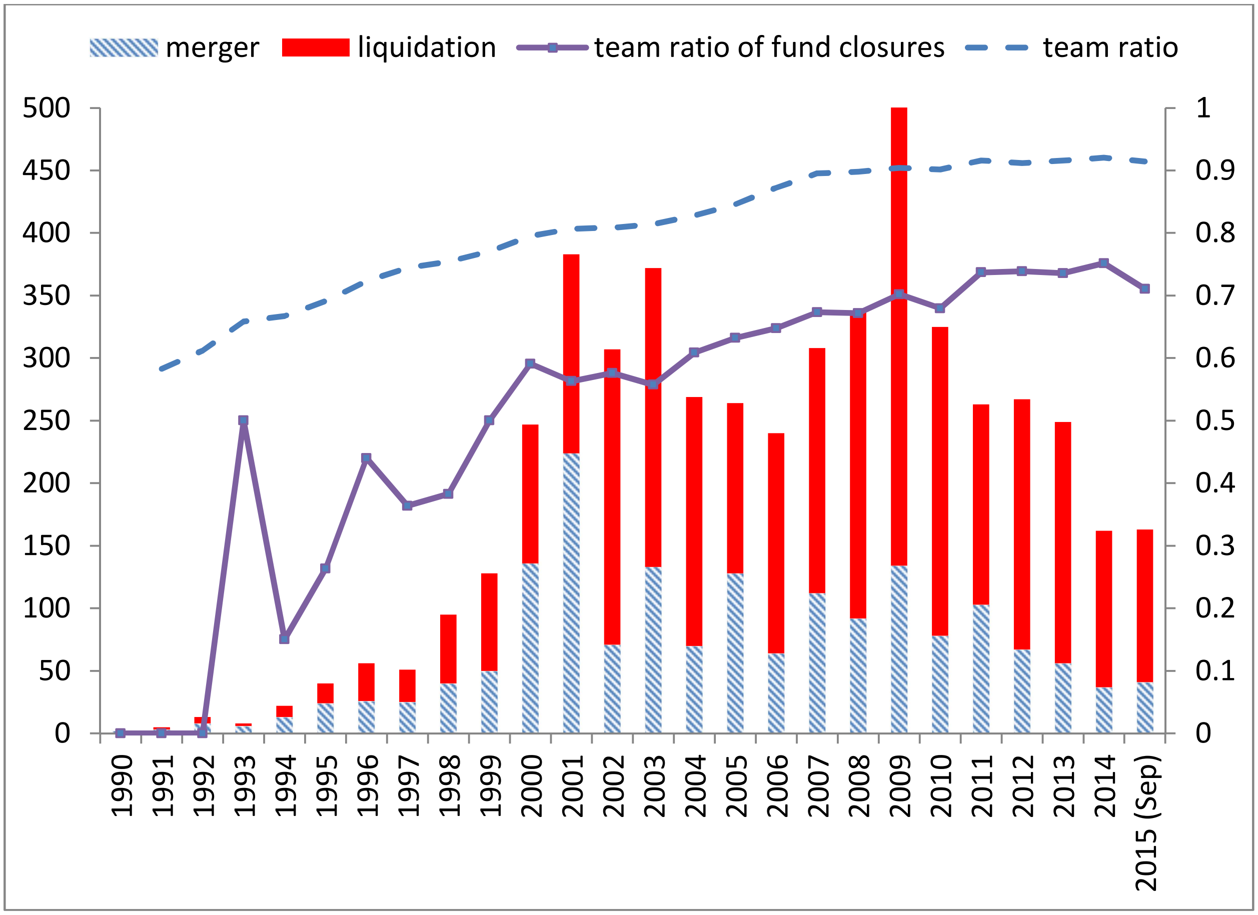


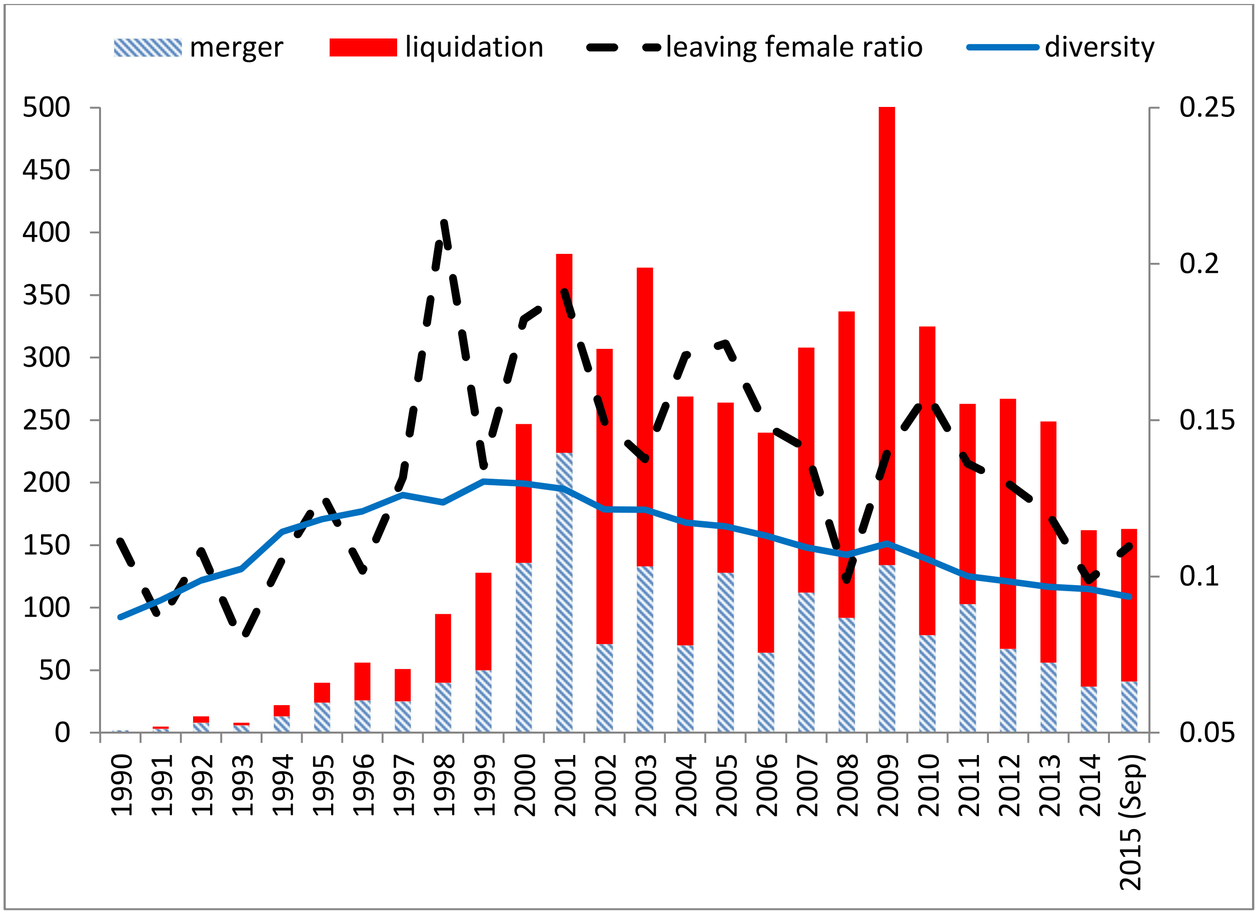
**Figure 4**
**Fund closure ratio and gender diversity**

Figure (A) plots a time series of the number of fund mergers and the number of fund liquidations on the left vertical axis. It also plots the ratio of the number of closures of team-managed funds to the number of all fund closures and the ratio of team-managed funds on the right vertical axis. Fund closures include fund mergers and liquidations. Figure (B) plots the ratio of the number of female managers who exit the equity mutual fund industry to the number of all managers who exit the fund industry and the ratio of female managers on the right vertical axis. The data period is from 1990 to 2015 (until September).

(A)



(B)

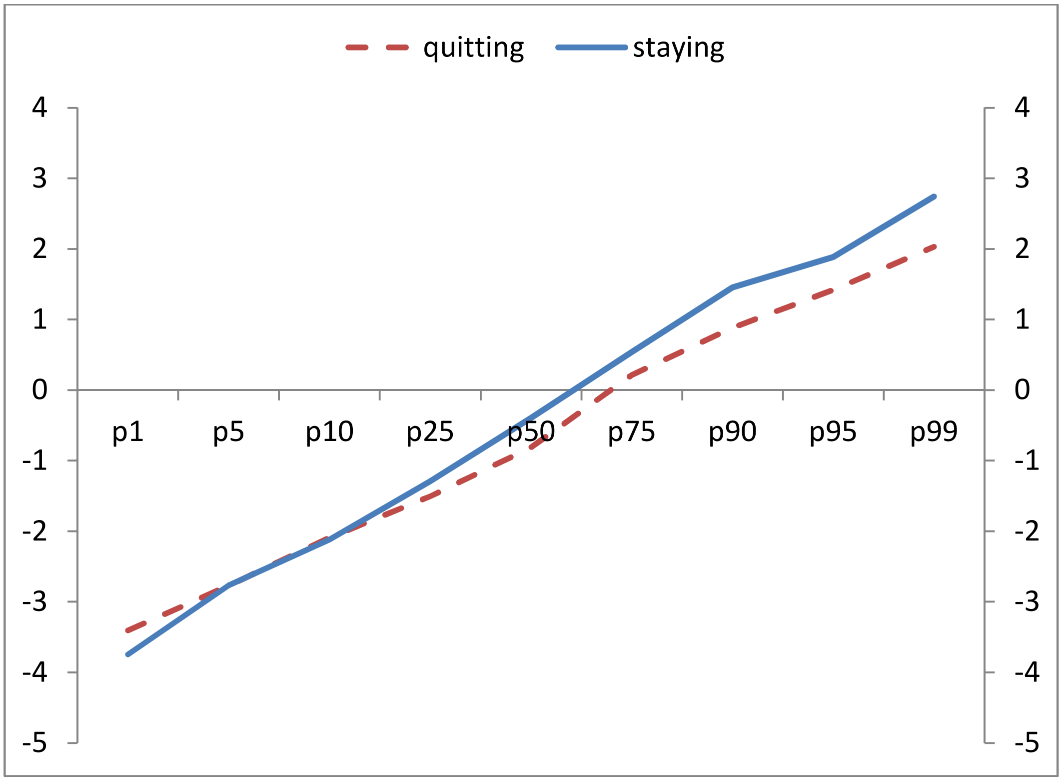


merger
liquidation
leaving female ratio
diversity
500
450
400
350
300
250
200
150
100
50
0
0.25
0.2
0.15
0.1
0.05
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015 (Sep)

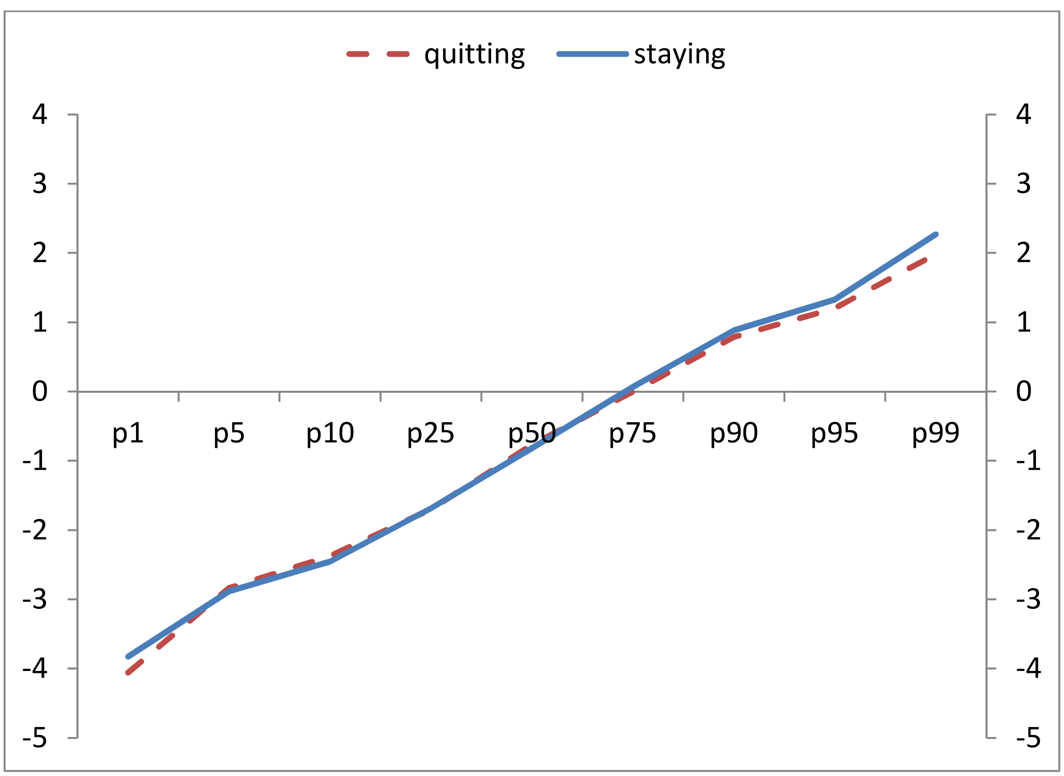
**Figure 5**
**Distribution of t-statistics of Carhart's (1997) alpha**

The distributions of t-statistics of abnormal returns of individual managers who work for diverse families and experience fund closures are plotted. Abnormal returns are estimated as the intercept of the regressions with four factors by Carhart (1997). The distribution is represented by 9 percentile points: 1st, 5th, 10th, 25th, 50th, 75th, 90th, 95th, and 99th. Figure (A) shows the distribution of the t-statistics of solo managers (manage at least one fund alone) who exit the equity mutual fund industry amid fund closures (quitting) and who still work in the industry (staying) in a dashed line and in a solid line, respectively. Figure (B) shows the distribution of the t-statistics of team managers (manage only team-managed funds), similar to Figure (A). Figures (C) and (D) show Figure (B) by gender. Figure (C) plots female team managers who exit the equity mutual fund industry amid fund closures (female quitting) and male team managers who still work in the industry (male staying) amid fund closures in a dashed line and in a solid line, respectively. Figure (D) plots male team managers who exit the equity mutual fund industry amid fund closures (male quitting) and female team managers who still work in the industry (female staying) amid fund closures in a dashed line and in a solid line, respectively. See Section 2.3 for the details about manager exit amid fund closures. The sample includes fund managers with at least 30 monthly time-series observations. The data period is from 1990 Q1 to 2015 Q3.

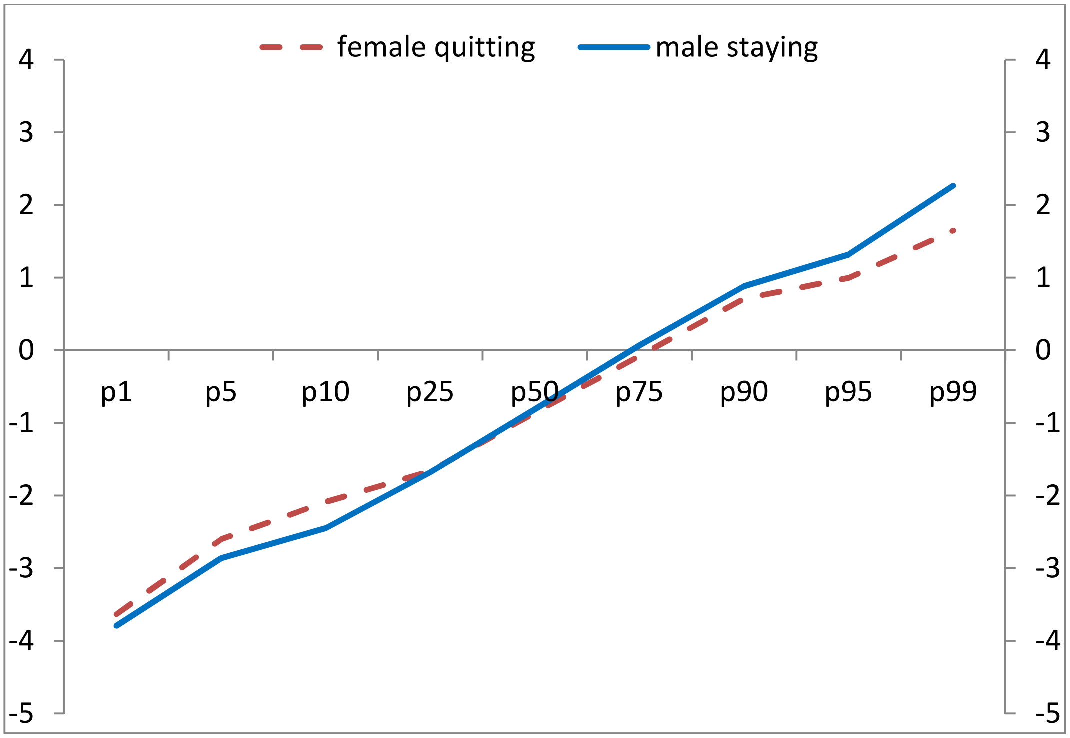
(A) T-statistics of Carhart alpha of solo managers in diverse fund families




(B) T-statistics of Carhart alpha of team managers in diverse fund families



(C) T-statistics of Carhart alpha of team managers in diverse fund families by gender




(D) T-statistics of Carhart alpha of team managers in diverse fund families by gender

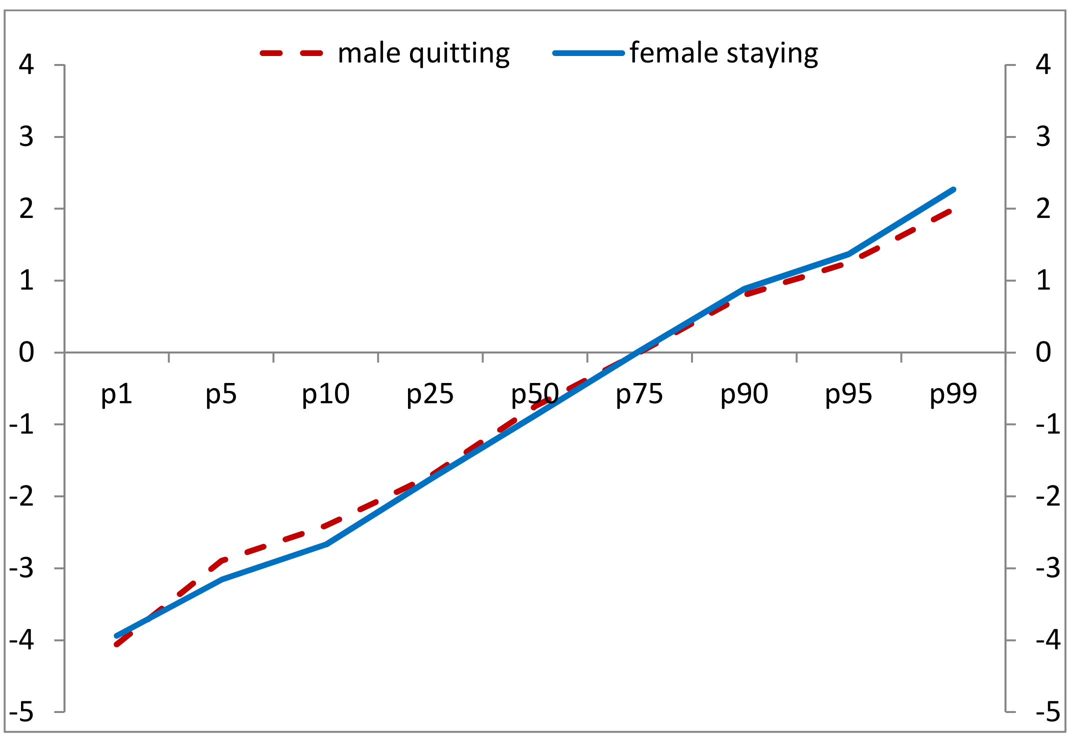


**Table 1**
**Descriptive statistics**

Panel (A) presents the average and the standard deviation (s.d.) of the variables in the first row from 1990 Q1 to 2015 Q3, from 1990 Q1 to 1999 Q3, and from 1999 Q4 to 2015 Q3. The sample includes both diverse fund families (with at least one own female manager) and male-only fund families (with no own female manager) but excludes one-manager family (self-employed). Total family (fund) is the number of families (funds) in the sample at the end of each quarter. Male family is the number of families with no female managers. Team ratio is the number of team funds divided by the total number of funds. Average fund (manager) is the average number of funds (managers) of a fund family. Total male (female) is the number of male (female) managers at the end of the quarter. Male family male is the number of male managers in male families. Diversity is the ratio of the number of female managers to the total number of managers. One manager is the number of managers in fund families with only one manager (i.e., self-employed). One female manager is the number of one-female-manager families. Male (female) hire is the ratio of the number of new male (female) hires in the quarter to the number of male (female) managers at the beginning of the quarter. Male (female) exit is the ratio of the number of male (female) managers leaving the family over the quarter to the number of male (female) managers at the beginning of the quarter. Fund birth (closure) is the number of funds that experience inceptions (closures) within the next four quarters. Fund closures include liquidations and mergers. Panel (B) presents descriptive statistics for the quarterly variables at the fund level, the fund family level, the industry level, and the manager level. The variable definition is as follow. Fund variables: Fund closure dummy (value of one if the fund is liquidated or merged to another fund); diversity (the ratio of the number of female managers to the total number of managers of the fund); # manager (the total number of managers); TNA (total net assets under management); index fund (a dummy variable that takes the value of one if the fund is an index fund); expense ratio (the annual expense ratio as disclosed in the most recent annual report); annual return (the fund returns after expenses over the year); annual flows (growth of TNA net of the returns over the year); age (time since the inception date); subadvised dummy (value of one if the fund is managed by a subadvisor(s); and solo dummy (value of one if the number of the managers is one). Family variables: Fund closure (the ratio of the number of closed funds to the total number of funds of the family); and the other family variables are similarly defined to the fund variables. Industry variables: Fund closure (the ratio of the number of closed funds to the total number of funds in the industry); and leave the family (the ratio of the number of fund managers who exit the fund family to the total number of fund managers in the industry). Manager variables: Leave the family (value of one if the manager no longer manages funds of the fund family); female dummy (value of one if the manager is female); fund closure ratio (the ratio of the number of closed funds to the total number of the funds under the manager's management); diversity (average diversity of the funds under the manager's management); # manager (average number of managers of the funds under the manager's management); TNA (the sum of TNA of the funds under the manager's management); # fund (the total number of the funds under the manager's management); tenure (time since the first date the own manager manages a fund of the fund family); and fund age (the average age of the funds under the manager's management). The sample is from Morningstar.

(A) Mutual fund industry statistics

| | All quarters | | | | 1990 Q1-1999 Q3 | | | | 1999 Q4-2015 Q3 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | own | | sub | | own | | sub | | own | | sub | |
| | average | s.d. | average | s.d. | average | s.d. | average | s.d. | average | s.d. | average | s.d. |
| total family | 333 | 94 | 179 | 44 | 232 | 77 | 145 | 49 | 398 | 20 | 202 | 19 |
| male family | 214 | 56 | 89 | 17 | 154 | 42 | 89 | 22 | 252 | 17 | 89 | 13 |
| total fund | 1617 | 591 | 1264 | 554 | 971 | 430 | 641 | 299 | 2030 | 118 | 1662 | 192 |
| team ratio | 0.73 | 0.11 | 0.54 | 0.15 | 0.62 | 0.06 | 0.39 | 0.07 | 0.81 | 0.07 | 0.64 | 0.08 |
| average fund | 4.85 | 0.63 | 6.81 | 2.40 | 4.19 | 0.50 | 4.28 | 0.59 | 5.27 | 0.17 | 8.44 | 1.55 |
| average manager | 6.21 | 0.32 | 12.23 | 0.72 | 5.18 | 0.17 | 5.70 | 0.17 | 6.87 | 0.19 | 16.41 | 0.54 |
| | | | | | | | | | | | | |
| one manager family | 177 | 37 | - | - | 143 | 39 | - | - | 199 | 10 | - | - |
| female one manager family | 8 | 3 | - | - | 7 | 4 | - | - | 8 | 3 | - | - |
| | | | | | | | | | | | | |
| total male | 1792 | 676 | 993 | 430 | 1035 | 466 | 505 | 192 | 2253 | 198 | 1291 | 200 |
| male in male family | 727 | 230 | 240 | 63 | 489 | 135 | 179 | 47 | 872 | 136 | 276 | 38 |
| total female | 221 | 84 | 132 | 47 | 134 | 77 | 79 | 33 | 275 | 15 | 165 | 12 |
| diversity | 0.11 | 0.01 | 0.12 | 0.01 | 0.11 | 0.02 | 0.13 | 0.01 | 0.11 | 0.01 | 0.11 | 0.01 |
| male hire | 0.037 | 0.018 | 0.047 | 0.022 | 0.054 | 0.015 | 0.063 | 0.021 | 0.026 | 0.009 | 0.037 | 0.015 |
| female hire | 0.044 | 0.036 | 0.052 | 0.034 | 0.073 | 0.042 | 0.070 | 0.042 | 0.027 | 0.015 | 0.040 | 0.020 |
| male exit | 0.018 | 0.006 | 0.024 | 0.011 | 0.015 | 0.006 | 0.017 | 0.009 | 0.020 | 0.006 | 0.029 | 0.009 |
| female exit | 0.023 | 0.014 | 0.033 | 0.021 | 0.018 | 0.016 | 0.023 | 0.022 | 0.027 | 0.012 | 0.038 | 0.019 |
| | | | | | | | | | | | | |
| fund birth | 175 | 62 | 138 | 58 | 136 | 75 | 94 | 59 | 200 | 34 | 167 | 34 |
| fund closure | 86 | 59 | 72 | 64 | 23 | 21 | 9 | 9 | 126 | 36 | 113 | 49 |

(B) Descriptive statistics of variables

| | All fund families | | | | | | Diverse fund families | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | obs | mean | s.d. | min | median | max | obs | mean | s.d. | min | median | max |
| fund variables | | | | | | | | | | | | |
| fund closure dummy | 226065 | 0.041 | 0.197 | 0.000 | 0.000 | 1.000 | 175404 | 0.040 | 0.196 | 0.000 | 0.000 | 1.000 |
| diversity | 226065 | 0.108 | 0.236 | 0.000 | 0.000 | 1.000 | 175404 | 0.139 | 0.259 | 0.000 | 0.000 | 1.000 |
| # manager | 226065 | 2.666 | 2.536 | 1.000 | 2.000 | 71.000 | 175404 | 2.811 | 2.747 | 1.000 | 2.000 | 71.000 |
| TNA ($B) | 226065 | 1.259 | 5.468 | 0.001 | 0.218 | 309.645 | 175404 | 1.378 | 5.880 | 0.001 | 0.264 | 309.645 |
| age | 226065 | 10.225 | 7.306 | 0.333 | 8.667 | 34.750 | 175404 | 10.440 | 7.371 | 0.333 | 8.917 | 34.750 |
| index fund dummy | 226065 | 0.060 | 0.238 | 0.000 | 0.000 | 1.000 | 175404 | 0.064 | 0.244 | 0.000 | 0.000 | 1.000 |
| expense ratio | 226065 | 0.038 | 0.047 | -0.769 | 0.017 | 0.773 | 175404 | 0.038 | 0.047 | -0.769 | 0.017 | 0.719 |
| annual return | 226065 | 0.100 | 0.244 | -0.998 | 0.120 | 8.276 | 175404 | 0.098 | 0.246 | -0.998 | 0.120 | 8.276 |
| annual flow | 226065 | 0.316 | 1.097 | -1.000 | 0.008 | 9.999 | 175404 | 0.306 | 1.088 | -1.000 | 0.004 | 9.999 |
| subadvised dummy | 226065 | 0.439 | 0.496 | 0.000 | 0.000 | 1.000 | 175404 | 0.500 | 0.500 | 0.000 | 1.000 | 1.000 |
| solo dummy | 226065 | 0.348 | 0.476 | 0.000 | 0.000 | 1.000 | 175404 | 0.334 | 0.471 | 0.000 | 0.000 | 1.000 |
| family variables | | | | | | | | | | | | |
| fund closure | 31982 | 0.036 | 0.136 | 0.000 | 0.000 | 1.000 | 16403 | 0.037 | 0.124 | 0.000 | 0.000 | 1.000 |
| # fund | 31982 | 12.365 | 15.952 | 2.000 | 6.000 | 137.000 | 16403 | 17.927 | 19.283 | 2.000 | 11.000 | 137.000 |
| diversity | 31982 | 0.100 | 0.133 | 0.000 | 0.048 | 0.750 | 16403 | 0.195 | 0.125 | 0.018 | 0.161 | 0.750 |
| # manager | 31982 | 19.405 | 26.287 | 2.000 | 9.000 | 235.000 | 16403 | 29.141 | 31.242 | 2.000 | 17.000 | 235.000 |
| TNA ($B) | 31982 | 12.331 | 45.293 | 0.001 | 1.301 | 1170.377 | 16403 | 19.414 | 60.239 | 0.001 | 3.679 | 1170.377 |
| age | 31982 | 15.748 | 8.410 | 0.333 | 15.000 | 34.750 | 16403 | 17.536 | 8.434 | 0.333 | 17.333 | 34.750 |
| industry variables | | | | | | | | | | | | |
| fund closure | 100 | 0.058 | 0.033 | 0.003 | 0.062 | 0.123 | 100 | 0.058 | 0.033 | 0.003 | 0.062 | 0.123 |
| leave the family | 100 | 0.129 | 0.030 | 0.053 | 0.130 | 0.182 | 100 | 0.129 | 0.030 | 0.053 | 0.130 | 0.182 |
| manager variables | | | | | | | | | | | | |
| leave the family | 455455 | 0.139 | 0.346 | 0.000 | 0.000 | 1.000 | 348065 | 0.144 | 0.351 | 0.000 | 0.000 | 1.000 |
| female dummy | 455455 | 0.113 | 0.317 | 0.000 | 0.000 | 1.000 | 348065 | 0.148 | 0.355 | 0.000 | 0.000 | 1.000 |
| fund closure ratio | 455455 | 0.055 | 0.214 | 0.000 | 0.000 | 1.000 | 348065 | 0.052 | 0.207 | 0.000 | 0.000 | 1.000 |
| diversity | 455455 | 0.113 | 0.198 | 0.000 | 0.000 | 1.000 | 348065 | 0.148 | 0.215 | 0.000 | 0.000 | 1.000 |
| # manager | 455455 | 4.603 | 4.931 | 1.000 | 3.000 | 71.000 | 348065 | 5.106 | 5.418 | 1.000 | 3.167 | 71.000 |
| TNA ($B) | 455455 | 2.309 | 11.896 | 0.000 | 0.273 | 431.362 | 348065 | 2.643 | 13.162 | 0.000 | 0.356 | 431.362 |
| # fund | 455455 | 1.616 | 1.630 | 1.000 | 1.000 | 62.000 | 348065 | 1.646 | 1.669 | 1.000 | 1.000 | 62.000 |
| tenure | 226761 | 5.368 | 5.248 | 0.000 | 3.753 | 54.614 | 148491 | 5.238 | 5.076 | 0.000 | 3.748 | 49.153 |
| fund age | 455455 | 9.406 | 6.778 | 0.083 | 8.167 | 34.750 | 348065 | 9.679 | 6.773 | 0.083 | 8.500 | 34.750 |

**Table 2**
**Panel regressions of fund closure**

The table reports coefficient estimates, standard errors, and pvalues (in parentheses). The regressions in the equation (1) are run separately for all fund families, diverse fund families, and male-only fund families. Diverse fund families have at least one female manager and male-only fund families have no female managers. Own funds are managed by managers who are employed by the fund family. The dependent variable is a dummy variable that takes the value of one when a share class of the fund is closed (liquidation and internal or external mergers). The independent variable is presented in the first column. Diversity is the ratio of the number of female managers to the total number of managers of the fund. Size (trillions) is the assets under management in trillion dollars. Expense ratio is the annual expense ratio as disclosed in the most recent annual report. Net return and flow are returns after expenses and net money flows for the fund, respectively, for the last one year. # managers (10s) is the total number of managers in tens. Age (10s) is the time since the inception date of the fund in a unit of 10 years. Index fund is a dummy variable that takes the value of one if the fund is an index fund. Industry closure ratio is the ratio of number of funds liquidated or merged to another fund to the total number of funds in the industry except for the fund in question over the same quarter. Family closure ratio is similar to the industry closure ratio except that only the funds in the same family are considered. Family # fund (10s), family diversity, family # managers (10s), family size (trillions), family age (10s) are similarly defined as the fund variables. Subadvised dummy takes the value of one if the fund is managed by subadvisors. The regressions also include fund family fixed effects and the standard errors are clustered by year-quarter. The data period is from 1990 Q1 to 2015 Q3.

| | All fund families | | | | Diverse families | | | | Male families | |
|---|---|---|---|---|---|---|---|---|---|---|
| | all funds | | own funds | | all funds | | own funds | | all funds | |
| diversity | -0.001 | -0.001 | 0.004 | 0.003 | -0.001 | -0.001 | 0.004 | 0.002 | | |
| (s.e.) | (0.004) | (0.004) | (0.005) | (0.005) | (0.004) | (0.004) | (0.005) | (0.005) | | |
| (pvalue) | (0.712) | (0.825) | (0.364) | (0.575) | (0.781) | (0.789) | (0.367) | (0.690) | | |
| size (trillions) | -0.388 | -0.408 | -0.415 | -0.306 | -0.288 | -0.342 | -0.294 | -0.237 | -0.899 | -0.826 |
| (s.e.) | (0.170) | (0.196) | (0.190) | (0.170) | (0.135) | (0.168) | (0.150) | (0.140) | (0.558) | (0.628) |
| (pvalue) | (0.025) | (0.040) | (0.032) | (0.075) | (0.035) | (0.044) | (0.053) | (0.093) | (0.110) | (0.191) |
| expense ratio (%) | -0.150 | -0.163 | -0.133 | -0.131 | -0.167 | -0.179 | -0.150 | -0.159 | -0.131 | -0.127 |
| (s.e.) | (0.023) | (0.029) | (0.022) | (0.031) | (0.026) | (0.033) | (0.026) | (0.035) | (0.029) | (0.041) |
| (pvalue) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.003) |
| net return (%) | -0.003 | -0.012 | -0.004 | -0.013 | -0.006 | -0.011 | -0.009 | -0.013 | -0.006 | -0.014 |
| (s.e.) | (0.003) | (0.004) | (0.004) | (0.004) | (0.003) | (0.004) | (0.004) | (0.004) | (0.006) | (0.006) |
| (pvalue) | (0.270) | (0.001) | (0.253) | (0.002) | (0.068) | (0.002) | (0.028) | (0.001) | (0.278) | (0.027) |
| flow (%) | -0.004 | -0.005 | -0.004 | -0.005 | -0.004 | -0.005 | -0.003 | -0.004 | -0.006 | -0.006 |
| (s.e.) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) |
| (pvalue) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) |

| | All fund families | | | | Diverse families | | | | Male families | |
|---|---|---|---|---|---|---|---|---|---|---|
| | all funds | | own funds | | all funds | | own funds | | all funds | |
| # managers (10's) | -0.008 | -0.014 | -0.005 | -0.025 | -0.012 | -0.015 | -0.012 | -0.027 | 0.003 | -0.009 |
| (s.e.) | (0.003) | (0.004) | (0.005) | (0.006) | (0.004) | (0.005) | (0.006) | (0.008) | (0.010) | (0.014) |
| (pvalue) | (0.018) | (0.002) | (0.277) | (0.000) | (0.003) | (0.003) | (0.030) | (0.001) | (0.781) | (0.520) |
| age (10's) | -0.005 | -0.006 | -0.004 | -0.005 | -0.006 | -0.006 | -0.005 | -0.006 | -0.003 | -0.002 |
| (s.e.) | (0.002) | (0.002) | (0.002) | (0.003) | (0.002) | (0.002) | (0.003) | (0.003) | (0.003) | (0.003) |
| (pvalue) | (0.003) | (0.003) | (0.120) | (0.069) | (0.002) | (0.004) | (0.084) | (0.072) | (0.329) | (0.486) |
| index fund | -0.011 | -0.012 | -0.010 | -0.008 | -0.012 | -0.012 | -0.013 | -0.007 | -0.004 | -0.018 |
| (s.e.) | (0.004) | (0.004) | (0.005) | (0.006) | (0.004) | (0.005) | (0.006) | (0.008) | (0.008) | (0.007) |
| (pvalue) | (0.005) | (0.007) | (0.040) | (0.225) | (0.003) | (0.013) | (0.028) | (0.326) | (0.626) | (0.016) |
| industry closure ratio | 0.258 | 0.076 | 0.257 | 0.083 | 0.142 | 0.016 | 0.136 | 0.031 | 0.398 | 0.222 |
| (s.e.) | (0.028) | (0.028) | (0.034) | (0.037) | (0.028) | (0.027) | (0.037) | (0.039) | (0.050) | (0.074) |
| (pvalue) | (0.000) | (0.008) | (0.000) | (0.029) | (0.000) | (0.543) | (0.000) | (0.431) | (0.000) | (0.003) |
| family closure ratio | 0.834 | 0.784 | 0.764 | 0.708 | 0.881 | 0.833 | 0.812 | 0.759 | 0.752 | 0.664 |
| (s.e.) | (0.020) | (0.024) | (0.027) | (0.031) | (0.022) | (0.026) | (0.031) | (0.037) | (0.035) | (0.041) |
| (pvalue) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) |
| family # funds (10's) | -0.001 | 0.000 | -0.001 | 0.001 | -0.001 | 0.000 | -0.001 | 0.002 | 0.001 | 0.002 |
| (s.e.) | (0.001) | (0.002) | (0.001) | (0.003) | (0.001) | (0.001) | (0.001) | (0.002) | (0.003) | (0.005) |
| (pvalue) | (0.443) | (0.976) | (0.189) | (0.775) | (0.352) | (0.744) | (0.225) | (0.429) | (0.817) | (0.661) |
| family diversity | 0.025 | 0.005 | 0.026 | 0.007 | 0.060 | 0.032 | 0.063 | 0.039 | | |
| (s.e.) | (0.009) | (0.012) | (0.011) | (0.017) | (0.011) | (0.015) | (0.015) | (0.023) | | |
| (pvalue) | (0.005) | (0.660) | (0.022) | (0.659) | (0.000) | (0.035) | (0.000) | (0.090) | | |
| family # managers (10's) | 0.001 | 0.000 | 0.001 | 0.000 | 0.001 | 0.000 | 0.001 | -0.001 | 0.003 | 0.005 |
| (s.e.) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.002) | (0.003) |
| (pvalue) | (0.283) | (0.786) | (0.166) | (0.665) | (0.048) | (0.740) | (0.084) | (0.541) | (0.234) | (0.061) |
| family size (trillions) | -0.010 | -0.013 | 0.001 | -0.014 | -0.002 | -0.009 | 0.009 | -0.009 | -0.073 | -0.175 |
| (s.e.) | (0.011) | (0.009) | (0.008) | (0.012) | (0.010) | (0.009) | (0.008) | (0.013) | (0.041) | (0.101) |
| (pvalue) | (0.365) | (0.183) | (0.901) | (0.266) | (0.862) | (0.305) | (0.259) | (0.502) | (0.075) | (0.088) |
| family age (10's) | 0.002 | 0.007 | 0.002 | 0.009 | 0.002 | 0.005 | 0.003 | 0.008 | -0.002 | 0.013 |
| (s.e.) | (0.001) | (0.002) | (0.002) | (0.003) | (0.001) | (0.002) | (0.002) | (0.003) | (0.002) | (0.004) |
| (pvalue) | (0.056) | (0.000) | (0.216) | (0.001) | (0.074) | (0.007) | (0.138) | (0.013) | (0.303) | (0.003) |
| sub managed dummy | 0.005 | 0.005 | | | 0.004 | 0.004 | | | 0.013 | 0.015 |
| (s.e.) | (0.002) | (0.005) | | | (0.002) | (0.006) | | | (0.004) | (0.008) |
| (pvalue) | (0.009) | (0.276) | | | (0.022) | (0.482) | | | (0.003) | (0.074) |
| fixed effects | none | family | none | family | none | family | none | family | none | family |
| $R^2$ | 0.218 | 0.152 | 0.194 | 0.135 | 0.199 | 0.135 | 0.179 | 0.122 | 0.286 | 0.188 |
| observations | 224414 | 224414 | 124977 | 124977 | 175104 | 175104 | 87360 | 87360 | 49310 | 49310 |

**Table 3**

**Unconditional probability of a manager's leaving or joining a fund family**

The table presents the results of the regression equation (3): coefficient estimates and standard errors, multiplied by 100. The dependent variable is a dummy variable that takes the value of one if the manager leaves the fund family (stops managing a fund for the fund family) in the quarter. Female manager is a dummy variable that takes the value of one if the manager is female. Male manager in a male family is a dummy variable that takes the value of one if the manager is from a male-only fund family (i.e., no female managers). sub manager is a dummy variable that takes the value of one if the manager manages only subadvised funds. Panel (B) is the same as Panel (A) except that the dependent variable is the dummy variable that takes the value of one if the manager starts managing a fund for the fund family in the quarter. The data period is from 1990 Q1 to 2015 Q3.

| | All quarters | | | 1990 Q1-1999 Q3 | | | 1999 Q4-2015 Q3 | | |
|---|---|---|---|---|---|---|---|---|---|
| | est*100 | s.e.*100 | pvalue | est*100 | s.e.*100 | pvalue | est*100 | s.e.*100 | pvalue |
| probability of leaving the fund family | | | | | | | | | |
| benchmark: own male managers in a diverse family | | | | | | | | | |
| own female manager in a diverse family | +0.541 | (0.097) | (0.000) | +0.044 | (0.158) | (0.783) | +0.654 | (0.116) | (0.000) |
| own male manager in a male family | +0.043 | (0.165) | (0.792) | -0.191 | (0.203) | (0.347) | +0.118 | (0.194) | (0.541) |
| sub manager | +0.657 | (0.183) | (0.000) | +0.076 | (0.213) | (0.722) | +0.788 | (0.201) | (0.000) |
| probability of leaving the fund industry | | | | | | | | | |
| benchmark: own male managers in a diverse family | | | | | | | | | |
| own female manager in a diverse family | +0.303 | (0.097) | (0.002) | +1.071 | (0.262) | (0.000) | +0.129 | (0.106) | (0.227) |
| own male manager in a male family | +0.228 | (0.154) | (0.140) | +0.001 | (0.300) | (0.998) | +0.330 | (0.172) | (0.055) |
| sub manager | +1.337 | (0.173) | (0.000) | +0.797 | (0.321) | (0.013) | +1.467 | (0.169) | (0.000) |

**Table 4**
**Selection of solo vs. team management**

The table presents coefficient estimates, standard errors, and pvalues of panel regressions of managers in each quarter. The dependent variable is a dummy variable that takes the value of one if the manager manages at least one fund alone (solo manager). The dependent variables are measured at the beginning of the quarter and presented in the first column. Gross return is the net return plus the expense ratio. Tenure is time in years since the first date the manager manages a fund of the fund family. Size is the sum of TNA of the funds under the manager's management in trillion dollars. # funds is the total number of the funds under the manager's management. Submanager dummy takes the value of one if the manager is not employed by the fund family but by a subadvisor. Male-only family dummy takes the value of one if the fund family has no own female manager. Industry solo ratio is the number of solo managers to the total number of managers in the fund industry. Female dummy takes the value of one if the manager is female. The standard errors are clustered by advisor and year-quarter. The data period is from 1990 Q1 to 2015 Q3.

| | dependent: dummy variable for solo manager | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | (1) | | | (2) | | | (3) | |
| | est | s.e. | pvalue | est | s.e. | pvalue | est | s.e. | pvalue |
| past 1-year gross return | 0.032 | (0.015) | (0.038) | 0.024 | (0.011) | (0.026) | 0.027 | (0.006) | (0.000) |
| past 1-year gross return*female | 0.002 | (0.025) | (0.948) | 0.000 | (0.023) | (0.988) | -0.007 | (0.017) | (0.695) |
| tenure | 0.007 | (0.002) | (0.000) | 0.008 | (0.001) | (0.000) | 0.008 | (0.001) | (0.000) |
| size | -0.584 | (0.657) | (0.376) | 0.065 | (0.478) | (0.893) | -0.169 | (0.376) | (0.653) |
| # funds | 0.006 | (0.003) | (0.037) | 0.004 | (0.003) | (0.163) | 0.008 | (0.002) | (0.001) |
| submanager dummy | 0.012 | (0.027) | (0.650) | -0.063 | (0.021) | (0.003) | -0.015 | (0.008) | (0.079) |
| male-only family dummy | 0.027 | (0.017) | (0.122) | 0.055 | (0.015) | (0.000) | 0.034 | (0.008) | (0.000) |
| industry solo ratio | 1.029 | (0.100) | (0.000) | 0.885 | (0.093) | (0.000) | 0.893 | (0.055) | (0.000) |
| constant | -0.062 | (0.024) | (0.011) | | | | | | |
| female dummy | -0.008 | (0.009) | (0.367) | 0.000 | (0.007) | (0.982) | | | |
| fixed effect | | none | | | advisor | | | manager | |
| $R^2$ | | 0.215 | | | 0.261 | | | 0.587 | |
| $R^2$ excluding fixed effect | | | | | 0.056 | | | 0.033 | |
| | | (4) | | | (5) | | | (6) | |
| | est | s.e. | pvalue | est | s.e. | pvalue | est | s.e. | pvalue |
| past 1-year net return | 0.029 | (0.014) | (0.041) | 0.021 | (0.010) | (0.033) | 0.023 | (0.006) | (0.000) |
| past 1-year net return*female | -0.009 | (0.024) | (0.696) | -0.012 | (0.023) | (0.600) | -0.011 | (0.017) | (0.535) |
| tenure | 0.007 | (0.002) | (0.000) | 0.008 | (0.001) | (0.000) | 0.008 | (0.001) | (0.000) |
| size | -0.586 | (0.657) | (0.375) | 0.063 | (0.479) | (0.896) | -0.170 | (0.376) | (0.653) |
| # funds | 0.006 | (0.003) | (0.037) | 0.004 | (0.003) | (0.165) | 0.008 | (0.002) | (0.001) |
| submanager dummy | 0.012 | (0.027) | (0.651) | -0.063 | (0.021) | (0.004) | -0.015 | (0.008) | (0.076) |
| male-only family dummy | 0.026 | (0.017) | (0.127) | 0.054 | (0.015) | (0.000) | 0.034 | (0.008) | (0.000) |
| industry solo ratio | 1.032 | (0.100) | (0.000) | 0.888 | (0.093) | (0.000) | 0.896 | (0.056) | (0.000) |
| constant | -0.062 | (0.024) | (0.011) | | | | | | |
| female dummy | -0.008 | (0.009) | (0.369) | 0.000 | (0.007) | (0.985) | | | |
| fixed effect | | none | | | advisor | | | manager | |
| $R^2$ | | 0.215 | | | 0.261 | | | 0.587 | |
| $R^2$ excluding fixed effect | | | | | 0.056 | | | 0.033 | |

**Table 5**

**Own team managers' probability of leaving the fund family and the industry**

The table reports coefficient estimates, standard errors, and pvalues (in parentheses) of the regression in Equation (3). The dependent variable is a dummy variable that takes the value of one if the manager leaves the fund family within the next four quarters as in (A); and if the manager leaves the equity fund industry within the next four quarters as in (B). The sample includes only managers working in teams and employed by diverse fund families (own team managers in diverse fund families). Diverse fund family employs at least one female fund manager. New hires are the managers who have less than 3 years of experience with the fund family. Independent variables are presented in the first column. Female is a dummy variable that takes the value of one if the manager is female. Fund closure is the ratio of funds liquidated or merged to another fund within the next four quarters to the total number of funds managed by the manager at the beginning of the quarter. Industry exit ratio is the ratio of managers who exit the fund industry within the next four quarters to the total number of managers in the industry at the beginning of the quarter. Tenure is time in years since the first date the manager manages a fund of the fund family. Diversity is the average fraction of female managers of the funds under management of the manager. # manager is the average number of managers of the funds under management of the manager. Size is the total assets under management of the manager. Managing funds is the number of the funds under management of the manager. Age is the average age of the funds under management of the manager. Variables at the family level are similarly defined. The regressions include the family fixed effects except for the regressions in (3) and (6) and the standard errors are clustered by fund family and year-quarter. The data period is from 1990 Q1 to 2015 Q3.

(A) Panel regressions for own team managers' exit from the fund family

| | Own team managers' exit from the fund family | | | | | | | | | New hires' exit | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | (1) | | | (2) | | | (3) | | | (4) | |
| | est | s.e. | pvalue | est | s.e. | pvalue | est | s.e. | pvalue | est | s.e. | pvalue |
| female | 0.006 | (0.006) | (0.330) | -0.036 | (0.024) | (0.125) | -0.047 | (0.026) | (0.067) | -0.026 | (0.033) | (0.439) |
| fund closure | 0.494 | (0.033) | (0.000) | 0.503 | (0.039) | (0.000) | 0.555 | (0.039) | (0.000) | 0.478 | (0.039) | (0.000) |
| fund closure*female | | | | 0.098 | (0.038) | (0.010) | 0.093 | (0.038) | (0.015) | 0.100 | (0.038) | (0.010) |
| industry exit ratio | 0.600 | (0.162) | (0.000) | 0.592 | (0.161) | (0.000) | 0.568 | (0.135) | (0.000) | 0.692 | (0.184) | (0.000) |
| fund closure*tenure | | | | -0.004 | (0.005) | (0.393) | -0.007 | (0.005) | (0.165) | | | |
| fund closure*tenure*female | | | | -0.007 | (0.005) | (0.181) | -0.006 | (0.005) | (0.261) | | | |
| diversity | 0.032 | (0.014) | (0.022) | 0.025 | (0.017) | (0.150) | 0.009 | (0.019) | (0.626) | 0.036 | (0.022) | (0.110) |
| # manager | 0.010 | (0.002) | (0.000) | 0.009 | (0.002) | (0.000) | 0.005 | (0.003) | (0.055) | 0.008 | (0.003) | (0.002) |
| size | -0.332 | (0.123) | (0.008) | -0.314 | (0.126) | (0.015) | -0.292 | (0.178) | (0.105) | -0.386 | (0.295) | (0.194) |
| managing funds | -0.012 | (0.005) | (0.014) | -0.012 | (0.005) | (0.018) | -0.011 | (0.004) | (0.009) | -0.006 | (0.004) | (0.176) |
| tenure | 0.005 | (0.001) | (0.000) | 0.005 | (0.001) | (0.000) | 0.002 | (0.001) | (0.009) | | | |
| age | 0.001 | (0.001) | (0.090) | 0.001 | (0.001) | (0.097) | 0.000 | (0.001) | (0.785) | 0.001 | (0.001) | (0.149) |
| family diversity | -0.102 | (0.060) | (0.091) | -0.099 | (0.062) | (0.113) | 0.061 | (0.051) | (0.236) | -0.021 | (0.068) | (0.763) |
| family # manager | 0.000 | (0.000) | (0.375) | 0.000 | (0.000) | (0.278) | 0.000 | (0.000) | (0.004) | 0.000 | (0.000) | (0.119) |
| family size | -0.003 | (0.003) | (0.311) | -0.004 | (0.004) | (0.321) | -0.018 | (0.004) | (0.000) | -0.011 | (0.005) | (0.032) |
| family age | -0.001 | (0.001) | (0.392) | -0.001 | (0.001) | (0.235) | 0.000 | (0.001) | (0.554) | 0.000 | (0.001) | (0.761) |
| diversity*female | | | | 0.045 | (0.039) | (0.246) | 0.086 | (0.039) | (0.031) | 0.026 | (0.046) | (0.575) |
| manager*female | | | | 0.004 | (0.003) | (0.176) | 0.002 | (0.003) | (0.567) | 0.003 | (0.003) | (0.323) |
| size*female | | | | -0.220 | (0.179) | (0.222) | -0.413 | (0.215) | (0.058) | -0.710 | (0.825) | (0.391) |
| managing funds*female | | | | -0.003 | (0.002) | (0.173) | -0.002 | (0.002) | (0.298) | -0.007 | (0.006) | (0.298) |
| tenure*female | | | | 0.000 | (0.001) | (0.982) | 0.000 | (0.001) | (0.799) | | | |
| age*female | | | | 0.000 | (0.001) | (0.914) | 0.000 | (0.001) | (0.719) | 0.001 | (0.001) | (0.575) |
| family diversity*female | | | | -0.022 | (0.057) | (0.694) | -0.027 | (0.061) | (0.661) | -0.010 | (0.075) | (0.892) |
| family # manager*female | | | | 0.000 | (0.000) | (0.022) | 0.000 | (0.000) | (0.019) | 0.000 | (0.000) | (0.073) |
| family size*female | | | | 0.001 | (0.003) | (0.797) | 0.004 | (0.003) | (0.188) | -0.006 | (0.005) | (0.232) |
| family age*female | | | | 0.002 | (0.001) | (0.064) | 0.002 | (0.001) | (0.024) | 0.002 | (0.001) | (0.200) |
| fixed effects | | family | | | family | | | none | | | family | |
| $R^2$ | | 0.087 | | | 0.088 | | | 0.236 | | | 0.088 | |
| observations | | 116,148 | | | 116,148 | | | 116,148 | | | 49,659 | |

(B) Panel regressions for own team managers' exit from the fund industry

| | Own team managers' exit from the fund industry | | | | | | | | | New hires' exit | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | (1) | | | (2) | | | (3) | | | (4) | |
| | est | s.e. | pvalue | est | s.e. | pvalue | est | s.e. | pvalue | est | s.e. | pvalue |
| female | 0.014 | (0.005) | (0.004) | -0.040 | (0.022) | (0.070) | -0.035 | (0.023) | (0.129) | -0.022 | (0.031) | (0.483) |
| fund closure | 0.282 | (0.023) | (0.000) | 0.236 | (0.028) | (0.000) | 0.253 | (0.029) | (0.000) | 0.209 | (0.024) | (0.000) |
| fund closure*female | | | | 0.085 | (0.040) | (0.037) | 0.075 | (0.041) | (0.075) | 0.078 | (0.044) | (0.083) |
| industry exit ratio | 0.232 | (0.105) | (0.030) | 0.234 | (0.104) | (0.026) | 0.174 | (0.080) | (0.032) | 0.312 | (0.133) | (0.021) |
| fund closure*tenure | | | | 0.007 | (0.005) | (0.115) | 0.006 | (0.005) | (0.170) | | | |
| fund closure*tenure*female | | | | -0.007 | (0.006) | (0.237) | -0.005 | (0.006) | (0.390) | | | |
| diversity | 0.035 | (0.013) | (0.007) | 0.028 | (0.017) | (0.098) | 0.018 | (0.017) | (0.296) | 0.047 | (0.018) | (0.009) |
| # manager | 0.004 | (0.001) | (0.001) | 0.004 | (0.001) | (0.002) | 0.000 | (0.001) | (0.697) | 0.003 | (0.002) | (0.139) |
| size | -0.282 | (0.102) | (0.007) | -0.252 | (0.106) | (0.019) | -0.277 | (0.134) | (0.041) | -0.243 | (0.232) | (0.296) |
| managing funds | -0.009 | (0.003) | (0.008) | -0.009 | (0.003) | (0.011) | -0.007 | (0.003) | (0.011) | -0.004 | (0.002) | (0.109) |
| tenure | 0.004 | (0.001) | (0.000) | 0.004 | (0.001) | (0.000) | 0.003 | (0.001) | (0.000) | | | |
| age | 0.001 | (0.000) | (0.146) | 0.001 | (0.000) | (0.086) | 0.000 | (0.000) | (0.316) | 0.000 | (0.001) | (0.407) |
| family diversity | -0.075 | (0.048) | (0.126) | -0.091 | (0.051) | (0.075) | 0.031 | (0.031) | (0.330) | -0.046 | (0.052) | (0.386) |
| family # manager | 0.000 | (0.000) | (0.837) | 0.000 | (0.000) | (0.926) | 0.000 | (0.000) | (0.000) | 0.000 | (0.000) | (0.954) |
| family size | 0.000 | (0.002) | (0.858) | -0.001 | (0.002) | (0.726) | -0.007 | (0.002) | (0.005) | -0.006 | (0.003) | (0.043) |
| family age | 0.000 | (0.001) | (0.654) | 0.000 | (0.001) | (0.927) | 0.000 | (0.000) | (0.896) | 0.001 | (0.001) | (0.147) |
| diversity*female | | | | 0.051 | (0.033) | (0.131) | 0.061 | (0.034) | (0.077) | 0.026 | (0.042) | (0.534) |
| manager*female | | | | 0.005 | (0.002) | (0.027) | 0.003 | (0.002) | (0.181) | 0.004 | (0.003) | (0.139) |
| size*female | | | | -0.249 | (0.159) | (0.121) | -0.357 | (0.167) | (0.035) | -0.343 | (0.792) | (0.666) |
| managing funds*female | | | | -0.003 | (0.002) | (0.111) | -0.002 | (0.002) | (0.163) | -0.006 | (0.004) | (0.152) |
| tenure*female | | | | -0.001 | (0.001) | (0.579) | -0.001 | (0.001) | (0.503) | | | |
| age*female | | | | -0.001 | (0.001) | (0.418) | -0.001 | (0.001) | (0.208) | -0.001 | (0.001) | (0.472) |
| family diversity*female | | | | 0.029 | (0.052) | (0.577) | 0.014 | (0.052) | (0.786) | 0.016 | (0.076) | (0.828) |
| family # manager*female | | | | 0.000 | (0.000) | (0.498) | 0.000 | (0.000) | (0.557) | 0.000 | (0.000) | (0.395) |
| family size*female | | | | 0.001 | (0.003) | (0.611) | 0.003 | (0.002) | (0.168) | -0.008 | (0.004) | (0.070) |
| family age*female | | | | 0.002 | (0.001) | (0.070) | 0.002 | (0.001) | (0.029) | 0.002 | (0.001) | (0.187) |
| fixed effects | | family | | | family | | | none | | | family | |
| $R^2$ | | 0.050 | | | 0.050 | | | 0.133 | | | 0.036 | |
| observations | | 116,148 | | | 116,148 | | | 116,148 | | | 49,659 | |

**Table 6**
**Sub team managers' probability of leaving the fund family and the industry**

The table reports coefficient estimates, standard errors, and pvalues (in parentheses) of the regression in Equation (3). The dependent variable is a dummy variable that takes the value of one if the manager leaves the fund family within the next four quarters (exit from the fund family); and if the manager leaves the equity fund industry within the next four quarters (exit from the fund industry). The sample includes only managers working in teams for the diverse fund families and employed by a subadvisor (sub team managers working for diverse fund families). Diverse fund family employs at least one female fund manager. Independent variables are presented in the first column. Female is a dummy variable that takes the value of one if the manager is female. Fund closure is the ratio of funds liquidated or merged to another fund within the next four quarters to the total number of funds managed by the manager. Industry exit ratio is the ratio of managers who exit the fund industry within the next four quarters to the total number of managers in the industry at the beginning of the quarter. Other control variables are the same as in Table 5. The regressions include the family fixed effects except for the regressions in (3) and (6) and the standard errors are clustered by fund family and year-quarter. The data period is from 1990 Q1 to 2015 Q3.

| | Sub team managers' exit from the fund family | | | | | | Sub team managers' exit from the fund industry | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | (1) | | | (2) | | | (3) | | | (4) | |
| | est | s.e. | pvalue | est | s.e. | pvalue | est | s.e. | pvalue | est | s.e. | pvalue |
| female | 0.009 | (0.004) | (0.056) | 0.021 | (0.027) | (0.441) | 0.021 | (0.004) | (0.000) | 0.031 | (0.022) | (0.159) |
| fund closure | 0.503 | (0.036) | (0.000) | 0.500 | (0.036) | (0.000) | 0.137 | (0.018) | (0.000) | 0.134 | (0.017) | (0.000) |
| fund closure*female | | | | 0.025 | (0.029) | (0.377) | | | | 0.022 | (0.022) | (0.300) |
| industry exit ratio | 0.296 | (0.138) | (0.035) | 0.295 | (0.138) | (0.036) | 0.148 | (0.076) | (0.055) | 0.146 | (0.076) | (0.058) |
| control variables | | Yes | | | Yes | | | Yes | | | Yes | |
| control variables*female | | No | | | Yes | | | No | | | Yes | |
| fixed effects | | family | | | family | | | family | | | family | |
| $R^2$ | | 0.099 | | | 0.099 | | | 0.018 | | | 0.018 | |
| observations | | 160,482 | | | 160,482 | | | 160,482 | | | 160,482 | |

**Table 7**
**Own solo managers' probability of leaving the fund family and the industry**

The table reports coefficient estimates and standard errors (in parentheses) of the regression in Equation (3). The dependent variable is a dummy variable that takes the value of one if the manager leaves the fund family within the next four quarters (exit from the fund family); and if the manager leaves the equity fund industry within the next four quarters (exit from the fund industry). In Panel (A), the sample includes only managers who manage at least one fund alone and employed by the diverse fund families (own solo managers in diverse fund families). The sample in Panel (B) includes all managers employed by the diverse fund families (own managers in diverse fund families). Diverse fund family employs at least one female fund manager. Independent variables are presented in the first column. Female is a dummy variable that takes the value of one if the manager is female. Fund closure is the ratio of funds liquidated or merged to another fund within the next four quarters to the total number of funds managed by the manager. Industry exit ratio is the ratio of managers who exit the fund industry within the next four quarters to the total number of managers in the industry at the beginning of the quarter. Tenure is time in years since the first date the manager manages a fund of the fund family. Other control variables are the same as in Table 5. The regressions include the family fixed effects or manager fixed effects as specified and the standard errors are clustered by fund family and year-quarter. The data period is from 1990 Q1 to 2015 Q3.

(A) Panel regressions for own solo managers' exit

| | Own solo managers' exit from the fund family | | | | | | Own solo managers' exit from the fund industry | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (1) | | | (2) | | | (3) | | | (4) | | |
| | est | s.e. | pvalue | est | s.e. | pvalue | est | s.e. | pvalue | est | s.e. | pvalue |
| female | 0.008 | (0.025) | (0.743) | -0.131 | (0.097) | (0.181) | -0.011 | (0.022) | (0.634) | -0.119 | (0.084) | (0.158) |
| fund closure | 0.536 | (0.035) | (0.000) | 0.615 | (0.048) | (0.000) | 0.289 | (0.029) | (0.000) | 0.295 | (0.045) | (0.000) |
| fund closure*female | | | | 0.051 | (0.100) | (0.613) | | | | -0.017 | (0.095) | (0.858) |
| industry exit ratio | 0.333 | (0.107) | (0.002) | 0.321 | (0.105) | (0.003) | 0.155 | (0.103) | (0.138) | 0.152 | (0.103) | (0.144) |
| fund closure*tenure | | | | -0.020 | (0.006) | (0.002) | | | | -0.003 | (0.007) | (0.636) |
| fund closure*tenure*female | | | | 0.014 | (0.019) | (0.471) | | | | 0.013 | (0.016) | (0.403) |
| control variables | | Yes | | | Yes | | | Yes | | | Yes | |
| control variables*female | | No | | | Yes | | | No | | | Yes | |
| fixed effects | | family | | | family | | | family | | | family | |
| $R^2$ | | 0.120 | | | 0.123 | | | 0.064 | | | 0.065 | |
| observations | | 24,638 | | | 24,638 | | | 24,638 | | | 24,638 | |

(B) Panel regressions for own managers' exit

| | Exit from the fund family | | | Exit from the fund industry | | |
|---|---|---|---|---|---|---|
| | est | s.e. | pvalue | est | s.e. | pvalue |
| Coefficients for team managers | | | | | | |
| fund closure | 0.537 | (0.043) | (0.000) | 0.218 | (0.030) | (0.000) |
| fund closure*female | 0.116 | (0.044) | (0.009) | 0.110 | (0.040) | (0.006) |
| industry exit ratio | 0.708 | (0.206) | (0.001) | 0.223 | (0.127) | (0.081) |
| fund closure*tenure | -0.007 | (0.006) | (0.205) | 0.008 | (0.005) | (0.135) |
| fund closure*tenure*female | -0.009 | (0.006) | (0.106) | -0.010 | (0.005) | (0.072) |
| Coefficients for solo managers | | | | | | |
| fund closure | 0.619 | (0.053) | (0.000) | 0.261 | (0.038) | (0.000) |
| fund closure*female | 0.153 | (0.103) | (0.140) | 0.071 | (0.092) | (0.443) |
| industry exit ratio | 0.823 | (0.183) | (0.000) | 0.564 | (0.137) | (0.000) |
| fund closure*tenure | -0.019 | (0.007) | (0.007) | -0.001 | (0.006) | (0.916) |
| fund closure*tenure*female | -0.002 | (0.018) | (0.906) | 0.001 | (0.016) | (0.965) |
| control variables | | Yes | | | Yes | |
| control variables*female | | Yes | | | Yes | |
| fixed effects | | manager | | | manager | |
| observations | | 140,786 | | | 140,786 | |
| $R^2$ | | 0.164 | | | 0.107 | |

**Table 8**
**Managers' probability of leaving the fund family and the industry following the mutual fund scandal**

The table reports coefficient estimates, standard errors, and pvalues (in parentheses) of the regression in Equation (3) with additional variables. The dependent variable is a dummy variable that takes the value of one if the manager leaves the fund family within the next four quarters (exit from the fund family); and a dummy variable that takes the value of one if the manager leaves the equity mutual fund industry (exit from the fund industry). Regressions are separately run for groups of managers. Own managers are employed by the fund family. Sub-managers are employed by subadvisors. Team managers manage funds only in teams. Solo managers manage at least one fund alone. Independent variables are presented in the first column. Scandal is a dummy variable that takes the value of one if the fund family is one of the scandal fund families and the quarter falls between 2003 and 2005. Female is a dummy variable that takes the value of one if the manager is female. Fund closure is the ratio of funds liquidated or merged to another fund within the next four quarters to the total number of funds managed by the manager. Other control variables are the same as in Table 5. The regressions include the family fixed effects and the standard errors are clustered by fund family and year-quarter.

| | Exit from the fund family | | | | | | Exit from the fund industry | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | (1) | | | (2) | | | (3) | | | (4) | |
| | est | s.e. | pvalue | est | s.e. | pvalue | est | s.e. | pvalue | est | s.e. | pvalue |
| (A) Own team managers | | | | | | | | | | | | |
| scandal | 0.047 | (0.014) | (0.002) | 0.045 | (0.015) | (0.002) | 0.021 | (0.011) | (0.052) | 0.021 | (0.011) | (0.054) |
| female | -0.037 | (0.023) | (0.115) | -0.038 | (0.024) | (0.114) | -0.041 | (0.022) | (0.065) | -0.041 | (0.022) | (0.065) |
| scandal*female | 0.000 | (0.032) | (0.990) | 0.012 | (0.031) | (0.695) | 0.006 | (0.025) | (0.808) | 0.007 | (0.022) | (0.748) |
| fund closure | 0.504 | (0.039) | (0.000) | 0.503 | (0.039) | (0.000) | 0.235 | (0.028) | (0.000) | 0.235 | (0.028) | (0.000) |
| female*fund closure | 0.098 | (0.038) | (0.010) | 0.103 | (0.038) | (0.008) | 0.085 | (0.040) | (0.037) | 0.085 | (0.041) | (0.039) |
| scandal*fund closure | -0.062 | (0.072) | (0.394) | -0.037 | (0.075) | (0.621) | 0.016 | (0.057) | (0.777) | 0.018 | (0.063) | (0.775) |
| scandal*fund closure*female | | | | -0.270 | (0.129) | (0.039) | | | | -0.023 | (0.146) | (0.873) |
| $R^2$ | | 0.088 | | | 0.088 | | | 0.051 | | | 0.050 | |
| observations | | 116,148 | | | 116,148 | | | 116,148 | | | 116,148 | |
| (B) Own solo managers | | | | | | | | | | | | |
| scandal | 0.033 | (0.013) | (0.010) | 0.033 | (0.013) | (0.015) | 0.003 | (0.010) | (0.749) | 0.004 | (0.006) | (0.537) |
| female | -0.139 | (0.099) | (0.163) | -0.139 | (0.099) | (0.163) | -0.121 | (0.084) | (0.155) | -0.120 | (0.084) | (0.156) |
| scandal*female | -0.058 | (0.041) | (0.163) | -0.058 | (0.043) | (0.175) | -0.008 | (0.032) | (0.799) | -0.011 | (0.020) | (0.587) |
| fund closure | 0.607 | (0.048) | (0.000) | 0.607 | (0.048) | (0.000) | 0.293 | (0.046) | (0.000) | 0.293 | (0.046) | (0.000) |
| female*fund closure | 0.051 | (0.099) | (0.607) | 0.051 | (0.100) | (0.611) | -0.017 | (0.095) | (0.857) | -0.019 | (0.094) | (0.840) |
| scandal*fund closure | 0.123 | (0.090) | (0.175) | 0.124 | (0.123) | (0.317) | 0.039 | (0.083) | (0.640) | 0.032 | (0.088) | (0.715) |
| scandal*fund closure*female | | | | -0.001 | (0.156) | (0.996) | | | | 0.028 | (0.223) | (0.900) |
| $R^2$ | | 0.124 | | | 0.122 | | | 0.065 | | | 0.065 | |
| observations | | 24,632 | | | 24,632 | | | 24,632 | | | 24,632 | |
| (C) Sub team managers | | | | | | | | | | | | |
| scandal | 0.028 | (0.013) | (0.027) | 0.024 | (0.014) | (0.094) | -0.003 | (0.011) | (0.817) | 0.003 | (0.009) | (0.776) |
| female | 0.022 | (0.027) | (0.426) | 0.022 | (0.027) | (0.424) | 0.031 | (0.022) | (0.159) | 0.031 | (0.022) | (0.159) |
| scandal*female | -0.115 | (0.032) | (0.000) | -0.091 | (0.028) | (0.002) | -0.028 | (0.038) | (0.466) | -0.059 | (0.034) | (0.085) |
| fund closure | 0.499 | (0.036) | (0.000) | 0.499 | (0.036) | (0.000) | 0.135 | (0.018) | (0.000) | 0.136 | (0.018) | (0.000) |
| female*fund closure | 0.026 | (0.029) | (0.363) | 0.030 | (0.029) | (0.310) | 0.023 | (0.022) | (0.292) | 0.018 | (0.022) | (0.405) |
| scandal*fund closure | 0.041 | (0.201) | (0.840) | 0.082 | (0.178) | (0.647) | -0.073 | (0.064) | (0.261) | -0.126 | (0.034) | (0.000) |
| scandal*fund closure*female | | | | -0.234 | (0.115) | (0.045) | | | | 0.302 | (0.218) | (0.169) |
| $R^2$ | | 0.099 | | | 0.099 | | | 0.019 | | | 0.019 | |
| observations | | 160,481 | | | 160,481 | | | 160,481 | | | 160,481 | |
| control variables | | Yes | | | Yes | | | Yes | | | Yes | |
| control variables*female | | No | | | Yes | | | No | | | Yes | |

**Table 9**
**Performance of value-weighted and equal-weighted portfolios of male-only funds and diverse funds**

The table presents the results of the regression in Equation (5). The dependent variable is monthly returns on the portfolio of funds managed by only male managers (male) and on the portfolio of funds managed by at least one female manager (diverse) minus the 1-month T-Bill rate. The returns are either gross returns (net returns plus expense ratio) or net returns. The portfolio is either value (TNA)-weighted or equal-weighted. The independent variables include a constant, a dummy variable that takes the value of one if the return is on the portfolio of diverse funds and zero otherwise, benchmark returns, and interaction terms between the dummy variable and the benchmark returns. The benchmark returns are either Fama and French's (1993) three factors (MKT, SMB, HML) or Carhart's (1997) four factors (MKT, SMB, HML, and MOM). The columns of alpha represent the estimates on the constant ("male") and on the dummy variable ("+diverse") multiplied by 12 (annualized). Similarly, the columns of the benchmark returns represent the coefficients on the benchmark returns ("male") and on the interaction terms ("+diverse"). The sample include funds managed by all managers, by own managers in diverse fund families, by own team managers in divers fund families in Panels (A), (B), and (C), respectively. Own managers are employed by the fund family. Diverse fund family employs at least one female fund manager. Team managers manage funds only in teams. The data are from Morningstar and Kenneth French's website. The data period is from January 1990 to September 2015.

| | Fama-French | | Carhart | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | alpha*12 | | alpha*12 | | MKT | | SMB | | HML | | MOM | |
| | male | +diverse | male | +diverse | male | +diverse | male | +diverse | male | +diverse | male | +diverse |
| Gross returns (%): value-weighted and monthly | | | | | | | | | | | | |
| (A) all managers | | | | | | | | | | | | |
| estimate | -0.189 | -0.024 | -0.254 | -0.130 | 0.984 | -0.035 | 0.088 | 0.008 | 0.011 | 0.021 | 0.007 | 0.011 |
| s.e. | (0.703) | (0.994) | (0.713) | (1.009) | (0.015) | (0.021) | (0.019) | (0.027) | (0.020) | (0.029) | (0.012) | (0.018) |
| pvalue | (0.788) | (0.980) | (0.722) | (0.898) | (0.000) | (0.089) | (0.000) | (0.754) | (0.603) | (0.454) | (0.598) | (0.544) |
| (B) own managers in diverse families | | | | | | | | | | | | |
| estimate | -0.341 | 0.087 | -0.385 | 0.028 | 0.977 | -0.046 | 0.086 | 0.022 | -0.018 | 0.059 | 0.004 | 0.006 |
| s.e. | (0.719) | (1.018) | (0.731) | (1.034) | (0.015) | (0.021) | (0.019) | (0.027) | (0.021) | (0.029) | (0.013) | (0.018) |
| pvalue | (0.635) | (0.932) | (0.599) | (0.978) | (0.000) | (0.030) | (0.000) | (0.419) | (0.380) | (0.045) | (0.729) | (0.737) |
| (C) own team managers in diverse families | | | | | | | | | | | | |
| estimate | -0.452 | 0.181 | -0.495 | 0.159 | 0.968 | -0.047 | 0.071 | 0.036 | -0.013 | 0.060 | 0.004 | 0.002 |
| s.e. | (0.744) | (1.052) | (0.756) | (1.070) | (0.015) | (0.022) | (0.020) | (0.028) | (0.021) | (0.030) | (0.013) | (0.019) |
| pvalue | (0.544) | (0.864) | (0.513) | (0.882) | (0.000) | (0.032) | (0.000) | (0.207) | (0.554) | (0.049) | (0.738) | (0.907) |
| Net returns (%): value-weighted and monthly | | | | | | | | | | | | |
| (A) all managers | | | | | | | | | | | | |
| estimate | -1.283 | -0.041 | -1.347 | -0.147 | 0.983 | -0.035 | 0.087 | 0.009 | 0.010 | 0.021 | 0.007 | 0.011 |
| s.e. | (0.702) | (0.993) | (0.713) | (1.008) | (0.015) | (0.021) | (0.019) | (0.027) | (0.020) | (0.029) | (0.012) | (0.018) |
| pvalue | (0.068) | (0.967) | (0.059) | (0.884) | (0.000) | (0.089) | (0.000) | (0.728) | (0.612) | (0.463) | (0.598) | (0.540) |
| (B) own managers in diverse families | | | | | | | | | | | | |
| estimate | -1.489 | 0.144 | -1.530 | 0.080 | 0.977 | -0.046 | 0.086 | 0.024 | -0.018 | 0.058 | 0.004 | 0.006 |
| s.e. | (0.719) | (1.017) | (0.731) | (1.033) | (0.015) | (0.021) | (0.019) | (0.027) | (0.021) | (0.029) | (0.013) | (0.018) |
| pvalue | (0.039) | (0.888) | (0.037) | (0.938) | (0.000) | (0.030) | (0.000) | (0.388) | (0.379) | (0.047) | (0.742) | (0.722) |
| (C) own team managers in diverse families | | | | | | | | | | | | |
| estimate | -1.605 | 0.257 | -1.647 | 0.232 | 0.968 | -0.047 | 0.070 | 0.037 | -0.013 | 0.059 | 0.004 | 0.003 |
| s.e. | (0.744) | (1.052) | (0.756) | (1.069) | (0.015) | (0.022) | (0.020) | (0.028) | (0.021) | (0.030) | (0.013) | (0.019) |
| pvalue | (0.031) | (0.807) | (0.030) | (0.828) | (0.000) | (0.031) | (0.000) | (0.189) | (0.545) | (0.051) | (0.744) | (0.892) |

| | Fama-French | | Carhart | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | alpha*12 | | alpha*12 | | MKT | | SMB | | HML | | MOM | |
| | male | +diverse | male | +diverse | male | +diverse | male | +diverse | male | +diverse | male | +diverse |
| Gross returns (%): equal-weighted and monthly | | | | | | | | | | | | |
| (A) all managers | | | | | | | | | | | | |
| est. | 0.223 | -0.720 | 0.336 | -0.883 | 0.967 | -0.006 | 0.190 | 0.003 | 0.070 | 0.010 | -0.011 | 0.017 |
| s.e. | (0.652) | (0.922) | (0.662) | (0.937) | (0.014) | (0.019) | (0.017) | (0.025) | (0.019) | (0.027) | (0.012) | (0.016) |
| pvalue | (0.733) | (0.435) | (0.613) | (0.346) | (0.000) | (0.758) | (0.000) | (0.898) | (0.000) | (0.716) | (0.321) | (0.310) |
| (B) own managers in diverse families | | | | | | | | | | | | |
| est. | 0.219 | -0.969 | 0.249 | -1.043 | 0.973 | -0.012 | 0.196 | 0.006 | 0.052 | 0.016 | -0.003 | 0.008 |
| s.e. | (0.663) | (0.938) | (0.674) | (0.954) | (0.014) | (0.019) | (0.018) | (0.025) | (0.019) | (0.027) | (0.012) | (0.017) |
| pvalue | (0.741) | (0.302) | (0.712) | (0.274) | (0.000) | (0.525) | (0.000) | (0.797) | (0.006) | (0.563) | (0.796) | (0.650) |
| (C) own team managers in diverse families | | | | | | | | | | | | |
| est. | 0.153 | -1.053 | 0.180 | -1.109 | 0.974 | -0.022 | 0.200 | 0.007 | 0.042 | 0.033 | -0.003 | 0.006 |
| s.e. | (0.685) | (0.968) | (0.696) | (0.984) | (0.014) | (0.020) | (0.018) | (0.026) | (0.020) | (0.028) | (0.012) | (0.017) |
| pvalue | (0.823) | (0.277) | (0.795) | (0.260) | (0.000) | (0.280) | (0.000) | (0.791) | (0.032) | (0.234) | (0.819) | (0.742) |
| Net returns (%): equal-weighted and monthly | | | | | | | | | | | | |
| (A) all managers | | | | | | | | | | | | |
| est. | -1.231 | -0.713 | -1.112 | -0.873 | 0.967 | -0.007 | 0.190 | 0.003 | 0.067 | 0.012 | -0.012 | 0.016 |
| s.e. | (0.650) | (0.919) | (0.660) | (0.933) | (0.013) | (0.019) | (0.017) | (0.025) | (0.019) | (0.026) | (0.012) | (0.016) |
| pvalue | (0.059) | (0.438) | (0.093) | (0.350) | (0.000) | (0.730) | (0.000) | (0.908) | (0.000) | (0.650) | (0.296) | (0.317) |
| (B) own managers in diverse families | | | | | | | | | | | | |
| est. | -1.192 | -0.957 | -1.159 | -1.031 | 0.973 | -0.013 | 0.196 | 0.007 | 0.050 | 0.016 | -0.003 | 0.007 |
| s.e. | (0.662) | (0.936) | (0.673) | (0.951) | (0.014) | (0.019) | (0.018) | (0.025) | (0.019) | (0.027) | (0.012) | (0.017) |
| pvalue | (0.072) | (0.307) | (0.085) | (0.279) | (0.000) | (0.502) | (0.000) | (0.786) | (0.010) | (0.559) | (0.773) | (0.652) |
| (C) own team managers in diverse families | | | | | | | | | | | | |
| est. | -1.255 | -1.037 | -1.220 | -1.093 | 0.974 | -0.022 | 0.199 | 0.008 | 0.040 | 0.033 | -0.004 | 0.006 |
| s.e. | (0.683) | (0.965) | (0.694) | (0.982) | (0.014) | (0.020) | (0.018) | (0.026) | (0.020) | (0.028) | (0.012) | (0.017) |
| pvalue | (0.067) | (0.283) | (0.079) | (0.266) | (0.000) | (0.269) | (0.000) | (0.759) | (0.043) | (0.242) | (0.768) | (0.737) |

## Table 10
**Performance of value-weighted (VW) and equal-weighted (EW) portfolios of male and female managers' funds**

The table presents the results of the regression in Equation (5). The dependent variable is monthly returns on the portfolio of individual male managers' portfolio of funds ("male") and on the portfolio of individual female managers' portfolio of funds ("female") minus the 1-month T-Bill rate. The returns are either gross returns (net returns plus expense ratio) or net returns. The portfolio is either value (TNA)-weighted or equal-weighted. The independent variables include a constant, a dummy variable that takes the value of one if the return is on the portfolio of diverse funds and zero otherwise, benchmark returns, and interaction terms between the dummy variable and the benchmark returns. The benchmark returns are either Fama and French's (1993) three factors (MKT, SMB, HML) or Carhart's (1997) four factors (MKT, SMB, HML, and MOM). The columns of alpha represent the estimates on the constant ("male") and on the dummy variable ("+diverse") multiplied by 12 (annualized). Similarly, the columns of the benchmark returns represent the coefficients on the benchmark returns ("male") and on the interaction terms ("+diverse"). The sample include funds managed by all managers, by own managers in diverse fund families, by own team managers in divers fund families in Panels (A), (B), and (C), respectively. Own managers are employed by the fund family. Diverse fund family employs at least one female fund manager. Team managers manage funds only in teams. The data are from Morningstar and Kenneth French's website. The data period is from January 1990 to September 2015.

| | Value-weighted | | | | Equal-weighted | | | |
|---|---|---|---|---|---|---|---|---|
| | FF alpha*12 | | Carhart alpha*12 | | FF alpha*12 | | Carhart alpha*12 | |
| | male | +female | male | +female | male | +female | male | +female |
| Gross returns (%): monthly | | | | | | | | |
| (A) all managers | | | | | | | | |
| estimate | 0.007 | -0.180 | 0.086 | -0.389 | -0.189 | -0.024 | -0.254 | -0.130 |
| s.e. | (0.687) | (0.972) | (0.698) | (0.987) | (0.703) | (0.994) | (0.713) | (1.009) |
| pvalue | (0.991) | (0.853) | (0.902) | (0.693) | (0.788) | (0.980) | (0.722) | (0.898) |
| (B) own managers in diverse families | | | | | | | | |
| estimate | 0.430 | -0.465 | 0.048 | -0.558 | -0.341 | 0.087 | -0.385 | 0.028 |
| s.e. | (0.775) | (1.096) | (0.678) | (0.959) | (0.719) | (1.018) | (0.731) | (1.034) |
| pvalue | (0.579) | (0.671) | (0.944) | (0.561) | (0.635) | (0.932) | (0.599) | (0.978) |
| (C) own team managers in diverse families | | | | | | | | |
| estimate | 0.371 | -0.208 | -0.020 | -0.309 | -0.452 | 0.181 | -0.495 | 0.159 |
| s.e. | (0.792) | (1.120) | (0.704) | (0.996) | (0.744) | (1.052) | (0.756) | (1.070) |
| pvalue | (0.640) | (0.853) | (0.978) | (0.757) | (0.544) | (0.864) | (0.513) | (0.882) |
| Net returns (%): monthly | | | | | | | | |
| (D) all managers | | | | | | | | |
| estimate | -1.398 | -0.202 | -1.311 | -0.422 | -1.283 | -0.041 | -1.347 | -0.147 |
| s.e. | (0.687) | (0.971) | (0.697) | (0.986) | (0.702) | (0.993) | (0.713) | (1.008) |
| pvalue | (0.042) | (0.835) | (0.061) | (0.669) | (0.068) | (0.967) | (0.059) | (0.884) |
| (E) own managers in diverse families | | | | | | | | |
| estimate | -0.939 | -0.496 | -1.308 | -0.598 | -1.489 | 0.144 | -1.530 | 0.080 |
| s.e. | (0.772) | (1.092) | (0.677) | (0.957) | (0.719) | (1.017) | (0.731) | (1.033) |
| pvalue | (0.225) | (0.650) | (0.054) | (0.532) | (0.039) | (0.888) | (0.037) | (0.938) |
| (F) own team managers in diverse families | | | | | | | | |
| estimate | -0.984 | -0.233 | -1.359 | -0.345 | -1.605 | 0.257 | -1.647 | 0.232 |
| s.e. | (0.789) | (1.116) | (0.703) | (0.994) | (0.744) | (1.052) | (0.756) | (1.069) |
| pvalue | (0.213) | (0.835) | (0.054) | (0.729) | (0.031) | (0.807) | (0.030) | (0.828) |