To Group or Not to Group? Evidence from Mutual Funds*

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Abstract

In spite of the overwhelming trend in the fund industry towards team management, empirical studies have found no performance benefits for this phenomenon. We observe that this results from large discrepancies in reported managerial structures between CRSP and SEC records. Then we show that with more superior Morningstar Direct data, which has a 97% match with SEC filings, team-managed funds exhibit higher risk-adjusted returns than single-managed funds. The performance spread is present across all fund categories, except aggressive funds, and is robust to the inclusion of fund- and manager-level controls. Across various managerial structures, the largest team-induced gains are reached among funds managed by three individuals. Furthermore, teams significantly improve fund performance when funds are located in financial centers, reflecting larger networking potential and/or better skills of people who reside in larger cities. This improvement is achieved in teams more homogeneous in age and education. Finally, team-managed funds do not take excessive risks, trade less aggressively, charge lower fees, and are able to generate extra inflows for their funds. Thus, team-management is useful for the fund industry, but its gains depend on team size, location, and social diversity.

JEL classifications: D70; G23; J24

Keywords: Knowledge spillover, Management structure, Performance evaluation, Team diversity

1. Introduction

> *"Mutual fund star managers have gone the way of the vinyl record: They're cool to have, expensive to get, and sometimes, not the best quality. In their place, fund companies … are moving in favor of a team-oriented approach. Even Fidelity Investments, home of one of the first star managers, Peter Lynch, has switched some funds to a team-managed approach. The move helps fund companies defend against poaching, protect their funds' returns, and shield themselves from the level of outflows seen at competing firms after their high-profile stars have flamed out."* (Dec. 2, 2011; Reuters) [1]

Over the past two decades, team-based portfolio management has become very popular in the U.S. mutual fund industry. For example, in 2010, more than 70% of all U.S. domestic equity mutual funds were managed by "teams" of portfolio managers compared to only 30% in 1992 (See Figure 1). The industry professionals predominantly explain this trend from the fund performance viewpoint. For example, Stephen Oristaglio, a Deputy Head at Putnam Investments argues: "*The overriding reason is performance. […] as investing becomes more complicated with so many new opportunities arising from new industries, markets and companies, team-managed funds make more sense*."[2] Indeed, with a growing universe and complexity of assets, a team of managers should be better suited to handle the sheer volume of information relevant to investment decisions than a single manager.

The extant academic literature also highlights the benefits of group decision making. For instance, Sharpe (1981), Barry and Starks (1984), and Sah and Stiglitz (1986, 1991) argue that teams in the portfolio management industry achieve diversification of style and judgment that reduces portfolio risk inducing better performance.[3] However, in stark contrast with both theoretical and real-world evidence, empirical studies find very little evidence of performance

[1] "Funds move away from star managers, favor teams," by Jessica Toonkel, December 2, 2011, Thomson Reuters.
[2] "Banding Together: More mutual fund companies take a team approach," by David Kovaleski, Pension and Investment Online (http://www.pionline.com/article/20000724/PRINT/7240741?templa=).
[3] There is also experimental evidence that implies inferior choices made within groups than among individuals (see Bone, Hey, and Suckling, 1999; Barber, Heath, and Odean, 2003). In economics, the negative effect of groups is often linked to possible productivity losses caused by free-riding by some team members (see Alchian and Demsetz, 1972; Holmstrom, 1982; Rasmusen, 1987; Nalbantian and Schotter, 1997).

benefits of teamwork in the fund industry. For instance, such papers as Prather and Middleton (2002), Chen, Hong, Huang, and Kubik, (2004), Bliss, Porter, and Schwarz (2008), Massa, Reuter, and Zitzewitz (2010), and Bar, Kempf, and Ruenzi (2011) find that team management in mutual funds provides no gains over single-managed funds and even leads to inferior performance. This seems puzzling. Hence, the goal of this paper is to understand the source of this puzzle and broadly re-examine the effect of teams on fund performance.

Our analysis has several novelties. First, we use a relatively new Morningstar Direct (MD, henceforth) mutual fund database. We show that it is far more accurate than CRSP in reporting fund manager data, and illustrate the impact of this discrepancy on fund performance analysis. Some studies provide evidence of better and more precise coverage of mutual funds by Morningstar than CRSP (e.g., see Elton, Gruber, and Blake, 2001; Massa, Reuter, and Zitzewitz, 2010; Karagiannidis, 2010). However, these papers do not systematize the disparity in fund management structure reporting. We highlight the discrepancies between CRSP and MD data related to managerial structure of funds and show that very often CRSP misclassify funds into single- or team-managed compared to MD and SEC. To compute the reporting accuracy rate in managerial structure of funds in CRSP and MD relative to the Securities and Exchange Commission (SEC) records, we obtain detailed managerial data from 100 randomly chosen U.S. domestic equity funds. We find that the accuracy rate of CRSP compared to SEC is only 76%, but that of MD is 97%. We also observe some systematic patterns in differences between MD and CRSP records in managerial structure: these differences are larger for funds that are young, positioned in the middle size deciles, and belong to the smaller fund families.

The existence of large differences between CRSP and MD databases, which in some years ranges from 10% to 26% of the overall sample of named equity mutual funds, may potentially affect the results of many recent studies that use fund manager-specific information from CRSP data.[4] Indeed, using an exactly matched sample between CRSP and MD, we show

[4] The non-inclusive list of other studies that use CRSP data on fund management structure include Agarwal and Ma (2011), Bar, Kempf, and Ruenzi (2010), Cici, (2011), Dass, Nanda, and Wang (2013), Deuskar, Pollet, Wang, and Zheng (2011), Han, Noe, and Rebello (2008), Kempf and Ruenzi (2007), and Nohel, Wang, and Zheng (2010).

that the impact of a team on fund performance is very different for the two datasets based on the same tests as in Chen, Hong, Huang, and Kubik, (2004). With CRSP data teams have no or negative contribution to risk-adjusted returns computed based on unconditional and conditional versions of Carhart (1997) model, while with the matched MD sample the team addition to fund performance is positive and statistically significant. In effect, CRSP underestimates mutual fund returns earned by team-managed funds by up to 50bp per year.

Second, we evaluate the team impact on fund performance using a full MD data while controlling for not only fund but also managerial characteristics. No other related study accounts for an extensive set of manager-level variables despite the evidence in Chevalier and Ellison (1999a). We observe that on average team-managed funds have higher risk-adjusted returns than their single-managed peers. This result holds steadily after accounting for a range of control variables and is present across various fund investment objectives including growth, growth & income, and equity income categories. With the full set of fund and manager controls, teams add on average between 37bp to 46bp per year to fund performance. The added benefits of a team among funds with growth & income and equity income objectives reach almost 100bp per year.

Third, we evaluate the relation between team size and performance. The intuition here is that any group work always leads to a tradeoff between benefits of a larger intrinsic knowledge base of the group versus coordination costs in arriving at optimal decisions, especially under time constraints present in the portfolio management industry. We observe a non-linear relation between team size and fund performance. In particular, we find that three-person teams are usually the largest contributors to fund performance relative to single-managed funds. The average risk-adjusted performance gains with complete set of control variables based on the conditional Carhart (1997) model are 32bp, 54bp, 46bp, and 46bp per year for funds with two, three, four, and five or more managers, respectively, relative to single-managed funds. This result corroborates well with the notion of increasing problems of potential free-riding and decreasing cooperation effectiveness in larger groups (e.g., Alchian and Demsetz, 1972; Holmstrom, 1982; Laughlin, Hatch, Silver, and Boh, 2006; Mueller, 2012).

Fourth, Christoffersen and Sarkissian (2009) show that funds in financial centers have superior performance in the long-run due to better information generation and dissemination environment of larger cities. Therefore, following Christoffersen and Sarkissian (2009) we split the sample into funds whose advisors are located in financial centers and those located in smaller cities and repeat our tests. The intuition here is that if mutual fund managers located in financial centers achieve higher performance because of knowledge transfer and access to private information through business connections, then teams of mutual fund managers in financial centers should be able to generate higher returns than single-managers because of their greater ability to collect more information through their extended business and social networks. We show that funds that are managed by teams and are located in financial centers gain on average between 60bp and 72bp per year after accounting for fund and manager characteristics. This result highlights the importance of learning and information spillover effects in larger cities (see Jacobs 1969; Glaeser, 1999; Christoffersen and Sarkissian, 2009), and is also consistent with informational diversity benefits arising from team work as argued by Sharpe (1981), since information sources are more diverse in larger cities.

Fifth, we look into the relation between team member characteristics and fund performance. The intuition here is that individual characteristics of team members must impact team performance even when team size and location are the same. We find among funds in financial centers that those with more heterogeneous team members in terms of age and undergraduate institution underperform those with more homogeneous managers. That is, large social category diversity among team members is detrimental to fund performance. These results are consistent with potentially larger frictions and conflicts of interests associated with non-homogeneous groups, as emphasized in Jehn, Northcraft, and Neale (1999), and career concerns issues in the mutual fund industry raised in Chevalier and Ellison (1999b).

Finally, similar to others, we analyze the differential impact of teams on funds' risk-taking behavior as well as various fund characteristics. We find little evidence that team-managed and single-managed funds differ drastically in their exposure to market and other

sources or risk. However, team-managed funds have different fund characteristics compared to single-managed funds. For instance, team-managed funds have 5.5% lower annual turnover rates than single-managed funds. This result implies less aggressive trading within groups of portfolio managers and, therefore, provides additional support that teams lead to less extreme behavior. Team-managed funds charge 2.5% lower fees than their single-managed counterparts. It is well known that low fees bring more fund flows (Barber, Odean, and Zheng, 2005). Consistent with this, we observe that teams help funds attract more flows: on average, team management adds 4.5% in net assets growth per year reflecting a recent trend in mutual fund industry to rely more on team-managed funds. Thus, we show that group-decision making in mutual fund industry has sizable performance benefits, but the extent of these benefits depends on team size and diversity, as well as fund location.

Our study makes two broad contributions to the literature. First, it raises a warning signal to researchers that use CRSP mutual fund data in evaluation of any phenomenon that requires accounting for manager-specific information. Second, it adds to the large cross-disciplinary literature on the relation of organizational structure to performance. The only empirical study that we are aware of that detects productivity gains in teams is by Hamilton, Nickerson, and Owan (2003), but it is based on very limited data from the textile industry. Other evidence in favor of teams is based on experimental studies on signaling games (e.g., Cooper and Kagel, 2004; Blinder, and Morgan, 2005).

The rest of the article is organized as follows. Section 2 describes the fund- and manager-level data. In Section 3, we compare managerial structures reported in CRSP and Morningstar Direct databases and then conduct preliminary tests on the importance of team management for fund performance using the two data sources. Section 4 presents the main empirical findings of our paper. Section 5 examines the differences between team-managed and single-managed funds in terms of various measures of fund risk and several fund characteristics. Section 6 concludes.

2. Data

2.1. Main Data Source

Our primary data source is Morningstar Direct a relatively new survivorship-bias free institutional research product offered by Morningstar, Inc. It provides one of the most comprehensive and in-depth coverage of open-ended mutual funds across the globe, including the United States. Our sample covers actively managed U.S. diversified domestic equity funds with the following investment objectives: aggressive growth (includes small company), growth, growth & income, and equity income from 1992 to 2010. We exclude all sector funds from our analysis because their portfolios are constrained to follow a particular industry and hence are not diversified. We also exclude index funds because majority of these funds are not actively managed. MD reports all data at the fund share class level, including the names of the fund managers. However, different share classes of the same fund have identical underlying portfolio with the same fund manager(s). This might lead us to multiple counting of fund management information and bias our analysis. To avoid such biases, we aggregate mutual fund share class level observations to one fund level observation using a unique fund identifier in MD.

To determine whether a fund is sole-managed or team-managed at the end of a calendar year, we use the detailed fund manager data which includes fund manager names, the exact date a fund manager joins and leaves a particular fund. We classify a fund as sole- or team-managed based on the number of fund managers with the fund at the end of calendar year. When only one fund manager is named at the end of calendar year, we classify that fund as sole-managed for that year. Similarly, when two or more fund managers are named with the fund, we classify the fund as team-managed. We remove all fund-years which have missing or anonymous fund manager names or tenure dates from our sample.[5] Our final sample covers 3,935 unique funds with 35,440 manager-fund-year observations.

[5] The proportion of blank or anonymous entries for fund manager information in our initial data sample is only 7%. This stark difference with the percentage of anonymous funds reported in Massa, Reuter, and Zitzewitz (2010), which was reaching 18% in some years is due to the fact that Morningstar Direct has filled in names of managers for almost all funds (retroactively) after 2006.

2.2. Fund Characteristics

For each fund we obtain information on total net assets under management, expense ratios, turnover ratios, fund inception date, and fund family name from MD. This information helps us control for fund characteristics that are well known in the literature to affect individual fund performance. These characteristics typically include fund size, measured by the total net assets under management of the fund at the end of calendar year; fund age, defined as the difference between the fund's inception year and the current year; expenses, measured by the annual net expense ratio of the fund; turnover, measured by the turnover ratio of the fund; fund family size, measured by the total net assets under management of the fund complex to which the fund belongs at the end of calendar year; fund return volatility, measured by standard deviation of raw net returns of funds over the past year. We also include net fund flows, defined as the net growth in the total net assets of funds, as a percentage of their total net assets, adjusted for prior year returns. To minimize the effect of outliers on our analysis, we winsorize expense ratios, turnover and annual fund flow variables at 1% and 99% levels.

Christoffersen and Sarkissian (2009) show that fund managers located in financial centers earn higher returns than their peers located in smaller towns. To control this effect, we obtain the location information of fund advisors from MD. Following Hong, Kubik, and Stein (2005) and Christoffersen and Sarkissian (2009), we define the following six cities to be financial centers: Boston, Chicago, Los Angeles, New York, Philadelphia, and San Francisco.[6] If the fund advisor company is headquartered within a 50-mile radius of any of these six cities, we classify the fund as located in the financial center.

It is important to point that our location variable differs from the previous studies. Instead of using the headquarter location of the fund company or fund sponsor (e.g., Christoffersen and Sarkissian, 2009), we use the headquarter location of the fund advisor company. For majority of funds, the fund advisor and the fund sponsor (the company that offers the mutual fund to public) might be the same company (Chen, Hong, and Kubik, 2013). But for few funds they might be

[6] These six cities are also the largest six U.S. mutual fund centers.

different because these funds choose to outsource their portfolio management to third-party fund advisor companies. By choosing the fund advisor location, we make analysis immune to the possibility of any bias due to third-party fund management outsourcing.

2.3. Fund Manager Characteristics

Chevalier and Ellison (1999a) show that managerial characteristics play an important role in fund performance. Therefore any study that examines potential impact of group decision making on fund performance should control for manager's demographic characteristics.[7] The demographic information available to us includes the name(s) of fund manager(s), the name(s) of all funds they currently manage and have managed in the past, their start and end dates with those funds, all undergraduate and graduate degrees received, the year in which the degrees were granted, and the name of degree-granting institution. We also have a detailed biographical sketch for all fund managers. This sketch is provided to MD by fund managers themselves that includes their personal and past work experience details. Following Chevalier and Ellison (1999a), we create four manager characteristics variables: tenure, MBA dummy, average SAT, and age. We add a female dummy to this list given some evidence of trading and performance differences between males and females (e.g., Barber and Odean, 2001).

Specifically, we define the manager tenure as the difference between the year when a fund manager started as a portfolio manager for a given fund and the current year. To create the MBA dummy variable, we use the graduate degree details of each fund manager in our sample. We define the MBA dummy as one if the fund manager received an MBA degree and zero otherwise. Female dummy is a variable which equals one when at least one fund manager is a female and zero otherwise. To construct the average SAT, we closely follow the methodology of Chevalier and Ellison (1999a). First, we obtain the name of the undergraduate institution for each fund manager. Then, we look for that institution's SAT score in the 23-rd edition of Lovejoy's

[7] Unfortunately, this has not been the case in many papers which attempt to determine the impact of team management of fund performance (e.g., Bar, Kempf, and Ruenzi, 2011; Massa, Reuter, and Zitzewitz, 2010).

College Guide (see Straughn and Straughn, 1995). Most schools report the upper and lower of median verbal and math scores for incoming student in that year. To calculate the composite SAT score for a given school, we simply add the average of the upper and lower bounds of the verbal score to the average of the upper and lower bounds of the math score. In few cases, schools choose to report ACT scores instead of SAT. In those cases, we convert the ACT to an equivalent SAT using SAT-ACT concordance tables provided by the College Board.[8]

The construction of fund manager age variable is not straightforward because very few fund managers in our sample disclose their date of birth in their biographical sketch. To overcome this problem, we again follow the methodology proposed by Chevalier and Ellison (1999a). For managers who report their date of birth, we simply take the difference between the year of their birth and the current year. For managers who do not report their date of birth, we construct an approximate manager age variable by assuming that each manager was 21 year old upon receiving their undergraduate degree. The limited coverage of undergraduate degree year information does reduce our sample size, but does not affect our analysis.

An important difference between Chevalier and Ellison (1999a) and our study is that they focus only on single manager funds, while our study focuses on both single- and team-managed funds. It is relatively straightforward to create manager characteristics for single-managed funds. But it is somewhat problematic to create manager characteristics for teams of fund managers. Ideally, one might be able to create team characteristics based on detailed understanding of the contribution of each team member. Unfortunately, we do not have any these data. To overcome this problem, we simply assume equal contribution of each team member. Hence, manager characteristics for a team, such as manager tenure, age and SAT scores will simply be the equally-weighted average of manager tenure, age and SAT scores of each fund manager in the team, respectively. For the MBA dummy variable in case of teams, we define it to be one if any one of the team members has a MBA degree and zero otherwise.

[8] A detailed description of the construction of an average SAT score is in Chevalier and Ellison (1999a).

2.4. Fund Performance Measures

For computing fund performance measures we use each fund's monthly net fund returns from MS. We use three different performance metrics: objective-adjusted returns, OAR, unconditional four-factor alpha, α(4U), using Carhart (1997) model, and conditional four-factor alpha, α(4C), following the application of Ferson and Schadt (1996) framework to Carhart (1997) model. We define OAR as the difference between the average monthly return (net-of-fees) of a fund in the year minus the mean fund returns across all funds for a given fund investment objective and year. We estimate each fund's unconditional and conditional risk-adjusted alphas using the following two equations:

$$r_{i,t} = \alpha_i + \beta_i r_{m,t} + s_i SMB_t + h_i HML_t + m_i UMD_t + e_{i,t}, \quad (1)$$

and

$$r_{i,t} = \alpha_i + \beta_i r_{m,t} + s_i SMB_t + h_i HML_t + m_i UMD_t + b_i^{Tbill}\left(r_{m,t} \times Z_{t-1}^{Tbill}\right) + b_i^{Term}\left(r_{m,t} \times Z_{t-1}^{Term}\right) + e_{i,t}, \quad (2)$$

respectively, where $r_{i,t}$ is the monthly net fund return less the risk-free rate (the one-month U.S. T-bill rate), $r_{m,t}$ is the monthly U.S. excess market return (the return on the CRSP value-weighted NYSE/AMEX/Nasdaq composite index less the one-month U.S. T-bill rate), while α_i is the risk-adjusted return, unconditional in Eq. (1), α(4U), and conditional in Eq. (2), α(4C). SMB, HML, and UMD are returns on the size, book-to-market, and momentum portfolios, respectively.[9] In equation (2), Z_{t-1}^{Tbill} and Z_{t-1}^{Term} are the two lagged (demeaned) public information variables: the one-month U.S. Treasury bill rate (T-bill) and the term-structure spread (Term), defined as the difference in yields on the 10-year U.S. government bond and three-month U.S. T-bill.

Funds change the number of fund managers from year to year. Therefore, we remove all fund-years that have less than 12 monthly fund return observations and estimate the fund alphas using their prior twelve monthly returns. Although the 12-month horizon gives us fewer data

[9] These data are from Ken French's site, http://mba.tuck.dartmouth.edu/pages/faculty/ ken.french/data_library.html.

points for the estimation than we may want, we believe that given the high frequency of fund manager turnover, the longer (greater than one year) estimation horizons will introduce bias in our analysis by incorrectly attributing fund performance to a certain type management structure.

2.5. Summary Statistics

First, in Figure 1, we show the evolution of mutual fund management structure from 1992 to 2010. It depicts the percentage of single-managed and team-managed funds along with the total number of funds in each year of our sample. The total number of funds increased from around 750 in the beginning of the sample period to more than 2,000 by 2010, peaking in 2007 with close to 2,500 funds. Consistent with reports in other studies (e.g., Massa, Reuter, and Zitzewitz, 2010), we can see that the proportion of single-managed funds has dropped significantly in the last two decades from almost 70% in 1992 to around 30% in 2010.

Table 1 shows the summary statistics of mutual funds by the fund management structure, where the data on team-managed funds is divided into funds with two managers, three managers, four managers, and five managers or more. Panel A reports the distribution (number and proportion in percent) of single- and team-managed funds for each year in our sample. While all team-managed funds have increased their presence in the industry, multiple-manager funds (five and more) have experienced the largest relative and absolute gains in representation, four-fold from 4% in 1992 to 16% in 2010. However, the largest proportion of team-managed funds has been directed by two managers throughout our sample period.

Panel B of Table 1 reports three measures of performance, OAR, α(4U), and α(4C), for single and team-managed funds. It also contains information about the difference test in mean performance measures between each group of team-managed funds and single-managed funds. We can see that team-managed funds show better objective- and especially risk-adjusted performance. For example, the difference in OAR between two-manager and single-manager funds is 0.014 per month or about 17bp per year, while that between four-manager and single-manager funds is almost 56bp per year, although this result is statistically insignificant.

However, both fund alphas show that three-manager funds, and, to some extent, funds managed by five or more people gain the most relative to funds managed by a single person. For three-manager funds, the differences in α(4U) and α(4C) are 43bp and 47bp per year, respectively, and these results are significant at the 5% level. For five-plus-manager funds, the positive and significant difference is observed only with respect to the unconditional alpha measure. Other team sizes are not associated with significant outperformance relative to single-managed funds.

Panel C of Table 1 reports mutual fund characteristics other than performance measures. These include fund volatility, total net assets (Find Size), fund age (Fund Age), turnover, and expenses. Among other fund characteristics, the notable differences across managerial structures include turnover and expenses. Both these measures decrease with an increase in the number of fund managers (and expenses decrease monotonically). In addition, fund size tends to increase with team size. There are no obvious differences however in fund volatility and age.

Finally, Panel D of Table 1 reports fund manager characteristics for our five managerial structure groups. We notice that the average tenure with the same fund is the highest among single-managed funds and so are the average SAT scores. Not surprisingly, funds with larger teams are more likely to have at least one manager with an MBA degree. The average age of managers appears relatively stable across both single-managed and team-managed funds. Female managers constitute about 9% of all managers in single-managed funds. The likelihood of having female managers, as expectedly, is increasing with team size, but their proportion drop for very large teams (five or more managers).

3. Management Structure: CRSP versus Morningstar

3.1. Fund Management Structure Differences

First of all, we determine the accuracy of funds' management structure information by comparing our MD sample to the widely used CRSP Survivorship Bias Free Mutual Fund

Database (CRSP, henceforth). Like MD, the unit of observation in CRSP is the fund share class and the fund tickers are uniquely assigned to share classes. To avoid double counting of fund's management structure, we aggregate the share class-level information to fund level for each fund. We match each fund in our MD sample to CRSP using individual fund tickers and date of inception. In cases where the fund ticker information is missing, we use fund names along with their date of inception for matching purposes. We carefully do this matching by hand because there are differences in fund naming conventions in both MD and CRSP. MD only reports the most recent name adopted by the fund whereas CRSP reports different names adopted by the fund over its active life. To ensure the accuracy of our matching strategy, we double check each matched fund by hand. At the end, we are able to match 92.78% of our MD sample funds to CRSP (3,651 out of 3,935 funds) sample between 1992 and 2010.

We also classify CRSP sample into single- or team-managed funds. For each fund in a given calendar year CRSP reports the name of the fund manager(s) under "Portfolio Manager Name" (also known as "mgr_name") variable. We classify a fund as sole-managed when only one manager name is listed and classify as team-managed when two or more managers (or phrases such as "Team Managed" and "Investment Committee") are listed. We remove funds from our sample that report the name of the fund company or their advisor(s) under the manager name variable. In addition, we also remove fund-year observations for which the manager name is not available. We end up with 29,918 manager-fund-year observations in CRSP that represents an 84.42% match with our main MD sample.

The table below provides one example of mismatch between the two data sources. This example includes AARP Growth and Income Fund (CRSP Fund No: 53; MD Fundid: FSUSA004ZG). The table compares the fund name as well as the number of fund managers that manage the fund at the end of the each calendar year for both CRSP and MD. To test the accuracy of fund manager information in both databases, we compare this information to the one provided by the fund to the financial regulator, the Securities and Exchange Commission (SEC), each year. We hand collect the fund manager information from the fund's Prospectuses and other

filings available on SEC's EDGAR database each year. To determine the number of fund managers in the SEC database, we count the names of fund managers listed in the SEC filings at the end of the calendar year.[10]

			# Fund Managers		
Fund Name (MD)	Fund Name (CRSP)	Year	MD	CRSP	SEC
AARP Growth & Income	AARP Growth & Income Fund	1992	3	3	-
AARP Growth & Income	AARP Growth Tr: Growth and Income Fund	1993	3	1	-
AARP Growth & Income	AARP Growth Tr: Growth and Income Fund	1994	3	1	-
AARP Growth & Income	AARP Growth Tr: Growth and Income Fund	1995	3	1	3
AARP Growth & Income	AARP Growth Tr: Growth and Income Fund	1996	4	3	4
AARP Growth & Income	AARP Growth Tr: Growth and Income Fund	1997	5	1	5
AARP Growth & Income	AARP Growth Tr: Growth and Income Fund	1998	4	1	4
AARP Growth & Income	AARP Growth Tr: AARP Growth and Income Fund	1999	2	2	2

The first and second columns report the name of the fund given in MD and CRSP, respectively. Columns 4-6 show the number of fund managers reported in MD, CRSP, and SEC databases in a given year, respectively. The first three rows in the last column have missing values because we were unable to find corresponding year's SEC filings on EDGAR's website. This table shows the managerial structure reported by Morningstar is consistent with SEC, but we cannot say the same thing about CRSP data.

To evaluate the extent of mismatch in fund managerial structure between CRSP and MD, as well as between these two databases and SEC more systematically, we randomly select 100

[10] Creating the number of fund manager variable based on SEC filings is somewhat involved. We start by hand-collecting the fund's Prospectus (Form N-1A), Annual Report (Form N-30D), and Post-Effective Amendments (Forms POS AM, 497, 485APOS and 485BPOS) available on SEC's EDGAR database each year. Funds are legally required to include the full name, title, length of service, and business experiences of the individuals, including each member of portfolio management team who are primarily responsible for the day-to-day management of the fund in these filings. In cases where funds employ large portfolio teams, SEC requires the fund to provide information on at least five members who share the most significant responsibility for the day-to-day management of the fund's portfolio, for example, the managers with the largest percentages of assets under management. Funds are also required to disclose any change in fund manager(s) and provide information about the new manager(s) under the Securities Act through these filings. Each of these filings contains a filing date, which refers to the date the information was made public, and an effectiveness date, which refers to the date the information took effect. We then sort these filings based on their effectiveness date for each calendar year. Lastly, to determine the number of fund manager(s) in the fund, we simply count the name(s) of the fund manager(s) listed in the last SEC filing at the end of the calendar year. Because of the difficulty of doing this exercise over our entire sample of fund-year observations, we only checked several randomly chosen funds on the consistency of their Morningstar managerial data with SEC filings.

funds in 2005 and compare the recorded number of managers and their names across all three data sources. The results of this exercise are shown in Table 3. Panel A of the table compares all three databases based on single- or team-management classification. We can see that in this sample CRSP regards 26 funds as anonymous, all of which are regarded as team-managed, but MD has no anonymous funds, consistent with SEC.[11] Furthermore, we observe a huge discrepancy in classifying funds as single- or team-managed in CRSP data. Out of 76 funds 12 funds are classified as single-managed, while in fact they are team-managed. Also, 12 funds are classified as team-managed, while they are shown as single-managed in SEC. This gives a total of 24 misspesified funds, implying an accuracy rate of only 76% in reporting basic managerial structure in CRSP database. The number of similar misspecifications in MD is only three, yielding a reporting accuracy of 97%.

Panel B of Table 2 compares these databases based on the number of fund managers and their names. With the remaining 74 funds with names in the sample, CRSP misreports 26 funds, a third of all fund managerial data. This gives an accuracy rate of 65%. Things become even worse for CRSP with the identification of specific manager names: it misreports them for 32 funds out of 74, yielding an accuracy rate of a mere 57%. Note also that the maximum number of fund managers reported by CRSP is very low (3), where, in reality, it is 20. The correctness rates for the number of managers and manager names in MD database are 87% and 85%, respectively. In addition, MD reports much more managers per fund when appropriate.[12] Thus, Table 2 illustrates that reporting of managerial structure by CRSP is severely inaccurate.

With this in mind, in Table 3 we report the full extent of a misspecification in management structure between CRSP and MD datasets for each year in our sample. Column 2

[11] The outcome of our random fund sampling that results in 26% anonymous funds in CRSP for 2005 is consistent with Massa, Reuter, and Zitzewitz (2010) who report 31% anonymous funds in 2004 and document a decreasing trend in no-name fund reporting.

[12] Note that in our random sample of 100 funds, not only MD reports team sizes correctly much more often than CRSP, but also the average misspecification in MD occurs with larger team sizes than in CRSP (4.25 member team in MD versus 1.75 in CRSP). This means that the fewer instances of misspecification of managerial structure in MD occur among larger team sizes than in CRSP. As a result, MD becomes the only viable option in investigating the team size effect on fund performance.

reports the number of matched funds. We see that the overlap in funds between the two databases is large in every year of our sample and it roughly follows the same trend as the overall number of funds in our sample reported in Table 2. Column 3 and 4 report the percent of single-managed funds in CRSP and MD databases, respectively. We can observe that for the whole of 1990s, especially in the beginning of the sample period, CRSP reports much more single-managed funds than MD. Columns 5 to 10 report misspecification statistics. Columns 5 and 6 show the number of funds and their proportion identified as single-managed funds in CRSP but team-managed ones in MD. Columns 7 and 8 show the number and proportion of funds recorded as single-managed funds in CRSP but identified as team-managed in MD, respectively. Finally, columns 9 and 10 give the total number and proportion of misspecified funds between the two matched databases, respectively.

Columns 5-10 of Table 3 easily show that the largest misspecification in managerial structure reporting between the two databases occurs in the early part of the sample. The total misspecification is higher than 20% of the matched sample for most of the 1990s. However, even in the 2000s, when both CRSP and MD report about the same proportion of single- and team-managed funds (see columns 4 and 6), there is still significant misreporting in fund management structure that never goes below 10% of the sample. Note that the average misspecification over the whole sample period is almost 20%. Taking into account the fact that we were not able to match about 16% of MD sample with CRSP database, the actual misspecification in the reports on the number of managers between the two databases is in excess of 20% during the last two decades. The range of misspecification in CRSP is 17% to 29% for single-managed funds and 6% to 23% for team-managed funds. Thus, Table 3 illustrates that the extent of differences in management structure reporting between CRSP and MD databases is very large and persistent and is likely to have a direct impact on studies using CRSP data.

Next, we move to uncovering whether the misspecification in management structure reporting between CRSP and MD is concentrated among funds with specific characteristics. Table 4 shows the results of univariate examinations for the full data sample across seven fund

characteristics, namely: fund size (Panel A), fund family size (Panel B), fund age (Panel C), fund fees (Panel D), and fund performance based on objective-adjusted returns (Panel E). Each panel has five columns. The first two columns show the percent of single-managed funds in reported by CRSP and MD, while the last three – three misspecifications (in percent) in reporting management structure between the two databases: Single(CRSP)-Team(MD), Team(CRSP)-Single(MD), and Single(CRSP)-Single(MD). In each panel each fund characteristic is split in to ten decilies, with the first (tenth) decile corresponding to the leftmost (rightmost) values of the given fund characteristic (with pairs S-L and L-H standing for small-large and low-high, respectively).

There are some systematic patterns in differences between MD and CRSP records in managerial structure that can be seen across several panels of Table 4. For example, from Panel A we find that funds across all size deciles except the smallest and the largest have substantially larger recording occurrences of single management in CRSP than MD. This seems not unintuitive: very small funds are more likely to be managed by single managers, while very large ones are likely to be more scrutinized in reporting. Likewise, in Panel B we observe that funds belonging to smaller fund families also tend to have larger instances of reporting single managers in CRSP than in MD. Again, smaller fund families are less popular, and CRSP may overlook those funds more than those coming from larger fund families. Similar pattern is present with fund age in Panel C: CRSP seems to overestimate the proportion of single-managed young funds more than older funds. Probably it is again related to less monitoring from CRSP of relatively recently established funds. We observe no systematic differences in CRSP misreporting rates across funds with various fee levels or performance.

3.2. Fund Performance Differences

Now we proceed to comparing the effect of team management on mutual fund performance using CRSP and MD data. The regression model that we deal with has the following general form:

$$Perf_{i,t} = c_o + c_1 Team_{i,t} + \delta_1 Fund\_Controls_{i,t-1} + \delta_2 Mgr\_Controls_{i,t} + \delta_3 FE_{i,t} + e_{i,t}, \quad (3)$$

where $Perf_{i,t}$ is one of our performance measures, Team is the dummy for multiple-manager funds, $Fund\_Controls_{i,t-1}$ and $Mgr\_Controls_{i,t}$ are the sets of fund- and manager-specific characteristics, while $FE_{i,t}$ includes the year and fund investment objective fixed effects. Our fund-level controls are lagged by one period to exclude the contemporaneous effect that they may have on fund performance.

Table 5 reports the results of panel regression tests of our risk-adjusted returns, α(4U) and α(4C), computed from MD database on a large set of fund and manager characteristics. In this table we again use our matched sample between the two databases. The independent variable of interest is Team, defined as a dummy variable which equals one if the fund has two (or more) fund managers and zero if it has only one fund manager at the end of calendar year. Most of other independent variables are defined in Table 1. To reduce the influence of outliers, we take the natural logs of fund size, fund age, and manager age. Flows is the net growth in total net assets under management of the fund over the past year. SAT score is divided by 100. All fund-level controls are lagged by one period except fund age. All regression specifications include time and investment objective fixed effects (FE), and the standard errors are clustered by fund. Each regression model also reports the number of observations and the adjusted R^2. Importantly, the regression specifications without manager controls that we use in this table are very similar to Chen Hong, Huang, and Kubik (2004). This helps us benchmark our study against theirs.

Panel A of Table 5 shows full sample estimations. There are 18,437 fund-year observations with fund controls alone, but this number drops to 10,982 after the inclusion of manager characteristics. Columns 1-4 report the estimation output using CRSP data. Columns 1 and 2 show the estimates for α(4U), without and with fund manager controls, respectively, while columns 3 and 4 show the corresponding estimates for α(4C). We can see that in all these regressions, the coefficient estimate on Team is negative but statistically insignificant. This result could explain conclusions in many papers that use CRSP data that team management does not

add any positive value for fund performance (e.g., see Chen, Hong, Huang, and Kubik, 2004; Bar, Kempf, and Ruenzi, 2011). Columns 5-8 report the estimation output using MD data. Columns 5 and 6 show the estimates for α(4U), while columns 7 and 8 for α(4C), again without and with fund manager controls, respectively. Now, we see that the results are drastically different. The coefficient on Team is consistently positive and economically sizable across all estimations and even significant at the 5% level after accounting for both fund and manager characteristics. Moreover, at the bottom of the panel we also report the test results of the hypothesis that slope coefficients on Team in the corresponding MD and CRSP estimations are the same, Team (MD-CRSP) = 0. As one can see, the difference is positive and statistically highly significant across all four regression specifications. In economic terms, this difference is 47-50bp per year, depending on alpha type, based on regression models with a full set of control variables.

It is worthwhile to mention the estimation results related to our control variables. In particular, note that the coefficient estimates and their statistical significance are very consistent across both CRSP and MD, unlike the results on the Team dummy, and are in line with results in previous studies. Among fund-level characteristics, we observe that fund size and expenses have large detrimental effect on performance. These results are similar to findings in many other papers.[13] However, funds benefit when they are part of a larger family, again consistent with earlier studies (Chen, Hong, Huang and Kubik, 2004; Pollet and Wilson, 2008). We also document persistency in our risk-adjusted performance measures. Finally, there is also some evidence (for α(4U)) that higher turnover reduces subsequent returns. As for the manager characteristics, consistent with Chevalier and Ellison (1999a) we find a positive and highly significant relation between fund performance metrics and managers' SAT scores and no relation to MBA degree. In addition, our results confirm that fund returns are higher for more experienced managers with longer tenures at their respective funds (e.g., see Christoffersen and

[13] For the relation between firm size and performance see Chen, Hong, Huang, and Kubik (2004); for the relation between firm expenses and performance see Jensen (1968), Elton, Gruber, Das, and Hlavka (1993), Carhart (1997) and others.

Sarkissian, 2009). The Female dummy is negative in all estimation but is statistically significant in regressions based on unconditional alphas. Note that even though the inclusion of manager characteristics drastically reduces the total number of fund-year observations, the adjusted R^2 indicate that they provide incremental explanatory power for fund returns and therefore are important for proper decoupling of the team management effect from manager-specific variables.

Panel B of Table 5 shows sub-sample estimations with unconditional Carhart alpha as the only dependent variable over two non-equal periods, 1992-1999 and 2000-2010. This non-equal time period split is motivated by some of the well-known earlier results on the importance of teams for mutual fund returns, such as Chen, Hong, Huang, and Kubik (2004), who use CRSP data over the 1992-1999 period and do not find any benefits for team management. Each specification controls for fund and manager characteristics but, for the sake of brevity, we report only the coefficient on Team dummy alongside with its respective p-values. The evidence in Panel A that MD data helps finding a significantly more positive impact of team management on fund performance is present also in sub-sample estimations. The test that slopes on Team for the respective MD and CRSP regressions are the same, that is, Team (MD-CRSP) = 0, is rejected for all specifications.

Thus, Tables 2-5 show that large discrepancies in management structure records between CRSP and MD databases on one side and SEC records on the other can translate into significant differences in team management impact on fund performance. *Ceteris paribus,* MD data is able to provide much more support for the benefits of group decision making in the fund industry.

3.3. Additional Misspecification Issues in Management Structure

There are two additional implications of the misspecification in management structure data in CRSP which are important. First, one can no longer rely on the start dates of fund manager(s) provided in this database, particularly in cases where more than one fund manager names are listed. The start date (also variable known as “mgr_dt”) in CRSP corresponds to a unique fund manager entry and specifies the date the current manager(s) took control and

assumed responsibility of the fund. For entries that list one fund manager these dates might be less problematic, but for entries that list two or more fund managers these dates might lead to serious errors. By giving one start date for funds with two or more fund managers, CRSP assumes that these managers joined the fund on the same date which might not be true in all cases. And this is exactly what we find in MD data, where in almost all team-managed funds, different fund managers join the fund on different dates. Second, because CRSP provides incomplete information on the number of fund managers (as shown previously), one also cannot rely on the name of fund manager(s) provided in this dataset. Particularly, studies on manager turnover which use fund manager names from CRSP might be affected from this misspecification.

4. Team Management and Fund Performance: Empirical Tests

Having established the accuracy of MD managerial data over CRSP, we now examine in detail the extent of team impact on fund performance by using our full MD sample. Note that the sample we use for the reminder of the paper is larger than the one used in the CRSP-MD matching tests in Table 3.

4.1. The Effect of Team on Fund Performance

Table 6 reports the results of the tests on the impact on team management on our three measures of fund performance, OAR, α(4U) and α(4C). We report test results with net (expense-adjusted) returns in Panel A and gross (expense-unadjusted) returns in Panel B. Like Table 5, all regression specifications include time and investment objective fixed effects, and the standard errors are clustered by fund. We also indicate the number of observations and the adjusted R^2. Again, the main variable of interest is the Team dummy. Most of our controls are also similar to those in Table 5 with two exceptions. First, given some controversy regarding the inclusion of

lagged dependent variable in panel tests, we no longer consider lagged performance measures as additional independent variables.[14] Second, given the evidence that funds returns may be different across geographic locations (e.g., Coval and Moskowitz, 2001; Christoffersen and Sarkissian, 2009), we now include a dummy variable for financial centers (FC), which equals one if the fund is in a financial center and zero otherwise.

In columns 1-3 of Panel A of Table 6, the dependent variable is the objective-adjusted returns. We report the results without and with fund-level and manager-level controls. In Panel A, the Team dummy comes up positive in all three regressions and is significant at the 5% level in the most comprehensive specification that controls for both fund and manager characteristics. In this latter regression, the economic impact of team management on objective-adjusted fund returns is close to 52bp per year. In columns 4-6, the dependent variable is the four-factor alpha. In this case, even without controls, the impact of team management is positive and significant at the 5% level. After adding fund-level variables, its significance drops slightly to 10%, but with the inclusion of manager characteristics, the coefficient on Team again becomes significant at the 5% level, and its economic magnitude increases by about 50% relative to that in column 4. In columns 7-9, the dependent variable is conditional alpha. The Team coefficient is again positive in all three specifications, it is again significant at the 5% level for the most comprehensive last regression specification. The economic impact of team management on conditional alpha after accounting for all fund and manager characteristics is 49bp per year. The slopes on most of the control variables are in line with those reported in Table 5. In Panel B, we generally see the same pattern as in Panel A.

The next natural inquiry is to determine whether teams benefit all type of funds, irrespective of their investment objective. If team-induced performance gains are concentrated in a specific fund category, then the most likely explanation for previous findings will be not so much related to the benefits that teams brings to fund operations but rather to the characteristics of that fund category. Table 7 reports the results of our tests on the impact on team management

[14] See Maddala and Rao (1973) and Grubb and Symons (1987) among others.

separately for each of the four fund investment objectives. We show the outcome of tests for two risk-adjusted measures of fund performance, $\alpha(4U)$ and $\alpha(4C)$, and report the same set of estimates as in Table 6. The characteristics of regression models are also the same as before but they always include both fund- and manager-level controls.

Columns 1 and 2 of Table 7 show that team management virtually has no impact on aggressive growth funds returns. This could be due to the fact that aggressive growth funds deal with more "soft," not easily available information about stocks and, as Stein (2002) argued, in these cases, single-manager structures may be preferable. This is not however the case for other objective categories. As shown in columns 3-8, managerial teams have economically and statistically significant, at least at 10% level, relation to risk-adjusted returns in all six estimations.[15] In these cases, with the inclusion of all controls, the economic impact of team management ranges between 47bp per year for growth funds to a whapping 102bp per year for growth & income funds. Therefore, Table 7 shows that having funds managed by teams benefits most of fund categories.

4.2. Team Size and Fund Performance

Our previous analysis shows that on average team-managed funds perform better than single-managed funds, and this result holds across most of fund investment objectives. A subsequent and relevant question then is: Are all teams better? That is, is there any relation between team size and fund performance? For instance, research shows that larger teams may often perform worse than small ones (e.g., see Thompson, 2003; Mueller, 2012). While the earlier literature has no clear answer on the optimal number of people in a group (on average, varies between five and ten), it is obvious that the ideal team size should depend on the tasks performed by individuals within a group. It appears that the more diluted the tasks are, the smaller should be the optimal group size. In this respect, Mueller (2012) argues that if companies

[15] Note that some drop in the significance of the Team dummy coefficient in Table 7 simply occurs due to the reduction in sample size rather than from the decrease in its magnitude from the full-sample estimation in Table 6.

deal with various coordination and motivational issues, then any group composed of five or more individuals will already see significant increases in coordination costs within the group and diminishing motivation across members of the group. Another evidence of non-linear benefits of team size is present in Hamilton, Nickerson, and Owan (2003), who find the largest increases in productivity of workers when they join the teams at the early stages of team formation. Therefore, we expect non-linear relation between fund performance and team size. Finally, in an experimental study, Laughlin, Hatch, Silver, and Boh (2006) find that when dealing with highly intellective problems three-person groups are necessary and sufficient to perform better than the best individuals, and that groups with more members do not add extra performance gains.

Recall from our Table 1 (Panel B) that team size indeed appears to be important to fund returns, and that the largest gains in risk-adjusted performance are observed among funds administered by three managers. What is necessary to do now is to examine if this pattern persists or changes after controlling for our usual sets of fund and manager characteristics. Therefore, we run the following regression model:

$$\begin{aligned} Perf_{i,t} &= c_0 + c_1 2FM_{i,t} + c_2 3FM_{i,t} + c_3 4FM_{i,t} + c_4 5FM_{i,t} + \\ &+ \delta_1 Fund\_Controls_{i,t-1} + \delta_2 Mgr\_Controls_{i,t} + \delta_3 FE_{i,t} + e_{i,t}, \end{aligned} \tag{4}$$

where $2FM_{i,t}$, is a dummy which equals one if the fund has two fund managers at the end of calendar year and zero otherwise; $3FM_{i,t}$, is a dummy which equals one if the fund has three fund managers at the end of calendar year and zero otherwise; $4FM_{i,t}$ is a dummy which equals one if the fund has four fund managers at the end of calendar year and zero otherwise; and $5FM_{i,t}$ is a dummy which equals one if the fund has five (or more) fund managers at the end of calendar year and zero otherwise. The other variables are defined as before.

Table 8 shows the estimation results of fund management team size on the two measures of risk-adjusted fund performance, $\alpha(4U)$, and $\alpha(4C)$. Consistent with results of simple difference tests in Panel B of Table 1, the three-manager funds add the most of performance gains vis-à-vis single-managed funds in terms of both unconditional and conditional alphas. The

economic value of a three-person team management on fund performance ranges between 59bp and 65bp per year for the specifications that include all controls. Importantly, the outperformance of three-manager funds is consistently significant at the 5% level across all six estimations. The teams with two managers as well as larger teams (four and five or more managers) add generally less performance gains relative to single-managed funds. Moreover, these extra benefits are not even always significant at the 10% level. Note that this absence of statistical significance is not driven always by smaller sample sizes of four- and five or more manager funds relative to three-manager funds, but can also often be linked to smaller coefficient magnitudes. Having said that, the economic value of team management for funds managed by two and especially five or more managers are still sizable in some regression specifications. For instance, for funds with five or more managers the annual impact of team management on their conditional alpha is 56bp, as reported in column 6.

Thus, Table 8 shows that team size is non-linearly related to fund performance. Intuitively, the number of team members determines the tradeoff associated with larger knowledge base that more people bring to the team versus coordination costs among multiple individuals, as indicated by Mueller (2012) and others. This result is also consistent with Hamilton, Nickerson, and Owan (2003) and Laughlin, Hatch, Silver, and Boh (2006). Each group member brings his/her specific skills and talents, but large cohorts of people with various views on the subject may reduce productivity due to higher difficulty of arriving to unanimous conclusions.

4.3. Team Management and Geographic Location

In the fund management industry in particular, skills, knowledge as well as networking ability of each team member can be of great importance to fund performance. That is, if teams in the financial industry are able to achieve diversification of style and judgment, as argued by Sharpe (1981), then the value of having a team must be larger when each individual has a higher potential to enhance the overall knowledge and resource base of the group. Numerous studies

have shown that those conditions are more readily available in larger cities (e.g., see Jacobs 1969; Glaeser, 1999; Christoffersen and Sarkissian, 2009). Indeed, larger cities, especially financial centers, can provide positive externalities to portfolio managers including, but not limited to, easier knowledge transfer, faster and more diverse business connections, and potential access to private information. Therefore, we test this idea by examining now the team impact on fund performance in financial centers versus smaller towns. The regression model is as follows,

$$\begin{aligned} Perf_{i,t} &= c_0 + c_1 Team_{i,t} + c_2 Team_{i,t} \times FC_i + c_3 FC_i + \\ &+ \delta_1 Fund\_Controls_{i,t-1} + \delta_2 Mgr\_Controls_{i,t} + \delta_3 FE_{i,t} + e_{i,t} \end{aligned}, \quad (5)$$

where $Team_{i,t} \times FC_i$ is the interaction term between the dummies on team management and financial center dummies.

Table 9 reports the estimation results of fund management team size on our two risk-adjusted measures of fund performance, $\alpha(4U)$, and $\alpha(4C)$. Besides reporting the usual outcome of estimations, for each regression it also shows the results of the F-test of the hypothesis that the performance of team-managed and single-managed funds is the same in financial centers. These tests are conducted separately across funds whose advisors are located in six financial centers and those outside that set of cities. Columns 1, 2, and 3 of the table show the estimation results for the unconditional alpha without controls, with fund controls only, and with full set of control variables, respectively. We can see that in all three specifications, the coefficient on Team is statistically zero (sometimes positive, sometimes negative), implying that teams add no gains to performance for funds not located in financial centers. The F-test at the bottom of the table restates these results. However, the value of a team is diametrically opposite in financial centers. First, the coefficient on the interaction term is consistently positive and economically significant, indicating extra benefits of team management in financial centers versus other places. Second

and more importantly, the F-test shows that in financial centers team-managed funds always significantly (at least at the 5% level) outperform single managed funds.[16]

Our estimations with conditional alpha in columns 4-6 of Table 9 lead to the same findings. Again, we observe no gains to managing funds in teams if the locations of funds advisors are outside financial centers. When funds are in financial centers, the evidence of benefits of group-decision making is even higher than before. Both economic and statistical results are stronger than in the case of unconditional alpha. For instance, for the regression specification with the full set of control variables (column 6), the marginal value of multiple-manager funds versus single-managed ones is more than 70bp per year, and this difference is statistically significant at the 1% level.

The results in Table 9 support Sharpe (1981) arguments and provide novel evidence that group decision making is more beneficial in such environments where their members are more likely to acquire knowledge, skills, and establish business connections. In the finance industry in general and fund industry in particular, this becomes more achievable in financial centers than in smaller towns. Our evidence also highlights a new example of superior learning and/or knowledge spillover effects in larger cities as argued by Jacobs (1969) and Glaeser (1999).

4.4. The Role of Team Diversity

Besides the tradeoff between group and individual decision making and the determination of the optimal size of a team, the other important question is the potential effect of group diversity on performance. It is clear that individual characteristics of team members are important for team decision making and performance. In particular, there could be differences between more homogeneous and less homogeneous teams. The literature on diversity in teams, based on limited experimental and empirical data, has led to inconclusive results regarding the impact of group composition on their performance (see Williams and O'Reilly, 1998; Van

[16] In these tests, we test whether the combined coefficient of the team impact on fund performance, c_1+c_2, is positive and statistically significant since both Team and FC are dummies and here take the value of unity.

Knippenberg and Schippers, 2007). Yet, if a mutual fund team includes a much more senior person then the probability of other team members to conform to the decisions of that individual increases leading potentially to inferior investment outcomes (e.g., Janis, 1982). Jehn, Northcraft, and Neale (1999) observe that while the information heterogeneity among group members is very helpful to group performance, the social category heterogeneity is not. Moreover, Chevalier and Ellison (1999b) point out that fund managers have different incentives at various stages of their careers, and so they are not likely to collaborate well within teams composed of members of various age groups.

Our rich mutual fund dataset with various characteristics of fund managers provides an ideal testing ground for the examination of the effect of social category diversity among fund managers on fund performance. In particular, we can create diversity proxies across three dimensions of fund manager characteristics: tenure with the fund, SAT score, and age. As a diversity measure we use the coefficient of variation. It is the ratio of the standard deviation of a variable over its mean, and it is a useful statistic for data which can only take non-negative values (e.g., see Allison, 1978). Therefore, our diversity proxies are:

$$Tenure\ Diversity_{i,t} = \sigma(Tenure_{i,t}) / \mu(Tenure_{i,t}), \quad (6)$$

$$SAT\ Diversity_{i,t} = \sigma(SAT_{i,t}) / \mu(SAT_{i,t}), \quad (7)$$

$$MAge\ Diversity_{i,t} = \sigma(MAge_{i,t}) / \mu(MAge_{i,t}), \quad (8)$$

where σ and μ are the standard deviation and mean of the corresponding manager characteristic, respectively. The table below reports the summary statistics of these diversity measures.

	Mean	S.D.	Min	Max	Median
Tenure Diversity	0.6313	0.3468	0.0338	2.0718	0.6082
SAT Diversity	0.0990	0.0574	0.0022	0.3735	0.0945
MAge Diversity	0.1834	0.1110	0.0111	0.6985	0.1746

All average and median diversity measures are within 0-1 range. The largest spread in these measures is observed for the fund tenure diversity, the smallest for SAT score diversity.

Table 10 shows the impact of team diversity on fund performance for funds located in financial centers and other places. We immediately focus on geographic breakup of our sample since we already determined a primary impact of team management on funds located in larger cities. The table reports the estimates from panel regressions of unconditional and conditional fund alphas on three team diversity measures defined by Eqs. (6-8), the number of observations, and the adjusted R-squares.[17] Columns 1 to 4 show the results for funds in financial centers, while columns 5 to 8 – in other locations. In columns 1 and 3 financial center fund alphas are regressed only on the three manager diversity measures with no any controls. We observe significant economic and statistical impact of diversity in SAT scores and manager age on fund performance, and this relation is negative. This implies that homogeneous teams in financial centers outperform heterogeneous ones. The diversity in manager tenure does not appear to play an important role for fund returns. After controlling for the full set of fund and manager characteristics, including the team size in columns (2) and (4), our earlier conclusions remain intact. A one standard deviation (0.06) decrease in the SAT score diversity increases unconditional and conditional alphas by about 60bp (0.06*12*0.8084) and 80bp (0.06*12*1.0856) per year, respectively, while a one standard deviation (0.1) decrease in manager age diversity leads up to 60bp annual performance boost based on conditional alpha. We do not find any consistent evidence for the importance of diversity in team members among funds located outside financial centers, illustrating again the irrelevance of team management for the performance these types of funds.

[17] Note that our sample size now is much lower than in the earlier tests. This drop occurs for the following two reasons. First, in the current tests we use only team-managed funds. Second, when only one manager in a team has identifiable characteristic, it is impossible to compute the diversity measure based on this characteristic. However, these observations still contribute to the sample that contains average manager characteristics.

Thus, our findings support other papers on team diversity that highlight more problems than benefits associated with grouping people with different characteristics into the same teams (e.g., Jehn, Northcraft, and Neale, 1999). The results are also consistent with career concerns issues in mutual funds (e.g., see Chevalier and Ellison, 1999b). Managers with large differences in incentives and career options, stemming from differences in their educational background and age, are unlikely to collaborate well on such vaguely defined issues as fund portfolio composition and trading activity.

5. Team Management, Risk Taking, and Fund Characteristics

After analyzing various aspects of performance differences between team-managed and single-managed funds in the earlier part of the paper, in this section, we examine whether there exist systematic differences in risk taking and other fund characteristics that can be distinctly attributed to group decision making in mutual fund industry. The existing literature is unclear on the impact of team on risk taking. Some studies, such as Wallach and Kogan (1965), Stoner (1968), Sunstein (2002), and others find that groups could act more aggressively and undertake more risk. Other studies, however, such as Sah and Stiglitz (1986, 1991), Sharpe (1981), Barry and Starks (1984) and Adams and Ferreira (2009), provide theoretical and some empirical evidence that groups may reduce risk. To address these issues within our framework, we use the following model:

$$Risk_{i,t} = d_0 + d_1 Team_{i,t} + \delta_1 Fund\_Controls_{i,t-1} + \delta_2 Mgr\_Controls_{i,t} + \delta_3 FE_{i,t} + e_{i,t}, \qquad (9)$$

where $Risk_{i,t}$ is one of fund's i risk measures at time t. We consider several risk measures. The first is the total volatility of the fund. The second is market risk and the idiosyncratic residual volatility coming from the standard CAPM. The final set comes from the Carhart (1997) model

(see Eq. (1)) and includes market beta, the loadings on size, book-to-market and momentum portfolios, as well as the idiosyncratic residual volatility from this model.

Table 11 reports the results of the estimation of the impact of team management on various risk measures. In this table, the market and residual risk from the CAPM are denoted by Mrk1 and IdVol1, respectively, while these risks from the Carhart (1997) model as Mrk4 and IdVol4, respectively. Each regression specification includes a full set of fund and manager controls as in previous tests with the exception of two fund-level variables, namely, fund family size and net flows. There are no a priori expectations about the impact of those two variables have on risk characteristics of funds. We can see that team management has no statistically significant impact on funds' market risk irrespective whether it is estimated based on the CAPM or the Carhart model. It appears that team-managed funds have more total risk, and based on the CAPM benchmarking, idiosyncratic volatility risk as well. One could argue, for instance, that the idiosyncratic risk of team managed funds is also large in economic sense, reaching almost 1% per year (0.0774*12). However, benchmarking on the Carhart model reveals that fund-specific volatility due to team management is very small (only about 10bp per year). Team-managed funds simply load more on small firms and high book-to-market firms: the coefficients on SMB and HML are both positive and significant at the 10% level. In part, this result can be explained by more resources that team-managed funds can allocate to the price discovery process in small and value stocks or simply to their knowledge of higher average returns on these stocks. Among fund-level controls, the most consistent results for market risk are that we find that it increases for large funds and funds with higher turnover rates. Also, we note that fund age has negative and almost everywhere statistically significant impact on risk across most of its measures except momentum. As for manager controls, the most profound outcome is that female-managed funds or team-managed funds with at least one female member show much less total and idiosyncratic fund volatility, irrespective of the benchmark. This result is consistent with prior evidence (e.g. Barber and Odean, 2001).

In sum, Table 11 illustrates that the impact of group-decision making on fund risk taking behavior is not very straightforward. Team-managed funds do take more market risk and their four-factor risk-adjusted volatility is also non-excessive, but they may expose themselves more to other possible measures of risk than single-managed funds.

Next, we look if team management is associated with specific fund characteristics using the regression setting below:

$$FundChar_{i,t} = d_0 + d_1 Team_{i,t} + \delta_1 Fund\_Controls_{i,t-1} + \delta_2 Mgr\_Controls_{i,t} + \delta_3 FE_{i,t} + e_{i,t}, \quad (10)$$

where $FundChar_{i,t}$ is one of the four relevant for our analysis fund's i characteristics at time t: expenses, turnover, fund size and net flows. Clearly, in these regression models, our set of fund-level control variables must depend on the fund characteristic in question.

Table 12 reports the results of tests based on Eq. (10). Column 1 shows the results for fund expenses. Consistent with Table 1 data, we find that team-managed funds are significantly cheaper for investors. Column 2 shows the results for fund turnover. We observe that team management drastically reduces the trading frequency of funds and this drop is statistically significant. For instance, in economic terms, an average team-managed fund reduces annual turnover by 5.5% relative to a single-managed fund with similar fund characteristics. Column 3 shows the results for fund size. *A priori*, one can think that larger funds are more likely to have teams of portfolio managers. However, just like Table 1 provides no clear signs that multiple-manager funds are usually larger, the current estimation results also give no support for a relation between team management and fund size.[18] Finally, in column 4, we show the impact of teams on generating fund flows. In these tests, we follow Sirri and Tufano (1998) and, besides controlling for the standard set of fund characteristics, also add the lagged unconditional alpha, $\alpha(4U)_{i,t-1}$, and the lagged flows to funds with the same investment objective, $Obj\ Flows_{i,t-1}$. We find that team-managed funds are able to generate significant net flows of about 4.5% per year to

[18] The set of our fund-level control variables also includes the lagged fund size as in Chevalier and Ellison (1999a).

their respective funds. Our finding that team-managed funds increase fund flows is consistent with recent trend towards increasing proportion of multiple-manager funds.

6. Conclusions

In this paper, we revisit the question on the benefits of group decision making and team management. Using detailed managerial-level data from mutual funds allows one to directly observe any differences in various aspects of performance and other characteristics between single-managed and team-managed funds. However, prior research in this area has been largely relying on CRSP data, and the prevailing conclusion has been that multiple-manager funds perform no better if not worse than single-manager ones.

We use mutual fund data from Morningstar Direct and meticulously show that there exist large discrepancies in managerial structure reporting between this database and CRSP. This misspecification averages about 20% per year over our sample period of 1992-2010. More importantly, using more reliable Morningstar data, which has a 97% match with SEC records, we provide compelling evidence that team management has on average a positive impact on fund risk-adjusted returns across all fund investment objectives except aggressive growth. In these tests, we are able to control for a wide range of fund-level and manager-specific characteristics.

We further show that the relation between team and fund performance is non-linear in team size and is not uniform across all geographic locations. Funds benefit the most from a team work of three portfolio managers. This may indicate the potential trade-off between the benefits of collective wisdom and increasing coordination and/or free-rider issues that become more problematic in larger groups. Also, the benefits of team management are strongly present among funds in financial centers but not outside those locations. This outcome is consistent with the idea that larger cities provide wider opportunities for learning, knowledge spillover, and dissemination of information, including private, so the impact of teams on fund performance in

larger cities is much higher than in smaller towns. We observe that team management practice in financial centers is effective among funds with more homogeneous managers along education and age dimensions, possibly reflecting the benefits of more alignment in career concerns and less frictions. Finally, we show that among other benefits of team-managed funds are substantially lower fees, decreased turnover, and ability to attract new fund flows. Our findings therefore explain why team management has become so popular in the fund industry – it has large performance gains, but they greatly depend on team size, diversity, and fund location.

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Table 1
Summary statistics of mutual funds management structure

Panel A: Distribution of single and team-managed funds

	1 Manager		2 Managers		3 Managers		4 Managers		5+ Managers	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
1992	519	67	145	19	70	9	17	2	29	4
1993	584	63	202	22	78	8	20	2	39	4
1994	672	64	243	23	85	8	23	2	35	3
1995	729	61	273	23	115	10	30	3	45	4
1996	767	57	350	26	121	9	57	4	46	4
1997	859	56	399	26	161	11	63	4	48	3
1998	921	53	449	26	210	12	67	4	84	5
1999	961	51	494	26	258	14	81	5	99	6
2000	987	49	587	29	253	12	90	5	116	6
2001	1004	47	602	28	272	13	115	6	134	7
2002	1000	46	647	30	283	13	120	6	137	7
2003	971	44	662	30	287	13	145	7	161	8
2004	876	39	659	30	320	14	174	9	196	10
2005	832	35	698	29	335	14	226	11	300	14
2006	802	33	731	30	352	14	222	11	346	16
2007	776	31	748	30	363	15	247	12	333	16
2008	776	32	732	30	356	15	243	12	327	16
2009	719	31	691	30	392	17	189	9	315	16
2010	622	29	666	31	398	19	164	9	293	16
Total	15377	43	9978	28	4709	13	2293	7	3083	10

Table 1 (continued)

Panel B: Fund performance of single and team-managed funds

	1 Manager		2 Managers		3 Managers		4 Managers		5+ Managers	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
OAR	0.001	1.347	0.015	1.283	0.018	1.157	0.048	1.480	0.037	0.975
Diff			0.014		0.017		0.047		0.036	
p-value			(0.447)		(0.470)		(0.147)		(0.176)	
α(4U)	-0.042	0.796	-0.031	0.765	-0.006	0.738	-0.029	0.788	-0.005	0.603
Diff			0.011		0.036**		0.013		0.037**	
p-value			(0.342)		(0.017)		(0.528)		(0.031)	
α(4C)	-0.006	0.857	-0.003	0.822	0.033	0.793	0.009	0.866	0.018	0.659
Diff			0.003		0.039**		0.015		0.024	
p-value			(0.806)		(0.016)		(0.498)		(0.188)	

Panel C: Fund characteristics of single and team-managed funds

	1 Manager		2 Managers		3 Managers		4 Managers		5+ Managers	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
Volatility	4.728	2.567	4.820	2.647	4.981	2.638	4.756	2.701	4.715	2.262
TNA	914	3,800	667	2,030	864	2,690	941	3,450	2,310	10,300
Fund Age	10.240	12.569	10.208	12.185	10.201	12.209	9.193	10.514	10.615	11.446
Turnover	0.913	0.843	0.856	0.698	0.906	0.745	0.828	0.630	0.807	0.627
Expenses	1.316	0.475	1.292	0.437	1.270	0.424	1.244	0.410	1.178	0.407

Panel D: Fund manager characteristics of single and team-managed funds

	1 Manager		2 Managers		3 Managers		4 Managers		5+ Managers	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
Tenure	4.42	4.80	3.83	3.60	3.67	3.20	3.52	3.2	3.61	2.9
SAT	1157.44	139.12	1146.17	116.13	1143.16	99.95	1139.86	93.01	1145.23	79.91
MBA	0.53	0.50	0.70	0.46	0.80	0.40	0.87	0.34	0.95	0.23
Mage	45.90	9.56	44.99	8.83	44.34	8.53	44.32	8.53	44.48	7.09
Female	0.09	0.28	0.15	0.36	0.27	0.44	0.36	0.48	0.26	0.44

Table 1 (continued)

This table gives the summary statistics of domestic equity mutual funds in the United States from 1992 to 2010. Panel A reports the number (and percentage) of funds managed by one, two, three, four, and five (or more) fund managers each year. Panel B report the mean and standard deviation of three fund performance measures. OAR (%, per month) is investment objective adjusted fund return, which is the difference between the average monthly net fund return for fund i in year t and the average monthly fund return of all funds in the matched investment objective in year t. α(4U) and α(4C) are the monthly risk-adjusted net fund returns using unconditional and conditional versions of Carhart (1997) four-factor model, respectively. The panel also shows the difference in performance test results between each group of team-managed funds and single-managed funds. Panel C reports the mean and standard deviation of different fund characteristics over the entire sample period. Volatility (%) is the standard deviation of monthly fund returns over the past 12 months for fund i in year t. TNA ($, millions) is the total net asset under management of fund i in year t. Fund Age (years) is the difference between fund i's inception year and the current year t. Turnover is the minimum of aggregated sales or aggregated purchases of securities of the year divided by the average 12-month total net assets of the fund. Expenses (%) is the annual total expense ratio of the fund i in year t. Panel D reports fund manager characteristics following Chevalier and Ellison (1999). Tenure (years) is the number of years the fund manager remains with the fund i at time t. SAT is the SAT score of matriculates of the fund manager's undergraduate institution. MBA is defined as a dummy variable which equals one when a fund manager (or at least one of the team members) has MBA degree and zero otherwise. MAge (years) is the fund manager's age at current year t. Female is defined as a dummy variable which equals one when a fund manager (or at least one of the team members) is a female and zero otherwise. Important note: In case of teams, we simply take the average for each of these characteristics: Tenure, SAT, and MAge.

Table 2
Random sample mismatch in the fund management structure reported by CRSP and Morningstar Direct

Panel A: Comparison of CRSP, MD, and SEC based on team vs. single manager classification

		Reported specification			True specification		Misspecified funds		Accuracy (%)		
	Sample	Team	Single	Anonymous	Team	Single	Team	Single	Team	Single	Total
CRSP	100	62	38	26	50	26	12	12	81	68	76
MD	100	61	39	0	60	37	1	2	97	97	97
SEC	100	62	38	0	62	38	0	0	100	100	100

Panel B: Comparison of CRSP, MD, and SEC based on number of and the names of fund managers

			Funds with the number of managers mismatch with SEC				Funds with name manager mismatch with SEC			
	Funds with FM names	Max # FM names	underestimated # of FMs	overestimated # of FMs	Total	Accuracy (%)	1 name mismatch	2+ name mismatch	Total	Accuracy (%)
CRSP	74	3	18	8	26	65	19	13	32	57
MD	100	13	7	6	13	87	10	5	15	85
SEC	100	20	0	0	0	100	0	0	0	100

This table shows the extent of managerial structure mismatch in CRSP and Morningstar Direct (MD) versus SEC reports for a random sample of U.S. domestic equity funds in 2005. Panel A reports the mismatch based on the single- vs. team-management classification. Panel B reports mismatches in the reported number of managers in a fund and their explicit names. FM stands as an abbreviation for fund managers.

Table 3
Misspecification in management structure between CRSP and Morningstar Direct

Year	# Matched Funds	% Single-managed		Misspecification					
				Single(CRSP) - Team(MD)		Team(CRSP) - Single(MD)		# Misspecified Funds	% Matched Sample
		CRSP	MD	# Funds	% Single(CRSP)	# Funds	% Team(CR)		
1992	582	80.76	67.87	89	18.94	14	12.50	103	17.70
1993	720	81.94	64.58	147	24.92	22	16.92	169	23.47
1994	835	79.64	63.35	176	26.47	40	23.53	216	25.87
1995	946	78.22	61.42	196	26.49	37	17.96	233	24.63
1996	1040	69.04	58.17	173	24.09	60	18.63	233	22.40
1997	1238	63.25	56.54	166	21.20	83	18.24	249	20.11
1998	1560	60.90	54.17	222	23.37	117	19.18	339	21.73
1999	1668	54.02	50.84	177	19.64	124	16.17	301	18.05
2000	1678	52.26	48.63	197	22.46	136	16.98	333	19.85
2001	1798	50.17	47.94	183	20.29	143	15.96	326	18.13
2002	1864	47.64	46.51	190	21.40	169	17.32	359	19.26
2003	1933	42.42	44.28	145	17.68	181	16.26	326	16.86
2004	1940	33.04	40.21	116	18.10	255	19.63	371	19.12
2005	2015	33.20	35.33	184	27.50	227	16.86	411	20.40
2006	2068	33.70	33.46	203	29.12	198	14.44	401	19.39
2007	2129	31.38	31.75	122	18.26	130	8.90	252	11.84
2008	2110	30.19	32.65	122	19.15	174	11.81	296	14.03
2009	1928	30.39	31.64	116	19.80	140	10.43	256	13.28
2010	1866	30.98	29.80	105	18.17	83	6.44	188	10.08

This table describes the nature and extent of misspecification in the management structure of U.S. domestic equity mutual funds from 1992 to 2010. The sample for each year is matched between CRSP and Morningstar Direct (MD) mutual fund databases (column 2). Columns 3 and 4 show the percentage of mutual funds classified as reporting one manager (Single) in CRSP and MD databases by year, respectively. The unit of observation is a fund, not a fund share class. Columns 5 to 10 report the extent of management structure misspecification in the matched sample by year. Column 5 reports the number of funds classified as single-managed in CRSP but team-managed in MS in the same calendar year. Column 6 reports these misspecified funds as a percentage of all funds classified as single-managed in CRSP. Similarly, column 7 reports the number of funds identified as team-managed in CRSP but single-managed in MD. Column 8 reports these misspecified funds as a percentage of all funds classified as team-managed in CRSP. Columns 9 and 10 report the total number of misspecified funds and express it as a percentage of total matched sample each year, respectively.

Table 4
Misspecification in management structure between CRSP and Morningstar Direct across fund characteristics

Panel A: Fund size

	% Single-managed		% Misspecification		
	CRSP	MD	Single(CRSP)-Team(MD)	Team(CRSP)-Single(MD)	Single(CRSP)-Single(MD)
1S	48.1	48.5	18.4	17.9	-0.5
2	48.0	45.0	21.4	14.1	2.9
3	44.4	42.2	22.3	13.7	2.3
4	46.4	42.8	24.7	14.6	3.6
5	46.2	42.8	25.1	15.1	3.5
6	45.3	42.9	23.8	15.4	2.4
7	45.9	43.5	22.0	14.2	2.4
8	46.5	43.6	25.5	16.7	2.9
9	43.7	41.3	21.3	12.3	2.4
10L	45.2	43.6	16.1	10.4	1.6

Panel B: Fund family size

	% Single-managed		% Misspecification		
	CRSP	MD	Single(CRSP)-Team(MD)	Team(CRSP)-Single(MD)	Single(CRSP)-Single(MD)
1S	57.0	53.2	16.9	13.5	3.8
2	45.1	40.7	24.2	11.9	4.4
3	44.9	42.9	24.8	16.6	2.0
4	45.6	43.4	25.5	17.3	2.2
5	42.2	42.2	22.1	16.1	0.0
6	45.4	42.9	23.4	14.9	2.5
7	38.9	36.8	28.1	14.4	2.1
8	41.7	39.6	25.2	14.5	2.1
9	44.5	42.2	22.9	14.2	2.3
10L	53.6	51.5	12.2	9.6	2.1

Panel C: Fund age

	% Single-managed		% Misspecification		
	CRSP	MD	Single(CRSP)-Team(MD)	Team(CRSP)-Single(MD)	Single(CRSP)-Single(MD)
1S	48.2	44.9	21.7	14.0	3.3
2	48.4	45.7	21.7	15.1	2.7
3	49.9	45.5	23.5	14.5	4.4
4	47.4	43.7	24.9	15.4	3.7
5	47.4	44.6	24.5	16.7	2.8
6	46.5	45.5	21.9	17.2	1.0
7	46.4	45.5	23.0	18.3	0.9
8	45.4	42.5	23.4	14.1	2.9
9	44.4	44.0	21.2	16.3	0.4
10L	46.0	44.2	22.6	15.9	1.9

Table 4 (continued)

Panel D: Fund fees

	% Single-managed		% Misspecification		
	CRSP	MD	Single(CRSP)-Team(MD)	Team(CRSP)-Single(MD)	Single(CRSP)-Single(MD)
1S	44.3	42.7	22.0	14.6	1.6
2	49.4	45.6	21.8	13.9	3.8
3	40.7	37.5	25.7	12.2	3.3
4	41.6	38.6	22.7	11.1	2.9
5	43.4	39.9	22.8	11.4	3.5
6	45.8	43.0	22.2	13.6	2.8
7	46.1	45.3	19.8	15.4	0.8
8	49.3	46.6	21.1	15.2	2.7
9	49.2	47.3	22.2	17.7	2.0
10L	46.5	46.3	19.9	16.9	0.2

Panel E: Fund performance (OAR)

	% Single-managed		% Misspecification		
	CRSP	MD	Single(CRSP)-Team(MD)	Team(CRSP)-Single(MD)	Single(CRSP)-Single(MD)
1L	46.0	44.5	22.0	18.7	1.6
2	44.3	42.6	21.6	17.4	1.7
3	45.6	43.1	21.9	17.5	2.5
4	45.4	43.2	22.2	17.9	2.2
5	44.8	42.2	24.1	19.0	2.6
6	43.8	42.0	22.2	17.6	1.8
7	44.7	41.3	23.4	17.5	3.4
8	44.3	42.2	22.5	17.8	2.1
9	46.0	44.4	21.9	18.5	1.6
10H	47.1	44.1	21.9	17.6	3.1

This table shows the misspecification in the management structure of U.S. domestic equity mutual funds from 1992 to 2010 across fund characteristics. The sample is matched between CRSP and Morningstar Direct (MD) mutual fund databases. Columns 1 and 2 report the percentages of single-managed funds reported in CRSP and MD, while columns 3-5 report the percentages of misspesified funds. The lowest (highest) decile for fund size, fund family size, and fund age is 1 (10).

Table 5
Effect on team management on fund performance: CRSP versus Morningstar

Panel A: Full matched sample analysis

	CRSP				Morningstar Direct			
	α(4U)	α(4U)	α(4C)	α(4C)	α(4U)	α(4U)	α(4C)	α(4C)
$Team_{i,t}$	-0.0012	-0.0082	-0.0033	-0.0048	0.0134	0.0311**	0.0127	0.0371**
	(0.912)	(0.586)	(0.777)	(0.771)	(0.204)	(0.044)	(0.266)	(0.025)
$Fund\ Size_{i,t-1}$	-0.0270***	-0.0318***	-0.0260***	-0.0244***	-0.0272***	-0.0324***	-0.0262***	-0.0250***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
$Fund\ Age_{i,t}$	-0.0035	-0.0159*	-0.0092	-0.0302***	-0.0031	-0.0168*	-0.0087	-0.0313***
	(0.629)	(0.090)	(0.244)	(0.003)	(0.672)	(0.071)	(0.269)	(0.002)
$Family\ Size_{i,t-1}$	0.0122***	0.0130***	0.0125***	0.0085**	0.0123***	0.0137***	0.0126***	0.0093**
	(0.000)	(0.001)	(0.000)	(0.047)	(0.000)	(0.000)	(0.000)	(0.030)
$Expenses_{i,t-1}$	-0.0573***	-0.0590***	-0.0457***	-0.0474**	-0.0568***	-0.0575***	-0.0451***	-0.0458**
	(0.000)	(0.002)	(0.005)	(0.022)	(0.000)	(0.002)	(0.006)	(0.027)
$Turnover_{i,t-1}$	-0.0271***	-0.0002*	-0.0050	0.0001	-0.0268***	-0.0002*	-0.0047	0.0002
	(0.003)	(0.074)	(0.622)	(0.338)	(0.003)	(0.095)	(0.644)	(0.283)
$Flows_{i,t-1}$	-0.0043	-0.0025	-0.0057*	-0.0056	-0.0043	-0.0025	-0.0057*	-0.0056
	(0.150)	(0.487)	(0.075)	(0.129)	(0.153)	(0.484)	(0.077)	(0.127)
$Performance_{i,t-1}$	0.0948***	0.1025***	0.0782***	0.0808***	0.0948***	0.1021***	0.0782***	0.0804***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
$Tenure_{i,t}$		0.0002***		0.0002***		0.0002***		0.0002***
		(0.000)		(0.002)		(0.000)		(0.001)
$SAT_{i,t}$		0.0035**		0.0043**		0.0042**		0.0051***
		(0.034)		(0.016)		(0.011)		(0.005)
$MBA_{i,t}$		0.0115		-0.0013		0.0031		-0.0104
		(0.503)		(0.949)		(0.857)		(0.598)
$MAge_{i,t}$		-0.0826**		-0.1006**		-0.0769*		-0.0943**
		(0.040)		(0.018)		(0.057)		(0.027)
$Female_{i,t}$		-0.0355**		-0.0130		-0.0419***		-0.0202
		(0.013)		(0.425)		(0.004)		(0.216)
Constant	0.1668**	0.3841**	0.1248	0.4854**	0.1611**	0.3366*	0.1189	0.4286**
	(0.025)	(0.033)	(0.132)	(0.014)	(0.032)	(0.065)	(0.153)	(0.031)
Time & Obj. FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cluster (Fund)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2 (%)	12.65	13.36	12.76	13.30	12.66	13.39	12.76	13.34
Obs.	18,437	10,982	18,437	10,982	18,437	10,982	18,437	10,982
Team (MD-CRSP) = 0					0.0146***	0.0393***	0.0160***	0.0419***
p-value					(0.000)	(0.000)	(0.000)	(0.000)

Table 5 (continued)

Panel B: Sub-period analysis with α(4U) as the dependent variable

	CRSP				Morningstar Direct			
	1992-1999		2000-2010		1992-1999		2000-2010	
$Team_{i,t}$	-0.0020	0.0274	0.0015	-0.0147	0.0215	0.0647**	0.0122	0.0200
	(0.941)	(0.407)	(0.892)	(0.370)	(0.400)	(0.034)	(0.298)	(0.277)
Fund Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mgr. Controls		Yes		Yes		Yes		Yes
Constant	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time & Obj. FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cluster (Fund)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2 (%)	5.42	5.66	15.13	16.37	5.43	5.74	15.14	16.37
Obs.	3,626	2,618	14,811	8,364	3,626	2,618	14,811	8,364
Team (MD-CRSP) = 0					0.0235***	0.0374***	0.0107***	0.0347***
p-value					(0.000)	(0.000)	(0.000)	(0.000)

This table compares the effect of management structure on fund performance across CRSP and Morningstar Direct databases using a panel regression approach on matched sample from 1992 to 2010. Panel A reports regression estimates of the matched funds across full sample period using both databases, while Panel B reports regression estimates of the matched funds across two sub-periods. In Panel A, the dependent variable includes two performance measures, α(4U) and α(4C), which are the monthly risk-adjusted net fund returns using unconditional and conditional versions of Carhart (1997) four-factor model, respectively. In Panel B the dependent variable is α(4U). The independent variable of interest is Team, defined as a dummy variable which equals one if the fund has two (or more) fund managers and zero if it has only one fund manager at the end of calendar year. Other independent variables include various fund and manager characteristics as controls. Fund Size is the log of total net assets under management of the fund. Fund Age is the log of the difference between the fund's inception year and the current year. Family Size is the log of total net asset under management of the fund's family. Expenses is the annual total expense ratio of the fund. Turnover is the minimum of aggregated sales or aggregated purchases of securities of the year divided by the average 12-month total net assets of the fund. Flows is the net growth in total net assets under management of the fund over the past year. Performance is the corresponding lagged fund performance measure, α(4U) or α(4C). Tenure is the number of years the fund manager remains with the fund. SAT is the SAT score (divided by 100) of matriculates of the fund manager's undergraduate institution. MBA is defined as a dummy variable which equals one when a fund manager (or at least one of the team members) has MBA degree and zero otherwise. Manager Age is the log of fund manager's age in current year. Female is defined as a dummy variable which equals one when a fund manager (or at least one of the team members) is a female and zero otherwise. All regression specifications include time and investment objective fixed effects (FE), and the standard errors are clustered by fund. Each regression model also reports the p-values of coefficients, the number of observations and the adjusted R^2. Team (MD-CRSP) is the hypothesis that slope coefficients on Team in the corresponding Morningstar Direct and CRSP estimations are the same and p-value is the p-value of this test. ***, ** and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Table 6
Effect of team management of fund performance

Panel A: Tests with net (expense-adjusted) returns

	OAR			α(4U)			α(4C)		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
$Team_{i,t}$	0.0237	0.0128	0.0432**	0.0216**	0.0181*	0.0392**	0.0189*	0.0184	0.0412**
	(0.154)	(0.332)	(0.020)	(0.031)	(0.100)	(0.014)	(0.081)	(0.118)	(0.016)
$Fund\ Size_{i,t-1}$		-0.0384***	-0.0558***		-0.0211***	-0.0255***		-0.0225***	-0.0211***
		(0.000)	(0.000)		(0.000)	(0.000)		(0.000)	(0.000)
$Fund\ Age_{i,t}$		0.0048	-0.0040		-0.0138*	-0.0280***		-0.0142*	-0.0380***
		(0.631)	(0.740)		(0.080)	(0.004)		(0.093)	(0.000)
$Family\ Size_{i,t-1}$		0.0126***	0.0210***		0.0104***	0.0111***		0.0106***	0.0080*
		(0.000)	(0.000)		(0.000)	(0.005)		(0.001)	(0.058)
$Expenses_{i,t-1}$		-0.0214	-0.0465*		-0.0414**	-0.0533***		-0.0369**	-0.0472**
		(0.311)	(0.053)		(0.011)	(0.007)		(0.041)	(0.028)
$Turnover_{i,t-1}$		0.0377***	0.0004**		-0.0279***	-0.0002*		-0.0196*	-0.0000
		(0.005)	(0.033)		(0.004)	(0.072)		(0.069)	(0.745)
$Volatility_{i,t-1}$		-0.0307**	-0.0069		-0.0112**	-0.0073		0.0235***	0.0259***
		(0.017)	(0.763)		(0.033)	(0.309)		(0.000)	(0.000)
$Flows_{i,t-1}$		-0.0025	-0.0056		-0.0001	0.0009		-0.0027	-0.0032
		(0.411)	(0.180)		(0.974)	(0.798)		(0.346)	(0.361)
FC_i		0.0110	0.0011		-0.0047	-0.0068		-0.0051	0.0109
		(0.378)	(0.943)		(0.663)	(0.624)		(0.663)	(0.471)
$Tenure_{i,t}$			0.0074***			0.0057***			0.0070***
			(0.002)			(0.001)			(0.000)
$SAT_{i,t}$			0.0003***			0.0002***			0.0002***
			(0.000)			(0.001)			(0.005)
$MBA_{i,t}$			0.0316			0.0019			-0.0085
			(0.141)			(0.918)			(0.667)
$MAge_{i,t}$			0.0013			-0.1014**			-0.1302***
			(0.978)			(0.014)			(0.002)
$Female_{i,t}$			-0.0835***			-0.0477***			-0.0206
			(0.000)			(0.001)			(0.204)
Constant	0.0098	0.5517***	0.2223	-0.0556**	0.1569**	0.4361**	-0.0996***	0.0213	0.4687**
	(0.751)	(0.000)	(0.296)	(0.049)	(0.044)	(0.019)	(0.001)	(0.801)	(0.019)
Time & Obj. FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cluster (Fund)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2 (%)	-0.04	1.93	3.12	11.02	11.90	12.82	11.09	12.31	13.25
Obs.	31,440	20,565	12,135	26,703	19,781	11,646	26,703	19,781	11,646

Table 6 (continued)

Panel B: Tests with gross (expense-unadjusted) returns

	OAR			α(4U)			α(4C)		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
$Team_{i,t}$	0.0179	0.0091	0.0411**	0.0172*	0.0159	0.0371**	0.0145	0.0163	0.0391**
	(0.273)	(0.482)	(0.025)	(0.082)	(0.142)	(0.019)	(0.177)	(0.161)	(0.021)
Fund Controls		Yes	Yes		Yes	Yes		Yes	Yes
Mgr. Controls			Yes			Yes			Yes
Constant	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time & Obj. FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cluster (Fund)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2 (%)	-0.05	2.16	3.22	10.86	11.91	12.82	10.97	12.54	13.49
Obs.	31,440	20,565	12,135	26,703	19,781	11,646	26,703	19,781	11,646

This table shows the effect of management structure on fund performance using the Morningstar Direct U.S. domestic equity mutual fund sample from 1992 to 2010. It reports the estimates from panel regressions of fund performance on management structure (team versus single) and other controls. Panel A shows test results with net (expense-adjusted) returns; Panel B – with gross (expense-unadjusted) returns. The dependent variable includes three performance measures: OAR, α(4U), and α(4C). OAR is the difference between the average monthly net fund return for the fund in year t and the average monthly net fund returns of all funds in the matched investment objective in year t. α(4U) and α(4C) are the monthly risk-adjusted net fund returns using unconditional and conditional versions of Carhart (1997) four-factor model, respectively. The independent variable of interest is Team, defined as a dummy variable which equals one if the fund has two (or more) fund managers and zero if the fund has only one fund manager at the end of calendar year. Other independent variables include various fund and manager characteristics as controls. Fund Size is the log of total net assets under management of the fund. Fund Age is the log of the difference between the fund's inception year and the current year. Family Size is the log of total net asset under management of the fund's family. Expenses is the annual total expense ratio of the fund. Turnover is the minimum of aggregated sales or aggregated purchases of securities of the year divided by the average 12-month total net assets of the fund. Flows is the net growth in total net assets under management of the fund over the past year. Volatility (%) is the standard deviation of monthly net fund returns over the past 12 months for the fund. FC is the dummy variable which equals one if the fund is in a financial center and zero otherwise. Financial center funds have headquarters located within 50 miles of Boston, Chicago, Los Angeles, New York, Philadelphia, or San Francisco. Tenure is the number of years the fund manager remains with the fund. SAT is the SAT score (divided by 100) of matriculates of the fund manager's undergraduate institution. MBA is defined as a dummy variable which equals one when a fund manager (or at least one of the team members) has MBA degree and zero otherwise. MAge is the log of fund manager's age in current year. Female is defined as a dummy variable which equals one when a fund manager (or at least one of the team members) is a female and zero otherwise. All regression specifications include time and investment objective fixed effects, and the standard errors are clustered by fund. Each regression model also reports the p-values of coefficients, the number of observations and the adjusted R^2. ***, ** and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Table 7
Effect of team management of fund performance by investment objective

	Aggressive Growth		Growth		Growth & Income		Equity Income	
	α(4U)	α(4C)	α(4U)	α(4C)	α(4U)	α(4C)	α(4U)	α(4C)
$Team_{i,t}$	-0.0048	-0.0238	0.0391*	0.0448**	0.0727***	0.0857***	0.0821**	0.0739*
	(0.908)	(0.600)	(0.066)	(0.046)	(0.007)	(0.004)	(0.041)	(0.089)
Fund Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mgr. Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time & Obj. FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cluster (Fund)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2 (%)	15.22	15.05	13.96	13.46	15.61	17.96	15.94	18.35
Obs.	2,402	2,402	6,908	6,908	1,761	1,761	575	575

This table shows the effect of management structure on fund performance using the Morningstar Direct U.S. domestic equity mutual fund sample from 1992 to 2010. It reports the estimates from panel regressions of fund performance on management structure (team versus single) and other controls and other controls across four different MS investment objective categories: aggressive growth, growth, growth & income, and equity income. The dependent variable includes two performance measures, α(4U) and α(4C), which are the monthly risk-adjusted net fund returns using unconditional and conditional versions of Carhart (1997) four-factor model, respectively. The independent variable of interest is Team, defined as a dummy variable which equals one if the fund has two (or more) fund managers and zero if the fund has only one fund manager at the end of calendar year. Other independent variables include various fund and manager characteristics as controls and are the same as in Table 4. All regression specifications include time and investment objective fixed effects, and the standard errors are clustered by fund. Each regression model also reports the p-values of coefficients, the number of observations and the adjusted R^2. ***, ** and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Table 8
Effect of team size on fund performance

	α(4U)			α(4C)		
	(1)	(2)	(3)	(4)	(5)	(6)
2 Managers	0.0121	0.0124	0.0334*	0.0058	0.0073	0.0316
	(0.317)	(0.336)	(0.066)	(0.653)	(0.600)	(0.104)
3 Managers	0.0359**	0.0320**	0.0493**	0.0384**	0.0388**	0.0541**
	(0.015)	(0.045)	(0.026)	(0.016)	(0.021)	(0.021)
4 Managers	0.0155	-0.0068	0.0290	0.0230	0.0052	0.0457*
	(0.516)	(0.737)	(0.240)	(0.373)	(0.802)	(0.076)
5+ Managers	0.0305**	0.0328*	0.0507**	0.0236	0.0307*	0.0464*
	(0.043)	(0.050)	(0.024)	(0.151)	(0.093)	(0.054)
Fund Controls		Yes	Yes		Yes	Yes
Mgr. Controls			Yes			Yes
Constant	Yes	Yes	Yes	Yes	Yes	Yes
Time & Obj. FE	Yes	Yes	Yes	Yes	Yes	Yes
Cluster (Fund)	Yes	Yes	Yes	Yes	Yes	Yes
R^2 (%)	11.13	11.96	12.88	11.20	12.39	13.28
Obs.	25,908	19,555	11,534	25,908	19,555	11,534

This table shows the effect of team size on fund performance using the Morningstar Direct U.S. domestic equity mutual fund sample from 1992 to 2010. It reports the estimates from panel regressions of fund performance on team size and other controls. The dependent variable includes two risk-adjusted performance measures, α(4U) and α(4C). α(4U) and α(4C) are the monthly risk-adjusted net fund returns using unconditional and conditional versions of Carhart (1997) four-factor model, respectively. 2 Managers is a dummy variable which equals one if the fund has two fund managers at the end of calendar year and zero otherwise; 3 Managers is a dummy variable which equals one if the fund has three fund managers at the end of calendar year and zero otherwise; 4 Managers is a dummy variable which equals one if the fund has four fund managers at the end of calendar year and zero otherwise; 5+ Managers is a dummy variable which equals one if the fund has five (or more) fund managers at the end of calendar year and zero otherwise. Other independent variables include various fund and manager characteristics as controls and are the same as in Table 4. All regression specifications include time and investment objective fixed effects, and the standard errors are clustered by fund. Each regression model also reports the p-values of coefficients, the number of observations and the adjusted R^2. ***, ** and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Table 9
Interaction of team and location on fund performance

	α(4U)			α(4C)		
	(1)	(2)	(3)	(4)	(5)	(6)
$Team_{i,t}$	0.0095	-0.0052	0.0219	-0.0089	-0.0152	0.0124
	(0.572)	(0.774)	(0.365)	(0.612)	(0.417)	(0.636)
$Team_{i,t} \times FC_i$	0.0222	0.0400*	0.0284	0.0469**	0.0578**	0.0473
	(0.286)	(0.076)	(0.335)	(0.033)	(0.016)	(0.140)
FC_i	-0.0124	-0.0290	-0.0264	-0.0267	-0.0401**	-0.0216
	(0.459)	(0.127)	(0.309)	(0.129)	(0.046)	(0.445)
Fund Controls		Yes	Yes		Yes	Yes
Mgr. Controls			Yes			Yes
Constant	Yes	Yes	Yes	Yes	Yes	Yes
Time & Obj. FE	Yes	Yes	Yes	Yes	Yes	Yes
Cluster (Fund)	Yes	Yes	Yes	Yes	Yes	Yes
R^2 (%)	11.29	11.91	12.77	11.33	12.34	13.26
Obs.	24,714	19,781	11,646	24,714	19,781	11,646
F-test: FC (Team - Single)	0.0317**	0.0348**	0.0503***	0.0380***	0.0426***	0.0597***
p-value	(0.013)	(0.011)	(0.010)	(0.007)	(0.004)	(0.005)

This table shows the impact of management structure and fund location interaction has on fund performance using the Morningstar Direct U.S. domestic equity mutual fund sample from 1992 to 2010. It reports the estimates from panel regressions of fund performance on Team and Financial Center location and other controls. The dependent variable includes two performance measures, α(4U) and α(4C), which are the monthly risk-adjusted net fund returns using unconditional and conditional versions of Carhart (1997) four-factor model, respectively. Independent variables of interest are Team × FC, Team, and FC, where Team is defined as a dummy variable which equals one if the fund has two (or more) fund managers and zero otherwise, while FC is a dummy variable which equals one if the fund is located in a financial center and zero otherwise. Financial center funds have their advisors located within 50 miles of Boston, Chicago, Los Angeles, New York, Philadelphia, or San Francisco. Other independent variables are defined as in Table 4. All regression specifications include time and investment objective fixed effects, and the standard errors are clustered by fund. Each regression model also reports the p-values of coefficients, the number of observations and the adjusted R^2. ***, ** and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Table 10
Effect of team diversity on fund performance across geographic locations

	Financial Centers				Non-Financial Centers			
	α(4U)		α(4C)		α(4U)		α(4C)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Tenure Diversity$_{i,t}$	-0.0290	0.0085	-0.0657	-0.0224	0.0351	0.0686	0.0805	0.1153*
	(0.515)	(0.851)	(0.167)	(0.651)	(0.499)	(0.216)	(0.155)	(0.066)
SAT Diversity$_{i,t}$	-0.6243**	-0.6147**	-0.8084***	-1.0856***	0.0325	0.1180	-0.0126	0.0548
	(0.032)	(0.027)	(0.007)	(0.000)	(0.938)	(0.785)	(0.977)	(0.910)
MAge Diversity$_{i,t}$	-0.4225**	-0.3829**	-0.5429***	-0.4885***	0.2100	0.2726*	0.1042	0.1676
	(0.027)	(0.041)	(0.002)	(0.004)	(0.202)	(0.096)	(0.552)	(0.330)
Team Size$_{i,t}$		0.0088		0.0166		-0.0396*		-0.0157
		(0.687)		(0.478)		(0.094)		(0.553)
Fund Controls		Yes		Yes		Yes		Yes
Mgr. Controls		Yes		Yes		Yes		Yes
Constant	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time & Obj. FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cluster (Fund)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2 (%)	15.14	16.56	17.40	18.31	13.18	15.88	15.39	17.87
Obs.	1,924	1,667	1,924	1,667	1,350	1,214	1,350	1,214

This table shows the impact of team diversity on fund performance across fund locations using the Morningstar Direct U.S. domestic equity mutual fund sample from 1992 to 2010. It reports the estimates from panel regressions of fund performance on three team diversity measures across funds located in financial centers and other places. The dependent variable includes two performance measures, α(4U) and α(4C), which are the monthly risk-adjusted net fund returns using unconditional and conditional versions of Carhart (1997) four-factor model, respectively. Independent variables of interest are Tenure Diversity, measured by the coefficient of variation of all managers' tenure with the fund in a team; SAT Diversity, measured by the coefficient of variation of all managers' SAT scores within a team; and Manager Age (MAge) Diversity, measured by coefficient of variation of all fund managers' age (in years) within a team. Team Size equals the number of fund managers within a team in a given year. For teams with four or more managers the Team Size equals four. Other independent variables are defined as in Table 4. Financial center funds have their advisors located within 50 miles of Boston, Chicago, Los Angeles, New York, Philadelphia, or San Francisco. All regression specifications include time and investment objective fixed effects, and the standard errors are clustered by fund. Each regression model also reports the p-values of coefficients, the number of observations and the adjusted R^2. ***, ** and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Table 11
Effect of team management on risk-taking behavior

		CAPM		Unconditional Carhart Model				
	Total Risk	Mrk1	IdVol1	Mrk4	SMB	HML	MOM	IdVol4
$Team_{i,t}$	0.0977*	0.0127	0.0774**	0.0108	0.0270*	0.0280*	-0.0053	0.0098
	(0.097)	(0.276)	(0.042)	(0.168)	(0.055)	(0.064)	(0.504)	(0.660)
$Fund\ Size_{i,t-1}$	0.0489***	0.0144***	-0.0146	0.0087***	-0.0037	-0.0065	0.0008	-0.0200***
	(0.003)	(0.000)	(0.201)	(0.000)	(0.296)	(0.123)	(0.736)	(0.005)
$Fund\ Age_{i,t}$	-0.1043***	-0.0126*	-0.0886***	-0.0025	-0.0252***	-0.0228***	0.0101**	-0.0416***
	(0.002)	(0.067)	(0.000)	(0.593)	(0.001)	(0.007)	(0.030)	(0.002)
$Expenses_{i,t-1}$	0.3170***	0.0508***	0.3606***	0.0041	0.1106***	-0.0329*	-0.0009	0.2246***
	(0.000)	(0.000)	(0.000)	(0.640)	(0.000)	(0.072)	(0.926)	(0.000)
$Turnover_{i,t-1}$	0.0033***	0.0008***	0.0021***	0.0003***	0.0008***	-0.0009***	0.0007***	0.0010***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
$FC_{i,}$	0.0043	0.0109	-0.0257	0.0082	0.0060	-0.0069	0.0025	-0.0272
	(0.935)	(0.319)	(0.479)	(0.255)	(0.662)	(0.646)	(0.744)	(0.203)
$Tenure_{i,t}$	0.0025	-0.0015	0.0217***	-0.0028***	0.0064***	0.0040**	-0.0014	0.0137***
	(0.693)	(0.263)	(0.000)	(0.002)	(0.000)	(0.019)	(0.132)	(0.000)
$SAT_{i,t}$	-0.0002	-0.0000	-0.0004**	0.0000	-0.0000	0.0001	-0.0000	-0.0001
	(0.483)	(0.824)	(0.024)	(0.554)	(0.389)	(0.325)	(0.105)	(0.135)
$MBA_{i,t}$	-0.1092	-0.0189	-0.0932*	-0.0001	-0.0170	0.0106	0.0138	-0.0824***
	(0.154)	(0.200)	(0.056)	(0.994)	(0.284)	(0.544)	(0.135)	(0.006)
$MAge_{i,t}$	-0.1906	-0.0520*	-0.0663	-0.0210	-0.0679**	0.0699*	-0.0285	-0.0095
	(0.185)	(0.078)	(0.486)	(0.284)	(0.044)	(0.067)	(0.149)	(0.865)
$Female_{i,t}$	-0.1229**	-0.0172	-0.1401***	-0.0078	-0.0025	0.0146	0.0154**	-0.1091***
	(0.025)	(0.134)	(0.000)	(0.289)	(0.876)	(0.313)	(0.046)	(0.000)
Constant	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time & Obj. FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cluster (Fund)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2 (%)	58.03	18.59	45.61	6.90	31.70	12.13	10.07	33.47
Obs.	12,891	12,286	12,286	12,286	12,286	12,286	12,286	12,286

Table 11 (continued)

This table shows the effect of management structure on risk-taking behavior of mutual funds using the Morningstar Direct U.S. domestic equity mutual fund sample from 1992 to 2010. The table reports the estimates from panel regressions of fund risk-taking on Team and other controls. The dependent variable includes different measures of risks. Total Risk is defined as the standard deviation of monthly net fund returns over the past twelve months. Mrk1 is the market risk defined as the coefficient of the market portfolio based on the CAPM performance evaluation model. IdVol1 is the standard deviation of the fund's residual return from the CAPM model. Mrk4, SMB, HML, and UMD are coefficients of market, size, book-to-market, and momentum portfolios based on the Carhart (1997) four-factor performance evaluation model. IdVol4 is the standard deviation of the fund's residual return from the Carhart (1997) model. The independent variable of interest is Team, defined as a dummy variable which equals one if the fund has two (or more) fund managers and zero if the fund has only one fund manager at the end of calendar year. Other independent variables include various fund and manager characteristics as controls. Fund Size is the log of total net assets under management of the fund. Fund Age is the log of the difference between the fund's inception year and the current year. Family Size is the log of total net asset under management of the fund's family. Expenses is the annual total expense ratio of the fund. Turnover is the minimum of aggregated sales or aggregated purchases of securities of the year divided by the average 12-month total net assets of the fund. FC is the dummy variable which equals one if the fund is in a financial center and zero otherwise. Financial center funds have headquarters located within 50 miles of Boston, Chicago, Los Angeles, New York, Philadelphia, or San Francisco. Tenure is the number of years the fund manager remains with the fund. SAT is the SAT score (divided by 100) of matriculates of the fund manager's undergraduate institution. MBA is defined as a dummy variable which equals one when a fund manager (or at least one of the team members) has MBA degree and zero otherwise. MAge is the log of fund manager's age in current year. All regression specifications include time and investment objective fixed effects, and the standard errors are clustered by fund. Each regression model also reports the p-values of coefficients, the number of observations and the adjusted R^2. ***, ** and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Table 12
Effect of team management on fund characteristics

	Expenses	Turnover	Fund Size	Flows
$Team_{i,t}$	-0.0252**	-0.0551**	0.0071	0.0449**
	(0.043)	(0.012)	(0.410)	(0.043)
$Fund\ Size_{i,t-1}$	-0.0474***	-0.0576***	0.9300***	-0.2245***
	(0.000)	(0.000)	(0.000)	(0.000)
$Fund\ Age_{i,t}$	0.0064	-0.0143	-0.0341***	-0.0733***
	(0.544)	(0.350)	(0.000)	(0.000)
$Family\ Size_{i,t-1}$	-0.0245***	0.0365***	0.0305***	0.0922***
	(0.000)	(0.000)	(0.000)	(0.000)
$Turnover_{i,t-1}$	0.0004***		-0.0167**	-0.0139
	(0.000)		(0.012)	(0.417)
$Volatility_{i,t-1}$	0.0244***	0.0631***	-0.0130***	-0.0055
	(0.000)	(0.000)	(0.000)	(0.493)
$Flows_{i,t-1}$	-0.0049***	-0.00037	0.0367***	
	(0.001)	(0.885)	(0.000)	
FC_i	0.0154	01223***	-0.0118	-0.0142
	(0.320)	(0.000)	(0.194)	(0.547)
$Expenses_{i,t-1}$		0.1384***	-0.0543***	-0.1940***
		(0.000)	(0.000)	(0.000)
$\alpha(4U)_{i,t-1}$				0.1982***
				(0.000)
$Obj.\ Flow_{i,t-1}$				0.1732**
				(0.024)
Constant	Yes	Yes	Yes	Yes
Time & Obj. FE	Yes	Yes	Yes	Yes
Cluster (Fund)	Yes	Yes	Yes	Yes
R^2 (%)	17.96	9.38	93.18	9.59
Obs.	22,407	20,854	20,566	20,565

Table 12 (continued)

This table shows the effect of management structure on different fund characteristics of U.S. domestic equity mutual funds from 1992 to 2010. The table reports panel regressions estimates of different fund characteristics on Team and other controls. The dependent variable includes: Expenses, defined as the annual total expense ratio of the fund; Turnover, defined as the minimum of aggregated sales or aggregated purchases of securities of the year divided by the average 12-month total net assets of the fund; Fund Size, defined as the log of total net assets under management of the fund; and Flows, defined as the net growth in total net assets under management of the fund over the past year. The independent variable of interest is Team, defined as a dummy variable which equals one if the fund has two (or more) fund managers and zero if the fund has only one fund manager at the end of calendar year. Other independent variables include various fund characteristics as controls. Fund Age is the log of the difference between the fund's inception year and the current year. α(4U) is the monthly risk-adjusted net fund return using Carhart (1997) four-factor model. Family Size is the log of total net asset under management of the fund's family. Volatility (%) is the standard deviation of monthly net fund returns over the past 12 months for the fund. FC is the dummy variable which equals one if the fund is a financial center fund and zero otherwise. Financial center funds have headquarters located within 50 miles of Boston, Chicago, Los Angeles, New York, Philadelphia, or San Francisco. All regression specifications include time and investment objective fixed effects, and the standard errors are clustered by fund. Each regression model also reports the p-values of coefficients, the number of observations and the adjusted R^2. ***, ** and * indicate significance at the 1%, 5%, and 10% levels, respectively.

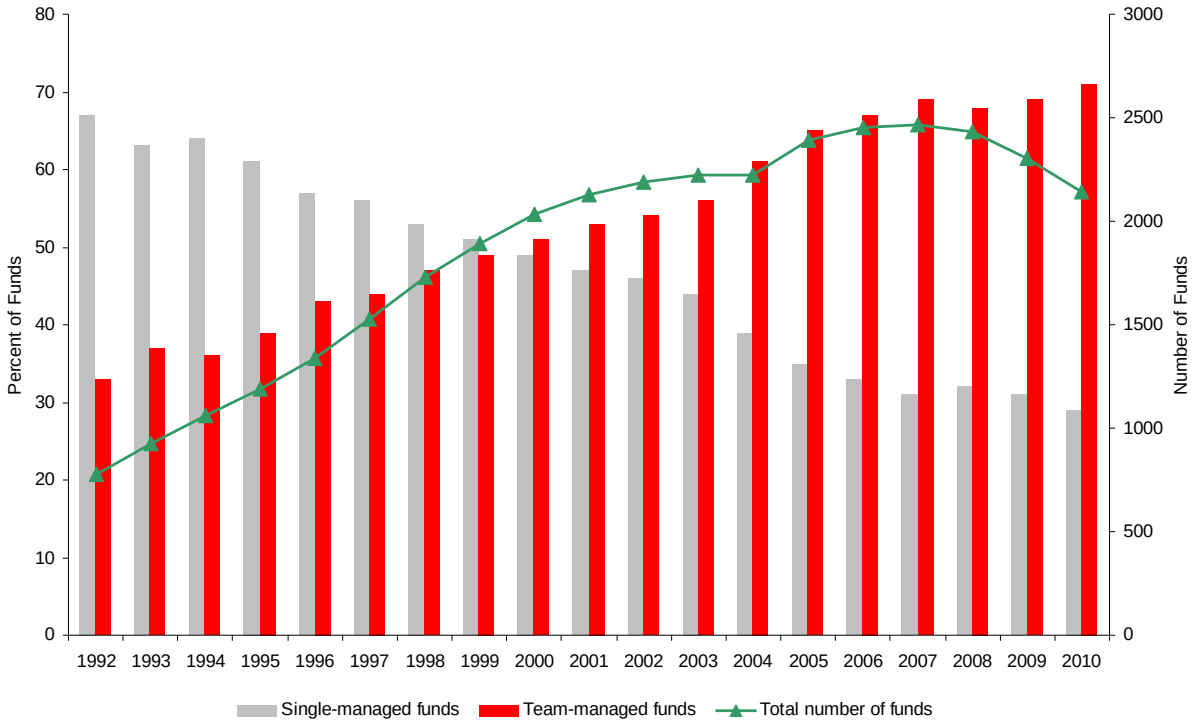

Figure 1. Evolution of mutual fund management structure from 1992 to 2010.
This figure shows the percentage of single-managed and team-managed funds along with the total number of funds in our sample for 1992 to 2010 from Morningstar Direct. The left-hand side vertical axis represents the percentage of single- and team-managed funds out of the total funds in our sample each year. The right-hand side vertical axis represents the total of funds in our sample each year. The horizontal axis represents each year included in our sample.