

Qiong, Liu; Yang, Kuan; Zhou, Yinggao

## Article

# The effect of management team characteristics on performance and style extremity of mutual fund portfolios

Journal of Industrial Engineering and Management (JIEM)

## Provided in Cooperation with:

The School of Industrial, Aerospace and Audiovisual Engineering of Terrassa (ESEIAAT),  
Universitat Politècnica de Catalunya (UPC)

*Suggested Citation:* Qiong, Liu; Yang, Kuan; Zhou, Yinggao (2014) : The effect of management team characteristics on performance and style extremity of mutual fund portfolios, Journal of Industrial Engineering and Management (JIEM), ISSN 2013-0953, OmniaScience, Barcelona, Vol. 7, Iss. 1, pp. 294-310,  
<https://doi.org/10.3926/jiem.987>

This Version is available at:

<https://hdl.handle.net/10419/188602>

## Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

## Terms of use:

*Documents in EconStor may be saved and copied for your personal and scholarly purposes.*

*You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.*

*If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.*



<https://creativecommons.org/licenses/by-nc/3.0/>

## The Effect of Management Team Characteristics on Performance and Style Extremity of Mutual Fund Portfolios

Qiong Liu<sup>1</sup>, Kuan Yang<sup>1</sup>, Yinggao Zhou<sup>2</sup>

<sup>1</sup>College of Business Administration, Hunan University, <sup>2</sup>School of Mathematics and Statistics, Central South University (China)

[1042619193@qq.com](mailto:1042619193@qq.com), [yangkuan@hnu.edu.cn](mailto:yangkuan@hnu.edu.cn), [ygzhou@mail.csu.edu.cn](mailto:ygzhou@mail.csu.edu.cn)

Received: October 2013

Accepted: March 2014

### **Abstract:**

**Purpose:** Along with mutual funds' scale and quantity expanding, it is common for fund management companies hiring new managers or the original fund managers mobilizing from one to another. The high liquidity of fund managers makes different managers regroup to manage the funds that belong to the same fund management company in each fund year. The characteristics of these different management teams will influence the fund performance, and also affect the earnings of the fund management companies and portfolio investors. The purposes of this paper are as follows. First, evaluating the effect of management team characteristics on portfolio characteristics: risk, performance, and extremity. Second, testing the hypothesis that the ranking of mid-year performance have effect on investment style extremity and researching what relationship exists between this phenomenon and management team characteristics in depth.

**Design/methodology/approach:** On the analysis of the relationships between the management team characteristics and portfolio characteristics, a series of OLS regressions were run. The time series regression model (the factor model) and cross-sectional regression were included based on using the STATA, EVIEWS and MATLAB. All of the above were aimed at achieving portfolio optimization and realizing the maximization of the interests for fund management companies and investors.

**Findings:** The main findings are as follows. Teams with more degrees (MBA, CPA and CFA) held more risky portfolios, while teams with long team tenure held less. More members, large

age diversity and long team tenure had positive effect on performance, and the opposite was gender diversity. Teams with more members tend to hold less extreme style decisions, but gender diversity and long tenure were related to more. Besides, tournament hypothesis did exist in China investment funds industry especially when the economy was in a downward phase, and fund managers were more likely to increase the risk of portfolio when their term was coming to an end.

**Research limitations/implications:** The primary limitation in the scope is the sample. The funds in our sample whose ages have to be more than one year, so the funds that can reach the condition are not a lot. It may affect the accuracy of the results on some degree.

**Practical implications:** These findings have important implications for fund management companies as they try to form a highly efficient management team as well as for individual investors' investment allocation decisions.

**Originality/value:** This paper proposes a new perspective to evaluate the relationship between the management team characteristics and portfolio characteristics. It focuses on the fund management companies rather than a single fund.

**Keywords:** financial engineering, mutual fund portfolios, management team characteristics, style extremity, tournament hypothesis

---

## 1. Introduction

Mutual fund managers in the fund management companies frequently change along with mutual funds' scale and quantity expanding. It is common for fund management companies hiring new managers or the original fund managers mobilizing from one to another. According to the Chinese Fund Net, 48.01 percent of the fund managers have changed their jobs from the year 2000 to 2010. The high liquidity of fund managers makes different managers regroup to manage the funds that belong to the same fund management company in each fund year. The characteristics of these different groups will influence the fund performance, and also affect the earnings of the fund management companies. Numerous studies have investigated the effect of managers characteristics on performance and risk-taking (Chevalier & Ellison, 1999; Indro, Jiang, Hu & Lee, 1999; Kon, 2000). Baer, Niessen and Ruenzi (2007) investigated the impact of four measures of work group diversity on mutual fund performance. These findings have important implications for fund management companies as they make decisions regarding the composition of management teams as well as for individual investors structuring their investment allocations.

The fact that the funds are not only managed by a single manager but also a management team which has more than one manager. This paper examines the structure of team-managed

funds using hand collected data on 343 fund years for 57 fund management companies from Jan 2003 to Dec 2012. Management team in this paper means all of the managers working in the same company in each fund year. The data are used to construct several team-level characteristics which are then related to measures of portfolio risk, risk-adjusted performance and style extremity. Then, if the fund management companies' performance is consistent with the individual funds? Is it better to form new teams of managers for the fund management companies? The answers to these questions have important investment implications. None of the recent researches was aimed at the relationship of management team characteristics and the performance of the fund management companies. This is the first question we are paying attention to in this paper. Besides, there is no doubt that the mutual fund market is a tournament in which all funds having comparable investment objectives compete with one another. And the amount of remuneration which a fund receives for "winning" this tournament depends on its performance relative to the other participants. Sirri and Tufano(1992) substantiated that mutual funds earning the highest returns during an assessment period receive the largest rewards in terms of increased new investments in the fund. Fund managers who have good performance are called "winners", and "losers" are the ones whose performance are not good. Managers with either extremely good or bad relative returns at mid-year have incentives to alter the investment characteristics of their portfolios, such as improving or reducing their portfolios risk levels. To this end, our goal in this paper is to test the hypothesis that the ranking of mid-year performance has effect on investment style extremity, and what relationship exists in the phenomenon and management team characteristics in depth. This is the second question in this paper. Both of the questions are very important for the fund management companies when taking management measures and allocating human resources reasonably.

The remainder of the paper proceeds as follows: Section 2 presents related literature. Section 3 describes the method, data sources, and variable definition. Section 4 presents the empirical results; Section 5 tests the tournament hypothesis in fund management company; Section 6 provides conclusions.

## **2. Literature review**

Motivated by the increasingly important role of portfolio management teams, recent literatures have focused on the team-managed funds. Several theoretical papers posited that team management might be a superior structure in the presence (Sharpe, 1981) or even in the absence (Barry & Starks, 1984) of specialization or diversification benefits. Han, Noe and Rebello (2012) found a positive correlation between team management and fund performance. Baer, Niessen and Ruenzi (2009) investigated the impact of work group diversity on performance, finding that informational diversity has a positive impact on performance, which is driven by tenure and educational diversity. Social category diversity had a negative impact

on performance, and it was driven by gender diversity while age diversity had no strong impact. In terms of portfolio risk and style, most studies pointed to the conclusion that single manager takes on more risk, making more extreme decisions (Baer, Kempf & Ruenzi, 2011), and adjusting their portfolios more often in the face of risk considerations (Qiu, 2003). Korniotis (2011) examined the investment decisions of older individual investors. It found that older investors' portfolio decisions reflect greater knowledge about investing, but their investment skill deteriorates with age due to the adverse effects of cognitive aging. Many other research studies, especially in the management and psychology literature, have investigated the decision-making process, behavior, and performance of teams. The results differ across studies mainly due to the variety of tasks and measures used in each study, which makes it difficult to know what characteristics of management team is superior.

All teams, however, are not the same. Team size and team diversity are the most frequently studied team characteristics with mixed results. Larger and more diverse teams may have a broader range of skill and knowledge. But in the opposite, they may not be able to exploit those advantages since some members may not be motivated to contribute, or the diversity of team members' views can sometimes be so broad that they are difficult to reconcile (Herrenkohl, 2004; Hill, 1982). The type of diversity also seems to be of some import. For instance, Simons, Pelled and Smith (1999) found that job related forms of diversity (background, education, and tenure) have a positive effect, while others (age) do not. In terms of risk, common sense would suggest that teams are prone to taking less risk and that risk would be even less for teams with more members. However, Herrenkohl (2004), Janis (1982) and other researchers have suggested that teams are subject to the risky shift phenomenon. Iordanis Karagiannidis (2012) investigated the effect of management team-level characteristics on portfolio risk and style extremity using a unique dataset of 1678 mutual fund managers. Results showed that teams with more members, longer tenure, and more members with graduate business training hold less risky portfolios. When people are in groups, they make decisions about risk differently than when they are alone. Member diversity is related to less extreme style decisions. And different levels of portfolio risk have great effect on the performance. How portfolio managers adapt their investment behavior to the economic incentives they are provided? Brown, Harlow and Starks (1996) studied the 334 growth funds from 1976 to 1991, finding that the tournament hypothesis in performance does exist by ranking the mid-year returns from highest to lowest. And then the volatility of monthly returns are attached according to the fund's ranking. Koski and Pontiff (1999) made regression analysis of 798 equity funds from 1992 to 1994 and also found the existence of performance competition. Meanwhile, some researchers have found the tournament hypothesis is not significant in statistical (Busse, 2001; Gorjaev, Nijman & Werker, 2005). Malmendier and Nagel (2010) focused on the effect of individual experiences of macroeconomic shocks on financial risk taking using data from the Survey of Consumer Finances from 1960 to 2007. They found that individuals who have experienced low stock market returns report lower willingness to

take financial risk, are less likely to participate in the stock market, and are more pessimistic about future stock returns. Those who have experienced low bond returns are less likely to own bonds. And more recent return experiences have stronger effects, particularly on younger people. All of the studies were aimed at a single fund, but none of them was related to the performance of the fund management companies. Does this phenomenon exist in management companies? What management team characteristics are related to this? The answers to these questions have important investment implications.

Ultimately, it is an empirical question whether the different management team characteristics have impact on fund management company's performance. Using the sample of 57 mutual fund management companies in 343 fund years, this study relates team size, tenure, the percentages of other degrees (MBA, CFA etc.) and several measures of diversity (age, gender and tenure) to portfolio risk and performance.

### **3. Method and data**

The analysis was as follows. First, manager characteristics were obtained for all funds at the beginning of each year  $t$  for all years in our sample period (2003-2011). Those management team characteristics were then used to create team-level variables for all funds of 57 fund management companies to measures of risk, risk-adjusted performance over the course of the next year (2004-2012). Considering these characteristics affect the performance of the fund will not immediately appear, so our research studies the influence of the fund management team characteristics in a certain period on its next fund year performance ( $t+1$ ). Ordinary least square (OLS) regressions were employed, and clustered standard errors were estimated by fund.

#### **3.1. Mutual fund data**

All of the mutual fund datas in this report come from the CSMAR Database and the index datas are from the Wind Database. The CSMAR Database contains lots of information about managers and daily fund returns for all funds in operation every year from 2003 to 2012.

Datas are gathered for all domestic equity funds with a self-declared investment objective of growth, aggressive growth, growth income, or equity income. Excluded are index funds, balanced funds, funds of funds, as well as other types of funds that are restricted in some sense in their investment decisions. Obtained for each fund were daily returns, annual expense ratios, accumulative total net values, total net assets, fund inception dates, fund management company's name, portfolio characteristics, such as total number of open mode fund, as well as characteristics of managers (age, gender, tenure, MBA and so on). Besides, the database lists the name of the managers and the date when they begin to manage the fund until they disappear from the database. So we can conclude their tenure and the term "management

team” when more than two people are involved in the management of the funds and they manage together.

From the advanced analytics view of the database, it is easy to know how many fund managers compose the management team. The data of the characteristics with each team at this time of the fund management company in each fund year were hand collected. Each fund's management fees were hand collected. Such as management fees in the database are taken from the fund prospectus. Finally, included are the objective and year dummy variables, as well as several other control variables, in all regressions even though their coefficients are not reported. Following Baer et al. (2007), age and gender diversity are used as proxies for social category diversity. Tenure diversity serve as measures of informational diversity. Also investigated in this study is the effect of other variables that have proven to be important in studies which focus on individual manager characteristics, such as team tenure.

### **3.2. Manager data and team-level variables**

The CSMAR database contains a brief biographical sketch for each fund manager. The information was hand collect about all of the portfolio managers who are members of a portfolio management team in our fund year. For each manager, data were collected on the starting date at the fund, gender, undergraduate and graduate institutions attended, degrees received (including the year in which the degrees were conveyed), the name of the management company for which they work, and the funds they manage. According to our analysis, we can know who works in the company in each fund year. Then, using the information collected from the biographical sketches, additional variables were constructed for every manager in our sample. More specifically, the following variables were constructed for each individual manager:

1. **Manager age:** The manager's age was calculated by starting with the manager's undergraduate graduation date and assuming that the manager was 23 years old at the time of undergraduate course graduation, 26 years old of master degree and 29 years old of doctor graduation.
2. **More degrees:** This variable was constructed that takes a value of one if the manager has an MBA, CFA or CPA etc, and zero otherwise.
3. **Manager Tenure:** A manager's tenure with the fund was estimated by subtracting the date the manager started at the fund from the date for which we wish to measure tenure.
4. **Gender:** A gender dummy was created that takes a value of one if the manager is male and a value of zero if the manager is female.

Using the manager characteristics data mentioned above for managers who work in teams, the following team-level variables were created:

1. Team Size: Team size was measured as the number of managers in the team.
2. Gender Diversity: For each of these variables, a team member can belong to one of two categories (male or female). Following Baer et al. (2007) entropy-based index as a measure of diversity was used.

$$Diversity = \sum_i -p_i \times \ln(p_i) \quad (1)$$

where  $i$  can be zero or one and  $p_i$  is the proportion of the team members belonging to that category. For men only or women only teams the measure is set equal to zero.

3. Age Diversity and Tenure Diversity: To capture age and tenure diversity, the coefficient of variation for the team members' ages and tenure were calculated, respectively.
4. More degrees (%): Both of these variables were calculated as the percent of managers in the team that have an MBA, CFA and CPA degree.
5. Team Tenure: The team tenure variable was defined as the time (in years) managers have been working together as a team. For teams whose managers joined the fund at different dates, team tenure was calculated from the time since the latest team member was added to the team.

Summary statistics for the team-level variables in this sample appear in Table 1. The management team has 3.88 members and has a team tenure of 1.62 years in mean. Most of the managers that are members of the team (25%) have more degrees.

Variable	N	Mean	Std dev	Min	Max
Team Size	343	3.88	2.13	2	15
Age Diversity	343	0.079	0.06	0	0.475
Gender Diversity	343	0.184	0.27	0	0.69
Tenure Diversity	343	0.284	0.187	0	0.94
More Degrees (%)	343	0.25	0.256	0	1
Team Tenure	343	1.62	0.73	0.67	4.5

Table 1. Summary statistics of team-level variables

	Team Size	Age Diversity	Gender Diversity	Tenure Diversity	More Degr(%)	Team Tenure
Team Size	1					
Age Diversity	0.18	1				
Gender Diversity	0.19	0.17	1			
Tenure Diversity	0.19	0.61	0.17	1		
More Degrees	0.08	0.001	0.20	-0.03	1	
Team Tenure	0.09	0.07	-0.03	0.06	-0.11	1

Table 2. Correlation matrix of team-level variables



Table 2 reports all the correlation coefficients among the team-level variables. All of the other correlation coefficients are relatively low, indicating that our team-level variables are not highly correlated, with the exception of the coefficient between Age Diversity and Tenure Diversity (0.61).

### 3.3. Portfolio risk and risk-adjusted performance measures

To evaluate the riskiness of the portfolio, the standard deviation of daily returns (total risk) and the market beta from the market model (systematic risk) were used. These data were derived from the following time-series regression model that was also employed to obtain Jensen's (1968) alpha:

$$R_{it} - R_{ft} = \alpha_i + \beta_{i1} EMR_t + \varepsilon_{it} \quad (2)$$

where  $R_{it} - R_{ft}$  is the day-t excess gross return for a fund management company  $i$  ( $i = 1, \dots, 57$ ) in each fund year, and  $R_{it}$  is the average returns of its funds. For a fund management company  $i$  in year  $t$ , and it has  $n$  types of funds.

$$R_{i,t} = \frac{\sum_{n=1}^N R_{n,t}}{N} \quad (3)$$

$$R_{n,t} = \ln(NAV_t) - \ln(NAV_{t-1}) \quad (4)$$

$NAV_t$  is the day-t accumulated earnings.  $EMR_t$  is the excess market return, where it equals to  $R_{mt} - R_{ft}$ , and  $R_{mt}$  is the market return.

$$R_{mt} = 0.8 * R_{816999.CV} + 0.2 R_{816020.CI} \quad (5)$$

And the one-day bank deposit interest rates are used as the risk-free rate in calculating excess market returns.

The style extremity measure, following Baer et al. (2009), was used as the extent to which the fund's factor loadings, on a Fama and French (1993) three factor model, deviate from the average factor loadings on funds in the same investment objective. First, the following regression was estimated:

$$R_{it} - R_{ft} = \alpha_i + \beta_{i1} EMR_t + \beta_{i2} SMB_t + \beta_{i3} HML_t + \varepsilon_{it} \quad (6)$$

Where  $SMB_t$  is the difference in returns across small-cap and large-cap stock portfolios,  $HML_t$  is the difference in returns between high and low book-to-market portfolios.

Then, three style extremity measures were conducted for each fund management company  $i$  and year  $t$ , as the absolute difference in the fund's factor loading,  $\beta_{it}$ , and the corresponding objective average factor loading,  $\bar{\beta}_{it}$ . This style benchmark is the average factor loading of all funds in the same prospectus objective and year. Similar to Baer et al. (2009), this number is

divided by the average absolute style difference in the corresponding prospectus objective to normalize it. More formally:

$$SE_{it}^F = |\beta_{i,t}^F - \bar{\beta}_{i,t}^F|^{norm} \quad (7)$$

where F indicates the style dimension (SMB or HML). By construction, the average style extremity is one. The greater the style extremity measure, the more extreme the fund's investment style.

Finally, to measure risk adjusted performance, the sharper ratio is used, as well as the one-factor and three-factor alpha from Equations (2) and (6) above.

#### 4. Models and results

In order to evaluate the effect of management team characteristics on portfolio risk and performance, a series of OLS regressions were run where the dependent variables are standard deviation or returns, market beta, sharpe ratio, one-factor and three-factor alphas and style extremity measures. Team-level variables, along with a set of control variables, are included above. Specifically:

$$\begin{aligned} \text{Dependent}_{i,t} = & \alpha + \beta_1 \text{TeamSize}_{i,t-1} + \beta_2 \text{AgeDiv}_{i,t-1} + \beta_3 \text{GenderDiv}_{i,t-1} + \beta_4 \text{TernureDiv}_{i,t-1} \\ & + \beta_5 \text{MoreDegree}_{i,t-1} + \beta_6 \text{TeamTernure}_{i,t-1} + \beta_7 X_t + \varepsilon_t \end{aligned} \quad (8)$$

where all of the variables are as defined above. Also included are the following control variables [represented by  $X_t$  in Equation (8)] that could affect the actions, risk, and performance of mutual funds: MgtFee is the management fee charged by the management company. LogAssets is a measure of fund size and is calculated by taking the log of the average of the fund's assets at the beginning and end of year t, and the age is also on average.

The results presented in Table 3 indicate that in terms of systematic risk (market beta), teams with more members hold less risky portfolios, which is significant at the 10% level. Management team members with more degrees hold more risky portfolios, and long tenure teams hold less. And both of them are significant when standard deviation of returns is in the measure of risk. One possible explanation could be that the managers with other degrees will be more confident and they prefer more risk which can bring higher returns. When making investment decisions, long cooperation makes them easily come to agreement in face of different opinions. It's worth noting that \* denotes significant at 10%, \*\* at 5%, and \*\*\* at 1% in the following tables.

Table 4, shows that team size, age diversity and team tenure are very important team-level characteristics related to performance. The coefficient of them are positive when sharpe ratio and the three-factor alpha are the measures of portfolio performance. Teams with large gender diversity often exhibit worse performance at the measure of Jensen's alpha (p-value<0.01)

and the three-factor alpha ( $p$ -value $<0.1$ ). Teams with more members will obtain better performance. If the managers in a team with all ages, the older ones can provide rich experience, and the young have more passion and energy when they are working. It is conducive to improve performance.

	Total Risk	Market Risk
Team Size	-0.045193 (0.48)	-0.00401* (0.08)
Age Diversity	0.031526 (0.57)	-0.123341 (0.13)
Gender Diversity	-0.222058 (0.64)	-0.28368 (0.98)
Tenure Diversity	-0.047869 (0.86)	0.055432 (0.49)
More Degrees (%)	0.281777* (0.09)	0.023937** (0.02)
Team Tenure	-0.081934** (0.02)	-0.060043* (0.07)
R-squared	0.502386	0.199884

Table 3. Portfolio risk

	Sharpe ratio	Jensen's alpha	3-factor alpha
Team Size	0.018329*** (0.01)	1.717135* (0.08)	0.003854 (0.68)
Age Diversity	0.781909** (0.04)	0.22637 (0.94)	3.015203** (0.03)
Gender Diversity	-0.389426 (0.57)	-0.830924*** (0.00)	-1.161037* (0.07)
Tenure Diversity	0.068743 (0.89)	0.240595* (0.06)	0.078525 (0.35)
More Degrees(%)	0.632568 (0.38)	-1.368977 (0.96)	-0.437385 (0.77)
Team Tenure	0.019751* (0.10)	0.056635 (0.62)	0.155497** (0.02)
R-squared	0.672386	0.254720	0.199125

Table 4. Risk-adjusted performance

The findings on style extremity are reported in table 5. Chan, Chen and Lakonishok (2002) has found that the SMB and HML are two important style choices. When the style extremity is measured by SMB or HML, both of the two indicators show that the more management teams members, the more tendency to steady investment. It can be explained that fund managers in a large team will be easier to influence and restrict each other in the process of decision-making. Though there are large difference between their own investment styles, they can be weakened and balanced by managing the same funds together. They will be inclined to avoid

more aggressive investment styles. Large gender diversity and long team tenure bring more extreme investment styles when is measured by SMB and HML (p-value<0.05), respectively.

	SMB	HML
Team Size	-0.18** (0.01)	0.55** (0.02)
Age Diversity	-0.0954 (0.81)	0.2382 (0.38)
Gender Diversity	0.0648** (0.04)	-0.08736 (0.54)
Tenure Diversity	0.02854 (0.58)	-0.01957 (0.67)
More Degrees(%)	-0.027880 (0.36)	-0.014265 (0.78)
Team Tenure	0.006634 (0.79)	-0.048060** (0.05)
R-squared	0.284736	0.211659

Table 5. Style extremity

## 5.The test of tournament hypothesis

The stock market fell in 2008 because of the financial crisis, but in 2007 comes a time when the economic is prosperity. So this article chooses these two years as a representative, in order to investigate the performance competition behavior of fund management companies in China.

### 5.1. The hypothesis and data

Tournament Hypothesis: Those managers who have high interim returns compared to their peers will want to maintain the high returns. They will be less inclined to take risky positions and may even consider scaling back their risk positions in an attempt to “lock in” their present return level. Unfortunately, to the extent that they anticipate what those managers ranked below them might do, it may be necessary for them to increase risk as well. After eliminating the fund companies whose yield of published were within a full year, we can get 37 companies in 2007 and 48 in 2008.

According to the Brown et al. (1996) and Busse (2001), the yield of accumulative total net values are ranked and the median value size is their divisions. The companies whose yield are located above the median are the interim winners and the below ones are the interim losers. Representing the interim winner and loser strategies by the subscripts W and L, respectively, and the corresponding portfolio risk levels in the first and second subperiods by  $\sigma_1$  and  $\sigma_2$ , these reasons lead to our central prediction:

$$\frac{\sigma_{2L}}{\sigma_{1L}} > \frac{\sigma_{2W}}{\sigma_{1W}} \quad (9)$$

The investors determine their investment behavior considering the end of the fund management company performance ranking. The first six months in each year is as the evaluation period and the next six months is the adjustment period. In the first period, we rank the fund management company's performance by  $CR_m$  (M-month cumulative return). The method is as follows: the  $R_{it}$  is the average returns in each day, so the  $R_m$  is the average returns in each month:

$$R_m = \prod_{t=1}^n (1 + R_{it}) - 1 \quad (10)$$

And  $n$  is the trading days of each month. For the average monthly returns, we can get the total yield in the first half year. If  $m=6$ , the six month cumulative return as follows:

$$CR_m = \prod_{t=1}^6 (1 + R_{m,t}) - 1 \quad (11)$$

Then we need to test the hypothesis that winners and losers make different adjustments to the investment characteristics of their portfolios is a ratio of each fund's volatility measured before and after the interim assessment period. With the interim assessment date at month  $m$ , the fund risk adjustment ratio, RAR (risk adjustment ratio), for a particular year is calculated as:

$$RAR_m = \sqrt{\frac{\frac{1}{5} \sum_{t=7}^{12} (R_{m,t} - \overline{R_{m2}})^2}{\frac{1}{5} \sum_{t=1}^6 (R_{m,t} - \overline{R_{m1}})^2}} \quad (12)$$

The  $\overline{R_{m1}}$  and  $\overline{R_{m2}}$  are the fund management company's average monthly income in evaluation and adjustment period, respectively. Now we can create a (CR, RAR) pair for every fund with the above definitions. The basic test procedure is then to generate a  $2 \times 2$  contingency table in which each pairing is placed into one of four cells: high CR (the winner) / high RAR; low CR (the loser) / high RAR; high CR (the winner) / low RAR; low CR (the loser) / low RAR. As with the earlier use of CR to define interim winners and losers, high and low levels of RAR are determined as being above and below the median RAR value, respectively, for a given tournament. In our tests, if the number of low CR (the loser) / high RAR is significantly more than the number of high CR (the winner) / high RAR, we can accept the tournament hypothesis; otherwise, we refuse it. The selection criteria of the research object in this section is consistent with section 3 above. The sample period is from Jan1, 2007 to Dec31, 2008, and the data are from the CSMAR database. We rank the fund performance in June30, 2007 and June30, 2008.

## 5.2. The empirical results

In table 6, 29.73% of the interim losers increase portfolio risk and the ratio of decreasing portfolio risk is 18.92%. Accordingly, the winners increase or decrease portfolio risk at a ratio of 21.62%, 29.73%. The fund managers who were classified as relative losers during an interim performance assessment period increase portfolio risk to a greater degree than do interim winners indeed. The same condition is in 2008.

Year	Number of Funds	Sample Frequency			
		Interim Losers		Interim Winners	
		Low RAR	High RAR	Low RAR	High RAR
2007	37	18.92%	29.73%	29.73%	21.62%
2008	48	18.75%	31.25%	31.25%	18.75%

Table 6. Descriptive statistics of CR and RAR in 2007 and 2008

Year	Interim Losers	Interim Winners	T-value	P-value
	RAR (mean)	RAR (mean)		
2007	1.3483	1.1937	1.6301	0.1118
2008	1.1614	0.9976	1.7158	0.0937*

Table 7. T-test statistics of interim losers and winners

The interim losers increase portfolio risk to promote their ranking, especially in 2008. In 2007, the frequencies of low CR / high RAR and high CR / high RAR cells are 29.73%, 21.62% and they are 31.25%, 18.75% in 2008, respectively. The tournament phenomenon is evident in 2008, and it may be related to the financial crisis to some extent. As the stock price falls, more fund managers tend to increase the portfolio risk, in an effort to obtain higher returns and reverse the situation when the economic rises.

For RAR, it is different between the losers and the winners. In 2008, the t value is 1.7158, which is significant at 10%. The risk adjustment ratio is obviously greater for the losers than the winners. By the table 6, 7 for those managers who have performed poorly, what they can do is to increase their relative risk level and only in this way can they have a chance to improve their ranking by year end. But for those who have high interim returns compared to their peers will want to maintain those high returns and consider scaling back their risk positions in an attempt to "lock in" their present return level. It's worth noting that the winners do not decrease risk to the same extent as the losers increase risk significantly.

Thus, we speculate that if there is some relationships between the portfolio risk adjustment behavior and the manager's remaining tenure? According to the fund manager's resume, we can calculate the length of time from now to their maturity dates, which is the average remaining tenure of all managers in the management team. We calculate two separate

classifications: funds whose fund manager's remaining tenure are above the median value of average remaining tenure and whose are below.

Year	Remaining Tenure	Number of Funds	Sample Frequency			
			Interim Losers		Interim Winners	
			Low RAR	High RAR	Low RAR	High RAR
2007	Below the Median Value (1.75year)	20	20%	45%	25%	10%
	Above the Median Value (1.75year)	17	17.65%	11.76%	52.94%	17.65%
2008	Below the Median Value (1.88year)	19	31.58%	15.79%	31.58%	21.05%
	Above the Median Value (1.88year)	29	10.34%	41.39%	31.03%	17.24%

Table 8. Frequency distributions of CR and RAR

In table 8, more interim winners choose to lower the risk of fund portfolios than increasing it in 2007, 2008. That's because the winners are more satisfied with the current status, and they do not need to change it. But for the interim losers in 2007, the shorter the remaining tenure, the higher risk they increase. Otherwise, the opposite. This phenomenon is largely due to the upturn of the economic in 2007. The fund managers whose tenure is coming over are not too care about being dismissed because of a huge loss for the company. So they hope to struggle and strive for generating a return which is sufficient to improving their ranking by year end with the help of the good economic situation at present. For those who still have a long tenure, they will reconsider their decisions and not easily take risks. But in 2008, the situation for interim losers is on the contrary: the shorter the tenure remaining, the lower risk they increase. Managers with a longer tenure increase the risk. The financial crisis in 2008 undoubtedly have great influence on fund manager's behavior. It is no surprising that the fund managers do not have incentive to fight for the good income in the future when the economic situation was in a recession, combining with that their tenure are coming to an end. But for the fund managers who still have long tenure, they will work hard for the good future job performance. Low-ranking performance and bad economic situation make them to produce the idea of "the man have nothing fears nobody ". So they will attempt to achieve good results by altering fund risk during the rest of the tenure.

Year	Long Remaining Tenure	Short Remaining Tenure	T-value	P-value
	Mean RAR	Mean RAR		
2007	1.3794	1.3856	2.52	0.0100***
2008	1.0334	1.3157	2.0362	0.0492**

Table 9. T-test Statistics of RAR

Although the fund manager's remaining tenure and risk adjustment ratio are related to the economic situation as well as the preliminary performance ranking, the fund managers who will soon be leaving are more inclined to increase the risk no matter the economic is good or bad.

## **6. Conclusions and implications**

This study mainly focuses on two major issues. Firstly, the effect of management team characteristics on portfolio returns, risk-taking and style extremity of mutual fund portfolios; Secondly, tournament hypothesis in fund management companies and the relationships between the manager's risk-taking behavior and their remaining tenure. We draw the following conclusions:

- Teams with more degrees (MBA, CPA and CFA) hold more risky portfolios, while teams with long team tenure hold less.
- More members, large age diversity and long team tenure have positive effect on performance, and the opposite is gender diversity.
- More members makes their investment style tend to be less extreme. Teams with large gender diversity and long team tenure prefer more extreme styles.
- Tournament hypothesis does exist in China investment funds industry especially when the economy is in a downward phase. In this period, the fund managers will be more urgent to change the bad status. Although the fund manager's remaining tenure and risk adjustment ratio will be related to the economic situation as well as the preliminary performance ranking, for fund managers who will soon be leaving are more inclined to increase the risk no matter the economic is good or not.

In general, this study provides new insights regarding the performances of the fund management companies. Results should have important implications for the companies as they make decisions about the composition of management teams as well as for individual investors who examine their investment allocations.

## **Acknowledgement**

The paper are supported by the National Natural Science Foundation of China (No. 71272209), Humanity and Social Science Foundation of Ministry of Education of China (No.12YJA630170), the Natural Science Foundation of Hunan province (No.12JJ3081), and the Fundamental Research Funds for the Central Universities(No.11HDSK306).



## References

- Baer, M., Kempf, A., & Ruenzi, S. (2011). Is a team different from the sum of its parts? Evidence from mutual fund managers. *Review of Finance*, 15(2), 359-396.  
<http://dx.doi.org/10.1093/rof/rfq014>
- Baer, M., Niessen, A., & Ruenzi, S. (2007). The impact of work group diversity of performance: Large sample evidence from the mutual fund industry. *Centre for Financial Research (CFR) Cologne. Working Paper*, 7-16. <http://hdl.handle.net/10419/57751>
- Baer, M., Niessen, A., & Ruenzi, S. (2009). *The impact of team diversity on mutual fund performance*. Working paper. <http://dx.doi.org/10.2139/ssrn.1343472>
- Barry, C., & Starks, L. (1984). Investment management and risk sharing with multiple managers. *Journal of Finance*, 39(2), 477-491.  
<http://dx.doi.org/10.1111/j.1540-6261.1984.tb02321.x>
- Brown, K., Harlow, W., & Starks, L. (1996). Of tournaments and temptations: An analysis of managerial incentives in the mutual fund industry. *The Journal of Finance*, 51(1), 85-110.  
<http://dx.doi.org/10.1111/j.1540-6261.1996.tb05203.x>
- Busse, J. (2001). Another look at mutual fund tournaments. *Journal of Financial and Quantitative Analysis*, 36, 53-73. <http://dx.doi.org/10.2307/2676197>
- Chan, L.K.C., Chen, H.L., & Lakonishok, J. (2002). On Mutual Fund Investment Styles. *Review of Financial Studies*, 15(5), 1407-1437. <http://dx.doi.org/10.1093/rfs/15.5.1407>
- Chevalier, J., & Ellison, G. (1999). Career concerns of mutual fund managers. *The Quarterly Journal of Economics*, 114(2), 389-432. <http://dx.doi.org/10.1162/003355399556034>
- Fama, E.F., & French, K.R. (1993). Common risk factors in the returns on stocks and bonds. *Journal of Financial Economics*, 33(1), 3-56. [http://dx.doi.org/10.1016/0304-405X\(93\)90023-5](http://dx.doi.org/10.1016/0304-405X(93)90023-5)
- Goriaev, A., Nijman, T.E., & Werker, B.J.M. (2005). Yet another look at mutual fund tournaments. *Journal of Empirical Finance*, 12(1), 127-137.  
<http://dx.doi.org/10.1016/j.jempfin.2003.11.001>
- Han, Y., Noe, T.H., & Rebello, M.J. (2012). Horses for courses: Fund managers and organizational structures. Working paper. <http://dx.doi.org/10.2139/ssrn.2024769>
- Herrenkohl, R. (2004). *Becoming a team*. Independence, KY: Cengage Learning.
- Hill, G. (1982). Group vs. individual performance: Are N+1 heads better than one? *Psychological Bulletin*, 91(3), 517-539. <http://dx.doi.org/10.1037/0033-2909.91.3.517>
- Indro, D.C., Jiang, C.X., Hu, M.Y., & Lee, W.Y. (1999). Mutual fund performance: Does fund size matter? *Financial Analysts Journal*, 55(3), 74-87. <http://dx.doi.org/10.2469/faj.v55.n3.2274>

- Janis, I. (1982). *Groupthink: A psychological study of policy decisions and fiascoes*. Boston, MA: Houghton Mifflin Company.
- Jensen, M.C. (1968). The performance of mutual funds in the period 1955 - 1964. *Journal of Finance*, 23(2), 389-416. <http://dx.doi.org/10.1111/j.1540-6261.1968.tb00815.x>
- Karagiannidis, I. (2012). The effect of management team characteristics on risk-taking and style extremity of mutual fund portfolios. *Review of Financial Economics*, 21(3), 153-158. <http://dx.doi.org/10.1016/j.rfe.2012.06.009>
- Kon, S.J. (2000). The market-timing performance of mutual fund managers. *Journal of Business*, 56(3), 323-347. <http://dx.doi.org/10.1086/296204>
- Korniotis, K. (2011). Do older investors make better investment decisions? *The Review of Economics and Statistics*, 93(1), 244-265. [http://dx.doi.org/10.1162/REST\\_a\\_00053](http://dx.doi.org/10.1162/REST_a_00053)
- Koski, J., & Pontiff, J. (1999). How are derivatives used? Evidence from mutual fund industry. *The Journal of Finance*, 54(2), 791-816. <http://dx.doi.org/10.1111/0022-1082.00126>
- Qiu, J. (2003). Termination risk, multiple managers and mutual fund tournaments. *European Finance Review*, 7(2), 161-190. <http://dx.doi.org/10.1023/A:1024533132105>
- Malmendier, U., & Nagel, S. (2011). Depression babies: Do macroeconomic experiences affect risk-taking? *Forthcoming Quarterly Journal of Economics*, 126(1), 373-416. <http://dx.doi.org/10.1093/qje/qjq004>
- Sharpe, W. (1981). Decentralized investment management. *Journal of Finance*, 36(2), 217-234. <http://dx.doi.org/10.1111/j.1540-6261.1981.tb00436.x>
- Simons, T., Pelled, L., & Smith, K. (1999). Making use of difference: Diversity, debate, and decision comprehensiveness in top management teams. *Academy of Management Journal*, 42(6), 662-673. <http://dx.doi.org/10.2307/256987>
- Sirri, S., & Tufano, P. (1992). *The demand for mutual fund services by individual investors*. Harvard University. Working paper.

