

Original Paper

Risk Lovers: Management Fee and Fund Performance

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Abstract

We analyze the relationship between fund management fee rates and the risk-returns characteristics of funds to infer retail investors' risk preferences. Using data on open-end equity funds in China, we document a positive relationship between the fund management fee rate and the fund risk. This relationship cannot be explained by the return of those funds with high risks, since we find that funds with higher management fee rates normally have lower returns. We argue this is because of the mental accounting of households, and they become risk-loving when making fund investment decisions. They prefer funds with higher risk, and demand from them pushes up the management fee rate. Our results do not contradict existing findings since households could be risk-averse overall and risk-loving for certain investments.

Keywords

risk preference, management fee, mutual fund

1. Introduction

Risk preference is one of the cornerstones of modern economics and finance. It is characterized by utility function and enters many theoretical models and empirical tests. Risk preference determines individual behavior in many aspects including consumption, investment, financing, and others. As a consequence, it would affect various aspects of the market and ultimately influence the macroeconomy. Therefore, risk preference has always been the core of economic research.

So far most of the existing studies assume that investors are risk reverse, which is reasonable as most empirical studies estimating the risk aversion coefficient get positive values. Thus, research on risk loving is less common. One exception is loss aversion. Tversky and Kahneman (1981) develops the prospect theory. They posit that individuals are normally risk averse when choosing among multiple exclusive investment options of “gains”, that is, the possible returns of these options are positive. However, when it comes to “losses”, i.e., the possible returns are negative, people become risk loving: they prefer

investment options with higher risks. However, current research on risk loving for “gains” is still insufficient.

In this paper, we argue that risk loving could also exist for gains, which does not necessarily contradict the assumption and evidence of risk aversion in the literature. We reconcile the two arguments by mental accounting (Thaler, 1985). When investors make decisions, they may (irrationally) use multiple (mental) accounts to make financial planning, with each account associated with a certain investment activity. For example, they may use one account for savings for education and healthcare and another for risky investments. Households could have different risk attitudes for different accounts. They could be very cautious when they make savings for education and healthcare but are highly risk-tolerant for risky investment accounts. Thus, investors could be risk-loving in particular investment activity and risk-averse overall.

We use China's public offering open-end fund data to test the above hypothesis. The public offering funds in China is analogous to mutual funds in the U.S. and has been developing rapidly in recent years. As of 2020 December, the total net asset value (NAV) of open-end funds in China reached 17.3 trillion Chinese Yuan (about 2.51 trillion U.S. dollars). For retail investors in China, investment in funds is risky and is in a different (mental) account from savings.

While we cannot directly measure retail investors' risk preference, we can infer the risk preference by fund performance and management fee. The management fee is a fee proportional to the NAV managed by the fund companies to investors and is also the main source of fund manager compensation. The management fee is affected by investor preference over funds: Investors are willing to pay a higher management fee to funds they prefer (and choose to invest). Thus, we can compare the risk and return characteristics of funds with higher management fees to those with lower management fees to infer investor risk attitudes.

Using panel data from 2011 to 2019, we find that funds with higher management fees have lower average returns, and this is not due to their risk: these funds with higher management fees have a higher risk (standard deviation of fund returns). In other words, investors prefer funds with higher risk even if they bring lower returns, which is risk loving.

This paper contributes to the literature by showing that risk loving exists even when investors choose among different gains. The findings enhance our understanding of the mutual fund industry. We show that when retail investors make a plan for a risky investment, they sacrifice expected returns to chase risk, which solves the puzzle in the literature (Malkiel, 1995) that some poorly performed funds earn high management fees.

2. Literature Review

Risk attitude is one of the key determinants of investor behavior (Bellante & Saba, 1986; Barasinska, Schäfer, & Stephan, 2012). Thus, there is a large body of literature on risk preference. Most studies consider investors risk averse when developing theoretical models or empirical research designs.

However, individuals could be risk loving under certain conditions. Risk loving means investors prefer assets with higher risk given expected returns. Current research associated with risk loving concentrates on loss aversion. When investors choose from different losses with different risk characteristics, they prefer those with higher risk (Tversky & Kahneman, 1981). That could lead to disposition effects (Shefrin & Statman, 1985). Investors that experienced negative shock may become more risk-loving (Bernile, Bhagwat, & Rau, 2017), and this process is affected by cognitive abilities, income, education, level, and age (Dohmen, Falk, Huffman, Sunde, Schupp, & Wagner, 2011; Mather, Mazar, Gorlick, Lighthall, Burgeno, Schoeke, & Ariely, 2012; Outreville, 2015; Riley & Chow, 1992; Shaw, 1996). Loss aversion has real consequences on the stock market (Benartzi & Thaler, 1995). Our paper contributes to this literature by showing evidence of risk loving when investors choose among different gains.

The second related literature is mental accounting, whereby individuals (irrationally) consider economic outcomes separately. Thaler (1985) put forward the theory which was further developed later (e.g Koch & Nafziger, 2016). Mental accounting affects individuals' behavior in the financial decision and also affect the stock market (Zhang & Sussman, 2017; Grinblatt & Han, 2005; Barberis & Huang, 2001). Our paper applies this concept to household portfolio management to explain the positive relationship between risk and management fees.

Our paper is also related to the literature on the quantification of risk aversion. Extant studies assume that individuals' risk aversion is constant across the financial decision on different assets. For example, Bian, Wang and Zhou (2021) estimate the risk conversion of China investors using risk-neutral density extracted from observable option prices developed in the literature (Aït-Sahalia and Lo, 2000; Bliss & Panigirtzoglou, 2004; Jackwerth, 2000; Rosenberg & Engle, 2002; Tarashev, Tsatsaronis, & Karampatos, 2003). Our paper contributes to the literature by considering the heterogeneity in risk attitudes when investors make decisions on a specific asset.

Fourth, our paper contributes to the literature on mutual fund managers' performance and compensation. Current literature focus on whether manager compensation is positively correlated with performance (e.g. Ippolito, 1989). While many studies find that high management fee cannot incentive fund manager to perform better (such as Malkiel (1995)), our paper considers this question from another perspective and justify the relationship between managers' compensation and performance by the risk preference of investors.

3. Methodology

3.1 Data Source

We collect data on all the open-end equity funds from 2011 to 2019 in China from the Wind database and construct a panel sample for fund management fee rate, fund returns and risk based on NAV, and fund manager characteristics including education level, gender, tenure, and the number of funds managed. In total, we have 11595 funds. Fund returns and risk are calculated in the next section.

3.2 Variable Construction

3.2.1 Fund Returns

Fund return is the ratio between a fund's payoff and costs and is the most intuitive indicator of a fund's performance. We calculate the annual return of the fund using the following equation:

$$R = \frac{C \times n(1 - d) - B + F}{B} \quad (1)$$

Where R is fund return, C is the NAV at the end of then year of funds, n is the number of fund shares, d is fund redemption fee rate, B is the dollar volume of the fund subscription at the beginning of the year, and F is cash dividend.

3.2.2 Fund Risk

Fund risk refers to the magnitude of changes in fund return volatility, We compute the fund risk in the following equation:

$$\sigma = \sqrt{\sum_{t=1}^T (R_t - \bar{R})^2} \quad (2)$$

where R_t is the fund risk. R is the monthly return of the fund calculated in a similar way to (1) except that the holding period is month rather than year.

3.3 Empirical Models

To test whether investors are risk loving, we investigate how the management fee changes with fund risk and return characteristics. Management fee reflects the demand of investors for funds. Risk-averse investors should prefer funds with higher returns and lower risks, thus such funds should have higher management fee rates. In contrast, if investors are risk-loving, funds with lower returns and higher risk should have higher management fee rates. Following this strategy, we run the following regression:

$$R_{it} = \beta_0 + \beta_1 a_{it} + \beta_2 x_{1m} + \beta_3 x_{2m} + \beta_4 x_{3m} + \beta_5 x_{4m} + \varepsilon_i \quad (3)$$

$$\sigma_{it} = \delta_0 + \delta_1 a_{it} + \delta_2 x_{1m} + \delta_3 x_{2m} + \delta_4 x_{3m} + \delta_5 x_{4m} + \varepsilon_i \quad (4)$$

where R_i is the annual return computed in Equation (1) for fund i in year t , a_i is the management fee rate of fund i , and σ_i is the standard deviation of return of fund i . Meanwhile, x_{1m} , x_{2m} , x_{3m} , and x_{4m} denote the fund manager's gender, education, number of days in service, and the number of funds managed, respectively. x_{1m} equals one if the fund manager is male and 0 otherwise. x_{2m} equals zero if the fund manager has a bachelor's degree, one if the fund manager has a master's degree, and 2 if the fund manager has a doctorate.

If we observe a negative estimate for β_1 and a positive estimate for δ_1 , investors prefer funds with higher risk even if the funds do not have higher returns. In that case, investors are risk-loving.

4. Result

4.1 Descriptive Statistics

We first analyze descriptive statistics, and the results are presented in Table 1. The range of management fee rates is between 0% and 3%, with a mean value of 0.89%. The range of fund returns is between -47.95% and 278.55%, with a mean value of 8.21%, and the fund market on average has a good performance. The range of the standard deviation of fund returns is mainly distributed between 0 and 61.75, with a mean value of 0.752.

In addition, the mean of the fund manager gender dummy for open-end equity funds is 0.73, indicating that fund managers are mainly male; the average value of fund manager education is 1.057, indicating that fund managers' education level is mainly concentrated in master's degree; the range of fund manager's tenure is between 0 and 6153 days, and the average value, with an average value of 1356.248, indicating that fund managers have an average of 3-5 years experience. The number of funds fund managed by each fund manager is between 0 and 22 funds, with an average value of 6.249.

Table 1. Descriptive Statistics

Variable	Obs	Mean	Std. dev.	Min	Max
Return (%)	25686	8.216	21.706	-47.95	278.55
Risk	25686	0.752	0.844	0	61.75
Managemetn fee rate (%)	25686	0.89	0.501	0	3
Gender	25686	0.73	0.444	0	1
Education	25686	1.057	0.38	0	2
Tenure (days)	25686	1356.248	927.244	0	6153
Number of managed funds	25686	6.249	3.712	0	22

4.2 Regression Results

We first perform the regression analysis in equation (4) to explore the relationship between fund management fee rate and fund risk. Table 2 reports the results. The coefficients of all variables except tenure are statistically significant and greater than zero, indicating that management fee rate, fund manager gender, education, and the number of funds managed have significant positive relationships with fund risk.

Table 2. Management Fee Rate and Fund Risk

DV: fund risk	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]
Fund management fee rate (%)	0.96	0.01	100.64	0	0.941	0.978
Tenure (days)	0	0	0.39	0.697	0	0
Gender	0.048	0.01	4.98	0	0.029	0.067

Education	0.059	0.011	5.30	0	0.037	0.081
Number of managed funds	0.026	0.001	20.60	0	0.023	0.028
Mean dependent var	0.752		SD dependent var		0.844	
R-squared	0.372		Number of obs		25686.000	
F-test	1167.940		Prob > F		0.000	
Akaike crit. (AIC)	52293.094		Bayesian crit. (BIC)		52407.245	

More specifically, the coefficient of the management fee rate on fund risk is 0.96, which means a one percentage point increase in the management fee rate is correlated with a 0.96 unit increase in fund risk. These results imply that investors prefer riskier funds and the increased demand for such funds raises the management fee rate. In addition, since fund managers need to increase the subscription in order to increase the total management fee income, they will increase the risk-taking of the fund to catering the "risk-chasing" investors. Therefore, the results are consistent with the hypothesis that China investors are risk-loving in fund investment.

However, there is an alternative explanation for the positive correlation between fund risk and management fee rate. It is possible that fund managers increase their risk-taking in pursuit of higher returns to attract investors, and the greater demand for such funds is due to investors' preference for funds with higher returns. To rule out this explanation, we further analyze the relationship between management fee rate and returns. A regression analysis of equation (3) is conducted, and Table 3 reports the results. First, the coefficient of the management fee rate is -6.604, which indicates a negative relationship between the management fee rate and fund returns. In other words, funds with higher management fees have lower returns, which rules out the alternative explanation stated above. Therefore, the aforementioned positive correlation between return and risk is not due to higher expected returns of higher risky funds, but rather due to the fund manager's appeal to investors' risk chasing.

Table 3. Management Fee Rate and Fund Return

DV: Fund return	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]
Fund management fee rate(%)	-6.604	0.247	-26.74	0	-7.088	-6.12
Tenure (days)	0.001	0	5.93	0	0	0.001
Gender	0.108	0.242	0.45	.656	-.367	0.583
Education	0.258	0.281	0.92	.359	-.293	0.809
Number of managed funds	0.126	0.032	4.01	0	0.065	0.188
Mean dependent var	8.216		SD dependent var		21.706	
R-squared	0.395		Number of obs		25686.000	
F-test	1290.307		Prob > F		0.000	
Akaike crit. (AIC)	218107.467		Bayesian crit. (BIC)		218221.619	

In addition, fund management fee rate, tenure, and the number of managed funds are all statistically significant. In contrast, the effects of gender and education on fund returns are statistically insignificant. In particular, when the number of managed funds increases by one unit, the fund risk increases by 0.026 and the fund return increases by 0.126%. This indicates that the more funds managers manage, the more experience and hands-on ability the fund manager possesses, and hence the fund performance is better. In summary, we find that retail investors prefer higher-risk funds, so funds with higher risks have higher management fee rates. But the increase in risk does not increase the expected return of the fund, so retail investors prefer higher-risk funds not because these funds can bring higher expected returns, but because retail investors are risk-loving. Note that the results are not necessarily inconsistent with findings in the extant literature that investors are risk averse, and we use mental accounting to reconcile the findings. Households may have different risk attitudes when dealing with different financial decisions. They may be risk averse in decisions like savings. What we study is the investment in funds, a risky investment.

5. Conclusion

In this paper, we analyze the relationship between fund management fee rates and the risk-returns characteristics of funds to infer retail investors' risk preferences. We collect Chinese open-end equity funds from the Wind database from 2011 to 2019, construct a panel sample, and conduct analysis to obtain the following findings. If the fund management fee rate (%) is higher, the fund risk is higher. We argue this is because investors are risk-loving when making fund investment decisions. They prefer funds with higher risk, and demand from them pushes up the management fee rate. An alternative explanation is that funds with higher risk may have higher returns which attract investors. We rule out this explanation by showing that funds with higher management fee rates have lower returns. We argue this risk loving is a manifestation of mental accounting in household investment decisions. Households could be risk-averse overall, but they could become risk-loving when making risky investment decisions.

We provide novel evidence on risk-loving investors who choose from different assets with gains. This is different from the risk loving due to loss aversion documented in the literature. Our findings also provide a new explanation for the puzzling findings that management fee rates cannot incentivize fund managers to get better performance in terms of risk-adjusted return. Because retail investors are risk-loving, higher risks become attractive, and managers tend to hold risky assets to cater to investors.

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