温州肯恩大学

WENZHOU-KEAN UNIVERSITY

The Role of Fees in the Mutual Fund FOF's Performance

—— Evidence in China

In Partial Fulfillment of the Requirements

for the Bachelor of Science in Finance

by

JIANG Ziqi

1098518

May, 2022

The Role of Fees in the Mutual Fund FOF's Performance

—— Evidence in China

December 7, 2021

Ziqi Jiang [a,*]

[a] *School of Accounting and Finance, College of Business and Public Management, Wenzhou-Kean University, Wenzhou 325060, China.*

Abstract

The fund of funds (FOF) in the mutual fund has been booming in recent years, attracting investors' interests, especially in China. Meanwhile, the fee structure will be taken into consideration by investors and fund managers. This paper examines the relationship between the fees of FOF and fund performance in China market. Aiming to achieve the result, it applies the Capital Asset Pricing Model, the Fama-French three factors model, the Carhart model and the Fama-French five factors model to measure the fund performance. Based on the data consisting of 91 mutual fund FOFs from 2017 to 2021, this study looks into the relationship between fees and FOFs. It is expected that the management fees are negatively related to the risk-adjusted return, with significant coefficients. The main results reveal that a negative relationship at the statistical level, implying lower fees is related to better fund performances. The robust check also confirm the negative relation. The findings provide new insight for the investors, fund managers, and fund companies, contributing to mutual fund FOFs studies.

JEL Classification: G12, G13, G20

Keywords: Mutual fund, FOF, Fees, Fund performance

* Corresponding author. Email address: ziqij@kean.edu

1. Introduction

A fund of funds (FOF) is a fund that invests in other funds, which means the portfolio consists of other funds' underlying portfolios. Based on the rule of diversification put forward by Markowitz (1952), FOF generates and alleviates risk and volatility. Due to this, the scale of FOF expands swiftly which attracts various investors' attention in the American market, especially after the 1990s. Over decades, this product in the US financial market has formed mature management and operation system. According to different underlying funds, FOF has mutual fund FOF, hedge fund FOF, private-equity FOF, and investment trust FOF. Among these, the mutual fund FOF increases fast with the rapid growth of the mutual fund industry.

In China, the number of mutual funds is over 8000, which is 23.54 trillion yuan in 2021, becoming the largest part of the market.[1] The excess performance of mutual funds is often related to the market timing, instead of the stock selection (Cornell et al., 2020). Also the cost is a significant determination of profits for investors, hence considering the costs is necessary. While FOF which takes advantage of portfolio selection, rises gradually. Notably in the mutual fund industry, FOF was officially launched in 2017. By the first quarter of 2021, the number of mutual fund FOF had reached 148 and the scale was over 105 billion yuan. Banks and institutions are preparing to launch more FOFs to broaden investment channels and asset allocation. The booming of this fund product affects investors' behaviors.

Fees of Funds are one of the sources of income for securities companies, fund companies and banks. Investors pay for the fees consist of two kinds. One is the expenses related to the sales process, like subscription fees. The other one is related to the management process. Fees rates vary from fund and country. Normally a lower fees is charged by larger

[1] China Securities Regulatory Commission, 2021 Mutual Fund Industry Data Report

funds and fund complexes (Khorana et al., 2008). Also to motivate and attract investors and managers, performance-fee, incentive fees, load fees are designed.

Studies about FOF mainly focus on hedge fund FOF and compare it with a hedge fund. Gregoriou and Pascalau (2011) prove that the hedge fund and FOF have an asymmetric relationship. The study suggests that the hedge fund FOF benefits the investors in the value-added for the long run and brings resilience (Darolles and Vaissie, 2012). It indicates the hedge fund FOF mitigates risks with the diversification and hedge method. In the fees and mutual fund field, they find that the fees negatively correlate with before-fee excess return performance in the equity mutual funds (Vidal et al., 2015).

Although the relationship between fees and performance of the fund has been studied for many years, there are few studies in the mutual fund FOF field. The management modes of FOF consist of internal or external managers with internal or external funds, the fees on fees will generate when the management mode is hybrid. Because the underlying funds in the FOF have their own costs, investors of the FOF may pay for these fees twice, which is called double fees. Hence, the fees structures and performance of FOF are often questioned that the high fees result in the underperformance. This additional layer of fees seems to become a trouble. Moreover, even though the FOF management model at home and aboard is somewhat different, especially in China, the mutual FOF is in its infancy. The relationship between the management model and performance is worth exploring.

Hence, this study attempts to fill the void by examining whether and to what extent fees influence mutual FOF's performance in the China market. This examination provides a reference for investors to choose a suitable mutual FOF when considering the fees pay off. Also, it contributes to the fees setting of mutual FOF for the fund institution in China.

This paper applies CAPM, the Fama-French three factor model, the Carhart model and the Fama-French five factor model to obtain the risk-adjusted return which is the dependent

variable and the management fee is employed as the independent variable. Finally, the significantly negative relationship between fees and fund performance in the statistical level is proved by taking ordinary least squares method, and panel data with between effects. Also the quadratic linear regression is taken to prove the existence of linear relationship. Additionally, the results of panel data with Hausman and Taylor Estimation display the negative relationship with the Fama-French three factors model and Carhart model, and the positive relationship with the CAPM and Fama-French five factors model. To make sure the robustness, sample with subperiods is applied as the robustness check. Generally, the results confirm the negative relationship.

Therefore, this paper sheds light on the emerging China market in the mutual fund FOF's field by examining the relationship between management fees and fund performance. It proves that the impact of management fees on the FOF's performance is similar to other types of mutual funds. Also the negative relationship reminds investors to take the management fee into consideration when choosing FOFs. Fund companies and managers are supposed to set up an appropriate management fee benefits the fund performance.

The rest of this paper is organized as follows: Section 2 presents the Literature review. Section 3 summarizes the data. Section 4 describes the empirical results. Section 5 is the conclusions

2. Literature Review and Hypotheses Development

The relation of fees and fund performance has been a complex and continuing topic in the fund management field due to the complicated fee structures and varied funds. To figure out the fees' association with fund performance, especially the mutual FOF field which is an emerging fund product. Relevant theories and empirical evidences in the fund industry are reviewed.

2.1. Fund Fees

Research on the fund fees aims to explore fees structure arrangement and investors' reaction to various charges. With more information disclosure, retail investors have stronger sensitivity to the expense of funds (Navone, 2012). For large funds, maintaining the fees revenue is the decisive factor for survival (Rohleder et al., 2018). Hence, how to setting reasonable fee structures which benefit institutions and investors is worth examining. In the mutual fund, front- and back-end load fees are applied to discourage the redemption, resulting in the fund with more cash (Chordia, 1996). Escobar-Anel et al. (2018) point out that setting up performance fees is beneficial for investors because it drives the manager to pay more attention to fund returns. As a consequence of differentiation, fee dispersion exists. Iannotta and Navone (2012) analyze that lower fee dispersion is often accompanied by marketing and distribution fees and lower search costs.

These various fees are generated because of the competition and operating mechanism in the fund industry. Wahal and Wang (2011) summarize that existing funds decrease management fees against new players with the competition. In the meantime, the distribution fees increases. Whereas the more competitive in the fund field, the higher total fees generate (Panida and Tang, 2018). In the life cycle of a fund product, initiating, managing, and marketing often involves different institutions. Cumming et al. (2015) discover that distributed service without advisory to the third party causes lower subscription fees, while not affecting management fees. However, a higher distribution fee will be charged if an asset management company combines a distribution channel (Han et al., 2013). Starks (1987) finds that mutual fund managers' interests are consistent with investors through incentive fees with bonus contracts, instead of symmetric ones. Research on the fund fees aims to explore fees structure arrangement and investors' reaction to various charges. With more information disclosure, retail investors have stronger sensitivity to the expense of funds (Navone, 2012). For large

funds, maintaining the fees revenue is the decisive factor for survival (Rohleder et al., 2018). Hence, how to setting reasonable fee structures which benefit institutions and investors is worth examining. In the mutual fund, front- and back-end load fees are applied to discourage the redemption, resulting in the fund with more cash (Chordia, 1996). Escobar-Anel et al. (2018) point out that setting up performance fees is beneficial for investors because it drives the manager to pay more attention to fund returns. As a consequence of differentiation, fee dispersion exists. Iannotta and Navone (2012) analyze that lower fee dispersion is often accompanied by marketing and distribution fees and lower search costs.

2.2. Fees and Fund Performance

Fund performance which can be reflected by returns, risks, or comprehensive evaluations, is one of the most concerning topics in fund researches. Academic studies that put forward many measures to assess the performance, including the Jensen's alpha. Sharpe (1992) develops the Sharpe ratio to measure the adjusted risk-return.

There are widely studies that examine the relationship between diverse fees and fund performance in the mutual fund. Golec and Starks (2004) find that the fund's risk increases when the performance fee changes. Meanwhile, cash and investors reduce. It suggests that the fees influence not only the return but also the risk of a portfolio. On the one hand, Santamaria et al. (2018) and Diaz-Mendoza et al. (2014) find that performance fees are positively related to the fund performance which is risk-adjusted. Also for fund charges redemption fees, the risk-adjusted returns are higher than those with load fees (Wilfred and Gerard, 1998). The mutual fund gains better returns after adjusting risk with incentive fees as managers actively select stocks (Elton et al, 2003). Additionally, Berk and Binsbergen (2015) examine that a superior performed fund requests higher fees. This result is also proved by Haque and Ahmed

(2015), who study the Australian mutual fund market with risk-adjusted performance and fees. Based on these studies, the first hypothesis is proposed.

Hypothesis 1*: Fees of the fund has a positive relationship with the mutual fund FOF performance.*

On the other hand, some studies find a contrary result. Mansor et al. (2015), declare that funds with higher fees have lower returns. This is also proved by Cooper et al. (2021), who state that fees are robustly negative related to fund performance. Gil-Bazo and Ruiz-Verdu (2009) also reveal that the pooer before-fee performance, the higher fees are paid. Malkiel (1995) suggests that the risk-adjusted return is strongly negatively related with the fund costs. Additionally, Alda and Ferruz (2012) support that the underperformed fund charges higher fees by analyzing the Spanish pension fund. Based on the above studies, the second hypothesis is proposed.

Hypothesis 2: *Fees of the fund has a negative relationship with the mutual fund FOF performance.*

In the fund of fund field, a few studies describe the relationship between fees and fund performance. Brown et al. (2005) mention that the fees on fees of FOF result in poor after-fee performance. Ang et al. (2008) also discuss the arguments of double fees in FOF. While they do not consider it a negative element, they propose that measuring FOF performance should not use the hedge fund's return as a benchmark. A study investigates that in-family FOF with lower costs overperforms the traditional equity fund and out-of-family FOF (Bertin and Prather, 2009).

Based on the review of fees and fund performance in the mutual fund and FOF, there is an argument about fees and fund performance. Moreover, no one examines the relation between fees and mutual fund FOF. Thus, this paper is expected to fill the gap in the emerging

fund product and shed light on the controversial fees and performance issue by an empirical study in China market.

3. Data and Methodology

3.1. Data

This paper uses the return to measure the fund performance, focusing on 91 FOFs that operate over two years in China mutual funds from the start of October 2017 to the end of September 2021. The net return will be counted.

The data is achieved from three sources : (1) WIND Database, (2) China Stock Market Accounting Research (CSMAR) database, and (3) Central University of Finance and Economics.

From WIND, I gain all China mutual fund FOF products from the start of 2017 to the end of September 2021 because this product appeared no earlier than 2017 in China market. Wind record the basic information of 260 mutual funds of the fund, including the fund code, fund name, return since the establishment, returns in the past one year, returns in the past two years, returns in the past three years, annual return, fund size, fund types. Because an extended period improves the accuracy of the performance measurement, FOFs that have more than two years of operation are selected. Another file is related to fees structures, including the fund code, fund name, management fee rate, trustee fee rate, distribution fee rate, load fee rate, redemption fee rate, fund units, end date. Part of the data set is hand-collected from the annual report of mutual fund FOF, like the total expenses and the date of fund establishment.

From CSMAR, I download all mutual fund FOFs weekly net value asset data from 2017 to the end of September 2021. It contains fund code, trading date, trading week, week start date, NAV, growth rate of NAV's return, accumulative NAV. Using the condition of more than two

years of operation and the sample from Wind is matched with the above file. Finally, there are 91 mutual fund FOFs. Also data about fund managers are downloaded. It includes the manager's name, education background and business duration in the finance industry. Bachelor degree is classified as 0, master degree is recorded as 1, and PhD is classified as 2.

From Central University of Finance and Economics, data related to the Fama-French three factors model, the Carhart model and the Fama-French five factors model is downloaded. It includes the weekly risk-free rate, the market portfolio return in excess of the risk-free rate, return on a value-weighted portfolio of small stocks minus the return on a value-weighted portfolio of big stocks, return on a value-weighted portfolio of high book-to-market stocks minus the return on a value weighted portfolio of low book-to-market stocks, the premium on winners minus losers, return on the two robust operating profitability portfolios minus the two weak ones, and return on the two conservative investment portfolios minus the two aggressive ones from 2017 to the end of September 2021. I match these data with the fund's weekly net return.

[Table 1 is around here]

Hence, the sample involves 91 mutual fund FOFs from October 2017 to September 2021, Table 1 shows the descriptive statistics of the data.

[Table 2 is around here]

Through examining the correlation between the independent variable, dependent variable and control variables, the table 2 is obtained. In table 2, the independent variable, management fee (*Fee*) is negatively related to all the risk-adjusted return which is the dependent variable from the four models. *Size*, and fund manager's degree (*FMdegree*) are all negtively related to the risk-adjusted return, while *Age* and work experience (*FMBD*), although the results are not significant.

3.2. Methodology

This paper applies the Capital Asset Pricing Model (CAPM) , the Fama-French three factors model, the Carhart's four factors model and the Fama-French five factors model to estimate the fund performance and explore the relation between fees and fund performance. To measure the fund performance, this paper analyzes funds' net return. Fees mainly focus on the management fees.

The CAPM is a classical model to measure the expected return under the risk. Referring to the CPAM and return model used by Mansor et al. (2015), the following single-factor model is adopted,

$$R_{it} = \alpha_i + \beta_i R_{m,t} + \varepsilon_{it} \ , \tag{1}$$

where R_{it} measures the return of fund i at week t, α_i presents the abnormal return offered by fund i, β_i is the slope of the model. $R_{m,t}$ is market portfolio return in excess of risk-free rate at time t. ε_{it} is the time-varying term. It employs the ordinary least squares (OLS) method to test the hypotheses.

For a more comprehensive assessment of fund return, Fama and French (1993) develop the three-factor model as follows,

$$R_{it} = \alpha_i + \beta_{1,i} R_{m,t} + \beta_{2,i} SMB_t + \beta_{3,i} HML_t + \varepsilon_{i,t} \, , \tag{2}$$

where R_{it} is the return in week t; $R_{m,t}$ is the market portfolio return in excess of the risk-free rate at time t; SMB_t is the return on a value-weighted portfolio of small stocks minus the return on a value-weighted portfolio of big stocks, and HML_t the return on a value-weighted portfolio of high book-to-market stocks minus the return on a value-weighted portfolio of low book-to-market stocks.

Based on their work, Carhart (1997) introduce the momentum factor.Hence, to estimate a risk-adjusted performance, Carhart's (1997) four-factor model is implied,

$$R_{it} = \alpha_i + \beta_{1,i} R_{m,t} + \beta_{2,i} SMB_t + \beta_{3,i} HML_t + \beta_{4,i} MOM_t + \varepsilon_{i,t}, \quad (3)$$

where R_{it} is the return, in week t; $R_{m,t}$ is the market portfolio return in excess of the risk-free rate at time t; SMB_t, HML_t and MOM_t represent that the fund return which proxy for common risk factors related to the size, book-to-market and momentum effects.

$$R_{it} = \alpha_i + \beta_{1,i} R_{m,t} + \beta_{2,i} SMB_t + \beta_{3,i} HML_t + \beta_{4,i} RMW_t + \beta_{5,i} CMA_t + \varepsilon_{i,t}, \quad (4)$$

where R_{it} is the return, in week t; $R_{m,t}$ is the market portfolio return in excess of the risk-free rate at time t; SMB_t, HML_t, RMW_t, and CMA_t represent that the fund return which proxy for common risk factors related to the size, book-to-market, profitability, and investment effects.

By following Gil-Bazon and Ruiz-Verdu's (2009) and Alda and Ferruz's (2012) two-stage process of estimation, weekly risk-adjusted fund performance is gained. At the first stage, each fund's exposure to risk factors for each week t in years 2017 to 2021. If less than two years of previous data are available for a specific fund week, the sample must be over 52 weeks in the previous 4 years. Then the available data will be used to estimate the betas. Subsequently, the average of annualized weekly risk-adjusted return of each fund is obtained.

To explore the relationship between fees and risk-adjusted-performance which is before fees, the ordinary least squares method is used for the regression equation,

$$\alpha_{1i,t} = \alpha_{it} + \beta_1 Fee_{i,t} + \beta_2 Size_{i,t} + \beta_3 Age_{i,t} + \beta_4 FMdegree_{i,t} + \beta_5 FMBD_{i,t} + \varepsilon_{i,t}, \quad (5)$$

$$\alpha_{3i,t} = \alpha_{it} + \beta_1 Fee_{i,t} + \beta_2 Size_{i,t} + \beta_3 Age_{i,t} + \beta_4 FMdegree_{i,t} + \beta_5 FMBD_{i,t} + \varepsilon_{i,t}, \quad (6)$$

$$\alpha_{4i,t} = \alpha_{it} + \beta_1 Fee_{i,t} + \beta_2 Size_{i,t} + \beta_3 Age_{i,t} + \beta_4 FMdegree_{i,t} + \beta_5 FMBD_{i,t} + \varepsilon_{i,t}, \quad (7)$$

$$\alpha_{5i,t} = \alpha_{it} + \beta_1 Fee_{i,t} + \beta_2 Size_{i,t} + \beta_3 Age_{i,t} + \beta_4 FMdegree_{i,t} + \beta_5 FMBD_{i,t} + \varepsilon_{i,t}, \quad (8)$$

where $\alpha_{1i,t}$ is the risk-adjusted performance from the CAPM, $\alpha_{3i,t}$ is the risk-adjusted performance from the Fama-French three factors model, $\alpha_{4i,t}$ is the risk adjusted performance from the Carhart factor model, $\alpha_{5i,t}$ is the risk-adjusted performance from the Fama-French five factors model. $Fee_{i,t}$ is the fund fees (management fees in this case), $Size_{i,t}$ is the fund i is the fund total net assets at time t, $Age_{i,t}$ is the operating year of fund i at time t, $FMdegree_{i,t}$ is the manager's education background of fund i, $FMBD_{i,t}$ is the fund manager's business duration in the industry of fund i at time t.

4. Results and Discussions

4.1. Main Results

This section reports the results of the relation between fund risk-adjusted return and management fees within the regression model (4). The result shows in Table 3. In Table 3, the dependent variables are the $\alpha_{1i,t}$, $\alpha_{3i,t}$, $\alpha_{4i,t}$, and $\alpha_{5i,t}$, which are annualized returns achieved from the weekly data. Control variables are included at the same time. The log transformation is used for size, the control variable during the regression. When applying the CAPM, the fee is negatively related to the return without other control variables, while the relationship becomes positive by adding control variables. Also, the fees, size, and age are significantly related to the return. However, the Fama-French three factors model, Carhart model, and Fama-French five factors model use more factors to adjust funds return. Fama-French three factors and Carhart model display negative coefficients of the management fee ($Fee_{i,t}$), which indicate the negative relationship exists with the fund performance and the p-value of fees indicates that the FOFs with worse performance charge higher fees strongly in the statistical

aspect. While at the economic significance level, the impact is tiny. When using the alpha from Fama-French five factors model, the relationship between fees and return is still negative but not significant. The negative relationship exists because the risk-adjusted return is based on the net return. The higher fees subtracted from the gross return results in a lower net return. If fees are lower, fund performances are more likely to improve.

For alpha measured by the CAPM, Fama-French model, and Carhart model, the coefficients $Size_{i,t}$ are all significantly negative from the statistics, indicating that the fund return is worse with larger fund size. While it is not significant at the economic level. The size of the fund age's four coefficients indicates that younger funds charge a little higher fees. Additionally, the fund manager's education background ($FMdegree_{i,t}$), divided into bachelor, master, and Ph.D. degrees has a negative relationship with the fund return at 10% statistical significance level for return measured by CAPM and Fama-French three factor model. Also, the fund manager's degree is negatively related to the return at a 5% statistically significant level for return measured by Fama-French three factor model and Carhart model. While at the economic level, the impacts brought by the education background are not substantial.

The fund manager's experience ($FMBD_{i,t}$) is positively related to the risk-adjusted return, with alphas gained from the CAPM. Then it is negatively related to the risk-adjusted return with alphas achieved from the Fama-French three factors and Carhart models. While it becomes positive again when applying the Fama-French five factors model. This phenomenon may be because the Fama-French five factors model is unable to explain and suit the China market well. Hence, the experience does not affect the fund return from OLS regression results.

[Table 3 is around here]

4.2. Additional Results

The quadratic form linear regression and the panel data with fixed effects are applied to examine the relationship between the fund performance and fees. The findings are followings. In Table 4, the result for the quadratic form linear regression, the coefficients of fee and fee-squared, are opposite. For fees, the independent variable, the p-value of fee-squared is less significant than the p-value of the fee with the CAPM. The management fee is negatively related to the fund performance, while not significant with no control variables. When adding control variables, the management fee becomes significant with the p-value smaller than 0.05.

For alphas from the Fama-French three factors model and the Fama-French five factors model, fees are negatively related to the fund performance insignificantly. Moreover, the squared fees are positively related to the fund performance insignificantly too. While for returns from the Carhart model, their relationships are statistically significant.

The fund manager's degree (*FMdegree)* and experience (*FMBD)* do not significantly impact risk-adjusted returns from four models. Also, coefficients of *Fmdegree* are all negatively related to returns from four models, indicating a higher degree does not improve the returns a lot. For the fund manager's experience, the quadratic form linear regression displays a different result from the OLS regression. Most coefficients of *FMBD* are positive, suggesting that the fund manager is more experience will not improve fund performance a lot. These results show that the nonlinear relationship do not exist for the CAPM, Fama-French, and Carhart models.

[Table 4 is around here]

In Table 5, the panel data table with between effects is displayed. The between effects method displays the cross-sectional information of the panel data, reflecting the changes between funds. The coefficients of fees in all models prove the negative relationship with the return. From the CAPM, Fama-French three factors model to the Carhart model, the

coefficients become a more substantial negative relation. The size seldom influences the fund performance at the statistical and economic level. Furthermore, control variables, like size and age, have a weaker relationship with the return than the previous regression results. The fund manager's educational background is negatively related to the fund performance. While in the actual situation, the degree's impacts on the difference of returns are tiny.

[Table 5 is around here]

To further explore the relationship of fees and return with panel data, in Table 6, the Hausman and Taylor Estimation method, which is able to examine coefficients of time-invariant variables, is adopted. For the return from the CAPM and Fama-French five factors model, the coefficients of the fund fees, size and manager's degree and experience are similar. The fees have both statistical and economic significance in the positively relationship with the return. The fund manager's higher education degree(*FMdegree*) and more extended work experience(FMBD) will slightly improve the performance in the theoretical aspect. However, using the return from the Fama-French three factors model and Carhart model as the independent variable has inverse results. The fees are negatively related to the returns of the two models. Even though coefficients of size in the four models are negative, in the actual situation, the smaller size will not influence the fund performance a lot. With the Hausman and Taylor Estimator, time-invariant factors, like the fund manager's degree, which impact the fund performance, are measured more accurately.

[Table 6 is around here]

4.3. Robustness Checks

The previous section applies the CAPM, Fama-French three factors, Carhart, and Fama-French five factors models to obtain risk-adjusted returns with the sample period from 2017 to 2021. The results of OLS, quadratic form linear regression, and between estimator of panel

data find that the $Fee_{i,t}$ is negatively related to the risk-adjusted return. This section uses subperiods to observe relationships between variables and explore whether the economic factor influences the relationship between fees and performance. The sample is divided into five subperiods (2017, 2018, 2019, 2020, and 2021). Each year is independently studied, which means one year is a subperiod. Table 6 shows the OLS results. In 2017, 2018 and 2019, the coefficients of fees confirm the negative relationship for all alphas from the CAPM, Fama-French three factor model, Carhart model, and Fama-French five factors model. For size, the coefficients are negatively related to fund performance with statistically significant for four subperiods (2017, 2018, 2019, and 2020). Age's impact on the fund performance is insignificant for all periods. Also, it finds that in 2020, the fund manager's degree coefficients have a significantly negative relationship with all risk-adjusted returns in the statistical level, suggesting the higher degree is unable to increase the returns.

[Table 7 is around here]

Table 8, which is the panel data with between estimator shows similar results with the OLS. In 2017, the significant negative relationship between fees and return appeares for the CAPM, the Fama-French three factors model, and the Carhart model, and the coefficients is more negative. Although in 2021, the relationship between fees and return is inverse which is an insignificant positive relationship, in 2018 and 2020, the coefficients still confirm the negative relation for return from the Fama-French three factors model, Carhart model and Fama-French five factors model. Control variables, like size and age, have different relationships with the return in each year. This indicates that other factors may influence the fund's performance.

This paper finds a negative relation between fees and fund of funds' risk-adjusted return with the above analyses. In other words, the fund which charges a higher management fee has a lower risk-adjusted return.

[Table 8 is around here]

5. Conclusions

Fund of funds in the mutual fund is a new and popular product in China market. Investors prefer funds with good performance and low risks. The fund company and manager are supposed to operate funds efficiently to gain higher performance and attract more investors. While fees charged by the fund may influence the fund return.

Since there is a gap in this FOFs' field, this paper analyzes the relationship between management fees and the return of Chinese funds. To achieve this goal, weekly returns, size, age, the fund manager's degree, and experience from October 2017 to September 2021. Additionally, this paper applies four models for performance to obtain different risk-adjusted returns. The CAPM, the Fama-French three factors model, the Carhart model and the Fama-French five factors model are employed.

This paper finds a statistically significant negative relationship by taking OLS, quadratic linear regression, and panel data with between estimator, which meets the hypothesis 2. Hence, a higher fund performance charges lower fees. This finding is similar to the result of Gil-Bazo and Ruiz-Verdu (2009), who study the mutual fund in the American market. Also, it is suggested that the size is negatively related to the risk-adjusted return, indicating a larger fund performs worse. Additionally, the fund manager's education background has an insignificantly negative relation with the fund performance. To further examine the results, a robustness test is adopted, which analyzes subperiods of the sample. In the robustness test, the OLS and between effects of panel data prove a general negative relation between management fees and fund performance.

However, this paper has some limitations because of short sample periods and small samples. Chinese mutual fund FOFs appeared in 2017. The amount of FOFs built for more

than three years is less than 100. This factor may influence the accuracy of the regression. Also, this paper does not use other types of returns, like the gross return, which lack a more precise comparison of the relationship.

In conclusion, this research provides evidence, fills a gap in FOFs' field, and sheds light on the emerging China market by examining the relationship between management fees and fund performance. The negative relationship reminds the fund company and manager that setting up an appropriate management fee benefits the fund performance. Imposing higher fees may reduce fund returns, which also hurts the investors and harms the benefits of the fund company.

References

Adams, J.C., Mansi, S.A., Nishikawa, T., 2012. Are mutual fund fees excessive? Journal of Banking and Finance 36, 2245–2259.

Alda, M., Ferruz, L., 2012. The role of fees in pension fund performance, evidence from Spain. Finance a Uver-Czech Journal of Economics and Finance 62, 518–535.

Ang, A., Rhodes-Kropf, M., Zhao, R., 2008. Do funds of funds deserve their fees-on-fees, NBER working paper.

Berk, J.B., van Binsbergen, J.H., 2015. Measuring skill in the mutual fund industry. Journal of Financial Economics 118, 1–20.

Brown, J.S., Goetzman, N.W., Liang, B., 2005. Fees on fees in funds of funds. The World of Hedeg Funds, 141–160.

Carhart, M.M., 1997. On persistence in mutual fund performance. Journal of Finance 52, 57–82

Chordia, T., 1996. The structure of mutul fund charges. Journal of Financial Economics 46, 3–39.

Cooper, M.J., Halling, M., Yang, W.H., 2021. The persistence of fee dispersion among mutual funds. Review of Finance 25, 365–402.

Cumming, D., Schwienbacher, A., Zhan, F., 2015. The scope of international mutual fund outsourcing: Fees, performance and risks. Journal of International Financial Markets Institutions and Money 38, 185–199.

Darolles, S., Vaissie, M., 2012. The alpha and omega of fund of hedge fund added value. Journal of Banking and Finance 36, 10671–078.

Diaz-Mendoza, A.C., Lopez-Espinosa, G., Martinez, M.A., 2014. The efficiency of performance-based fee funds. European Financial Management 20, 825–855.

Elton, E.J., Gruber, M.J., Blake, C.R., 2003. Incentive fees and mutual funds. Journal of Finance 58, 779–804.

Escobar-Anel, M., Hohn, V., Seco, L., Zagst, R., 2018. Optimal fee structures in hedge funds. Journal of Asset Management 19, 522–542.

Fama, E.F., French, K.R., 1993. Common risk-factors in the returns on stocks and bonds. Journal of Financial Economics 33, 3–56.

Golec, J., Starks, L., 2004. Performance fee contract change and mutual fund risk. Journal of Financial Economics 73, 93–118.

Gil-Bazo, J., Ruiz-Verdu, P., 2009. The relation between price and performance in the mutual fund industry. Journal of Finance 64, 2153–2183.

Gil-Bazo, J., Ruiz-Verdu, P., Santos, A.A.P., 2010. The performance of socially responsible mutual funds: the role of fees and management companies. Journal of Business Ethics 94, 243–263.

Gregoriou, G. N., Pascalau, R., 2011. A joint survival analysis of hedge funds and funds of funds using copulas. Managerial Finance 38, 82–100.

Han, J.J., Kang, K.H., Won, S., 2013. Fund expenses and vertical structures of the fund industry. Economic Modelling 35, 856–864.

Haque, T., Ahmed, A.D., 2015. The relationship between Australian mutual fund fees and risk-adjusted performance in differing economic conditions. Australian Economic Papers 54, 1–21.

Iannotta, G., Navone, M., 2012. The cross-section of mutual fund fee dispersion. Journal of Banking and Finance 36, 846–856.

Khorana, A., Servaes, H., Tufano, P., 2008. Mutual fund fees around the world. The Review of Financial Studies 22, 1279–1310.

Malkiel, B.G., 1995. Returns from investing in equity mutual funds 1971 to 1991. Journal of Finance 50, 549–572.

Mansor, F., Bhatti, M.I., Ariff, M., 2015. New evidence on the impact of fees on mutual fund performance of two types of funds. Journal of International Financial Markets Institutions and Money 35, 102–115.

Markowitz, H., 1952. Portfolio selection. The Journal of Finance 7, 77–91.

Navone, M., 2012. Investors' distraction and strategic repricing decisions. Journal of Banking and Finance 36, 1291–1303.

Panida, S., Tang, Z.Y., 2018. Price competition in the mutual fund industry. Economic Modelling 70, 29–39.

Rohleder, M., Scholz, H., Wilkens, M., 2018. Success and failure on the corporate bond fund market. Journal of Asset Management 19, 429–443.

Santamaria, T.C., de Ibarreta, C.M., Calvo, J.R., 2018. Timid performance fees in mutual funds. Journal of Asset Management 19, 64–77.

Starks, L.T., 1987. Performance incentive fees: an agency theory approach. The Journal Financial and Quantitative Analysis 22, 17–32.

Vidal, M., Vidal-Garcia, J., Lean, H. H., Uddin, G. S., 2015. The relation between fees and return predictability in the mutual fund industry. Economic Modelling 47, 260–270.

Wahal, S., Wang, A., 2011. Competition among mutual funds. Journal of Financial Economics 99, 40–59.

Table 1. Sample Statistics of Mutual Fund FOFs

The table reports descriptive statistics for the sample of mutual fund FOFs. The fee structures and returns are obtained from WIND. Management fee (*Fee*) is the percentage of annual assets under management of the fund. *Size* is the yearly total net asset of the fund in billion RMB. *FMdegree* is the fund manager's education background. Bachelor's degree is classified as 0, Master's degree is classified as 1, and Ph.D. is classified as 2. The fund manager's business duration (*FMBD*) describes the fund manager's experience in this field. The CAPM also is used to get the risk-adjusted return (*CAPM* α), the Fama-French Models are also applied to achieve the risk-adjusted return by three factors (*FF3* α) and five factors (*FF5* α). The risk-adjusted return (*Carhart α*) is the annualized risk-adjusted return by Carhart Model. Sample period is from October 2017 to September 2021, weekly frequency.

Variables	N	Mean	StdDev	Min	Max	Skewness	Kurtosis
Fee	12506	0.81	0.16	0.50	1.20	0.12	2.60
Size(billion)	12506	34.21	1333.86	0.01	52755.48	39.53	1558.87
Age	12506	1.38	0.86	0.02	3.89	0.43	2.59
FMdegree	12506	1.08	0.38	0.00	2.00	0.89	6.36
FMBD	12506	11.37	4.73	3.00	27.00	0.94	3.28
CAPM α	12506	0.06	0.27	-.54	1.26	0.74	3.39
FF3 α	12506	0.04	0.34	-0.51	17.80	44.87	2326.966
Carhart α	12506	0.05	0.13	-0.05	1.53	1.13	10.98
FF5 α	12506	0.05	0.35	-0.73	17.80	42.07	2131.32

Table 2. Correlations

The table reports the correlation between risk-adjusted returns, management fees, size, age, fund manager's education background and fund manager's work experience in the finance market. It displays the slope coefficients for the correlation. Management fee (*Fee*) is the independent variable. The CAPM also is used to get the risk-adjusted return ($\alpha_{1i,t}$), which is denoted as *CAPM α* in the table. Tthe Fama-French Models are also applied to achieve the risk-adjusted return by three factors ($\alpha_{3i,t}$) and five factors ($\alpha_{5i,t}$) which are denoted as *FF3* α and *FF5* α in the table. The risk-adjusted return ($\alpha_{4i,t}$) , which is denoted as *Carhart α* in the table is the annualized risk-adjusted return by the Carhart model. It describes the average of annualized weekly return for each fund. Each fund's weekly *Size* and *Age* are applied. Fund manager's degree (*FMdegree*) and yearly work experience (*FMBD*) are applied. * stat. sign. at 10% level; ** stat. sign. at 5% level; *** stat.sign. at 1% level. Sample Period is from October 2017 to September 2021.

	CAPM α	*FF3* α	*Carhart* α	*FF5* α	*Fee*	*Size*	*Age*	*FMdegree*	*FMBD*
Table 2 Correlation for the sample									
CAPM α	1.0000	1.0000	1.0000	1.0000					
Fee	-0.0046	-0.006	-0.013	-0.007	1.0000				
	(0.610)	(0.540)	(0.145)	(0.434)					
Size	-0.0098	-0.002	-0.007	-0.012	0.013	1.0000			
	(0.274)	(0.840)	(0.413)	(0.174)	(0.140)				
Age	-0.457*	0.013	0.137*	-0.015	0.071*	-0.038*	1.0000		
	(0.000)	(0.153)	(0.000)	(0.086)	(0.000)	(0.000)			
FMdegree	-0.0087	-0.009	-0.016	-0.007	-0.177*	-0.006	-0.024*	1.0000	
	(0.332)	(0.303)	(0.067)	(0.420)	(0.000)	(0.527)	(0.006)		
FMBD	-0.0389*	-0.006	0.012	0.003	-0.061*	-0.034*	0.113*	-0.151*	1.0000
	(0.000)	(0.520)	(0.195)	(0.744)	(0.000)	(0.000)	(0.000)	(0.000)	

Table 3. Main Regression Results

The table shows results for the OLS regressions:

$$\alpha_{1i,t} = \alpha_{it} + \beta_1 Fee_{i,t} + \beta_2 Size_{i,t} + \beta_3 Age_{i,t} + \beta_4 FMdegree_{i,t} + \beta_5 FMBD_{i,t} + \varepsilon_{i,t},$$

$$\alpha_{3i,t} = \alpha_{it} + \beta_1 Fee_{i,t} + \beta_2 Size_{i,t} + \beta_3 Age_{i,t} + \beta_4 FMdegree_{i,t} + \beta_5 FMBD_{i,t} + \varepsilon_{i,t},$$

$$\alpha_{4i,t} = \alpha_{it} + \beta_1 Fee_{i,t} + \beta_2 Size_{i,t} + \beta_3 Age_{i,t} + \beta_4 FMdegree_{i,t} + \beta_5 FMBD_{i,t} + \varepsilon_{i,t},$$

$$\alpha_{5i,t} = \alpha_{it} + \beta_1 Fee_{i,t} + \beta_2 Size_{i,t} + \beta_3 Age_{i,t} + \beta_4 FMdegree_{i,t} + \beta_5 FMBD_{i,t} + \varepsilon_{i,t},$$

where $\alpha_{1i,t}$ is the risk-adjusted performance from the CAPM, $\alpha_{3i,t}$ is the risk-adjusted performance from the Fama-French three factors model, $\alpha_{4i,t}$ is the risk adjusted performance from the Carhart factor model, $\alpha_{5i,t}$ is the risk-adjusted performance from the Fama-French five factors model, management fee (*Fee*) is the fund fees as the percentage of annual assets under management, denoted as $Fee_{i,t}$, $Size_{i,t}$ is the annual total net assets of fund i, which is log transformed. $Age_{i,t}$ is the operating time of fund i at week t, $FMdegree_{i,t}$ is the manager's education background of fund i at time t. $FMBD_{i,t}$ is the fund manager's business duration in the industry of fund i at time t. * stat. sign. at 10% level; ** stat. sign. at 5% level; *** stat. sign. at 1% level. Sample period is from October 2017 to September 2021.

Dependent Variable is risk-adjusted return (CAPM α , FF3α , Carhartα and FF5α)

	CAPM α	CAPM α	*FF3 α*	*FF3 α*	*Carhart α*	*Carhart α*	*FF5 α*	*FF5 α*
Fee	-0.0074	0.0362***	-0.0114	-0.0243***	-0.0108	-0.0225**	-0.0149	-0.0201*
	(0.0144)	(0.0132)	(0.0080)	(0.00941)	(0.0086)	(0.00891)	(0.0091)	(0.0107)
Size		-0.00367***		-0.00266*		-0.0001		-0.00246*
		(0.00119)		(0.00144)		(0.000656)		(0.00147)
Age		-0.143***		0.00593		0.0222***		-0.00603
		(0.00221)		(0.00482)		(0.00135)		(0.00487)
FMdegree		-0.0115**		-0.0124**		-0.00697**		-0.00921*
		(0.00569)		(0.00494)		(0.00292)		(0.00512)
FMBD		0.000571		-0.000809		-0.000253		0.000119
		(0.000492)		(0.000728)		(0.000281)		(0.000745)
Constant	0.0664***	0.253***	0.0510***	0.0889***	0.0630***	0.0526***	0.0630***	0.0962***
	(0.0119)	(0.0181)	(0.0076)	(0.0333)	(0.00704)	(0.0114)	(0.0086)	(0.0340)
Observations	12,506	12506	12,506	12,506	12,506	12,506	12,506	12506
R-squared	0.000	0.210	0.000	0.001	0.000	0.020	0.000	0.000

Table 4. Quadratic Form Linear regression

The table shows results for Quadratic Form Linear Regression, the dependent variable is representively the return from CAPM, Fama-French model and Carhart model. The CAPM model also is used to get the annualized risk-adjusted return (*CAPM* α), the Fama-French Models are also applied to achieve the annualized risk-adjusted return by three factors (*FF3* α) and five factors (*FF5* α). The risk-adjusted return (*Carhart α*) is the annualized risk-adjusted return by the Carhart Model. The independent variable is the management fee (*Fee*) as the percentage of annual assets under management. The *Fee-sqaured* is twice of *Fee* at week *t*. *Size* is the annual total net assets of funds which is log transformed in the regression, *Age* is the operating time of funds, Fund manager's degree (*FMdegree*) and yearly work experience (*FMBD*) are applied. * stat. sign. at 10% level; ** stat. sign. at 5% level; *** stat. sign. at 1% level. Sample period is from October 2017 to September 2021.

Quadratic Form Linear Regression

	CAPM *α*	CAPM *α*	*FF3 α*	*FF3 α*	*Carhart α*	*Carhart α*	*FF5 α*	*FF5 α*
Fee	-0.1460	0.196*	-0.252**	-0.253*	-0.573***	-0.633***	-0.217*	-0.216
	(0.1140)	(0.102)	(0.1250)	(0.153)	(0.0747)	(0.0750)	(0.1290)	(0.157)
Fee-squared	0.0845	-0.0972	0.1460*	0.139	0.341***	0.372***	0.123	0.120
	(0.0685)	(0.0620)	(0.0770)	(0.0964)	(0.0470)	(0.0474)	(0.0797)	(0.0983)
Size		-0.00360***		-0.00276**		-0.000359		-0.00255*
		(0.00119)		(0.00138)		(0.000657)		(0.00141)
Age		-0.143***		0.00614		0.0228***		-0.00585
		(0.00221)		(0.00494)		(0.00134)		(0.00499)
FMdegree		-0.0125**		-0.0109*		-0.00300		-0.00793
		(0.00573)		(0.00575)		(0.00299)		(0.00590)
FMBD		0.000468		-0.000662		0.000141		0.000246
		(0.000494)		(0.000814)		(0.000278)		(0.000828)
Constant	0.121***	0.192***	0.146***	0.176***	0.146***	0.285***	0.143***	0.171***
	(0.0464)	(0.0420)	(0.0463)	(0.0351)	(0.0463)	(0.0295)	(0.0486)	(0.0384)
Observations	12,506	12,506	12,506	12,506	12,506	12,506	12,506	12,506
R-squared	0.000	0.210	0.000	0.001	0.007	0.028	0.000	0.001

Table 5. Panel Data with Between Effects

The table shows results for panel data with the between effects method, which displays the cross-sectional information. The dependent variable is representively the return from CAPM, Fama-French model and Carhart model. The CAPM also is used to get the risk-adjusted return (*CAPM* α), the Fama-French Models are also applied to achieve the risk-adjusted return by three factors (*FF3* α) and five factors (*FF5* α). The risk-adjusted return (*Carhart α*) is the annualized risk-adjusted return by the Carhart Model. The independent variable is the management fee (*Fee*) as the percentage of annual assets under management. *Size* is the annual total net assets of funds which is log transformed in the regression, *Age* is the operating time of funds, *FMdegree* is the fund manager's education background, and *FMBD* is the manager's yearly work experience. * stat. sign. at 10% level; ** stat. sign. at 5% level; *** stat. sign. at 1% level. Sample period is from October 2017 to September 2021.

Panel Data with Between Effects

	CAPM *α*	*FF3 α*	*Carhart α*	*FF5 α*
Fee	0.00439	-0.0173	-0.0225***	-0.0201
	(0.0277)	(0.0440)	(0.00766)	(0.0198)
Size	0.00218	-0.00207	-0.0001	-0.00246
	(0.00288)	(0.00456)	(0.000723)	(0.00187)
Age	-0.00999	-0.00996	0.0222***	-0.00603
	(0.0171)	(0.0271)	(0.00143)	(0.00368)
FMdegree	-0.000558	-0.0122	-0.00697**	-0.00921
	(0.0127)	(0.0202)	(0.00335)	(0.00863)
FMBD	0.00187*	-0.00109	-0.000253	0.000119
	(0.000970)	(0.00154)	(0.000263)	(0.000679)
Constant	0.0393	0.105	0.0526***	0.0962***
	(0.0424)	(0.0672)	(0.0103)	(0.0265)
Observations	12,506	12,506	12,506	12,506
R-squared	0.059	0.011	0.020	0.000

Table 6. Panel Data with Hausman—Taylor Estimator

The table shows results for panel data with the Hausman and Taylor model, which is able to estimate coefficients of time-invariant variables. The dependent variable is representively the return from CAPM, Fama-French model and Carhart model. The CAPM also is used to get the risk-adjusted return (*CAPM* α), the Fama-French Models are also applied to achieve the risk-adjusted return by three factors (*FF3* α) and five factors (*FF5* α). The risk-adjusted return (*Carhart α*) is the annualized risk-adjusted return by the Carhart Model. The independent variable is the management fee (*Fee*) as the percentage of annual assets under management. *Size* is the annual total net assets of funds which is log transformed, *Age* is the operating time of funds, *FMdegree* is the fund manager's education background, and *FMBD* is the manager's yearly work experience. * stat. sign. at 10% level; ** stat. sign. at 5% level; *** stat. sign. at 1% level. Sample period is from October 2017 to September 2021.

Panel Data with Hausman—Taylor Estimator

	CAPM *α*	*FF3 α*	*Carhart α*	*FF5 α*
Fee	12.95	-2.197	-3.844	2.168
	(19.21)	(3.816)	(5.970)	(3.934)
Size	-0.0490***	-0.00711*	-0.00260	-0.00647
	(0.00284)	(0.00425)	(0.00165)	(0.00434)
Age	-0.329***	0.0391***	0.0794***	-0.0370***
	(0.00776)	(0.0110)	(0.00450)	(0.0112)
FMdegree	1.277	-0.233	-0.396	0.206
	(2.275)	(0.450)	(0.707)	(0.446)
FMBD	0.168***	-0.0304***	-0.0530***	0.0306***
	(0.00722)	(0.0102)	(0.00418)	(0.0104)
Constant	-13.04	2.400	4.102	-2.203
	(17.19)	(3.438)	(5.344)	(3.544)
Observations	12,506	12,506	12,506	12,506
Number of fund	91	91	91	91

Table 7. OLS of Subperiods

The table shows results for the OLS regressions of five subperiods (2017, 2018, 2019, 2020, 2021), the dependent variable is representively the return from CAPM, Fama-French model and Carhart model. The CAPM also is used to get the risk-adjusted return (*CAPM* α), the Fama-French Models are also applied to achieve the risk-adjusted return by three factors (*FF3* α) and five factors (*FF5* α). The risk-adjusted return (*Carhart α*) is the annualized risk-adjusted return by the Carhart Model. The independent variable is the management fee (*Fee*) as the percentage of annual assets under management. *Size* is the annual total net assets of funds which is log transformed in the regression, *Age* is the operating time of funds, *FMdegree* is the fund manager's education background, and *FMBD* is the manager's yearly work experience. * stat. sign. at 10% level; ** stat. sign. at 5% level; *** stat. sign. at 1% level. Sample period is from October 2017 to September 2021.

OLS Regression of Five Subperiods

		CAPM α	*FF3 α*	*Carhart α*	*FF5 α*
2017	*Fee*	-0.299***	-0.381***	-0.388***	0.156***
		(0.0531)	(0.0735)	(0.0754)	(0.0107)
	Size	0.0110***	0.0155***	0.0172***	0.00476***
		(0.00235)	(0.00327)	(0.00338)	(0.000535)
	Age	0.0422	0.0584	0.0596	-0.00801
		(0.0325)	(0.0453)	(0.0470)	(0.00680)
	FMdegree	-0.0411***	-0.0438***	-0.0423***	0.0156***
		(0.00650)	(0.00902)	(0.00928)	(0.00130)
	FMBD	-0.00241***	-0.00252***	-0.00222***	0.000873***
		(0.000471)	(0.000656)	(0.000678)	(8.59e-05)
	Constant	0.0905*	0.270***	0.271***	-0.196***
		(0.0463)	(0.0644)	(0.0664)	(0.0090)
	Observations	95	95	95	95
	R-squared	0.518	0.438	0.423	0.920
2018	*Fee*	-0.167***	-0.0174	-0.0746***	-0.0281
		(0.0447)	(0.0184)	(0.0169)	(0.0599)
	Size	0.0113***	-0.0019***	-0.0008	-0.0064***
		(0.0038)	(0.0007)	(0.0007)	(0.0016)
	Age	-0.160***	0.0599***	0.0524***	0.0204**
		(0.0159)	(0.00488)	(0.00612)	(0.0102)
	FMdegree	-0.0515***	-0.0169***	-0.0338***	-0.0183***
		(0.0102)	(0.00310)	(0.00371)	(0.00584)
	FMBD	0.0003	0.0007**	0.0007	0.0001
		(0.0013)	(0.0004)	(0.0006)	(0.0006)
	Constant	0.207***	0.0574***	0.122***	0.131***
		(0.0485)	(0.0211)	(0.0192)	(0.0500)
	Observations	758	758	758	758
	R-squared	0.134	0.188	0.183	0.028
2019	*Fee*	-0.0129	-0.0448**	-0.0119	-0.0492***
		(0.0221)	(0.0176)	(0.0138)	(0.0186)
	Size	-0.00681***	-0.0136***	-0.00365***	-0.0132***
		(0.00208)	(0.00388)	(0.00112)	(0.00387)
	Age	-0.0234***	-0.0407*	-0.00123	-0.0203
		(0.00699)	(0.0247)	(0.00364)	(0.0247)
	FMdegree	0.00899	-0.0244	0.00156	-0.0171
		(0.0100)	(0.0157)	(0.00457)	(0.0157)
	FMBD	-0.000745	-0.00711**	-0.00240***	-0.00617**
		(0.000820)	(0.00281)	(0.000391)	(0.00281)
	Constant	0.275***	0.306***	0.145***	0.288***

		(0.0288)	(0.0956)	(0.0165)	(0.0959)
	Observations	3,464	3,464	3,464	3,464
	R-squared	0.007	0.005	0.012	0.003
2020	*Fee*	0.112***	-0.0333**	-0.0395***	-0.00871
		(0.0252)	(0.0135)	(0.0151)	(0.0175)
	Size	0.0106***	0.00273***	0.00205**	0.00489***
		(0.00246)	(0.000935)	(0.000943)	(0.00128)
	Age	-0.151***	-0.0219***	-0.00322	-0.0524***
		(0.00573)	(0.00190)	(0.00211)	(0.00267)
	FMdegree	-0.0288***	-0.0403***	-0.0374***	-0.0375***
		(0.0105)	(0.00353)	(0.00342)	(0.00539)
	FMBD	0.00180*	-0.00162***	-0.00224***	-0.000847
		(0.000982)	(0.000449)	(0.000447)	(0.000612)
	Constant	0.201***	0.0834***	0.0582***	0.101***
		(0.0376)	(0.0212)	(0.0208)	(0.0285)
	Observations	4,640	4,640	4,640	4,640
	R-squared	0.101	0.034	0.021	0.049
2021	*Fee*	0.0204	0.0161	-0.00354	0.0100
		(0.0140)	(0.0129)	(0.0144)	(0.0129)
	Size	0.00117	0.00396***	0.00452***	0.00265**
		(0.00131)	(0.00106)	(0.00112)	(0.00106)
	Age	-0.0376***	0.0541***	0.0516***	0.0336***
		(0.00399)	(0.00378)	(0.00386)	(0.00407)
	FMdegree	0.0137**	0.0436***	0.0394***	0.0418***
		(0.00626)	(0.00654)	(0.00542)	(0.00692)
	FMBD	0.00178***	0.00557***	0.00410***	0.00682***
		(0.000536)	(0.000479)	(0.000507)	(0.000571)
	Constant	-0.126***	-0.182***	-0.0975***	-0.141***
		(0.0197)	(0.0180)	(0.0185)	(0.0182)
	Observations	3,549	3,549	3,549	3,549
	R-squared	0.028	0.090	0.069	0.063

Table 8. Panel Data with Between Effects of Subperiods

The table shows results for the panel data with between effects method of five subperiods (2017, 2018, 2019, 2020, 2021), the dependent variable is representatively the return from CAPM, Fama-French model and Carhart model. The CAPM also is used to get the risk-adjusted return (*CAPM* α), the Fama-French Models are also applied to achieve the risk-adjusted return by three factors (*FF3* α) and five factors (*FF5* α). The risk-adjusted return (*Carhart α*) is the annualized risk-adjusted return by the Carhart Model. The independent variable is the management fee (*Fee*) as the percentage of annual assets under management. *Size* is the annual total net assets of funds which is log transformed, *Age* is the operating time of funds, *FMdegree* is the fund manager's education backgournd, and *FMBD* is the manager's yearly work experience. * stat. sign. at 10% level; ** stat. sign. at 5% level; *** stat. sign. at 1% level. Sample period is from October 2017 to September 2021.

Panel Data with Between Effects of Five Subperiods

		CAPM *α*	*FF3 α*	*Carhart α*	*FF5 α*
2017	*Fee*	-0.322***	-0.413***	-0.388***	0.156***
		(0.0180)	(0.0343)	(0.0487)	(0.00701)
	Size	0.00514**	0.00740*	0.0172***	0.00476***
		(0.00170)	(0.00325)	(0.00429)	(0.000619)
	Age	2.549***	3.530***	0.0596	-0.00801
		(0.147)	(0.280)	(0.0501)	(0.00722)
	FMdegree	-0.0268***	-0.0239***	-0.0423***	0.0156***
		(0.00266)	(0.00507)	(0.00656)	(0.000944)
	FMBD	0.000113	0.000975	-0.00222***	0.000873***
		(0.000295)	(0.000563)	(0.000676)	(9.74e-05)
	Constant	-0.138***	-0.0456	0.271***	-0.196***
		(0.0214)	(0.0409)	(0.0435)	(0.00626)
	Observations	95	95	95	95
	R-squared	0.994	0.987	0.423	0.920
2018	*Fee*	-0.00996	-0.0486	-0.0746***	-0.0281
		(0.169)	(0.0324)	(0.0182)	(0.0313)
	Size	0.00462	-0.00145	-0.000754	-0.00639***
		(0.00896)	(0.00172)	(0.00109)	(0.00188)
	Age	-0.162*	-0.0153	0.0524***	0.0204*
		(0.0887)	(0.0171)	(0.00624)	(0.0107)
	FMdegree	-0.0549	-0.0219*	-0.0338***	-0.0183**
		(0.0557)	(0.0107)	(0.00425)	(0.00729)
	FMBD	0.00342	-0.000131	0.000675	0.000107
		(0.00471)	(0.000907)	(0.000463)	(0.000796)
	Constant	0.0901	0.135***	0.122***	0.131***
		(0.194)	(0.0373)	(0.0206)	(0.0353)
	Observations	758	758	758	758
	R-squared	0.193	0.234	0.183	0.028
2019	*Fee*	0.0266	-0.0104	-0.0119	-0.0492
		(0.0601)	(0.124)	(0.0118)	(0.0662)
	Size	-0.00488	-0.0113	-0.00365***	-0.0132**
		(0.00555)	(0.0114)	(0.00111)	(0.00626)
	Age	-0.0373*	-0.0590	-0.00123	-0.0203
		(0.0220)	(0.0453)	(0.00365)	(0.0205)
	FMdegree	0.0142	-0.0217	0.00156	-0.0171
		(0.0273)	(0.0563)	(0.00519)	(0.0292)
	FMBD	-0.000841	-0.00731*	-0.00240***	-0.00617***
		(0.00213)	(0.00439)	(0.000409)	(0.00230)
	Constant	0.235***	0.275*	0.145***	0.288***

		(0.0800)	(0.165)	(0.0154)	(0.0865)
	Observations	3,464	3,464	3,464	3,464
	R-squared	0.053	0.055	0.012	0.003
2020	*Fee*	0.0219	-0.0461	-0.0395***	-0.00871
		(0.0376)	(0.0389)	(0.0106)	(0.0140)
	Size	0.00632*	0.00211	0.00205*	0.00489***
		(0.00380)	(0.00393)	(0.00107)	(0.00142)
	Age	-0.00999	-0.00149	-0.00322	-0.0524***
		(0.0115)	(0.0119)	(0.00284)	(0.00377)
	FMdegree	-0.0219	-0.0393**	-0.0374***	-0.0375***
		(0.0174)	(0.0180)	(0.00491)	(0.00651)
	FMBD	0.00273**	-0.00149	-0.00224***	-0.000847*
		(0.00132)	(0.00137)	(0.000373)	(0.000495)
	Constant	0.0777	0.0654	0.0582***	0.101***
		(0.0526)	(0.0544)	(0.0148)	(0.0196)
	Observations	4,640	4,640	4,640	4,640
	R-squared	0.109	0.077	0.021	0.049
2021	*Fee*	-0.00677	0.0428	-0.00354	0.0100
		(0.0226)	(0.0389)	(0.0136)	(0.0148)
	Size	0.00186	0.00322	0.00452***	0.00265*
		(0.00213)	(0.00366)	(0.00128)	(0.00140)
	Age	0.0118*	0.00495	0.0516***	0.0336***
		(0.00694)	(0.0120)	(0.00386)	(0.00421)
	FMdegree	0.0176*	0.0396**	0.0394***	0.0418***
		(0.0105)	(0.0181)	(0.00633)	(0.00691)
	FMBD	0.00219***	0.00508***	0.00410***	0.00682***
		(0.000794)	(0.00137)	(0.000478)	(0.000522)
	Constant	-0.229***	-0.0773	-0.0975***	-0.141***
		(0.0336)	(0.0578)	(0.0200)	(0.0218)
	Observations	3,549	3,549	3,549	3,549
	R-squared	0.124	0.167	0.069	0.063