

# An Empirical Analysis of the Impact of Fund Manager's Personal Characteristics on Fund Performance in China's Fund Market - Based on DEA Model and Threshold Panel Model

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## Abstract

This paper chooses 11 personal characteristics of fund managers in China's fund market and classifies them into four categories: physiological characteristics, educational background, professional experience and professional skills. Then, the paper uses DEA model and threshold panel model to study influences of fund managers' personal characteristics on fund performance in China's fund market. In this paper, the model of input-oriented DEA is used to calculate super efficiency DEA which measures fund performance. Empirical findings show that number of working days, years of being fund manager, number of funds held, master's degree or doctorate degree, MBA degree, overseas study experience and the fund's performance, has significant positive impact on fund performance, while age is negatively correlated with fund performance. In addition, the availability of professional skills such as CPA and CFA and the absence of major in business have no significant effect on fund performance.

**Keywords:** fund manager's personal characteristics, fund performance, DEA model, threshold panel model

## 1. Introduction

Compared with the securities investment funds market that has been in existence for more than a century, the development of China's securities investment fund industry shows its characteristics of a late start and a rapid development. In July 1991, Zhuhai International Trust and Investment Corporation launched China's first fund - No. 1 Zhu Xin Trust, the size of which is 69.3 million yuan. In 1998, China officially started the trial of securities funds, and the fund industry developed rapidly. By 2003, China's fund management companies have increased from 5 to 23. Since then, there has been a rapid development of new fund products such as securities funds, index funds and ETFs. As of December 2016, there are 113 fund management companies in China, with a total of 4,962 open-ended funds under its ownership and a total asset size of about 9,180 billion yuan. As the world's second-largest economy, China's financial industry is developing rapidly. As a mass investment vehicle, securities investment funds have been recognized by more and more people and the number of investors is also on the rise. Securities investment funds play a very important role both in the small and medium-sized investor market and in the securities market.

Due to the special third-party professional management mechanism of investment funds, the behavior of fund managers has a significant impact on fund performance with the relationship of principal-agent, not only for fund selection but also for market timing. The development of behavioral finance also attaches importance to the fact that personal characteristics of fund managers are closely related to fund performance. Whether personal characteristics of fund managers affect their business ability and investment behaviors and finally affect fund performance through their business ability, investment style and risk appetite is one of the focuses of the securities investment fund industry.

In recent years, the stock market has fluctuated sharply worldwide. In the context of such a complicated and high-risk financial market, people in the fund industry need to choose a suitable fund manager group carefully to lead a stable development. Based on this background, this paper focuses on two issues: what kind of impact would personal characteristics of fund managers, such as gender, age and other factors have on fund performance and through which path to affect fund performance would have a more significant impact.

## 2. Related Literature

Based on the Capital Asset Pricing Model (CAPM), Jensen (1968) proposed a way to evaluate the fund by estimating the fund's actual return over the expected return of its exposure to risk, the Jensen Index. Treynor (1965) presented a way to assess the risk-return available to a portfolio of unit-risk exposures, the Treynor Index, as an indicator of fund performance. Eling (2008) suggested that the Sharpe Ratio should be the most widely used and most influential empirical measure of fund performance. The Sharpe Ratio measures the return that can be gained per unit of risk and presents a sound investment strategy that summarizes risks and rewards. Dowd (1999) argued that the Sharpe Ratio is a good measure of fund performance, whether it is a measure of the investor's overall venture capital or a fraction of the venture capital. The Jensen Index, the Treynor Index and the Sharpe Ratio are three widely accepted performance measures. Treynor and Mazuy (1966) argued that excess returns can be decomposed into fund manager's timing and stock picking ability. For the first time, Fama (1972) analyzed the composition of fund performance and the evaluation ability of fund managers from the macroscopic perspectives and microscopic perspectives, and decomposed them into ability selection and stock selection.

For fund manager's characteristics, Chevalier *et al.* (1999), Prather *et al.* (2004) and Hu *et al.* (2008) considered tenure as a measure of fund manager's management experience. Golec (1996) argued that a longer term means that the manager's ability is improved. Hu *et al.* (2008) argued that fund performance increases with the term of the fund manager, but Costa (2006) and Switzer (2007) did not consider this relationship significant. Based on previous literature, Golec (1996), Chevalier *et al.* (1999), Gottesman (2006) and Hu *et al.* (2008) argued that the educational background may reflect the expertise which affects fund performance. If treating fund managers as skilled workers whose job involves collecting and analyzing relevant data, it seems reasonable to think that education levels may be positively correlated with fund performance. The amount of fund manager's management of funds may also have an impact on fund performance. Hu *et al.* (2008) and Prather *et al.* (2004) found that if fund managers manage more than two funds simultaneously, their performance tend to decline.

The problem of the turnover of fund managers is often neglected in previous research on the performance of open-end funds. Chevalier *et al.* (1999) found that there is an inverse relationship between the probability of fund manager's turnover and past performance, and performance can be described by asset growth rate and portfolio return rate. However, by studying a sample of 358 Taiwanese fund managers from 2001 to 2005, Chen (2010) found that male managers who are more dominant than their fellow managers in fiscal and window dressing strategies may have longer tenure, which changes the interval of work.

Some traditional viewpoints such as Wann *et al.* (2010) and Ammon *et al.* (2007) argued that compared with male fund managers, female fund managers prefer risk aversion in financial decision-making. However, there are few studies which focus on the effect of gender on fund performance. Barber *et al.* (2001) studied 35,000 individual investors over a six-year period and found that female investors performed better than male investors in financial markets. Bliss *et al.* (2002) examined the relationship between fund managers' gender and fund performance and found that female managers are at higher risk of holding a portfolio than men and female investors outperform male investors in financial markets. Besides, Atkinson *et al.* (2003) found that after controlling for differences in wealth and knowledge between two asset managers, the difference in fund performance and risk appetite vanished. Chen (2010) found that Taiwanese fund managers who manage lower-beta funds appear to be more conservative and have longer survival time than their male counterparts, but the difference is not significant.

Most previous research on fund performance simply measures fund performance by the Jensen Index, the Treynor Index, or the Sharpe Ratio. DEA model to study fund performance. The DEA model, despite the choice made to select variables representing inputs and outputs has some subjectivity, yet provides a way to comprehensively measures fund performance. Therefore, the results of DEA model might be useful for fund companies to make effective policy. Concerning fund managers' characteristics for fund performance, a large part of previous research engages in theoretical analysis or descriptive analysis, while there are very few empirical studies.

## 3. The Data

This paper selects data of 5,908 funds from 2011 to 2016 as the sample. Fund manager's characteristics data, fund performance data and fund characteristics data are all gathered from Wind database. Among them, MBA, CPA, CFA, whether the education background of the fund manager is in business and whether the fund manager has overseas experience are gathered in fund managers' profile. In addition, this paper uses China's one-year deposit rate as the risk-free rate. Initial screening removes imputed data. Finally, 1,393 fund observations are obtained. This paper applies the White Cross-Sectional Standard Error Method to eliminate the effect of heteroskedasticity due to the

existence of individual differences among fund managers. Moreover, fund data utilized in this paper is unbalanced panel data.

In order to measure fund performance in a better way, this paper selects the DEA model of input-oriented to measure fund performance, and utilizes super efficiency DEA as a new explained variable to measure fund performance. According to Murthi *et al.* (1997), Sengupta (2001) and Hu and Chang (2008), this paper selects the annual return rate as the single output of the super efficiency DEA model in this paper, expense ratio and standard deviation as input indicators, where annual return rate measures the cost of the fund, and standard deviation of return measures risk. Moreover, annual return rate can be obtained by the sum of the operating expense ratio and the custodian expense ratio at the year end. The standard deviation of return refers to the standard deviation of the annualized return of daily income. The actual annualized return rate refers to the return on capital in a year. Details of the indicators are shown in Table 1. All data are gathered from the Wind database.

Table 1. Input indicators and output indicator

Input Indicators	Output Indicator
Operating Expense Ratio	
Custodian Expense Ratio	Annual Return Rate
Standard Deviation	

In this paper, fund managers' personal characteristics are explanatory variables, and eleven kinds of fund managers' personal characteristics are selected to study their impact on fund performance. They are classified into four categories: physiological characteristics, educational background, work experience and professional skills. Physical characteristics include age and gender. In this paper, "age" is set as a continuous variable, and "gender" is set as a dummy variable, with male fund managers taking the value of 1 and female fund managers taking the value of 0. The educational background reflects the overall professional competence of a fund manager. In this paper, "Master", "PhD", "MBA", "Business Background" and "Study Abroad" are selected as proxy variables for educational background. If the fund manager holds Master's degree, PhD, or MBA, then variables master, PhD, MBA takes the value of 1; otherwise it takes the value of 0. When the major of a fund manager is business or economics, the "business background" variable takes the value of 1; otherwise it takes the value of 0. If the fund manager has overseas study experience, then the "overseas study" variable takes a value of 1; otherwise it takes a value of 0. Work experience includes tenure, experience and turnover rate. Among them, "tenure" measures the fund manager's time spent in the management of the fund; "experience" refers to the fund manager's years working in investment and related industries; "turnover" measures the fund manager's turnover, which is the number of companies the manager has worked for since the first day of working in the fund industry.

Along with fund manager's personal characteristics as explanatory variables, this paper also selects five fund characteristics as control variables as control variables. Chen *et al.* (1992), Annaert *et al.* (2003) and Hu *et al.* (2008) pointed out that fund performance is related to fund size. However, Carhart (1997) and Prather (2004) pointed out that this relationship does not exist. Performance sustainability is a topic of great concern to most investors in the open-end fund market. Many studies by Hendricks *et al.* (1993), Carhart (1997), Annaert *et al.* (2003) and Hu (2008) found out that there is a significant positive correlation between fund performance and sustainability, while Prather *et al.* (2004) cast doubt on this idea. In addition, the age of the fund may also affect fund performance. Annaert *et al.* (2003) suggested that funds with longer operating periods should have advantages. However, Hu *et al.* (2008) put forward an opposite view. In summary, this paper selects "total fund assets (yuan)", "fund net asset value (yuan)", "fund asset change rate", "fund net asset value change rate" and "fund term" as control variables. Table 2 summarizes all variables.

Table 2. Description of variables

	Variable Name	Meaning
Explained Variable	Super Efficiency DEA	Annualized rate of return
	Male	Whether the fund manager is male
Explanatory Variables	Age	Age of the fund manager
	Master	Whether the fund manager has a master's degree
	Doctor	Whether the fund manager has a doctor's degree
	MBA	Whether the fund manager has an MBA degree
	Major	Whether the fund manager is majored in business or economics
	Overseas	Whether the fund manager has overseas study experience
	Tenure	Number of days the fund manager has worked for the fund
	Experience	Number of years the fund manager has worked in the fund industry
	Turnover	Number of funds the fund manager has managed to date
	CFA	Whether the fund manager has a CFA certificate
	CPA	Whether the fund manager has a CPA certificate
Control Variables	Total Assets	Total asset value of the fund
	Net Assets	Net asset value of the fund
	TAC	The fund's total assets of the current year divided by the total assets of the previous year
	NAC	The fund's net asset value of the current year divided by the net asset value of the previous year
	Duration	Years the fund has been established

Explanatory variables include both continuous variables and discrete variables. Table 3 provides descriptive statistics of continuous variables.

Table 3. Descriptive statistics of continuous variables

Variables	Observations	Mean	Standard Deviation	Minimum	Maximum
Age	1393	38.924	4.738801	27	54
Tenure (day)	1393	1525.001	930.8493	44	4734
Experience (year)	1393	7.220843	2.985353	0.1753	13.4329
Turnover	1393	8.413496	4.911708	1	23
Duration (year)	1393	6.541274	3.395536	1.3507	15.6137
Total Assets (yuan)	1393	2.78E+09	4.71E+09	1.26E+07	5.01E+10
Net Assets (yuan)	1393	2.10E+09	3.92E+09	976.11	5.00E+10
TAC	1393	36.7733	258.55	-91.1393	4744.7
NAC	1393	65.40038	728.7194	-99.9845	18777.17

Table 4 provides descriptive statistics of discrete variables.

Table 4. Descriptive statistics of discrete variables

Variables	Observations	Frequency	Proportion (%)
Male	1393	1,163	83.49
Bachelor	1393	39	2.8
Master	1393	1,147	82.34
Doctor	1393	207	14.86
MBA	1393	207	14.86
CFA	1393	166	11.92
CPA	1393	21	1.51
Overseas	1393	93	6.68
Business Major	1393	1,008	72.36

The variables that characterize fund manager's physiology are gender and age. Among 1,393 fund managers, 1,163 are men and the majority of fund managers are men. The average age of fund managers is 38.924 years old. The minimum and maximum is 27 and 54, respectively. Li *et al.* (2011) pointed out that the average age of hedge fund managers in the United States was 45.43 years old; Chevalier *et al.* (1999) showed that the average age of fund managers in the United States was 44.18 years old. Compared with US fund managers, the average age of Chinese fund managers, is younger by 5 years to 6.5 years.

Educational background variables are master's degree, doctorate, MBA degree and business background. In this sample, 82.34% of fund managers have master's degree, 14.86% of fund managers have doctorates, and only 2.8% of fund managers have bachelor's degree. It can be seen that fund managers' generally possess high level of education. A total of 14.86% of the funds are managed by fund managers with MBA degree, well below the 58.1% of US fund managers reported by Gottesman *et al.* (2006). In addition, 72.36% of fund managers have a business degree or a degree in economics.

In terms of experience, fund managers have an average duration of 7.22 years, with a minimum of 0.17 years and a maximum of 13.43 years. The average industry experience of US hedge fund managers reported by Li *et al.* (2011) is 19.45 years, far exceeding the average industry years of fund managers in this sample. The average number of funds that fund managers have managed is 8.413. Only 6.68% of fund managers have overseas study experience or work experience.

In conclusion, China's fund managers are younger than their counterparts in the United States, but they have less industry experience and fewer of them have MBA or CFA qualifications. Most of the fund managers have a master's degree, and fund managers are mainly male. Descriptive statistics find that the eigenvalues of variables have obvious differences and the correlation coefficients are relatively low. Therefore, regression is not disturbed by the serious multicollinearity problem.

#### 4. Empirical Analysis

In this paper, input variables of the super efficiency DEA model are "standard deviation of return" and "expense ratio". The output value is "annual return rate". The super efficiency DEA model provides a comprehensive performance of the fund. In this paper, input and output are brought into the super efficiency DEA model and a typical short panel data of  $N = 430$  and  $T = 6$  are obtained after screening the obtained super efficiency DEA values. After unit root test, Breusch-Pagan Lagrange Multiplier Test, F test, Hausman test, and Wald heteroskedasticity test, asymptotic fixed effect model which controls heteroskedasticity is found to be the best model. The model, ideally, is of the following form.

$$\begin{aligned}
 SE = & \alpha + \beta_1 Age + \beta_2 Gender + \beta_3 Tenure + \beta_4 Experience + \beta_5 Funds + \beta_6 Master + \beta_7 Doctor \\
 & + \beta_8 MBA + \beta_9 CFA + \beta_{10} CPA + \beta_{11} Overseas + \beta_{12} Major + \beta_{13} TotalAssets + \beta_{14} NetAssets \\
 & + \beta_{15} TAC + \beta_{16} NAC + \beta_{17} Duration + \varepsilon,
 \end{aligned} \tag{1}$$

where  $\alpha$  is the intercept,  $\beta_i$  ( $i=1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17$ ) is the regression coefficient, and  $\varepsilon$  is the random error term.

Regression results and robustness check are shown in Table 5. Regression I is a simple linear regression (OLS) that controls heteroskedasticity. Regression II is pooled OLS. Regression III is random effect model which controls heteroskedasticity. Regression IV is fixed effect model that controls heteroskedasticity. Regression V is asymptotic fixed effect model that controls heteroskedasticity. This paper interprets the results of Regression V.

Table 5. Regression results and robust check

Explanatory Variables	Explained Variable: Super Efficiency DEA				
	Regression I	Regression II	Regression III	Regression IV	Regression V
	Coefficient (t value)	Coefficient (t value)	Coefficient (t value)	Coefficient (t value)	Coefficient (t value)
Age	-0.00177** (-2.15)	-0.00177 (-1.90)	-0.00436*** (-3.63)	-0.279*** (-43.95)	-0.279*** (-43.95)
Male	-0.0414*** (-3.52)	-0.0414*** (-4.99)	-0.0524*** (-2.75)	-3.111*** (-4.75)	-3.111*** (-4.75)
Tenure	0.0000115*** (2.92)	0.0000115 (2.21)	0.0000174*** (2.78)	0.00101*** (69.14)	0.00101*** (69.14)
Experience	0.00158 (0.89)	0.00158 (1.63)	0.00191 (0.83)	0.646*** (10.16)	0.646*** (10.16)
Turnover	0.00138** (2.07)	0.00138 (2.05)	0.00234** (2.17)	0.185* (2.74)	0.185* (2.74)
Master	0.0797** (2.13)	0.0797 (1.82)	0.0973* (1.86)	5.288*** (11.89)	5.288*** (11.89)
Doctor	0.0849** (2.14)	0.0849 (1.83)	0.103* (1.80)	5.094*** (44.76)	5.094*** (44.76)
MBA	0.00410 (0.42)	0.00410 (0.59)	0.00296 (0.18)	0.928*** (11.39)	0.928*** (11.39)
CFA	0.00370 (0.40)	0.00370 (0.54)	0.00723 (0.47)	0.738 (8.31)	0.738 (8.31)
CPA	0.00952 (0.64)	0.00952 (0.81)	0.0314 (1.43)	0.00538 (2.53)	0.00538 (2.53)
Overseas	0.00184 (0.14)	0.00184 (0.14)	0.00377 (0.18)	0.00796*** (6.13)	0.00796*** (6.13)
Business Major	0.0104 (1.09)	0.0104 (1.25)	0.00255 (0.16)	0.00544 (0.13)	0.00544 (0.13)
Total Assets	1.59e-11*** (4.20)	1.59e-11*** (5.20)	1.13e-11*** (3.54)	3.71e-12 (1.41)	3.71e-12 (1.41)
Net Assets	-8.05e-12* (-1.92)	-8.05e-12* (-2.69)	-4.21e-12 (-0.98)	-2.64e-13 (-0.11)	-2.64e-13 (-0.11)
TAC	-0.0000197 (-1.36)	-0.0000197 (-1.21)	-0.0000232* (-1.92)	-0.0000192** (-7.29)	-0.0000192*** (-7.29)
NAC	0.0000103** (2.00)	0.0000103*** (8.51)	0.00000959** (2.16)	0.00000616*** (15.99)	0.00000616*** (15.99)
Duration	-0.00503*** (-3.64)	-0.00503 (-1.44)	-0.00635*** (-3.53)	-0.131*** (-18.44)	-0.131*** (-18.44)

Note: \*, \*\*, \*\*\* denotes that the variable is significant at 10%, 5%, and 1% significance level, respectively.

According to Table 5, it can be found that age is negatively related to super efficiency DEA. This result is consistent with Golec (1996) that younger fund managers have better performance. In addition, male is significantly and negatively correlated with super efficiency DEA at 1% level, showing that male fund managers perform worse than female fund managers. The educational background of fund managers also affects fund performance. Master and PhD are significantly and positively correlated with super efficiency DEA. Chevalier *et al.* (1999) argued that a higher education background means that fund managers possess higher intelligence and better knowledge accumulation. Educational experiences at top universities can also help fund managers create special social network that enhances their ability to access information. It can be seen that highly educated fund managers are more likely to achieve good overall performance. MBA also has a significant positive correlation with super efficiency DEA. This is consistent with the findings of Golec (1996). An MBA degree is recognized in China. Upon completion of the MBA program, people can master various business concepts and strategies and apply them to their daily business operations. In addition, overseas study experience is also significantly and positively correlated with super efficiency DEA. In terms of work experience, regression results show that number of days in service is significantly and positively related to super efficiency DEA, indicating that fund managers with longer tenure have better performance. Moreover, the significant positive correlation between fund manager's age and super efficiency DEA may indicate that fund managers with longer working experience have better overall performance. Furthermore, there is a significant positive correlation between the number of funds that the fund manager has managed and super efficiency DEA. Other explanatory variables, CFA and CPA representing professional skills, are positively related, but not significantly, to super efficiency DEA.

### 5. Threshold Panel Model Regression

In this paper, the annual return rate, which is through the purchase of fund products, can be considered an expected rate of return converted into annual rate of return. It is an explanatory variable added to explore which level the annualized rate of return can have a positive impact on fund performance. The annualized return refers to the fund company's income and the return ratio of investment. The annualized yield is not as high as possible. Controlling the annualized rate of return to a higher level can indeed increase the fund company's investment income and increase profits. However, the fund spend time deliberately on the annualized rate of return at a high level also means that fund managers may expose the fund to greater risk and reduce customer investment intentions.

Therefore, this paper proposes the hypothesis that there exists one or several thresholds, and when the annualized return rate is at a low level, it is negatively correlated with fund performance. When the excess return rate is higher than a certain threshold, it has positive influence on fund performance.

The precondition of the panel threshold model is that all variables are stationary, so the unit root test of each variable is required. At the same time, there is also a need to ensure that variables, especially the key threshold variables, are exogenous. Therefore, this paper conducts endogeneity tests. This paper uses the same method as Section 4 to test the unit root of the annualized return rate (ARR) and finds that the annualized return rate is stationary. The Davidson-Mackinnon test shows that annualized return rate is an exogenous variable.

This paper first utilizes the Bootstrap method to test the threshold value. The sampling time is 300 times. The significance level is 1%, 5% and 10%. The test results are shown in Table 6.

Table 6. Bootstrap of threshold effect

Model	F value	P value	BS times	Critical value		
				1%	5%	10%
Single Threshold	29.759**	0.003	300	16.546	7.575	6.219
Double Threshold	36.748**	0.000	300	14.951	9.973	6.431
Triple Threshold	0	0.643	300	0	0	0

Note: \*, \*\*, \*\*\* denotes that the variable is significant at 10%, 5%, and 1% significance level, respectively.

As can be seen from Table 6, the P value of the bootstrap threshold effect of single-threshold model and dual-threshold models is less than 0.05, indicating that it is significant at the 5% significance level. The P value of the bootstrap triple-threshold model is greater than 0.05, indicating that the sample selected herein is insignificant. Therefore, there are two thresholds.

After confirming the threshold effect of the annualized rate of return, this paper proceeds to estimate and test the two thresholds. When the significance level is 5%, the critical value of likelihood ratio (LR) statistic is 7.35. The first threshold of the dual threshold model is -20.09. The 95% confidence interval is [-23.122, -18.790]. The second threshold is 17.11, and the 95% confidence interval is [14.543, 48.494]. After confirming the second threshold and recalculate the first threshold, the result is still -20.09. The confidence interval for the thresholds and its 95% significance level are shown in Table 7.

Table 7. Threshold and 95% confidence interval

	Threshold Value	95% Confidence Interval
Single Threshold	-20.090	[-23.122, -18.790]
Double Threshold	17.112	[14.543, 48.494]

Again, super efficiency DEA is regressed on influencing factors as in Section 4.

$$\begin{aligned}
 SE = & \alpha + \beta_1 * I * ARR (ARR \leq \gamma_1) + \beta_2 * I * ARR (\gamma_1 \leq ARR \leq \gamma_2) + \beta_3 * I * ARR (ARR \geq \gamma_2) + \beta_4 Age \\
 & + \beta_5 Gender + \beta_6 Tenure + \beta_7 Experience + \beta_8 Funds + \beta_9 Mast + \beta_{10} Doctor + \beta_{11} MBA \\
 & + \beta_{12} CFA + \beta_{13} CPA + \beta_{14} Overseas + \beta_{15} Major + \beta_{16} TotalAssets + \beta_{17} NetAssets \\
 & + \beta_{18} TAC + \beta_{19} NAC + \beta_{20} Duration + \varepsilon,
 \end{aligned}
 \tag{2}$$

where  $\alpha$  is the intercept,  $\beta_i$  ( $i=1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17$ ) is the regression coefficient, and  $\varepsilon$  is the random error term.  $\gamma_i$  ( $i=1, 2$ ) is the threshold value and  $I$  is the indicator, which equals 1 when the condition is true and 0 if not.

The regression results are shown in Table 8. Regression is a Panel Threshold Model. Regression II directly adopts fixed effect model that controls heteroskedasticity augmented with annualized return rate (ARR). Regression III is fixed effect model that controls heteroskedasticity augmented with the quadratic term of annualized return rate (ARR). This paper interprets Regression I, the result of the Panel Threshold Model.

Table 8. Regression results and robustness check

Explanatory Variables		Explained Variable: Super Efficiency DEA		
		Regression I	Regression II	Regression III
		Coefficient	Coefficient	Coefficient
		(t value)	(t value)	(t value)
Main Variables	Explanatory	ARR		0.232 (-1.69)
		ARRSQR		0.00353 (-1.41)
	ARR<-20.090	-0.00286*** (-10.67)		
	-20.090<ARR<17.112	-0.0000856 (-0.34)		
	ARR>17.112	-0.0000636 (-0.77)		
	Control Variables	Age	-0.202*** (-250.99)	-0.891*** (-4.05)
	Gender	-0.000575 (-0.03)	19.30*** (3.59)	19.66*** (3.65)
	Tenure	0.000575*** (157.46)	0.00475*** (4.27)	0.00481*** (4.34)

Experience	0.000967 (0.53)	4.219*** (3.56)	4.298*** (3.63)
Turnover	-0.000364 (-0.48)	1.481*** (3.41)	1.508*** (3.48)
Master	-0.00167 (-0.06)	-34.68*** (-3.56)	-35.33*** (-3.63)
Doctor	-3.714*** (-129.46)	-34.72*** (-3.54)	-35.37*** (-3.61)
MBA	-0.731*** (-58.64)	-13.14*** (-3.33)	-13.48*** (-3.41)
CFA	-0.00237 (-0.20)	47.69*** (3.25)	48.92*** (3.33)
CPA	-0.00348 (-0.16)	-0.00355** (-3.09)	-0.00348** (-3.02)
Overseas	0.00494 (0.27)	0.00881 (0.07)	0.00781 (0.07)
Business Major	0.0748*** (9.01)	0.00655 (0.16)	0.00617 (0.15)
Total Assets	2.04e-12 (1.30)	3.83e-12* (1.75)	3.90e-12* (1.77)
Net Assets	-7.59e-13 (-0.43)	6.17e-16 (0.00)	-6.26e-14 (-0.02)
TAC	0.000214*** (2.98)	-0.0000202 (-1.64)	-0.0000207* (-1.68)
NAC	-0.000174*** (-2.61)	0.00000603 (1.30)	0.00000614 (1.33)
Duration	0.115*** (103.54)	0.127*** (98.54)	
Constant	7.391*** (177.56)	4.308*** (7.54)	4.280*** (7.79)
R <sup>2</sup>		0.4172	0.3338

Note: \*, \*\*, \*\*\* denotes that the variable is significant at 10%, 5%, and 1% significance level, respectively.

As can be seen from Table 8, the goodness of fit of the dual threshold panel model for the above variables is 0.4172, significantly higher than that of the multivariate linear model and that of the quadratic function model. It is also significantly better in terms of the regression results of the annualized return rate. Therefore, the relationship between the annualized return rate and super efficiency DEA cannot simply be explained by multiple linear function or quadratic function, but can be more closely explained by a threshold function.

Two thresholds of the annualized return rate divide the connections between the annualized return rate and the super efficiency DEA into three intervals. When the annualized return rate of a fund company is below -20.090%, the annualized return rate is significantly negatively correlated with fund performance and the coefficient is as high as -0.00286, which means that when the fund company's annualized return rate is at a low level, for every 1% increase in annualized return rate, fund performance, measured by super efficiency DEA, is expected to decrease by -0.00286. However, when the annualized return rate is between -20.090% and 17.112%, the annualized return rate is still negatively correlated with fund performance, but the relation is softened a lot. When the fund company's annualized return rate is higher than 17.112%, the annualized return rate and the fund performance begin to exhibit a positive correlation. This phenomenon shows that when the annualized return rate is at a high level, investors are better able to reap the benefits of fund financial products and are more willing to buy fund wealth management products with higher profitability. As a result, the performance of fund companies is improved.

## 6. Conclusion and Policy Implications

This paper uses the super efficiency value derived from the DEA model as the measure of fund performance and finds out the relationship between the fund manager's personal characteristics and fund performance in Chinese fund market by using panel data regression and threshold panel data regression. Empirical results show that young fund managers with long tenure and more funds which they have managed have better performance. Meanwhile, the regression result of this paper reveals the effectiveness of MBA and business majors as an educational and professional training tool to improve the managers' ability in managing mutual funds. The positive influence of high level of education such as master's degree and doctorates on the comprehensive performance of the funds is also found in empirical results. MBA education not only provides investment knowledge in the master's program, but also it establishes a network of relationships through which the fund manager can gain internal investment information and hands-on experience. In addition, majoring in business provides fund managers with adequate training to understand economic trends better and make good investment decisions. Higher educational background such as master's degree and doctorate qualifications represent a higher level of intelligence and a better knowledge base for fund managers. The findings of this paper also provide policy implications. For example, an MBA or a business professional background is an important characteristic which affects the performance of fund managers, but only 14.86% of fund managers in this sample have MBA degrees. It implies that delivering more MBA holders to the market is likely to benefit the performance of the fund market, and policymakers should pay attention to MBA education and provide more resources for MBA education. In sum, the regression results in this paper allow investors to understand how to choose the right fund manager to manage their assets.

Finally, this paper summarizes some suggestions for investors and fund companies from the research results. For investors, they had better choose young female fund managers with long working experience and MBA, master's degree or doctor's degree and who have studied business and managed many funds. It is a better and more important way to achieve investment goals by choosing a competent fund manager instead of evaluating funds' past performance. More importantly, investors should not have the antiquated idea that female fund managers are inferior to male fund managers. Because female fund managers have milder investment style and tend to take stable investment actions, they can help investors obtain continuous returns. For fund companies, the characteristics of fund managers should be more worth considering because these factors are more easily controlled than the characteristics of the fund itself. In addition, the threshold regression result shows that when fund companies maintain the return rate at a high level, investors are more able to benefit from the fund financial products and more willing to buy funds with a higher potential yield. Therefore, by maintaining a high return rate can fund companies improve their performance.

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