Animal spirits: Superstitious behavior by mutual fund managers

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Abstract

Using a unique dataset from China spanning 2005 to 2023, we investigate how superstitious beliefs influence mutual fund managers' risk-taking behavior and how this influence evolves over their careers. We find a significant 6.82% reduction in risk-taking during managers' zodiac years, traditionally considered unlucky in Chinese culture. This effect is particularly pronounced among less experienced managers, those without financial education backgrounds, and those with lower management skills. The impact also intensifies during periods of high market volatility. Our findings challenge the traditional dichotomy between retail and professional investors, showing that even professional fund managers can be influenced by irrational beliefs early in their careers. However, the diminishing effect of superstition with experience and expertise suggests a gradual transition towards more rational decision-making. Our results provide insights into the process by which financial professionals evolve from exhibiting behavior akin to retail investors to becoming the rational actors often assumed in financial theory.

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1. Introduction

The finance literature has long drawn a distinction between retail and professional investors, often characterizing the former as prone to behavioral biases and irrational decision-making[1], while portraying the latter as sophisticated and rational actors in financial markets. For example, Bhattacharya et al. (2018) argue that individual investors are more likely to be prone to superstition than professional investors, showing that individual investors, but not institutional investors, submit disproportionately more limit orders at 8 (a lucky number in China) than at 4 (an unlucky number). This dichotomy, however, raises an important question: At what point do professional investors truly become "professional" in their decision-making processes? While it is generally accepted that professional investors, such as mutual fund managers, possess superior financial knowledge and skills compared to retail investors, it remains unclear whether and when they fully shed the behavioral biases and superstitions that are commonly associated with individual investors.

This paper investigates this transition by examining how superstitious beliefs influence the risk-taking behavior of mutual fund managers throughout their careers. Specifically, we focus on the impact of the Chinese zodiac year, a culturally significant superstition, on fund managers' risk-taking decisions. By analyzing how this effect changes with experience and other factors, we trace the evolution of financial professionals from exhibiting behavior similar to retail investors to becoming the rational actors often assumed in financial theory.

Analyzing the impact of superstition on fund manager behavior is important for several reasons. First, superstitions exist everywhere in the world. Every country on the planet has its own local

[1] For example, Hirshleifer et al. (2018) examine digital superstitions in China on financial decisions in the initial public offering (IPO) market and find that lucky numerical stocks are listed more frequently than expected by chance. Fisman et al. (2023) examine the Chinese Zodiac Year superstition and find that the investment behavior of individual investors and chairpersons of firms are more conservative in their zodiac years. He et al. (2020) examine the impact of superstition and conspicuous spending motives on housing demand and house prices in Singapore and find that there were fewer housing transactions and lower housing prices on inauspicious days of the lunar calendar. Block and Kramer (2018) show that Taiwanese consumers are relatively more likely to purchase a product with positive superstitious associations based on its "lucky" color and are more likely to purchase and are willing to pay more money for a product with a smaller but "lucky" number of units contained in the package. Padgett and Jorgenson (1982) show that economic threat variables significantly predicted levels of superstition in Germany during 1918-1940.

superstitions. Each country also has its own variations on common superstitions (Shrivastav and Kotnala, 2013). Second, investors are increasingly choosing to invest in mutual funds. For example, in the United States, 68.6 million, or 52.3 percent of, households own mutual funds in 2022, representing 115.3 million individual investors (Investment Company Institute, 2022). Similar percentages are reported elsewhere.[2] Hence, any biases in the behavior of professional fund managers have the potential to significantly impact economic growth and investment in the country.

In this paper, we examine the effect of a specific superstition bias on fund managers' investment decisions. The superstition arises from traditional Chinese beliefs about the zodiac year. In Chinese tradition, each year is associated with an animal sign, repeating every 12 years. If a person's birth year aligns with the current year's animal sign, the current year is considered their zodiac year, which is often viewed as unlucky. Chinese individuals often worry about losing fortunes in their zodiac years and try to avoid any form of risk-taking. This superstition provides a unique opportunity to analyze psychological influences on fund manager behavior, as the occurrence of the zodiac year is unlikely to directly affect fund fundamentals. It allows us to isolate specific periods when individual fund managers are most likely to be affected. In addition, it is exogenous to other factors that might affect fund manager behavior, such as individual characteristics, the macro environment, and other factors.

We begin our analysis by investigating whether the zodiac year of a fund manager reduces his or her risk-taking levels using a unique dataset covering the 2005–2023 period. Controlling for various fund and fund manager characteristics, we show that fund managers significantly reduce portfolio risk in their zodiac year. The estimates from our baseline regression suggest are both statistically and economically significant. Specifically, in their zodiac years, fund managers reduce their risk-taking levels by 6.82% on average relative to non-zodiac years. Therefore, we provide the first direct evidence that even professional institutional investors are also likely to be affected by superstitious behavior.

[2] Anecdote evidence shows that "US has the highest population percentage investing in mutual funds at 46%. China closely followed US at 44%. Japan is the third in terms of MF penetration at 20%" (Patnaik, Jul 19, 2022, accessed at 7 February 2024) .

How specifically do zodiac year managers reduce risk? We find that fund managers adjust their asset allocation strategies during their zodiac year. Specifically, they significantly decrease their investments in high-risk assets and increase investments in lower-risk ones. Additionally, we observe that these managers significantly underweight risky stocks during their zodiac year, further reducing their exposure to high-risk assets.

To examine the evolution of investor sophistication, we next explore the factors that influence the intensity of this behavior. We investigate whether particular types of managers are more sensitive to superstitions by segmenting our sample based on various characteristics that may indicate susceptibility to superstitious beliefs. We find that managers with less experience are more influenced by their zodiac years, suggesting that the impact of superstitious beliefs may diminish as fund managers gain more experience in the industry. This aligns with the notion that professional sophistication develops over time, gradually reducing the influence of irrational beliefs.

Moreover, managers with lower capabilities, as measured by past performance and management skills, show a higher susceptibility to zodiac year effects. This indicates that the development of professional judgment and skills plays a crucial role in overcoming superstitious tendencies. Interestingly, we also find that fund managers without a finance background are more prone to adjusting their risk-taking behavior during their zodiac years, highlighting the importance of formal financial education in cultivating rational decision-making processes.

The structural characteristics of the funds themselves also play a role in the manifestation of superstitious behavior. Funds with easily adjustable holdings and those following more passive investment strategies show a higher susceptibility to zodiac year effects. This suggests that the flexibility to act on superstitious beliefs and a less active approach to investment management may exacerbate the influence of such beliefs on professional decision-making.

Finally, we find that periods of higher economic volatility intensify the influence of superstitions on fund managers' decisions. This result is particularly noteworthy as it suggests that even as fund managers develop professional sophistication, they may revert to more irrational decision-making processes during times of increased uncertainty. This finding has important implications for

understanding how market conditions can affect the rationality of professional investors.

To address potential concerns about omitted variables, we conduct two placebo tests. First, we create a ‘pseudo zodiac year’ by randomizing the link between fund managers and their zodiac years. This approach allows us to test whether the observed changes in risk-taking behavior are truly associated with the actual zodiac year or if they could be attributed to random chance. This randomized approach does not yield significant differences in risk-taking, supporting our contention that the effects we observe are genuinely linked to the superstitious beliefs associated with a manager's true zodiac year.

Second, we employ propensity score matching to create a control group based on other potential confounding traits at the fund manager level. This method helps us isolate the effect of the zodiac year by comparing managers with similar characteristics, differing primarily in whether they are in their zodiac year or not. Our results are robust to this match, further reinforcing our argument that the observed differences in risk-taking behavior are indeed related to superstitious beliefs, rather than other unobserved factors. These placebo tests, combined with a series of robustness checks such as modifying key variable definitions and controlling for additional fund manager characteristics, provide strong support for the consistency of our results. The fact that our findings hold across these various specifications and tests underscores the robustness of our conclusions.

In addition, we also assess the effect of manager turnover on fund risk levels. We find that when a zodiac year manager replaces a non-zodiac year manager, the risk level of the fund decreases. However, if a zodiac year manager leaves the fund, the risk level does not drop.

Lastly, we investigate investment performance during fund managers’ zodiac years. We hypothesize that if managers act ‘irrationally’ during their zodiac years, performance should decline as they reduce risk-taking. Our results confirm this, showing a drop in risk-adjusted investment performance when managers reduce risk. This suggests that the superstition-induced behavior negatively impacts performance beyond just the reduction in risk.

Collectively, these results show that the journey from novice to sophisticated investor is not straightforward. They suggest that while experience, education, and skill development can reduce

the impact of superstitious beliefs on professional decision-making, other factors such as fund structure, investment strategy, and market conditions can still influence the extent to which even experienced fund managers exhibit irrational behavior.

Our study enhances existing literature in several ways. Firstly, we contribute to the ongoing debate about the evolution of investor sophistication. While the finance literature has traditionally drawn a stark contrast between retail and professional investors (Bhattacharya et al., 2018; Hirshleifer et al., 2018), our study provides insights into how and when professional investors truly become "professional" in their decision-making processes. By examining the persistence of superstitious beliefs among mutual fund managers throughout their careers, we shed light on the transition from behaviorally biased to more rational investment decision-making.

Second, we add to the growing body of work on the psychological influences on fund managers. Previous studies such as Pool et al. (2012) and Alok et al. (2020) have shown that fund managers can be influenced by familiarity and salience biases. Unlike these biases, which can be linked to firm fundamentals, the superstition-induced bias we examine is entirely unrelated to firm fundamentals. We demonstrate that zodiac year superstitions can significantly influence fund managers' risk-taking behavior and negatively impact fund performance.

Third, we contribute to the literature on the role of superstition in decision-making. While most studies (Bhattacharya et al., 2018; Hirshleifer et al., 2018; Bhattacharya et al., 2021; Zeng et al., 2022; Fisman et al., 2023) suggest that individual investors are more prone to superstition than institutional investors, our research shows that even professional investors are not immune to superstition biases. This is particularly true when they face economic uncertainty, regardless of their investment experience or method.

Lastly, we expand on recent findings by Zeng et al. (2022) and Zhang and Du (2022), who show that superstition effects are significant even in markets dominated by sophisticated investors. We build on this literature by demonstrating that superstitions can significantly impact fund managers' investment decisions, indicating that superstition biases persist even among professional institutional investors. Our study documents how these biases are likely to evolve over a fund

manager's career, offering insights into the process of developing professional sophistication in financial decision-making.

The rest of the paper is organized as follows. Section 2 describes the Chinese zodiac year superstition in detail. Section 3 provides a detailed description of our empirical methodology and data. Section 4 investigates the possible association between the zodiac year of fund managers and their risk-taking in China. Section 5 further examines the impact of fund managers' zodiac year on their portfolio rebalancing. Section 6 examines the cross-sectional differences of fund managers' zodiac year affecting the level of risk taking and reports several robustness tests. Section 7 examines the influence of the fund managers' zodiac year on investment performance. Section 8 concludes.

2. The Chinese Zodiac Year Superstition

In Chinese tradition, zodiac signs, which cycle every 12 years, are used to denote birth years. Each year corresponds to a different animal sign, starting with the Rat and ending with the Pig. An individual's zodiac year is the year that aligns with their birth sign in this cycle. For instance, if someone is born in the Year of the Rat in 2008, their next zodiac year will be the Year of the Rat in 2020.

Traditionally, the zodiac year is considered a year of misfortune. Folklore suggests that individuals may face various adversities and are prone to act out of character during their zodiac year. Consequently, many people approach their zodiac year with caution, often avoiding significant life changes and risk-taking (Fisman et al., 2023).

The superstition surrounding the zodiac year provides an exogenous instrument for examining its impact on fund managers' risk-taking behavior. This instrument is appropriate for several reasons. First, the Chinese Zodiac Year culture is pervasive, influencing even modern individuals' decisions (Fisman et al., 2023). Second, the zodiac year is traditionally viewed as unlucky, with potential for financial loss, emotional difficulties, and professional challenges, which can alter risk perception and behavior (Zeng et al., 2022). Third, the zodiac year, determined by birth year and cycling every 12 years, mitigates endogeneity issues. As the birth year of a fund manager is

independent of unobservable fund manager-level factors (like personal characteristics, macroeconomic conditions, etc.), we can identify a causal effect between a fund manager's zodiac year and the fund's risk exposure. Furthermore, fund managers will be part of both the treated and control groups over their tenures at the same fund in different years, allowing for within-manager comparisons over time. Lastly, the zodiac year offers a random sample selection process, as around one-twelfth of the population will be in their zodiac year in any given year.

3. Data and Sample Description

3.1. Data

We obtain our initial sample of funds and fund managers from the China Stock Market and Accounting Research (CSMAR) and RESSET databases, covering the period from 2005 to 2023. We exclude observations lacking fund manager data. CSMAR and RESSET provide asset allocation and stock return data. Age and birth data for fund managers are obtained from the CSMAR, Wind, and RESSET databases, supplemented manually via the Tiantian Fund website. We start our sample in 2005 due to the lack of reliability of birth and asset allocation data in the three databases prior to this year. Our final sample comprises 12,773 fund-year observations and 727 unique fund managers from 2005 to 2023.[3] Our sample consists of 3,048 unique funds of which 16.08%, 26.67%, 51.02%, 4.23%, and 1.97% were equity, bond, hybrid, money market, and fund of funds, respectively. We omit the last two fund classes from our analysis because of the small number of funds in these two classes (as in Ammer et al., 2023).

Our primary independent variable is the fund manager's zodiac year. We employ three distinct categories of dependent variables to measure risk-taking behavior.

First, we examine the influence of the zodiac year of the fund manager on the fund manager's *expected* risk change by computing ex ante shifts in portfolio risk. Following Kempf et al. (2009), we calculate the Risk Adjustment Ratio (RAR) for each fund and year. This measure compares the

[3] Through the use of these databases supplemented with manual research, we identify the birth dates of 793 fund managers. After aligning this with the data on fund manager holdings, we are left with 769 fund managers. However, as the investment data for fund managers is not disclosed annually, our dataset forms an unbalanced panel.

intended portfolio risk for the second half of the year (σ_{ft}^{int}) to the realized risk in the first half (σ_{ft}). The intended risk is based on actual portfolio weights in the second half and expected equity volatility, estimated using first-half stock volatilities. This forward-looking measure allows us to capture managers' risk-taking intentions. Specifically, for each fund and year, we calculate the intended portfolio risk for the second half of the year, σ_{ft}^{int}, based on the actual portfolio weight in the second half of the year and the expected equity volatility in the second half of the year. The volatility of the stock in the first half of the year is used as an estimate of the expected volatility of the stock in the second half of the year. The risk adjustment ratio is defined as in Kempf et al., 2009:

$$RAR_{f,t} = \frac{\sigma_{ft}^{int}}{\sigma_{ft}} \tag{2}$$

where, σ_{ft}^{int} is the expected risk in the second half of the year and σ_{ft} is the realized risk in the first half of the year. We assume that the fund managers change their holdings only once between the report dates. For the remaining period, we assume that the number of shares held by the fund managers remain the same. We first calculate the realized risk σ_{ft} of the fund manager's portfolio for the first half of the year, based on the 26-week (first half) portfolio return. To calculate the expected risk σ_{ft}^{int} of the fund manager's portfolio in the second half of the year, we compute 26 hypothetical (second half) portfolio returns based on the holding information from the second half of the year and the stock returns from the first half of the year. This gives us a time series of weekly portfolio returns σ_{ft}^{int}, defined as the volatility of that portfolio return time series.

Second, we use two measures of tracking error (TE) to quantify the deviation of fund returns[4] from benchmark returns (Elton et al., 2003; Chen and Pennacchi, 2009; Shu et al., 2012; Bae and Kim, 2020). The *Fund TE1*$_t$ is the standard deviation of the difference between realized fund returns and returns of a hypothetical buy-and-hold portfolio maintaining historically disclosed positions (Bae and Kim, 2020). *TE1*$_t$ captures the extent to which a fund's returns differ from what would have been achieved if the fund simply held its historical portfolio positions without making

[4] The fund return includes the reinvestment of cash dividends. Fund returns are relevant for understanding what an investor actually earned from the fund, including any income distributed by the fund.

any changes. It essentially reflects the fund manager's active decisions to change the portfolio over time. $TE2_t$ is the standard deviation of the difference between fund returns and the CSI 300 index returns. $TE2_t$ specifically captures how closely the fund's performance tracks its benchmark index, in this case, the CSI 300 index, which is a common benchmark for Chinese equity funds.[5] It is useful for understanding the extent of deviation from a standard market index.

Our final measure, *Fund STD*$_t$, represents the average standard deviation of monthly fund returns during the year. This metric provides a straightforward measure of overall fund return variability, reflecting the total risk borne by the fund.

We control for a set of fund characteristics that may influence fund managers' risk-taking decisions, including fund assets under management (*Fund AUM*), fund flow (*Fund Flow*) [6], fund age (*Fund Age*), sales fee rate (*Sales Fee*), management fee rate (*Management Fee*), transaction fee rate (*Transaction Fee*), and fund turnover ratio (*Turnover*) (Chen, 2011; Brown et al., 2018; Ma and Tang, 2019; Cici et al., 2021; Rau and Wang, 2022). In all regressions, we include year, fund manager, and fund fixed effects to control for the influence of changing macro factors, unobservable fund manager characteristics, and unobservable fund characteristics, respectively. We winsorize all continuous variables at the 1st and 99th percentiles. Detailed variable definitions are provided in the Appendix.

3.2. Summary Statistics

Table 1 presents summary statistics for the primary variables in our study. Our sample includes 676 unique fund managers. Approximately 8.98% of fund managers experienced a zodiac year during our sample period, consistent with the literature (e.g., Fisman et al., 2023).[7] The average

[5] Since the CSI 300 was established in April 2005, a growing number of funds have benchmarked to it for portfolio allocation (Deng et al., 2018).

[6] Following prior literature on fund flows (Agarwal et al., 2019; Irvine et al., 2024), we calculate flows for fund f in year t as: $Fund\ Flow_{i,f,t}=\left(AUM_{i,f,t}-AUM_{i,f,t-1}\left(1+R_{i,f,t}\right)\right)/AUM_{i,f,t-1}$ where $AUM_{if,,t}$ represents the assets managed by fund f managed by fund manager i during year t, and $R_{i,f,t}$ is the original return of fund f managed by fund manager i during year t. This definition of $Fund\ Flow_{i,f,t}$ compared to the amount of fund inflows or outflows, helps to negate the impact of fund size on fund flows.

[7] Our sample requires matching fund age (zodiac year) data with the fund manager's shareholding data. However, not every fund manager discloses investment data annually. Therefore, if the shareholding data is missing for a fund manager's zodiac year, that particular zodiac year is not included in our sample.

age of fund managers is around 40 years, with a range from 19 to 61 years, reflecting the general working age range in the Chinese fund industry (Fang and Wang, 2015). Zodiac year managers also charge significantly lower management fees than non-Zodiac year managers. Beyond this, few other significant differences exist in other characteristics between Zodiac and non-Zodiac year fund managers, indicating a well-balanced sample.

However, our risk level proxies, *Fund RAR*, *TE1*, *TE2* and *STD*, provide univariate evidence supporting our initial hypotheses.[8] All four variables are significantly lower for Zodiac year managers than for non-Zodiac year managers. Similarly, the systematic risk is higher (though not significantly so), and the idiosyncratic risk is significantly lower for fund managers in their zodiac years, suggesting that Zodiac year managers do not take idiosyncratic risks in their zodiac years. Figure 1 illustrates risk-taking levels within a [-2, +2] year window around the fund manager's zodiac year, showing a striking drop in risk-taking during the zodiac year, suggesting that the zodiac year effect is not due to other time trends in the data. Interestingly, our ex ante risk measure, *Fund RAR* shows a different pattern from the other three measures, with relatively little difference in RAR between the year immediately prior to the zodiac year and the zodiac year itself, suggesting that zodiac year managers start taking less ex ante risk in the period leading up to their zodiac years.

Panel B of Table 1 offers a univariate comparison of the fund trading strategies and asset allocations for Zodiac and non-Zodiac year fund managers. First, we compare the trading characteristics of funds managed by Zodiac and non-Zodiac year fund managers. The return gap is a well-known indicator of fund trading aggressiveness (Shu et al., 2012) while the industry concentration ratio and Herfindahl index measure the degree of diversification in their investment strategies (Shu et al., 2012). Consistent with our hypotheses, Zodiac year fund managers are less aggressive in their trading behavior and their portfolios are more diversified. Next, we compare the different types of assets held by fund managers in their zodiac year versus those not in their zodiac year. Zodiac year managers have lower median levels of holdings in equity and higher

[8] To increase the readability of the results, we multiply the dependent variable by 100, which does not change the regression model's goodness of fit (Wooldridge, 2014).

levels of fixed income assets, though the difference is not statistically significant.[9] Finally, we compare the equity asset allocation of Zodiac and non-Zodiac year fund managers. Changes in portfolio weights reflect active rebalancing decisions rather than just changes in stock prices (Pan et al., 2022). Consistent with our hypotheses, Zodiac year fund managers appear to reduce their equity holdings likely due to the higher risk associated with equity assets.

4. Empirical Analysis

4.1. Do Zodiac year Fund Managers Reduce their Risk-taking levels? Baseline Results

In this subsection, we begin our formal regression analysis to study the impact of the fund manager's zodiac year on their risk-taking behavior. The analysis is conducted at the fund manager-fund-year level. Following Brown et al. (2018), and Bae and Kim (2020), the specific regression model is as follows:

$$\begin{aligned} Y_{i,f,t} = {} & \beta_0 + \beta_1 Zodiac_{i,t} + \beta_2 AUM_{i,f,t} + \beta_3 Flow_{i,f,t} + \beta_4 Fund\ Age_{i,f,t} + \beta_5 Sales\ Fee_{i,f,t} \\ & + \beta_6 Management\ Fee_{i,f,t} + \beta_7 Transaction\ Fee_{i,f,t} + \beta_8 Turnover_{i,f,t} \\ & + Year\ fixed\ effect + Fund\ Manager\ fixed\ effect + Fund\ fixed\ effect + \varepsilon_{i,f,t} \end{aligned} \quad (1)$$

The dependent variable, $Y_{i,f,t}$, measures the risk-taking level of fund *f* managed by fund manager *i* during year *t*. *Y* is one of *Fund RAR*, *TE1*, *TE2*, or *STD* as defined in Subsection 3.1. Our variable of interest, $Zodiac_{i,t}$ is an indicator variable that is one if fund manager *i* is in his zodiac year during year *t* (e.g., 24, 36, or 48 years old) and zero otherwise. If fund managers reduce their risk-taking during their zodiac year, we expect the estimate of β_1 to be negative and statistically significant. T-statistics in all regressions are computed based on robust standard errors clustered at the fund manager level (Petersen, 2009).

Table 2 presents the baseline results. The dependent variables are *Fund RAR, TE1*, *TE2*, and *STD* in Columns 1 through 4, respectively. In all regressions, we control for year, fund manager,

[9] Here, we employ the semi-annual statistical fund manager asset allocation data. After data matching and excluding extreme values, we have only 46 observations of zodiac year fund-manager years where we have data on their stock allocations, which is small as opposed to 2,217 non-Zodiac year fund manager-year observations, and hence this result is likely biased by outliers. Our inferences rely more on the multiple regressions later. Table 1 Panel B uses asset allocation data of fund managers from the annual statistics, which increases the number of fund managers in the zodiac year increases to 84. However, the value of alternative assets is typically either zero or missing, leaving us unable to calculate the allocation to alternative assets for a significant proportion of the funds.

and fund fixed effects to account for any unobserved macro factors, time-invariant fund manager-level, and time-invariant fund-level factors that might influence the fund manager's risk-taking behavior. In Column 1, the Zodiac coefficient is negative and significant at the 5% level, indicating that the zodiac year reduces fund managers' ex ante risk-taking behavior by 0.03. This translates to a 6.82% (-0.03/0.44) decrease in the standard deviation of *Fund RAR* compared to non-zodiac years. In Column 2, the *Zodiac* coefficient is negative and significant at the 1% level, which translates to a 6.11% (-0.36/5.89) decrease in the standard deviation of *TE1* compared to non-zodiac years.[10] The results in Columns 3 and 4 are similar. With *TE2* as the dependent variable, the *Zodiac* coefficient is -0.07, significant at the 1% level. This suggests a 3.72% (-0.07/1.88) decrease in the standard deviation of *Fund TE2* during the zodiac year. With *Fund STD* as the dependent variable, the *Zodiac* coefficient is -0.07, again significant at the 1% level, indicating a 3.68% (-0.07/1.90) decrease in *Fund STD*'s standard deviation during the zodiac year. On average, fund managers significantly reduce their risk-taking levels during their zodiac years.

Next, we check the robustness of our results by controlling for fund, fund company, and fund manager characteristics that might affect risk-taking (Shu et al., 2012; Fisman et al., 2023; Rau and Wang, 2022). These controls include fund manager gender, degree, tenure duration, age, and age squared. We include year and fund fixed effects in this part of the analysis. The results, reported in Panel A of Table 3, remain largely unchanged. Again, across all four risk-taking proxies, the zodiac variable is significantly negatively related to the level of manager risk-taking. We re-estimate our tests using fund manager-year level samples (instead of fund manager-fund-year level samples), reporting results in columns (1), (3), and (5) of Panel B in Table 3. In addition, we examine whether the results are robust to explicitly controlling for fund, and fund company characteristics that might affect risk-taking: fund investment style (*Investment Style*) (Shu et al., 2012; Brown et al., 2018). Because managers could have greater incentives to take risks when the fund family is larger and hence there is greater competition within the same fund company (Kempf and Ruenzi, 2008; Shu et al., 2012), we also control for the number of funds in the company which

[10] The level of economic significance is similar to that in prior literature (e.g., Pool et al., 2019).

the fund manager belongs (*Fund Company Num*). The results are reported in columns (2), (4), and (6) of Panel B in Table 3 and the results are again qualitatively similar.

Third, we examine if our results are robust to alternative measures of fund manager risk taking. Following Huang et al. (2011), we calculate *Fund NAV TE*, defined as the standard deviation of the return difference between the fund NAV returns and index returns in year *t* where the index is the CSI 300. *Fund NAV TE* quantifies the degree to which fund managers deviate from their benchmarks. A higher tracking error suggests that the fund's performance diverges more from the benchmark, indicating more active management. Using benchmarks such as the market return allows for an evaluation of a fund's performance relative to the broader market. In this measure, we use NAV returns to assess the performance of the fund's underlying investments, as opposed to total fund returns which reflect the investor's actual earnings including distributions. The results are shown in column (1) of Table 4. The coefficient on *Zodiac* is still significantly negatively related to the level of risk-taking when measured by *Fund NAV TE*.

We also examine whether the reduction in fund managers' risk-taking levels is driven by changes in systemic risk or idiosyncratic risk. Systematic risk affects all market participants and cannot be diversified away because it stems from global factors. We expect fund managers in their zodiac year to reduce their idiosyncratic risk, which is specific to individual investments, but not their systematic risk, which is common to the entire market. Hence, we decompose fund risk into systematic and idiosyncratic components each month by estimating a market model using the fund's monthly returns and the fund-specific benchmark index. We use the β estimate from the Capital Asset Pricing Model (CAPM) to measure the fund's systematic risk for that year and refer to it as "market risk". Specifically, the model is as follows:

$$r_{j,t} = r_{f,t} + \beta_j (r_{m,t} - r_{f,t}) + \varepsilon_{j,t} \tag{3}$$

when calculating systematic risk, we use the monthly stock investment data of fund managers. For each fund, the regression is conducted annually and monthly respectively, where $r_{j,t}$ is the return rate of stock *j* (stocks held by the fund) in month *t*; $r_{m,t}$ is the return rate of market *m* corresponding to stock *j* in month *t*; r_f is the risk-free interest rate in month *t*.

Following Gerritzen et al. (2023), we then use the standard deviation of the estimated residuals of Fung and Hsieh (2004) seven-factor model to capture idiosyncratic risk. Specifically, the model is as follows:

$$r_{j,t} = \alpha_j + \beta_{1,j}(r_{m,t} - r_{f,t}) + \beta_{2,j}SMB_t + \beta_{3,j}HML_t + \beta_{4,j}MOM_t + \beta_{5,j}BOND_t + \beta_{6,j}CBMB_t + \beta_{7,j}BOND\_RET_t + \beta_{8,j}FUTURES_t + \varepsilon_{j,t} \quad (4)$$

When calculating idiosyncratic risk, we also use the monthly stock investment data of fund managers. For each fund, the regression is conducted annually and monthly respectively, where $r_{j,t}$ is the return rate of stock j (stocks held by the fund) in month t; $r_{m,t}$ is the return rate of market m corresponding to stock j in month t; r_f is the risk-free interest rate in month t. SMB_t, HML_t, MOM_t, $BOND_t$, $CBMB_t$, $BOND\_RET_t$ and $FUTURES_t$ are the size factor, value factor, momentum factor, bond factor, credit risk factor, bond composite factor and commodity market factor in month t, respectively.

The results are shown in columns (2) and (3) of Table 4. Relative to fund managers who are not in their zodiac year, the systemic risk of fund managers in their zodiac year does not change significantly. However, the fund manager's idiosyncratic risk decreases significantly, indicating that the fund manager actively adjusts her risk-taking levels by reducing the idiosyncratic risk of the investment portfolio in the zodiac year.

Overall, the results in Tables 3 and 4 confirm the robustness of our findings, even after controlling for fund manager personal characteristics, fund characteristics, using fund manager-year level samples, and using alternative measures of fund manager's risk-taking behavior.

4.2. How Do Zodiac Year Fund Managers Reduce Risk?

In this subsection, we examine *how* fund managers alter their risk-taking levels by explicitly adjusting their portfolios, focusing on three key aspects. First, from the perspective of funds, we analyze the trading behavior of fund managers in their zodiac year. Second, from the perspective of the fund manager, we analyze the shifts in the allocation of different asset types within a fund manager's portfolio during their zodiac year. Finally, from the perspective of equity investment, we examine the alterations to the fund managers' equity holdings during this same period.

4.2.1. Trading Behavior

In this subsection, we complement our main risk-taking results by examining the effects of zodiac superstitious beliefs on specific risk-taking behaviors that contribute to the variation in fund risk-taking. In particular, we examine both trading- and holding-based risk-taking behaviors.

4.2.1.1. Fund Trading Activities

In this subsection, we analyze the aggressiveness of trading activities by funds as a function of the manager's zodiac year. Following Kacperczyk et al. (2008), Huang et al. (2011), and Li and Rao (2023)[11], we define the absolute return gap as the absolute value of the difference between net fund return and the net stock holding return:

$$\left|Return\ Gap_{f,t}\right| = \left|Fund\ Return_{f,t} - (Return\ from\ Stock\ Holding_{f,t} - Fund\ Expense_{f,t})\right| \quad (5)$$

where $Fund\ Return_{i,t}$ is the relative change in the NAV (i.e., NAV at the end of period t – NAV at the beginning of period t) of the fund f divided by the NAV at the beginning of period t. $Return\ from\ Stock\ Holding_{f,t}$ is calculated as the holding-based portfolio returns of stocks (held by the fund based on the most recent year-end disclosure date) [12] weighted by number of shares held by the fund f. $Fund\ Expense_{f,t}$ is the sales expense ratio of the fund f during period t. The larger the absolute return gap of the fund, the more aggressive its trading becomes, indicating a higher preference for risk and a greater willingness to take on risk.

We next use the following regression model:

$$\begin{aligned}\left|Return\ Gap_{i,f,t}\right| = {} & \beta_0 + \beta_1 Zodiac_{i,t} + \beta_2 AUM_{i,f,t} + \beta_3 Flow_{i,f,t} + \beta_4 Fund\ Age_{i,f,t} + \beta_5 Sales\ Fee_{i,f,t} \\ & + \beta_6 Management\ Fee_{i,f,t} + \beta_7 Transaction\ Fee_{i,f,t} + \beta_8 Turnover_{i,f,t} \\ & + Year\ fixed\ effect + Fund\ Manager\ fixed\ effect + Fund\ fixed\ effect + \varepsilon_{i,f,t}\end{aligned} \quad (6)$$

The estimation results are reported in column (1) of Table 5. The column shows a negative and statistically significant coefficient for *Zodiac*, indicating that fund managers significantly reduce their absolute return gap during their zodiac years. Specifically, with *Return Gap* as the dependent variable, the coefficient of *Zodiac* is -0.03, significant at the 1% level. This suggests a decrease of

[11] Li and Rao (2023) adapt the construction of the return gap variable to the Chinese context.
[12] Chinese funds typically disclose their financial information on a quarterly, semi-annual and annual basis, according to the regulatory requirements set by the China Securities Regulatory Commission (CSRC).

about 6.67% (-0.03/0.45) in the standard deviation of *Return Gap* during the zodiac year compared to non-zodiac years, indicating that fund managers reduce the level of risk taking by reducing the aggressive level of their trading activities during the zodiac year.

4.2.1.2. Fund Diversification Strategies

Next, we examine whether the differences in fund risk taking across fund managers' zodiac year are due to their differences in the degree of diversification in their investment strategies (Shu et al., 2012). Following Kacperczyk et al. (2005), we therefore use two measures to directly investigate industry concentration of fund portfolios:

(i) The industry concentration ratio, defined as the sum of squared differences between a fund's industry weights and the corresponding market's industry weights:

$$Industry\ Concentration\ Index_{f,t} = \sum_{j=1}^{N}(w_{f,j,t} - \overline{w_{j,t}})^2 \quad (7)$$

where $w_{f,j,t}$ is the weight of the fund *f*'s holdings in industry *j* during year *t* and $\overline{w}_{i,t}$ is the weight of the industry *j* in the market during year *t*. The *Industry Concentration Index* measures how much a fund manager's portfolio deviates from the market portfolio. If a fund manager uses exactly the same industry composition as the market portfolio, the index equals zero and increases as funds become more concentrated in a few industries.

(ii) The industry Herfindahl index, defined as the sum of squared industry weights of fund portfolio:

$$\text{Herfindahl Index}_{f,t} = \sum_{j=1}^{N}(w_{f,j,t})^2 \quad (8)$$

where $w_{f,j,t}$ is the weight of the fund *f*'s holdings in industry *j* during year *t*. Like the industry concentration index, the larger the *Herfindahl Index*, the more concentrated the fund manager's investments are in a single industry, and hence the higher risk-taking.

We next use the following regression model:

$$\begin{aligned} Industry\ Concentration_{i,f,t} = {} & \beta_0 + \beta_1 Zodiac_{i,t} + \beta_2 AUM_{i,f,t} + \beta_3 Flow_{i,f,t} + \beta_4 Fund\ Age_{i,f,t} \\ & + \beta_5 Sales\ Fee_{i,f,t} + \beta_6 Management\ Fee_{i,f,t} + \beta_7 Transaction\ Fee_{i,f,t} \\ & + \beta_8 Turnover_{i,f,t} + Year\ fixed\ effect + Fund\ Manager\ fixed\ effect \\ & + Fund\ fixed\ effect + \varepsilon_{i,f,t} \end{aligned} \quad (9)$$

The dependent variable, *Industry Concentration*$_{i,f,t}$, is defined as the *Industry Concentration Index* (or *Herfindahl Index*) of fund *f* managed by fund manager *i* during year *t*. The estimation results are reported in column (2) and column (3) of Table 5. Column 2 shows a negative and statistically significant coefficient for *Zodiac*, indicating that fund managers significantly reduce the industry concentration of the portfolio during their zodiac years, that is, the categories of industries in which the fund manager invests are more diversified. Specifically, with *Industry Concentration Index* as the dependent variable, the coefficient on *Zodiac* is -0.12, significant at the 1% level. This suggests a decrease of about 7.41% (-0.12/1.62) in the standard deviation of *Industry Concentration Index* during the zodiac year compared to non-zodiac years. Similarly, with *Herfindahl Index* as the dependent variable in Column 3, the coefficient of Zodiac is -0.44, significant at the 1% level. This suggests an increase of about 10.53% (-0.44/4.18) in the standard deviation *Herfindahl Index* during the zodiac year compared to non-zodiac years. This indicates that fund managers reduce the level of risk taking by increasing portfolio diversification during the zodiac year.

4.2.2 Asset Allocation

In this subsection, we explore how fund managers adjust their asset allocations during their zodiac years, specifically analyzing rebalancing activities across different asset types at the fund manager-year level. Based on Huang et al. (2011) and the definitions of fund types for our sample, equity funds are those in which more than 80% of fund assets are invested in stocks. Bond funds invest more than 80% of fund assets in bonds. Mixed funds invest in stocks, bonds, money market instruments, or other fund shares. As documented by Huang et al. (2011), fund managers adjust the proportion of investments in different types of assets to adjust risk-taking levels. For example, stock funds adjust the investment levels in other types of assets to adjust the level of risk taking. To examine the level of this shift, we use the following regression model:

$$\begin{aligned} Asset_{i,t} = {} & \beta_0 + \beta_1 Zodiac_{i,t} + \beta_2 AUM_{i,t} + \beta_3 Flow_{i,t} + \beta_4 Fund\ Age_{i,t} + \beta_5 Sales\ Fee_{i,t} \\ & + \beta_6 Management\ Fee_{i,t} + \beta_7 Transaction\ Fee_{i,t} + \beta_8 Turnover_{i,t} \\ & + Year\ fixed\ effect + Fund\ Manager\ fixed\ effect + \varepsilon_{i,t} \end{aligned} \quad (10)$$

where $Asset_{i,t}$ represents either risky or low-risk assets (Andonov et al., 2017) held by fund manager *i* during year *t*. Risky investments include stock investments, and low-risk assets include fixed income investments, like bonds and asset-backed securities. Each investment category is measured by the proportion of the investment category in the total assets (*Stock Proportion*$_{Assets}$, *Fixed Income Proportion*$_{Assets}$), and the proportion of the investment category in the net asset value (*Stock Proportion*$_{NAV}$, *Fixed Income Proportion*$_{NAV}$). [13] The estimation results are reported in Table 6. In Column 1, the coefficient for *Zodiac* is negative and statistically significant, implying that fund managers noticeably reduce their stock investments during their zodiac years. Specifically, when using *Stock Proportion*$_{Assets}$ as the dependent variable, the coefficient of Zodiac is -4.90, significant at the 1% level. This implies a decrease of approximately 14.85% (-4.90/32.99) in the standard deviation of *Stock Proportion*$_{Assets}$ during the zodiac year compared to non-zodiac years. In Column 2, the coefficient for Zodiac is positive and statistically significant, showing that fund managers significantly increase their investments in fixed income during their zodiac years. Specifically, when using *Fixed Income Proportion*$_{Assets}$ as the dependent variable, the coefficient of Zodiac is 5.37, significant at the 1% level. This suggests an increase of approximately 18.49% (5.37/29.04) in the standard deviation of *Fixed Income Proportion*$_{Assets}$ during the zodiac year compared to non-zodiac years.

To sum up, during their zodiac years, fund managers tend to invest in more low-risk assets, such as fixed income investments, and less in high-risk assets, such as stocks. This implies that riskier assets are less favored during the fund managers' zodiac years, aligning with our previous results.

4.2.3. Rebalancing Shareholdings

Next, we explore how fund managers adjust their stock holdings during their zodiac years. Stock

[13] Total Assets refers to the total value of all assets held by the fund, including stocks, bonds, cash, and other investments. It represents the gross value of the fund's portfolio before considering any liabilities or expenses. Total NAV (Net Asset Value) is calculated by subtracting the fund's liabilities and expenses from its total assets. It represents the per-share value of the fund and is calculated by dividing the total net assets by the number of shares outstanding. In China, NAV is often used to determine the value of a single share of the fund and is typically reported on a per-share basis. In summary, while both total assets and total NAV represent the value of a fund's holdings, total assets reflect the gross value of the portfolio, whereas total NAV accounts for liabilities and expenses to provide a more accurate representation of the fund's net value per share.

selection behavior is an important way for fund managers to actively adjust the risk level of their asset allocation (Bollen and Busse, 2001; Chen et al., 2018; Busse et al., 2023).[14] We analyze rebalancing activities at the fund manager-stock-year level. Specifically, we compute the change in the portfolio price weight for each stock in each fund manager's portfolio between 2005 and 2023 as follows:

$$\triangle \text{ Stock Weight}_{ij}^{t}=\text{Stock Weight}_{ij}^{t}-\text{Stock Weight}_{ij}^{t-1}=\frac{n_{ij}^{t}p_{j}^{t-1}}{\sum n_{ij}^{t}p_{j}^{t-1}}-\frac{n_{ij}^{t-1}p_{j}^{t-1}}{\sum n_{ij}^{t-1}p_{j}^{t-1}} \quad (11)$$

where n^{t}_{ij} (n^{t-1}_{ij}) is the number of stock j shares in the portfolio of fund manager i in year t (t-1). Changes in portfolio weights reflect active rebalancing decisions rather than just changes in stock prices (Pan et al., 2022). We use end-of-t-1 stock prices, p^{t-1}_{j}, to compute the dollar value of portfolio holdings in both year t-1 and t. The sample average for *⊿Stock Weight* is 0.07% with a standard deviation of 1.52.

We use the following regression model:

$$\Delta Stock\ Weights_{i,j,t}=\beta_0+\beta_0 Zodiac_{i,t}+Year\ fixed\ effects+$$
$$Fund\ manager\ fixed\ effects+Stock\ fixed\ effects+\varepsilon_{i,t} \quad (12)$$

where, for ease of interpretation, we scale *⊿Stock Weight* by the absolute value of the sample mean (0.07%), so the coefficient estimate represents the effect as a percentage change relative to the sample mean. We double-cluster standard errors by fund manager and stock. The estimation results are reported in Table 7.

Table 7 examines how fund managers' zodiac years affect their risky investments, specifically in terms of their stock holdings. The results in Column 1 are consistent with those in Column 1 in Table 6. The *Zodiac* coefficient is negative and statistically significant, indicating that during their zodiac year, fund managers tend to rebalance their portfolios away from stocks more compared to when they are not in their zodiac year. For a firm with the average *△Stock Weight* value (0.07%), the estimated -0.04 coefficient on Zodiac implies that fund managers in their zodiac year reduce *Stock Weight* by approximately 57.14% compared to when they are not in their zodiac year. In

[14] For example, Huang et al. (2011) decompose the fund risk into the riskiness of the disclosed equity positions and the non-equity positions when measuring the risk-taking level of the fund and argue that changing the equity portfolio is the most important way to adjust the risk.

Column 2, we analyze which types of stocks the fund managers underweight during their zodiac year. The variable *Not Indexed* is a dummy variable that equals 1 if the stock is not indexed and 0 otherwise. Here, the coefficient on the interaction term *Zodiac* × *Not Indexed* is also negative and statistically significant, suggesting that fund managers in their zodiac year tend to rebalance away from non-indexed stocks more than managers not in their zodiac year.

Overall, we find that fund managers tend to shift their investments away from risky stocks during their zodiac years, especially when it comes to non-indexed stocks.

5. What Types of Managers Are Prone to Superstition Biases?

In this subsection, we explore how a fund manager's progression from superstitious to rational decision-making affects their risk-taking behavior during their zodiac year. We hypothesize that this progression is influenced by various factors including experience, education, and market conditions. Psychological research suggests that belief in luck often relies on irrational notions about chance events (Darke and Freedman, 1997; Day and Maltby, 2003; Thompson and Prendergast, 2013). We expect that fund managers who have progressed further in their transition to rational decision-making are less likely to be influenced by superstitious beliefs, even during their zodiac year. Conversely, fund managers who are earlier in this transition are more likely to exhibit superstition-influenced behavior, potentially reducing their risk tolerance during their zodiac year.

To study this progression, we examine differences in risk-taking behavior during a fund manager's zodiac year from three perspectives: the manager's personal attributes (such as experience and education), the specific characteristics of the fund (which may constrain or enable superstitious behavior), and the prevailing economic conditions (which may accelerate or hinder the transition to rational decision-making). These factors allow us to trace the evolution of fund managers from exhibiting behavior similar to retail investors to becoming the rational actors often assumed in financial theory. The variables used in this cross-sectional examination are described in the Appendix.

5.1. Fund Manager Attributes

We first examine how educational background affects a fund manager's progression from superstitious to rational decision-making. We hypothesize that formal finance education accelerates this transition. Bhattacharya et al. (2018) suggest that professional investors with relevant expertise are less prone to superstitious influences than non-professional investors. To test this, we divide our sample based on whether the fund manager's highest degree is in finance. The results, shown in Panel A of Table 8, support our hypothesis. Fund managers without a finance degree exhibit behavior more similar to retail investors, being more inclined to reduce their risk-taking during their zodiac year. The coefficient on the interaction term *Zodiac* × *Not Finance Major* is significant and negative at the 5% level. This suggests that formal finance education plays a crucial role in the transition from superstition-influenced to rational decision-making, with finance-educated managers progressing faster along this continuum.

Second, we examine how a fund manager's experience contributes to their transition from superstition-influenced to rational decision-making. We hypothesize that as investors gain more experience, they progress further along this continuum, becoming less influenced by superstitious beliefs (Seru et al., 2010; Bhattacharya et al., 2018; Titman et al., 2022). To test this, we split our sample into two groups based on the median job tenure of the fund manager and the median number of funds they manage in the year prior to their zodiac year. The results, shown in Panels B and C of Table 8, support our hypothesis. Less experienced fund managers and those handling fewer funds exhibit behavior more akin to retail investors, being more likely to reduce their risk-taking during their zodiac year. Specifically, the coefficient for the interaction term *Zodiac* × *Short Tenure* is significant and negative at the 5% level, indicating that less experienced managers are at an earlier stage in their transition to rational decision-making. Similarly, when we split the sample based on the median number of funds managed, the coefficient for the interaction term *Zodiac* × *Low Number of Funds* is significantly negative at the 1% level. These findings suggest that both the length of experience and the breadth of responsibility play crucial roles in a fund manager's progression towards fully rational decision-making.

Third, we examine how a fund manager's abilities influence their progression to rational decision-making. We hypothesize that managers with stronger investment abilities will be further along this continuum. Those with weaker trading skills are expected to be at an earlier stage in this transition, relying more on social norms, religious beliefs, and superstitions when making investment choices (Li and Yu, 2012; Bhattacharya et al., 2018). To test this, we divide our sample based on the median performance of fund managers in the year prior to their zodiac year. We expect managers with high past performance, indicating potentially strong investment abilities, to exhibit more rational decision-making, even during their zodiac year. Conversely, we expect fund managers with lower performance to behave more like retail investors, making superstition-based adjustments during their zodiac year. Our findings, presented in Panel D of Table 8, support this hypothesis. When a fund manager's performance is low, the impact of superstitious beliefs on their risk-taking behavior is significantly more pronounced. This holds true for both the China-based four-factor model (Liu et al., 2019) (Columns 1-4) and the fund's net asset value return (Columns 5-8). These results suggest that investment ability is a key factor in a fund manager's transition from superstition-influenced to fully rational decision-making.

Additionally, we also segment our sample based on the median managerial skill of the fund managers, following the methodology of Berk and van Binsbergen (2015). We define managerial skill in a manner similar to their concept of "value added," which measures the manager's skill as the dollar value of the fund's performance above its benchmark, adjusted for the size of the assets managed. Specifically, in our paper, the skill measure is calculated as the product $\frac{1}{T_i}\sum_{t=1}^{T_i} q_{it-1} r_{it}$ of the assets of fund i in month $t-1$ (q_{it-1}) and the benchmark-adjusted gross return of fund i in month t (r_{it}). This measure reflects the manager's ability to generate returns above a benchmark on a given scale of assets, consistent with Berk and van Binsbergen's focus on value creation through effective management. Our findings, shown in Panel E of Table 8, support our hypothesis that managers at different stages of this progression exhibit different behaviors. Fund managers with lower managerial skills behave more like retail investors during their zodiac year, showing a significant

reduction in their risk-taking behavior for two out of four proxies. These results underscore the importance of skill development in a fund manager's journey towards becoming a fully rational financial professional.

5.2. Fund Attributes

Turning to fund characteristics, we examine how the structure of fund management affects the manager's use of superstition-influenced decision-making. We hypothesize that team management may accelerate this transition to rational decision making by constraining individual managers' ability to act on superstitious beliefs. We split our sample based on the median percentage of team-managed funds in a fund manager's portfolio. When the proportion of team-managed funds is high, we expect managers to exhibit more rational behavior, even during their zodiac year, as they cannot easily change the portfolio based on personal beliefs. Conversely, managers with a lower proportion of team-managed funds have more freedom to adjust their portfolios, potentially allowing superstitious beliefs to influence their decisions. This setup allows us to observe whether institutional constraints can accelerate the transition to rational decision-making, even for managers who might otherwise be at an earlier stage in this progression.

To measure the impact of team management on the fund manager's progression towards rational decision-making, we use *Team Management*, which indicates the percentage of funds managed by a team. We calculate this by dividing the number of team-managed funds by the total number of funds managed by the fund manager. *Low Team-Managed* indicates that the proportion of team-managed funds is below the median in the year prior to the zodiac year. Our findings, shown in Panel A of Table 9, support our hypothesis that institutional constraints can accelerate the transition from superstition-influenced to rational decision-making. For example, the coefficient for the interaction term *Zodiac* × *Low Team-Managed* is significantly negative at the 5% level (Column 2, estimated coefficient = -1.35; t-statistic = -2.09). This indicates that fund managers with a lower proportion of team management exhibit behavior more similar to retail investors, being more likely to reduce their risk-taking during their zodiac year. Conversely, managers with higher team management show more rational behavior, suggesting that team structures may help accelerate the

progression towards fully rational decision-making, even for managers who might otherwise be at an earlier stage in this transition.

Next, we explore how the investment style of fund managers influences their progression to a rational decision-making style, as reflected in their risk-taking behavior during their zodiac year. We divide our sample based on the median percentage of fund managers' investments in index stocks in the year prior to the zodiac year. We hypothesize that managers with a lower proportion of index stocks in their portfolio, who tend to have a more active and risk-oriented investment style, will be further along in their transition to rational decision-making. These managers, we expect, will be less influenced by superstitious beliefs during their zodiac year. Conversely, we expect that fund managers with a higher proportion of index stocks, who typically adopt a more passive and risk-averse approach, may be at an earlier stage in this progression and thus more likely to adjust their portfolios based on superstitions during their zodiac year.

Our findings, presented in Panel B of Table 9, support this hypothesis. The impact of superstitious beliefs on risk-taking is significantly stronger when the proportion of index stocks in a fund manager's portfolio is higher. The coefficient for the interaction term *Zodiac* × *Index Stock Proportion* is significantly negative at the 1% level for three of the four risk proxies (for example, in Column 2, the estimated coefficient is -1.62; t-statistic = -3.08). This indicates that fund managers with a higher proportion of investments in index stocks are more inclined to reduce their risk-taking during their zodiac years, suggesting they are at an earlier stage in their transition from superstition-influenced to fully rational decision-making. Conversely, managers with a lower proportion of index stocks show behavior more consistent with rational decision-making, even during their zodiac years, indicating they have progressed further along this continuum.

Finally, we examine how the proportion of a fund manager's portfolio that is actively managed makes them more prone to rational decision-making. Following Cremers and Pareek (2016), we split our sample based on whether a manager has a higher or lower active share in their portfolio than the median in the year prior to the zodiac year. We hypothesize that fund managers with a higher active share are more likely to be prone to rational decision-making. These managers, who

likely possess higher investment abilities and a more active investment style, are expected to be less influenced by superstitious beliefs during their zodiac year. Conversely, we expect that fund managers with a lower active share, whose investment style tends to be more passive and whose investment abilities may be lower, are at an earlier stage in this progression. These managers may be more reliant on factors beyond their professional abilities, potentially making them more susceptible to superstition-based adjustments during their zodiac year.

We measure the active share of the fund manager following Cremers and Pareek (2016). Active share measure the proportion of the fund's portfolio in equity assets that is different from the holdings of the fund's benchmark (index stocks) [15] at a particular point in time. Specifically, it is calculated as follows:

$$Active\ Share = \frac{1}{2}\sum_{j=1}^{N}\left|w_{fund,j} - w_{benchmark,j}\right| \tag{13}$$

where $w_{fund,j}$ is the weight of stock j in the fund, and $w_{benchmark,j}$ is the weight of stock j in the benchmark. *Active Share* thus sums up the absolute difference in weights across all stocks that are in either the fund or the benchmark and divides that sum by two, treating overweights and underweight identically (Cremers and Pareek, 2016). Therefore, if the fund holds equity assets that do not overlap with the stocks in the index, the fund's actively managed share is 100%. If the fund's equity holdings overlap exactly with the stocks in the index, the fund's actively managed share is 0%.

Our results, as shown in Panel C of Table 9, support our hypothesis. The impact of superstitious beliefs on risk-taking is more significant when the a fund manager's active share is below the median. The coefficient for the interaction term *Zodiac* × *Low Active Share* is significantly negative at the 5% level (Column 1, estimated coefficient = -0.24; t-statistic = -2.26). This suggests that fund managers with a lower active share are more likely to reduce their risk-taking during their zodiac year, indicating they are more prone to superstitious behavior. Conversely, managers with a higher active share show behavior more consistent with rational decision-making, even

[15] Index stocks refer to the stocks included in the construction of market indexes in China's stock market, including CSI 300 index, Shenzhen 100 Index, CSI 500 Index, SSE 50 index, etc.

during their zodiac years.

5.3. Macroeconomic Factors

In this subsection, we explore how macroeconomic factors, particularly market-level uncertainty, affect the transition of fund managers from superstitious to rational decision-making. We hypothesize that higher market uncertainty may slow this transition (Kumar, 2009; Kalcheva et al., 2021), causing even more experienced managers to rely on superstitious beliefs. We use the Economic Policy Uncertainty Index (EPU) as a measure of market uncertainty, which tracks changes in economic uncertainty related to policy decisions (Baker et al., 2016; Kalcheva et al., 2021). We divide our sample based on the median value of the EPU index. When the EPU index is low, indicating a stable macroeconomic environment, we expect fund managers to exhibit more rational behavior, regardless of their zodiac year. Conversely, when the EPU index is high, suggesting a volatile investment environment, we expect fund managers to be more susceptible to superstitious beliefs, potentially reverting to behavior typical of less experienced investors. We use *China EPU* to indicate whether the China EPU index each year is higher than the average EPU index value from the first year of the sample to that year.

Our results, presented in Table 10, support this hypothesis. The interaction term *Zodiac* × *China EPU* is significantly negative at the 5% level (Column 3, estimated coefficient = -0.01; t-statistic = -2.53). This suggests that during periods of high economic uncertainty, fund managers are more likely to reduce their risk-taking in their zodiac years, regardless of their experience level. These findings indicate that the process of transitioning from superstitious to rational decision-making is not linear and can be influenced by external factors such as market uncertainty.

6. Other Robustness Tests

6.1. Placebo Tests

In this section, we conduct two placebo tests to falsify our results. The first test, following the methodology of Gilje (2016) and Fauver et al. (2017), creates a "pseudo zodiac year" for fund managers. If fund managers' risk-taking behavior is indeed influenced by superstition during their

zodiac year, we would not expect to see similar results in these "pseudo zodiac years". We shift the fund manager's zodiac year three years forward and backward and reassess the impact of this "pseudo zodiac year" on fund managers' risk-taking. The results, shown in Table 11, find insignificant coefficients for *Zodiac** in Columns 1 to 8. This suggests that fund managers' risk-taking levels are only affected by superstitions during their actual zodiac year.

Our second placebo test randomizes the relationship between a fund manager and their zodiac year. This helps ensure that our coefficient estimates are not capturing some other aspect of the joint distributions of these variables. We then estimate regressions analogous to those in Table 2 to obtain the coefficient estimates on *Zodiac*. Figures 2a, 2b, 2c, and 2d plot the distributions of the coefficient estimates on Zodiac from the placebo regressions, with *Fund RAR*, *Fund TE1*, *Fund TE2*, and *FundSTD* as the dependent variables, respectively. The randomization procedure maintains the original data structure but reshuffles the relationship between fund managers and their zodiac years. Each histogram plots 1,000 simulations and indicates the estimate obtained using actual data. The figures show that the coefficient estimates from Table 2 are well to the left of the entire distribution of coefficient estimates from the placebo test. Moreover, in Figures 2a, 2b, 2c, and 2d, only 3.8%, 0.1%, 0.3%, and 0.4%, respectively, of the random simulated coefficients are smaller than the estimated coefficient from the real data. This suggests that the significant and negative coefficients generated in our main tests are unlikely to be produced by a fund manager being randomly matched to their zodiac years.

6.2. Propensity Score Matching (PSM)

In this section, we employ PSM to further mitigate the potential influence of inherent differences between fund managers in their zodiac year and those who are not. Given that our sample contains fewer fund managers in their zodiac year, we use a 1:n matching method to effectively reduce the difference between the treatment group (fund managers in their zodiac year) and the control group (fund managers not in their zodiac year). This method matches one treatment group sample with the *n* control group samples that have the closest propensity score. Following Dannhauser (2017),

we use PSM based on fund manager characteristics[16] and apply 1:1, 1:5, and 1:10 matching ratios based on fund objectives, respectively. Our matching process uses reset sampling and sets the caliper to 0.01.

After obtaining the matched samples, we re-estimate model (1). Table 12 presents the regression results after redefining the samples using the PSM method. Panel A, Panel B, Panel C and Panel D display the balance test results with dependent variables *Fund RAR*, *Fund TE1*, *Fund TE2*, and *Fund STD*, respectively. These results indicate no significant difference in the characteristics of fund managers who are in their zodiac year and those who are not after matching. Panel E presents the regression results after matching. The results show that the regression coefficients of Zodiac in all columns are almost always significantly negative, suggesting that the risk-taking level of fund managers in their zodiac year is significantly lower compared to those not in their zodiac year. This is consistent with the results in Table 2, indicating that our basic findings hold even after controlling for the influence of other characteristics of the two groups of fund managers on the level of risk-taking.

6.3. Fund Manager Turnover

In this subsection, we investigate how the turnover of fund managers, especially during their zodiac year, affects the risk-taking behavior of the funds they oversee. The underlying idea is that Chinese fund managers, influenced by cultural superstitions related to their zodiac year, tend to be more cautious during that period, leading to a reduction in the funds' risk-taking. We hypothesize that when a fund manager in their zodiac year takes over from a manager who is not in their zodiac year, the fund's risk level is likely to decrease. Conversely, if a non-zodiac year manager replaces another non-zodiac year manager, the fund's risk-taking level would likely stay the same. That is precisely what we find.

Table 13 presents the risk-taking levels associated with different changes in fund managers. Generally, changing fund managers does not significantly alter a fund's risk-taking behavior.

[16] The literature (Serfling, 2016; Blanco and Wehrheim, 2017) suggests that by taking the control variable in the basic model as the proportioning variable in the PSM, a control group sample similar to the treatment group can be constructed to effectively control the selection bias of the sample.

However, when we focus on funds that experienced a managerial change and compare those with a zodiac change to those without, we observe significant differences in risk-taking levels. In Panel A of Table 13, we examine the impact of a zodiac year fund manager taking over a fund. We use $Enter_{i,j,t-1}$ as a dummy variable for fund manager entry, which is 1 if fund *j* was not managed by fund manager *i* in year *t*-2 but was managed by them in year *t*-1, and 0 otherwise. The interaction term *Zodiac* × *Enter*, which indicates a new fund manager's entry, shows a significantly negative coefficient. This suggests that when a non-zodiac year manager is replaced by a zodiac year manager, the fund's risk-taking level decreases more significantly.

In Panel B of Table 13, we explore the impact of a zodiac year fund manager leaving a fund. The interaction term *Zodiac* × *Leave*, where $Leave_{i,j,t-1}$ is a dummy variable indicating a fund manager's departure, is not significant. This indicates that when a zodiac year manager leaves a fund, the fund's risk-taking level remains unchanged, implying that a manager's departure does not significantly affect the original fund's risk-taking level. The results in Table 13 confirm that fund managers in their zodiac year actively adjust the risk-taking behavior of the funds they manage. This supports our initial premise that superstitious fund managers tend to reduce the risk-taking level of the funds they join.

7. Zodiac Year Investment Performance

In the last section, we assess how fund managers' superstitions related to their zodiac years affect their investment performance. Our previous findings are consistent with the hypothesis that fund managers tend to be more cautious during their zodiac years, leading to reduced risk-taking. Now, we explore whether this behavior, driven by superstition, has a negative impact on their investment performance.

To investigate this, we measure investment performance using both the China-based four-factor model Liu et al., 2019) and the fund's net asset value return. The results are presented in Table 14. In Column 1, we use *Four-factor alpha* as the dependent variable, representing the excess return of the fund manager adjusted based on China's four-factor model. In Column 2, the dependent variable is *NAV*, representing the value of the fund's net assets managed by the fund manager. In

both columns, the coefficients of *Zodiac* are negative and significantly significant at the 1% level (in Column 1, estimated coefficient = -0.01, t-statistic = -3.54; in Column 2, estimated coefficient = -0.02, t-statistic = 2.84).

These results suggest that fund managers, influenced by superstitions related to their zodiac year, reduce their risk-taking levels, and this, in turn, has a negative impact on their investment performance. Overall, our results are consistent with the hypothesis that decisions influenced by superstition can lead to less favorable investment outcomes.

8. Conclusion

We investigate how superstition impacts the behavior of professional investors, specifically focusing on how a fund manager's zodiac year influences their willingness to take risks. Using data from Chinese fund managers spanning 2005 to 2023, we find a significant negative correlation between a fund manager's zodiac year and their inclination for risk-taking. This relationship appears to be primarily driven by superstition. Our study challenges the common view in finance that retail investors are irrational while professional investors are rational. We find that professional investors, specifically mutual fund managers in China, can be influenced by superstitions early in their careers. This effect is stronger for less experienced managers, those without finance degrees, and those with lower skills. The impact is more pronounced during high market volatility.

However, we also find that as fund managers gain experience and expertise, the influence of superstitious beliefs decreases. This suggests a gradual transition towards more rational decision-making over time. Our findings indicate that the line between retail and professional investors is not as clear as previously thought. Professional sophistication in financial decision-making develops over time, rather than being present from the start of a career. Factors such as experience, formal financial education, and improved skills play a role in reducing irrational biases.

These results have implications for understanding financial markets and investor behavior. They suggest a need for a more nuanced approach to studying investor behavior, recognizing that even professional investors can be influenced by irrational beliefs, especially early in their careers.

Future research can explore factors that speed up or slow down the transition to rational decision-making among fund managers. It would also be valuable to investigate whether similar patterns exist in other financial professions or different cultural contexts. Overall, our study shows that professional investors may start their careers susceptible to irrational beliefs, similar to retail investors. However, they gradually become more rational through experience, education, and skill development. This highlights the importance of ongoing learning and professional development in the financial industry.

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Appendix

Panel A: Main Variables

Variables	Definitions	Source
Zodiac year variable		
Zodiac	A dummy variable that equals one if the fund manager is in the "zodiac year" in year *t*, and zero otherwise.	CSMAR Fund Manager Database, Wind, RESSET Database, Tiantian Fund Website
Fund risk variables		
Fund RAR	The intended risk in the second half of the year *t* divided by the realized risk in the first half of the year *t*. Realized portfolio risk in the first half of the year is calculated using the actual portfolio holdings in the first half of the year and the realized stock volatility in the same period. Intended portfolio risk in the second half of the year is calculated using the actual portfolio holdings in the second half of the year and realized stock volatility in the first half of the year.	CSMAR Fund Finance Database
Fund TE1	The standard deviation of the return difference between fund and NAV returns. The fund return is the annual return of the fund after reinvestment of dividends.	CSMAR Fund Finance Database
Fund TE2	The standard deviation of the return difference between fund and index returns. The fund return is the annual return of the fund after reinvestment of dividends. The index return is the return on the CSI 300 index.	CSMAR Fund Finance Database
Fund STD	The average standard deviation of monthly fund returns during year *t*. The fund return is the annual return of the fund after reinvestment of dividends.	CSMAR Fund Finance Database
Fund NAV TE	The standard deviation of the return difference between index and NAV returns. The index return is the return on the CSI 300 index.	CSMAR Fund Finance Database
Systematic Risk	The beta coefficient of the capital asset pricing model (CAPM) using monthly returns during year *t*.	CSMAR Fund Finance Database, CSMAR Stock Market Trading Database
Idiosyncratic Risk	The standard deviation of fund residuals from the Fung and Hsieh (2004) seven-factor model during year *t*.	CSMAR Fund Finance Database, CSMAR Stock Market Trading Database
Fund characteristics control variables		
Fund AUM	The natural logarithm of the assets under management.	CSMAR Fund Finance Database
Fund Flow	The net flow of funds at the annual level.	CSMAR Fund Finance Database
Fund Age	The fund age since inception.	CSMAR Fund

		Finance Database
Sales Fee (%)	Fund's annual selling service fee (standardized by dividing by the fund's annual total asset value).	CSMAR Fund Finance Database
Management Fee (%)	Fund's annual remuneration of managers (standardized by dividing by the fund's annual total asset value).	CSMAR Fund Finance Database
Transaction Fee (%)	Fund's annual transaction fee (standardized by dividing by the fund's annual total asset value).	CSMAR Fund Finance Database
Turnover	The sum of the fund's trading volume in a year divided by the fund's market share on the closing date of the year.	CSMAR Fund Finance Database
Fund manager characteristics control variables		
Manager Gender	The gender of the fund manager that equals to 1 if the fund manager is male and equals to 0 if the fund manager is female.	CSMAR Fund Manager Database
Manager Degree	The degree of fund manager, where 1 = PhD; 2 = Master's degree; 3 = Undergraduate course; 4 = MBA/EMBA; 5 = College; 6 = Technical secondary school and below; 0 = Other.	CSMAR Fund Manager Database
Manager Tenure	The number of years the manager has been managing the current fund.	CSMAR Fund Manager Database
Manager Age	The age of the fund manager.	CSMAR Fund Manager Database
Investment Style	The investment style of the fund, where 0 = Value; 1 = Capital preservation and appreciation; 2 = Value-added; 3 = Balanced; 4 = Growth; 5 = Index; 6 = Income; 7 = Active growth; 8 = Steady value-added; 9 = steady growth.	CSMAR Fund Finance Database
Fund company characteristics control variables		
Fund Company Num	The number of funds managed by the fund company.	CSMAR Fund Finance Database

Panel B: Other Variables

Variables	Definitions	Source
Fund manager turnover variables		
Enter	A dummy variable that equals to one if fund j is not managed by fund manager i in year t-2 but is managed by fund manager i in year t-1, and zero otherwise.	CSMAR Fund Manager Database
Leave	A dummy variable that equals to one if fund j is managed by fund manager i in year t-2 but is not managed by fund manager i in year t-1, and zero otherwise.	CSMAR Fund Manager Database
Trading activities variable		
Return Gap	The absolute value of the difference between net fund return and the net stock holding return.	CSMAR Fund Finance Database, CSMAR Stock Market Trading Database
Portfolio diversification variables		
Industry Concentration	The sum of squared differences between a fund's	CSMAR Fund

Index	industry weights and the corresponding market's industry weights.	Finance Database, CSMAR Stock Market Trading Database
Herfindahl Index	The sum of squared industry weights of fund portfolio	CSMAR Fund Finance Database, CSMAR Stock Market Trading Database
Asset allocation variables		
Stock Proportion$_{Assets}$	The proportion of stock investment in the total assets of the fund manager in year t.	CSMAR Fund Finance Database
Stock Proportion$_{NAV}$	The proportion of stock investment in the NAV of the fund manager in year t.	CSMAR Fund Finance Database
Alternative Assets Proportion$_{Assets}$	The proportion of alternative assets in the total assets of the fund manager in year t.	CSMAR Fund Finance Database
Alternative Assets Proportion$_{NAV}$	The proportion of alternative assets in the NAV of the fund manager in year t.	CSMAR Fund Finance Database
Fixed Income Proportion$_{Assets}$	The proportion of fixed income investment in the total assets of the fund manager in year t.	CSMAR Fund Finance Database
Fixed Income Proportion$_{NAV}$	The proportion of fixed income investment in the NAV of the fund manager in year t.	CSMAR Fund Finance Database
△Stock Weight (%)	The difference between a stock's weight in a fund manager's portfolio in year t and its weight in year t-1, where both weights are calculated using constant stock prices as of the end of year t-1.	CSMAR Fund Finance Database
Fund manager characteristic variables		
Not Finance Major	A dummy variable that equals to one if the fund manager's major is not finance, and zero otherwise.	CSMAR Fund Manager Database
Tenure	The tenure of the fund manager in year t-1.	CSMAR Fund Manager Database
Number of Funds	The number of funds managed by the fund manager in year t-1.	CSMAR Fund Manager Database
Performance	The average four-factor model-adjusted excess return for the funds managed by the fund manager at year t-1.	CSMAR Fund Finance Database
NAV	The mean value of the fund's net asset value managed by the fund manager in year t-1.	CSMAR Fund Finance Database
Skill	The value-added measure from Berk and van Binsbergen (2015) computed as the product of fund AUM from last month and the gross alpha of the fund this month, to measure fund performance. We first calculate skill using the monthly measure later annualized by taking the sum of the value-added measure over 12 months in the year and divide by 12.	CSMAR Fund Finance Database
Fund characteristic variables		
Team Proportion	The proportion of funds managed by the fund manager through the team in year t-1. The number	CSMAR Fund Finance Database

	of funds managed by the manager team divided by the total number of funds managed by the fund manager.	
Index Stock Proportion	The proportion of index stocks over a fund manager's holding in year t-1.	CSMAR Fund Finance Database
Active Management proportion	The proportion of the fund's holdings that is different from the holdings of the fund's benchmark in year t-1.	CSMAR Fund Finance Database
Macroeconomic characteristics variables		
China EPU	A dummy variable that equals to one if the EPU value in year *t* is higher than the mean of the EPU from the first year to year *t* of the sample, and zero otherwise.	CSMAR Market Index Database

Table 1: Summary Statistics

This table gives the summary statistics for variables used in this study. The sample consists of 688 fund manager and 9,407 fund manager-fund-year paired observations of Chinese fund managers from 2005 to 2020. To mitigate the effect of outliers, all continuous variables are winsorized at 1% and 99% level. Definitions of variables are listed in the Appendix.

Panel A: Main Sample

	Zodiac year managers (Observations=1,144)				Non-Zodiac year managers (Observations=11,629)				t-test (Zodiac vs. Non-Zodiac)
	N	Mean	Median	SD	N	Mean	Median	SD	
# of Unique Fund Managers	390				676				
Fund risk									
Fund RAR	825	1.04	1.02	0.30	8,357	1.08	1.01	0.45	-2.79***
Fund TE1	1,144	0.70	0.00	3.02	11,629	1.28	0.00	6.08	-5.49***
Fund TE2	1,144	0.39	0.00	1.37	11,629	0.52	0.00	1.91	-2.89***
Fund STD	1,144	0.39	0.00	1.39	11,629	0.52	0.00	1.94	-2.95***
Fund NAV TE	1,144	8.81	5.48	9.31	11,628	9.53	5.25	11.94	-2.41**
Systematic Risk	1,115	0.53	0.00	2.56	11,570	0.42	0.00	4.09	1.29
Idiosyncratic Risk	1,071	-0.01	0.00	0.03	11,611	0.01	0.00	0.04	-8.47***
Fund characteristics control variables									
Fund AUM	1,144	20.59	20.78	1.68	11,629	20.45	20.60	1.71	2.64***
Fund Flow	1,144	0.48	-0.13	3.74	11,629	0.46	-0.18	3.79	0.16
Fund Age	1,144	4.09	3.00	3.83	11,629	3.91	3.00	3.63	1.52
Sales Fee	1,144	0.04%	0.00%	0.11	11,629	0.04%	0.00%	0.12	-1.42
Management Fee	1,144	1.19%	1.18%	0.82	11,629	1.26%	1.22%	1.19	-2.13**
Transaction Fee	1,144	0.52%	0.16%	0.84	11,629	0.53%	0.18%	0.84	0.57
Turnover	1,144	0.15	0.00	0.99	11,629	0.13	0.00	0.16	0.68
Fund manager characteristics control variables									
Manager Gender	1,141	0.86	1.00	0.35	11,581	0.86	1.00	0.35	0.26
Manager Degree	1,141	1.93	2.00	0.44	11,581	1.93	2.00	0.47	-0.46
Manager Tenure	1,141	2.13	1.00	2.40	11,581	2.09	1.00	2.28	0.42
Manager Age	1,141	39.88	36.00	6.04	11,581	40.24	40.00	5.92	-1.95*
Investment Style	1,141	4.83	5.00	2.53	11,581	4.83	5.00	2.55	-0.03
Fund company characteristics control variables									
Fund Company Num	1,141	130.82	101.00	86.92	11,581	131.21	101.00	87.29	-0.08

Panel B: Fund portfolio characteristics

	Zodiac year managers (Observations=84)				Non-Zodiac year managers (Observations=3,222)				t-test (Zodiac vs. Non-Zodiac)
	N	Mean	Median	SD	N	Mean	Median	SD	
Trading activities									
Return Gap	762	0.38	0.26	0.36	7,827	0.43	0.26	0.46	-2.79***
Portfolio diversification									
Industry Concentration Index	917	0.84	0.43	1.13	9,497	1.00	0.44	1.66	-2.93***
Herfindahl Index	918	3.30	2.30	2.97	9,498	3.80	2.42	4.28	-3.46***
Asset allocation									
Stock Proportion$_{Assets}$	84	60.18	66.85	22.19	3,222	56.94	72.05	33.22	1.30
Stock Proportion$_{NAV}$	84	61.64	69.29	22.59	3,222	58.41	73.85	33.58	1.28
Log Stock Amount	84	19.20	20.84	5.09	3,222	18.41	20.01	5.62	1.39
Fixed Income Proportion$_{Assets}$	84	23.66	20.67	12.60	3,222	23.30	7.73	29.34	0.24
Fixed Income Proportion$_{NAV}$	84	25.36	20.91	14.08	3,222	26.49	7.79	34.41	-0.69
Log Fixed Income Amount	84	19.23	19.53	1.87	3,222	15.37	18.45	7.46	15.91***
Stock asset allocation									
△Stock Weight	50,429	0.03	0.00	0.71	549,995	0.08	0.00	1.57	-11.18***

Table 2: Baseline Regressions

This table reports coefficients from OLS regressions to test how the fund manager's "zodiac year" affects their risk-taking. Detailed definitions of all variables are reported in the Appendix. In all regressions, we control for Year, Fund Manager, and Fund fixed effects. We report t-statistics in parentheses, and ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	Fund RAR $_t$	*Fund TE1* $_t$	*Fund TE2* $_t$	*Fund STD* $_t$
	(1)	(2)	(3)	(4)
Zodiac	**-0.03****	**-0.36*****	**-0.07*****	**-0.07*****
	(-2.39)	**(-3.63)**	**(-3.71)**	**(-3.77)**
Fund AUM	-0.01	0.15***	-0.00	0.01
	(-0.51)	(2.81)	(-0.04)	(0.51)
Fund Flow	-0.01**	-0.01	0.00	0.00
	(-2.39)	(-0.46)	(0.94)	(0.91)
Fund Age	-0.03	1.43**	0.22	0.24
	(-0.95)	(2.23)	(1.18)	(1.15)
Sales Fee	0.10	0.08	0.04	0.05
	(0.69)	(0.43)	(0.42)	(0.48)
Management Fee	0.06***	0.04	0.00	0.01
	(3.31)	(1.39)	(0.59)	(0.84)
Transaction Fee	-0.03*	0.20**	0.05**	0.04**
	(-1.93)	(2.45)	(2.57)	(2.35)
Turnover	0.01	0.27***	0.14***	0.12***
	(1.40)	(3.42)	(3.76)	(3.44)
Constant	1.26***	-7.51**	-0.41	-0.64
	(4.19)	(-2.56)	(-0.48)	(-0.69)
Year fixed effects	Yes	Yes	Yes	Yes
Fund manager fixed effects	Yes	Yes	Yes	Yes
Fund objective fixed effects	Yes	Yes	Yes	Yes
Fund fixed effects	Yes	Yes	Yes	Yes
N	9,182	12,773	12,773	12,773
Adj R-squared	0.116	0.658	0.813	0.820

Table 3: Baseline Regressions with Further Controls for Fund Manager Characteristics

This table reports coefficients from OLS regressions to test how fund manager's "zodiac year" affects their risk-taking after further controlling for fund manager characteristics. Panel A and B report fund level and fund manager level results, respectively. Detailed definitions of all variables are reported in the Appendix. We report t-statistics in parentheses, and ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Fund level regressions

	Fund RAR$_t$	*Fund TE1$_t$*	*Fund TE2$_t$*	*Fund STD$_t$*
	(1)	(2)	(3)	(4)
Zodiac	**-0.04*** **	**-0.39*** **	**-0.07*** **	**-0.07*** **
	(-2.66)	**(-3.69)**	**(-3.56)**	**(-3.62)**
Fund AUM	-0.00	0.15***	-0.00	0.01
	(-0.29)	(2.69)	(-0.14)	(0.41)
Fund Flow	-0.01**	-0.01	0.00	0.00
	(-2.42)	(-0.73)	(0.67)	(0.63)
Fund Age	-0.06***	1.37*	0.13	0.17
	(-2.86)	(1.72)	(0.68)	(0.80)
Sales Fee	0.10	-0.09	0.01	0.01
	(0.69)	(-0.43)	(0.13)	(0.11)
Management Fee	0.06***	0.08**	0.01	0.01
	(3.35)	(2.44)	(0.94)	(1.38)
Transaction Fee	-0.03*	0.12	0.04**	0.03*
	(-1.91)	(1.36)	(2.29)	(1.80)
Turnover	0.01	0.25***	0.14***	0.11***
	(1.36)	(3.15)	(3.96)	(3.60)
Manager Gender	-0.00	-0.14	-0.09*	-0.10*
	(-0.24)	(-0.58)	(-1.89)	(-1.82)
Manager Degree	-0.01	0.07	0.03	0.03
	(-0.84)	(0.41)	(1.20)	(0.91)
Manager Tenure	-0.01**	0.03	0.01	0.01
	(-2.34)	(0.80)	(1.02)	(1.00)
Manager Age	-0.01	-0.18	0.02	0.01
	(-0.50)	(-1.37)	(0.62)	(0.44)
Manager Age^2	0.00	0.00	-0.00	-0.00
	(0.61)	(1.34)	(-0.41)	(-0.25)
Constant	1.46***	-3.76	-0.45	-0.68
	(3.98)	(-0.90)	(-0.49)	(-0.68)
Year fixed effects	Yes	Yes	Yes	Yes
Fund objective fixed effects	Yes	Yes	Yes	Yes
Fund fixed effects	Yes	Yes	Yes	Yes
N	9,169	12,722	12,722	12,722
Adj R-squared	0.144	0.627	0.805	0.810

Panel B: Fund manager level regressions

	Fund RAR_t		*Fund $TE1_t$*		*Fund $TE2_t$*		*Fund STD_t*	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Zodiac	**-0.03*** **	**-0.02** **	**-0.66*** **	**-0.77*** **	**-0.14*** **	**-0.16*** **	**-0.15*** **	**-0.18*** **
	(-2.76)	**(-2.16)**	**(-3.26)**	**(-3.36)**	**(-2.67)**	**(-2.59)**	**(-2.72)**	**(-2.70)**
Fund AUM	0.01	0.01**	0.30***	0.23**	0.11***	0.11***	0.12***	0.11***
	(1.50)	(2.28)	(2.64)	(2.29)	(2.74)	(3.31)	(2.95)	(3.28)
Fund Flow	-0.00*	-0.00***	-0.10***	-0.12***	-0.03*	-0.03**	-0.03*	-0.03*
	(-1.70)	(-3.01)	(-3.96)	(-3.14)	(-1.88)	(-2.00)	(-1.77)	(-1.87)
Fund Age	0.01***	0.01***	0.34***	0.42***	0.09***	0.12***	0.10***	0.13***
	(4.54)	(4.28)	(5.06)	(6.06)	(4.34)	(5.44)	(4.40)	(5.57)
Sales Fee	0.11	0.04	-0.43	-1.32	-0.40	-0.48**	-0.40	-0.52**
	(0.95)	(0.45)	(-0.46)	(-1.54)	(-1.23)	(-2.02)	(-1.21)	(-2.11)
Management Fee	0.09***	0.09***	0.06	0.12	0.04	0.04	0.04	0.04
	(4.99)	(5.32)	(0.53)	(1.08)	(1.15)	(1.12)	(1.01)	(1.02)
Transaction Fee	0.02	0.02**	-0.02	-0.23	-0.03	-0.09*	-0.04	-0.09*
	(1.45)	(2.42)	(-0.10)	(-1.22)	(-0.80)	(-1.81)	(-0.91)	(-1.86)
Turnover	-0.00	-0.00	0.57***	0.82***	0.34***	0.47***	0.31***	0.43***
	(-0.58)	(-0.03)	(4.24)	(3.58)	(4.73)	(5.28)	(4.44)	(4.95)
Manager Gender		0.01		-0.37		-0.11		-0.12
		(0.26)		(-0.98)		(-0.81)		(-0.89)
Manager Degree		-0.00		0.33		0.10		0.09
		(-0.20)		(1.15)		(0.94)		(0.87)
Manager Tenure		0.00		-0.11*		-0.04**		-0.04**
		(0.07)		(-1.94)		(-2.15)		(-2.21)
Manager Age		-0.01		-0.32		-0.01		-0.02
		(-0.71)		(-1.40)		(-0.17)		(-0.32)
Manager Age^2		0.00		0.00		0.00		0.00
		(0.83)		(1.32)		(0.15)		(0.30)
Investment Style		0.00*		-0.03		-0.02		-0.02
		(1.94)		(-0.77)		(-1.30)		(-1.43)
Fund Company Num		-0.00		0.00		0.00		0.00
		(-0.28)		(0.97)		(0.53)		(0.46)
Constant	0.52***	0.58***	-5.59**	2.56	-1.91**	-1.56	-2.15**	-1.34
	(3.70)	(3.18)	(-2.27)	(0.52)	(-2.16)	(-0.88)	(-2.36)	(-0.74)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fund manager fixed effects	Yes	No	Yes	No	Yes	No	Yes	No
Fund objective fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	3,881	3,867	4,702	4,696	4,702	4,696	4,702	4,696
Adj R-squared	0.283	0.190	0.563	0.354	0.631	0.346	0.639	0.349

Table 4: Alternative Measures of Risk-taking

This table reports coefficients from OLS regressions to test how the fund manager's "zodiac year" affects their other risk-taking. The sample is fund-year level. The dependent variables in columns (1), (2), and (3) is *Fund NAV TE*, *Systematic Risk*, and *Idiosyncratic Risk*, respectively. *Zodiac* is a dummy variable that equals to one if the fund manager is in the "zodiac year" in year *t*, and zero otherwise. Detailed definitions of all variables are reported in the Appendix. We report t-statistics in parentheses, and ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	Fund NAV TE$_t$	*Systematic Risk$_t$*	*Idiosyncratic Risk$_t$*
	(1)	(2)	(3)
Zodiac	**-0.74*** **	**0.12**	**-0.01*** **
	(-3.63)	**(1.16)**	**(-6.29)**
Fund AUM	0.66***	0.04	0.00
	(5.36)	(0.97)	(0.05)
Fund Flow	0.04	0.00	0.00
	(1.14)	(0.07)	(0.47)
Fund Age	1.16	0.12	-0.00
	(1.06)	(0.64)	(-0.10)
Sales Fee	1.77*	0.19	0.01
	(1.87)	(0.36)	(1.42)
Management Fee	-0.12	0.05	-0.00
	(-1.52)	(1.56)	(-0.50)
Transaction Fee	0.89***	0.01	-0.00
	(4.64)	(0.14)	(-0.41)
Turnover	0.10	-0.00	-0.00
	(0.96)	(-0.07)	(-0.20)
Constant	-8.99*	-1.02	0.00
	(-1.74)	(-0.89)	(0.09)
Year fixed effects	Yes	Yes	Yes
Fund manager fixed effects	Yes	Yes	Yes
Fund objective fixed effects	Yes	Yes	Yes
Fund fixed effects	Yes	Yes	Yes
N	12,772	12,685	12,682
Adj R-squared	0.635	0.262	0.235

Table 5: Fund Trading Activities

This table reports coefficients from OLS regressions to test how the fund manager's "zodiac year" affects the fund activities. Column (1) reports the results of testing how the fund manager's "zodiac year" affects the trading activities. Following Kacperczyk et al. (2008) and Huang et al. (2011), the dependent variables *Return Gap* in column (1) is the absolute return gap of the fund manager i in year t, defined as the absolute value of the difference between net investor return and the net holding return. Column (2) and column (3) report the results of testing how the fund manager's "zodiac year" affects the portfolio diversification. Following Kacperczyk et al. (2005) and Shu et al. (2012), the dependent variables *Industry Concentration Index* in column (2) is the industry concentration ratio of the fund manager *i*'s portfolio in year *t*, defined as the sum of squared differences between a fund's industry weights and the corresponding market's industry weights. The dependent variables *Herfindahl Index* in column (3) is the industry Herfindahl index of the fund manager *i*'s portfolio in year *t*, defined as the sum of squared industry weights of fund portfolio. Detailed definitions of all variables are reported in the Appendix. We report t-statistics in parentheses, and ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	Return Gap$_t$	*Industry Concentration Index*$_t$	*Herfindahl Index*$_t$
	(1)	(2)	(3)
Zodiac	**-0.03*** **	**-0.12*** **	**-0.44*** **
	(-2.69)	**(-2.90)**	**(-4.01)**
Constant	0.41***	-1.70*	-2.07
	(2.73)	(-1.86)	(-0.94)
Controls	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
Fund manager fixed effects	Yes	Yes	Yes
Fund objective fixed effects	Yes	Yes	Yes
Fund fixed effects	Yes	Yes	Yes
N	8,589	10,414	10,416
Adj R-squared	0.749	0.473	0.500

Table 6: Asset Allocation

This table reports coefficients from OLS regressions to test how the fund manager's "zodiac year" affects the asset allocation of fund managers. Following Andonov et al., (2017), we divide the asset allocation classes of fund managers into risk assets and non-risky assets. Risky assets include investments in stocks, and non-risky assets include investments in fixed income assets. The dependent variables *Stock Proportion*$_{Assets}$, and *Stock Proportion*$_{NAV}$ in column (1) are the proportion of stock investment in the total assets of the fund, and the proportion in the net asset value of the fund, respectively. The dependent variables *Fixed Income Proportion*$_{Assets}$, and *Fixed Income Proportion*$_{NAV}$ in column (2) are the proportion of fixed income investment in the total assets of the fund, and the proportion in the net asset value of the fund, respectively. Detailed definitions of all variables are reported in the Appendix. We report t-statistics in parentheses, and ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A: As a percentage of the fund's total assets

	Stock Proportion$_{Assets\ t}$	*Fixed Income Proportion*$_{Assets\ t}$
	(1)	(2)
Zodiac	**-4.90*** **	**5.37*** **
	(-2.70)	**(3.78)**
Constant	3.45	39.31***
	(0.28)	(3.84)
Controls	Yes	Yes
Year fixed effects	Yes	Yes
Fund manager fixed effects	Yes	Yes
N	3,306	3,306
Adj R-squared	0.840	0.834

Panel B: As a percentage of the fund's NAV

	Stock Proportion$_{NAV\ t}$	*Fixed Income Proportion*$_{NAV\ t}$
	(1)	(2)
Zodiac	**-4.92*** **	**5.78*** **
	(-2.68)	**(3.62)**
Constant	4.63	35.93***
	(0.37)	(3.01)
Controls	Yes	Yes
Year fixed effects	Yes	Yes
Fund manager fixed effects	Yes	Yes
N	3,306	3,306
Adj R-squared	0.840	0.830

Panel C: Logarithm of carrying amount

	Ln(*Stock*$_t$)	*Ln*(*Fixed Income*$_t$)
	(1)	(2)
Zodiac	**-0.63***	**2.74*** **
	(-1.83)	**(6.58)**
Constant	0.20	-3.85
	(0.07)	(-0.98)
Controls	Yes	Yes
Year fixed effects	Yes	Yes
Fund manager fixed effects	Yes	Yes
N	3,306	3,306
Adj R-squared	0.729	0.491

Table 7: Portfolio Rebalancing

This table reports coefficients from OLS regressions to test how the fund manager's "zodiac year" affects the portfolio rebalancing behavior of fund managers. The dependent variable *△Stock Weight* equals the difference between a stock's weight in a fund manager's portfolio in year *t* and its weight in year *t-1*, where both weights are calculated using constant stock prices as of the end of year *t-1*. *Not Indexed* is a dummy variable that is 1 if the fund manager invests in stocks that are not indexed, and 0 otherwise. Detailed definitions of all variables are reported in the Appendix. We report t-statistics in parentheses, and ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	$\triangle Stock\ Weight_t$	
	(1)	(2)
Zodiac	**-0.04*** **	-0.03**
	(-3.26)	(-2.07)
Zodiac × Not Indexed		**-0.03** **
		(-1.96)
Not Indexed		0.12***
		(7.82)
Constant	0.08***	0.04***
	(89.70)	(9.90)
Year fixed effects	Yes	Yes
Fund manager fixed effects	Yes	Yes
Stock fixed effects	Yes	Yes
N	600,424	600,424
Adj R-squared	0.012	0.012

Table 8: Cross-sectional Variation: Fund Manager Characteristics

This table reports coefficients from OLS regressions to test whether the effect of the fund manager's "zodiac year" on its risk-taking varies with the manager's characteristics. Panel A reports the results of tests on whether the effect of the fund manager's "zodiac year" on its risk-taking varies with the manager's major. The variable *Not Finance Major* is a dummy variable that equals one if the fund manager's major is not finance and zero otherwise. Panel B reports the results of tests on whether the effect of the fund manager's "zodiac year" on its risk-taking varies with the manager's working years. *Tenure* is the number of years the fund manager has worked in year *t*, and *Short Tenure* multiplies *Tenure* by -1. Panel C reports the results of tests on whether the effect of the fund manager's "zodiac year" on its risk-taking varies with the number of funds managed by the fund manager. *Fund Number* is the number of funds managed by the fund manager in year *t*, and *Low Number of Funds* multiplies *Fund Number* by -1. Panel D reports the results of tests on whether the effect of the fund manager's "zodiac year" on its risk-taking varies with the fund manager's past performance. Columns (1) to columns (3) use the China-based four-factor model (Liu et al., 2019); and columns (4) to columns (6) use the fund's net asset value return to measure the performance of fund managers, respectively. *Performance* is the average four-factor model-adjusted excess return for the funds managed by the fund manager at year *t*. *NAV* is the mean value of the fund's net asset value managed by the fund manager in year *t*. The fund manager performance variable is adjusted by multiplying it by -1. Panel E reports the results of tests on whether the effect of the fund manager's "zodiac year" on its risk-taking varies with the management skills of fund managers. We follow Berk and van Binsbergen (2015) to measure the management skills of fund managers. *Skill* is the management skill of fund manager in year *t*, and *Low Skill* adjusts it by multiplying *Skill* by -1. In all regressions, we control for Year, Fund Manager, and Fund fixed effects. We report t-statistics in parentheses, and ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Educational background

	Fund RAR$_t$	*Fund TE1$_t$*	*Fund TE2$_t$*	*Fund STD$_t$*
	(1)	(2)	(3)	(4)
Zodiac	0.02	0.00	-0.02***	-0.01***
	(0.77)	(0.11)	(-2.70)	(-2.69)
Zodiac* × *Not Finance Major	**-0.10****	**-0.06***	**-0.02**	**-0.02***
	(-2.53)	**(-1.85)**	**(-1.42)**	**(-1.76)**
Constant	1.56***	-1.43	-0.12	-0.18
	(3.17)	(-1.60)	(-0.44)	(-0.65)
Controls	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Fund manager fixed effects	Yes	Yes	Yes	Yes
Fund objective fixed effects	Yes	Yes	Yes	Yes
Fund fixed effects	Yes	Yes	Yes	Yes
N	8,106	10,467	10,467	10,467
Adj R-squared	0.163	0.778	0.896	0.888

Panel B: Fund manager tenure

	Fund RAR$_t$	*Fund TE1$_t$*	*Fund TE2$_t$*	*Fund STD$_t$*
	(1)	(2)	(3)	(4)
Zodiac	-0.00	-0.69***	-0.12***	-0.11***
	(-0.04)	(-3.18)	(-2.98)	(-2.79)
Short Tenure	0.03	0.34	0.13	0.11
	(1.44)	(1.03)	(1.14)	(1.03)
Zodiac × Short Tenure	**0.00**	**-0.04*****	**-0.01****	**-0.01***
	(0.93)	**(-2.63)**	**(-2.04)**	**(-1.93)**
Constant	1.15***	-4.83	0.31	-0.03
	(4.45)	(-1.14)	(0.24)	(-0.03)
Controls	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Fund manager fixed effects	Yes	Yes	Yes	Yes
Fund objective fixed effects	Yes	Yes	Yes	Yes
Fund fixed effects	Yes	Yes	Yes	Yes
N	8,739	11,858	11,858	11,858
Adj R-squared	0.098	0.646	0.816	0.820

Panel C: Number of funds under management

	Fund RAR$_t$	*Fund TE1$_t$*	*Fund TE2$_t$*	*Fund STD$_t$*
	(1)	(2)	(3)	(4)
Zodiac	0.03	-0.52***	-0.09***	-0.09***
	(0.94)	(-3.32)	(-3.43)	(-3.21)
Low Number of funds	-0.00	0.01*	-0.00	-0.00
	(-0.29)	(1.82)	(-1.20)	(-0.86)
Zodiac × Low Number of Funds	**0.01*****	**-0.03*****	**-0.004****	**-0.004****
	(2.69)	**(-3.32)**	**(-2.04)**	**(-2.15)**
Constant	1.15***	-4.83	0.31	-0.03
	(4.45)	(-1.14)	(0.24)	(-0.03)
Controls	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Fund manager fixed effects	Yes	Yes	Yes	Yes
Fund objective fixed effects	Yes	Yes	Yes	Yes
Fund fixed effects	Yes	Yes	Yes	Yes
N	8,734	11,926	11,926	11,926
Adj R-squared	0.168	0.668	0.813	0.821

Panel D: Fund manager performance

	Four-factor alpha				NAV			
	Fund RAR_t	*Fund $TE1_t$*	*Fund $TE2_t$*	*Fund STD_t*	*Fund RAR_t*	*Fund $TE1_t$*	*Fund $TE2_t$*	*Fund STD_t*
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Zodiac	-0.01	-0.63***	-0.14***	-0.16***	-0.05***	-0.37***	-0.07***	-0.07***
	(-0.38)	(-3.37)	(-3.10)	(-3.51)	(-3.20)	(-2.89)	(-3.12)	(-3.28)
Performance	-0.06	-3.19***	0.76***	0.34				
	(-1.03)	(-3.09)	(2.85)	(1.25)				
Zodiac × Performance	**0.12***	**3.75*****	**0.65****	**0.79*****				
	(1.73)	**(3.25)**	**(2.38)**	**(2.77)**				
NAV					0.03	-2.66***	-0.28***	-0.23***
					(0.86)	(-5.54)	(-3.57)	(-2.86)
Zodiac × NAV					**-0.08***	**2.44*****	**0.34*****	**0.30*****
					(-1.69)	**(3.63)**	**(3.10)**	**(2.60)**
Constant	-0.01	-0.63***	-0.14***	-0.16***	1.13***	-9.06**	-0.25	-0.56
	(-0.38)	(-3.37)	(-3.10)	(-3.51)	(3.88)	(-2.29)	(-0.21)	(-0.43)
Control	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fund manager fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fund objective fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fund fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	6,787	8,250	8,250	8,250	6,781	8,418	8,418	8,418
Adj R-squared	0.251	0.705	0.895	0.895	0.098	0.704	0.835	0.844

Panel E: Fund manager management skills

	Fund RAR_t	*Fund $TE1_t$*	*Fund $TE2_t$*	*Fund STD_t*
	(1)	(2)	(3)	(4)
Zodiac	-0.01	-0.14	0.07	0.07
	(-0.73)	(-0.45)	(1.12)	(1.08)
Low Skill	0.00	-0.23***	0.05**	0.04*
	(0.26)	(-2.6915)	(2.2371)	(1.65)
Zodiac × Low Skill	**-0.0028**	**-0.0617**	**-0.0433****	**-0.04***
	(-1.03)	**(-0.72)**	**(-2.07)**	**(-1.93)**
Constant	1.49***	-5.77*	0.07	-0.26
	(2.62)	(-1.82)	(0.09)	(-0.32)
Controls	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Fund manager fixed effects	Yes	Yes	Yes	Yes
Fund objective fixed effects	Yes	Yes	Yes	Yes
Fund fixed effect	Yes	Yes	Yes	Yes
N	6,711	8,269	8,269	8,269
Adj R-squared	0.195	0.680	0.828	0.837

Table 9: Cross-sectional Variation: Fund Characteristics

This table reports coefficients from OLS regressions to test whether the effect of the fund manager's zodiac year on its risk-taking varies with the fund characteristics. Panel A reports the results of tests on whether the effect of the fund manager's "zodiac year" on its risk-taking varies with the fund management model. *Team Proportion* is the proportion of funds managed by the fund manager through the team in year *t*, and *Low Team-Managed* adjusts it by multiplying *Team Proportion* by -1. Panel B reports the results of tests on whether the effect of the fund manager's zodiac year on its risk-taking varies with the proportion of index stocks the fund manager invests in. *Index Stock Proportion* is the proportion of the fund manager's investment in stocks in the index in year *t*. Panel C reports the results of tests on whether the effect of the fund manager's zodiac year on its risk-taking varies with the fund manager's share of active management. We refer to the method of Cremers and Pareek (2016) to measure the active management share of the fund manager. *Active Management proportion* is the proportion of the fund's holdings that is different from the holdings of the fund's benchmark in year *t*, and *Low Active Share* adjusts it by multiplying *Active Management proportion* by -1. In all regressions, we control for Year, Fund Manager, and Fund fixed effects. We report t-statistics in parentheses, and ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Team management

	Fund RAR$_t$	*Fund TE1$_t$*	*Fund TE2$_t$*	*Fund STD$_t$*
	(1)	(2)	(3)	(4)
Zodiac	-0.12**	-1.34**	-0.24***	-0.20***
	(-2.40)	(-2.40)	(-3.08)	(-2.66)
Low-Team Managed	0.03	0.75*	0.13	0.14
	(0.75)	(1.88)	(1.46)	(1.50)
Zodiac × Low Team-Managed	**-0.10***	**-1.35****	**-0.24*****	**-0.19****
	(-1.81)	**(-2.09)**	**(-2.60)**	**(-2.09)**
Constant	0.88***	-7.64**	-0.22	-0.47
	(3.71)	(-2.34)	(-0.26)	(-0.50)
Controls	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Fund manager fixed effects	Yes	Yes	Yes	Yes
Fund objective fixed effects	Yes	Yes	Yes	Yes
Fund fixed effects	Yes	Yes	Yes	Yes
N	8,590	11,877	11,877	11,877
Adj R-squared	0.109	0.675	0.843	0.842

Panel B: Types of stocks the fund invests in

	Fund RAR$_t$	*Fund TE1$_t$*	*Fund TE2$_t$*	*Fund STD$_t$*
	(1)	(2)	(3)	(4)
Zodiac	-0.12	0.81**	0.24**	0.21**
	(-1.00)	(2.43)	(2.23)	(2.06)
Index Stock Proportion	0.26**	-0.58*	-0.05	-0.05
	(2.07)	(-1.95)	(-0.55)	(-0.53)
Zodiac × Index Stock Proportion	**0.13**	**-1.62*****	**-0.44*****	**-0.41*****
	(0.83)	**(-3.08)**	**(-2.94)**	**(-2.81)**
Constant	1.41***	-7.07*	-0.09	-0.31
	(3.33)	(-1.96)	(-0.10)	(-0.30)
Control	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Fund manager fixed effects	Yes	Yes	Yes	Yes
Fund objective fixed effects	Yes	Yes	Yes	Yes
Fund fixed effects	Yes	Yes	Yes	Yes
N	8,253	10,780	10,780	10,780
Adj R-squared	0.188	0.738	0.806	0.818

Panel C: Fund manager actively manages shares

	Fund RAR$_t$	*Fund TE1$_t$*	*Fund TE2$_t$*	*Fund STD$_t$*
	(1)	(2)	(3)	(4)
Zodiac	-0.06***	-0.61***	-0.11***	-0.13***
	(-2.61)	(-4.59)	(-4.18)	(-4.65)
Low Active Share	0.33***	0.35	0.11	0.14
	(3.47)	(1.36)	(1.57)	(1.60)
Zodiac × Low Active Share	**-0.24****	**-2.20*****	**-0.17***	**-0.26****
	(-2.26)	**(-4.86)**	**(-1.76)**	**(-2.52)**
Constant	1.58***	-12.72***	-0.82	-1.11
	(3.24)	(-2.71)	(-0.65)	(-0.81)
Controls	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Fund manager fixed effects	Yes	Yes	Yes	Yes
Fund objective fixed effects	Yes	Yes	Yes	Yes
Fund fixed effects	Yes	Yes	Yes	Yes
N	7,736	7,979	7,979	7,979
Adj R-squared	0.148	0.709	0.886	0.885

Table 10: Cross-sectional Variation: Macroeconomic Factors

This table reports coefficients from OLS regressions to test whether the effect of the fund manager's "zodiac year" on its risk-taking varies with the macro economy. *China EPU* is a dummy variable that equals to one if the China's EPU index in year *t* is higher than the mean of the China's EPU index from the first year to year *t* of the sample, and zero otherwise. In all regressions, we control for Year, Fund Manager, and Fund fixed effects. We report t-statistics in parentheses, and ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	Fund RAR$_t$	*Fund TE1$_t$*	*Fund TE2$_t$*	*Fund STD$_t$*
	(1)	(2)	(3)	(4)
Zodiac	0.10	0.01	0.00	0.00
	(1.52)	(0.40)	(0.39)	(0.08)
Zodiac* × *China EPU	**-0.12***	**-0.05***	**-0.01****	**-0.01****
	(-1.80)	**(-1.72)**	**(-2.53)**	**(-2.05)**
Constant	0.95***	-1.10	0.05	0.02
	(4.45)	(-1.50)	(0.44)	(0.22)
Controls	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Fund manager fixed effects	Yes	Yes	Yes	Yes
Fund objective fixed effects	Yes	Yes	Yes	Yes
Fund fixed effects	Yes	Yes	Yes	Yes
N	8,978	12,122	11,909	11,909
Adj R-squared	0.086	0.770	0.886	0.877

Table 11: Placebo Tests

The table reports coefficients from OLS regressions of placebo tests of a fund manager's "zodiac year" on their risk-taking. The variable *Zodiac** indicates that the fund manager's zodiac year is pushed forward by 3 years and backward by 3 years respectively. We examine the impact on risk taking based on a "virtual" fund manager's birth year. In all regressions, we control for Year, Fund Manager, and Fund fixed effects. We report t-statistics in parentheses, and ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	Zodiac year minus 3				Zodiac year plus 3			
	Fund RAR$_t$	*Fund TE1$_t$*	*Fund TE2$_t$*	*Fund STD$_t$*	*Fund RAR$_t$*	*Fund TE1$_t$*	*Fund TE2$_t$*	*Fund STD$_t$*
Zodiac*	**-0.00**	**0.13**	**0.04**	**0.04**	**-0.02**	**0.07**	**0.03**	**0.03**
	(-0.12)	**(0.85)**	**(1.19)**	**(1.21)**	**(-1.54)**	**(0.77)**	**(0.90)**	**(0.88)**
Fund AUM	0.00	0.14***	-0.00	0.01	0.00	0.14***	-0.00	0.01
	(0.32)	(2.80)	(-0.04)	(0.50)	(0.32)	(2.79)	(-0.05)	(0.50)
Fund Flow	-0.01**	-0.01	0.00	0.00	-0.01**	-0.01	0.00	0.00
	(-2.45)	(-0.44)	(0.95)	(0.92)	(-2.46)	(-0.45)	(0.95)	(0.91)
Fund Age	-0.03	1.43**	0.22	0.24	-0.03	1.43**	0.22	0.24
	(-1.05)	(2.22)	(1.17)	(1.15)	(-1.01)	(2.21)	(1.17)	(1.15)
Sales Fee	0.06	0.09	0.04	0.05	0.06	0.09	0.04	0.05
	(0.49)	(0.47)	(0.43)	(0.49)	(0.50)	(0.44)	(0.41)	(0.47)
Management Fee	0.06***	0.04	0.00	0.01	0.06***	0.04	0.00	0.01
	(3.31)	(1.43)	(0.62)	(0.86)	(3.30)	(1.46)	(0.65)	(0.89)
Transaction Fee	-0.03**	0.20**	0.05**	0.04**	-0.03*	0.20**	0.05**	0.04**
	(-1.97)	(2.43)	(2.57)	(2.35)	(-1.96)	(2.40)	(2.52)	(2.29)
Turnover	0.01	0.27***	0.14***	0.12***	0.01	0.27***	0.14***	0.12***
	(1.38)	(3.41)	(3.75)	(3.43)	(1.36)	(3.42)	(3.76)	(3.44)
Constant	1.05***	-7.55**	-0.42	-0.65	1.05***	-7.53**	-0.41	-0.64
	(4.11)	(-2.56)	(-0.49)	(-0.70)	(4.10)	(-2.56)	(-0.48)	(-0.70)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fund manager fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fund objective fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fund fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	9,164	12,773	12,773	12,773	9,164	12,773	12,773	12,773
Adj R-squared	0.123	0.657	0.812	0.820	0.123	0.657	0.812	0.820

Table 12: Propensity Score Matching

The table reports the results of a Propensity Score Matching test of a manager's zodiac year on fund risk-taking. Since there are few samples in the treatment group and there are many optional matching samples, we adopt a PSM based on the characteristics of the fund managers and use the 1:1, 1:5, and 1:10 ratio respectively, matching each fund manager in the zodiac year with the closest sample of fund managers who are not in the zodiac year. The matching process uses reset sampling, and the caliper is set to 0.01. Panel A to Panel D report balance test results of PSM. Panel E is the regression result after matching. The dependent variable of Panel A is *Fund RAR*; the dependent variable of Panel B is *Fund TE1*; the dependent variable of Panel C is *Fund TE2*; the dependent variable of Panel D is *Fund STD*. Detailed definitions of all variables are reported in Appendix. We report t-statistics in parentheses, and ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A: *Fund RAR*

	Unmatched			Matched-1:1			Matched-1:5			Matched-1:10		
	Treat	Control	P-value	Treat	Control	P-value	Treat	Control	P-value	Treat	Control	P-value
Fund AUM	20.61	20.44	0.01	20.61	20.62	0.97	20.61	20.62	0.90	20.61	20.62	0.90
Fund Flow	0.35	0.32	0.85	0.35	0.43	0.65	0.35	0.34	0.97	0.35	0.33	0.90
Fund Age	4.60	4.37	0.09	4.60	4.57	0.89	4.60	4.51	0.67	4.60	4.55	0.82
Sales Fee	0.04%	0.04%	0.41	0.04%	0.04%	0.60	0.04%	0.04%	0.80	0.04%	0.03%	0.89
Management Fee	1.42%	1.46%	0.22	1.42%	1.40%	0.75	1.42%	1.39%	0.45	1.42%	1.40%	0.67
Transaction Fee	0.67%	0.68%	0.83	0.67%	0.66%	0.87	0.67%	0.64%	0.50	0.67%	0.65%	0.66
Turnover	0.14	0.12	0.59	0.14	0.13	0.88	0.14	0.14	0.96	0.14	0.13	0.81

Panel B: *Fund TE1*

	Unmatched			Matched-1:1			Matched-1:5			Matched-1:10		
	Treat	Control	P-value	Treat	Control	P-value	Treat	Control	P-value	Treat	Control	P-value
Fund AUM	20.58	20.43	0.01	20.58	20.60	0.86	20.58	20.62	0.65	20.58	20.61	0.67
Fund Flow	0.48	0.45	0.80	0.48	0.42	0.69	0.48	0.43	0.75	0.48	0.50	0.90
Fund Age	4.06	3.85	0.06	4.06	4.07	0.95	4.06	3.95	0.47	4.06	3.98	0.63
Sales Fee	0.04%	0.05%	0.18	0.04%	0.04%	0.72	0.04%	0.04%	0.57	0.04%	0.04%	0.61
Management Fee	1.21%	1.26%	0.16	1.21%	1.21%	0.93	1.21%	1.21%	0.99	1.21%	1.22%	0.89
Transaction Fee	0.52%	0.52%	0.73	0.52%	0.50%	0.69	0.52%	0.52%	0.96	0.52%	0.52%	0.81
Turnover	0.16	0.13	0.41	0.16	0.13	0.54	0.16	0.13	0.52	0.16	0.12	0.40

Panel C: *Fund TE2*

	Unmatched			Matched-1:1			Matched-1:5			Matched-1:10		
	Treat	Control	P-value	Treat	Control	P-value	Treat	Control	P-value	Treat	Control	P-value
Fund AUM	20.58	20.43	0.01	20.58	20.60	0.86	20.58	20.62	0.65	20.58	20.61	0.67
Fund Flow	0.48	0.45	0.80	0.48	0.42	0.69	0.48	0.43	0.75	0.48	0.50	0.90
Fund Age	4.06	3.85	0.06	4.06	4.07	0.95	4.06	3.95	0.47	4.06	3.98	0.63
Sales Fee	0.04%	0.05%	0.18	0.04%	0.04%	0.72	0.04%	0.04%	0.57	0.04%	0.04%	0.61
Management Fee	1.21%	1.26%	0.16	1.21%	1.21%	0.93	1.21%	1.21%	0.99	1.21%	1.22%	0.89
Transaction Fee	0.52%	0.52%	0.73	0.52%	0.50%	0.69	0.52%	0.52%	0.96	0.52%	0.52%	0.81
Turnover	0.16	0.13	0.41	0.16	0.13	0.54	0.16	0.13	0.52	0.16	0.12	0.40

Panel D: *Fund STD*

	Unmatched			Matched-1:1			Matched-1:5			Matched-1:10		
	Treat	Control	P-value	Treat	Control	P-value	Treat	Control	P-value	Treat	Control	P-value
Fund AUM	20.58	20.43	0.01	20.58	20.60	0.86	20.58	20.62	0.65	20.58	20.61	0.67
Fund Flow	0.48	0.45	0.80	0.48	0.42	0.69	0.48	0.43	0.75	0.48	0.50	0.90
Fund Age	4.06	3.85	0.06	4.06	4.07	0.95	4.06	3.95	0.47	4.06	3.98	0.63
Sales Fee	0.04%	0.05%	0.18	0.04%	0.04%	0.72	0.04%	0.04%	0.57	0.04%	0.04%	0.61
Management Fee	1.21%	1.26%	0.16	1.21%	1.21%	0.93	1.21%	1.21%	0.99	1.21%	1.22%	0.89
Transaction Fee	0.52%	0.52%	0.73	0.52%	0.50%	0.69	0.52%	0.52%	0.96	0.52%	0.52%	0.81
Turnover	0.16	0.13	0.41	0.16	0.13	0.54	0.16	0.13	0.52	0.16	0.12	0.40

Panel E. Regression results

	Fund RAR_t			*Fund $TE1_t$*			*Fund $TE2_t$*			*Fund STD_t*		
	1:1	1:5	1:10	1:1	1:5	1:10	1:1	1:5	1:10	1:1	1:5	1:10
Zodiac	**-0.04**	**-0.03***	**-0.03***	**-0.04****	**-0.38*****	**-0.33*****	**-0.03***	**-0.06****	**-0.06*****	**-0.05****	**-0.08*****	**-0.06*****
	(-0.92)	**(-1.76)**	**(-1.90)**	**(-2.16)**	**(-3.00)**	**(-3.03)**	**(-1.84)**	**(-2.06)**	**(-2.71)**	**(-2.32)**	**(-2.67)**	**(-2.61)**
Fund AUM	0.08	0.01	-0.01	-0.00	-0.00	0.08	0.03	-0.03	-0.02	0.00	-0.02	-0.01
	(1.26)	(0.59)	(-0.24)	(-0.13)	(-0.05)	(1.13)	(1.60)	(-1.39)	(-0.95)	(0.10)	(-0.96)	(-0.64)
Fund Flow	-0.02***	-0.00	-0.01**	-0.00	0.02	0.02	-0.00	0.01	0.01	0.00	-0.00	0.01
	(-2.70)	(-0.43)	(-2.43)	(-0.02)	(0.57)	(0.74)	(-0.47)	(0.69)	(1.18)	(1.10)	(-1.21)	(1.24)
Fund Age	-0.09	-0.06*	-0.09	-0.01	0.92	0.73	-0.06	0.34	0.19	0.47	0.32	0.21
	(-0.35)	(-1.67)	(-1.46)	(-0.07)	(1.44)	(1.29)	(-0.33)	(1.40)	(1.01)	(1.32)	(1.16)	(1.05)
Sales Fee	0.39	-0.21	-0.20	1.01	0.52	0.51*	0.08	0.19	0.12	0.71	0.13	0.13
	(0.54)	(-1.01)	(-0.92)	(1.31)	(1.45)	(1.67)	(1.11)	(1.05)	(0.77)	(0.78)	(0.69)	(0.81)
Management Fee	0.21**	0.10***	0.14***	0.01	0.01	0.02	0.01	-0.00	0.00	0.07	-0.01	0.00
	(1.99)	(4.15)	(4.61)	(0.59)	(0.20)	(0.48)	(1.29)	(-0.30)	(0.18)	(1.18)	(-0.99)	(0.42)
Transaction Fee	-0.07	-0.06***	-0.05**	-0.06	0.11	0.32**	0.01	0.01	0.07**	-0.07	0.02	0.05*
	(-0.86)	(-2.78)	(-2.07)	(-1.54)	(1.18)	(2.54)	(0.64)	(0.43)	(2.07)	(-1.54)	(0.85)	(1.75)
Turnover	0.01	0.03	0.03	0.32**	0.15	0.28*	0.01	0.14**	0.14**	0.26*	0.14**	0.13**
	(0.28)	(1.02)	(1.43)	(2.49)	(1.04)	(1.71)	(0.08)	(1.99)	(2.14)	(1.95)	(2.14)	(2.29)
Constant	-0.35	1.04***	1.50***	0.25	-2.69	-3.59	-0.28	-0.23	0.08	-2.15	-0.44	-0.10
	(-0.17)	(2.66)	(2.72)	(0.25)	(-0.79)	(-1.28)	(-0.30)	(-0.19)	(0.09)	(-1.20)	(-0.33)	(-0.10)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fund manager fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fund objective fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fund fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	888	3,437	5,597	1,212	4,851	7,815	1,206	4,845	7,808	1,249	4,835	7,807
Adj R-squared	0.110	0.084	0.159	0.866	0.700	0.664	0.852	0.830	0.816	0.843	0.858	0.824

Table 13: Fund Manager Turnover

The table reports coefficients from OLS regressions on the impact of manager turnover on the risk taking of the funds managed by them. Panel A reports the impact on risk taking when a fund is managed by a new fund manager. *Enter* is the dummy variable for fund manager entry, which is 1 if fund *j* is not managed by fund manager *i* in year *t-2* but is managed by fund manager *i* in year *t-1*; otherwise, it is 0. Panel B reports on the impact on risk taking when a fund is no longer managed by a fund manager. *Leave* is the dummy variable for the fund manager to leave, which is 1 if fund *j* is managed by fund manager *i* in year *t-2* but is not managed by fund manager *i* in year *t-1*; otherwise, it is 0. In all regressions, we control for Year, Fund Manager, and Fund fixed effects. We report t-statistics in parentheses, and ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Fund manager arrival

	Fund RAR_t	*Fund $TE1_t$*	*Fund $TE2_t$*	*Fund STD_t*
Zodiac	0.02	-0.06	-0.04***	-0.04***
	(0.88)	(-0.93)	(-2.84)	(-2.86)
$Enter_{t-1}$	0.10**	0.01	-0.01	-0.02
	(2.47)	(0.08)	(-0.63)	(-1.41)
$Enter_{t-1}$ × Zodiac	**-0.18****	**-0.34****	**-0.06****	**-0.06***
	(-2.34)	**(-2.10)**	**(-1.99)**	**(-1.87)**
Fund AUM	-0.08	0.22***	0.03*	0.03
	(-1.58)	(3.24)	(1.83)	(1.62)
Fund Flow	-0.00	-0.08	-0.02	-0.01
	(-0.97)	(-0.79)	(-1.02)	(-0.50)
Fund Age	-0.12	0.13*	0.03	0.03
	(-0.64)	(1.72)	(1.48)	(1.40)
Sales Fee	0.06	0.68	0.29	0.22
	(0.73)	(0.95)	(1.13)	(0.87)
Management Fee	0.04	0.02	-0.00	-0.00
	(1.40)	(0.21)	(-0.15)	(-0.15)
Transaction Fee	-0.06*	0.17	0.06**	0.06**
	(-1.92)	(1.32)	(2.00)	(2.00)
Turnover	0.01	1.17***	0.87***	0.65***
	(1.11)	(3.11)	(4.66)	(3.37)
Constant	3.32**	-4.23***	-0.29	-0.25
	(2.11)	(-2.74)	(-0.95)	(-0.80)
Year fixed effects	Yes	Yes	Yes	Yes
Fund manager fixed effects	Yes	Yes	Yes	Yes
Fund objective fixed effects	Yes	Yes	Yes	Yes
Fund fixed effects	Yes	Yes	Yes	Yes
N	9,139	11,155	11,155	11,155
Adj R-squared	0.323	0.797	0.918	0.915

Panel B: Fund manager departure

	Fund RAR_t	*Fund $TE1_t$*	*Fund $TE2_t$*	*Fund STD_t*
Zodiac	-0.02	-0.14*	-0.05***	-0.05***
	(-1.02)	(-1.86)	(-3.58)	(-3.42)
$Leave_{t-1}$	-0.04*	0.04	0.01	0.02
	(-1.74)	(0.38)	(0.81)	(1.24)
$Leave_{t-1}$ × Zodiac	**0.06**	**-0.02**	**-0.04**	**-0.06**
	(1.22)	**(-0.11)**	**(-1.12)**	**(-1.57)**
Fund AUM	-0.08	0.22***	0.03*	0.02
	(-1.55)	(3.21)	(1.80)	(1.59)
Fund Flow	-0.00	-0.08	-0.02	-0.01
	(-1.04)	(-0.78)	(-1.00)	(-0.48)
Fund Age	-0.15	0.13*	0.03	0.03
	(-0.87)	(1.79)	(1.54)	(1.51)
Sales Fee	0.05	0.68	0.28	0.21
	(0.69)	(0.95)	(1.11)	(0.85)
Management Fee	0.04	0.02	-0.00	-0.01
	(1.40)	(0.19)	(-0.17)	(-0.19)
Transaction Fee	-0.06*	0.17	0.06**	0.06**
	(-1.91)	(1.32)	(2.00)	(1.99)
Turnover	0.01	1.17***	0.87***	0.65***
	(1.13)	(3.12)	(4.67)	(3.38)
Constant	3.48**	-4.23***	-0.29	-0.26
	(2.24)	(-2.74)	(-0.96)	(-0.82)
Year fixed effects	Yes	Yes	Yes	Yes
Fund manager fixed effects	Yes	Yes	Yes	Yes
Fund objective fixed effects	Yes	Yes	Yes	Yes
Fund fixed effect	Yes	Yes	Yes	Yes
N	9,139	11,155	11,155	11,155
Adj R-squared	0.322	0.797	0.918	0.915

Table 14: Effect of the fund manager's zodiac year on performance

This table reports coefficients from OLS regressions to test how the fund manager's "zodiac year" affects its performance. We use the China-based four-factor model (Liu et al., 2019) and the fund's net asset value return to measure the performance of fund managers, respectively. The dependent variable of column (1) *Four-factor alpha* is the four-factor model-adjusted excess return for the funds managed by the fund manager at year *t*. The dependent variable of column (2) *NAV* is the value of the fund's net asset value managed by the fund manager in year *t*. *Zodiac* is a dummy variable that equals to one if the fund manager is in the "zodiac year" in year *t*, and zero otherwise. Detailed definitions of all variables are reported in Appendix. In all regressions, we control for Year, Fund Manager, and Fund fixed effects. We report t-statistics in parentheses, and ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	Four-factor alpha$_t$	*NAV*$_t$
	(1)	(2)
Zodiac	**-0.01*** **	**-0.02*** **
	(-3.54)	**(-2.84)**
Constant	-0.24***	-0.51***
	(-3.01)	(-4.03)
Controls	Yes	Yes
Year fixed effects	Yes	Yes
Fund manager fixed effects	Yes	Yes
Fund objective fixed effects	Yes	Yes
Fund fixed effects	Yes	Yes
N	11,214	10,727
Adj R-squared	0.578	0.455

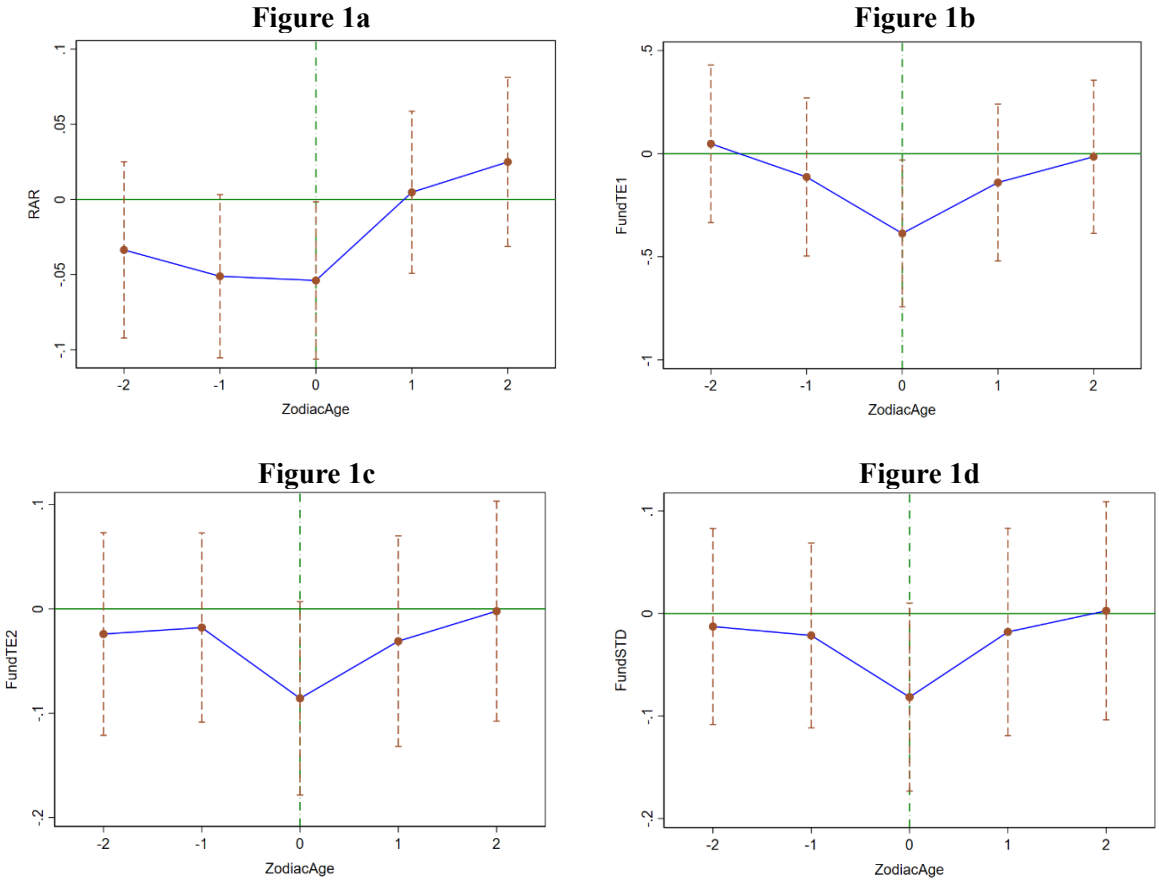

Figure 1: Event plot illustrating the relationship between fund manager zodiac year and risk-taking. This figure shows the level of risk taking by fund managers, for the years 2005-2023, as a function of the fund manager's zodiac year. The horizontal axis reflects years relative to the fund manager's zodiac year. The solid lines at each year reflect the level of risk taking, and the dashed lines denote 95 percent confidence intervals. Panels 1a through 1d show the distribution of coefficient estimates when the dependent variable is *Fund RAR*, *TE1*, *TE2*, and *STD* respectively.

Figure 2a

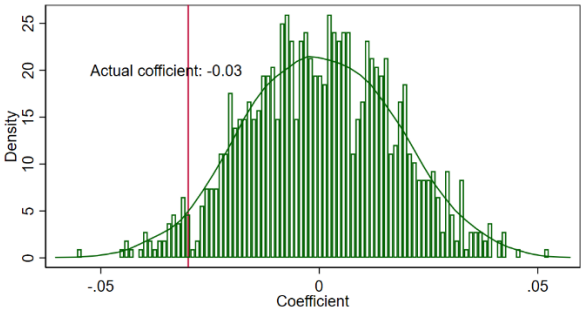

Figure 2b

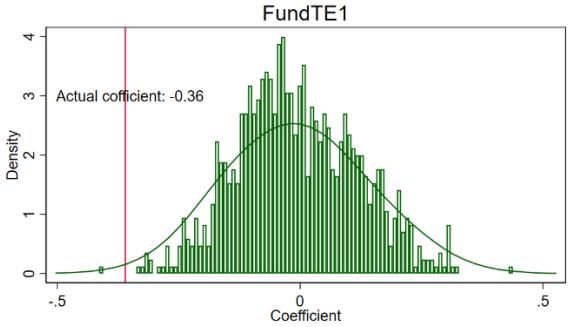

Figure 2c

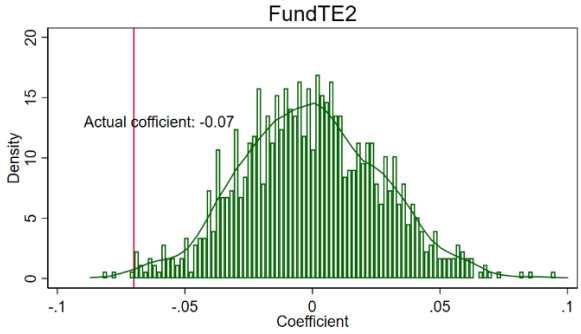

Figure 2d

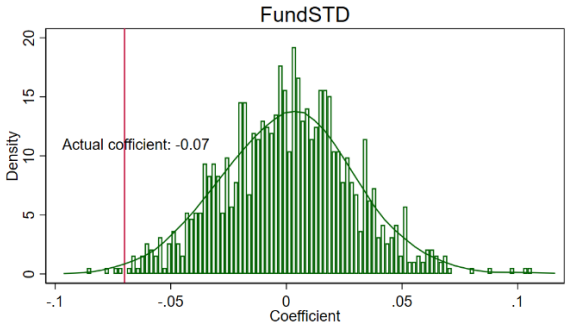

Figure 2: Placebo test. Histogram of the estimated coefficients obtained after randomly matching fund managers with the zodiac year. The virtual fund manager's zodiac year is then used to examine its impact on risk taking, and the estimated coefficient is recorded. We repeat this process at least 1,000 times. Panels 2a through 2d show the distribution of coefficient estimates when the dependent variable is *Fund RAR*, *TE1*, *TE2*, and *STD* respectively.