



Animal spirits: Superstitious behavior by mutual fund managers

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Motivation: Retail investors are different to professional investors

Retail investors are prone to behavioral biases and irrational decision-making:

- **Hirshleifer et al. (2018)**: Digital superstitions in China in the IPO market: Lucky numerical stocks are listed more frequently than expected by chance.
- **Fisman et al. (2023)**: Chinese Zodiac Year superstition: Investment behavior of individual investors are more conservative in their zodiac years.
- **He et al. (2020)**: Impact of superstition on housing demand and house prices in Singapore: Fewer housing transactions and lower housing prices on inauspicious days of the lunar calendar
- **Block and Kramer (2018)**: Taiwanese consumers more likely to purchase a product with positive superstitious associations based on its “lucky” color; 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)**: Economic threat variables: Predict levels of superstition in Germany during 1918-1940.
- **Bhattacharya et al. (2018)**: Individual investors, but not institutional investors, submit disproportionately more limit orders at 8 than at 4.

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Motivation

- Professional investors are important:
 - 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).
 - China: By the end of 2021, over half of China's population, approximately 720 million investors, invested through mutual funds that collectively managed assets exceeding \$6.5 trillion (Asset Management Association of China)
- Superstition is everywhere:
 - Each country has its own variations on common superstitions

At what point do professional investors truly become “professional” in their decision-making processes?

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The Zodiac year superstition

Advantages:

- 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.
- It is exogenous to other factors that might affect fund manager behavior, such as individual characteristics, the macro environment, and other factors.
- The same fund manager will be part of both the treated and control sample over the period at the fund.

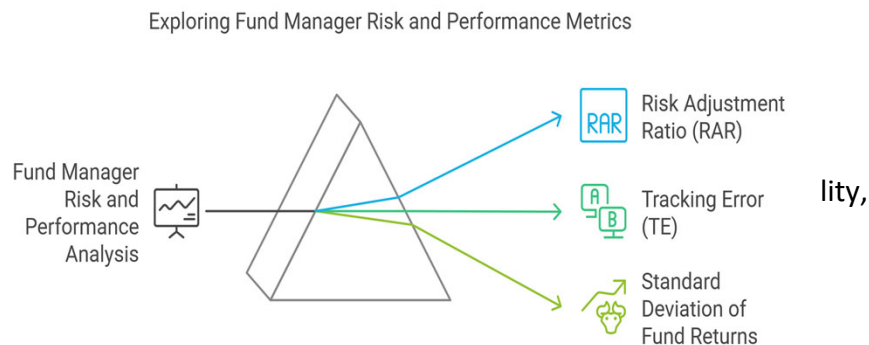
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Data

- Sample of funds and fund managers from the China Stock Market and Accounting Research (CSMAR) and RESSET databases
- Covers the period from 2005 to 2023.
- 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.
- Sample starts 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
- 3048 unique funds (equity, bond, hybrid funds considered)

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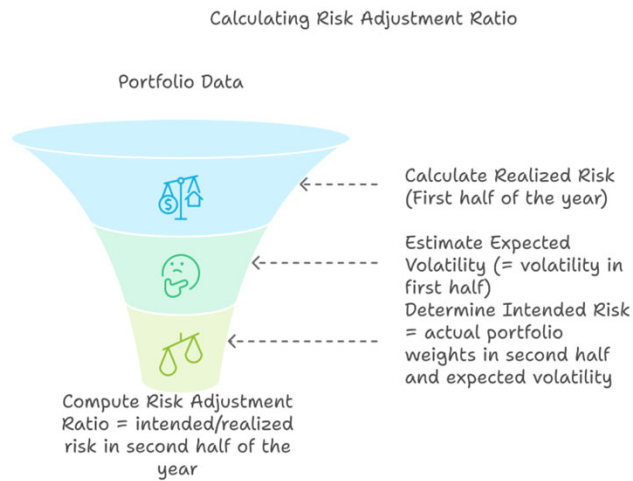
Main dependent variables: Fund manager risk-taking



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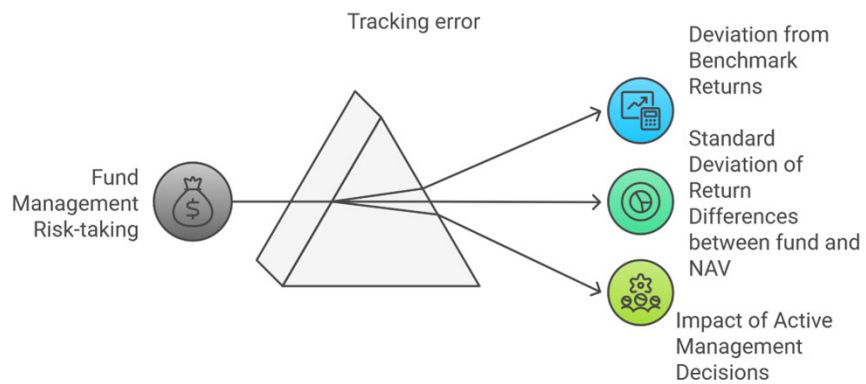
Main dependent variables: Expected risk change

- Risk adjustment ratio



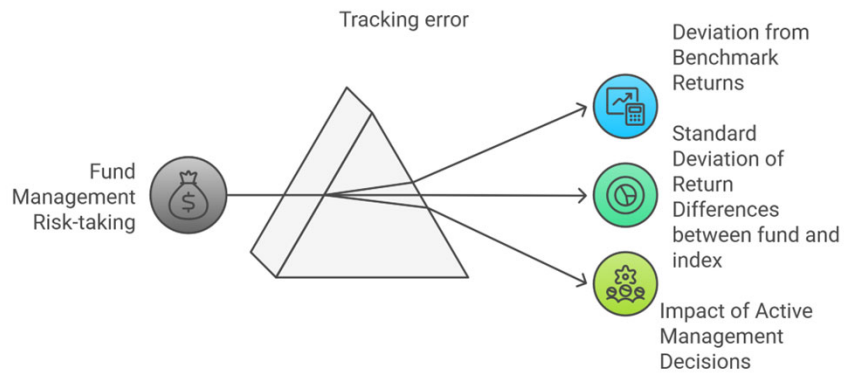
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Main dependent variables: Tracking error 1



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Main dependent variables: Tracking error 2



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Main dependent variables: Standard deviation

- **Fund STD_t :**
- The average standard deviation of monthly fund returns during the year.
- Straightforward measure of overall fund return variability, reflecting the total risk borne by the fund.

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Main controls

Following Chen, 2011; Brown et al., 2018; Ma and Tang, 2019; Cici et al., 2021; Guo, Rau, and Wang, 2024:

- Fund assets under management (Fund AUM)
- Fund flow (Fund Flow)
- Fund age (Fund Age)
- Sales fee rate (Sales Fee)
- Management fee rate (Management Fee)
- Transaction fee rate (Transaction Fee)
- Fund turnover ratio (Turnover).
- Year, fund manager, and fund fixed effects
- All continuous variables winsorized at the 1st and 99th percentiles.

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Univariate statistics

	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 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

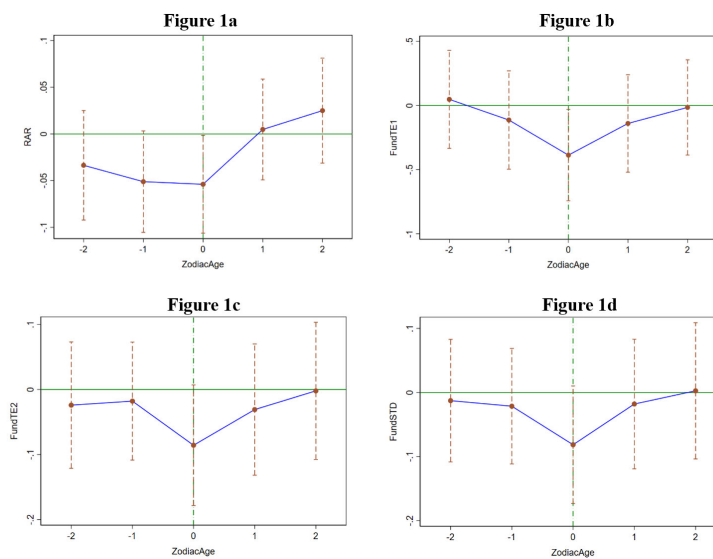
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The effect of the Zodiac year on risk-taking

	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

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The effect of the Zodiac year on risk-taking



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The effect on asset allocation

As a proportion of total assets of the fund

	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

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The effect on portfolio rebalancing

	Δ 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

$$\Delta \text{ Stock Weight}_{ij}^t = \text{Stock Weight}_{ij}^t - \text{Stock Weight}_{ij}^{t-1} = \frac{n_{ij}^t p_j^{t-1}}{\sum n_{ij}^t p_j^{t-1}} - \frac{n_{ij}^{t-1} p_j^{t-1}}{\sum n_{ij}^{t-1} p_j^{t-1}}$$

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Who are the affected managers?

Skill? (Berk and Binsbergen)	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

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What types of funds are more likely to be affected?

Manager picks 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

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When are funds most likely to be affected?

	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

△ *China EPU* represents the number of months in a given year in which China's EPU index is higher than the mean EPU index for that year.

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Placebo tests

	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

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Fund manager turnover

	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

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What about the effect on performance?

	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

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Conclusions

Superstition impacts the behavior of professional investors too.

During their zodiac year:

- Fund managers tend to reduce their exposure to risky assets and decrease their holdings in risky stocks.

Who is susceptible to these superstitions?

- Professional investors early in their careers. This effect is stronger for less experienced managers, those without finance degrees, and those with lower skills.
- **When do superstitions matter?**
 - When fund managers have the flexibility to adjust their portfolios or when they have a significant proportion of passive investments.
 - During periods of greater macroeconomic uncertainty.

Our study challenges the common view in finance that retail investors are irrational while professional investors are rational.