

2023 S.T. Yau High School Science Award (Asia)

Research Report

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Hedge Fund Performance and Manager Characteristics: Evidence from China

Date

15 August 2023

Commitments on Academic Honesty and Integrity

We hereby declare that we

1. are fully committed to the principle of honesty, integrity and fair play throughout the competition.
2. actually perform the research work ourselves and thus truly understand the content of the work.
3. observe the common standard of academic integrity adopted by most journals and degree theses.
4. have declared all the assistance and contribution we have received from any personnel, agency, institution, etc. for the research work.
5. undertake to avoid getting in touch with assessment panel members in a way that may lead to direct or indirect conflict of interest.
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7. ~~observe the safety regulations of the laboratory(ies) where the we conduct the experiment(s), if applicable.~~ Jade yang
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(Signatures of full team below)

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X [Signature]
Name of supervising teacher: Jie Song

Noted and endorsed by (1).
(signature) [Signature]
Name of school principal: Mark Blackshaw

(1) I endorse that from our knowledge and experience with Ashley Zhang she demonstrates high levels of academic honesty and integrity.
[Signature]

Note: Commitments on Academic Honesty and Integrity

Item 7 in the Commitments on Academic Honesty and Integrity form has been requested to be removed by the principal's office of King George V School, as it is not applicable to our research. This item was manually crossed out and signed by Ms. Jade Yang, mother of Ashley Zhang. Ms. Yang accompanied her daughter when presenting this form to Mr. Mark Blackshaw, the Principal of King George V School, for his official signature.

Hedge Fund Performance and Manager Characteristics: Evidence from China

Ashley Zhang*

Abstract

This study examines the performance and risk profiles of hedge funds in China, focusing on the impact of fund manager characteristics. Findings indicate that quantitative funds consistently outperform non-quantitative ones, with higher returns and lower risks. Fund managers' education is positively associated with fund performance. Interestingly, managers without economics training and those with overseas experience exhibit superior performance metrics. The insights offer guidance for investors and have regulatory implications, suggesting a potential shift in entry mechanisms and investor protection strategies.

Keywords: China's capital market, Market efficiency, Hedge fund performance, Hedge fund manager

*King George V School, Kowloon, Hong Kong. I am indebted to Jie Song, PhD candidate at the Chinese University of Hong Kong, for his invaluable guidance.

Acknowledgment

I express sincere gratitude to my supervising teacher whose invaluable insights and comments guided the completion of this paper. I would also like to thank Simuwang.com for providing the essential data that substantiated my research. My appreciation extends to the Yau Science Award for the opportunity it provides. Lastly, I thank my school, peers, and family for their unwavering support.

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1 Introduction

Privately offered hedge funds (hereafter, hedge funds) have made momentous strides as contributors to financial markets and wealth management, becoming an essential component of China's wealth management landscape. As of February 2023, there are 95,737 extant hedge funds with an aggregate scale of 5.64 trillion RMB.¹ This rapid expansion can be attributed to several factors, including the liberalization of financial markets and the demand for diversification and varied investment strategies. Traditionally, risk-averse Chinese investors favor low-risk asset management products such as fixed-income bonds. However, recent market turbulence and credit events have shown that these investments are vulnerable, demonstrating that even seemingly low-risk assets can be susceptible to significant losses. In this context, quantitative hedge funds that employ scientific approaches and effective risk management techniques could shield investors against market fluctuations while still achieving competitive returns.

However, despite these advantages, regulators and many Chinese investors still view quantitative hedge funds with skepticism. This apprehension primarily stems from these funds' novelty and relatively lower information disclosure compared to other asset management products. Amongst a diverse range of managers and products with varying characteristics in the market, some exhibit extremely poor risk control, making it difficult for outsiders to observe their qualities. Consequently, distinguishing between well- and poorly-managed hedge funds has become a critical issue for both regulators and investors.

Beyond the formulation and study of relevant market rules, investor education and the safeguarding of their rights remain cardinal responsibilities of regulatory bodies. For instance, the China Securities Regulatory Commission (CSRC) emphasized in its 2022 Work Report that "raising the quality of services for investors, protecting their legitimate rights, and enhancing their sense of gain" constitute significant parts of its agenda.² Similarly, the US Securities and Exchange Commission's (SEC) mission statement clearly

¹<https://www.amac.org.cn/researchstatistics/report/zgsmjjhysjbg/202303/P020230313631071848228.pdf>

²<http://www.csrc.gov.cn/csrc/c105752/c7399269/content.shtml>

upholds a commitment to “protecting the investing public; maintaining a robust, relevant regulatory framework; supporting a skilled and diverse workforce”.³ Their manifesto advocates fairness and access to appropriate investment facts for all parties.

Historically, regulatory bodies have sought to control market risk and protect investors by enforcing federal securities laws, establishing admission systems, and penalizing violators. In general, regulatory information provided to investors mainly centers around legal provisions and system-related expositions. For example, the CSRC webpage “Investor Education and Protection” offers vast macro-level resources on market institutions and micro-level case studies of company contraventions against market regulations. Likewise, the US SEC expresses its commitment to investor protection through the rigorous enforcement of federal securities laws to uphold honesty and fairness. Despite these measures, investor education regarding sources of investment risk, particularly in relation to hedge funds, remains desperately sparse.

Hedge funds are often viewed as high-risk investments, demanding great risk resilience from investors. Consequently, regulators tend to take a laissez-faire attitude toward investments in such funds. Take the Chinese market as an example, unlike publicly offered mutual funds that are available for purchase via platforms like Alipay, funds require the investors to be qualified investors with net worth exceeding RMB 3 million. However, there is no definitive evidence indicating that higher net-worth individuals possess stronger risk tolerance or display a more comprehensive understanding of risk (Glazer & Weber 2007). Camerer and Lovallo (1999) states that overconfidence could lead to excess entry into the competitive market. The infamous Madoff Ponzi Scheme is a perfect example of how wealth does not guarantee financial acuity. Furthermore, no evidence suggests that investing in hedge funds poses a higher risk than investing in mutual funds. Quite contrary, hedge funds have outperformed public mutual funds over the past five years with average returns of 129.52% and 85.14% respectively, highlighting a difference of roughly 44%.⁴

³<https://www.sec.gov/our-goals>

⁴<https://www.htsec.com/jfimg/colimg/upload/20230206/81381675649430631.pdf>

Therefore, alongside the strengthening of market regulation and punishment of rule violators to sidestep systemic risks, an essential strategy in securing investors' rights involves aiding them in understanding underlying market mechanics, returns, and risks associated with investment targets. Assisting them in discerning hedge funds that manage risk well can decrease potential losses, enhance investor satisfaction, and elevate social welfare. At the same time, comprehension of risk sources can further aid regulatory bodies in developing more effective market entry regulations.

In this research, we study a comprehensive dataset of China's hedge fund market to investigate the returns and risks associated with hedge funds. As different strategies are characterized by different risk metrics, and the most effective strategy is not necessarily the one yielding the highest return, we primarily utilize the Sharpe Ratio as our principal measure for fund performance. We also study other measures such as absolute return, risk measured by return volatility, excess return (alpha), and information ratio.

We find that quantitative funds significantly outperform non-quantitative ones, generating higher returns, lower risks, and superior Sharpe and Information Ratios. We further investigate the fund managers, allowing us to comprehend the defining traits that constitute a "good" manager and identify the characteristics of managers who are more likely to develop strategies with lower risk and higher returns. We discover that fund managers without economics (Econ) training tend to outperform those who have undergone Econ training. This result primarily stems from the fact that non-Econ major managers typically possess higher educational levels. However, after adjusting for education level, we observe that the effect becomes negligible. The effect of education is most significant when we compare the funds managed by individuals owning Ph.D. degrees against those without, indicating that rigorous academic training can help fund managers gain a competitive edge in the capital market. We also find out that managers with overseas experience tend to outperform those without overseas experience.

2 Literature Review

Our research contributes to three distinct areas of literature: the source of return and risk for hedge funds, especially the impact of fund managers' background on fund performance, the performance of hedge funds in China, and the regulation of the capital market.

There is a growing body of literature discussing the sources of hedge fund return and risk. Existing factors include market returns (Chen and Liang, 2007), market liquidity (Cao et al., 2013), and macroeconomic risks (Bali et al., 2014). Moreover, researchers have documented that motivated (Agarwal et al., 2009), emerging (Aggarwal and Jorion, 2010), and distinctive (Sun et al., 2012) hedge fund managers outperform their peers.

Chaudhuri, et al. (2018), and Gottesman et al. (2006) study the influence of fund managers' higher education on fund performance. Covrig et al. (2006) and Chan et al. (2005) explore the home bias of fund managers by building links between nationality on asset allocation. Jagannathan et al. (2017) complement these studies by divulging a "home field" advantage among foreign-origin managers in global markets. This research extends this discourse by examining how educational background influences fund outcomes in the context of China. Our research provides evidence of superior performance from hedge fund managers with Bachelor of Science degrees, suggesting that specialized quantitative training is important in the complex domain of hedge fund investing. Although Chevalier and Ellison (1999) find that MBA holders outperform their non-MBA counterparts in terms of raw returns, our study challenges it by demonstrating that fund managers with economics-related degrees tend to underperform.

Our research also contributes to an emerging body of literature on hedge fund performance in China by Ling et al. (2015), Hong et al. (2017), and Huang et al. (2018). These studies meticulously detail industry performance and risk characteristics. Our study uncovers that cross-sectional differences between China's hedge funds depend on managers' training background and work experience. This contributes to a more in-depth under-

standing of the unique factors that shape hedge fund performance in China's dynamic economic context.

The regulatory landscape for hedge funds and capital markets has undergone significant changes. Naik, Ramadorai & Stromqvist (2007) posit that regulatory measures should strike a balance between hedge fund performance and inherent risks, as these funds tend to amplify market volatility. Eisentraut & Yorulmazer (2008) underscore the need for stringent regulations to mitigate risk and forestall financial instability, attributing a central role to financial intermediaries for preserving market equilibrium. Aggarwal and Jorion (2010) advocate for regulatory emphasis on fund transparency, contending that opacity tends to spur risky behavior. Acharya & Pedersen (2005) promote regulations capable of sustaining liquidity and market efficiency. Across the literature, there is broad agreement on the necessity for robust, comprehensive regulations to manage risk and uncertainty in the capital market. Our study adds to this stream of literature by offering a new angle for regulators in providing investor protection.

3 Data and Methodology

We collect data on China's hedge funds and their managers from simuwang.com, a leading provider of such information. Our study's metrics include annualized monthly returns, risk (measured by return standard deviation), annualized alpha, Sharpe ratio, and a 6-month information ratio. We also examine fund characteristics like inception date, strategy, report frequency, management fee, performance fee, and liquidation date (if applicable). Our risk model benchmarks are the CSI 300 index and China's Cahart 4-factor model (Cahart 1997), extracted from the CSMAR database.

Fund managers' characteristics include the highest educational attainment (including institution and specialization), professional background, gender, and years of investment experience.

Our primary explanatory variables are strategy, education level, major, and profes-

sional background. We focus on return disparities between funds employing quantitative versus non-quantitative strategies. Out of the 23 sub-strategies for funds provided by our data source, we selected all quant-related ones and marked them using a dummy variable, $Quant = 1$.

The dataset's original educational levels, which ranged from 1 (primary school) to 7 (postdoctoral), are reorganized into four categories: non-college degree, bachelor's degree or higher, master's degree or higher, and PhD or higher, represented by dummy variables: $Noncollege=1$, $Bachelor=1$, $Master=1$, and $PhD=1$, respectively.

Academic majors initially posed a challenge due to inconsistent naming conventions across institutions. To standardize them, we manually group majors into 13 general categories based on China's Ministry of Education official discipline classifier.⁵ These disciplines are further divided into either science or art, denoted by the dummy variable $Art = 1$ for art disciplines.

In terms of majors, we particularly examine whether economics training influenced fund performance.

For professional experience, we analyze the potential impact of overseas work exposure prior to joining a Chinese hedge fund, as prior research indicates a positive correlation between top management's international experience and firm performance (Giannetti, Liao, and Yu, 2015).

All funds with missing characteristic variables are excluded. Also, despite a data span since 1992, we establish January 2017 as the threshold to ensure cross-sectional variability. Hedge funds reporting less than 12 monthly returns during this period are dropped to maintain time-series variation.

Our study constructs a unique monthly panel for empirical analysis by matching fund characteristics with their respective managers, covering January 2017 to December 2022. We incorporate both active and expired funds within this period to circumvent the survivorship bias (Li, Zhang, and Zhao, 2012).

⁵<https://www.gov.cn/zhengce/zhengceku/2023-04/20/5752327/files/7256143e8b94465d9263f5fcfae1ecb1.pdf>

The final sample includes 1676 hedge fund managers overseeing 3591 hedge fund products. Each cross-section features a minimum of 1243 funds and 646 distinct fund managers. We winsorize continuous variables at the 1% level to enhance the robustness of the research. Variable measures used are outlined in Table 1.

Table 1: Variable Defination

Variables	Defination
<i>Return</i>	Annualized monthly raw return of the fund
<i>Risk</i>	Standard deviation of return
<i>Sharpe Ratio</i>	Excess annualized return against risk free rate divided by risk
<i>Alpha</i>	Risk adjusted annulized return against China’s Carhart 4 factor model
<i>Information Ratio</i>	Annualized abnormal return divide by annualized idiosyncratic risk
<i>Fund Age</i>	The number of years from the fund’s inception date to today
<i>Management Fee</i>	The proportion by which the fund manager can draw from the amount under management
<i>Performance Fee</i>	The proportion by which the fund manager can draw from the excess return
<i>Liquidation Date</i>	The date when a fund seized operation
<i>Gender</i>	Dummy variable: 1 if the fund manager is a biological male
<i>Highest Education</i>	Highest education earned by the manager
<i>Major</i>	Fund manager’s college major
<i>Professional Background</i>	Fund manager’s background before current position
<i>Investment Years</i>	Investment
<i>Quant</i>	Dummy variable: 1 if the fund adopts quantitative strategy
<i>Phd</i>	Dummy variable: 1 if the manager has a Phd or hinger degree
<i>Master</i>	Dummy variable: 1 if the manager has a Master or hinger degree
<i>Bechelor</i>	Dummy variable: 1 if the manager has a Beachelor or hinger degree
<i>Noncollege</i>	Dummy variable: 1 if the manager has no Beachelor or hinger degree
<i>Econ</i>	Dummy variable: 1 if the manager has art major
<i>Art</i>	Dummy variable: 1 if the manager has art major
<i>Overseas</i>	Dummy variable: 1 if the manager has oversea experience before current position

4 Empirical Results

4.1 Descriptive Statistics

We report descriptive statistics at both fund and manager levels. Table 2 summarizes key variable statistics, showcasing 1676 hedge fund managers operating 3591 fund products from January 1, 2017, to December 31, 2022. On average, a manager manages 1.72 products in our sample. Fund performance is gauged by taking the mean of the measure over the length of our sample, followed by the calculation of the mean, median, and standard deviation of this measure. The mean and median annualized *Return* are 6.29% and 6.55%, respectively, while both *Alpha*’s mean (3.60%) and median (3.43%) are positive. *Risk*,

Table 2: Summary Statistic of Fund and Manager Characteristics

Variables.	Obs.	Mean	S.D.	Median
Fund Performance:				
<i>Return</i> (%)	3591	6.29	12.16	6.55
<i>Alpha</i> (%)	3591	3.60	15.89	3.43
<i>Risk</i> (%)	3591	18.70	11.29	17.84
<i>Sharpe Ratio</i> (%)	3591	37.30	211.17	40.41
<i>Information Ratio</i> (%)	3591	-7.21	104.85	-7.88
Fund Manager Characteristic:				
<i>Gender</i>	1676	0.92	0.27	1.00
<i>Investment Year</i>	1676	14.18	6.57	12.97
<i>PhD (%)</i>	1676	7.88	26.94	0.00
<i>Master (%)</i>	1676	59.60	49.08	1.00
<i>Beachelor (%)</i>	1676	97.32	16.17	1.00
<i>Noncollege (%)</i>	1676	2.69	16.17	0.00
<i>Art (%)</i>	1676	74.28	43.17	1.00
<i>Econ</i> (%)	1676	69.51	46.05	1.00
<i>Oversea (%)</i>	1676	4.47	20.68	0.00
Fund Characteristic:				
<i>Quant</i> (%)	3591	4.20	20.14	0.00
<i>Management Fee (%)</i>	3591	1.42	1.51	1.50
<i>Performance Fee (%)</i>	3591	13.17	10.73	20.00
<i>Fund age</i>	3591	3.29	1.87	3.10
<i>Isliquid (%)</i>	3591	22.17	41.54	0.00

measured by return standard deviation, has a mean and median of 18.70% and 17.84%, respectively. *Sharpe Ratio's* positive mean (37.30%) and median (40.41%) highlight risk-adjusted hedge fund profitability.

Approximately 4.2% of funds employ quantitative strategies. Of all fund managers, 7.9% hold PhD degrees, 59.6% possess master's degrees, and a minuscule 2.7% lack college experience. Regarding managers' majors, arts represent a 74.2% majority. Of all managers, 69.5% are equipped with Econ training. A modest 4.5% of fund managers have overseas work experience.

Additional control variables reveal an average investment tenure of 14.2 years. The average lifespan of hedge fund products, at 3.3 years, pales against US counterparts. The average management and incentive fees are 1.42% and 13.17%, respectively. Male managers represent a dominant 92%.

We employ the Sharpe ratio as our primary performance measure, considering its comprehensive reflection of investment skill. Proposed by Nobel laureate William F. Sharpe as a byproduct of his Capital Asset Pricing Model (CAPM) research, it offers a robust risk-adjusted return measure.

Table 3: Sub Sample Results on Quant Funds

Variables.	<i>Quant</i>	<i>NonQuant</i>	<i>Quant-NonQuant</i>
<i>Return</i> (%)	8.83	7.45	1.38
<i>Alpha</i> (%)	8.22	4.92	3.30***
<i>Risk</i> (%)	16.57	20.26	-3.69***
<i>Sharpe Ratio</i> (%)	65.28	41.70	23.59***
<i>Information Ratio</i> (%)	21.04	9.05	11.99

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 3 outlines descriptive statistics for the subsamples. Quant funds significantly outperform non-quant funds in terms of return (8.83% vs. 7.45%), alpha (8.22% vs. 4.92%), Sharpe ratio (65.28% vs. 41.70%), and information ratio (21.04% vs. 9.05%). Quant

funds are also associated with lower risk, evidenced by a lower return standard deviation (16.57% vs. 20.26%).

We further break down the sample into subgroups of managers with different educational backgrounds. We compare fund managers with and without a PhD degree, as well as fund managers with and without economic training in college. Table 4 shows that PhD holders and non-PhD holders yield similar returns; however, PhD holders take on significantly less risk, resulting in a higher Sharpe ratio.

Econ training versus non-Econ training comparison results are surprising - non-Econ trained managers marginally outperform their Econ trained peers regarding return and Sharpe ratio. However, These managers generate significantly lower risk. A similar pattern is observed when comparing art major managers, as 94% of art majors are Econ majors. The reason could be due to that there are more PhD in non-Econ majors. Our sample shows that a non-Econ major fund manager are more likely to become a PhD (14.26% to 9.2%, resulting in a higher Sharpe ratio in the non-Econ sub-sample.

Table 4: Sub Sample Results on PhD and Econ Backgrounds

Variables.	PhD	NonPhD	PhD-NonPhD	Econ	NonEcon	Econ-NonEcon
<i>Return</i> (%)	7.65	7.57	0.08	7.49	7.67	-0.18
<i>Alpha</i> (%)	6.18	5.12	1.06	4.88	6.22	-1.34**
<i>Risk</i> (%)	16.27	20.45	-4.17***	20.39	18.62	1.77***
<i>Sharpe Ratio</i> (%)	63.88	41.34	22.56**	42.45	49.73	-7.28
<i>Information Ratio</i> (%)	21.04	9.05	11.99	10.70	8.10	2.60
<i>PhD</i> (%)				9.20	14.26	4.66***

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

4.2 Fund Performance and Quantitative Strategy

In order to expand upon the explanatory influence of hedge fund managers' foreign experiences on fund performance and risks, we commence by estimating the following multivariate panel regression on quantitative funds.

$$\begin{aligned}
& \text{Return, Risk, Alpha, Sharpe Ratio, Information Ratio} = \\
& \beta_0 + \beta_1 * \text{Quant} + \beta_2 * \text{Gender} + \beta_3 * \text{Investment Years} + \beta_4 * \text{Fun Age} + \\
& \beta_5 * \text{Management Fee} + \beta_6 * \text{Performance Fee} + \epsilon \quad (1)
\end{aligned}$$

We examine the impact of a quantitative strategy using several proxies for hedge fund performance and risk. Specifically, our dependent variables comprise of *Return*, *Alpha*, *Risk*, *Sharpe Ratio*, and *Information Ratio*. The *Return* variable represents hedge fund annualized net-of-fee return. The *Alpha* variable is defined as the annualized China seven-factor monthly alpha where factor loadings are estimated using a 24-month period. *Risk* is the standard deviation of the annualized fund return. *Sharpe Ratio* is the average annualized fund excess returns divided by the standard deviation of annualized fund returns. *Information Ratio* refers to the annualized abnormal return divided by the annualized idiosyncratic risk. All performance and risks are average annualized figures across the fund's lifetime.

We commence our investigation by examining *Quant*, which signifies whether a hedge fund has implemented a quantitative strategy. Our panel regression includes several control variables such as *Investment Years*, which measures the years of investing experience of the fund manager during a specific year and month, thus representing a time-variant variable. *Management Fee* is the fee the fund receives in proportion to the total size, while *Performance Fee* represents the proportion that the fund manager can deduct from the excess return. *Fund Age* is measured by the number of years since the inception date of the fund. *Gender* is also included within our data set, representing the biological sex of the fund manager.

The findings from the multivariate regression analysis are summarized in Table 5. Most importantly, column 4 reveals a positive and statistically significant coefficient of the quantitative strategy on the Sharpe Ratio. Column 1 suggests that the coefficient of the quantitative fund on return is positive, although not statistically significant. Column 3

Table 5: Multivariate Regression on Quantitative Strategy

	(1)	(2)	(3)	(4)	(5)
	<i>Return</i>	<i>Risk</i>	<i>Alpha</i>	<i>Sharpe Ratio</i>	<i>Information Ratio</i>
<i>Quant</i>	0.0084 (0.0078)	-0.0255*** (0.0016)	0.0292*** (0.0027)	0.0643** (0.0274)	0.1256*** (0.0180)
<i>Gender</i>	-0.0050 (0.0088)	0.0245*** (0.0018)	-0.0052* (0.0030)	-0.1391*** (0.0309)	-0.0291 (0.0204)
<i>Invest Years</i>	-0.0005 (0.0003)	-0.054 *** (0.041)	-0.0009*** (0.0001)	0.0001 (0.0012)	-0.0017** (0.0008)
<i>Fund Age</i>	-0.0035** (0.0012)	-0.0041 (0.0003)	-0.0053*** (0.0004)	-0.0147*** (0.0043)	-0.0070** (0.0029)
<i>Performance Fee</i>	0 (0.0002)	0.0004 (0)	0 (0)	-0.0116*** (0.0009)	-0.0006 (0.0006)
<i>Management Fee</i>	0.0006 (0.0015)	-0.0005 (0.0003)	0.0014** (0.0005)	-0.0058 (0.0052)	-0.0224*** (0.0034)
Observations	121782	121782	121782	121782	121782
FE_Time	Yes	Yes	Yes	Yes	Yes

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

suggests a positive and significant alpha, while Column 2 presents a statistically significant negative coefficient of the quantitative fund on *Risk*, reiterating that the positive risk is driven by both significant positive excess return and significant negative risk. Column E confirms a positive and significant information ratio.

These findings allow us to conclude that after accounting for other fund-level characteristics and manager attributes, funds implementing quantitative strategies consistently outperform non-quantitative hedge funds.

4.3 Fund Performance and Manager Characteristics

This subsection delves into the correlation between fund performance and the educational background of the fund managers. We estimate a similar panel regression as discussed

previously.

$$\begin{aligned}
 & \text{Return, Risk, Alpha, Sharpe Ratio, Information Ratio} = \\
 & \beta_0 + \beta_1 * \text{PhD} + \beta_2 * \text{Gender} + \beta_3 * \text{Invest Years} + \beta_4 * \text{Fund Age} + \\
 & \beta_5 * \text{Management Fee} + \beta_6 * \text{Performance Fee} \epsilon_i
 \end{aligned} \tag{2}$$

Table 6: Multivariate Regression on Managers with PhD

	(1) <i>Return</i>	(2) <i>Risk</i>	(3) <i>Alpha</i>	(4) <i>Sharpe Ratio</i>	(5) <i>Information Ratio</i>
<i>PhD</i>	0.0030 (0.0075)	-0.0225*** (0.0015)	0.0081** (0.0025)	0.3792*** (0.0258)	0.0350** (0.0172)
<i>Gender</i>	-0.0054 (0.0088)	0.0235*** (0.0018)	-0.0053* (0.0030)	-0.1450*** (0.0309)	-0.0314 (0.0204)
<i>Invest Years</i>	-0.0006 (0.0003)	0.0006 *** (0)	-0.0011*** (0.0001)	-0.0019 (0.0012)	-0.0028** (0.0008)
<i>Fund age</i>	-0.0037** (0.0012)	-0.0038*** (0.0003)	-0.0055*** (0.0004)	-0.0144*** (0.0043)	-0.0084** (0.0029)
<i>Performance Fee</i>	0 (0.0002)	0.0004*** (0)	-0.0001 (0)	-0.0113*** (0.0009)	-0.0011** (0.0006)
<i>Management Fee</i>	0.0007 (0.0015)	-0.0004*** (0.0003)	0.0014** (0.0005)	-0.0057 (0.0052)	-0.0218*** (0.0034)
Observations	121782	121782	121782	121782	121782
FE_Time	Yes	Yes	Yes	Yes	Yes

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Column 4 provides evidence that funds managed by individuals who have PhD degrees outperform those managed by individuals without PhD degrees on the Sharpe Ratio, contributing an excess of 37.92% to the Sharpe Ratio of funds. Comparable to our previous analysis regarding quantitative versus non-quantitative funds, absolute return appears unaffected. Yet again, we observe significantly higher ALPHA values and significantly lower RISK, along with a significantly higher INFO ratio.

Similarly, the effects of a college degree exhibit analogous patterns, with statistically significant absolute returns. Remarkably, a college degree contributes an increase of 6.5% in ALPHA, and 40.7% in SHARPE.

After accounting for various factors, economics training results in a neutral Sharpe Ratio but is associated with significantly higher RISK.

The superior performance of quantitative funds can be attributed to the higher concentration of PhD holders managing these funds. Approximately 20% of fund managers in quantitative funds hold PhD degrees, almost doubling that in non-quantitative funds. When we control for PhD holders in the panel regression, the coefficient of the quantitative fund on the Sharpe Ratio reduces to 3.84% and becomes statistically insignificant. Regardless, the quantitative strategy still denotes a significantly lower RISK, indicating the inherent stability of the strategy. Additionally, we find that managers with over-

Table 7: Multivariate Regression on Manager Oversea Experience

	(1) <i>Return</i>	(2) <i>Risk</i>	(3) <i>Alpha</i>	(4) <i>Sharpe Ratio</i>	(5) <i>Information Ratio</i>
<i>Overseas</i>	0.0264** (0.0111)	-0.0377*** (0.0023)	0.0360*** (0.0038)	0.3847*** (0.0398)	0.3850*** (0.0262)
Observations	121782	121782	121782	121782	121782
Control Variables	Yes	Yes	Yes	Yes	Yes
FE_Time	Yes	Yes	Yes	Yes	Yes

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

sea experiences outperform those who do not possess oversea experiences. Unlike other results, in addition to a boost in the Sharpe ratio, oversea managers could also generate significantly higher returns, making them the 'star manager' in our sample.

5 Robustness Tests

5.1 Sub-sample with Stock-only Strategy

Considering that we do not possess a Chinese version of the Fung and Hsieh 7-factor model for China's hedge fund market (Fung and Hsieh, 2004), establishing a baseline risk model for our analysis is challenging. Thus, this section focuses solely on the sub-sample of funds that exclusively invest in stocks. We calculate the ALPHA as the relative excess

return to the Carhart 4-factor model, treated as a risk-adjusted return.

Tables 8 and 9 confirm that our findings remain consistent within the sub-sample of funds targeting only stocks. Quantitative funds contribute a significant 5.62% to the Sharpe Ratio, accompanied by considerably higher ALPHA and lower RISK.

Focusing on stock-only strategies reduces the number of PhD managers in each cross-section, insufficient to generate a significant variation for analysis. Therefore, we turn our attention to managers with Master's degrees or above, discovering that those with this qualification generate an excess of 15.5% in the Sharpe Ratio compared to those without a Master's degree.

Table 8: Multivariate Regression on Manager Education Level

	(1)	(2)	(3)	(4)	(5)
	<i>Return</i>	<i>Risk</i>	<i>Alpha</i>	<i>Sharpe Ratio</i>	<i>Information Ratio</i>
<i>Quant</i>	0.0091	-0.0102***	0.0269***	0.562**	0.2764***
	(0.0121)	(0.0022)	(0.0038)	(0.0227)	(0.0256)
Control Variables	Yes	Yes	Yes	Yes	Yes
Observations	95737	95737	95737	95737	95737
FE_Time	Yes	Yes	Yes	Yes	Yes

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 9: Multivariate Regression on Manager Education Level

	(1)	(2)	(3)	(4)	(5)
	<i>Return</i>	<i>Risk</i>	<i>Alpha</i>	<i>Sharpe Ratio</i>	<i>Information Ratio</i>
<i>Master</i>	0.0112	-0.0475***	0.0045**	0.1550**	0.0622***
	(0.0063)	(0.0011)	(0.0020)	(0.0118)	(0.0135)
Control Variables	Yes	Yes	Yes	Yes	Yes
Observations	95737	95737	95737	95737	95737
FE_Time	Yes	Yes	Yes	Yes	Yes

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

5.2 Continuous Education Level Measure

In our primary analysis, we group educational levels into four categories and mainly study the effect of having a PhD degree on fund performance. Here we adopt an alter-

native method, treating education as a continuous variable, ranging from 1 (the lowest - elementary school) to 7 (the highest - post-doctorate). As per the panel regression, Table 10 suggests consistent results that a higher education level corresponds to a higher Sharpe Ratio and lower RISK.

6 Conclusion and Implications

In this study, we first investigate how quantitative funds differ from non-quantitative funds in terms of performance and risk. Our conclusion is that the former significantly outperforms the latter. Furthermore, we examine the impact of fund manager characteristics on the performance and risk of funds. We find that the educational background of fund managers has a strong positive influence on fund performance, not through returns, but through reduced risk and increased Sharpe ratios. Non-Econ major fund managers perform better than those with an economics background, and managers with overseas experience outperform those without.

6.1 Implications

For investors targeting hedge funds, our research is crucial as it can help identify high-performing and substandard funds. Moreover, our findings have critical regulatory implications. First, recognizing the types of hedge funds that present lower risks and higher returns is vital for regulators. This insight will allow them, as credible public organizations, to provide rigorous academically-sound factual information during investor education. Second, studying the backgrounds of fund managers can enable regulatory bodies to better adjust entry mechanisms for fund managers. Regulating entry strategies for funds is challenging as it is impossible to entirely forbid certain strategies. However, regulators can modify entry reviews for managers. Our research indicates managers with higher education levels adopt less risky strategies, and thus achieve higher Sharpe ratios. As such, regulators should encourage or ease entry systems for more educated fund

managers. Furthermore, products managed by non-Econ major fund managers incur lower risks, hence regulatory scrutiny over stringent economics training for managers is unnecessary. Instead, diversity amongst novice managers should be encouraged. Finally, managers with overseas experience produce higher returns and lower risks, likely due to longer exposure and richer experiences in foreign capital markets, enhancing their risk resistance. Therefore, implementing policies to attract overseas fund managers should be one of the tasks for regulators.

6.2 Future work

Due to constraints in data and methodology, our study has several limitations. First, the history of hedge funds in China is relatively short and the data are not fully preserved before 2017, thus we could only use a short time frame for our analysis. A comprehensive risk (factor) model is lacking in China's market, hence we lack a sound benchmark model. Developing the Chinese equivalence of the Fung and Heish 7-factor model could become a starting point for our future work. Also, we do not have hedge fund position data in our dataset. If available, we could better investigate fund strategies, such as the impact of quantitative strategies on price efficiency. We could explore whether stock volatility, risks, and prices change over time after market participation of quantitative funds, thereby examining market efficiency implications.

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