Life Cycle Performance of Hedge Fund Managers*

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ABSTRACT

We study the life cycle performance of hedge fund managers as one of managerial characteristics to address asymmetric information between hedge fund managers and investors. We are the first to find that hedge fund managers have a hump-shaped life cycle relationship between their work experience and performance. In the early years of their profession, fund managers have serious career concerns and therefore work hard to build up their confidence and expertise. As a result, they exhibit an improving performance. But as their performance steadily ascends, the improvement of the performance is at a decelerating rate as their career concerns start to ebb away and their effort on their jobs is lessened. The performance of an average fund manager peaks around 5 years and then deteriorates afterwards. We also find that fund managers with postgraduate degrees have a Sharpe ratio 9.2% higher than their peers without postgraduate degrees and female fund managers have a Sharpe ratio 17.5% above their male peers. Fund managers working at financial centers outperform their peers at non-financial centers due to both sorting and learning effects. However, the outperformance in financial centers gradually diminishes after 10 years. In a natural experiment setting, we find that the stock market crash had a permanent negative impact on the life cycle performance of fund managers, resulting in a 14.7% decline in the Sharpe ratio. In conclusion, the life cycle work experience of fund managers provides a signal of hedge fund performance that could mitigate information asymmetry to outside investors.

Keywords: Life cycle performance; Hedge fund managers; Work experience; Financial center

JEL classification: G11, G23, G40, G41

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1. Introduction

It has long been recognized that there is severe asymmetric information between investors and hedge fund managers because of low disclosure requirements and flexible investment strategies in the hedge fund industry (Bollen and Pool, 2009; Brophy, et al., 2009; Massoud, et al., 2011; Agarwal, et al., 2013; Aiken, et al., 2015; Grundy and Verwijmeren, 2018; Kumar, et al. 2020). Investors have less information about the portfolio compositions and future risks of hedge funds than fund managers. This leads to the question of how to choose a hedge fund for investors. Grossman (2005) and Lim et al. (2016) point out that the performance of a hedge fund is mostly dependent on the fund manager's capabilities. Chevalier and Ellison (1999b) and Li. et al. (2011) attribute the fund performance to managerial characteristics such as age, SAT score, and MBA degree. We study the life cycle work experience of fund managers as a signal of hedge fund's performance to outside investors under the asymmetric information world.

To our best knowledge, we are the first to depict the life cycle performance of fund managers throughout their career life. In this paper we use a proprietary dataset in China to study how work experience affects the performance of hedge fund managers. The shape of the life cycle performance of fund managers is an empirical question. Li. et al. (2011) and Chevalier and Ellison (1999b) find a negative effect of managers' work experience on the effect of both hedge fund and mutual fund performance respectively because less experienced managers are eager to exert more effort as they are more prone to be dismissed for poor performance.

We find a hump shape in the life cycle performance of hedge fund managers by using a risk-adjusted measure, Shape ratio, at the manager level. Young fund managers exert great effort to build up their confidence and expertise in the face of acute career concerns (Holmström, 1999; Bai, et al., 2019). As a result, their performance is ascending in the early career life. As their performance improves, fund managers tend to slack off as they face less career concerns. Hence, the improvement of their performance is at a decelerating rate. After reaching their peak in around 5 years, their performance begins to deteriorate afterwards.

Next, we identify several channels of hedge fund manager's life cycle performance such as financial center, gender, and educational attainment. We first explore the effect of financial centers on the life cycle performance of hedge fund managers. We find hump-shaped relationships in the life cycle performance of fund managers in both financial centers and non-financial centers. Fund managers

working in financial centers perform better than their peers in non-financial centers, ceteris paribus. We find evidence to support the sorting hypothesis developed by Helsley and Strange (1990, 1991). They argue that financial centers attract high-skilled fund managers because they can match with better jobs and are easier to change jobs. We also find evidence to support the learning hypothesis developed by Christoffersen and Sarkissian (2009). They argue that fund managers working in financial centers approach updated information and transform knowledge more easily.

It is worth noting that we find the outperformance in financial centers will diminish as fund managers outside the financial centers become more experienced. Fund managers working in non-financial centers are more dedicated to improving their skills and acquiring information than their peers in financial centers because they need to make greater effort to compete and survive in the hedge fund industry. The improvement in both skills and information acquisition of fund managers working in non-financial centers eventually reduces the performance gap with those working in financial centers.

We find that gender also has a significant effect on life cycle performance. The average Sharpe ratio of female fund managers is 17.5% higher than that of male fund managers. This result is consistent with the findings of Aggarwal and Boyson (2016) that female-managed funds need to perform better than male-managed funds to survive because they are more prone to failure since they have far fewer assets under management than male-managed funds. Furthermore, we find that young female fund managers working in non-financial centers at their early career life have relatively lower performance than both male and female fund managers working in financial centers. However, they make greater effort to compete and survive in the hedge fund industry and consequently first catch up with male fund managers working in financial centers in their fifth year of career. Then they continue to improve their skills and keep up the effort to acquire information, and gradually reduce the gap with the female fund managers working in financial centers.

For education attainment, we find that the fund managers who finished postgraduate studies have an average Sharpe ratio 9.2% higher than those without postgraduate degrees. The result is consistent with Chevalier and Ellison (1999b) and Li. et al. (2001). They find that fund managers graduated from the undergraduate institutions with higher SAT scores have higher performance. As education is a proxy for manager talent, higher-educated fund managers have better fund performance due to their stronger learning ability and richer knowledge.

Furthermore, using a natural experiment of the Chinese stock market crash in 2018, we explore how an exogenous shock affects the life cycle performance of hedge fund managers. We show that fund managers perform worse in the post-crash period than the pre-crash period. In specific, there is a

14.7% decline in the Sharpe ratio after the stock market crash.

To further validate our main life cycle performance results, we conduct three robustness tests. First, the sample period is expanded to a total of 17 years from 2004 to 2020. Second, we adopt a logarithmic transformation of the Sharpe ratio to better fit the data. Third, we use a dataset at the fund level with a subset of fund managers to examine the fund manager's life cycle performance based on various risk-adjusted measures of fund performance such as Sharpe ratio, Jensen's alpha, and Appraisal ratio. In all the cases, we continue to find the hump-shaped life cycle relationships between work experience and performance at the fund level. Furthermore, the fund level dataset also enables us to test and validate the two main channels of confidence and career concerns of the fund managers that result in their hump-shaped life cycle performance.

We contribute to the literature on fund manager performance in four ways.

First, we are the first to find the hump-shaped life cycle relationship between work experience and the performance of hedge fund managers. This finding is important as it will reduce asymmetric information between hedge fund managers and investors. To explore the factors contributing to the fund performance, most of the literature focus on the fund characteristics such as fund age, fund size, fund flows, the attitudes towards risk, managerial compensation characteristics and managerial flexibility (Ackermann et al.,1999; Berk and Green, 2004; Aragon, 2007; Agarwal et al., 2009; Aggarwal and Jorion, 2010; Huang, et al., 2011; Aggarwal and Boyson, 2016). In terms of manager characteristics, some literature interested in the effect of fund managers' skills such as investment decision and timing skills on fund performance (Ferson and Schadt, 1996; Bollen and Busse, 2001; Cohen, et al. 2005; Cao, et al., 2013). Much of the current literature also focuses on the education attainment of fund managers such as MBA degree and the quality of undergraduate institutions (Golec, 1996; Chevalier and Ellison, 1996b; Gottesman and Morey, 2006; Li. et al., 2001).

Less is known about the life cycle performance of fund managers. Christoffersen and Sarkissian (2009) and Chevalier and Ellison (1999b) find a negative relationship between mutual fund performance and either manager's tenure or his age. Likewise, Li. et al. (2011) also find a negative effect of work experience as one of the manager characteristics on the effect of hedge fund performance. In this paper, we find the hump-shaped relationship between work experience and manager's performance. Fund investors may choose hedge funds by using the fund managers' work experience over their life cycles as signals of fund performance in an asymmetric information world.

Second, we also provide new evidence on the effect of the urban agglomeration on the manager's life cycle performance. There are two non-exclusive hypotheses to explain why fund managers

working in financial centers have better performance. First is the sorting hypothesis that financial centers attract more skilled fund managers developed by Helsley and Strange (1990, 1991). Second is the learning hypothesis that workers would benefit from the extensive information flow suggested by Jacobs (1969), Lucas (1988) and Glaeser (1999). Christoffersen and Sarkissian (2009) provide evidence to support learning hypothesis by finding that mutual funds located in financial centers have higher risk-adjusted returns by more experienced managers. We find evidence to support both sorting and learning hypotheses. Fund managers working in financial centers have better performance than those working in non-financial centers. However, we find that the outperformance resulting from geographic advantages would gradually vanish as the fund manager is more experienced. We provide a plausible explanation for the diminishing gap that the fund managers working in non-financial centers exert more effort to improve their skills and acquire information. Thus, they can reduce the performance gap with those working in financial centers because of both skill and information convergence.

Third, we contribute to the literature by focusing on the effect of gender on the manager's life cycle performance. Bliss and Potter (2002) find that female mutual fund managers outperform male counterparts in raw returns but cannot find significant difference after controlling risks. Aggarwal and Boyson (2016) find that hedge funds with all-female managers perform indifferently to those with all-male managers but funds with at least one female manager would perform better than male-managed funds for surviving funds. From the life cycle performance perspective, we find that female hedge fund managers have better performance than male peers. Furthermore, we find that female managers working in non-financial centers is geographically disadvantaged to start with. However, they make greater effort to survive in the hedge fund industry and first catch up with male fund managers working in financial centers in their fifth year of work experience. Then, they continue to improve their skills and acquire information, and gradually reduce the gap with the female fund managers working in financial centers.

Finally, we contribute to the literature by investigating the impact of exogenous shocks on the manager's life cycle performance. Some empirical evidence reveals that hedge fund performance severely deteriorate during the financial crisis (Aragon and Strahan, 2012; Ben-David, et al; 2012; Mitchell and Pulvino, 2012; Nagel, 2012). Ain Tomma, et al. (2022) investigate the effect of COVID-19 on the performance of female hedge fund managers. We use the Chinese stock market crash in 2018 as a natural experiment to find a negative effect of stock market crash on the life cycle performance of hedge fund managers.

The rest of the paper proceeds as follows. Section 2 describes the data and provides a range of summary statistics. Section 3 provides the empirical results for the life cycle performance of hedge fund managers. Section 4 investigates several channels for the life cycle performance of hedge fund managers. Section 5 discusses the effect of 2018 stock market crash in China on the life cycle performance of hedge fund managers. Section 6 provides several robustness checks. Section 7 tests the confidence and career concerns channels at the fund level. Finally, Section 8 includes.

2. Data and variables

2.1. Data

Hedge funds are also named as private securities investment funds[1] ("si mu tou zi ji jin" in Chinese) in China. The performance and the personal characteristics data of hedge fund managers in this paper is from a proprietary dataset by a private securities investment fund information service provider under the Rongzhi Investment Consulting Company affiliated with Shenzhen Financial Consulting Association. Our sample period is 2011-2020. Our sample contains information on 5,107 unique fund managers.

2.2. Manager characteristics and performance

Our primary measure of risk-adjusted performance of hedge fund managers is the Sharpe ratio (Sharpe, 1966). In the manager-level dataset, the Sharpe ratio for each fund manager is the risk premium divided by the standard deviation of returns on the portfolio of funds that the manager holds. Following Chevalier and Ellison (1999b), we use the logarithm of the number of years the manager has worked (*lnexper*) as work experience, which is one of our main explanatory variables.

The dataset also provides information on the hedge fund managers' education background, gender, professional background, investment strategy, location, and number of funds under management by the manager. We winsorize all the variables at both 0.5% and 99.5% to eliminate the effect of outliers.

[1] Jiang (2020) mentions that private funds in China are offered in three main categories. One of the categories, whose official name translates as "private securities investment fund," is equivalent to "hedge fund" in the US market. These funds mainly trade in the secondary market of various financial assets, including stocks, bonds, and futures. They may also take leverage or use complex financial instrument to implement their strategies.

2.3. Summary statistics

Panel A of Table 1 provides the hedge fund manager distribution by year in our sample. The number of managers fluctuates in the periods between 2011 and 2020. We include both active and inactive managers to mitigate the potential problem of survivorship bias. We present the hedge fund manager distribution by work experience in Panel B. We divide the managers into five groups and find a hump-shaped relationship between work experience and performance. The performance of fund manager increases in the early career. It starts to peak at 5 years of work experience and deteriorates after 15 years.

[Insert Table 1 here]

Panel A of Table 2 provides the summary statistics of the sample. We have two performance measures for managers in this paper. The average Sharpe ratio and transformed Shape ratio for the robustness test are 0.781 and 0.762, respectively, both have a wide dispersion. The lowest Sharpe ratio is around -3.8 and the highest is more than 9.2 per year. In terms of manager characteristics, the average value of the logarithm of years the manager has worked (*lnexper*) is 2.594 and the standard deviation is 0.498, indicating that the hedge fund managers have 13.4 years of work experience on average. About 63.4% of hedge fund managers have a master's degree or above. The percentage of hedge fund managers working in the financial centers is 67.3% on average. In other words, more than two-thirds of hedge fund managers worked in Shenzhen and Shanghai. About 8.9 percent of hedge fund managers are female. The average value of the logarithm of the number of funds the manager manages (*lntnf*) is 1.766, indicating that the hedge fund managers manage about 6 funds on average.

[Insert Table 2 here]

We report the correlations among the performance of fund managers and various manager characteristics in Panel B of Table 2. We find a negative correlation between the Sharpe ratio and the square term of the logarithm of years the manager has worked (*lnexper2*), which provides preliminary evidence that there is a hump-shaped relationship between performance and work experience. Besides, we find that the hedge fund managers with master's degrees or above have better performance than their peers without master's degrees based on the positive correlation. The positive correlation between performance and female dummy indicates that female hedge fund managers perform better than male managers. We find a positive correlation between the Sharpe ratio and the number of funds the manager manages, which provides preliminary evidence that hedge fund managers in charge of more funds

would perform better. From the correlation between our independent variables, the logarithm of years the manager has worked (*lnexper*) and its square term (*lnexper2*) have low correlations with any of the other variables.

3. Life cycle performance of hedge fund managers

The performance of fund managers can be explained by their work experience and other managerial characteristics by the following baseline regression model:

$$Sharpe_{i,t} = \beta_0 + \beta_1 lnexper_{i,t} + \beta_2 (lnexper_{i,t})^2 + MgrChars_{i,t} + FE_{i,t} + u_{i,t} \quad (1)$$

where $Sharpe_{it}$ is the Sharpe ratio defined as the risk premium divided by the standard deviation of returns on the portfolio of funds that the fund manager holds. $lnexper_{i,t}$ is calculated by the logarithm of the number of years the manager has worked. $MgrChars_{i,t}$ is a vector of managerial characteristics of education level (*master*), female indicator (*female*), and the logarithm of the number of funds the manager manages (*lntnf*). The fixed effects (*FE*) include year, city location, professional background, and investment strategy of the fund manager in the regression.

Table 3 reports the empirical results of our regressions. We run six specifications. The first three columns control for year and location fixed effects. The regressions in columns 4 and 5 further include professional background fixed effects to control for the possibility that fund managers with different professional backgrounds may have different performances. We also add investment strategy fixed effects in column 6 to control for the possibility that managers with some investment strategies may perform better than those with other strategies. All *t*-statistics in parentheses are based on standard errors that are corrected for heteroskedasticity and double clustered at both fund and city location levels.

Across all specifications, we find a hump-shaped relationship between fund manager's work experience and performance. The coefficients of the logarithm of the number of years of the manager has worked (*lnexper*) are positive and significant at the 5% level, and the coefficients of its quadratic term (*lnexper2*) are negative and significant at the 1% significance level. In addition, our regression results indicate that the hedge fund managers with master's degrees or above perform significantly better than those managers without master's degrees.

From column 3 to column 6, we find the female indicator to be positive and significant at the 1% level. It indicates that female hedge fund managers perform better than male managers. The regressions also show the effect of the number of funds managed by the manager (in logarithmic terms) to be

positive and significant, indicating that fund managers holding more funds would perform better.

[Insert Table 3 here]

Using the coefficient estimates in column 6 as an example, we plot the hump-shaped relationship between work experience and manager performance in Figure 1. In the early career, fund managers encounter more career concerns and thus work hard to gain more skills and confidence, resulting in an improving performance. As they become more experienced, fund managers exert less effort because their career concerns are alleviated. As a result, the improvement of the performance is at a declining rate. Their performance reaches its peak in the fifth year of their career and begins to deteriorate afterwards.

[Insert Figure 1 here]

We further discuss the economic implication in terms of dollar amount the fund manager generated by Figure 1. It should be noticed that the dollar amount the fund manager generated may not necessarily decrease in his later career life. A manager would have more assets under management as his work experience increases. By using a sub-sample of about 600 fund managers, we find a positive relationship between the manager's work experience and the assets under management. For example, the median assets under management in the sub-sample of managers with 7 and 17 years of work experience are 19 million RMB (approximately 3.17 million US dollars) and 30 million RMB (approximately 5 million US dollars), respectively. The Sharpe ratio is 0.715 for the managers with 7 years of work experience, and 0.499 for the managers with 17 years of work experience according to the life cycle performance curve.

Suppose that the two groups of managers have the same median standard deviation of returns (std=15.06%), the manager with 7 years of work experience can generate $0.715 \times 15.06/100 \times 19 = 2.046$ million RMB (approximately 341 thousand US dollars) and the manager with 17 years of work experience can generate $0.499 \times 15.06/100 \times 30 = 2.254$ million RMB (approximately 375.67 thousand US dollars). Although the fund manager with 17 years of work experience has a lower Sharpe ratio, they generate higher dollar amounts than their peers with 7 years of work experience.

4. Channels of hedge fund manager's life cycle performance

4.1. Financial center and fund manager's life cycle performance

An important factor that affects a fund manager's life cycle performance is their surrounding work environment. In this section, we study the effect of financial centers on fund manager's performance by including the financial center indicator and its interaction with the linear and square terms of manager's work experience in our baseline model. We define Shanghai and Shenzhen as the financial centers in China. Helsley and Strange (1990, 1991) developed the sorting hypothesis that financial centers can attract high-skilled fund managers. If a positive and significant coefficient of the financial center indicator is found, then it is evidence to support the sorting hypothesis. Jacobs (1969) established the learning hypothesis that fund managers working in financial centers would be easier to acquire information and benefit from information transformation and knowledge spillover. If significant coefficients of the interaction terms of the financial center indicator with the linear and square terms of manager's work experience are found, then it is evidence to support the learning hypothesis. Both sorting and learning effects of financial centers would contribute to the higher performance of fund managers working in financial centers.

The main regression model to test the effect of financial centers is as follows.

$$Sharpe_{it} = \beta_0 + \beta_1 lnexper_{it} + \beta_2 (lnexper_{it})^2 + \beta_3 fcenter_i + \beta_4 fcenter_i \times lnexper_{it} + \beta_5 fcenter_i \times (lnexper_{it})^2 + MgrChars_{it} + FE_{i,t} + u_{it} \quad (2)$$

where the indicator variable $fcenter_i$ equals one if the fund manager works in Shenzhen or Shanghai, and zero otherwise. $Sharpe_{it}$ is the Sharpe ratio defined as the risk premium divided by the standard deviation of returns on the portfolio of funds that the fund manager holds. $lnexper_{i,t}$ is the logarithm of the number of years the manager has worked. $MgrChars_{i,t}$ is a vector of managerial characteristics of education level (*master*), female indicator (*female*), the logarithm of the number of holding funds (*lntnf*). The model also includes a full set of fixed effects (*FE*) such as year, professional background, and investment strategy.

The regression results are shown in Table 4. The coefficients of the logarithm of the number of years of work experience (*lnexper*) are positive and significant at the 1% level and the coefficients of the logarithm of the quadratic term of the number of years of work experience (*lnexper2*) are negative and significant at the 1% level. These results indicate a hump-shaped life cycle performance of fund managers working in non-financial centers. The coefficients of the interaction term of the financial

center indicator with work experience ($fcenter \times lnexper$) are positive and significant at the 5% level. The coefficients of another interaction term ($fcenter \times lnexper2$) are negative and significant at the 5% level. In column 6, for fund managers working in the financial centers, the coefficient of work experience (*lnexper*) is $0.792 - 0.562 = 0.230 > 0$, and the coefficient of the quadratic term of work experience (*lnexper2*) is $0.100 - 0.210 = -0.110 < 0$. Thus, the life cycle performance curve for fund managers working in financial centers still maintains the hump-shaped relationship.

[Insert Table 4 here]

We plot two life cycle performance curves for the fund managers working in financial centers and non-financial centers respectively in Figure 2 to visualize the effect of financial center on the relationship between a manager's work experience and performance. The life cycle performance curve for the managers working in financial centers lies above that for non-financial centers. A significant and positive coefficient for *fcenter* confirms the sorting hypothesis that high-skilled fund managers are sorted to work in financial centers and perform better. The significant coefficients of the two financial center interaction terms with work experience, *fcenter*×*lnexper* and *fcenter*×*lnexper2*, confirm the learning hypothesis. Therefore, our results support both the sorting hypothesis that financial centers attract high-skilled fund managers and the learning hypothesis that fund managers working in financial centers are easier to approach updated information and transform the news and knowledge.

[Insert Figure 2 here]

However, Figure 2 shows that the performance gap becomes narrower as the work experience of fund managers increases. For fund managers working in non-financial centers, they are more devoted to improving their skills to catch up with their peers working in financial centers. Furthermore, they also have more desire to gain information than their peers at financial centers. Thereby both the skill and information advantages of those fund managers working in financial centers gradually diminishes. In conclusion, we find new evidence for both skill convergence and information convergence between managers inside and outside financial centers over their life cycle work experience.

4.2. Gender, financial center, and fund manager's life cycle performance

In this section, we study the life cycle effect of gender on the manager's performance. Columns 3 to 6 in Table 3 show that the coefficients of the female indicator are positively significant at the 1% significance level. We find that the Sharpe ratio of female fund managers is 17.5% higher than that of male peers.

In Figure 3, we plot the hump-shaped relationships for both female and male managers. The life cycle performance curve for female fund managers is above that for male peers. Our results are consistent with Aggarwal and Boyson (2016). They find that funds with at least one female manager perform better than male-managed funds in those surviving funds because female managers have to accomplish much better for their funds to survive in the male-dominated competitive hedge fund industry.

[Insert Figure 3 here]

Next, we further divide the fund managers by the categories of gender and financial center to compare the effects of educational attainment and financial center on manager's performance. We plot four life cycle performance curves of fund managers grouped by gender and financial center in Figure 4.

[Insert Figure 4 here]

All four life cycle performance curves for fund managers behave hump shaped as established earlier. Here, we find an interesting catching-up story for the female fund managers working in non-financial centers. They are disadvantaged in their performance in their early careers because of the geographic location. However, they make more effort than male managers working in financial center to ensure the survival of their funds. As a result, they catch up with the male fund managers working in the financial centers in the fifth years of work experience. Then they continue to work harder to improve their skills and to acquire information than the *female* counterparts working at financial centers. Eventually, we observe both skill convergence and information convergence among the female managers working inside and outside financial centers in their 10 years of work experience.

4.3. Educational attainment and fund manager's life cycle performance

We now turn our attention to study the education effect on hedge fund manager's life cycle performance in Table 3. From columns 2 to 6, the coefficient of the indicator for a manager with a master's degree (*master*) is positively significant at the 1% significance level. Specifically, in column 6, we find that the Sharpe ratio of hedge fund managers with a master's degree would be 9.2% higher than that of fund managers without a master's degree. This result coincides with the finding in Chevalier and Ellison (1999b) that mutual fund managers with MBA degrees perform better than those without MBA degrees.

To visualize the effect of educational attainment on the life cycle performance curve for the hedge

fund manager, we plot two life cycle performance curves for the fund managers with and without master's degrees in Figure 5. We find that both curves are hump-shaped. Figure 5 also shows that managers with master's degrees perform better than their peers without master's degrees.

[Insert Figure 5 here]

Column 6 of Table 3 shows that the Sharpe ratio of hedge fund managers with a master's degree is 9.2% higher than those without a master's degree. How to translate this incremental Sharpe ratio into the dollar amount effect? In other words, what is the market value of a master's degree in China? To answer this question, we concentrate on the previous sub-sample of about 600 fund managers. The median assets under management in the sub-sample of managers with a master's degree is 25 million RMB (approximately 4.17 million US dollars). Suppose the manager's portfolio has the median standard deviation of return (std=15.06%), the market value of a master's degree would be $0.092 \times 15.06 / 100 \times 25{,}000 = 346$ thousand RMB (approximately 57.67 thousand US dollars). *Ceteris paribus*, the hedge fund manager with a master's degree earns 346 thousand RMB on average higher than those without a master's degree each year. This finding could provide valuable guidance for tuition fee pricing of master's degrees at Business schools.

Whether the firm should hire a new graduate with a master's degree or a more experienced manager without a master's degree in the position of a hedge fund manager is always a tough decision for human resource managers. From the firm's perspective, Figure 2 may provide the human resource manager with information about the trade-offs to select a fund manager based on educational attainment and work experience. For example, we can directly compare the performance of the candidates with the same educational attainment based on the hump-shaped curve. In most cases, the human resource manager may consider giving priority to hiring a fund manager with a postgraduate degree for long-term employment. However, if a fund manager is expected to be hired temporarily for less than 2 years, the human resource manager may consider a candidate who has two years of work experience without a master's degree instead of a fresh postgraduate with a master's degree.

From the individual's perspective, a new graduate with a bachelor's degree always encounters a dilemma: pursue a master's degree or work in the financial industry. The decision is essential for the individual who is preparing to become a hedge fund manager and considering whether it is worthwhile to pursue a master's degree because of the opportunity costs and tuition expenses. Suppose the studying period is three years for postgraduate students, Figure 6 depicts two scenarios that a new graduate with a bachelor's degree can choose from. The fund managers who choose to pursue further postgraduate study for three years will have a lower performance in the first two years as fund managers. However,

they will beat their undergraduate cohorts (without master degrees) from the third year on their jobs. Therefore, it is worthwhile for undergraduate students to pursue a master's degree before they join the hedge fund industry. Such a choice benefits both individuals' long-term income and hedge funds' performance in the long run.

[Insert Figure 6 here]

5. Natural experiment: Effect of stock market crash on fund manager's life cycle performance

In 2018, China suffered from a stock market crash throughout the year. The CSI 300 index, the capitalization-weighted stock market index of the top 300 stocks traded on the Shanghai and the Shenzhen Stock Exchanges, fell by as much as 25% in one year. Affected by the stock market crash, many hedge funds with stock strategy as their main investment strategy suffered from serious losses. We introduce this natural experiment to study the impact of the stock market crash on the fund manager's life cycle performance. To minimize the interference by the events from other years, we select the 2016-2017 two years as the pre-crash sample and the 2018-2019 as the post-crash sample. The subsample from 2016 to 2019 is used for regression analysis in the following model.

$$Sharpe_{it} = \beta_0 + \beta_1 lnexper_{it} + \beta_2 (lnexper_{it})^2 + \beta_3 postshock2018_t + CONTROLS + u_{it} \quad (5)$$

where the stock market crash indicator $postshock2018_t$ equals one in the post-crash period and equals zero in the pre-crash period. $Sharpe_{it}$ is the Sharpe ratio defined as the risk premium divided by the standard deviation of returns on the portfolio of funds that the fund manager holds. *CONTROLS* is a vector of managerial characteristics of education level (*master*), female indicator (*female*), the logarithm of the number of holding funds (*lntnf*) from our earlier regressions. It includes a full set of fixed effects such as city location, professional background, and investment strategy in the regression.

[Insert Table 5 here]

Table 5 reports the results of the effect of the stock market crash on fund manager's life cycle performance. We find positive and significant coefficients of the logarithm of years of work experience (*lnexper*), and negative and significant coefficients of its quadratic term (*lnexper2*) in all six specifications. This implies that the manager's life cycle performance under the stock market crash is still hump-shaped. The coefficient of the stock market crash indicator *preshock2018* is negative and significant at the 1% level in all the columns. This implies that the performance of fund managers in

the post-crash period is worse than that in the pre-crash period. Specifically, we find that a 14.7% decrease in Shape ratio for the fund managers after the stock market crash.

We present the effect of the stock market crash on the life cycle performance curve of fund managers in Figure 7. We plot two life cycle performance curves in the pre-crash period and the post-crash period respectively. We show that the stock market crash pushes down the life cycle performance of fund managers after the crash.

[Insert Figure 7 here]

To demonstrate the effect of the stock market crash on the individual manager's life cycle performance curve, we use an example of a hedge fund manager who suffered from the stock market crash in his fifth year of work experience. We illustrate the effect of the stock market crash on this individual manager's performance in Figure 8. The life cycle performance of this fund manager increases in the first four years before the crash (the dotted blue curve) in Figure 8. However, the performance was broken down from his fifth year due to the stock market crash. From then on, this manager's performance follows a new life cycle performance curve at a lower level after the crash (the triangle red curve) in Figure 8.

[Insert Figure 8 here]

6. Robustness checks

We conduct a battery of robustness checks to test and confirm our main life cycle performance results. First, we expand the sample period to a total of 17 years from 2004 to 2020. In the previous analysis, we excluded the observations in the early years because of the limited number of available fund managers. To ensure that our results are not driven by sample selection bias, we include all of them in our robustness check. The results are reported in Table 6. The coefficients of the logarithm of years of work experience (*lnexper*) continue to be positive and significant at the 5% level, and the coefficients of its quadratic term (*lnexper2*) are negative and significant at the 1% significance level in all six specifications. Therefore, the life cycle performance curve remains hump shaped.

[Insert Table 6 here]

Second, we transform the dependent variable *Sharpe* into *Sharpe_robust* that is calculated by $100\times(1+ Sharpe/100)$. This logarithmic transformation would fit the normal distribution better, resulting in a better fit of the data. We re-estimate eq. (1) by using *Sharpe_robust* and present the

results in Table 7. We continue to find positive and significant coefficients of *lnexper* and negative and significant coefficients of *lnexper2*, which confirms previous findings of the hump-shaped life cycle performance of fund managers.

[Insert Table 7 here]

Third, we focus on the fund-level dataset from the same data source. We merge the managerial characteristics into the fund-level dataset. At the fund level, we can study the fund manager's life cycle performance based on various risk-adjusted measures of fund performance.

There are four advantages to considering the fund-level dataset. First, our main results of the life cycle performance of fund managers can be tested and confirmed at the fund level instead of the manager's personal level. Second, we can derive several measures of risk-adjusted performance for hedge funds. Third, both managerial characteristics and fund characteristics can be controlled in the regression. The fourth advantage is quarterly instead of annual observations can be used since the dataset provides the monthly returns for each fund.

Following Li, et al (2011), we use past 24 monthly returns to run the following rolling regression for each fund *i* at the end of each quarter *q*:

$$R_{i,t} - R_{f,t} = \alpha_i + \beta_{i,q}(RCI_t - R_{f,t}) + \varepsilon_{i,t}, \quad (5)$$

where $R_{i,t}$ is the return of fund *i* over month *t*, $R_{f,t}$ is the risk-free rate over month *t* and RCI_t *is* the Rongzhi Composite Index over month *t*, and $\beta_{i,q}$ represents the risk exposures of fund *i* at quarter *q*.

We then calculate the residual volatility for fund *i* at quarter *q* as follows:

$$res\_vol_{i,q} = \sqrt{Var(\hat{\varepsilon}_{i,t})} \quad \text{with } \hat{\varepsilon}_{i,t} = R_{i,t} - R_{f,t} - \hat{\alpha}_i + \hat{\beta}_{i,q}(RCI_t - R_{f,t}) \quad (6)$$

We construct several measures of risk-adjusted performance of fund *i* at quarter *q*:

$$Jensen\_alpha_{i,q} = \hat{\alpha}_i = R_{i,q} - R_{f,q} - \hat{\beta}_{i,q}(RCI_q - R_{f,q}) \quad (7)$$

$$Appraisal\_ratio_{i,q} = Jensen\_alpha_{i,q}/res\_vol_{i,q} \quad (8)$$

where $R_{i,q}$ is the quarterly return of fund *i* at quarter *q*, $R_{f,q}$ is the quarterly risk-free rate at quarter *q*, and RCI_q is the quarterly return of Rongzhi Composite Index at quarter *q*. $Jensen\_alpha_{i,q}$ measures the abnormal return of fund *i* and $Appraisal\_ratio_{i,q}$ measures the abnormal return per unit of idiosyncratic risks.

We also calculate the quarterly Sharpe ratio at fund level:

$$Sharpe\_ratio_{i,q} = (R_{i,q} - R_{f,q})/std_{i,q} \quad (9)$$

where $std_{i,q}$ is the standard deviation of past 12 monthly returns of fund *i* at the end of quarter *q*.

[Insert Table 8 here]

Panel A of Table 8 provides the summary statistics of the fund-level sample. We include three performance measures for managers: Jensen alpha, Appraisal ratio and Sharpe ratio. In addition to the former manager characteristics from the previous sections, we also include the *legal* dummy variable that equals one if the fund manager is also a legal representative of the company and zero otherwise, *other_position* dummy variable that equals one if the fund manager also has other positions in the company. As we mentioned before, we can include fund characteristics in control variables in fund-level data. Manager's compensations that could come from management fee and shares of the company is aligned with their performance and thus we include fund age, fund size measured by the logarithm of the initial assets under management (*lninitial_aum*), number of managers in charge of the fund (*n_managers*), whether the fund invests in illiquid investment targets (*invest_illiquid*) and management fee as the fund characteristics control variables.

The average values for Sharpe ratio, Jensen's alpha and Appraisal ratio are 1.349, 0.806 and 1.199, respectively. As for the main explanatory variables, the average value of the logarithm of years the manager has worked (*lnexper*) is 2.593, indicating that the hedge fund managers have 13.4 years of work experience on average. About 13.4 percent of hedge fund managers are female. The average value of the logarithm of the number of funds the manager manages (*lntnf*) is 2.418, indicating that the hedge fund managers manage about 11 funds on average. The percentage of hedge fund managers who are legal representatives of the company is 2.4% on average. About 63.5% of fund managers have other positions in the company. In terms of firm characteristics, the mean age of funds is about three years. Tthe average management fee is 1%. Although most of the funds are run by one manager, some funds have at most five managers. About 99.4% of funds invest in illiquid investment targets. The average value of the logarithm of the initial assets under management (*lninitial_aum*) is 7.872, indicating that the average initial assets under management of funds is about 26.2 million RMB (approximate 4.37 million US dollars) on average.

We report the correlations among measures of the hedge fund performance and characteristics of both managers and funds in Panel B of Table 10. We find a negative correlation between the square term of the logarithm of years the manager has worked (*lnexper2*) and all the three performance measures, which provides preliminary evidence that there is a hump-shaped relationship between risk-adjusted performance and work experience at the fund level.

To investigate the life cycle relationship between work experience and risk-adjusted performance at the fund level, we estimate the following regression:

$$Risk\_adjusted\ performance_{it} = \beta_0 + \beta_1 lnexper_{it} + \beta_2 (lnexper_{it})^2 + MgrChars_{i,t} +$$

$$FundChars_{i,t} + FE_{i,t} + u_{it} \quad (10)$$

where $Risk\_adjusted\ performance_{it}$ includes *Sharpe ratio, Jensen's alpha* and *Appraisal ratio*. The *Sharpe_ratio* is defined as the risk premium divided by the standard deviation of the returns on the fund. The *Jensen's alpha* is calculated by eq. (7). The *Appraisal ratio* is calculated by *Jensen's alpha* divided by residual volatility. $lnexper_{i,t}$ is calculated by the logarithm of years the manager has worked. $MgrChars_{i,t}$ is a vector of managerial characteristics including the dummy for education level (*master*), female indicator (*female*), the logarithm of the number of holding funds (*lntnf*), dummy for legal representatives (*legal*), and dummy for other positions (*other_position*). $FundChars_{i,t}$ is a vector of fund characteristics including fund age (*fund_age*), the logarithm of the initial assets under management (*lninitial_aum*), number of managers in charge of the fund (*n_managers*), dummy for illiquid investment targets (*invest_illiquid*), and management fee (*management_fee*).

Table 9 shows the regression results at the fund level. All the regressions control for year fixed effects, location fixed effects, and fixed effects related to manager characteristics such as education, professional background, and investment strategy. We also control for the value ranges of assets under management fixed effects.

[Insert Table 9 here]

From Table 9, we find a hump-shaped relationship between fund manager's work experience and performance across all three different risk-adjusted measures. The coefficients of the logarithm of years of work experience (*lnexper*) are positive and significant at the 5% level, and the coefficients of its quadratic term (*lnexper2*) are negative and significant at the 5% level. This implies that the life cycle performance remains hump-shaped for all three different risk-adjusted measures at the fund level.

Our regression results also indicate female hedge fund managers perform better than male managers. The effect of the number of funds under management (in logarithmic term) is positive and significant at the 1% level in three columns, indicating that fund managers holding more funds would perform better. We find that the fund managers perform worse if they are legal representatives or have other positions in the company as other job duties may distract their attention from having good performance in fund management. For the firm characteristics, we find that fund age is negatively correlated with fund performance, indicating that younger funds tend to have better performance. The fund with more managers would perform better as well.

7. Fund level channels: Confidence and career concerns

We now turn our attention to identify two underlying mechanisms through which work experience could affect fund manager's performance: The confidence channel and the career concerns channel.

The confidence channel is developed by Bai, et al. (2019). They find that relatively older managers have higher confidence and thus they have higher fund performance compared to their younger peers. We use the percentage of company's shares held by managers (*pct_share*) as a proxy for their confidence. This is because the more confident they are, the more likely they hold more shares of their own company.

To test whether more experienced managers have more shareholdings in the fund companies, we estimate the following linear regression model:

$$pct\_share_{it} = \beta_0 + \beta_1 lnexper_{it} + \beta_2 (lnexper_{it})^2 + MgrChars_{i,t} + FundChars_{i,t} + FE_{i,t} + u_{it} \quad (11)$$

where pct_share_{it} is the percentage of company's shares held by fund managers. $lnexper_{i,t}$ is calculated by the logarithm of years the manager has worked. $MgrChars_{i,t}$ is a vector of managerial characteristics and $FundChars_{i,t}$ is a vector of fund characteristics from our earlier regressions.

[Insert Table 10 here]

Panel A of Table 10 contains the results of this regression model. Our results are consistent with the hypothesis that more experienced fund managers are more confident. Specifically, the coefficients of the quadratic term of work experience (*lnexper2*) are positive and significant at the 5% level. The coefficients of the linear term of work experience (*lnexper*) are not significant at the 5% level. This provides evidence to support the confidence channel that the more experienced fund managers are prone to hold more shares of their own company and that reflects their ascending confidence level.

We also test whether confidence level (proxied by *pc_share*) could increase the fund performance by estimate the following regression model:

$$Risk\_adjusted\ performance_{it} = pct\_share_{it} + \beta_1 lnexper_{it} + \beta_2 (lnexper_{it})^2 + MgrChars_{i,t} + FundChars_{i,t} + FE_{i,t} + u_{it} \quad (12)$$

where $Risk\_adjusted\ performance_{it}$ includes *Sharpe ratio, Jensen's alpha and Appraisal ratio*. The *Sharpe_ratio* is the risk premium divided by the standard deviation of the returns on the fund. The *Jensen_alpha* is calculated by eq. (7). The *Appraisal_ratio* is the *Jensen's alpha* divided by residual volatility. pct_share_{it} is the percentage of company's shares held by fund managers. $MgrChars_{i,t}$ is a vector of managerial characteristics and $FundChars_{i,t}$ is a vector of fund characteristics from

our earlier regressions.

Panel B of Table 10 reports the results of this regression. The coefficients of pct_share_{it} are positively significant at the 5% level in column 1 and column 3. Therefore, we conclude that the managers with more shareholdings in the fund companies would perform better. Taking together, results from Table 10 confirm the confidence channel that fund managers with more confidence could perform better in the hedge fund markets.

The other channel is career concerns. Chevalier and Ellison (1999a) focus on the possible effects of managerial career concerns on attenuating the agency problem in the labor market for mutual fund managers. They find that younger fund managers would hold less idiosyncratic risks as they are more afraid of being fired due to poor performance. Following Chevalier and Ellison (1999a), we use the non-systematic risks, i.e., residual volatility from the equation (6), as the measure of career concerns for hedge fund managers.

We test whether more experienced managers have less career concerns in the fund companies by estimating the following linear regression model:

$$res_{vol_q}{}_{it} = \beta_0 + \beta_1 lnexper_{it} + \beta_2 (lnexper_{it})^2 + MgrChars_{i,t} + FundChars_{i,t} + FE_{i,t} + u_{it} \quad (13)$$

where $res\_vol\_q_{it}$ is calculated by eq. (6). $lnexper_{i,t}$ is the logarithm of years the manager has worked. $MgrChars_{i,t}$ is a vector of managerial characteristics and $FundChars_{i,t}$ is a vector of fund characteristics from our earlier regressions.

[Insert Table 11 here]

Table 11 reports the results of this regression. In column 3, we find that the coefficient of the quadratic term of work experience (*lnexper2*) is positive and significant at the 5% significance level. The coefficient of the linear term of the work experience (*lnexper*) is not significant at the 5% level. The result indicates that more experienced fund managers are prone to have more idiosyncratic risks of the fund. In other words, more experienced fund managers have lower career concerns (Chevalier and Ellison, 1999a). Finally, since the idiosyncratic risks is part of the total risk embedded in the denominators of two performance measures of Sharpe ratio and Appraisal ratio, this implies that an increase in idiosyncratic risks would reduce both performance measures directly. This completes our test of the career concerns channel that more experienced managers have less career concerns that would reduce their effort and performance consequently.

In conclusion, we provide evidence to support our hump shaped life cycle performance of fund

managers established in the previous sections by the two channels of confidence and career concerns at the fund level. Taking these two channels together, we find that fund managers encounter great career concerns and exert great effort to gain confidence and expertise in their early career. Thus their performance increases due to an increasing level of confidence. However, as career concerns begin to ebb away, their effort on their jobs is lessened. The improvement of performance is at a decelerating rate. The performance reaches its peak and then deteriorates afterwards because career concerns diminish as fund managers become more experienced.

8. Conclusion

Using a dataset of hedge fund managers in China, this paper established a hump-shaped relation between work experience and performance of hedge fund managers. In their early career, fund managers exert great effort to gain confidence and expertise because they are afraid of being fired due to poor performance. As a result, the performance increases in their early career. However, as their performance ascends, fund managers are likely to slack off because the threat of dismissal would be lower. As a result, the improvement of their performance is at a decelerating rate. Their performance reaches its peak in the fifth year of their career and deteriorates afterwards.

Our results also point to the importance of financial centers, gender, and educational attainment as channels in the life cycle performance of fund managers. We find that fund managers working in financial centers have better performance than their peers working in non-financial centers due to both sorting and learning effects. On the one hand, high-skilled managers are attracted to work in financial centers because they can find a more suitable job for their capabilities. On the other hand, financial centers provide the environment where fund managers can approach more information and exchange ideas and knowledge more frequently. However, we find that the outperformance in financial centers would gradually vanish over the career life of fund managers. Fund managers working in non-financial centers would exert more effort to learn skills and gain information. Thus, they can gradually catch up with those working in financial centers and the outperformance would vanish after 10 years of work experience.

We find that female fund managers have a Sharpe ratio 17.5% higher than their male peers. The reason is that female fund managers need to perform better than male peers to survive in the hedge fund industry. For female fund managers working in non-financial center, their initial performance are

worse than managers in financial centers due to location disadvantage. To survive, they make greater effort and gradually catch up with the male peers working in financial center in their fifth year of career. Then they continue to work hard to improve their skills and acquire information. As a result, they can catch up with the female peers working in financial center in their tenth year of career.

For the effect of education attainment on the performance of fund managers, we find that fund managers with master's degrees could gain a Sharpe ratio 9.2% higher than their peers without master degrees.

Our results also speak to the importance of exogenous negative shock on the life cycle performance of fund managers. Using a natural experiment of the Chinese stock market crash in 2018, we find that the Sharpe ratio of fund managers was reduced by 14.7% by the crash.

Our findings on the life cycle performance of fund managers are also supported by the empirical evidence at the fund level. In particular, the confidence and career concerns channels provide further empirical support for the hump shaped life cycle performance hypothesis established at the manager level.

Our results could benefit the hedge fund industry in three dimensions. For individual's career planning, we provide guidance for fresh bachelor degree holders to consider whether they should work at the hedge fund industry immediately, or pursue a higher-level degree first and then work at hedge fund later. For hedge fund recruitment officers, we offer some advice for them to consider candidates with different education attainments versus work experiences. Finally, for investors, the life cycle work experience of fund managers provides a signal of hedge fund's performance that could reduce information asymmetry to outside investors.

Reference

Ackermann, C., McEnally, R., and Ravenscraft, D. (1999), "The Performance of hedge funds: Risk, return, and incentives," *Journal of Finance*, 54, 833–874.

Agarwal, V., Daniel, N. D., and Naik, N. Y. (2009), "Role of managerial incentives and discretion in hedge fund performance," *Journal of Finance*, 64, 2221–2256.

Agarwal, V., Jiang, W., Tang, Y., and Yang, B. (2013), "Uncovering hedge fund skill from the portfolio holdings they hide," *Journal of Finance*, 68, 739–783.

Aggarwal, R., and Boyson, N. M. (2016), "The performance of female hedge fund managers," *Review of Financial Economics*, 29, 23–36.

Aggarwal, R. K., and Jorion, P. (2010), "The performance of emerging hedge funds and managers," *Journal of Financial Economics*, 96, 238–256.

Aiken, A. L., Clifford, C. P., and Ellis, J. A. (2015), "Hedge funds and discretionary liquidity restrictions," *Journal of Financial Economics*, 116, 197–218.

Ain Tommar, S., Kolokolova, O., and Mura, R. (2022), "When paid work gives in to unpaid care work: Evidence from the hedge fund industry under COVID-19," *Management Science*, 68, 6250–6267.

Aragon, G. O. (2007), "Share restrictions and asset pricing: Evidence from the hedge fund industry," *Journal of Financial Economics*, 83, 33–58.

Aragon, G. O., and Strahan, P. E. (2012), "Hedge funds as liquidity providers: Evidence from the Lehman bankruptcy," *Journal of Financial Economics*, 103, 570–587.

Bai, J., Ma, L., Mullally, K. A., and Solomon, D. H. (2019), "What a difference a (birth) month makes: The relative age effect and fund manager performance," *Journal of Financial Economics*, 132, 200–221.

Ben-David, I., Franzoni, F., and Moussawi, R. (2012), "Hedge fund stock trading in the financial crisis of 2007–2009," *Review of Financial Studies*, 25, 1–54.

Berk, J. B., and Green, R. C. (2004), "Mutual fund flows and performance in rational markets," *Journal of Political Economy*, 112, 1269–1295.

Bliss, R. T., and Potter, M. E. (2002), "Mutual fund managers: Does gender matter?," *Journal of Business and Economic Studies*, 8, 1.

Bollen, N. P. B., and Busse, J. A. (2001), "On the timing ability of mutual fund managers," *Journal of Finance*, 56, 1075–1094.

Bollen, N. P. b., and Pool, V. K. (2009), "Do hedge fund managers misreport returns? Evidence from the Pooled Distribution," *Journal of Finance*, 64, 2257–2288.

Brophy, D. J., Ouimet, P. P., and Sialm, C. (2009), "Hedge funds as investors of last resort?," *Review of Financial Studies*, 22, 541–574.

Cao, C., Chen, Y., Liang, B., and Lo, A. W. (2013), "Can hedge funds time market liquidity?," *Journal of Financial Economics*, 109, 493–516.

Chevalier, J., and Ellison, G. (1999a), "Career concerns of mutual fund managers," *Quarterly Journal of Economics*, 114, 389–432.

Chevalier, J., and Ellison, G. (1999b), "Are Some mutual fund managers better than others? Cross-sectional patterns in behavior and performance," *Journal of Finance*, 54, 875–899.

Christoffersen, S. E. K., and Sarkissian, S. (2009), "City size and fund performance," *Journal of Financial Economics*, 92, 252–275.

Cohen, R. B., Coval, J. D., and Pástor, Ľ. (2005), "Judging Fund managers by the company they keep," *Journal of Finance*, 60, 1057–1096.

Ferson, W. E., and Schadt, R. W. (1996), "Measuring fund strategy and performance in changing economic conditions," *Journal of Finance*, 51, 425–461.

Glaeser, E. L. (1999), "Learning in cities," *Journal of Urban Economics*, 46, 254–277.

Goetzmann, W. N., Ingersoll Jr., J. E., and Ross, S. A. (2003), "High-water marks and hedge fund management contracts," *Journal of Finance*, 58, 1685–1718.

Golec, J. H. (1996), "The effects of mutual fund managers' characteristics on their portfolio performance, risk and fees," *Financial Services Review*, 5, 133.

Gottesman, A. A., and Morey, M. R. (2006), "Manager education and mutual fund performance," *Journal of Empirical Finance*, 13, 145–182.

Grossman, S. J. (2005) "Hedge funds today: Talent required, Commentary." *The Wall Street Journal* (Sept. 29, 2005), A18.

Grundy, B. D., and Verwijmeren, P. (2018), "The buyers' perspective on security design: Hedge funds and convertible bond call provisions," *Journal of Financial Economics*, 127, 77–93.

Helsley, R. W., and Strange, W. C. (1990), "Matching and agglomeration economies in a system of cities," *Regional Science and Urban Economics*, 20, 189–212.

Helsley, R. W., and Strange, W. C. (1991), "Agglomeration economies and urban capital markets," *Journal of Urban Economics*, 29, 96–112.

Holmström, B. (1999), "Managerial incentive problems: A Dynamic perspective," *Review of Economic*

Studies, 66, 169–182.

Huang, J., Sialm, C., and Zhang, H. (2011), "Risk shifting and mutual fund performance," *Review of Financial Studies*, 24, 2575–2616.

Jacobs, J. (1969), The Economy of Cities, Vintage, New York.

Jiang, W. (2020), "Investment funds in China", *The Handbook of China's Financial System*, Chapter 14, pp.359-382, Princeton University Press, NJ.

Kumar, N., Mullally, K., Ray, S., and Tang, Y. (2020), "Prime (information) brokerage," *Journal of Financial Economics*, 137, 371–391.

Li, H., Zhang, X., and Zhao, R. (2011), "Investing in talents: Manager characteristics and hedge fund performances," *Journal of Financial and Quantitative Analysis*, 46, 59–82.

Lim, J., Sensoy, B. A., and Weisbach, M. S. (2016), "Indirect incentives of hedge fund managers," *The Journal of Finance*, 71, 871–918.

Lucas, R. E. (1988), "On the mechanics of economic development," *Journal of Monetary Economics*, 22, 3–42.

Massoud, N., Nandy, D., Saunders, A., and Song, K. (2011), "Do hedge funds trade on private information? Evidence from syndicated lending and short-selling," *Journal of Financial Economics*, 99, 477–499.

Mitchell, M., and Pulvino, T. (2012), "Arbitrage crashes and the speed of capital," *Journal of Financial Economics*, 104, 469–490.

Sharpe, W. F. (1966), "Mutual fund performance", *Journal of Business*, 39, 119-138.

Nagel, S. (2012), "Evaporating liquidity," *Review of Financial Studies*, 25, 2005–2039.

Figure 1

The life cycle performance of fund manages

The graph is based on the estimated coefficients of the logarithm of years of work experience (*lnexper*) and the coefficient of its quadratic term (*lnexper2*) in columns 6 of **Table 3**. The initial value of the dependent variable (*Sharpe*) is the median Sharpe ratio of hedge fund managers with four years or less of work experience in our sample.

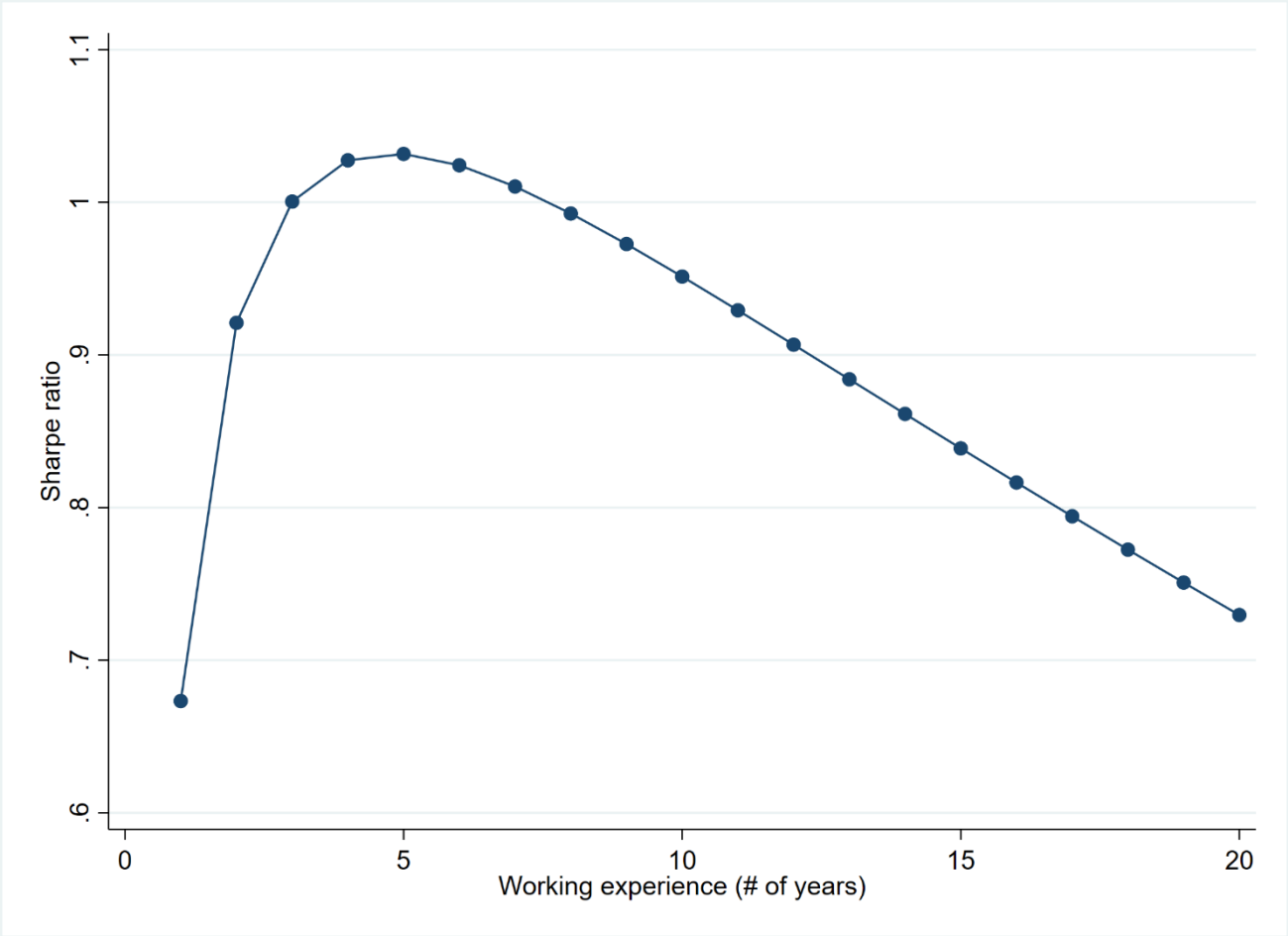

Figure 2

Fund manager's life cycles grouped by financial center

The dotted red curve (−●−) on the top is the life cycle performance for hedge fund managers working in financial centers. The dotted blue curve (−●−) at the bottom is the life cycle performance for the hedge fund managers working in non-financial centers. The graph is based on the estimated coefficients of the logarithm of years of work experience (*lnexper*) and the coefficient of its quadratic term (*lnexper2*) in columns 6 of **Table 4**. The initial value of the dependent variable (*Sharpe*) is given based on the median Sharpe ratio of hedge fund managers with four years or less of work experience in the corresponding group in our sample.

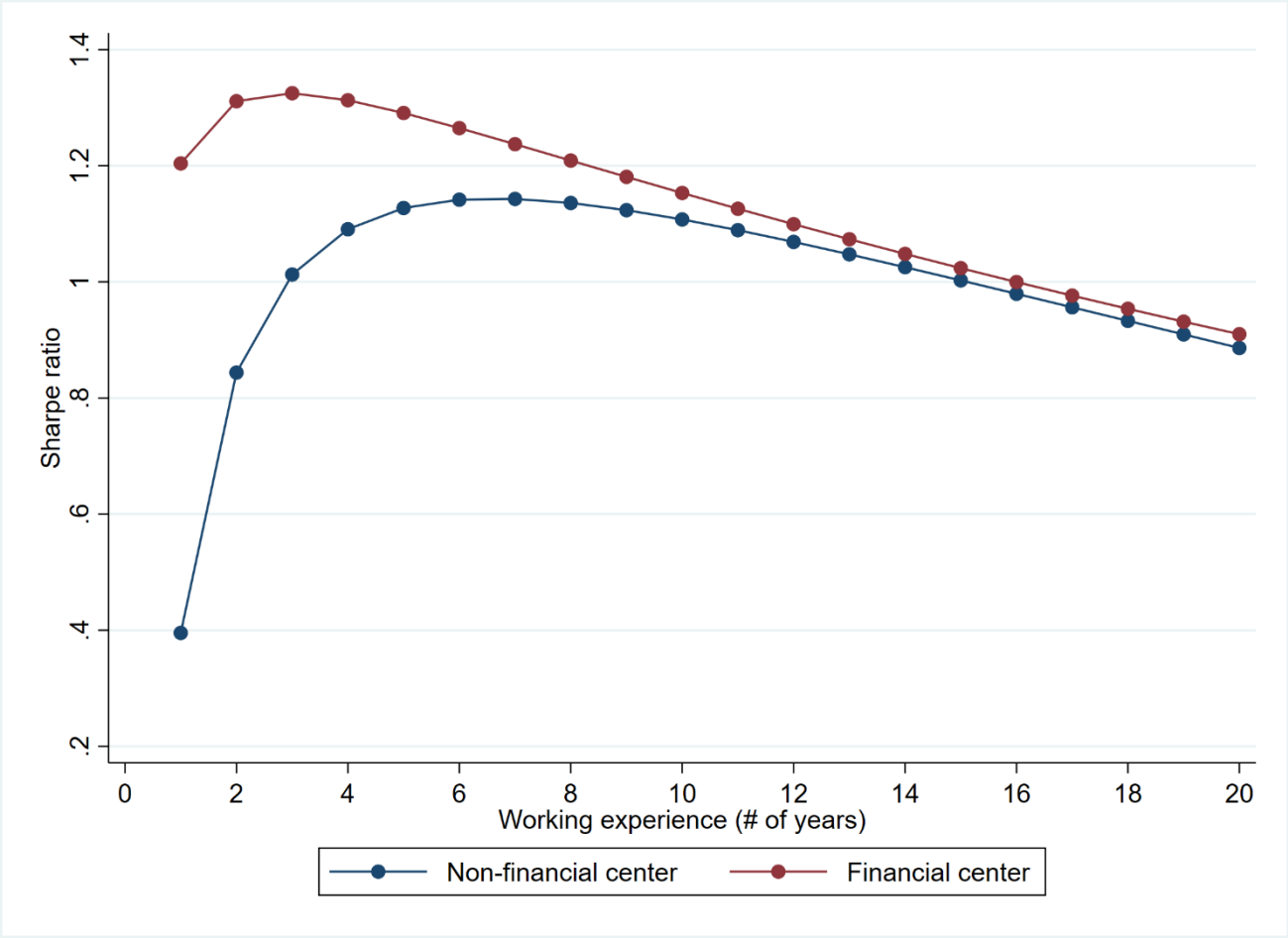

Figure 3

Fund manager's life cycles grouped by gender

The dotted red curve (−●−) on the top is the life cycle performance for female hedge fund managers. The triangle blue curve (−▲−) at the bottom is for male hedge fund managers. The graph is based on the estimated coefficients of the logarithm of years of work experience (*lnexper*) and the coefficient of its quadratic term (*lnexper2*) in columns 6 of **Table 3**. The initial value of the dependent variable (*Sharpe*) is given based on the median Sharpe ratio of hedge fund managers with four years or less of work experience in the corresponding group in our sample.

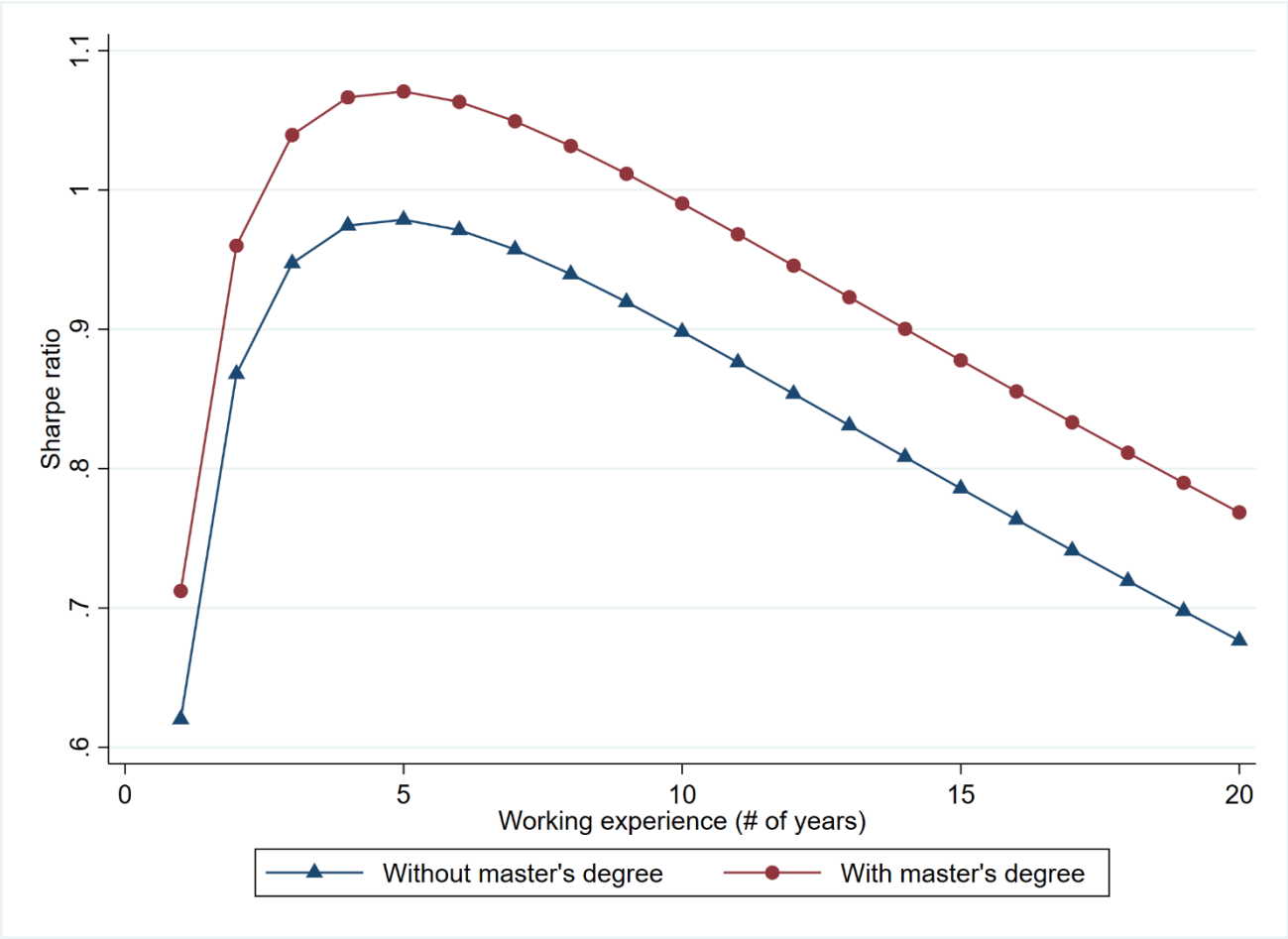

Figure 4

Catching-up: Life cycles performance of managers grouped by gender and financial center

The triangle green curve (−▲−) on the very top is the life cycle performance for the female hedge fund managers who work in financial centers. The blue circle curve (−**O**−) is for the male managers in financial centers. The dotted red curve (−●−) is for the female managers in non-financial centers. Finally, the orange squared curve (−■−) at the bottom is for the male managers in non-financial centers. The graph is based on the estimated coefficients of the logarithm of years of work experience (*lnexper*), the coefficient of its quadratic term (*lnexper2*), and their interaction terms with financial center dummy in columns 6 of **Table 4**. The initial value of the dependent variable (*Sharpe*) is the median Sharpe ratio of hedge fund managers with four years or less of work experience in the corresponding group in our sample.

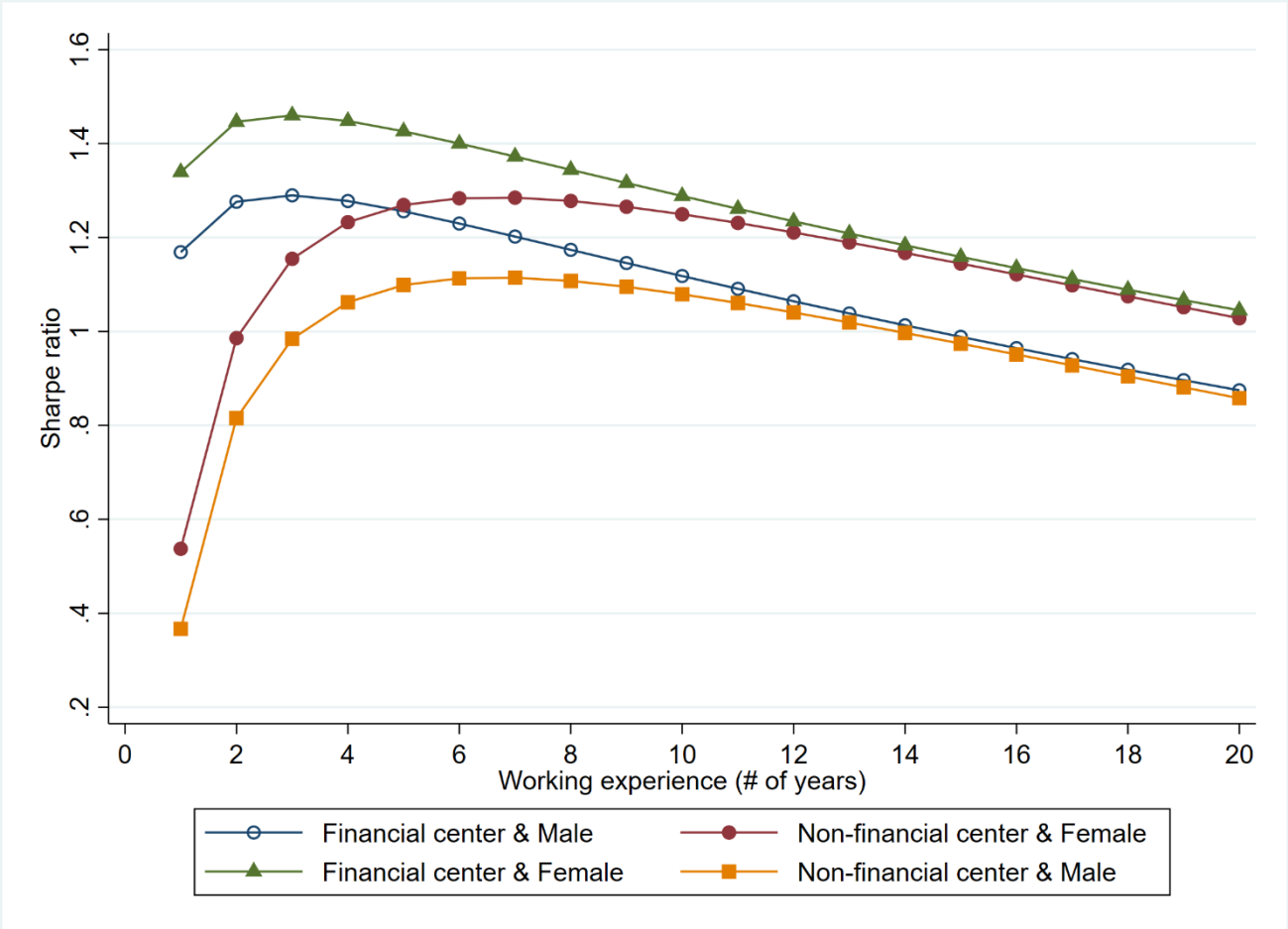

Figure 5

Fund manager's life cycles grouped by educational attainment (firm perspective)

The dotted red curve (−●−) on the top is the life cycle performance for the hedge fund managers with master's degrees and the triangle blue curve (−▲−) at the bottom is for the hedge fund managers without master's degrees. The graph is based on the estimated coefficients of the logarithm of years of work experience (*lnexper*) and the coefficient of its quadratic term (*lnexper2*) in columns 6 of **Table 3**. The initial value of the dependent variable (*Sharpe*) is given based on the median Sharpe ratio of hedge fund managers with four years or less of work experience in the corresponding group in our sample.

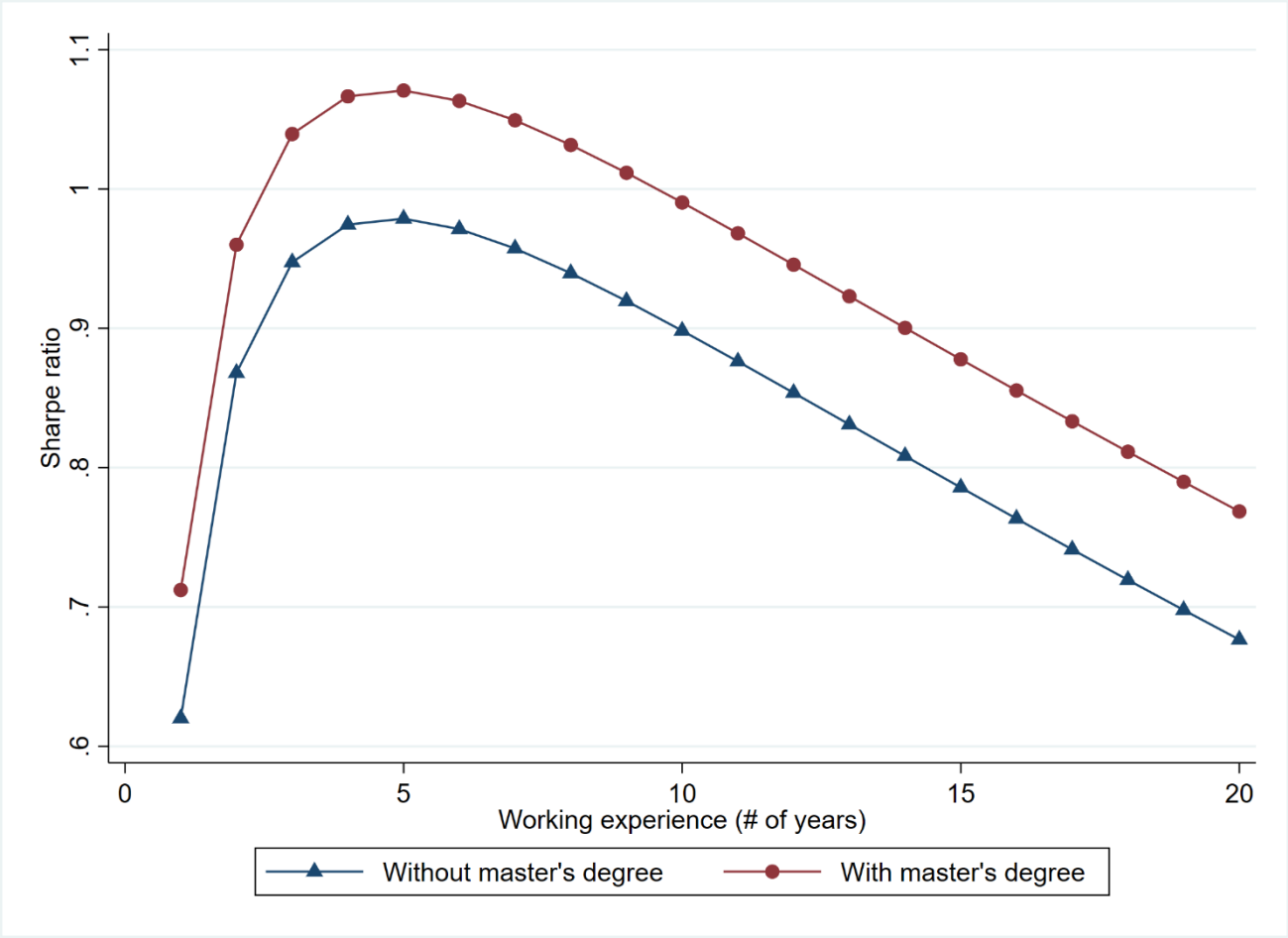

Figure 6

Fund manager's life cycles performance grouped by educational attainment (individual perspective)

The two curves represent the life cycle performance of two fund managers with the same age. The dotted red curve (−●−) at the top is the life cycle performance of fund managers who choose to pursue a master's degree and thereby with a delay of three-year to work at financial market. The triangle blue curve (−▲−) at bottom is for managers working in the financial market immediately after their bachelor's study. The graph is based on the estimated coefficients of the logarithm of years of work experience (*lnexper*) and the coefficient of its quadratic term (*lnexper2*) in columns 6 of **Table 3**. The initial value of the dependent variable (*Sharpe*) is given based on the median Sharpe ratio of hedge fund managers with four years or less of work experience in the corresponding group in our sample.

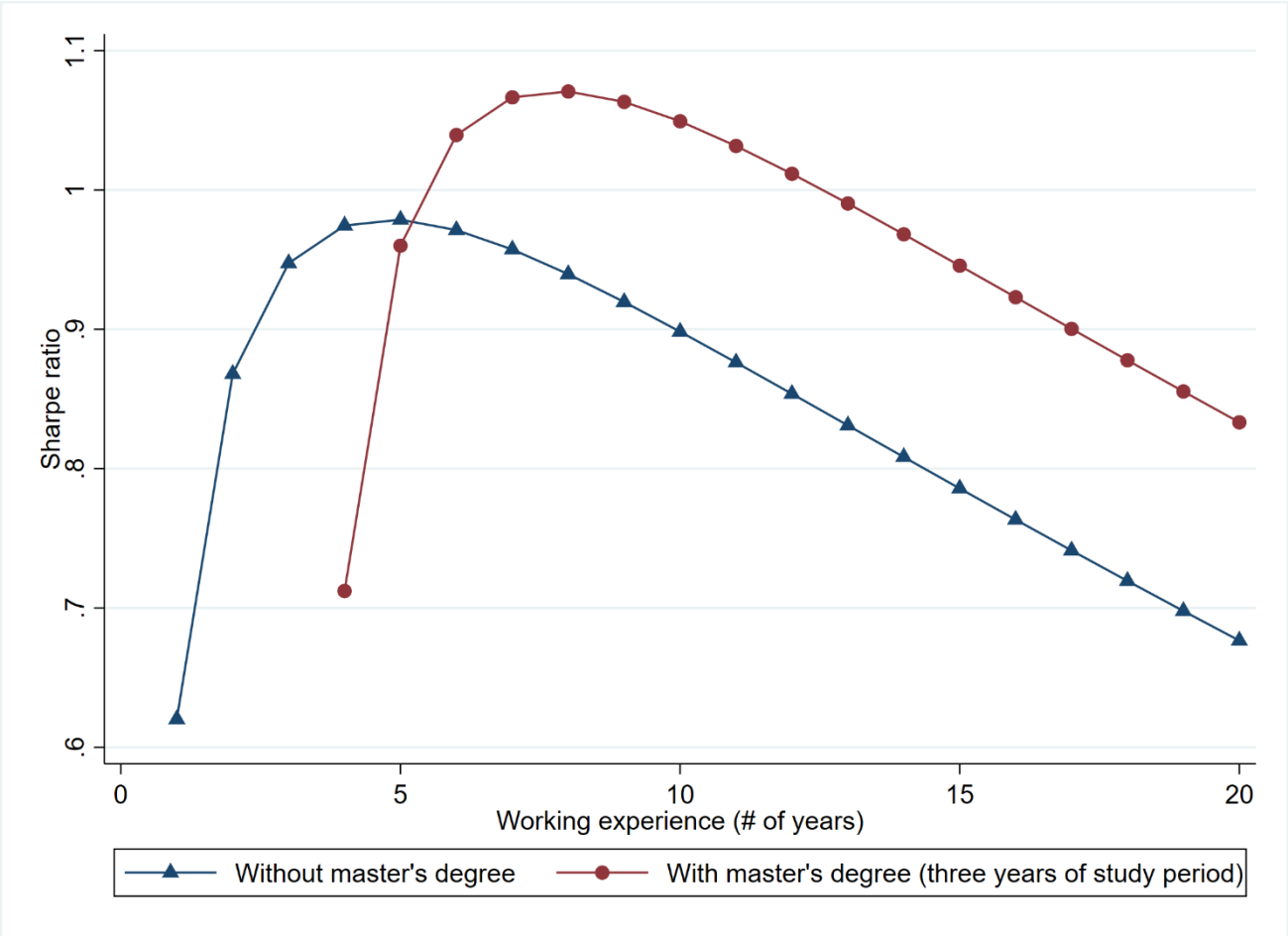

Figure 7

Effect of 2018 stock market crash on fund manager's life cycle performance

The dotted blue curve (−●−) on the top is the life cycle performance for the hedge fund managers in the pre-crash period. The triangle red curve (−▲−) at the bottom is for the managers in the post-crash period. The graph is based on the estimated coefficients of the logarithm of years of work experience (*lnexper*) and the coefficient of its quadratic term (*lnexper2*) in columns 6 of **Table 7**. The initial value of dependent variable (*Sharpe*) is given based on the median Sharpe ratio of hedge fund managers with four years or less of work experience in the corresponding group in our sample.

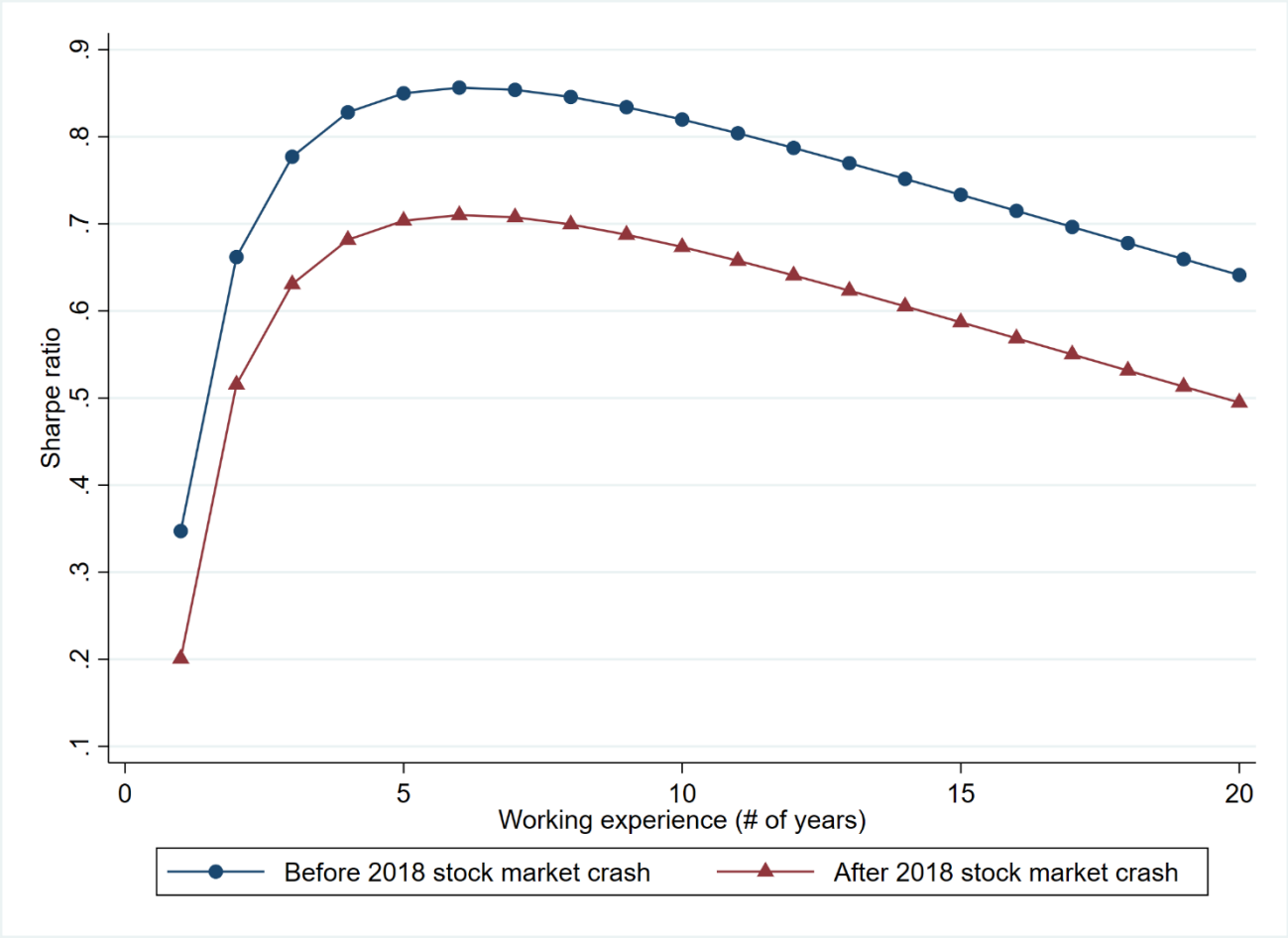

Figure 8

An illustrative example: Effect of 2018 stock market crash on an individual fund manager's life cycle performance

Suppose a manager with 5 years of work experience suffered from the stock market crash in 2018. The solid dotted blue curve (−●−) is the life cycle performance of this manger in the pre-crash period. The green dashed curve (●) is the counterfactual life cycle performance of this manager if there would be no stock market crash. The triangle red curve (−▲−) is the actual life cycle performance of this manager in the post-crash period. The graph is based on the estimated coefficients of the logarithm of years of work experience (*lnexper*) and the coefficient of its quadratic term (*lnexper2*) in columns 6 of **Table 7**. The initial value of dependent variable (*Sharpe*) is given by the median Sharpe ratio of hedge fund managers with four years or less of work experience in the corresponding group in our sample.

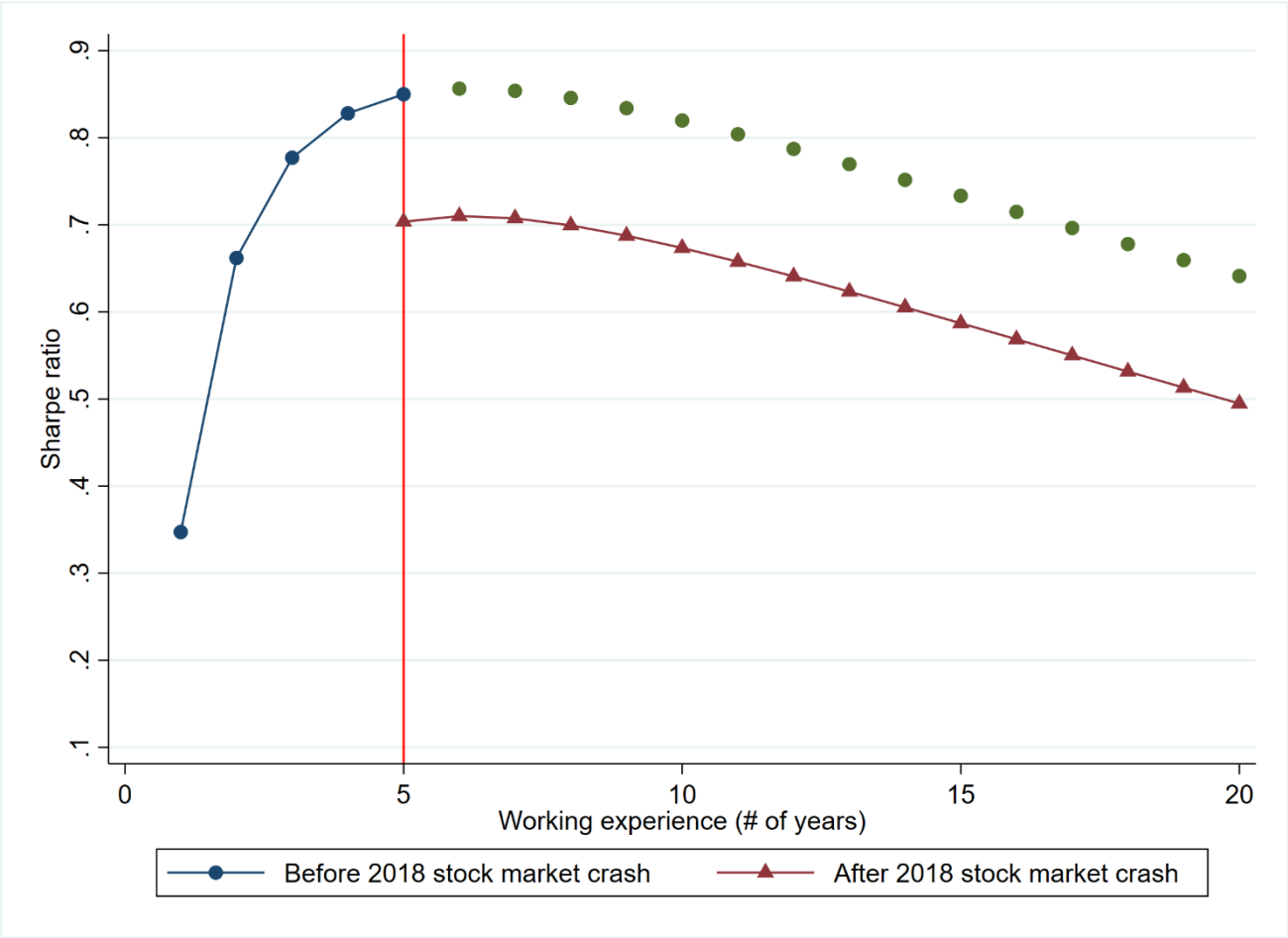

Table 1

Sample manager distributions

This table reports the distribution of hedge fund managers by years (Panel A) and by work experience (Panel B) in our sample respectively. Sharpe ratio is the risk premium divided by the standard deviation of returns on the portfolio of funds that the manager holds.

Panel A: Manager distribution by year

Year	# of managers	% of sample
2011	304	5.95
2012	134	2.62
2013	123	2.41
2014	224	4.39
2015	371	7.26
2016	898	17.58
2017	865	16.94
2018	793	15.53
2019	748	14.65
2020	647	12.67
Total	5,107	100

Panel B: Manager distribution by work experience

Work experience	# of managers	Mean of Sharpe Ratio
< 5 years	302	0.72
≥5 years and < 10 years	1,285	0.86
≥10 years and < 15 years	1,676	0.86
≥15 years and < 20 years	955	0.78
≥20 years	889	0.63
Total	5,107	0.78

Table 2

Summary statistics and correlation matrix

The table reports summary statistics for all the variables (Panel A) and correlation matrix (Panel B). The sample period is from 2011 to 2020. Panel A presents the number of observations (N), number of managers (# of managers), the mean, standard deviation (Std. dev), minimum, the first quartile (Q1), median, the third quartile (Q3), and maximum for all the variables used in this paper. Definitions of all the variables are in Appendix Table A1.

Panel A:

Variable	N	# of managers	Mean	Std. dev	Minimum	Q1	Median	Q3	Maximum
Performance measures									
Sharpe	16,273	5,107	0.781	1.803	-3.785	-0.422	0.736	1.804	9.690
Sharpe_robust	16,271	5,107	0.762	1.775	-3.840	-0.421	0.734	1.788	9.249
Manager characteristics									
lnexper	16,273	5,107	2.594	0.498	0.000	2.303	2.639	2.996	3.434
lnexper2	16,273	5,107	6.975	2.408	0.000	5.302	6.965	8.974	11.792
master	16,272	5,106	0.634	0.482	0.000	0.000	1.000	1.000	1.000
female	14,576	4,556	0.089	0.285	0.000	0.000	0.000	0.000	1.000
lntnf	16,273	5,107	1.766	1.250	0.000	0.693	1.609	2.565	4.844
fcenter	16,273	5,107	0.673	0.469	0.000	0.000	1.000	1.000	1.000
Natural experiment									
postshock2018	9,972	3,304	0.592	0.491	0.000	0.000	1.000	1.000	1.000

Table 2 Continued…

Panel B: Correlations

	Sharpe	Sharpe_robust	lnexper	lnexper2	master	female	lntnf	fcenter	postshock2018
Sharpe	1.000								
Sharpe_robust	1.000	1.000							
lnexper	-0.034	-0.033	1.000						
lnexper2	-0.040	-0.040	0.987	1.000					
master	0.054	0.054	-0.020	-0.027	1.000				
female	0.051	0.050	-0.147	-0.147	0.040	1.000			
lntnf	0.138	0.138	0.103	0.102	0.206	0.023	1.000		
fcenter	-0.004	-0.003	0.079	0.081	0.137	0.018	0.077	1.000	
postshock2018	-0.027	-0.028	0.058	0.056	-0.027	-0.020	-0.078	-0.008	1.000

Table 3

Life cycle performance of hedge fund managers.

This table reports the OLS regression results on the effect of work experience of hedge fund managers on their performance. The sample period is from 2011 to 2020. The dependent variable *Sharpe* is the Sharpe ratio defined as the risk premium divided by the standard deviation of returns on the portfolio of funds that the manager holds. *lnexper* is logarithm of the number of years the manager has worked. *lnexper2* is defined as $(\text{lnexper})^2$. *lntnf* is logarithm of the number of funds under management. *Background* is professional background. *Strategy* is investment strategy. Definitions of all the variables are in Appendix Table A1. The t-statistics in parentheses is calculated from the heteroskedasticity robust standard errors double clustered by manager and city location. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Dependent variable	Sharpe					
	(1)	(2)	(3)	(4)	(5)	(6)
lnexper	0.598**	0.539**	0.611***	0.514***	0.501***	0.459***
	(2.49)	(2.26)	(3.29)	(3.16)	(3.19)	(2.97)
lnexper2	-0.178***	-0.166***	-0.170***	-0.157***	-0.166***	-0.147***
	(-3.95)	(-3.75)	(-5.04)	(-5.25)	(-5.87)	(-5.34)
master		0.214***	0.220***	0.182***	0.098***	0.092***
		(7.87)	(9.05)	(7.24)	(3.64)	(3.10)
female			0.227***	0.234***	0.238***	0.175***
			(4.37)	(4.34)	(4.32)	(3.39)
lntnf					0.209***	0.177***
					(19.44)	(13.42)
Background fixed effects	No	No	No	Yes	Yes	Yes
Strategy fixed effects	No	No	No	No	No	Yes
Location fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Number of managers	5107	5106	4555	4555	4555	4555
Observations	16,273	16,272	14,575	14,575	14,575	14,575
Adjusted R-squared	0.269	0.272	0.282	0.287	0.306	0.317

Table 4

Effect of financial center on fund manager's life cycle performance

This table presents the OLS regression results on the effect of financial center on the relationship between work experience of hedge fund managers and their performance. The sample period is from 2011 to 2020. The dependent variable *Sharpe* is the Sharpe ratio defined as the risk premium divided by the standard deviation of returns on the portfolio of funds that the manager holds. *lnexper* is logarithm of the number of years the manager has worked. *lnexper2* is defined as $(\text{lnexper})^2$. *lntnf* is logarithm of the number of funds under management. *Background* is professional background. *Strategy* is investment strategy. The indicator variable *fcenter* equals one if the fund manager works in Shenzhen and Shanghai, and zero otherwise. Definitions of all the variables are in Appendix Table A1. The t-statistics in parentheses is calculated from the heteroskedasticity robust standard errors double clustered by manager and city location. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Dependent variable	Sharpe					
	(1)	(2)	(3)	(4)	(5)	(6)
lnexper	1.013***	0.937***	1.022***	0.873***	0.833***	0.792***
	(2.95)	(2.84)	(4.16)	(4.08)	(4.25)	(4.05)
lnexper2	-0.261***	-0.243***	-0.245***	-0.223***	-0.226***	-0.210***
	(-3.60)	(-3.50)	(-4.49)	(-4.56)	(-5.07)	(-4.86)
fcenter	0.996*	0.979*	1.040***	0.922***	0.836***	0.802**
	(1.90)	(1.93)	(3.14)	(2.93)	(2.75)	(2.63)
fcenter × lnexper	-0.739*	-0.726**	-0.711***	-0.624***	-0.565**	-0.562**
	(-1.97)	(-2.00)	(-2.84)	(-2.70)	(-2.54)	(-2.60)
fcenter × lnexper2	0.147*	0.140*	0.127**	0.111**	0.096**	0.100**
	(1.96)	(1.95)	(2.32)	(2.21)	(2.05)	(2.24)
master		0.210***	0.220***	0.178***	0.094***	0.086**
		(8.33)	(8.95)	(6.46)	(3.25)	(2.58)
female			0.215***	0.224***	0.229***	0.170***
			(4.03)	(4.08)	(4.15)	(3.27)
lntnf					0.213***	0.183***
					(19.03)	(13.34)
Background fixed effects	No	No	No	Yes	Yes	Yes
Strategy fixed effects	No	No	No	No	No	Yes
Location fixed effects	No	No	No	No	No	No
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Number of managers	5107	5106	4555	4555	4555	4555
Observations	16,273	16,272	14,575	14,575	14,575	14,575
Adjusted R-squared	0.261	0.264	0.272	0.278	0.298	0.308

Table 5

Effect of 2018 stock market crash on fund manager's life cycle performance: A natural experiment

This table reports the OLS regression results on the effect of 2018 stock market crash on fund manager's life cycle performance. The sample period is from 2016 to 2019. The dependent variable *Sharpe* is the Sharpe ratio defined as the risk premium divided by the standard deviation of returns on the portfolio of funds that the manager holds. The stock market crash indicator *postshock2018* equals one in the years of 2018 and 2019 and equals zero in the years of 2016 and 2017. *lnexper* is logarithm of the number of years the manager has worked. *lnexper2* is defined as $(\text{lnexper})^2$. *lntnf* is logarithm of the number of funds under management. *Background* is professional background. *Strategy* is investment strategy. Definitions of all the variables are in Appendix Table A1. The sample period is from 2011 to 2020. The t-statistics in parentheses is calculated from the heteroskedasticity robust standard errors double clustered by manager and city location. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Dependent variable:	Sharpe					
	(1)	(2)	(3)	(4)	(5)	(6)
postshock2018	-0.106***	-0.101***	-0.124***	-0.132***	-0.099***	-0.147***
	(-4.64)	(-4.45)	(-5.06)	(-5.13)	(-3.82)	(-6.31)
lnexper	0.723**	0.616**	0.729***	0.627***	0.626***	0.565***
	(2.29)	(2.01)	(2.76)	(3.02)	(2.94)	(2.90)
lnexper2	-0.197***	-0.176***	-0.187***	-0.171***	-0.179***	-0.155***
	(-3.40)	(-3.18)	(-4.10)	(-4.63)	(-4.96)	(-4.85)
master		0.206***	0.219***	0.198***	0.121***	0.112***
		(5.01)	(5.15)	(4.77)	(2.86)	(2.87)
female			0.245***	0.249***	0.255***	0.178***
			(3.91)	(4.12)	(4.09)	(3.08)
lntnf					0.183***	0.128***
					(13.55)	(7.28)
Background fixed effects	No	No	No	Yes	Yes	Yes
Strategy fixed effects	No	No	No	No	No	Yes
Year fixed effects	No	No	No	No	No	No
Location fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Number of managers	4158	4158	3691	3691	3691	3691
Observations	9,965	9,965	8,878	8,878	8,878	8,878
Adjusted R-squared	0.015	0.018	0.020	0.027	0.041	0.063

Table 6

Life cycle performance for hedge fund managers: Robustness check with the expanded sample period.

This table reports the OLS regression robustness check results on the effect of the work experience of hedge fund managers on their performance with the expanded sample period from 2004 to 2020. *Sharpe* is the Sharpe ratio defined as the risk premium divided by the standard deviation of returns on the portfolio of funds that the manager holds. *lnexper* is logarithm of the number of years the manager has worked. *lnexper2* is defined as $(\text{lnexper})^2$. *lntnf* is logarithm of the number of funds under management. *Background* is professional background. *Strategy* is investment strategy. Definitions of all the variables are in Appendix Table A1. The t-statistics in parentheses is calculated from the heteroskedasticity robust standard errors double clustered by manager and city location. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Dependent variable:	Sharpe					
	(1)	(2)	(3)	(4)	(5)	(6)
lnexper	0.537**	0.491**	0.525***	0.444***	0.403***	0.358**
	(2.63)	(2.40)	(3.18)	(2.99)	(2.72)	(2.39)
lnexper2	-0.165***	-0.155***	-0.152***	-0.142***	-0.147***	-0.127***
	(-4.24)	(-4.03)	(-4.93)	(-4.99)	(-5.26)	(-4.61)
master		0.211***	0.216***	0.179***	0.097***	0.093***
		(7.88)	(9.21)	(7.49)	(3.80)	(3.31)
female			0.214***	0.221***	0.228***	0.165***
			(4.38)	(4.36)	(4.32)	(3.31)
lntnf					0.208***	0.176***
					(19.59)	(14.26)
Background fixed effects	No	No	No	Yes	Yes	Yes
Strategy fixed effects	No	No	No	No	No	Yes
Location fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Number of managers	5144	5143	4592	4592	4592	4592
Observations	16,726	16,725	15,017	15,017	15,017	15,017
Adjusted R-squared	0.282	0.285	0.295	0.300	0.319	0.330

Table 7

Life cycle performance for hedge fund managers: Robustness check by the transformation of Sharpe ratio.

This table reports the OLS regression robustness check results on the effect of the work experience of hedge fund managers on their performance. The sample period is from 2011 to 2020. The dependent variable $Sharpe\_robust$ is the transformed Shape ratio defined as $100 \times \log(1 + Sharpe/100)$ where *Sharpe* is the Sharpe ratio defined as the risk premium divided by the standard deviation of returns on the portfolio of funds that the manager holds. *lnexper* is logarithm of the number of years the manager has worked. *lnexper2* is defined as (lnexper)^2. *lntnf* is logarithm of the number of funds under management. *Background* is professional background. *Strategy* is investment strategy. Definitions of all the variables are in Appendix Table A1. The t-statistics in parentheses is calculated from the heteroskedasticity robust standard errors double clustered by manager and city location. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Dependent variable:	Sharpe_robust					
	(1)	(2)	(3)	(4)	(5)	(6)
lnexper	0.600**	0.542**	0.612***	0.516***	0.503***	0.463***
	(2.56)	(2.33)	(3.34)	(3.22)	(3.26)	(3.05)
lnexper2	-0.177***	-0.165***	-0.169***	-0.157***	-0.166***	-0.147***
	(-4.01)	(-3.81)	(-5.05)	(-5.28)	(-5.92)	(-5.41)
master		0.209***	0.215***	0.178***	0.096***	0.090***
		(8.00)	(9.21)	(7.31)	(3.70)	(3.16)
female			0.216***	0.223***	0.227***	0.166***
			(4.33)	(4.31)	(4.29)	(3.36)
lntnf					0.205***	0.173***
					(19.49)	(13.39)
Background fixed effects	No	No	No	Yes	Yes	Yes
Strategy fixed effects	No	No	No	No	No	Yes
Location fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Number of managers	5107	5106	4555	4555	4555	4555
Observations	16,271	16,270	14,573	14,573	14,573	14,573
Adjusted R-squared	0.275	0.278	0.288	0.294	0.312	0.323

Table 8

Summary statistics and correlation matrix: Robustness check at the fund level

The table reports summary statistics for all the variables (Panel A) and correlation matrix (Panel B) at the fund level. The sample period is from 2012Q1 to 2020Q4. Panel A presents the number of observations (N), number of managers (# of managers), the mean, standard deviation (Std. dev), minimum, the first quartile (Q1), median, the third quartile (Q3), and maximum for all the variables used in this paper. The variable *Sharpe_ratio* is defined as the risk premium divided by the standard deviation of the returns on the fund. The variable *Jensen_alpha* is calculated by eq. (7). The variable *Appraisal_ratio* is calculated by Jensen's alpha divided by residual volatility. For the manager characteristics, the variable *lnexper* is defined as the logarithm of the number of years the manager has worked. *lnexper2* is defined as $(\text{lnexper})^2$. The indicator variable *female* equals one for female fund managers and zero otherwise. The variable *lntnf* is calculated as the logarithm of the number of funds under management. The sample contains 3,071 distinct hedge fund managers covering 79,219 unique fund-quarter observations. Definitions of all the variables are in Appendix Table A2.

Panel A: Summary statistics

Variable	N	# of managers	Mean	Std. dev	Minimum	Q1	Median	Q3	Maximum
Sharpe_ratio	79,219	3,071	1.349	3.663	-3.844	-0.645	0.658	2.381	18.906
Jensen_alpha	70,828	2,465	0.806	7.896	-20.840	-2.809	0.728	3.870	26.441
Appraisal_ratio	66,477	2,188	1.199	6.489	-35.642	-1.294	0.399	2.289	28.481
lnexper	79,219	3,071	2.593	0.520	0.000	2.303	2.639	2.996	3.332
lnexper2	79,219	3,071	6.993	2.475	0.000	5.302	6.965	8.974	11.104
female	74,394	2,865	0.134	0.341	0.000	0.000	0.000	0.000	1.000
lntnf	79,219	3,071	2.418	1.494	0.000	1.386	2.303	3.332	5.852
legal	79,200	3,069	0.024	0.153	0.000	0.000	0.000	0.000	1.000
other_position	79,219	3,071	0.635	0.481	0.000	0.000	1.000	1.000	1.000
fund_age	79,030	3,057	3.072	2.061	0.030	1.548	2.570	4.063	9.778
management_fee	57,002	2,016	0.905	0.686	0.000	0.100	1.000	1.500	2.000
n_managers	79,219	3,071	1.147	0.404	1.000	1.000	1.000	1.000	5.000
invest_illiquid	79,219	3,071	0.994	0.075	0.000	1.000	1.000	1.000	1.000
lninitial_aum	79,219	3,071	7.872	1.617	4.605	6.908	8.006	8.987	11.379
pct_share	30,320	788	0.442	0.380	0.000	0.000	0.490	0.800	1.000
res_vol	66,477	2,190	3.224	3.200	0.008	0.986	2.290	4.369	15.898

Table 8 Continued…

Panel B: Correlations

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	Sharpe_ratio	1.000															
2	Jensen_alpha	0.350	1.000														
3	Appraisal_ratio	0.727	0.407	1.000													
4	lnexper	-0.124	-0.033	-0.123	1.000												
5	lnexper2	-0.137	-0.037	-0.134	0.984	1.000											
6	female	0.198	0.004	0.160	-0.221	-0.232	1.000										
7	lntnf	0.218	0.041	0.183	0.109	0.098	0.143	1.000									
8	legal	-0.041	-0.020	-0.038	0.089	0.096	-0.056	0.015	1.000								
9	other_position	-0.205	-0.002	-0.176	0.411	0.424	-0.256	0.004	0.119	1.000							
10	fund_age	-0.006	-0.052	-0.043	0.210	0.217	0.023	0.150	0.043	-0.014	1.000						
11	management_fee	-0.228	-0.004	-0.198	0.143	0.158	-0.203	-0.144	0.041	0.258	-0.012	1.000					
12	n_managers	0.004	0.018	0.017	-0.095	-0.096	0.051	-0.120	-0.008	-0.120	0.067	-0.005	1.000				
13	invest_ illiquid	0.002	-0.006	-0.003	-0.008	-0.004	0.006	0.033	0.012	-0.034	0.005	-0.022	0.012	1.000			
14	lninitial_aum	0.185	-0.008	0.164	-0.121	-0.115	0.160	0.255	0.020	-0.301	0.298	-0.175	0.047	0.015	1.000		
15	pct_share	0.031	0.027	0.017	0.189	0.194	-0.118	0.100	-0.000	0.191	-0.046	0.005	-0.157	0.006	0.022	1.000	
16	res_vol_q	-0.164	0.119	-0.148	0.125	0.130	-0.091	-0.131	0.055	0.162	0.030	0.108	-0.041	0.009	-0.204	0.036	1.000

Table 9

Life cycle performance of hedge fund managers: Robustness check at the fund level.

This table reports the OLS regression robustness check results on the effect of the work experience of hedge fund managers on their performance at the fund level. The sample period is from 2012Q1 to 2020Q4. The dependent variable *Sharpe_ratio* is defined as the risk premium divided by the standard deviation of the returns on the fund. The dependent variable *Jensen_alpha* is calculated by eq. (7). The dependent variable *Appraisal_ratio* is defined as *Jensen's alpha* divided by residual volatility. *lnexper* is logarithm of the number of years the manager has worked. *lnexper2* is defined as $(\text{lnexper})^2$. *lntnf* is logarithm of the number of funds under management. *Education* is the categories of education degrees such as bachelors, masters, PhD, etc. *AUM* is the value ranges of assets under management of funds. *Background* is professional background. *Strategy* is investment strategy. Definitions of all the variables are in Appendix Table A2. The t-statistics in parentheses is calculated from the heteroskedasticity robust standard errors double clustered by fund and city location. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Table 9 Continued …

Dependent variables	Sharpe_ratio	Jensen_alpha	Appraisal_ratio
	(1)	(2)	(3)
lnexper	1.395***	1.151***	2.240***
	(3.33)	(2.83)	(3.20)
lnexper2	-0.244***	-0.295***	-0.382**
	(-2.85)	(-2.78)	(-2.63)
Manager characteristics controls			
female	0.440**	-0.138	0.414
	(2.49)	(-0.82)	(1.15)
lntnf	0.221***	0.024	0.253***
	(5.05)	(0.53)	(5.36)
legal	-0.280***	-1.008	-0.625**
	(-2.72)	(-1.26)	(-2.05)
other_position	-0.044	0.275**	-0.050
	(-0.62)	(2.18)	(-0.33)
Fund characteristic controls			
fund_age	-0.143***	-0.183***	-0.243***
	(-3.67)	(-9.16)	(-3.20)
management_fee	-0.319***	-0.030	-0.486***
	(-3.76)	(-0.28)	(-3.55)
n_managers	0.171**	0.282***	0.481***
	(2.04)	(2.81)	(3.01)
invest_low_fluidity	-0.485***	-1.146***	-1.479***
	(-2.89)	(-4.90)	(-9.40)
lninitial_aum	0.189	-0.014	0.288
	(1.15)	(-0.30)	(1.05)
AUM fixed effects	Yes	Yes	Yes
Education fixed effects	Yes	Yes	Yes
Location fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
Background fixed effects	Yes	Yes	Yes
Strategy fixed effects	Yes	Yes	Yes
Number of managers	2085	1996	1952
Observations	53,621	48,659	46,053
Adjusted R-squared	0.278	0.029	0.192

Table 10

Confidence channel at the fund level

Panel A of this table reports the OLS regression results on the effect of work experience on confidence. The sample period is from 2012Q1 to 2020Q4. We use the percentage of company's shares held by managers (*pct_share*) as a proxy for their confidence, which is the dependent variable. Panel B of this table reports the OLS regression results on the effect of fund manager's confidence on fund performance. The dependent variable *Sharpe_ratio* is the risk premium divided by the standard deviation of the return for the fund. The dependent variable *Jensen_alpha* is calculated by eq. (7). The dependent variable *Appraisal_ratio* is Jensen's alpha divided by residual volatility. *lnexper* is the logarithm of the number of years the manager has worked. *lnexper2* is defined as $(\text{lnexper})^2$. Definitions of all the variables are in Appendix Table A2. The t-statistics in parentheses is calculated from the heteroskedasticity robust standard errors double clustered by fund and city location. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Relationship between working experience and shareholdings of fund managers

Dependent variable	pct_share		
	(1)	(2)	(3)
lnexper	-0.120	-0.145	-0.323*
	(-1.29)	(-1.30)	(-1.90)
lnexper2	0.052***	0.051***	0.083***
	(3.26)	(2.77)	(2.78)
Manager characteristics controls	No	Yes	Yes
Fund characteristic controls	No	No	Yes
All other fixed effects	Yes	Yes	Yes
Number of managers	795	750	750
Observations	30,320	28,984	28,963
Adjusted R-squared	0.189	0.200	0.244

Panel B: Relationship between shareholdings of fund managers and fund performance

Dependent variable	Sharpe_ratio	Jensen_alpha	Appraisal_ratio
	(1)	(2)	(3)
pct_share	0.315***	0.542	0.539**
	(4.12)	(1.23)	(2.20)
lnexper	0.866	2.108	2.071
	(0.84)	(1.40)	(1.02)
lnexper2	-0.158	-0.482	-0.381
	(-0.88)	(-1.65)	(-1.06)
Manager characteristics controls	Yes	Yes	Yes
Fund characteristic controls	Yes	Yes	Yes
All other fixed effects	Yes	Yes	Yes
Number of managers	575	571	568
Observations	19,552	17,933	17,020
Adjusted R-squared	0.222	0.043	0.096

Table 11

Career concerns channel at the fund level

This table reports the OLS regression results on the effect of work experience on the idiosyncratic risks of the fund. The sample period is from 2012Q1 to 2020Q4. We use idiosyncratic risks (*res_vol_q*) as a proxy for the *inverse* of career concerns of fund managers. The dependent variable *res_vol_q* is calculated by eq. (6). *lnexper* is calculated by the logarithm of the number of years the manager has worked. Definitions of all the variables are in Appendix Table A2. The t-statistics in parentheses is calculated from the heteroskedasticity robust standard errors double clustered by fund and city location. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Dependent variable	res_vol_q		
	(1)	(2)	(3)
lnexper	-0.181	-0.219	-0.346
	(-0.78)	(-0.81)	(-1.46)
lnexper2	0.087*	0.091*	0.119**
	(1.67)	(1.67)	(2.44)
Manager characteristics controls	No	Yes	Yes
Fund characteristic controls	No	No	Yes
All other fixed effects	Yes	Yes	Yes
Number of managers	2,893	2,697	2,695
Observations	66,476	62,517	62,502
Adjusted R-squared	0.139	0.141	0.148

Appendix Table A1

Definitions of variables at the manager level

Variable names	Variable definitions
Performance measures	
Sharpe	Sharpe ratio, calculated as (average returns on the portfolio of funds held by managers – risk free rate) / (standard deviation of returns on the portfolio of funds held by managers), where risk free rate is the one-year RMB benchmark deposit rate of financial institutions.
Sharpe_robust	=100 × log (1 + *Sharpe* / 100), logarithmic transformation of the Sharpe ratio
Manager characteristics	
lnexper	Natural logarithm of the number of years the manager has worked
lnexper2	= (*lnexper*)^2, square of the natural logarithm of years the manager has worked
master	Indicator variable, equals one if the manager has a master's degree or above, and zero otherwise
female	Indicator variable, equals one for female managers and zero otherwise
Manager control variables	
lntnf	Natural logarithm of the number of funds that the manager manages
fcenter	Indicator variable, equals one if the fund manager works in Shenzhen or Shanghai, and zero otherwise
Strategy fixed effects	Investment strategy of the fund manager
Background fixed effects	Professional background of the fund manager
Location fixed effects	City location of the fund manager
Natural experiment variable	
postshock2018	Indicator variable, equals one if the observation is in the year of 2018 or 2019, and zero if the observation is in the year of 2016 or 2017.

Appendix Table A2

Definitions of variables at the fund level

Variable names	Variable definitions
Performance measures	
Sharpe_ratio	Quarterly Sharpe ratio, calculated as (quarterly returns of the fund – quarterly risk-free rate) / (quarterly standard deviation of returns on the fund), where the quarterly risk-free rate $R_{f,q}$ is the one-year RMB benchmark deposit rate of financial institutions at the quarterly frequency. Quarterly standard deviation of returns of the fund is calculated by the standard deviation of the previous 12 monthly returns.
Jensen_alpha	Quarterly Jensen's alpha, calculated by $\hat{\alpha}_i = R_{i,q} - R_{f,q} - \hat{\beta}_{i,q}(RCI_q - R_{f,q})$, where $R_{i,q}$ is the quarterly return of fund *i* at quarter *q*, $R_{f,q}$ is the quarterly risk-free rate at quarter *q*, and RCI_q is the quarterly return of the Rongzhi Composite Index (the hedge fund manager's performance index across all strategies and regions in China) at quarter *q*. $\hat{\beta}_{i,q}$ is estimated by $R_{i,t} - R_{f,t} = \alpha_i + \beta_{i,q}(RCI_t - R_{f,t}) + \varepsilon_{i,t}$ using past 24 monthly returns, where $R_{i,t}$ is the return of fund *i* over month *t*, $R_{f,t}$ is the risk-free rate in month *t* and RCI_t is the Rongzhi Composite Index in month *t*.
Appraisal_ratio	Quarterly Appraisal ratio, calculated by *Jensen_alpha* divided by *res_vol_q*
Manager characteristics	
lnexper	Natural logarithm of the number of years the manager has worked
lnexper2	= (*lnexper*)^2, square of the natural logarithm of years the manager has worked
female	Indicator variable, equals one for female managers and zero otherwise
Manager control variables	
lntnf	Natural logarithm of the number of funds that the manager manages
legal	Indicator variable, equals one if the fund manager is also a legal representative of the company, and zero otherwise
other_position	Indicator variable, equals one if the fund manager also has other positions in the company, and zero otherwise
Strategy fixed effects	Investment strategy of the fund manager
Background fixed effects	Professional background of the fund manager
Location fixed effects	City location of the fund manager
Education fixed effects	The category of fund manager's education degree such as bachelors, masters, PhD, etc.
Fund characteristics	
fund_age	Duration of the fund, calculated by the number of days between the date of fund establishment and 31/12/2020 divided by 365
management_fee	Management fee of the fund (%)
n_managers	Number of managers in charge of the fund
invest_illiquid	Indicator variable, equals one if the fund invests in illiquid investment targets, and zero if the fund does not invest in illiquid investment targets
lninitial_aum	Natural logarithm of the initial assets under management
AUM fixed effects	The value ranges of assets under management of funds
Channel variables	
pct_share	The percentage of company's shares held by fund managers
res_vol_q	Quarterly residual volatility, where the residual is estimated by $\hat{\varepsilon}_{i,t} = R_{i,t} - R_{f,t} - \hat{\alpha}_i + \hat{\beta}_{i,q}(RCI_t - R_{f,t})$, where $R_{i,t}$ is the return of fund *i* in month *t*, $R_{f,t}$ is the risk-free rate in month *t* and RCI_t is the quarterly return of Rongzhi Composite Index in month *t*. $\hat{\alpha}_i$ and $\hat{\beta}_{i,q}$ are estimated by $R_{i,t} - R_{f,t} = \alpha_i + \beta_{i,q}(RCI_t - R_{f,t}) + \varepsilon_{i,t}$ using past 24 monthly returns