 doi:10.20944/preprints202212.0580.v1

Credence Goods, Price, and Quality

Marian W. Moszoro*[a]

[a]International Monetary Fund, George Mason University
& SGH Warsaw School of Economics

December 28, 2022

Abstract

When sellers set the price for *ex-ante* unobservable and *ex-post* unenforceable quality, price signals credence quality. Hedge funds resemble incomplete long-term contracts for credence goods under buyer-determined auctions. I show that hedge funds' ability to solicit investments at higher management fees signals their capacity to generate higher net returns. This result is more pronounced during bust cycles and closer to financial hubs, i.e., when signaling quality is more valuable. The findings are relevant to understanding price and effort in the provision of credence goods like medical procedures and legal advice.

JEL Classification: L14, L15, G11, G41

Keywords: Credence Goods, Price and Performance, Incomplete Contracts, Gift Exchange and Reciprocity

* ✉ 1900 Pennsylvania Ave NW, Washington, DC 20431. Email: mmoszoro@imf.org. I am grateful to Youngmin Choi, Andrea Deghi, and Arthur Silve for comments and suggestions. I acknowledge financial support from the "MIUR Project Department of Excellence" of the Department of Economics and Management, University of Padova. This work was undertaken before the author joined the IMF. The views expressed herein are those of the author and do not necessarily represent the views of the IMF, its Executive Board, or its management. Declarations of interest: none.

 doi:10.20944/preprints202212.0580.v1

"Quality is never an accident. It is always the result of intelligent effort."

— John Ruskin, English writer, philosopher and art critic of the Victorian era.

"The bitterness of poor quality is remembered long after the sweetness of low price has faded from memory."

— Aldo Gucci, Guccio Gucci's son, chairman of Gucci from 1953 to 1986.

1 Introduction

Consider a setting in which a buyer wishes to acquire a service from a set of possible suppliers, the suppliers' cost is increasing in quality level, and the buyer's valuation of the service depends on the quality level the contracted supplier chooses after the price is set. This setting is a labeling twist of Fehr, Kirchsteiger, and Riedl's (1993, 1998) classic studies. Laboratory experiments indicate that under incomplete contracting, buyer-determined auctions (i.e., when sellers compete to obtain the business) lead to greater levels of gift exchange and higher price-quality reciprocity than forward auctions (i.e., when buyers compete to obtain goods or services by offering increasingly higher prices) and double auctions (Brosig-Koch and Heinrich 2014; Fugger, Katok, and Wambach 2019), even in one-shot procurement settings without reputation (Houser, Shachat, and Zheng 2018). Moreover, suppliers reciprocate more strongly when they know they won the auction despite not submitting the lowest bid.

The hedge fund investor-acquisition process resembles a buyer-determined auction, in which sellers (hedge funds) offer bids (fees) and buyers (investors) choose with whom to trade. This paper studies whether higher price signals higher commitment to quality when quality is not observable *ex ante* and not enforceable *ex post* using the hedge fund industry.

The hedge fund industry presents interesting contractual features which relate to the price mechanism for expert services, including medical and legal services (Dana Jr and Spier 1993; Emons 2017). Hedge funds charge management and incentive fees, which are unvarying throughout the lifespan of the hedge fund. Management fees are a fixed percentage of the assets under management to cover the fixed cost of running the fund. Incentive (or performance) fees are a percentage relative to the *surplus* over a stochastic benchmark, such as the stock market index, to determine whether a performance fee can be earned. I focus on the management

 doi:10.20944/preprints202212.0580.v1

fee, which is analogous to the bid price in a buyer-determined auction or the retainer in legal services and which, surprisingly, received little attention in the finance and contract literature.

In standard models of search goods, price depends on quality (Tirole 1988); but when quality is unknown *ex ante*—i.e., regarding experience goods (Nelson 1970) or credence goods (Arrow 1963; Darby and Karni 1973)—then quality depends on price (Stiglitz 1987). In other words, the price signals quality.

Hedge funds resemble credence goods in that their managers promise non-enforceable quality (given by non-verifiable skill and effort), set up the charges—i.e., management and incentive fees—and search for long-term investors (Emons 1997). Investors cannot withdraw money without previous notice and high penalties. The long-term commitment is stressed by redemption fees charged by hedge funds for early withdrawals (typically within a year) to discourage short-term investing and deter withdrawals after periods of poor performance.

Contracts between hedge funds and investors are incomplete in nature—i.e., skill and effort are unobservable *ex ante* and non-enforceable *ex post*—and thus subject to moral hazard. The usually considered constraints on moral hazard in incomplete contracts are reputational concerns in repeated strategic interactions. It has been shown that fairness and gift exchange (Akerlof 1982, Fehr, Kirchsteiger, and Riedl 1993, 1998) also limit moral hazard in labor contracts: employees are more productive than required in return for employers' higher wages. Also, the interplay of promised abnormal performance and high upfront payments is conducive to a psychological lock-in. Stone and Stremitzer (2020) show that in the absence of legal enforcement, promisors (sellers) are more likely to keep promises about performance the more they were relied on by a promisee (buyers). Promisees anticipate this effect and strategically overpay *ex ante* to lock promisors into keeping their promises of high performance.

2 Related Literature

Previous research—predominantly on mutual funds—advanced the understanding of how fund managers contract and operate. Incentive fees aim to improve performance by attracting the most talented individuals into the investment management industry and aligning the incentives of the portfolio manager with those of the investor (Servaes and Sigurdsson 2019). Also, incentive fees are a neat marketing tool to attract new investments to mutual funds (Elton, Gruber, and Blake 2003). However, their complexity may allow managers to 'game' the fee by

 doi:10.20944/preprints202212.0580.v1

manipulating portfolios (Grinold and Rudd 1987; Arnott 2005).

Khorana, Servaes, and Tufano (2009) evidenced that mutual funds charge higher management fees when they are small, distributed across several countries, and located in countries with higher taxes and with weaker investor protection. Ptak (2017) argued that management fees are outmoded and that incentive fees better align fund managers and shareholders. Mutual funds experience constant inflows and outflows, making them closer to search goods with repeated interactions and reputation.

In contrast to mutual funds, hedge funds have unique features, such as lockup periods, notice periods, and redemption periods. Hedge funds are limited to accredited investors who generally are high-net-worth individuals and institutional investors. Agarwal, Daniel, and Naik (2009) found no significant and, in some cases, adverse effects of incentive fees on performance, and no correlation between management fees and performance.

The actions of hedge fund managers rather than those of market forces tend to drive hedge fund returns. Hedge funds have negatively skewed returns with positive excess kurtosis. (Preece 2013). Hedge funds' incentive fees explain some of their higher performance, but not the increased total risk in comparison to mutual funds (Ackermann, McEnally, and Ravenscraft 1999). Fund-of-funds—a subset of hedge funds—that deliver abnormal returns are more likely to survive longer and experience higher capital inflows, which further attenuate their performance (Fung, Hsieh, Naik, and Ramadorai 2008).

Do hedge funds' fees signal managerial quality? Anecdotally, the top-earning Renaissance's Medallion hedge fund—which has generated returns of about 40 percent annually since its inception in 1988—charges a 5 percent management fee and 44 percent incentive fee, way above the industry standard of 2 and 20 percent, respectively.[1]

I find a significant and robust effect of funds' management fees on managers' performance. This result is augmented during turmoil, arguably when high performance is strenuous, and credence has a higher value. To my knowledge, this is the first empirical study on incomplete long-term contracts for credence goods, price, and quality using observational data.

The remainder of the paper is organized as follows. Section 3 describes the data and the identification strategy. Section 4 presents the results and robustness tests, including boom

[1] See https://www.fnlondon.com/articles/hedge-fund-boss-with-44-performance-fee-tops-investor-rich-list-20180531 (accessed August 2019).

 doi:10.20944/preprints202212.0580.v1

and bust cycles, instrumenting management quality, and risk-adjusted and abnormal returns. Section 5 investigates fund survival, while Section 6 explores sequential and peer reputation. Section 7 offers a discussion and concluding remarks.

3 Data and Identification

I collected a rich panel data of the whole universe of US hedge funds' monthly performance (including historical returns and assets under management [AUM]) for 1999-2014 from Hedge Fund Research.[2]

Hedge funds are alternative investments using pooled funds to earn active return—or "*alphas*"—for their investors. Hedge funds can make use of derivatives and leverage in both domestic and international markets to generate high returns (either in an absolute sense or over a specified market benchmark or "bogey").

Hedge funds can be classified according to the main strategies they employ into:

(a) **Equity Hedge**

Equity Hedge strategies primarily maintain positions both long and short in equity and equity derivative securities.

(b) **Event-Driven**

Event-Driven investment managers maintain positions in companies currently or prospectively involved in singular corporate transactions including mergers, restructurings, financial distress, tender offers, shareholder buybacks, debt exchanges, security issuance, and other capital structure adjustments.

(c) **Fund of Funds**

Funds of Funds invest with multiple funds or managed accounts. The strategy designs a diversified portfolio of managers to lower the risk of investing with an individual manager significantly.

(d) **Macro**

Macro investment managers trade a broad range of strategies in which the investment process is predicated on movements in underlying economic variables and the impact these have on equity, fixed income, hard currency, and commodity markets.

[2] See: https://www.hedgefundresearch.com/.

 doi:10.20944/preprints202212.0580.v1

(e) **Relative Value**

Relative Value investment managers maintain positions in which the investment is based on the realization of a valuation discrepancy in the relationship between multiple securities.

Hedge funds' main strategies further decompose into sub-strategies. Table 1 presents the frequency in month-years and share of the total count of hedge funds' main strategies and sub-strategies.[3] Except for the ambiguous "multi-strategy" label, each sub-strategy is unique to a main strategy.

For comparability, I study only American hedge funds.[4] In the US, hedge funds are only accessible to accredited investors as they require less SEC regulations than mutual funds and other investment vehicles.

Hedge funds charge management fees and incentive fees: management fees are intended to cover fund expenses (typically 2 percent per year of the assets under management) and incentive fees are a profit share (typically 20 percent of realized profit). This scheme—usually referred in the industry as the "2/20" or "2-and-20"—is constant throughout the lifespan of the fund. Investors usually perceive the incentive fee as a bonus payment to fund managers, while the management fee is perceived as the price of (or cost of running) the fund. Management and incentives fees are determined at inception and then remain constant for the lifecycle of the fund. Hedge funds have a target lifespan of 10 years, but can be terminated earlier if they are underperforming.

Overall, the panel dataset is slightly unbalanced with some gaps but extremely detailed and rich with more than 340,000 monthly observations for 5,854 funds across 16 years. The variables of interest are measures of fund performance by month, and management and incentive fees, winsorized at 1 percent level. In the regressions, I control for main strategy and sub-strategy, state of incorporation, fund status (dead or alive), and time (month-year) fixed effects, with standard errors clustered at the fund level.

[3] For a detail explanation of sub-strategies, see HFR Hedge Fund Strategy Classification System at https://www.hedgefundresearch.com/hfr-hedge-fund-strategy-classification-system (accessed August 2019).

[4] Funds with keywords such as foreign country names, "emerging," "international," and "global" in their strategy description denoting international or foreign funds were excluded.

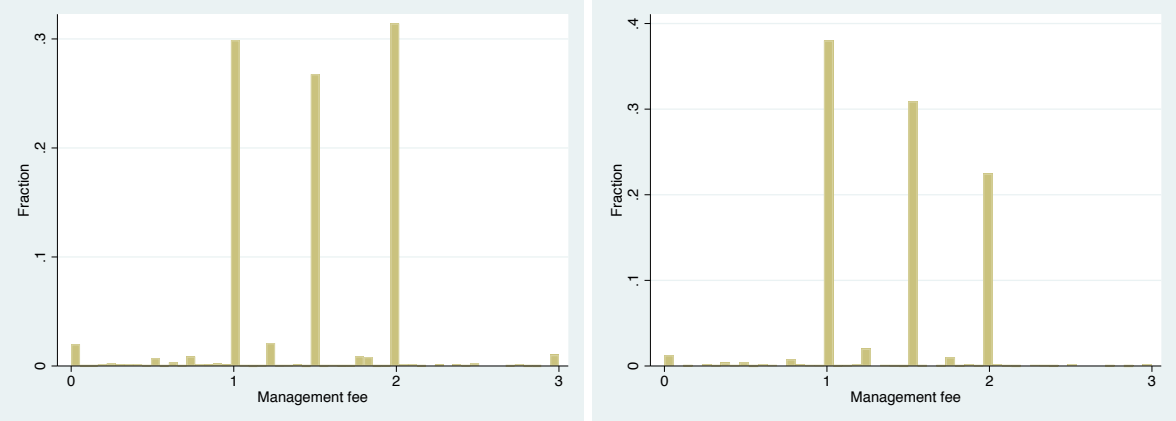
Preprints (www.preprints.org) | NOT PEER-REVIEWED | Posted: 30 December 2022 doi:10.20944/preprints202212.0580.v1

4 Results and Robustness

Table 2 presents the main results. Management and incentive fees are time-invariant within funds and their variation comes from the cross-section between funds. Estimates reported in the tables are monthly and then annualized on a compound basis hereinafter to facilitate comparison. For all hedge fund types, an increase in 1 percent point in the management fee is associated with an increase in 1.3 percent points in annualized returns (see model 1). In table model 2, I restrict the analysis to equity hedge funds, the most competitive type. The results are reinforced: an increase in 1 percent point in the management fee is associated with an increase in 2.3 percent points in annualized returns.

Management fees are distributed nonuniformly from zero to 3 percent (see figure 1). To avoid inflated t-values by outliers, in model 3 I restrict the analysis to the most frequently observed management fees—i.e., 1, 1.5, and 2 percent—which account for 91.4 percent of equity hedge funds. In this model, an increase in 1 percent point in the management fee is associated with an increase in 3.5 percent points in annualized returns.

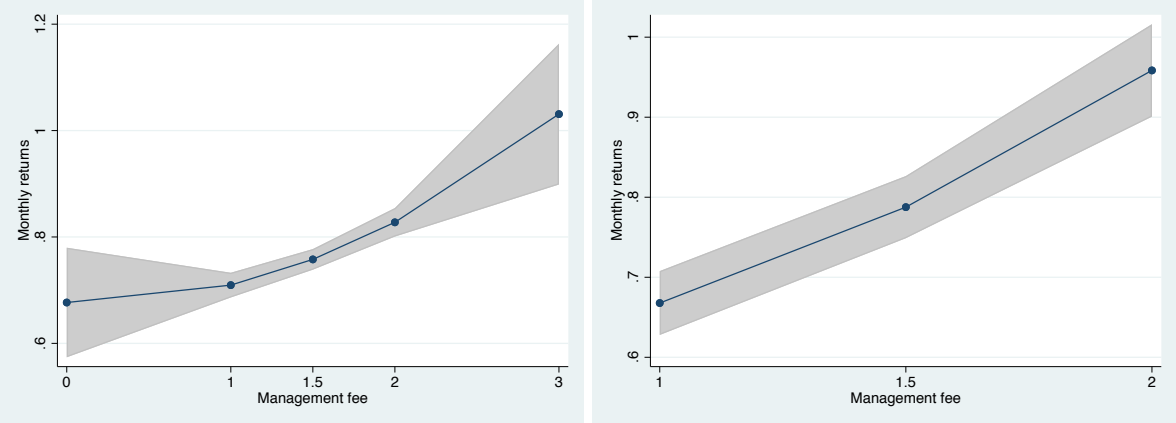
Figure 1: This figure presents the histograms of management fees in all hedge funds (left graph) and equity hedge funds only (right graph) in the data.



To check whether performance increases linearly in management fees, I add a quadratic term to management fee. Figure 2 plots the predictive margins of monthly returns on single and quadratic terms of management fee for all hedge funds along the whole management fee spectrum (left graph) and equity hedge funds at 1, 1.5, and 2 percent management fees (right graph). The results show that linear estimations are a suitable approximation.

Preprints (www.preprints.org) | NOT PEER-REVIEWED | Posted: 30 December 2022 doi:10.20944/preprints202212.0580.v1

Figure 2: This figure plots the predictive margins of monthly returns on single and quadratic terms of management fee for all hedge funds along the whole management fee spectrum (left graph) and equity hedge funds at 1, 1.5, and 2 percent management fee (right graph). The gray area represents the 95-percent confidence intervals.



4.1 Boom and Bust Cycles

Models 4 and 5 break down the regressions into bull (boom) and bear (bust) stock markets. The correlation between higher fees and higher performance is reinforced during recessions: in bull markets, an increase in 1 percent point in the management fee is associated with an increase in 2 percent points in annualized returns on an average annual return of 13.7 percent; but in bear markets, an increase in 1 percent point in the management fee is associated with an increase in 7.5 percent points in annualized returns on an average annual return of -2.9 percent. The incentive fee is either not statistically significant, or economically weakly associated with funds' performance.

Investment strategies and managerial attitudes may be endogenous to the time of fundraising and fund inception. For example, funds started during bull markets may be more risk-seeking and perform better during future economic booms, while funds started during bear markets may be more risk-averse and conservative, and thus perform better during future economics bust times. Similarly, investors' choices of funds may be endogenous to the investment climate at the time of investing. Future economic cycle, however, is difficult to predict, particularly several years in advance.

Concurrently, when the economy is booming, low-quality fund managers rely more on the achievable profit-sharing incentive fee for compensation, and thus are more prone to lower

Preprints (www.preprints.org) | NOT PEER-REVIEWED | Posted: 30 December 2022 doi:10.20944/preprints202212.0580.v1

management fees to lure investors. Meanwhile, high-quality funds maintain or increase their management fee to signal quality. This syllogism is consistent with the higher observed survival rate of hedge funds started in bull markets with high management fees.

Further, I harness these insights into a quasi-experiment to tease out quality signaling through price in long-term relationships. I compare the performance of funds started in *bull markets* from February 1999 to December 2006 (roughly half of the observations and just before the Global Financial Crisis) during *bear market* periods in 2007-2014. The time and market cycle separation—i.e., the performance of funds started in a bull market period in 1999-2006 in bear markets in 2007-2014—takes care of endogenous fund choice and investment profile, and the unpredictability of future market busts helps identify low- and high-quality performers.

Models 6 and 7 in table 2 present the result of this test for all funds and for equity hedge funds only, respectively. For all funds (model 6), 1 percent point higher management fees of funds started during bull markets in 1999-2006 redounded in 3.7 percent points higher annual returns in 2007-2014 in comparison with funds with lower fees in the same period and market cycle. This pattern is reinforced for equity hedge funds (model 7): 1 percent point higher management fees correspond to 5.5 percent points higher annualized returns.

4.2 Instrumenting Management Quality

Management fees are fixed at the fund's outset. Therefore, the variation of the management fees' instrument needs to predate the fund's inception. Prestigious academic credentials arguably facilitate soliciting investments at a higher fee. Previous research has shown behavioral biases in quality perception associated with first names (Cotton, O'neill, and Griffin 2008; Fryer Jr and Levitt 2004; Twenge, Abebe, and Campbell 2010), gender (Atkinson, Baird, and Frye 2003; Dwyer, Gilkeson, and List 2002; Van Staveren 2014), and even phonetic symbolism (Lowrey and Shrum 2007).

I exploit these variations to instrument *perceptions* of management quality using textual analysis of fund managers' bios and names. The first stage of the IV yields high R-squared values and significant F statistics. The results of the instrumental variable regressions in models 8 and 9 in table 2 show that an increase in the management fee by 1 percent point increases the funds' performance by 12.9 percent points for all funds and 18.9 percent points for equity hedge funds, i.e., ca. threefold higher than OLS estimates.

Preprints (www.preprints.org) | NOT PEER-REVIEWED | Posted: 30 December 2022 doi:10.20944/preprints202212.0580.v1

4.3 Sharpe Ratios and Abnormal Returns

As robustness checks, I re-estimate the main results using alternative measures of fund performance. In table 3, I use the Sharpe ratio—i.e., a risk-adjusted measure of return on investments (Sharpe 1964)—as the dependent variable. I calculate the Sharpe ratio by subtracting the substrategy index return from the portfolio return in the past 12 months, divided by the portfolio return's standard deviation, on a rolling basis. The Sharpe ratio adjusts a portfolio's past performance for the excess risk that was taken by the fund managers. The results are similar to the main estimates in table 2: an increase in 1 percent point in management fee is associated with an annualized increase in the Sharpe ratio by 1 (see model 3), a significant increase taking into account a mean of 1.95 and that a Sharpe ratio equal to 1 is considered good by investors.

In a similar fashion, table 4 reports the point estimates of the regressions using *alphas*—i.e., a measure of abnormal returns (Jensen 1968)—as the dependent variable. I calculated *alpha* as the coefficient of the constant in a market model regression. In an efficient market, the expected value of the *alpha* coefficient is zero. Therefore, the *alpha* coefficient indicates how an investment has performed after accounting for the risk it involved. If *alpha* is greater than zero, the investment has a return in excess of the reward for the assumed risk. The estimations show that an increase in 1 percent point in management fee corresponds to an annualized abnormal return of 3.1 percent points (see model 3), also a significant increase over a mean of annual abnormal returns of 3.5 percent.

5 Fund Survival

Hedge funds bind investors and managers in a contract aiming at 10 years. If management fees signal *ex ante* unobservable management quality, they should also covary *ex post* with hedge fund survival rate (Jagannathan, Malakhov, and Novikov 2010). Does management fee predict a fund's target 10-year survival? I calculate the lifetime of hedge funds by subtracting the start date from the fund's last observation, for funds started from February 1999[5] onwards until December 2005, i.e., 10 years before the last observation in the sample.

Table 5 present cross-section logit regressions at the hedge fund level where the dependent

[5] Hedge Fund Research detailed data starts from January 1999 onwards. All funds which started before 1999 are coded as starting in January 1999.

 doi:10.20944/preprints202212.0580.v1

variable is a dummy variable equal to 1 if the hedge fund achieved the 10-year target lifespan. According to model 1, an increase of 1 percent point in the management fee is associated with an increase in the probability of surviving 10 years by 6.2 percent. This effect is driven only by funds started during bull but not during bear market periods (see model 2 versus model 3). This result is augmented when the sample is restricted to equity hedge funds: an increase of 1 percent point in the management fee during bull market periods is associated an increase in the 10-year survival probability by 15 percent, but there is no effect during bear market periods (see model 5 versus model 6).

Interestingly, in line with the rationale presented in section 4 that low-quality hedge fund managers increase incentive fees during bull-market periods, an increase in the incentive fee in equity hedge funds during bull-market periods is associated with a decrease in the funds' probability of surviving 10 years, while there is no impact of increasing the incentive fee during bear-market periods on the funds' probability of surviving 10 years (see model 5 versus model 6 in table 5).

6 Vertical versus Lateral Reputation

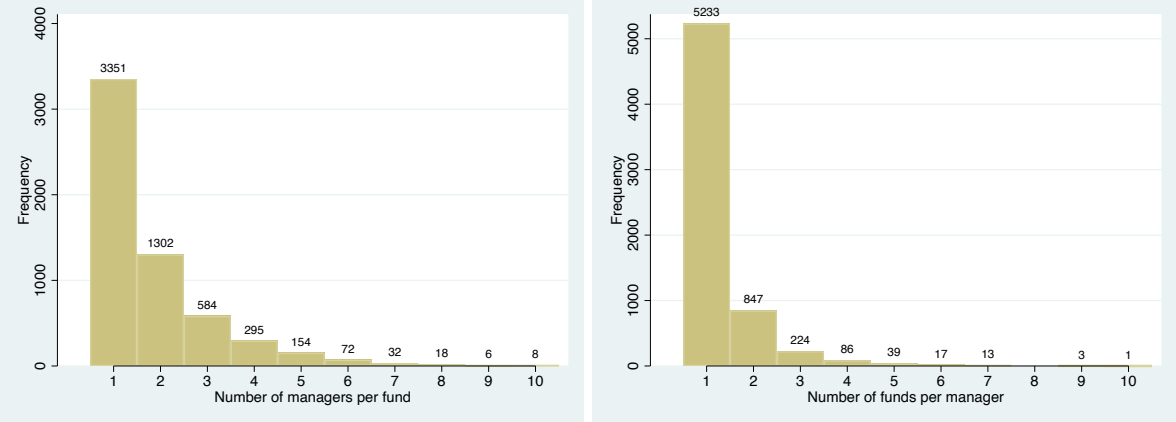
Managers can build *vertical* reputation vis-à-vis investors through sequential interactions, and increase fees in subsequent funds following successful outcomes in previous funds. Alternatively, managers may be concerned about *lateral* reputation among their peers, i.e., other fund managers, where the best managers are the ones able to attract investors at high fees.

To test these hypotheses, I parsed the names of the fund managers algorithmically, and hand-cleaned a few observations with mistakes or without proper names (e.g., with name of parent company or corporate position). Most funds have only one (57.2 percent of funds) or two managers (27.2 percent of funds); some funds have multiple managers, up to 34 reported managers in one fund in the data. The left graph in figure 3 plots the number of managers per fund, truncated at 10 managers.

As per the industry convention, managers are listed hierarchically in order of relevance in the fund. For data handling, I included all listed managers in funds with up to five managers (97.1 percent of funds) and the first five listed managers in the remaining (2.9 percent) of funds. The resulting dataset contains 517,861 unique manager-month level observations corresponding to 6,465 fund managers.

Preprints (www.preprints.org) | NOT PEER-REVIEWED | Posted: 30 December 2022 doi:10.20944/preprints202212.0580.v1

Figure 3: This figure plots the number of managers per fund (left graph) and number of funds per manager (right graph), truncated at 10 for readability.



From the fund managers' perspective, managers can manage one fund, or several funds simultaneously or sequentially. The right graph in figure 3 plots the number of funds per manager, truncated at 10 funds. 5,233 fund managers (ca. 81 percent) managed only one fund during the analyzed period. Out the managers 1,232 (19 percent) who manage two or more funds, 698 managers (ca. 11 percent) charge the same management fee in their funds;[6] 153 managers (2.4 percent) lowered their management fees in subsequent funds; 101 managers (1.6 percent) both increased and decreased their management fees in subsequent funds; and 59 managers (1 percent) applied different management fees to funds started at the same time, implying a trial-and-error or mixed sales strategy.

Of the managers 229 fund managers (3.5 percent) who increased the management fees in subsequent funds, 50 (0.8 percent) did so within three years of the previous fund, when it is hard to attest whether the fund was successful. Only 179 fund managers (2.8 percent) increased management fees after three or more years of experience in a previous fund. In table 6, I run manager-level regressions of management fees on managers' experience proxied by the number of previous hedge funds managed. The estimates show that management fees are orthogonal to managers' experience in any previous hedge fund (see models 1–3) and with three or more years of experience in previous hedge funds (see models 4–6).

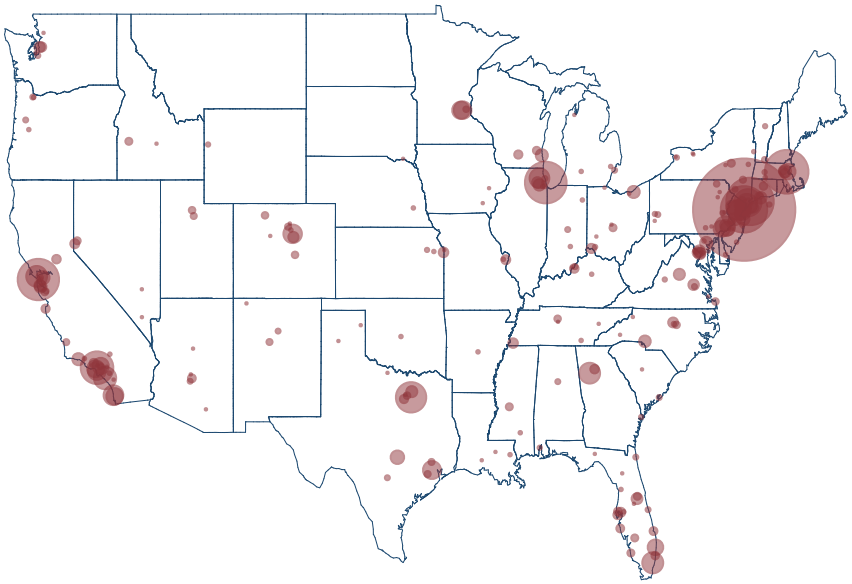
[6] For example, the record-holder manager with 14 funds charges the same 1 percent management fee in all funds under his management.

Preprints (www.preprints.org) | NOT PEER-REVIEWED | Posted: 30 December 2022 doi:10.20944/preprints202212.0580.v1

To complement this analysis, in table 7 I interact management fees with managerial experience in hedge funds. Management fees remain a strong predictor of funds' performance. Managers' experience in previous funds, however, is not significant, neither as a stand-alone covariate nor interacted with management fees (see models 1–3). The coefficients related to managers' experience also stay insignificant when accounting for three or more years of experience before launching a new fund (see models 4–6). It seems that managers carrying reputation to their subsequent funds is more an industry stereotype than based on evidence. Most likely managers experience comes from previous jobs *outside* the hedge fund industry, e.g., investment banking or wealth management.

As an alternative explanation, I analyze whether fund managers engage in a reputation contest with other fund managers in the same area, in which attracting investors at a high management fee signals status. To test this hypothesis, I geolocated all fund managers with the latitude and longitude corresponding to the funds' ZIP codes and counties. Figure 4 shows the location of hedge fund managers in the 48 continuous US states. Most fund managers are clustered around New York City, Greenwich (Connecticut), Chicago, Boston, San Francisco, Dallas, Los Angeles, and Miami areas.

Figure 4: This figure shows the density of hedge fund managers by location in the 48 continuous US states. Location is defined as three-digit ZIP codes. The area of the circle is proportional to the number of hedge fund managers in a given location. A few hedge fund managers from Alaska and Hawaii are omitted for easy readability.



Preprints (www.preprints.org) | NOT PEER-REVIEWED | Posted: 30 December 2022 doi:10.20944/preprints202212.0580.v1

Gravity models and spacial autoregressive models (SAR) can proxy the impact of local competition on fees and performance. In table 8, I control for the distance of each hedge fund to the major hedge fund hubs, namely: New York City, NY; Greenwich, CT; Chicago, IL; Boston, MA; San Francisco, CA; Dallas, TX; Los Angeles, CA; and Miami, FL. These hubs host more than two-thirds of hedge funds at any time. State fixed effects are omitted to avoid discontinuities in the distance estimator at the borders of contiguous states (e.g., New York City area neighboring Connecticut and New Jersey or Chicago area neighboring Indiana and Wisconsin). The results of the regressions are quantitatively almost identical to the point estimates in models 1–3 in table 2, but the coefficients on distance are small and predominantly not significant: i.e., the distance to major financial hubs does not seem to directly affect the main result that higher management fees signal higher performance. This parsimonious approach, however, does not take into account possible spatial autocorrelation.

Spatial autocorrelation models require extremely balanced panels. In contrast, actual hedge fund data is unbalanced by nature: funds start and end at different points in time, and sometimes are discontinued before their 10-year expected lifetime. Forced balancing—even if technically feasible—would add biases to the estimators. On top of that, location (ZIP codes) is shared by many entities (funds), which magnifies the panel unbalance and further prevents from using spatial autocorrelation models.

To remedy this hurdle, first I construct spatial weight vectors proportionate to the inverse distance, using latitude and longitude to calculate distances in miles between funds' ZIP codes centroids and areas with the highest density of hedge funds listed above.[7] Then, I use these vectors to spatially lag both the independent—i.e, management and incentive fees—and dependent—i.e,. performance—variables by month by financial hub (models 1–8). In model 9, I uses a truncated spatial weight matrix with all eight hubs. Table 9 shows the results of these truncated spatial autocorrelation models. The point estimates are similar for most of the regressions. Boston and San Francisco areas are well-known venture hubs. Consistent with a pro-entrepreneurial approach, equity hedge funds around these two cities seem to signal quality with higher incentive fee, rather than higher management fee (see models 4 and 5). Overall, when accounting for spatial autocorrelation using a 1,164 geolocated ZIP codes by

[7] Mathematically, a spatial weight vector is equivalent to a truncated spatial weight matrix at one centroid.

 doi:10.20944/preprints202212.0580.v1

eight financial hubs matrix, management fee remains a solid predictor of performance (see model 9). Interestingly, in model 9 incentive fee becomes statistically significant, although at a low point estimate. I.e., when competition becomes tougher—arguably in dense hedge fund areas—both management and incentive fees signal higher quality.

Two (inter-related) channels explain these results:

(a) High quality hedge fund managers self-select into areas where business is more conducive. Or, analogously, the investor base may differ across locations regarding willingness to pay management fees. Thereby, higher fees correlate with higher hedge fund density.

(b) In areas with high density of hedge fund managers, hedge fund managers signal their quality type through fees.

In both cases, higher fees correlate with higher performance in highly competitive areas. Spatial autoregressive models in table 9 provide support for the latter statement, and gravity models in table 8 weaken the former interpretation.

7 Discussion and Conclusions

Gift exchange in credence goods markets has been proven theoretically and in the laboratory. I find evidence in the hedge fund market—i.e., incomplete long-term contracts for credence goods under buyer-determined auctions—that when quality is unknown, price signals quality. When sellers (i.e., hedge fund managers) set the price and buyers (i.e., investors) choose whom to trade with, buyers pay more and sellers exert *ex-ante* unobservable and *ex-post* unenforceable effort that translates into higher performance. The results are remarkably strong and consistent in linear, quasi-experimental, and IV regressions and controlling for spatial autoregression.

Signaling-*cum*-gift-exchange, reinforced by a psychological lock-in (Stone and Stremitzer 2020) due to lateral reputation among peers even in the absence of subsequent interactions, seem to explain this pattern. Vertical reputation between fund managers and investors built up in sequential interactions, however, seems to play less of a role due to the very long lifespan of the funds, rather unrepeated game, and few managers who manage subsequent funds at higher management fees.

The findings are relevant to understand pricing strategies and effort in the provision of credence goods: e.g., insurance, medical procedures, liberal arts education, and legal advice.

 doi:10.20944/preprints202212.0580.v1

References

Ackermann, C., R. McEnally, and D. Ravenscraft (1999). The performance of hedge funds: Risk, return, and incentives. *Journal of Finance 54*(3), 833–874.

Agarwal, V., N. D. Daniel, and N. Y. Naik (2009). Role of managerial incentives and discretion in hedge fund performance. *Journal of Finance 64*(5), 2221–2256.

Akerlof, G. A. (1982). Labor contracts as partial gift exchange. *Quarterly Journal of Economics 97*(4), 543–569.

Arnott, R. D. (2005). Performance fees: the good, the bad, and the (occasionally) ugly.

Arrow, K. J. (1963). Uncertainty and the welfare economics of medical care. *American Economic Review 53*(5), 941–973.

Atkinson, S. M., S. B. Baird, and M. B. Frye (2003). Do female mutual fund managers manage differently? *Journal of Financial Research 26*(1), 1–18.

Brosig-Koch, J. and T. Heinrich (2014). Reputation and mechanism choice in procurement auctions: An experiment. *Production and Operations Management 23*(2), 210–220.

Cotton, J. L., B. S. O'neill, and A. Griffin (2008). The "name game": Affective and hiring reactions to first names. *Journal of Managerial Psychology 23*(1), 18–39.

Dana Jr, J. D. and K. E. Spier (1993). Expertise and contingent fees: The role of asymmetric information in attorney compensation. *Journal of Law, Economics, & Organization 9*(2), 349–367.

Darby, M. R. and E. Karni (1973). Free competition and the optimal amount of fraud. *Journal of Law and Economics 16*(1), 67–88.

Dwyer, P. D., J. H. Gilkeson, and J. A. List (2002). Gender differences in revealed risk taking: evidence from mutual fund investors. *Economics Letters 76*(2), 151–158.

Elton, E. J., M. J. Gruber, and C. R. Blake (2003). Incentive fees and mutual funds. *Journal of Finance 58*(2), 779–804.

Emons, W. (1997). Credence goods and fraudulent experts. *RAND Journal of Economics 28*(1), 107–119.

 doi:10.20944/preprints202212.0580.v1

Emons, W. (2017). Legal fees and lawyers' compensation. In F. Parisi (Ed.), *The Oxford Handbook of Law and Economics*, Volume 3, Chapter 12, pp. 247–258. Oxford University Press Oxford.

Fehr, E., G. Kirchsteiger, and A. Riedl (1993). Does fairness prevent market clearing? An experimental investigation. *Quarterly Journal of Economics 108*(2), 437–459.

Fehr, E., G. Kirchsteiger, and A. Riedl (1998). Gift exchange and reciprocity in competitive experimental markets. *European Economic Review 42*(1), 1–34.

Fryer Jr, R. G. and S. D. Levitt (2004). The causes and consequences of distinctively black names. *The Quarterly Journal of Economics 119*(3), 767–805.

Fugger, N., E. Katok, and A. Wambach (2019). Trust in procurement interactions. *Management Science 65*(11), 5110–5127.

Fung, W., D. A. Hsieh, N. Y. Naik, and T. Ramadorai (2008). Hedge funds: Performance, risk, and capital formation. *Journal of Finance 63*(4), 1777–1803.

Grinold, R. and A. Rudd (1987). Incentive fees: Who wins? Who loses? *Financial Analysts Journal 43*(1), 27–38.

Houser, D., J. Shachat, and W. Zheng (2018). Gift exchange in alternative procurement mechanisms. Technical report, George Mason University.

Jagannathan, R., A. Malakhov, and D. Novikov (2010). Do hot hands exist among hedge fund managers? An empirical evaluation. *Journal of Finance 65*(1), 217–255.

Jensen, M. C. (1968). The performance of mutual funds in the period 1945–1964. *Journal of Finance 23*(2), 389–416.

Khorana, A., H. Servaes, and P. Tufano (2009). Mutual fund fees around the world. *Review of Financial Studies 22*(3), 1279–1310.

Lowrey, T. M. and L. J. Shrum (2007). Phonetic symbolism and brand name preference. *Journal of Consumer Research 34*(3), 406–414.

Nelson, P. (1970). Information and consumer behavior. *Journal of Political Economy 78*(2), 311–329.

Preece, D. (2013). Performance of hedge funds. In H. K. Baker and G. Filbeck (Eds.),

 doi:10.20944/preprints202212.0580.v1

Alternative Investments: Instruments, Performance, Benchmarks, and Strategies, pp. 475–494. Wiley Online Library.

Ptak, J. (2017). Performance fees: An idea whose time has come. Morningstar.

Servaes, H. and K. Sigurdsson (2019). The costs and benefits of performance fees in mutual funds. CEPR Discussion Paper.

Sharpe, W. F. (1964). Capital asset prices: A theory of market equilibrium under conditions of risk. *Journal of Finance 19*(3), 425–442.

Stiglitz, J. E. (1987). The causes and consequences of the dependence of quality on price. *Journal of Economic Literature 25*(1), 1–48.

Stone, R. and A. Stremitzer (2020). Promises, reliance, and psychological lock-in. *Journal of Legal Studies 49*(1), 33–72.

Tirole, J. (1988). *The Theory of Industrial Organization*. Cambridge, MA: The MIT Press.

Twenge, J. M., E. M. Abebe, and W. K. Campbell (2010). Fitting in or standing out: Trends in american parents' choices for children's names, 1880–2007. *Social Psychological and Personality Science 1*(1), 19–25.

Van Staveren, I. (2014). The Lehman Sisters hypothesis. *Cambridge Journal of Economics 38*(5), 995–1014.

Preprints (www.preprints.org) | NOT PEER-REVIEWED | Posted: 30 December 2022 doi:10.20944/preprints202212.0580.v1

Table 1: This table presents hedge funds' main strategies and sub-strategies by frequency in month-year observations and share of total count.

Main strategy and sub-strategies	Frequency	Percent of total
Equity Hedge	**170,047**	**48.96%**
Equity Market Neutral	22,706	6.54%
Fundamental Growth	30,366	8.74%
Fundamental Value	72,274	20.81%
Multi-Strategy	6,535	1.88%
Quantitative Directional	13,214	3.80%
Sector - Energy/Basic Materials	6,718	1.93%
Sector - Technology/Healthcare	15,936	4.59%
Short Bias	2,298	0.66%
Event-Driven	**42,529**	**12.24%**
Activist	2,136	0.61%
Credit Arbitrage	2,172	0.63%
Distressed/Restructuring	12,777	3.68%
Merger Arbitrage	6,458	1.86%
Multi-Strategy	3,027	0.87%
Private Issue/Regulation D	2,097	0.60%
Special Situations	13,862	3.99%
Fund of Funds	**52**	**0.01%**
Diversified	52	0.01%
Macro	**68,554**	**19.74%**
Active Trading	3,848	1.11%
Commodity - Agriculture	2,194	0.63%
Commodity - Energy	1,308	0.38%
Commodity - Metals	757	0.22%
Commodity - Multi	5,235	1.51%
Currency - Discretionary	1,680	0.48%
Currency - Systematic	5,850	1.68%
Discretionary Thematic	13,339	3.84%
Multi-Strategy	9,204	2.65%
Systematic Diversified	25,139	7.24%
Relative Value	**66,162**	**19.05%**
Fixed Income - Asset Backed	13,355	3.84%
Fixed Income - Convertible Arbitrage	9,218	2.65%
Fixed Income - Corporate	11,609	3.34%
Fixed Income - Sovereign	2,509	0.72%
Multi-Strategy	16,615	4.78%
Volatility	7,547	2.17%
Yield Alternatives - Energy Infrastructure	2,686	0.77%
Yield Alternatives - Real Estate	2,623	0.76%
Total	**347,344**	**100.00%**

Table 2: This table presents results from linear regression (models 1–7) and two-stage least square (models 8–9) estimations of funds' **returns** on funds' management fees. The dependent variables are hedge funds' **monthly returns** winsorized at 1% level. Controls include main strategies and sub-strategies, state of incorporation, fund status, and time fixed effects. Data are from Hedge Fund Research and Compustat. The sample period is 1999-2014. Model 1 includes all hedge fund strategies and sub-strategies. Model 2 restricts the analysis to equity hedge funds. Model 3 analyzes the most frequent management fees, i.e., 1, 1.5, and 2 percent. Models 4 and 5 differentiate the results for bull (boom) and bear (bust) stock markets. Models 6 and 7 compare the returns of funds started in bull markets in 1999-2006 during bear markets in 2007-2014 for all strategies and equity hedge strategy, respectively. Models 8 and 9 reproduce models 6–7 instrumenting management fee with hurdle rates, high watermark, and 10-year survival. Standard errors are clustered at the fund level. Heteroskedasticity-robust standard errors are reported in parenthesis; * denotes significance at 10%, ** significance at 5%, and *** significance at 1%.

Hedge Funds' Fees and Returns

	(1) All strategies	(2) Equity Hedge	(3) {1, 1.5, 2}	(4) Bull market	(5) Bear market	(6) Bull/bear all	(7) Bull/bear EH	(8) IV all	(9) IV EH
Management fee	0.109***	0.189***	0.287***	0.168***	0.635***	0.307**	0.448**	1.015**	1.455**
	(0.0192)	(0.0329)	(0.0368)	(0.0466)	(0.0995)	(0.120)	(0.183)	(0.401)	(0.594)
Incentive fee	0.00384**	-0.00297	-0.00681**	-0.0150***	0.0211**	0.0290***	0.0374***	0.0182	0.0221
	(0.00165)	(0.00257)	(0.00308)	(0.00416)	(0.00841)	(0.00927)	(0.0129)	(0.0117)	(0.0168)
Main strategy fixed effect	Yes	No	No	No	No	Yes	No	Yes	No
Sub-strategy fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fund status fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	341556	166708	153151	113186	39965	19915	9928	19856	9873
Adjusted R^2	0.137	0.218	0.216	0.214	0.200	0.193	0.242	0.191	0.240
Clustered at fund ID	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Chi-squared								9440.9	3880.8

doi:10.20944/preprints202212.0580.v1

Table 3: This table presents results from linear regression (models 1–7) and two-stage least square (models 8–9) estimations of funds' **Sharpe ratio**—a risk-adjusted measure of returns on investments—on funds' management fees. The dependent variable are hedge funds' 12-month rolling **Shape ratios** using the sub-strategy index as the benchmark, winsorized at 1% level. Controls include main strategies and sub-strategies, state of incorporation, fund status, and time fixed effects. Data are from Hedge Fund Research and Compustat. The sample period is 1999-2014. Model 1 includes all hedge fund strategies and sub-strategies. Model 2 restricts the analysis to equity hedge funds. Model 3 analyzes the most frequent management fees, i.e., 1, 1.5, and 2 percent. Models 4 and 5 differentiate the results for bull (boom) and bear (bust) stock markets. Models 6 and 7 compare the returns of funds started in bull markets in 1999-2006 during bear markets in 2007-2014 for all strategies and equity hedge strategy, respectively. Models 8 and 9 reproduce models 6–7 instrumenting management fee with hurdle rates, high watermark, and 10-year survival. Standard errors are clustered at the fund level. Heteroskedasticity-robust standard errors are reported in parenthesis; * denotes significance at 10%, ** significance at 5%, and *** significance at 1%.

Hedge Funds' Fees and Sharpe Ratio

	(1) All strategies	(2) Equity Hedge	(3) {1, 1.5, 2}	(4) Bull market	(5) Bear market	(6) Bull/bear all	(7) Bull/bear EH	(8) IV all	(9) IV EH
Management fee	0.0213**	0.0569***	0.0825***	0.0746***	0.108***	0.0835**	0.107***	0.0751	0.261**
	(0.0106)	(0.0122)	(0.0139)	(0.0149)	(0.0224)	(0.0338)	(0.0370)	(0.0886)	(0.104)
Incentive fee	0.000402	0.000171	-0.000381	-0.00189	0.00409***	-0.00343	0.00136	-0.00334	-0.000990
	(0.000965)	(0.000891)	(0.00105)	(0.00117)	(0.00153)	(0.00298)	(0.00221)	(0.00326)	(0.00288)
Main strategy fixed effect	Yes	No	No	No	No	Yes	No	Yes	No
Sub-strategy fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fund status fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	280693	136588	125630	91965	33665	19905	9926	19846	9871
Adjusted R^2	0.227	0.227	0.227	0.221	0.224	0.332	0.307	0.334	0.293
Clustered at fund ID	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Chi-squared								11993.2	44182.9

doi:10.20944/preprints202212.0580.v1

Table 4: This table presents results from linear regression (models 1–7) and two-stage least square (models 8–9) estimations of funds' ***alpha***—a measure of abnormal returns on investments—on funds' management fees. The dependent variables are hedge funds' ***alphas*** winsorized at 1% level. Controls include main strategies and sub-strategies, state of incorporation, fund status, and time fixed effects. Data are from Hedge Fund Research and Compustat. The sample period is 1999-2014. Model 1 includes all hedge fund strategies and sub-strategies. Model 2 restricts the analysis to equity hedge funds. Model 3 analyzes the most frequent management fees, i.e., 1, 1.5, and 2 percent. Models 4 and 5 differentiate the results for bull (boom) and bear (bust) stock markets. Models 6 and 7 compare the returns of funds started in bull markets in 1999-2006 during bear markets in 2007-2014 for all strategies and equity hedge strategy, respectively. Models 8 and 9 reproduce models 6–7 instrumenting management fee with hurdle rates, high watermark, and 10-year survival. Standard errors are clustered at the fund level, with the exception of models 6–9 for lack of sufficient observations within clusters. Heteroskedasticity-robust standard errors are reported in parenthesis; * denotes significance at 10%, ** significance at 5%, and *** significance at 1%.

Hedge Funds' Fees and *Alphas*

	(1) All strategies	(2) Equity Hedge	(3) {1, 1.5, 2}	(4) Bull market	(5) Bear market	(6) Bull/bear all	(7) Bull/bear EH	(8) IV all	(9) IV EH
Management fee	0.0176	0.170***	0.254***	0.232***	0.371***	0.162***	-0.00861	0.305***	0.317**
	(0.0227)	(0.0421)	(0.0481)	(0.0504)	(0.122)	(0.0312)	(0.0514)	(0.0946)	(0.147)
Incentive fee	0.00900***	0.00720**	0.00551	0.00304	0.0157	0.00788***	0.0203***	0.00561*	0.0140***
	(0.00188)	(0.00332)	(0.00400)	(0.00399)	(0.0108)	(0.00272)	(0.00468)	(0.00311)	(0.00539)
Main strategy fixed effect	Yes	No	No	No	No	Yes	No	Yes	No
Sub-strategy fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fund status fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	178615	68838	62629	52682	9947	9463	3881	9436	3858
Adjusted R^2	0.043	0.042	0.045	0.045	0.084	0.140	0.134	0.139	0.126
Clustered at fund ID	Yes	Yes		Yes	Yes	No	No	No	No
Chi-squared								1629.9	662.8

doi:10.20944/preprints202212.0580.v1

Table 5: This table presents results from logit regression estimations of funds' **probability of achieving 10 years** on funds' management fees. The dependent variable a **dummy variable** equal to 1 if the fund achieved 10 years of life. Management fees are limited to the most frequent management fees, i.e., 1, 1.5, and 2 percent. Controls include main strategies and sub-strategies, state of incorporation, fund status, and start date fixed effects. Data are from Hedge Fund Research and Compustat. The sample period is 1999-2014, but includes only funds started up to December 2005. Models 1–3 includes all hedge fund strategies and sub-strategies. Models 2 and 3 differentiate the results for bull (boom) and bear (bust) stock markets. Models 4–6 restrict the analysis to equity hedge funds. Models 5 and 6 differentiate the results for bull (boom) and bear (bust) stock markets for equity hedge funds. The table reports marginal effects. Heteroskedasticity-robust standard errors are reported in parenthesis; * denotes significance at 10%, ** significance at 5%, and *** significance at 1%.

Hedge Funds' Fees and Probability of 10-Year Survival

	All strategies			Equity Hedge		
	(1)	(2)	(3)	(4)	(5)	(6)
	Any start	Bull-market start	Bear-market start	Any start	Bull-market start	Bear-market start
Management fee	0.0627**	0.0869**	0.0325	0.0645	0.150***	-0.0866
	(2.23)	(2.40)	(0.68)	(1.52)	(2.73)	(-1.19)
Incentive fee	-0.0156***	-0.0149***	-0.0188**	-0.0144***	-0.0155***	-0.0141
	(-5.51)	(-4.91)	(-2.26)	(-3.32)	(-3.20)	(-1.21)
Main strategy fixed effect	Yes	Yes	Yes	No	No	No
Sub-strategy fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
State fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Start date fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1681	982	653	846	476	335
Pseudo R^2	0.141	0.167	0.126	0.142	0.162	0.151

doi:10.20944/preprints202212.0580.v1

Table 6: This table presents results from linear regression of **management fees** on managers' experience. The dependent variables is **management fees** winsorized at 1% level. Controls include main strategies and sub-strategies, state of incorporation, fund status, and time fixed effects. Data are from Hedge Fund Research and Compustat. The sample period is 1999-2014. **Experience** is the order of a given fund under a manager. Models 1–3 account for managers' experience in any previous fund. Models 4–6 account for managers' experience in funds older than three years. Models 1 and 4 include all hedge fund strategies and sub-strategies. Models 2 and 5 restricts the analysis to equity hedge funds. Models 4 and 6 analyze the most frequent management fees, i.e., 1, 1.5, and 2 percent. Standard errors are clustered at the manager level. Heteroskedasticity-robust standard errors are reported in parenthesis; * denotes significance at 10%, ** significance at 5%, and *** significance at 1%.

Hedge Fund Mangers' Experience and Management Fees

	Any experience			Three-year experience		
	(1)	(2)	(3)	(4)	(5)	(6)
	All strategies	Equity Hedge	{1, 1.5, 2}	All strategies	Equity Hedge	{1, 1.5, 2}
Experience	0.0187**	0.0158	0.0184	-0.0000202	0.0264	0.0342
	(0.00765)	(0.0140)	(0.0119)	(0.0182)	(0.0295)	(0.0272)
Main strategy fixed effect	Yes	No	No	Yes	No	No
Sub-strategy fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
State fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Fund status fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Time fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Observations	512235	240589	220165	512235	240589	220165
Adjusted R^2	0.187	0.152	0.178	0.187	0.152	0.177
Clustered at manager ID	Yes	Yes	Yes	Yes	Yes	Yes

doi:10.20944/preprints202212.0580.v1

Table 7: This table presents results from linear regression of funds' **returns** on funds' management fees and managers' experience. The dependent variables are hedge funds' **monthly returns** winsorized at 1% level. Controls include main strategies and sub-strategies, state of incorporation, fund status, and time fixed effects. Data are from Hedge Fund Research and Compustat. The sample period is 1999-2014. **Experience** is the order of a given fund under a manager. Models 1–3 account for managers' experience in any previous fund. Models 4–6 account for managers' experience in funds older than three years. Models 1 and 4 include all hedge fund strategies and sub-strategies. Models 2 and 5 restricts the analysis to equity hedge funds. Models 4 and 6 analyze the most frequent management fees, i.e., 1, 1.5, and 2 percent. Standard errors are clustered at the manager level. Heteroskedasticity-robust standard errors are reported in parenthesis; * denotes significance at 10%, ** significance at 5%, and *** significance at 1%.

Hedge Fund Mangers' Experience and Returns

	Any experience			Three-year experience		
	(1) All strategies	(2) Equity Hedge	(3) {1, 1.5, 2}	(4) All strategies	(5) Equity Hedge	(6) {1, 1.5, 2}
Management fee	0.136***	0.199***	0.328***	0.180***	0.258***	0.416***
	(0.0307)	(0.0492)	(0.0570)	(0.0492)	(0.0882)	(0.105)
Experience	-0.0580*	-0.0982*	-0.0607	-0.00280	0.0506	0.139
	(0.0351)	(0.0523)	(0.0682)	(0.0643)	(0.111)	(0.140)
Management fee × Experience	0.0124	0.0199	-0.00832	-0.0271	-0.0344	-0.0948
	(0.0215)	(0.0333)	(0.0429)	(0.0421)	(0.0743)	(0.0915)
Incentive fee	0.00427***	-0.00165	-0.00411	0.00435***	-0.00131	-0.00376
	(0.00139)	(0.00241)	(0.00287)	(0.00140)	(0.00243)	(0.00289)
Main strategy fixed effect	Yes	No	No	Yes	No	No
Sub-strategy fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
State fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Fund status fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Time fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Observations	506523	237502	218461	506523	237502	218461
Adjusted R^2	0.145	0.227	0.221	0.145	0.227	0.221
Clustered at manager ID	Yes	Yes	Yes	Yes	Yes	Yes

doi:10.20944/preprints202212.0580.v1

Preprints (www.preprints.org) | NOT PEER-REVIEWED | Posted: 30 December 2022 doi:10.20944/preprints202212.0580.v1

Table 8: This table presents results from linear regression estimations of funds' **returns** on funds' management fees. The dependent variables are hedge funds' **monthly returns** winsorized at 1% level. Controls include main strategies and sub-strategies, fund status, time fixed effects, and **distances to major hedge fund hubs** (in miles). State fixed effects are omitted to avoid discontinuities in the distance estimator at the borders of contiguous states. Data are from Hedge Fund Research and Compustat. The sample period is 1999-2014. Model 1 includes all hedge fund strategies and sub-strategies. Model 2 restricts the analysis to equity hedge funds. Model 3 analyzes the most frequent management fees, i.e., 1, 1.5, and 2 percent. Standard errors are clustered at the fund level. Heteroskedasticity-robust standard errors are reported in parenthesis; * denotes significance at 10%, ** significance at 5%, and *** significance at 1%.

Hedge Funds' Fees and Returns
Controlling for Distance to Major Hedge Fund Hubs

	(1)	(2)	(3)
	All strategies	Equity Hedge	{1, 1.5, 2}
Management fee	0.105***	0.181***	0.283***
	(0.0194)	(0.0329)	(0.0362)
Incentive fee	0.00479***	-0.00200	-0.00579*
	(0.00166)	(0.00257)	(0.00308)
Distance to New York City, NY	-0.000816***	-0.000475	-0.000161
	(0.000313)	(0.000457)	(0.000474)
Distance to Greenwich, CT	0.000968**	0.000522	0.000184
	(0.000383)	(0.000554)	(0.000574)
Distance to Chicago, IL	0.0280***	0.0286***	0.0274***
	(0.00638)	(0.00891)	(0.00967)
Distance to Boston, MA	-0.000142	0.000203	0.000260
	(0.000199)	(0.000235)	(0.000247)
Distance to San Francisco, CA	-0.000103*	-0.000103	-0.000109
	(0.0000563)	(0.0000786)	(0.0000829)
Distance to Dallas, TX	-0.000184	0.000113	0.000161
	(0.000171)	(0.000203)	(0.000211)
Distance to Los Angeles, CA	0.000207***	0.000187*	0.000174
	(0.0000777)	(0.000113)	(0.000116)
Distance to Miami, FL	-0.00138	0.00128	0.00121
	(0.00506)	(0.00629)	(0.00668)
Sub-strategy fixed effect	Yes	Yes	Yes
Fund status fixed effects	Yes	Yes	Yes
Time fixed effect	Yes	Yes	Yes
Observations	340665	166187	152731
Adjusted R^2	0.137	0.218	0.215
Clustered at fund ID	Yes	Yes	Yes

Table 9: This table presents results from linear regression estimations of funds' **returns** on funds' management fees. The dependent variables are hedge funds' **monthly returns** winsorized at 1% level. Controls include equity hedge sub-strategies, fund status, time fixed effects. State fixed effects are omitted to avoid discontinuities in the distance estimator at the borders of contiguous states. Management and incentive fees, and monthly returns are lagged using **spatial weight vectors** proportionate to the inverse of the distance to major financial hubs: New York City, NY; Greenwich, CT; Chicago, IL; Boston, MA; San Francisco, CA; Dallas, TX; Los Angeles, CA; and Miami, FL, respectively in models 1–8. Model 9 uses a truncated **spatial weight matrix** of 1,164 geolocated ZIP codes by eight financial hubs. Data are from Hedge Fund Research and Compustat. The sample period is 1999-2014. Data is restricted to equity hedge funds and the most frequent management fees, i.e., 1, 1.5, and 2 percent. Standard errors are clustered at the fund level. Heteroskedasticity-robust standard errors are reported in parenthesis; * denotes significance at 10%, ** significance at 5%, and *** significance at 1%.

Hedge Funds' Fees and Returns with Spatial Autocorrelation Lags

	(1) NYC	(2) GRE	(3) CHI	(4) BOS	(5) SFO	(6) DAL	(7) LAX	(8) MIA	(9) All
Management fee	0.177***	0.191*	0.147	-0.0477	-0.188	0.483***	0.440***	0.257*	0.292***
	(0.0655)	(0.111)	(0.193)	(0.179)	(0.245)	(0.122)	(0.150)	(0.143)	(0.0414)
Incentive fee	0.0291***	0.0262***	0.0259	0.0408***	0.0485***	0.0101	0.0135	0.0282***	0.0176***
	(0.00502)	(0.00900)	(0.0162)	(0.0118)	(0.0165)	(0.00985)	(0.00987)	(0.0104)	(0.00316)
Sub-strategy fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fund status fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	152731	152731	152731	152731	152731	152731	152731	152731	152731
Adjusted R^2	0.102	0.055	0.030	0.042	0.036	0.048	0.033	0.079	0.168
Clustered at fund ID	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

doi:10.20944/preprints202212.0580.v1