Relative Performance Evaluation for Asset Managers: A Quantitative Assessment*

Vincent Grégoire[†] Juan Sotes-Paladino[‡]

December 2025

Abstract

Using a unique dataset of performance-fee mutual funds, we quantify incentives from relative performance evaluation (RPE) and their behavioral implications. We measure direct (short-term) incentives by the option delta embedded in performance fees and indirect (long-term) incentives via the value of future fees. RPE funds face stronger short-term and similar or weaker long-term incentives, yielding a more short-term compensation profile. Incentive sensitivity rises with benchmark risk, consistent with models of optimal contracting under learning. While stronger direct incentives increase active risk, long-horizon incentives attenuate this effect. However, performance effects are modest, and managerial skill is reflected mainly in base pay.

Keywords: Relative performance evaluation, incentive fees, direct and indirect incentives, fund flows, managerial risk taking, fund performance.

JEL Classification: G11, G23.

---

*We gratefully acknowledge the support provided by the ANID Fondecyt Regular Grant 1231421. All errors are our own.

[†] HEC Montreal, Department of Finance; Email: vincent.gregoire@hec.ca

[‡] Universidad de los Andes, Chile, School of Business and Economics; Email: jsotes@uandes.cl

1 Introduction

The design of managerial compensation contracts plays a central role in shaping how managers allocate effort and take risks. A key aspect of this design is whether to incorporate elements of relative performance evaluation (RPE) and, if so, how prominently. Since Holmstrom (1982), theory has emphasized that tying pay to performance relative to the return on a market index or other aggregate measures can help filter out common shocks, thereby isolating signals of effort or ability and reducing a risk-averse manager's exposure to uncontrollable factors. The empirical implementation of RPE has been widely studied,[1] but data limitations have led most studies to infer RPE provisions only indirectly and to offer qualitative implications.[2] While informative, this approach provides limited insight into the economic relevance of RPE, both on its own and relative to non-RPE elements, in shaping actual compensation and managerial behavior. To what extent does relative performance influence short- and long-term pay in practice? How does this influence compare to that of other pay components? And what impact does it have, if any, on risk-taking and performance?

In this paper, we use a unique dataset of international mutual funds with performance fees to tackle these questions. Our dataset includes the detailed fee structures of mutual funds that charge performance fees across several European countries and offshore domiciles over the period 2001-2010. In addition to levying traditional management fees, 1,573 out of the 18,583 funds in the dataset offer explicit pay-for-performance arrangements in the form of incentive (performance) fees. Of the performance fee (PF) funds, 75% contain "relative" conditions for payment, specifying that performance must exceed a risky benchmark before incentives are paid. The remaining 25% rely only on hedge-fund-like "absolute" conditions such as the requirement that performance exceeds a fixed hurdle rate. Along with a high heterogeneity in performance fees and investment styles, and with the availability of large groups of comparable funds with either absolute performance conditions or no performance fees, the prevalence of explicit relative performance conditions in our sample allows for a novel quantitative assessment, within a financial corporate setting, of the *effective* incentives

[1] For a recent review, see Angelis and Grinstein (2020).

[2] Exceptions include Elton, Gruber, and Blake (2003), Golec and Starks (2004), and Servaes and Sigurdsson (2022), who, like us, study mutual funds with incentive fees tied to performance in excess of risky benchmarks; see the literature review below.

associated with RPE in practice.[3]

Motivated by the complexity of fee schedules and fund characteristics in our dataset, our first contribution is to develop analytical measures that summarize the *direct* and *indirect* incentives associated with a fund's RPE. Performance fees create direct incentives by linking a fund's expected compensation over an evaluation period to its performance to date. Among funds with relative performance fees (RPF), the incentive fee contract represents a call option written by fund investors on the assets under management, where the *benchmark* value at maturity serves as the strike price. Building on the theory of exchange options, we characterize the "delta" of this option as a function of fund and benchmark characteristics and, following Agarwal, Daniel, and Naik (2009), use it as our measure of the *effective* direct incentives of RPF funds. For indirect incentives, we follow Lim, Sensoy, and Weisbach (2016) in accounting for a second channel through which fund performance affects managerial pay, namely, its impact on expected lifetime fees from future assets under management. We use contingent claim valuation to provide an analytical characterization of the value of this component of funds' long-term compensation.[4] Our numerical analysis reveals a complex and dynamic relationship between the ratio of direct to indirect incentives and the joint distribution of fund and benchmark returns, and highlights the inherent difficulties of using a fund's performance fee rate alone as sufficient statistics for relative pay-for-performance.

Our second contribution is to estimate these incentives across the funds in our sample. To quantify indirect incentives, we first characterize the funds' flow-to-performance relationship. In line with both theory and the evidence on non-performance fee (NPF) funds, we find that flows to RPF funds exhibit high sensitivity to performance, and that this sensitivity decreases with participation costs (Huang, Wei, and Yan, 2007). We further find that the performance sensitivity of flows to the median RPF fund is 50% lower than that of an absolute performance fee (APF) fund with similar characteristics, and 22% lower than a comparable NPF fund. These findings suggest that the performance fees of RPF funds act as a partial substitute for the flow incentives faced by traditional funds.

[3]With the exception of the studies cited in footnote 2, empirical assessments of relative performance evaluation have been almost exclusively confined to nonfinancial corporate settings (e.g., Gibbons and Murphy, 1990, 1992; Angelis and Grinstein, 2020).

[4]Unlike in Lim, Sensoy, and Weisbach (2016), the presence of performance conditions relative to risky benchmarks prevents us from using the theoretical characterization of indirect incentives in Goetzmann, Ingersoll, and Ross (2003).

Accounting for these flow estimates, our analysis reveals important systematic differences between the direct and indirect incentives packages of funds with and without explicit RPE. First, despite being evaluated relative to higher-risk, higher-expected return benchmarks, RPF funds face steeper direct incentives than APF funds. The average RPF fund can expect to capture 8.5 cents in incentive fees per dollar of return generated, compared to 5.8 cents for APF funds. Accounting for total assets under management, the average direct incentives of RPF funds amount to $184,000 per percentage point increase in returns, almost tripling those of APF funds ($62,000). Second, although large in absolute terms, the indirect incentives of RPF funds are a smaller multiple of direct incentives than those of APF funds. Assuming a typical fund shares holding period of 10 years,[5] the average RPF fund can expect to receive 20.2 cents in lifetime fee income per dollar of return ($388,000 per percentage point return increase), compared to 24.5 cents per dollar return ($285,000 per percentage point return increase) for APF funds. These pay structures result in indirect-to-direct incentive ratios of 2.37 per dollar return for RPF funds versus 4.25 for APF funds (or 2.11 versus 4.63 when expressed per percentage point return), suggesting a more short-term orientation of incentives under RPF contracts. Third, performance fees contribute 26.2% of extra lifetime revenue per dollar returns for RPF funds versus 42.9% for APF funds (or 23.7% versus 43.2% per percentage point return). A comparison with the indirect incentives of NPF funds further reveals that incentive fees allow RPF funds to increase average fee revenue per dollar returned to investors by 32–39% over their lifetimes. Fourth, cross-fund analyses reveal that, for RPF funds, the performance sensitivity of the option-like component of both short- and long-term pay increases with the riskiness of a fund's investment category, consistent with optimal dynamic contracting considerations under learning (He, Wei, Yu, and Gao, 2017). The cross-fund analyses further indicate that the relative importance of direct incentives declines with managerial fees in the cross-section of RPF funds, providing evidence of offsetting forces between fixed and variable compensation components.

Our third contribution is to provide evidence that the distinction between the direct and indirect incentive channels is crucial for understanding risk-taking and, to a lesser extent, performance, across

[5]For comparison with other studies, we consider fund share holding periods in the range of 7 to 20 years (Sirri and Tufano, 1998; Lim, Sensoy, and Weisbach, 2016; see Section 3.2.2). Although we set 10 years as the baseline holding period in our simulations, conclusions remain similar across the alternative holding periods considered.

performance-fee investment vehicles. The two channels do not necessarily have the same expected impact on managerial risk-taking (Lan, Wang, and Yang, 2013; Yin, 2016; Yin and Zhang, 2024). The direct channel generally encourages increased risk-taking because of the immediate link between outperformance and compensation. While the desire for fund inflows and career advancement might also push towards higher risk, the concern for fund survival, particularly when management fees are substantial, can lead to risk reduction. Therefore, the expected impact of the direct and indirect channels of performance fees on managerial risk-taking is not the same and depends on the relative strength of these competing incentives. Evidence of an additional impact of these incentives on fund performance could help disentangle their effect on informed activeness from mere risk shifting.

We find significant evidence that the structure of incentives has first-order implications for managerial risk-taking, but more limited evidence of their impact on fund performance. Among PF funds with RPE provisions, stronger direct, option-like incentives lead managers to increase benchmark-relative active risk, insofar as stronger direct incentives are associated with greater subsequent change in fund tracking error. Importantly, this effect is sharply attenuated when managers face stronger indirect, long-horizon incentives arising from future fee income. Decomposing active risk reveals that incentive-driven adjustments operate through benchmark-relative idiosyncratic positions rather than changes in systematic exposure. Our estimates imply that, following a one-standard-deviation increase in direct incentives, an RPF fund with median characteristics increases benchmark-adjusted idiosyncratic volatility by 0.065 standard deviations if its indirect incentives are in the bottom quartile (short-term orientation), but only by 0.005 if they are in the top quartile (long-term orientation). These incentive-risk-taking patterns are absent among APF funds when controlling for standard fund characteristics. We further find that, while neither direct nor indirect incentives are systematically related to benchmark-adjusted returns or abnormal performance, stronger indirect incentives are associated with higher information ratios. However, the results are not strong or robust enough to draw firm conclusions. Thus, while relative performance incentives meaningfully affect how managers take risks, it is less evident that they lead to either value-enhancing activeness or to detrimental risk-shifting.

In the last part of the paper, we examine additional contracting considerations that may help rationalize the incentive patterns documented earlier, and test the robustness of our main findings. First, we find that a one standard deviation increase in flow-performance sensitivity is associated with a 3.5% decrease in the probability of adopting a relative benchmark, offering novel evidence of within-fund substitutability between market-based and contractual incentives. We further find that RPF funds following riskier investment strategies are more likely to adopt performance fees, consistent with the theoretical implication of He, Wei, Yu, and Gao (2017) that option-based compensation is more valuable in environments with greater uncertainty. Second, using the value-added measure of skill proposed by Berk and Van Binsbergen (2015), we find that more skilled RPF fund managers tend to secure higher base compensation, consistent with improved managerial outcomes accruing to the fund company rather than to shareholders under RPE. Third, we show the robustness of the managerial behavior results to unmodeled country-specific factors by verifying their validity in matched samples that pair each RPF fund-quarter observation with a comparable NPF fund-quarter within the same country.

Related Literature. Our paper contributes to three main literature streams. First, we advance the literature on RPE in managerial compensation by providing the first comprehensive quantitative assessment of *relative* performance incentives among financial firms. Holmstrom (1982) rationalizes RPE in tournament-like settings where competing agents face common uncertainty, while Gibbons and Murphy (1990) discuss the costs and benefits of RPE, arguing that its benefits in terms of filtering common risk will be greater when there are fewer opportunities for sabotage or collusion, when managers cannot influence benchmark choice, and when benchmarks are inexpensive to measure. In asset management, these costs are likely to be outweighed by the benefits to a greater extent than in other industries.[6] Yet, while evidence on RPE is abundant among nonfinancial firms (Jenter and Kanaan, 2015; Angelis and Grinstein, 2020; Bizjak, Kalpathy, Li, and Young, 2022), it remains scarce among financial firms (Elton, Gruber, and Blake, 2003; Golec and Starks, 2004; Servaes and Sigurdsson, 2022). Our paper contributes a novel quantitative assessment of the *short- and long-term* relative performance incentives, and their behavioral implications, in the asset management segment of the financial industry.

[6]Perhaps the greatest threat to the use of RPE in asset management is the possibility that funds strategically choose easy-to-beat benchmarks. Sensoy (2009) offers evidence of this behavior among U.S. mutual fund managers.

Second, we extend the literature that quantifies total incentives in asset management. Agarwal, Daniel, and Naik (2009) demonstrate that hedge fund option deltas predict future returns better than fee rates alone, while Lim, Sensoy, and Weisbach (2016) show that indirect incentives can exceed direct incentives but find no evidence that compensation schemes adjust to indirect incentives—a puzzling finding given theory (Gibbons and Murphy, 1992). Riddiough and Wiley (2022) find that only 6% of unlisted REIT income comes from performance fees. These studies make meaningful progress toward filling the gap in the current literature, as identified by Edmans, Gabaix, and Jenter (2017), regarding estimates of the effect of current performance on future long-term pay. We contribute to these studies by extending the analysis to investment vehicles with high heterogeneity in both relative and absolute performance fee rates, and by documenting, for the first time, a significantly negative relationship between direct and indirect incentives within the relative-performance segment of these vehicles, which aligns more closely with economic intuition. We also provide the first comparison of incentives facing funds with similar characteristics but different performance conditions (absolute versus relative) in their fee structures. Moreover, we go beyond this cross-sectional characterization and comparison to examine its investment implications and the potential relationship between long-term compensation and managerial skill.

Third, we contribute novel evidence on the relevance of the distinction between short- and long-term incentives to the literature on performance-based compensation and managerial outcomes. The use and economic implications of this type of compensation in the money management industry have long been debated. On the one hand, theoretical work shows that incentive fees can improve investor welfare by facilitating surplus extraction from informed managers (Das and Sundaram, 2002), inducing greater managerial effort and better investment decisions (Li and Tiwari, 2009), or allowing investors to capture much of the value of managers' private information through appropriate combinations of absolute and relative incentives (Sotes-Paladino and Zapatero, 2022). Consistent with these arguments, empirical studies find that incentive-fee funds attract greater investor flows than comparable non-incentive-fee funds (Elton, Gruber, and Blake, 2003; Golec and Starks, 2004). On the other hand, a large theoretical and empirical literature emphasizes that the option-like structure of RPE can distort managerial risk-taking incentives, leading managers to take inefficiently low or high levels of portfolio risk (Carpenter, 2000; Ross, 2004; Basak, Pavlova, and Shapiro, 2007; Cuoco and Kaniel, 2011; Golec and Starks, 2004). These concerns, which became particularly salient in the aftermath of the Global Financial Crisis, have motivated heightened regulatory scrutiny of compensation practices in asset management and the broader financial sector. The opposite risk-taking implications of the short-term and long-term incentives associated with relative performance fees that we document can help explain the lack of significance of performance fees for managerial risk-taking documented by prior literature (Servaes and Sigurdsson, 2022).

Our characterization of the relative importance of direct versus indirect incentive components offers new insights into the policy debate surrounding performance fees. While direct incentives largely reflect bargaining between funds and clients (and thus depend on relative bargaining power), indirect flow incentives reflect market responses to performance. Regulatory authorities can more easily affect explicit performance-based pay terms than fund flow-performance relationships. Our finding that stronger indirect incentives are associated with lower prevalence of explicit performance-based compensation, but only for relative (not absolute) performance fees, suggests—in line with Servaes and Sigurdsson (2022)—a more limited scope for regulatory intervention among relative than absolute performance fee structures. More broadly, this conclusion echoes the framework of Edmans, Gabaix, and Jenter (2017), who emphasize that regulation can only be effective to the extent that it targets levers within regulators' reach, and is likely to be limited when implicit market-based incentives already exert strong disciplinary effects.

2 Data

2.1 Sources

Our primary data source is the Fitzrovia International plc / Lipper Ltd Benchmarking Performance Fees database.[7] From this database, we obtain the detailed fee structure of mutual funds that charge performance fees across several European countries and offshore domiciles. A fee structure defines the level of performance fees, the relative or absolute performance condition for payment, the benchmark index or hurdle rate against which performance is assessed, and the frequency of

[7] Lipper, a subsidiary of LSEG, acquired Fitzrovia in October 2004.

performance fee crystallization, among others. As described by Servaes and Sigurdsson (2022), who perform an in-depth analysis of this dataset, Fitzrovia/Lipper acquires this information by contacting asset management companies directly. Our sample of fund fee structures spans the ten-year period between 2001 and 2010, after which the Benchmarking Performance Fees database was discontinued.[8]

The mutual funds in this database charge *asymmetric* performance fees, in the sense that investors pay these fees only when fund performance exceeds a given hurdle. This feature contrasts with the symmetry required by law on the "fulcrum" performance fee structures of U.S. mutual funds (Elton, Gruber, and Blake, 2003).[9] In turn, the hurdle can be determined by a constant hurdle rate, such as 5%, or by a *risky* benchmark portfolio, such as a diversified equity index.[10] The latter case aligns with the prescription from the theory of relative performance evaluation (RPE), which assesses a manager's performance relative to an aggregate performance measure (Holmstrom, 1982). For this reason, we classify all funds using risky benchmarks in their performance hurdles as *relative performance fee* (RPF) funds. By contrast, we classify all funds using no risky benchmarks in their performance hurdles as *absolute performance fee* (APF) funds.

We complement the information on fund fee structures with data on fund and benchmark returns, assets under management, expense ratios, and other fund- and family-level characteristics from Cremers, Ferreira, Matos, and Starks (2016).[11] This dataset is free of self-reporting and survivorship bias and provides quarterly coverage of performance fee structures in our sample, as well as of mutual funds with no performance fees (NPF) in their respective countries of domicile, from 1997 to 2010. Although our main dataset begins in 2001, this longer history enables us to incorporate multiple lags into our analysis.

Our data offers several advantages over existing hedge fund data for analyzing incentives in asset management. First, as described in the next section, the performance fee funds in our sample

[8]The dataset includes some information on performance fee structures for 2011, although this information is incomplete. To avoid classifying actual performance fee funds that are missing from the dataset in this year as non-performance fee funds, we exclude 2011 from our sample.

[9]Fulcrum fees specify that the incentive fee must be centered around an index, with increases in fees for performance above that index matched by decreases in fees for performance below the index.

[10]Some funds include both hurdle types, in which case fund performance must exceed the performance of the benchmark by the given margin (e.g., 2%) to earn a performance fee.

[11]We are grateful to Miguel Ferreira and Pedro Matos for generously providing us with this information.

include a large number of funds with either relative or absolute conditions for incentive fee payment, each of which exhibits substantial cross-sectional variation in the levels of both managerial and incentive fees. In contrast, explicit relative performance conditions are nonexistent, while incentive fees exhibit little variation in the cross-section in the hedge fund space. Second, our sample includes both performance-fee and nonperformance-fee mutual funds. The fact that both types of funds are available to the same group of investors provides us with a natural comparison group, virtually inexistent in studies of hedge funds, for assessing the unique incentives stemming from performance fees. Third, performance reporting is mandatory for mutual funds, so their reported returns are free from the self-reporting bias that affects hedge fund databases (see, e.g., Aiken, Clifford, and Ellis, 2013). Finally, the funds in our sample are open-ended. Therefore, they have no lock-up provisions or any of the capital restrictions identified by Getmansky, Liang, Schwarz, and Wermers (2015) as mechanically affecting estimates of hedge funds' flow-performance relationship.

2.2 Sample Description

For comparability with prior literature, we restrict our analysis exclusively to actively managed open-end equity mutual funds. Thus, we exclude closed-end funds, index-tracking funds, exchange-traded funds, and funds of funds. To facilitate the analysis and interpretation, we further restrict the list of domiciles considered to European countries only. Because our focus is on the RPE features of the funds' incentives, we exclude fee structures with high-water mark provisions (12,777 obs./3.3% of the fee structures in our sample), whose impact on managerial incentives has been extensively studied both theoretically (e.g., Hodder and Jackwerth, 2007; Panageas and Westerfield, 2009) and empirically (e.g., Agarwal, Daniel, and Naik, 2009; Servaes and Sigurdsson, 2022). Since some funds offer multiple share classes with potentially different fee structures, we keep individual mutual fund share classes as our unit of observation. We refer to those units of observations as "funds" throughout to avoid burdening the text.[12]

[12] We further restrict our sample by excluding funds for which the age is missing or negative (1205 obs./0.2% of the observations), the total expense ratio is missing (81,292 obs./13.4% of the observations), smaller than or equal to zero (1,366 obs./0.3% of the observations), or greater than 20% (56 obs./0.0% of the observations); the fund TNA is missing (139,007 obs./26.6% of the observations), the fund family TNA is missing (420 obs./0.1% of the observations), the performance fee is greater than 100% (1 obs./0.0% of the observations), and PF funds with equalization systems in place (32 obs./0.0% of the observations)

Our final sample comprises 18,583 individual equity funds spanning 370,291 quarterly observations from 2000 to 2010. Of these, 1,573 funds have asymmetric fee structures, accounting for 17,965 quarterly observations. Out of our sample of performance-fee funds, 1,182 funds (75%) have a relative condition, while 503 funds (25%) have only an absolute condition. This is a unique feature of our dataset, as the vast majority of other investment vehicles that offer asymmetric performance fees, such as hedge and private equity funds, use absolute conditions only.

2.2.1 Fund Characteristics

Panel A of Table 1, which contains descriptive statistics by type of incentive condition, indicates that the median relative performance fee (RPF) fund is older and larger than both the median absolute performance fee (APF) and the median non-performance fee (NPF) mutual funds in our sample. RPF funds also exhibit slightly higher total expense ratios—which exclude performance fees—than either of the other two categories, and belong to fund families that manage more assets than APF funds' families do, but less than NPF funds' families.

A comparison of fund flows across fund types in Panel A of Table 1 indicates that all fund types grew over our sample period, with NPF funds outpacing performance-fee (RPF and APF) funds. Following Chevalier and Ellison (1997), Sirri and Tufano (1998), and others, we define quarterly net flows into a fund as:

$$Flow_{i,t} = \frac{TNA_{i,t} - TNA_{i,t-1}(1 + R_{i,t})}{TNA_{i,t-1}} \quad (1)$$

where $TNA_{i,t}$ is fund i's quarterly total net asset value from Lipper at the end of quarter t and $R_{i,t}$ is fund i's return over that quarter. We winsorize the top and bottom 1% of flows on a quarterly basis to attenuate the impact of outliers. The quantiles of the distributions reveal that flows are heavily skewed to the right. In particular, the median fund experiences outflows across fee structure types. A cross-structures comparison of category flows, computed as the value-weighted average winsorized flows within each category, suggests that performance fees were not particularly attractive to fund investors, and that within performance-fee structures those with RPE elements were the least attractive.

Moving to performance fee rates, RPF funds typically retain a larger share of the excess returns they generate, even though there is significant heterogeneity within each group. The latter point is further illustrated in Figure 1, which presents the distributions of performance fees across total expense ratios (TERs) for the performance fee (PF) funds in our sample. The vast majority of PF funds charge performance fees of 10%-25%, with clear clusters at discrete 5% intervals. However, a non-negligible number of funds charge performance fees smaller than 10%, with substantial dispersion in the level of fees charged. This heterogeneity in performance fees is in stark contrast with the hedge fund industry, where "2/20" fees (2% of assets under management plus 20% of profits) are the norm.

Panel A of Table 2 shows a sustained growth in the number of funds with RPF structures over our sample period. This growth is comparable to that experienced by the NPF funds and contrasts with the choppy dynamics in the number of APF funds over the same period. Figure 2 shows that the dynamics in the number of funds carry through, with the exception of the GFC years 2008 and 2009, to the dynamics in assets under management across performance fee structures. Although fee structures tend to be rather stable over time, Panel B of Table 2 reveals that at least part of the cross-structures dynamics can be explained by a non-negligible level of transition from one performance fee structure to the other, from non-performance to performance fee structures, as well as from performance fee to no performance fee structures.

Figure 3 offers a geographical and investment styles characterization of our fund-quarter observations. Panel A indicates that more than 70% of the observations on RPF funds are from funds domiciled in either Luxembourg (40%) or Italy (33%), with Ireland, Germany and France contributing another 22% of the observations in this category.[13] Except for Luxembourg or Ireland, the relative contribution of these countries to the total number of observations of APF and NPF funds is much smaller. For APF funds, in particular, Spain (23%) and Belgium (11%) are the countries that, besides Luxembourg and Ireland, contribute the bulk of the APF observations in our sample.

Panel B reveals that RPF funds have a predominantly global investment style (16%), followed closely by Europe (14%) and North America (8%). This ranking of investment styles is also reflected

[13] Fund domicile refers to the country in which the collective investment scheme is legally established, which can be different from the country of origin of the fund promoter.

in APF and NPF funds. Consistent with the importance of Italy and Spain as main countries of origin for RPF and APF structures, respectively, many of the remaining observations for these types of funds have an investment focus on Italy (6% for RPF) or Spain (5% for APF).

2.2.2 Proxies for Risk-Taking

A key implication of the theory is that the relevant margin of risk for funds evaluated against a risky benchmark is not their total return volatility but their benchmark-relative risk. As Basak, Pavlova, and Shapiro (2007) emphasize, option-like incentives tied to beating a reference index make it ambiguous, without additional information on preferences and index risk, whether managers should optimally increase or decrease total volatility in response to incentives. The reason is that sufficiently risk-tolerant managers will prefer to engage in risk-shifting by increasing the volatility of their fund returns, while sufficiently risk-averse managers will decrease this volatility instead. Both managers, however, will unambiguously increase the fund's *tracking error volatility* (also referred to simply as "tracking error"). This perspective motivates our use of tracking error and its systematic and idiosyncratic components as the central behavioral outcomes in this paper.

Panel B of Table 1 reports descriptive statistics of tracking error, beta, and idiosyncratic volatility across fund types. We define a fund's *tracking error volatility* as the standard deviation of its benchmark-adjusted excess returns:

$$\mathrm{TE}_{i,t} = \sqrt{\mathrm{Var}_{\tau \in [t-36,t-1]}\left(R_{i,\tau} - R^B_{i,\tau}\right)}, \tag{2}$$

where $R_{i,\tau}$ denotes the net return of fund i in month τ, $R^B_{i,\tau}$ is the return of the corresponding benchmark, and the variance is computed over a rolling 36-month window.

To distinguish between systematic and security-selection (active) risk, we decompose tracking error into its beta and idiosyncratic components. Specifically, we estimate the benchmark regression

$$R_{i,\tau} = \alpha_{i,t} + \beta_{i,t} R^B_{\tau} + \varepsilon_{i,\tau}, \tag{3}$$

using monthly data over the same rolling window. The estimated coefficient $\beta_{i,t}$ captures the fund's systematic exposure to the benchmark. We measure *idiosyncratic volatility* as the standard deviation of the regression residuals:

$$\text{IdioVol}_{i,t} = \sqrt{\text{Var}_{\tau \in [t-36,t-1]}(\varepsilon_{i,\tau})}. \tag{4}$$

Consistent with the findings of Servaes and Sigurdsson (2022), we find no substantial difference, ex ante, in the typical risk-taking behavior of RPF funds compared to the behaviors of APF funds or NPF funds. If anything, we find that the average and median APF funds exhibit the highest tracking error volatility and active risk across all fund types, followed by NPF funds and, lastly, RPF funds. The comparison of systematic risk-taking (β) across structures is less clear, as rankings vary depending on whether mean or median fund β is used to identify typical values.

2.2.3 Performance Measures

To assess whether incentive-induced changes in risk-taking translate into differences in outcomes, we examine benchmark-relative measures of fund performance that are directly aligned with the evaluation criteria embedded in performance-fee contracts and our risk-taking measures. Our primary measure of performance is benchmark-adjusted excess returns:

$$\text{ExcessRet}_{i,t} = R_{i,t} - R^B_{i,t}, \tag{5}$$

where, as before, $R_{i,t}$ denotes the fund's quarterly net return and $R^B_{i,t}$ is the return on its designated benchmark. Following this definition, we measure abnormal performance as the fund's benchmark-relative alpha, as captured by the intercept $\alpha_{i,t}$ in the time-series regression (3). Finally, to correct abnormal performance for active (idiosyncratic) risk-taking, we complement benchmark-relative alpha with the information ratio (IR), computed as

$$\text{IR}_{i,t} = \frac{\alpha_{i,t}}{\text{IdioVol}_{i,t}}, \tag{6}$$

where $\text{IdioVol}_{i,t}$ denotes the benchmark-adjusted idiosyncratic volatility defined in Section 2.2.2. The information ratio, therefore, measures abnormal active performance per unit of active risk.

Descriptive statistics for these measures are presented in Panel C of Table 1. All fund types exhibit negative benchmark-adjusted performance over the sample period, whether measured by raw excess returns, benchmark-relative alpha, or the information ratio. Both the magnitudes and the distributions of these performance measures are broadly similar across performance-fee structures. As with the risk-taking measures, this similarity suggests that any cross-sectional relationship between incentives and performance is unlikely to be driven by systematic differences in investment styles, and instead reflects heterogeneity in the strength and composition of managerial incentives.

3 Quantifying Pay for Relative Performance

The previous section documents substantial heterogeneity in fee structures, investment styles, and performance across funds in our sample. This variation, which is particularly pronounced among relative performance fee (RPF) funds, provides a natural setting to assess how compensation design shapes managerial incentives. In this section, we develop a quantitative framework to measure and compare the direct and indirect incentives associated with relative performance evaluation in asset management.

3.1 Analytical Characterization

The fee structure of the mutual funds in our sample includes both standard management fees and performance fees. Management fees are charged as a fixed percentage (e.g., 1%) of existing assets under management (AUM). Performance fees, in contrast, are charged as a share (e.g., 20%) of the fund's dollar return in excess of the return on a comparable risky benchmark (RPF funds) or a predetermined hurdle rate (APF funds), only when this excess return is positive. Thus, performance fees represent call options written by fund investors to the fund management company on the assets under management, with the strike price determined by the particular payment condition (relative or absolute) specified in the contract. In Section 3.1.1, we rely on the well-developed theory of options and on prior literature to identify a measure of the direct pay for performance implied by these performance fees. In Section 3.1.2, we build on these results and on a contingent-claim valuation framework to identify measures of the expected lifetime value to the fund management companies of both management and performance fees. We compare these incentives using simulated comparative statics in Section 3.1.3. We describe all relevant calculations and derivation details in Appendix A.

3.1.1 Option Deltas of Relative Performance Fees

Although a fund's actual performance fees can be known only at crystallization dates (e.g., at the end of a calendar year), their value to the fund management company can be determined at any interim date using option valuation theory. We follow Agarwal, Daniel, and Naik (2009) in evaluating performance fees as call options on a fund's asset value and computing the sensitivity of these options' value to fund performance via option delta. The Black and Scholes (1973) formula for European call options underlying these authors' approach is appropriate for calculating the delta of the *absolute* performance fee structures in our sample. However, it is not appropriate to compute the deltas associated with *relative* performance fees. For RPF structures, the strike price is not a constant but the uncertain value (from today's perspective) of the *benchmark* at maturity. Under certain conditions, the value of this type of option can be determined using Margrabe (1978)'s formula for *exchange* options. The delta of this option reflects the dollar value of expected relative performance fees per *dollar* increase in AUM, and represents our measure of *direct* pay for relative performance. We present the formulas for the delta of both option types and details on their calculation in Appendix A.1. The formulas take into account the time remaining until the next crystallization date.

As one might expect, the delta of relative performance fees increases with the fund's incentive fee rate, and is affected by the fund's current performance relative to its benchmark (the option's moneyness) and by the volatility of its AUM. Less obviously, the delta is also affected by the correlation between the fund's returns and its benchmark, as well as by the riskiness of the overall investment style (as captured by the fund's benchmark volatility). We examine the exact impact of these factors through numerical examples in Section 3.1.3.

3.1.2 Expected Lifetime Value of Fees

A fund's performance also affects managerial pay through its impact on the expected managerial and performance fees to be collected from future assets under management. Goetzmann, Ingersoll, and Ross (2003) develop an analytical formula to compute this component of pay for the case of absolute-performance fee structures with high-water mark provisions. The uncertainty around the benchmark values that determine whether *relative* performance fees are paid or not prevents us from directly applying their formula, based on the certainty about the high-water mark as of the start of each period, to the funds in our sample. However, the absence of high-water mark provisions among the fee contracts that we study allows us to take a simpler, more direct approach that yields explicit formulas for the value of a fund's expected lifetime managerial and performance fees. We describe this approach in detail in Appendix A.2.

Importantly, the typically positive relationship between a fund's past performance and investor flows introduces a *reputational* effect to the value of the fund's future fee income, according to which current positive performance will result in greater management and incentive fee income from flow-driven growth in future AUM.[14] Following Lim, Sensoy, and Weisbach (2016), we account for this reputational effect in our calculations of the fund's value of expected lifetime fees by augmenting fund volatility by the performance sensitivity of flow-driven growth in AUM. We present estimates of the flow-to-performance for the funds in our sample in Section 3.2.1. Similarly to Lim, Sensoy, and Weisbach (2016), we refer to the ensuing performance-expected lifetime fee income relationship as the *indirect* incentives facing fund managers.

Inspection of the resulting formulas (presented in Appendix A.2) indicates that the indirect incentives created by relative performance fees, as well as the relative importance of management versus performance fees in these incentives, depends not only on the level of these fees, the volatility of the fund's returns, and the investor withdrawal rate (as in Goetzmann, Ingersoll, and Ross, 2003), but also on the riskiness of the fund's benchmark and the correlation between the fund and its benchmark returns. We compare the theoretical impact of these variables on funds' direct and

[14]This positive flow-to-performance relationship has been documented extensively in the empirical mutual fund literature (Chevalier and Ellison, 1997; Sirri and Tufano, 1998; Ferreira, Keswani, Miguel, and Ramos, 2012) and rationalized in relation to fund investors' learning about managerial ability (Berk and Green, 2004; Huang, Wei, and Yan, 2007). We verify that this positive relationship also holds in our sample in Section 3.2.1.

indirect incentives in the following section.

3.1.3 Numerical Analysis

By definition, the delta of the option implied in the performance fees should be more effective in aligning the incentives of the manager and the investor in the *short term*, whereas the expected lifetime value of fund fees should be a better measure of the manager's *long-term* incentives. Thus, the specific mix of direct-to-indirect incentives a manager faces can be informative about the relative strength of her pay-for-performance across different time horizons. However, this mix can only vary across funds if the sensitivities of their direct incentives to changes in (at least some) attributes or contract parameters differ from those of their indirect incentives. Because the extent to which this condition is satisfied is unclear from the formulas in Appendix A, we examine this question numerically in Figures 4 and 5.

For a hypothetical performance-fee fund, we compute the direct incentive component (option delta), the indirect incentive component (present value of lifetime fee income), and their ratio. Each figure displays how these outcomes evolve with changes in the volatility of fund returns (left panels) or with the correlation between fund and benchmark returns (right panels), under varying levels of benchmark risk (Figure 4) and of the fund's performance relative to the benchmark (Figure 5). Importantly, the contractual fee parameters and the performance sensitivity of flows are held fixed throughout the analysis, so all variation stems from changes in market or performance variables.[15]

The figures reveal several insights. First, both direct and indirect incentives can be higher or lower for RPF funds than for APF funds, depending on the riskiness of the fund strategy. This can be seen in a comparison of levels across the top and middle-left panels of the figure, where direct and indirect incentives are higher for funds following risky benchmarks when fund risk is low, but lower when fund risk is high. Moreover, differences in incentives across benchmark risk categories vary nonmonotonically with the level of fund risk. This is due to the fact that the relationship between incentives and fund risk can follow opposite increasing/decreasing patterns between RPF ($\sigma_Y > 0$) and APF ($\sigma_Y = 0$) funds over certain regions of fund risk.

[15] We estimate and incorporate the incentive effects of contractual and fund characteristics in our empirical analysis of Section 3.2.

Second, for a given (positive) level of benchmark risk, both the direct and the indirect incentives of RPF funds generally fall with the correlation between a fund and its benchmark returns, as the opportunities to outperform, and thus earn performance fees, diminish. However, they fall at different rates, leading to a positive relationship between this correlation and the direct-to-indirect incentives ratio. Moreover, this ratio varies significantly across benchmark risk levels.

Third, a fund's current performance relative to its benchmark further modulates these relationships. Figure 5 shows that, for a fixed benchmark risk level, the effect of fund volatility or correlation on incentives differs substantially across funds that are underperforming, at-the-money, or outperforming their benchmarks. By definition, this heterogeneity affects direct but not indirect incentives—indirect incentives account for fee income from the next crystallization period onward. Thus, these differences largely carry through to the ratio of direct to indirect incentives.

Overall, the results underscore that the relative strength of the short-term (direct) versus the long-term (indirect) incentives of RPF funds is a complex function of both contractual parameters and fund-specific characteristics. The finding reinforces the importance of integrating both types of incentives into the analysis, rather than focusing solely on performance fee rates, to assess managerial incentives and behavior.

3.2 Empirical Assessment

To estimate incentives for our sample of mutual funds using the analytical framework of the previous section, we first assess the empirical sensitivity of fund flows to performance, a key driver of the lifetime income that funds expect to collect from fees. We then estimate the observed magnitude of the direct and indirect incentives that funds face. Throughout the analysis, our emphasis is on documenting and comparing these incentives across RPF funds, and in contrasting them with the relatively better-known incentives of either APF or NPF funds.

3.2.1 Sensitivity of Fund Flows to Performance

Any predictable response of shareholders' money flows to past returns creates an additional channel through which performance affects managerial compensation beyond direct performance fees. Following an extensive literature (Chevalier and Ellison, 1997; Sirri and Tufano, 1998; Berk and Green, 2004), we assess the importance of this channel across the different fee structures in our sample by estimating their flow-performance relationships.

Funds' money flows may respond to past returns but might also be affected by several other aggregate and cross-sectional characteristics. We account for these characteristics by including them as controls within the following flow-performance regression:

$$\text{Flow}_{i,t} = \beta_R \text{Ret}_{i,t-1} + \mathbf{X}'_{i,t-1}\beta_X + \text{Ret}_{i,t-1} \times \mathbf{X}'_{i,t-1}\beta_{RX} + \mathbf{Z}'_{i,t}\delta + \mu_{\text{category}(i)} + \mu_{\text{quarter}(t)} + \varepsilon_{i,t}, \quad (7)$$

where $\text{Flow}_{i,t}$ represents quarterly net flows for fund i in quarter t, calculated following Eq. (1), and $\text{Ret}_{i,t-1}$ captures fund performance in quarter $t-1$, measured by net returns.[16] The vector $\mathbf{X}_i$ includes log of fund age, log of family size, total expense ratio, and performance fee level. The first three of these characteristics are identified by existing theory as determinants of the flow-performance relationship, with fund age having a negative impact (consistent with investors' estimates of managerial talent becoming more accurate over time; see Berk and Green, 2004), and family size and expense ratios having a positive impact (consistent with these variables inversely proxying for information and participation costs; see Huang, Wei, and Yan, 2007). The inclusion of performance fees among these controls seeks to determine whether, in practice, the indirect incentives of performance fee funds reinforce (positive coefficient) or offset (negative coefficient) their direct incentives. The vector $\mathbf{Z}_{i,t}$ contains additional controls, including lagged fund volatility, lagged log of fund size, contemporaneous category flows, and performance fee contract characteristics (clawback, fee cap, and hurdle dummies), aimed to capture differences in mean flow rates across levels of fund risk and size, across investment style dynamics, and across fee structures. Finally, $\mu_{\text{category}(i)}$ and $\mu_{\text{quarter}(t)}$ are investment objective and quarter fixed effects, respectively. To examine how the flow-performance relationship varies across fee structure types, we estimate this specification for RPF, APF, and NPF funds separately, including interaction terms with fee structure indicators

[16]This specification assumes a linear relationship between fund flows and returns. Servaes and Sigurdsson (2022) use an alternative approach and find a convex flow-performance relationship that is steeper for PF funds when performance is measured by quarterly performance *ranking*. Following Lim, Sensoy, and Weisbach (2016), we impose a linear relationship because it allows us to account for the strength of the flow-performance relationship when estimating indirect incentives, which is our main focus.

in panel regressions.

Table 3 presents our main flow-performance results. The relationship between past returns and flows to RPF funds is positive and statistically significant when theory-predicted determinants are omitted in column (1), and becomes highly economically significant when these are included in column (2). Consistent with investors inferring managerial ability from their past returns (Berk and Green, 2004), both columns indicate that flows to RPF funds chase past performance, while the interaction of past return and TER in column (2) indicates that they do so less intensively among funds with higher participation costs (Huang, Wei, and Yan, 2007). Columns (3), (4), (7), and (8) show that, similarly to RPF funds, past returns have a positive impact on the flow growth of APF and NPF funds, with the impact falling significantly with fund age in the case of NPF funds. Like RPF funds but unlike NPF funds, flows to APF funds with higher expense ratios are less sensitive to past performance. Unlike RPF funds, the sensitivity of APF fund flows to past performance increases with the performance fee rate. Lastly, consistent with Huang, Wei, and Yan (2007), NPF funds that belong to larger families face more performance-sensitive flows.

Finally, we compare RPF to APF and NPF directly in columns (5), (6), (9), and (10) by adding an interaction term with $\mathbb{1}_{RelPerf}$, which is a dummy variable that takes the value of 1 for RPF funds and 0 otherwise, to all performance-related regressors. We find that the flow-performance relationship of RPF funds differs significantly from those of APF and NPF funds after accounting for the impact of fund characteristics in columns (6) and (10). To interpret the total effect of the estimates, we consider characteristic values of the median RPF fund. Based on these values, the flow-to-performance sensitivity of the median RPF fund is 50% lower than that of an APF fund with similar characteristics, and 22% lower than a comparable NPF fund. Taken together, these findings suggest that the performance fees of RPF funds act as a partial substitute for the flow incentives faced by traditional funds. We examine this potential substitution between incentives more closely in section 5.1.

Ultimately, the finding that flow sensitivity varies systematically with the fee structure and characteristics of funds implies that indirect incentives will also vary, likely creating rich cross-sectional heterogeneity in the relative importance of direct versus indirect compensation channels.[17]

[17] In Online Appendix Table OA.1, we reexamine the flow-performance relationship using up to 11 quarterly lags of

We assess the extent of this heterogeneity in the next section.

3.2.2 Direct and Indirect Incentives Estimates

Section 3.1 analyzes the theoretical relationship between a fund's direct and indirect incentives and its characteristics and performance, for a *given* fee contract. It highlights the fact that, even holding the fee contract fixed, the direct and indirect incentives, as well as the ratio between the two, for RPF funds can be higher or lower than those for APF funds, depending on these fund-specific variables. In practice, fee contracts might endogenously change with these variables across funds, in ways that could offset or exacerbate the depicted patterns. In this section, we examine to what extent this is the case by estimating the actual direct and indirect incentives that RPF funds face, and compare them with those of peers with different performance-fee conditions.

To implement the incentive measures introduced in Section 3.1, we estimate fund-specific direct and indirect incentives for each quarter in our sample. As a first step, we recover each fund's gross returns, since performance fees are based on gross rather than net performance. Because in our dataset returns are net of all fees, but total expense ratios do not include performance fees, we infer gross returns by reversing out the effects of reported management and incentive fees, using each fund's contractual fee structure and assets under management. We explain this procedure in detail in Appendix B.

We measure direct incentives as the delta of the option embedded in the performance fee contract following the approach described in Appendix A.1. This delta captures the marginal increase in expected compensation from a one-dollar increase in fund dollar returns, accounting for volatility, hurdle rates, fee rates, and the fund's current position relative to its benchmark. We assign a delta of zero to funds without performance fees, exclude observations with missing data, and reset investor tracking whenever gaps prevent continuous measurement.

We define indirect incentives as the present value of expected future fee income, following the approach described in Appendix A.2. This measure includes both management and performance fee revenue, scaled by the empirical flow-performance relationship. To capture cross-sectional variation,

---

returns. The results show that, while the flow-performance relationship extends well beyond the first lag for all fund types, for RPF funds significant positive coefficients persist through at least the third lag. Importantly, the basic patterns observed in Table 3 remain robust when we account for these longer-term flow responses.

we adjust indirect incentives based on key fund characteristics—age, size, expense ratio, and fee structure. We discuss the effects of this heterogeneity further in Section 3.2.3. We also normalize incentive measures for comparability: for instance, we adjust performance fees based on total net assets to yield equivalent economic incentives,[18] and we standardize year-end quarters to account for annual crystallization schedules. We express the resulting incentive measures both per dollar return and per percentage point increase in returns.

Figure 6 plots the distributions of estimated incentives at each observed performance fee rate, adjusted to remove the effect of this rate in the case of direct incentives, for the RPF and APF funds in the sample. Panels A and B illustrate the value of a fund's expected performance fee revenue in the current crystallization period per $\$1/k$ change in the fund's dollar returns, where k is the fund's performance fee rate. Panel C and D illustrate the value of the additional managerial and performance fees that the fund expects to collect over its lifetime following a 1$ return on the fund's portfolio.[19]

A first observation is that, consistent with our numerical analysis in Section 3.1.3, RPF funds exhibit wide heterogeneity in both direct and indirect incentives at any given level of the incentive fee. Naturally, this heterogeneity is more pronounced at the most common fee rates in the sample, such as 20 and 25%, but is also present even at less frequent rates, such as those below 5%. When focusing on direct incentives, this observation implies that incentive fee rates are unlikely to fully capture the actual performance sensitivity of funds' incentive fee payments, which can vary widely with other fund characteristics such as up-to-date performance or fund volatility. Similar observations apply to the direct incentives of the APF funds in our sample, confirming the conclusion of Agarwal, Daniel, and Naik (2009) that option delta is a more granular measure of the direct incentives that fund managers face.

Table 4 presents a summary of the estimated incentives per dollar change (as reported in Fig. 6) and per 1% increase in the fund's returns, by type of fund, as well as a decomposition of indirect

[18]Specifically, some APF funds apply their performance fee rate k on total net assets TNA_t whenever the fund outperforms over the crystallization period, $TNA_{t+1} > (1+h)TNA_t$, where h is the fund's performance hurdle, rather than on the increase in assets resulting from outperformance, $(TNA_{t+1} - (1+h)TNA_t)^+$. For this funds, we compute the equivalent performance fee rate $\hat{k}$ as $\hat{k} = TNA_{t+1}/(TNA_{t+1} - (1+h)TNA_t)^+$.

[19]As we explain below (and in detail in Appendix A), estimates of indirect incentives require assumptions about the rate c_I at which investors withdraw their money from a fund. Our baseline assumption is $c_I = 10\%$ per year in this figure.

incentives into its managerial fee and performance fee components, as described in Appendix A.2. Because estimates of indirect incentives depend on the average holding period of a fund's investors, we present calculations for three different assumptions about the fraction of capital that investors withdraw each year: 5%, 10%, and 15%. The 5% and 10% withdrawal rates are the same as used by Lim, Sensoy, and Weisbach (2016) to characterize the typical spending rules of institutional investors or other long-term investors. The 15% rate is intended to reflect the 14% TNA-weighted average redemption rate of equity mutual funds, as estimated by Sirri and Tufano (1998) in the United States. To compare estimates of direct and indirect incentives across fund types, the table presents results from difference-in-means tests that control for investment style and quarter.

The results reveal that, despite being evaluated relative to a higher-risk, higher-expected return benchmark, RPF funds face steeper direct incentives than APF funds and, because they are typically larger, expect to collect about three times as much in incentive fees. Starting from funds' direct incentives, the average RPF fund in our sample expects to capture 8.5 cents in incentive fees per dollar of return generated. By comparison, APF funds expect to capture 5.8 cents per dollar return.[20] Controlling for investment style and time, the mean difference in direct incentives between RPF and RPF funds is a statistically significant (at the 1% level) 2.4 cents per extra dollar returned to investors. Taking into account the size of the assets under management, the average direct incentives of RPF and APF funds amount to, respectively, $184,000 and $62,000 per percentage point increase in returns. The difference accounting for investment style and time, of $110,000 per percentage point increase in returns, is again highly statistically significant.

The indirect incentives of RPF funds are sizable but, relative to direct incentives, significantly less important than those of APF funds. Assuming a typical fund's shareholding period of 10 years, the RPF funds in our sample receive an average return of 20.2 cents per dollar of expected future total fee income. When we account for fund size, this implies that a one-percentage-point increase in fund returns generates, on average, an extra $388,000 in expected lifetime fees. These numbers compare to 24.5 cents per dollar return and $285,000 per percentage-point increase in returns, in terms of expected total fee income, for APF funds. The differences in total indirect

[20]Estimates for APF funds are comparable to those obtained by Lim, Sensoy, and Weisbach (2016) (6.8 cents for every dollar returned) among U.S. hedge funds.

incentives according to either measure are, however, not statistically significant. Therefore, RPF funds generate about the same lifetime total fee revenue as APF funds. This implies that the ratios of average indirect to direct incentives per dollar and per 1% increase in RPF funds' AUM are 2.37 and 2.11, respectively. Although sizable, these ratios are about half the corresponding indirect-to-direct incentive ratios for APF funds, at 4.25 and 4.63.[21] Comparisons between the two types of funds remain similar when we assume alternative fund share holding periods of 7 or 20 years. Overall, associating direct incentives with shorter time horizons than indirect incentives, our results indicate that, as a fraction of long-term incentives, short-term incentives are almost twice as strong for RPF funds as for APF funds.

The third and fourth rows of each panel of Table 4 indicate that, although performance fees provide powerful incentives to RPF funds in the short term—as captured by measured direct incentives—they are relatively less important in determining the long-term expected compensation of RPF funds compared to APF funds. For an average shareholding period of 10 years, performance fees contribute 26.2% and 23.7% of the extra lifetime revenue that RPF funds expect to receive, respectively, per extra dollar and per 1% increase in fund returns. By comparison, the corresponding contributions of performance fees to the lifetime revenue of APF funds almost double those of RPF funds at 42.9% and 43.2%, respectively. The difference is explained by the 98% greater share of each extra dollar fund return that accrues to APF funds in expected lifetime performance fees, and it is both economically and statistically significant. The relative contributions of performance and managerial fees to funds' expected lifetime income, hence the comparisons across funds, remain similar across shareholding period assumptions.

Lastly, a comparison of the indirect incentives of RPF and NPF funds suggests that relative performance fees can be an economically significant source of additional revenue to fund management companies. While the fee structure of NPF funds does not provide direct incentives or performance fee-related indirect incentives, it still offers meaningful indirect incentives associated with the managerial fees on future AUM. Across the different assumed withdrawal rates in Table 4, the indirect

[21] Lim, Sensoy, and Weisbach (2016) find similar differences in indirect-to-direct incentives ratios between hedge funds with and without high-water marks. Our results offer novel evidence of differences in ratios across funds *without* high-water marks, due mainly to the performance-fee condition (relative vs. absolute) employed.

incentives for the NPF funds in our sample range from 10.4 cents for shorter holding periods to 25.4 cents for longer holding periods in terms of extra lifetime revenue per incremental dollar return. These represent between 75% and 79% of the indirect incentives faced by comparable RPF funds. Accounting for fund size, the average indirect incentives of the NPF funds in our sample range from $153,000 to $382,000 per 1% increase in fund return for the shorter and longer share withholding periods, respectively.[22] Thus, incentive fees allow RPF funds to increase average fee revenue per dollar returned to investors by between 32% and 39% over their lifetimes.

3.2.3 Cross-Sectional Characterization

The average incentive estimates documented above could be driven by outliers within certain types of funds or might otherwise mask systematic patterns across the fund cross-section. At least two fund characteristics could create ex ante cross-sectional dispersion in the levels and relative strengths of the direct versus the indirect incentives associated with RPE. First, according to He, Wei, Yu, and Gao (2017), the optimal compensation contract in the presence of learning about managerial skill should rely more heavily on option-based compensation in industries with higher uncertainty. Applying this argument to asset management, one could expect performance-fee funds that follow riskier investment strategies to face higher direct and performance-fee-related indirect incentives. Second, since managerial fees raise the participation costs of fund investors (Huang, Wei, and Yan, 2007) we should expect, according to our results in section 3.2.1, a lower sensitivity of investor flows to performance as funds' total expense ratio (TER) rise. It is an empirical question whether the potentially lower growth of assets has an overall negative impact on these funds' indirect incentives, given that a higher fee is still applied to each dollar of future assets under management.

To examine how incentives vary along these dimensions, Tables 5 and 6 report the average direct and indirect incentive levels of RPF, APF, and NPF funds, by quintile of either benchmark volatility or TER. They also report the differences in incentives between the extreme quintiles ("5–1") and across fund types, as well as the split of indirect incentives into performance fee-related and managerial fee-related expected income, and the ratios of average direct to indirect incentives

[22] According to Lim, Sensoy, and Weisbach (2016), the corresponding indirect incentives of U.S. funds without performance fees, such as mutual funds, are between 28% and 51% of the size of indirect incentives facing comparable firms with performance fees, such as hedge funds.

of PF funds. To control for the effect of fund size, we focus on incentives per dollar returned to investors across all tables.[23]

The first observation is that our conclusions in Section 3.2.1 are not driven by outliers but rather generalize across several fund dimensions. In particular, RPF funds (i) face stronger direct incentives, (ii) feature lower ratios of indirect to direct incentives, and (iii) derive a lower fraction of their expected lifetime fee income from incentive fees across benchmark risk and total expense ratio levels. These results highlight remarkable consistency across funds in the shorter-term orientation of RPE schemes observed at the aggregate level and suggest that fundamental or institutional features, rather than chance alone, might explain them.

Other systematic patterns are evident. Consistent with the implications of He, Wei, Yu, and Gao (2017), Table 5 indicates that both the direct incentives and the performance fee-related indirect incentives of performance-fee funds increase with the riskiness of their investment styles, as measured by their benchmarks' risk. For RPF funds, the difference in expected incentive fees per dollar of return at the time of performance between the riskiest and the most conservative investment styles is 1.6 cents (22%), and is highly statistically significant. The indirect incentives of RPF funds follow a similar pattern, leading to a statistically significant 16.5% difference in expected lifetime fee income between high- and low-volatility benchmark groups. Examining the performance-fee and managerial-fee components reveals that the higher indirect incentives of high-risk-style funds are explained exclusively by performance fees, which approximately double when moving from low- to high-volatility benchmarks. This positive relationship between benchmark risk and incentive-fee-driven indirect incentives is also observed among APF funds. Unlike APF and NPF funds, for RPF funds the relationship between expected lifetime income from managerial fees and style riskiness is significant, validating, within this fee structure, that the theoretical implication applies only to the option-like component of their compensation.

Although management fees do not affect option-implied deltas, Table 6 shows a marked decrease in the direct incentives of RPF funds as management fees (TER) increase. In particular, high-management-fee funds can expect to collect 24% less incentive fee revenue per dollar of return at

[23] Online Appendix Tables OA.3 and OA.4 report the corresponding incentives per 1% return to the fund investors.

the time of performance than their low-management-fee counterparts, with the difference being statistically significant at the 1% level. The pattern provides evidence of offsetting forces at play between the fixed and variable components of direct compensation among RPF funds. These forces are somewhat absent, and even play (weakly) in the opposite direction, among PF funds that use no RPE: the direct incentives per dollar of return of APF funds with high management fees can be 17% higher than those of their peers with low management fees. The contrasting patterns across PF structures imply that the positive spread between the direct incentives of RPF and APF funds observed at the aggregate level in Section 3.2.1 widens significantly, from 1.5 to 4.8 cents per dollar of return generated, when one compares high- versus low-management fee PF funds. In line with the positive direct effect of management fees prevailing over its negative effect through the performance sensitivity of flows, the relationship between fund TER and indirect incentives is overall increasing and driven exclusively by the management-fee (as opposed to by the performance-fee) component of these incentives for both types of PF structures.

4 Fund Responses to Direct vs. Indirect Incentives

Economic theory predicts that the balance between direct and indirect incentives should shape a manager's willingness to take risks. Direct, option-like incentives—such as those embedded in performance fees—reward short-term outperformance and therefore tend to push managers toward higher risk. In contrast, indirect incentives, which operate through the value of future fees and depend on continued fund survival, can have ambiguous effects on managerial risk-taking. While the desire for fund inflows and career advancement might also push towards higher risk, the concern for fund survival, particularly when management fees are substantial, can lead to risk reduction. Section 3 establishes, both theoretically and empirically, that substantial heterogeneity exists in incentive components and their relative importance across performance-fee funds, as well as between relative- and absolute-performance contracts. This heterogeneity provides a natural setting to test the extent to which the impact of short- and long-term incentives on actual investment choices offsets or reinforces each other. In this section, we examine these links between incentives and behavior, beginning with risk-taking and turning next to performance.

4.1 Risk Taking

We first examine whether effective direct and indirect incentives, and especially their interaction, predict changes in tracking error.[24] To quantify the relation between incentives and risk-taking, we estimate the following (fund i, quarter t)-panel regressions:

$$
\begin{aligned}
\Delta\text{Risk}_{i,t} \quad = \quad & \beta_1 \text{DirectInc}_{i,t-1} + \beta_2 \text{IndirectInc}_{i,t-1} + \beta_3 \left(\text{DirectInc}_{i,t-1} \times \text{IndirectInc}_{i,t-1}\right) \\
& + \beta_4 \mathbf{X}_{i,t-1} + \alpha_c + \alpha_q + \varepsilon_{i,t},
\end{aligned} \tag{8}
$$

where ΔRisk denotes the quarterly change in a fund's tracking error volatility (2), $DirectInc$ measures the option-delta component of the fee contract, and $IndirectInc$ (alternatively, $IndIncMgmt$ and $IndIncPerf$) captures the fund's indirect incentives as measured by the change in the present value of expected future total (respectively, management and performance) fees per dollar change in returns. The interaction term between direct and indirect incentives allows us to test whether and how the economic magnitude of managers' long-term incentives affects their risk-taking response to short-term incentives. It aims to capture the heterogeneity in ratios of direct-to-indirect incentives examined in Section 3. A negative sign for the estimated coefficient indicates an attenuating effect of long-term incentives on risk taking, consistent with concerns about fund survival outweighing the desire for larger fund inflows. A positive sign indicates a risk-exacerbating role for long-term incentives, consistent with an over-concern for AUM growth. The vector $\mathbf{X}$ includes standard controls (age, TNA, family size, TER, and category flows). Regressors are lagged to ensure that incentives and controls are kept fixed over the quarter in which risk-taking is measured, alleviating concerns of reverse causality (see Agarwal, Daniel, and Naik, 2009). All specifications include investment category fixed effects α_c and time fixed effects α_q. We present our estimates in Table 7.

We start our analysis, in columns (1) and (4), by estimating an alternative version of Eq. (8) that replaces the direct and indirect incentives terms (as well as their interaction) for the fund's

[24] In a separate analysis, we verified that the theoretical argument of Basak, Pavlova, and Shapiro (2007) against fund return volatility as a risk-shifting measure is valid in our sample. To this end, we rerun regression (8) using fund return volatility rather than tracking error as the risk measure. In line with the theory, we find no consistent relationship between either direct or indirect incentives, or their interaction, and the fund's total risk. Results are available from the authors upon request.

performance fee rate (Perf Fee). Across columns, the estimated coefficient is small and not statistically significant. Consistent with a central message of previous sections and the argument of Agarwal, Daniel, and Naik (2009), fee rates are poor proxies for the effective relative-performance-fee incentives to which managers' risk-taking behavior responds.

In contrast, columns (2) and (3) reveal that these incentives are better captured by the delta (DirectInc) and the expected lifetime value of fees per dollar returns (IndInc) implicit in the relative-performance fee. Across specifications, the coefficients on direct incentives are positive and statistically significant (0.29 and 0.27, with t-stats of 3.57 and 3.83), indicating that RPF managers increase tracking error when direct incentives strengthen. This effect is also economically meaningful: a one-standard-deviation increase in delta is associated with an increase in the change in tracking error by 26% to 28% of its standard deviation. The finding confirms the theoretical view that short-horizon, option-like incentives tied to relative performance have a first-order impact on active risk-taking.

Columns (2) and (3) also indicate that the indirect incentives associated with RPE unambiguously attenuate the positive effect of direct incentives on risk taking. The interaction between direct and indirect incentives is negative (equal to -0.12 in column (2), and -0.09 and -0.16 for its management-fee and performance-fee components, respectively, in column (3)) and highly statistically significant (t-stats of -3.58, -3.49, and -2.36, respectively). Thus, the same increase in direct incentives has a weaker positive impact on tracking error among funds with relatively longer-term (stronger indirect) incentives. This attenuation effect is also large in economic terms: following a one-standard-deviation increase in direct incentives, a median-characteristics RPF fund in the top quartile of indirect incentives (long-term orientation) increases its tracking error by $0.087 - 0.028 = 0.059$ standard deviations less than an otherwise equivalent RPF fund in the bottom quartile (long-term orientation) of indirect incentives. This is the case even though, on their own, indirect incentives have no clear impact on risk taking, as the coefficient on $IndirectInc$ switches signs from model (2) to (3), and is statistically insignificant in model (2). The decomposition into management-fee and performance-fee components reveals that the attenuating effect of indirect incentives operates through both management- and performance-fee related lifetime compensation.

According to models (5) to (7), these risk-taking channels are specific to funds with RPE mechanisms in place. First, the direct incentives of APF funds have no distinguishable impact on their tracking error, as the coefficients on $DirectInc$ in models (5) and (6) are statistically insignificant. Second, the total indirect incentives of APF funds have at most a small and statistically weak negative impact on their active risk-taking: the coefficient on $IndirectInc$ equals -0.004 (t-stat of 1.88), and its interaction with $DirectInc$ is statistically insignificant, in model (5). The decomposition of these indirect incentives into managerial and performance fee components in column (6) reveals that this small effect might be driven exclusively by the latter, and that it can be largest among the funds with the lower direct incentives—as indicated by the positive and weakly statistically significant coefficient of the interaction between direct and performance-fee indirect incentives (0.068, t-stat of 1.73). Lastly, as expected given that indirect incentives are proportional to managerial fees for NPF funds, we find no significant impact of these incentives on active risk-taking after controlling for fund TER.

Next, we investigate whether the documented incentives-driven changes in the active risk of RPF funds arise from adjustments to systematic or idiosyncratic risk. To this end, we re-estimate Eq. (8) using two alternative left-hand-side variables. The first is the quarterly change in the benchmark beta calculated following Eq. (3), which captures adjustments to systematic exposure via leverage or de-leverage of the benchmark in the fund's portfolio. The second is the quarterly change in benchmark-adjusted idiosyncratic volatility (4), which reflects changes in residual risk relative to the benchmark via security selection.

The results, reported in Table 8, offer strong evidence that the risk-taking effects of incentives operate primarily through an active risk channel rather than through a benchmark leverage channel. In models (1) to (3), the coefficients of changes in funds' benchmark beta on the level of performance fees, and on direct incentives, indirect incentives, and their interaction, are all small and statistically insignificant. Thus, managers do not respond by altering the degree of systematic leverage in their portfolios to either long or short-term incentives, or to their relative contribution to total pay-for-performance sensitivity. Models (4) to (6) indicate that, in contrast, direct incentives and their interaction with indirect incentives are significantly related to changes in benchmark-adjusted idiosyncratic volatility. In particular, (i) increases in direct incentives are associated with higher idiosyncratic volatility (point estimates of 0.025 in (5) and 0.024 in (6), with t-stats equal to 2.65 and 2.92); (ii) total indirect incentives are associated with idiosyncratic risk-taking only through an attenuation of the relationtionship idiosyncratic risk–direct incentives (point estimate of -0.112 and t-stat of -2.83); and (iii) both the management-fee and the performance-fee components of indirect incentives contribute to this attenuation (point estimates of -0.089 and -0.140 and t-stats of -3.19 and -2.14). The estimated relationship implies that, following a one-standard-deviation increase in direct incentives, an RPF fund with median characteristics increases benchmark-adjusted idiosyncratic volatility by 0.065 standard deviations if its indirect incentives are in the bottom quartile (short-term orientation), but only by 0.005 if they are in the top quartile (long-term orientation). These patterns mirror the results for tracking error and reinforce the view that short-horizon incentives encourage more aggressive benchmark-relative risk-taking, while long-horizon incentives moderate such responses.

4.2 Performance

The final step in our analysis is to examine whether the incentive-driven changes in risk documented above translate into differences in fund performance. A positive association between incentives or their interaction on performance would offer evidence that deviations in a fund's policy from its benchmark, as documented in section 4.1, reflect managerial value-enhancing information. A negative association would support the view that these deviations reflect risk-shifting behavior, which is detrimental to fund investors.

To investigate this issue, we again estimate Equation (8), replacing the left-hand-side variable with the three alternative performance measures introduced in section 2.2.3: benchmark-adjusted returns, benchmark alpha, and the information ratio. Given the insufficient evidence of a relationship between incentives and risk-taking behavior among APF funds, we focus our analysis on RPF funds in this section. The results are reported in Table 9.

Columns (1), (4), and (7) confirm, within our sample of RPF funds, the absence of a relationship between the level of performance fee rates and the performance of incentive-fee funds documented by Agarwal, Daniel, and Naik (2009) and Servaes and Sigurdsson (2022). Across these columns, the coefficient on $Perf.Fee$ is statistically indistinguishable from zero, suggesting either that performance fees do not affect performance (Servaes and Sigurdsson, 2022), or that the level of this fee rate is an insufficient statistic of incentives—in line with our analysis above and the insights of Agarwal, Daniel, and Naik, 2009)—unable to capture their performance effects. In all cases, the results are consistent with our finding that the performance fee rate has no meaningful impact on the risk-taking of RPF funds in section 4.1.

According to columns (3), (4), (5), and (6), the risk-taking behavior induced by the incentives associated with relative performance fees has no impact on the benchmark-adjusted or the abnormal returns of RPF funds. The coefficients on the direct and indirect incentive variables are all statistically insignificant across the specifications. Only the interaction between direct and performance fee-related indirect incentives is (marginally) positive in column (3), suggesting that the attenuating impact of these indirect incentives on the positive relationship between direct incentives and tracking error reported in column (3) of Table 7 improves excess performance for the RPF fund investors. However, the evidence is too weak to draw firm conclusions.

A relationship between the incentives and performance of RPF funds becomes more apparent in the analysis of active risk-adjusted performance, as columns (8) and (9) report a statistically significant relationship between funds' indirect incentives and information ratios. By definition, the information ratio captures the abnormal excess performance generated by a fund per unit of active risk. Given the insufficient evidence of an effect of indirect incentives on abnormal excess performance in columns (5) and (6), it is possible that the results in columns (8) and (9) are driven not by the active risk-taking behavior documented in the previous section. Examining Table 8, we see that the coefficient on indirect incentives is negative (albeit not significant) in column (5) while the coefficients on the management fee-component of indirect incentives and on the interaction of direct incentives with the performance-fee component of indirect incentives in column (6) are positive and significant. The results in column (8) suggest that the moderating impact of total indirect incentives on active risk-taking improves risk-adjusted performance, while the exacerbating impact of management fee-related indirect incentives and the buffering effect of performance fee-related indirect incentives on the relationship between direct incentives and idiosyncratic risk hurt it.

Overall, the results in this and the previous section suggest that, while the direct and indirect incentives associated with the performance fees of RPF funds have a meaningful impact on risk-taking, the evidence on performance is insufficient to flag this behavior as either value-enhancing activeness or detrimental risk-shifting.

5 Additional Analyses and Robustness

In this section, we explore other contracting considerations that may align with the patterns documented in the previous sections. First, we search for evidence of a systematic relationship, following substitution or complementarity arguments, between the drivers of the direct and indirect incentives of RPF funds that we quantify in Section 3. Next, we examine whether the absence of a clear link between incentives and performance documented in Section 4.2 remains consistent with an equilibrium in which any surplus associated with improved managerial outcomes accrues mostly to the fund company rather than to its shareholders. Finally, we test whether the managerial behavior patterns that we document in Section 4 are robust for alternative controls for country-specific factors driving the relationship.

5.1 Relation Between Direct and Indirect Incentives

Should direct incentives be higher or lower for managers with greater career concerns? The answer is not obvious from a theoretical perspective. Moreover, existing evidence on the issue is scarce and inconclusive.[25] If both types of incentives serve the same purpose of inducing the manager to exert more effort, acting as *substitutes* of each other, a negative relation between them is expected. If, in contrast, direct and indirect incentives serve different purposes such as incentive alignment over the short (direct incentives) and the long (indirect incentives) terms, such a negative relation need not hold.

[25] Lim, Sensoy, and Weisbach (2016) examine this question using hedge fund data, and find no evidence of a relationship between the two incentive types. They consider their findings puzzling, as—presumably following the incentives substitution hypothesis described below—they defy conventional theories of optimal contracting.

To examine the nature of this relationship in our sample, we regress funds' fee structures on the slope of their flow-performance relationships, along with additional controls. The fee structure, as captured by either the performance condition for payment or the level of the performance fee, is a key determinant of the direct incentives of performance-fee funds.[26] The market-determined sensitivity of flows to performance, in turn, is a key determinant of their lifetime compensation and, hence, their career concerns. We assess the statistical relationship between these determinants by running the following probit and panel regressions:

$$\begin{aligned} \Pr(y_{i,t} = 1) &= \Phi\left(\alpha + \beta_1 \text{F-P sensitivity}_{i,t-1} + \mathbf{X}'_{i,t}\boldsymbol{\gamma} + \upsilon_{i,t}\right) \qquad (9) \\ y_{i,t} &= \beta_1 \cdot \text{F-P sensitivity}_{i,t-1} + \beta_2 \cdot \left(\text{F-P sensitivity}_{t\,i,t-1} \times \mathbb{1}_{\text{RPF},i,t}\right) \\ &\quad + \beta_3 \cdot \mathbb{1}_{\text{RPF},i,t} + \mathbf{X}'_{i,t}\boldsymbol{\gamma} + \mu_{\text{country}(i)} + \mu_{\text{category}(i)} + \mu_{\text{quarter}(t)} + \varepsilon_{i,t}, \qquad (10) \end{aligned}$$

where $y_{i,t}$ is either an indicator for whether the fund charges a performance fee or uses a relative performance benchmark, or the performance fee level, and $\Phi(\cdot)$ is the standard normal CDF. The main explanatory variable is the fund's lagged flow-performance sensitivity. For the probit regression (9), we estimate this slope from contemporaneous return-flow regressions that do not include the effect of the performance fee. For panel regressions, we run specifications with flow estimates that, alternatively, do and do not include the effect of the performance fee.[27] The interaction with the RPF dummy in Eq. (10) allows us to assess whether the relationship between flow sensitivity and performance fee design differs between APF and RPF structures. The vector of controls $\mathbf{X}$ includes lagged fund size (in logs, $Log(Size)$) and benchmark return volatility ($Bench.Vol.$). The former is aimed at assessing the extent to which fund scale affects the design of performance fee structures. The latter is meant to capture whether funds following riskier strategies are more likely, in line with the theoretical implications of He, Wei, Yu, and Gao (2017), to offer managers performance-sensitive compensation. The panel regression also includes country, investment objective, and quarter fixed effects. Results are reported in Table 10, where columns (1) and (2) present results for the probit

[26] It is also an important driver of the performance-fee component of indirect incentives. As seen in Section 3.2, however, this is the smaller component of most funds' total indirect incentives.

[27] Estimates of the flow-performance relationship slope that do not include the effect of the performance fee correspond to columns (2), (5), and (7) of Table OA.2, while those that do account for this effect correspond to columns (3), (6), and (8) of the same table.

regression (9), and columns (3) and (4) present results for the panel regression (10).

A first observation from this table is that the probability of adopting performance fees, but not the probability of including RPE components in the performance fee structure, is positively associated with the strength of career concerns. Without distinction for performance condition (relative or absolute), flow-performance sensitivity is a strong positive predictor of performance fee adoption in column (1). However, the relationship is fundamentally altered among funds that rely on RPE, as shown in column (2). The negative, highly statistically significant coefficient on F-P sensitivity indicates that the likelihood of adopting performance fees relative to a risky benchmark declines as the fund's flow-performance sensitivity increases. A one-standard-deviation increase in flow-performance sensitivity is associated with a decrease of 3.5% in the probability of adopting a relative benchmark (a 4.6% decrease relative to the sample mean of 76.2%).[28] This result represents novel evidence of an *incentive substitution effect* among funds that rely on RPE for compensation purposes: when managers already face strong market-based incentives through investor flows, their fee structures internalize performance pressure, and hence are less likely to require explicit fee power.

Similarly, funds with stronger career concerns impose stronger direct incentives via contractual fees, but only when they do not rely on RPE. In columns (3), F-P sensitivity is estimated including the effect of the performance fee rate, while in column (4) this effect is excluded.[29] In both columns, the coefficients on F-P sensitivity capture the estimated relationship between the performance fee rate and the flow-performance sensitivity of APF funds, while the sums of the coefficients on F-P sensitivity and F-P sensitivity $\times \mathbb{1}_{\text{RPF}}$ capture the corresponding relationship for RPF funds. The estimated coefficient for APF funds is positive and highly statistically significant. However, the inclusion of RPE in funds' compensation fundamentally changes this relationship, as the interaction term with the RPF dummy is negative and significant in both columns. Thus, the positive relationship between career concerns and performance fee levels is at least attenuated—potentially, muted or reversed—for RPF funds. To formally test whether the net effect for RPF funds differs

[28]The impact of a one-standard deviation change in flow-performance sensitivity is based on the average marginal effects of the probit regressions. The average marginal effects are statistically significant at the 1% level in both regressions.

[29]See footnote 27.

from zero, we conduct a Wald test of the null hypothesis that $\beta_1 + \beta_2 = 0$. In column (3), the test strongly rejects the null (Wald statistic = 4.87, $p = 0.027$), indicating that the positive relationship between flow-performance sensitivity and performance fees is actually *negative* for RPF funds. In column (4), when flow-performance sensitivity is estimated excluding cross-sectional differences in performance fees, the Wald test fails to reject the null (Wald statistic = 1.08, $p = 0.300$). That is, once we control for the mechanical effect of performance fees on flow sensitivity, the relationship between indirect incentives and performance fee rates disappears for RPF funds. This result is consistent with direct and indirect incentives serving different purposes, such as short- and long-term goal alignment, for funds that rely on RPE for compensation, and with these purposes being uncorrelated with each other.

Estimates for the control variables in columns (1) and (2) indicate that smaller funds and funds pursuing riskier investment styles are more likely to adopt performance fees (the coefficients on $Log(Size)$ and $Bench\,Vol.$ are negative and positive, respectively, and highly statistically significant), while the opposite holds for the adoption of RPE in the performance fee structure (the coefficients on $Log(Size)$ and $Bench\,Vol.$ flip signs but remain highly statistically significant). Moreover, the estimates for these variables across columns (3) and (4) indicate that, while fund size has no impact on the level of the performance fee adopted, funds in riskier investment categories adopt higher performance fee rates.

The depicted relationship between funds' performance fee structures and benchmark risk offers novel evidence in support of the theoretical predictions of He, Wei, Yu, and Gao (2017). In their model, option-based compensation is optimally more prevalent and steeper in environments with greater uncertainty, where learning about managerial skill is more valuable. As highlighted above, benchmark volatility provides a natural proxy for industry-level risk in our context. Consistent with this prediction, the estimates in Table 10 imply that funds evaluated against riskier benchmarks are more likely to adopt performance fees and to embed stronger option-like incentives via higher performance fee rates.

5.2 Incentives and Managerial Skills

To what extent are the level and structure of incentives related to managerial skill? The absence of a clear link between the incentives induced by (relative) performance fees and the performance realized by fund investors, documented above, raises the possibility that these incentives may still improve managerial outcomes, but that much of the resulting surplus accrues to the fund company rather than to its shareholders. This could occur, for instance, if skilled managers possess greater bargaining power vis-à-vis investors. In such a case, higher-skill managers may attract larger inflows, negotiate more favorable base compensation, or adjust the mix between direct and indirect incentives to reflect their reputation and outside options. This section investigates whether these patterns are present in our data and examines how managerial skill relates to the level and composition of lifetime compensation across performance-fee structures.

We measure managerial skill using the value-added methodology developed by Berk and Van Binsbergen (2015), as described in our Appendix C. This approach quantifies the dollar value that fund managers extract from financial markets. The resulting skill measure we adopt, *Skill Ratio*, varies by fund and quarter and is standardized to allow for comparisons across funds.

Table 11 presents regression results examining the relationship between lagged fund skill and indirect incentives across different fund types and incentive components. We decompose total indirect incentives into management fee-related and performance fee-related components to clarify the mechanisms through which skilled managers structure their compensation. We include lagged values of fund size, family size, total expense ratios, flows, and returns as additional covariates to control for the effect of these variables on our estimates of indirect incentives, either on their own (e.g., total expense ratios) or through their impact on the fund's flow-performance sensitivity.

The results reveal heterogeneous relationships between managerial skill (*Skill Ratio*) and indirect incentives that depend critically on both the fund's performance fee structure and the component of indirect incentives considered. For funds with relative performance fees (RPF), we find no significant relationship between skill and *total* indirect incentives (Column 1, t-statistic $= -0.74$). However, this aggregate result masks important offsetting effects in the underlying components: skilled managers in these funds exhibit significantly higher management-related indirect incentives (column (4), coefficient = 4.656, t-statistic = 2.59) but possibly lower performance-related indirect incentives (column (6), coefficient = −8.985, t-statistic = −1.31), although this latter effect is not statistically significant at conventional levels. The decomposition reveals that skilled RPF managers extract higher compensation primarily through the base management fee component rather than through performance-contingent fees. The pattern could be consistent with managers with proven track records preferring the stability of higher base fees over performance-contingent compensation, as would be expected if managers were risk-averse or faced decreasing returns to scale that make future outperformance more difficult to achieve.

For funds with either absolute performance fees (APF), or with no performance fees (NPF), the patterns are less clear. While estimates suggest a positive relationship between skill and total indirect incentives for APF funds (column (2), coefficient = 11.915), this effect is only marginally statistically significant (t-statistic = 1.75), likely reflecting the smaller sample size of this type of fund. The decomposition shows a positive but insignificant relationship with management-related incentives (column (5), coefficient = 3.439, t-statistic = 1.46) and performance-related incentives (column (7), coefficient = 8.475, t-statistic = 1.20). The lack of precision in these estimates prevents us from drawing strong conclusions about how skill affects compensation structure in the absolute performance fee segment. We find no evidence of a relationship between skill and indirect incentives (column (3), coefficient = -0.016, t-statistic = -0.03) among NPF funds.

5.3 Robustness

A potential concern with our main analysis is that adopting a relative performance fee structure may be correlated with country-specific factors. Different jurisdictions have varying regulatory frameworks for performance fees, investor protection rules, and market structures that could independently affect both the prevalence of different fee structures and fund behavior. To address this concern, we construct a matched sample that pairs each RPF fund-quarter observation with a comparable NPF fund-quarter within the same country. The matched sample provides a controlled test of whether adopting a relative performance benchmark affects fund behavior, holding constant the institutional environment in which funds operate.

We employ a nearest-neighbor matching algorithm that combines exact matching on categorical variables with distance-based matching on continuous characteristics. Specifically, for each RPF fund-quarter observation, we identify a matched NPF fund-quarter within the same investment category and domicile country. Among NPF funds that satisfy the exact constraints, we select the closest match based on the Mahalanobis distance computed over the logs of total net assets, fund age, and family size. The Mahalanobis distance is computed using the pooled covariance matrix of the matching variables, ensuring that differences are appropriately scaled by the joint distribution of characteristics.

Because NPF funds have no performance fees, their direct incentives and indirect incentives from performance fees are mechanically zero. Therefore, we only interact the RPF indicator with the incentive component that varies for NPF funds: indirect incentives and their component originating from management fees.

Tables OA.5 and OA.6 of the Online Appendix report the results of re-estimating our baseline risk and performance specifications on this matched sample. Looking first at risk-taking in Table OA.5, the core findings from our main analysis are preserved. Direct incentives continue to exhibit a positive and significant relationship with changes in tracking error (columns (2)–(3)) and benchmark-adjusted idiosyncratic volatility (columns (8)–(9)), while having no discernible effect on benchmark beta (columns (5)–(6)). Importantly, the attenuating effect of indirect incentives on direct incentive-driven risk-taking remains robust: the interaction between direct and management fee-related indirect incentives is negative and highly significant for both tracking error (-0.077, $t = -3.25$) and idiosyncratic volatility (-0.081, $t = -2.32$). The RPF indicator and its interactions with indirect incentives are largely insignificant, suggesting that once we control for the level of incentives, the adoption of a relative performance benchmark does not independently predict differential risk-taking behavior relative to matched NPF funds operating in the same regulatory environment.

Turning to performance in Table OA.6, the matched-sample results are broadly consistent with our baseline findings. Neither direct nor indirect incentives exhibit a statistically significant relationship with benchmark-adjusted returns or benchmark alpha across specifications. For the information ratio, we find that management fee-related indirect incentives are associated with lower risk-adjusted performance (-2.086, $t = -2.27$), while performance fee-related indirect incentives show a positive association (0.671, $t = 2.00$). The interaction between direct incentives and performance fee-related indirect incentives is positive and significant for benchmark-adjusted returns (0.559, $t = 2.13$), providing some evidence that the attenuation of direct incentive-driven risk-taking by performance fee-related indirect incentives may benefit fund investors. However, as in the main analysis, the overall evidence on performance effects remains mixed and insufficient to conclude that incentive-driven risk-taking systematically enhances or destroys value.

Overall, the matched-sample analysis confirms that the relationships between incentives and risk-taking documented in Section 4 are not driven by unobserved country-level heterogeneity. The stability of our core findings across these alternative specifications reinforces the interpretation that direct incentives encourage active risk-taking, while indirect incentives—particularly those linked to management fees—moderate this response.

6 Conclusion

This paper provides a quantitative assessment of the incentive effects of relative performance evaluation (RPE) in asset management using a unique international dataset of mutual funds with performance fees. Unlike most traditional fund structures, a large subset of funds in our sample condition incentive fee payments on outperformance relative to risky benchmarks. These relative performance fee (RPF) contracts allow us to examine, in a broad empirical setting, how explicit benchmarking provisions shape the level, composition, and effective horizon of managerial incentives.

Our analysis combines structural valuation techniques with detailed fee structures, performance data, and fund flows to decompose managerial incentives into direct (contractual) and indirect (flow-driven) components. We capture direct incentives through the option delta embedded in incentive fee contracts and indirect incentives through the expected lifetime value of fees generated by performance-sensitive investor flows. Analytical and numerical results show that the relative importance of these components depends jointly on contract parameters and market characteristics such as fund volatility, benchmark risk, and return correlation, highlighting the limits of using incentive fee rates alone as sufficient statistics for pay-for-performance.

Empirically, we find that RPF funds face substantially stronger direct incentives than otherwise comparable absolute-performance fee (APF) funds, despite being evaluated against higher-volatility benchmarks. In contrast, their indirect incentives are similar in magnitude or weaker. As a result, the ratio of indirect to direct incentives is significantly lower for RPF funds, implying a more short-term oriented compensation profile under RPE contracts. At the same time, relative performance fees remain economically important: compared to non-performance-fee funds, RPF funds generate 32–39% higher expected lifetime fee revenue, reflecting the combined contribution of performance fees and flow-driven effects. In the cross-section of performance-fee funds, those following riskier investment styles exhibit stronger option-based incentive sensitivity, consistent with models of optimal contracting under learning about managerial ability.

Beyond compensation structure, our results clarify how relative performance incentives translate into managerial behavior. Short-horizon, option-like incentives embedded in RPE contracts have a first-order effect on active risk-taking: stronger direct incentives predict subsequent increases in benchmark-relative risk, operating primarily through idiosyncratic rather than systematic exposures. Crucially, this effect is sharply attenuated when managers face stronger long-horizon incentives arising from expected future fee income. Identical increases in direct incentives therefore induce markedly different risk responses depending on the strength of indirect incentives, helping explain why prior studies often find weak or inconsistent links between performance fees and risk-taking when incentives are proxied by fee rates alone. These incentive-driven adjustments in risk-taking do not translate into robust differences in benchmark-adjusted returns. While stronger indirect incentives are associated with modest improvements in risk-adjusted performance, as measured by the information ratio, these effects are limited and not uniformly robust. Overall, the evidence indicates that RPE contracts primarily affect how risk is taken rather than systematically improving or destroying performance.

Additional evidence from funds' contract choices reinforces this interpretation. We show that market-based incentives help shape the adoption of RPE itself: funds facing stronger flow–performance sensitivity are significantly less likely to employ relative performance benchmarks, consistent with substitution between contractual and market-based discipline. Our analysis of managerial skill suggests that talent primarily affects the structure of compensation rather than its overall sensitivity to performance. More skilled managers in RPF funds secure higher base compensation but do not earn proportionally higher lifetime performance-contingent fees, implying that skill is reflected in greater compensation stability rather than stronger incentive pay or reliably superior fund performance.

Overall, our findings have broader implications for the design and regulation of pay-for-performance in asset management and beyond. They show that benchmarking fundamentally reshapes the balance between short- and long-horizon incentives and that policy assessments of compensation schemes must account jointly for contractual provisions and market-based discipline. Consistent with the framework of Edmans, Gabaix, and Jenter (2017), regulation is likely to be less effective where implicit incentives through investor flows already exert strong disciplinary pressure, particularly under RPE contracts. More broadly, our results highlight both the promise and the limits of relative performance evaluation as a mechanism for managing agency frictions in financial intermediation.

References

Agarwal, V., N. D. Daniel, and N. Y. Naik, 2009, "Role of Managerial Incentives and Discretion in Hedge Fund Performance," *Journal of Finance*, 64, 2221–2256.

Aiken, A. L., C. P. Clifford, and J. Ellis, 2013, "Out of the Dark: Hedge Fund Reporting Biases and Commercial Databases," *Review of Financial Studies*, 26(1), 209–243.

Angelis, D. D., and Y. Grinstein, 2020, "Relative Performance Evaluation in CEO Compensation: A Talent-Retention Explanation," *Journal of Financial and Quantitative Analysis*, 55, 2099–2123.

Basak, S., A. Pavlova, and A. Shapiro, 2007, "Optimal Asset Allocation and Risk Shifting in Money Management," *Review of Financial Studies*, 20, 1583–1621.

Berk, J. B., and R. C. Green, 2004, "Mutual Fund Flows and Performance in Rational Markets," *Journal of Political Economy*, 112, 1269–1295.

Berk, J. B., and J. H. Van Binsbergen, 2015, "Measuring skill in the mutual fund industry," *Journal of Financial Economics*, 118(1), 1–20.

Bizjak, J., S. Kalpathy, Z. F. Li, and B. Young, 2022, "The Choice of Peers for Relative Performance Evaluation in Executive Compensation," *Review of Finance*, 26, 1217–1239.

Black, F., and M. Scholes, 1973, "The pricing of options and corporate liabilities," *Journal of Political Economy*, 81, 637–654.

Carpenter, J. N., 2000, "Does option compensation increase managerial risk appetite?," *Journal of Finance*, 55, 2311–2331.

Chevalier, J., and G. Ellison, 1997, "Risk taking by mutual funds as a response to incentives," *Journal of Political Economy*, 105(6), 1167–1200.

Cremers, M., M. A. Ferreira, P. Matos, and L. Starks, 2016, "Indexing and active fund management: International evidence," *Journal of Financial Economics*, 120, 539–560.

Cuoco, D., and R. Kaniel, 2011, "Equilibrium Prices in the presence of Delegated Portfolio Management," *Journal of Financial Economics*, 101, 264–296.

Das, S. R., and R. K. Sundaram, 2002, "Fee speech: signaling, risk sharing, and the impact of fee structures on investor welfare," *Review of Financial Studies*, 15, 1465–1497.

Edmans, A., X. Gabaix, and D. Jenter, 2017, "Executive Compensation: A Survey of Theory and Evidence," *The Handbook of the Economics of Corporate Governance*, 1, 383–539.

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

Ferreira, M. A., A. Keswani, A. F. Miguel, and S. B. Ramos, 2012, "The flow-performance relationship around the world," *Journal of Banking & Finance*, 36(6), 1759–1780.

Getmansky, M., B. Liang, C. Schwarz, and R. Wermers, 2015, "Share restrictions and investor flows in the hedge fund industry," *Working Paper*.

Gibbons, R., and K. J. Murphy, 1990, "Relative Performance Evaluation for Chief Executive Officers," *Industrial and Labor Relations Review*, 43(3), 30–51.

——— , 1992, "Optimal Incentive Contracts in the Presence of Career Concerns: Theory and Evidence," *The Journal of Political Economy*, 100(3), 468–505.

Goetzmann, W. N., J. E. Ingersoll, and S. A. Ross, 2003, "High-water marks and hedge fund management contracts," *Journal of Finance*, 58(4), 1685–1718.

Golec, J., and L. Starks, 2004, "Performance fee contract change and mutual fund risk," *Journal of Financial Economics*, 73, 93–118.

He, Z., B. Wei, J. Yu, and F. Gao, 2017, "Optimal Long-term Contracting with Learning," *Review of Financial Studies*, 30, 2006–2065.

Hodder, J. E., and J. C. Jackwerth, 2007, "Incentive Contracts and Hedge Fund Management," *Journal of Financial and Quantitative Analysis*, 42, 811–826.

Holmstrom, B., 1982, “Moral Hazard in Teams,” *Bell Journal of Economics*, 13(2), 324–340.

Huang, J., K. D. Wei, and H. Yan, 2007, “Participation costs and the sensitivity of fund flows to past performance,” *Journal of Finance*, 62(3), 1273–1311.

Jenter, D., and F. Kanaan, 2015, “CEO Turnover and Relative Performance Evaluation,” *Journal of Finance*, 70, 2155–2183.

Lan, Y., N. Wang, and J. Yang, 2013, “The economics of hedge fund,” *Journal of Financial Economics*, 110, 300–323.

Li, C. W., and A. Tiwari, 2009, “Incentive Contracts in Delegated Portfolio Management,” *Review of Financial Studies*, 22, 4681–4714.

Lim, J., B. A. Sensoy, and M. S. Weisbach, 2016, “Indirect incentives of hedge fund managers,” *Journal of Finance*, 71(2), 871–918.

Ma, L., and Y. Tang, 2019, “Portfolio Manager Ownership and Mutual Fund Risk Taking,” *Management Science*, 65, 5518–5534.

Margrabe, W., 1978, “The value of an option to exchange one asset for another,” *Journal of Finance*, 33, 177–186.

Panageas, S., and M. M. Westerfield, 2009, “High-Water Marks: High Risk Appetites? Convex Compensation, Long Horizons, and Portfolio Choice,” *Journal of Finance*, 64, 1–36.

Riddiough, T. J., and J. A. Wiley, 2022, “Private Funds for Ordinary People: Fees, Flows, and Performance,” *Journal of Financial and Quantitative Analysis*, 57, 3252–3280.

Ross, S. A., 2004, “Compensation, Incentives, and the Duality of Risk Aversion and Riskiness,” *Journal of Finance*, 59, 207–225.

Sensoy, B. A., 2009, “Performance Evaluation and Self-Designated Benchmark Indexes in the Mutual Fund Industry,” *Journal of Financial Economics*, 92, 25–39.

Servaes, H., and K. Sigurdsson, 2022, "The Costs and Benefits of Performance Fees in Mutual Funds," *Journal of Financial Intermediation*, 50, 100959.

Sirri, E. R., and P. Tufano, 1998, "Costly search and mutual fund flows," *Journal of Finance*, 53(5), 1589–1622.

Sotes-Paladino, J., and F. Zapatero, 2022, "Carrot *and* Stick: A Role for Benchmark-Adjusted Compensation in Active Fund Management," *Journal of Financial Intermediation*, 52, 100981.

Yin, C., 2016, "The Optimal Size of Hedge Funds: Conflict between Investors and Fund Managers," *Journal of Finance*, 71, 1857–1893.

Yin, C., and X. Zhang, 2024, "Risking or Derisking: How Management Fees Affect Hedge Fund Risk-Taking Choices," *Review of Financial Studies*, 36, 904–944.

Appendix

A Computation of direct and indirect incentives

In this Appendix, we present a simple valuation framework to compute the pay-for-performance sensitivity (direct incentives) and the expected lifetime value of fees (indirect incentives) for the performance fee funds in our sample.

A.1 Direct Pay for Performance

Let c and k be, respectively, the fund's per-period management and incentive fee rates, W be the fund's assets under management (AUM), Y be the value of the fund's (possibly riskless) benchmark index, $r = \ln(1 + r_f)$ be the continuously compounded riskfree rate of return, and $h = \ln(1 + H)$ be the continuously compounded equivalent of the hurdle performance rate H by which the fund must outperform the benchmark to gain the incentive fee. Let T be the next performance fee crystallization date, l be the length of time in between crystallization dates, and t an interim date $T - l \leq t \leq T$.

Assume that under some (unique) martingale measure Q, the dynamics of W and Y on the time interval $[T - l, T]$ are given by

$$dW_t = W_t \left(r\,dt + \sigma_W\,dw^*_{W,t}\right),$$
$$dY_t = Y_t \left(r\,dt + \sigma_Y\,dw^*_{Y,t}\right),$$

where $w^* = [w^*_W, w^*_Y]$ is a standard two-dimensional Brownian motion under Q, such that $(dw^*_{W,t})(dw^*_{Y,t}) = \rho\,dt$.

Assume that the management fee is paid at the beginning of the period, whereas the incentive fee is paid at the end of the period. Resetting the benchmark at the beginning of each crystallization period so that $Y_t = W_t$, the incentive fee for the period $[T-l, T]$ is:

$$F_T = k \max\left(0, W_T - e^{hl} Y_T\right).$$

Under these assumptions, we can use Margrabe (1978)'s formula for exchange options to compute the time-t value $V_t(\tau)$ of incentive fees per dollar of AUM for the time $\tau = T - t$ remaining until the next crystallization date as:

$$\begin{aligned} V_t(\tau) =& E^* \left[e^{-r\tau} F_T \,|\mathcal{F}_t \right] \\ =& k\big(W_t N(d_1(\tau)) - e^{h\tau} Y_t N(d_2(\tau))\big), \end{aligned} \tag{11}$$

where:

$$\begin{aligned} d_1(\tau) =& \frac{\ln(W_t/Y_t) + (\frac{1}{2}\sigma^2 - h)\tau}{\sigma\sqrt{\tau}}, \\ d_2(\tau) =& d_1(\tau) - \sigma\sqrt{\tau}, \\ \sigma =& \sqrt{\sigma_W^2 - 2\rho\sigma_W\sigma_Y + \sigma_Y^2}. \end{aligned}$$

The valuation equation (11) encompasses the two performance fee structures in our sample:

- For RPF structures, Y is the stochastic benchmark against which relative performance is assessed, so $\sigma_Y > 0$ and σ is the fund tracking error volatility.
- For APF structures, Y is a riskless benchmark with time-t value $Y_t = e^{-r\tau} W_t$ and $\sigma_Y = 0$, so that σ is the fund return volatility.

In both cases, the delta of this option with respect to the fund's AUM, $\Delta_W(\tau) = \frac{\partial V(\tau)}{\partial W}$, is:

$$\Delta_W(\tau) = kN(d_1(\tau)), \tag{12}$$

and the manager's dollar value of a 1% increase in the fund's value over the period $[t, T]$ is given by

$$0.01 \times \Delta_W(\tau) W_t. \tag{13}$$

We refer to either (12) or (13) as the *direct incentives* created by a fund's performance fees.[30]

A.2 Indirect Pay for Performance

To compute the present value of the total future management and incentive fees that a fund collects, we must keep track of the evolution of the fund's assets under management (AUM) before and after fees are paid.[31] Without loss of generality, we assume that each crystallization period (the time elapsed between crystallization dates) has length $l = 1$. Thus, crystallization dates are $n = 1, 2, \cdots$.

[30] As described in Appendix B, several characteristics facilitate the computation of delta, compared to the "total delta" methodology of Agarwal, Daniel, and Naik (2009), for the performance fee funds in our sample.

[31] We are indebted to Hervé Roche for his contribution to the setup of this section.

We also assume that investors make withdrawals at rate c_I *at the beginning* of each period, at the same time that management fees are paid. Let $W_n^{(-)}$ and $W_n^{(+)}$ denote the value of AUM, respectively, at the end of period $[n-1,n]$ before time-n incentive fees are paid, and at the beginning of period $[n,n+1]$ before time-n management fees are paid and investors' withdrawals are realized (but after time-n incentive fees are paid):

$$W_n^{(+)} = W_n^{(-)} - F_n.$$

At the beginning of period $[n, n+1]$, the benchmark is reset so that $Y_n = W_n$. Under these assumptions, the time-n value of the fund's incentives fees simplifies to

$$V_n(1) = e^{-r} E_n^*[F_{n+1}] = k\Lambda(1) W_n^{(+)},$$

where:

$$\Lambda(\tau) = N(d_1(\tau)) - e^{h\tau} N(d_2(\tau)).$$

Right after investors' withdrawals and the management fees are paid, the AUM fall to $(1 - c_I - c)W_n^{(+)}$, so that

$$E_n^* \left[W_{n+1}^{(-)} \right] = e^r (1 - c_I - c) W_n^{(+)},$$

and we find that

$$E_n^* \left[W_{n+1}^{(+)} \right] = e^r \left(1 - c_I - c - k\Lambda(1)\right) W_n^{(+)},$$

which implies that

$$E_0^* \left[W_n^{(+)} \right] = e^{rn} (1 - c_I - c - k\Lambda(1))^n W_0^{(+)}.$$

Thus, the time-0 value of total fees over the lifetime of the fund are:

$$\begin{aligned} E_0^* \left[\sum_{n=0}^{\infty} e^{-rn} \left(c W_n^{(+)} + e^{-r} F_{n+1} \right) \right] &= E_0^* \left[\sum_{n=0}^{\infty} E_n^* \left[\left[c W_n^{(+)} + e^{-r} F_{n+1} \right] e^{-rn} \right] \right] \\ &= (c + k\Lambda(1)) E_0^* \left[\sum_{n=0}^{\infty} e^{-rn} W_n^{(+)} \right] \\ &= (c + k\Lambda(1)) E_0^* \left[\sum_{n=0}^{\infty} \left[1 - c_I - (c + k\Lambda(1)) \right]^n W_0^{(+)} \right] \\ &= \frac{c + k\Lambda(1)}{c_I + c + k\Lambda(1)} W_0^{(+)}. \end{aligned} \tag{14}$$

From Eq. (14), the increase in the present value of the manager's lifetime compensation per dollar increase in AUM is:

$$\frac{PV(\textit{Manager's lifetime compensation})}{\textit{Assets}} = \frac{c + k\Lambda(1)}{c_I + c + k\Lambda(1)}, \tag{15}$$

which increases with the fund management fees c and the expected per-period value of the fund's incentive fees $k\Lambda(1)$, and decreases with the investor withdrawal rate c_I. We refer to Eq. (15) as the *indirect incentives* facing the fund manager.

We can further decompose these indirect incentives into two: the indirect incentives driven by management fees:

$$\frac{PV(\textit{Manager's lifetime management fees})}{\textit{Assets}} = \frac{c}{c_I + c + k\Lambda(1)}, \tag{16}$$

and the indirect incentives driven by incentive fees:

$$\frac{PV(\textit{Manager's lifetime incentive fees})}{\textit{Assets}} = \frac{k\Lambda}{c_I + c + k\Lambda(1)}. \tag{17}$$

To further account for the indirect incentives stemming from the performance-based flows that the fund experiences, we follow Lim, Sensoy, and Weisbach (2016) in augmenting the fund return volatility (APFs) or tracking error volatility (RPFs) in Eqs. (14)–(17) according to the estimated sensitivity of the fund assets' growth to contemporaneous performance, controlling for all the covariates of Table OA.2. Further accounting for the effect of a fund's age, family size, total expense ratios, and the level of incentive fees on this sensitivity introduces cross-sectional variation in our estimates of indirect incentives (14)–(17) that is absent in the estimates (12)–(13) of direct incentives.[32]

B Computation of Gross Returns

While the fund returns in our dataset are net of management and incentive fees, the reported total expense ratios exclude performance fees. Thus, we need to estimate each fund's gross returns from observations of its assets under management (AUM), net returns, management fees, and incentives fees. To this end, we follow the procedure and notation described in Appendix A of Lim, Sensoy, and Weisbach (2016).

Several characteristics of our sample facilitate the calculations. First, unlike in the U.S., where the SEC mandates manager ownership disclosure, most European jurisdictions do not require public disclosure of mutual fund managers' personal investments in the funds they manage. Thus, we adopt a conservative approach to total delta estimation by assuming that the mutual fund managers in our sample have no stake, MS, in their funds ($MS_t = 0$ for all t).[33] Second, our focus on fee structures without high-water mark provisions removes the need to account for dynamic resetting of the strike price across time due to past losses. Lastly, almost all of the performance fee funds in our sample ($> 99\%$) have no equalization system, implying that there is a unique (representative) investor per fund whose spot price S equals the fund's AUM.

Accounting for these features, Eq. (A2) in Lim, Sensoy, and Weisbach (2016) simplifies to:

$$1 + net_t = \frac{S_{t-1} \times (1 + gross_t) - ifee_t - mfee_t}{S_{t-1}}$$

where, letting c and k denote, respectively, the management and incentive fee rates per period:

[32]Conversely, the estimates of direct incentives account for cross-sectional and time-series heterogeneity in funds' year-to-date performance that is absent in the definition of indirect incentives.

[33]In general, managerial ownership is lower among mutual funds than among hedge even in the U.S. (Ma and Tang, 2019).

- $mfee_t = c \times S_{t-1}$; and
- $ifee_t = \max\left[S_{t-1} \times (1 + gross_t - c) - X_{t-1}, 0\right] \times k$,

for the exercise price X_{t-1} above which performance fees are paid. Depending on the fund's incentive structure, X might reflect an absolute or a relative (with respect to a prespecified benchmark index) performance criterion, each of which in turn can further include a hurdle rate component h. Specifically, for APF funds

$$X_t = S_t(1 + h),$$

whereas for RPF funds

$$X_t = S_t(1 + ret\_bench_{t+1} + h),$$

where ret_bench is the return on the fund's benchmark index.

These expressions allow us to compute the funds' gross returns explicitly, depending on whether:

1. $S_{t-1} \times (1 + gross_t - c) > X_{t-1}$: In this case,

   $$1 + net_t = (1 + gross_t) - k \times (1 + gross_t - c - X_{t-1}/S_{t-1}) - c,$$

   so

   $$gross_t = \frac{net_t + k(1 - X_{t-1}/S_{t-1})}{1 - k} + c \tag{18}$$

   if $net_t > X_{t-1}/S_{t-1} - 1$.

2. $S_{t-1} \times (1 + gross_t - c) \leq X_{t-1}$: In this case,

   $$1 + net_t = (1 + gross_t) - c,$$

   so

   $$gross_t = net_t + c \tag{19}$$

   if $net_t < X_{t-1}/S_{t-1} - 1$.

Thus, whether the condition $net_t > X_{t-1}/S_{t-1} - 1$ is satisfied or not determines whether gross returns are computed following (18) or (19).

C Managerial Skill Measure

We measure managerial skill using the value-added methodology developed by Berk and Van Binsbergen (2015). This approach quantifies the dollar value that fund managers extract from financial markets. For each fund i in quarter t, we first compute per-period value added as:

$$V_{it} = q_{i,t-1} \times (R_{it}^g - R_{it}^B) \tag{20}$$

where $q_{i,t-1}$ is lagged assets under management (AUM), R_{it}^g is the gross return before (managerial and performance) fees, and R_{it}^B is the fund's benchmark return.[34] Accordingly, value added captures

[34] See Appendix B for a description of the methodology we employ to compute performance-fee funds' gross returns.

the dollar outperformance generated by a fund manager relative to a passive benchmark, scaled by invested capital. Berk and Van Binsbergen (2015)'s measure of fund-level skill is the time-series expectation of (20). We allow for time variation in this expectation by computing an expanding window average of value added for each fund:

$$\hat{S}_{it} = \frac{1}{T_{it}} \sum_{\tau=1}^{t} V_{i\tau} \tag{21}$$

where T_{it} is the number of quarters with valid value added data for fund i up to quarter t. This expanding-window estimator uses all available historical information up to time t, thereby avoiding look-ahead bias while allowing the skill measure to evolve as new information accumulates. To account for differences in estimation precision across funds with varying history lengths, we employ the *skill ratio* measure from Berk and Van Binsbergen (2015), defined as:

$$\text{Skill Ratio}_{it} = \frac{\hat{S}_{it}}{\text{SE}(\hat{S}_{it})} = \frac{\hat{S}_{it}}{\sigma_{it}/\sqrt{T_{it}}} \tag{22}$$

where σ_{it} is the expanding-window standard deviation of value added and $\text{SE}(\hat{S}_{it})$ is the standard error of the skill estimate. This ratio is analogous to a t-statistic and provides a standardized measure of skill that is comparable across funds regardless of their track record length.[35] We winsorize the skill ratio at the 1st and 99th percentiles to limit the influence of outliers, and standardize it by its cross-sectional standard deviation to facilitate interpretation of regression coefficients.

[35] Funds with longer histories receive higher skill ratios for the same average performance because we have greater confidence in their skill estimates. This approach prevents spuriously high skill estimates from funds with short track records and substantial sampling variation from dominating our inferences.

Figure 1: Distribution of Fees

This figure shows the distribution of total expense ratios and performance fees of relative performance fee funds (Panel A) and absolute-only performance fee funds (Panel B). The dashed lines represent the commonly used thresholds for performance fees (20%) and total expense ratios (2%) in the hedge fund industry. Observations are at the fund-quarter level, and the size of the points represents the number of observations for each combination of total expense ratio and performance fee. The sample is from 2001Q1 to 2010Q4.

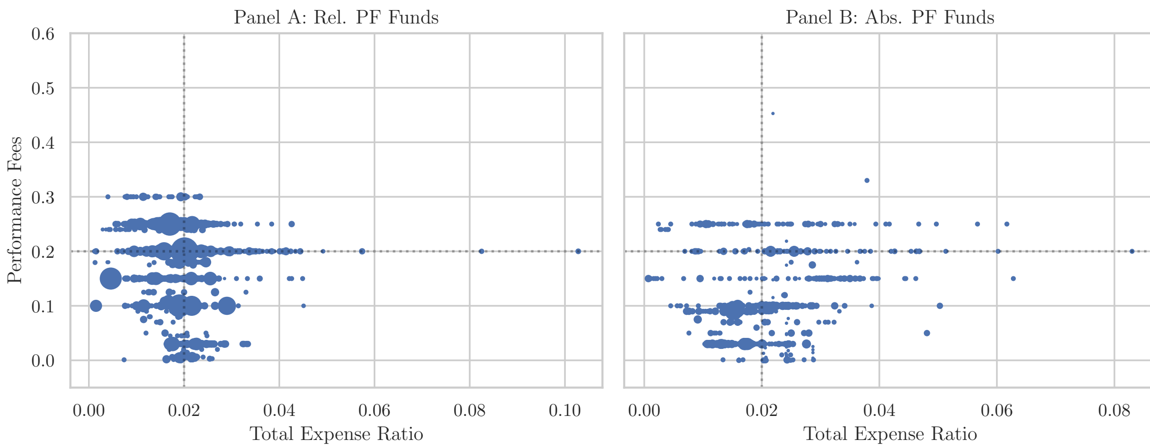


Figure 2: Sample Funds Over Time

This figure shows the total assets under management over time in billions of USD for performance fee funds (Panel A) and non-performance fee funds (Panel B). The sample is from 2000Q1 to 2010Q4 for non-performance fee funds and 2001Q1 to 2010Q4 for performance fee funds.

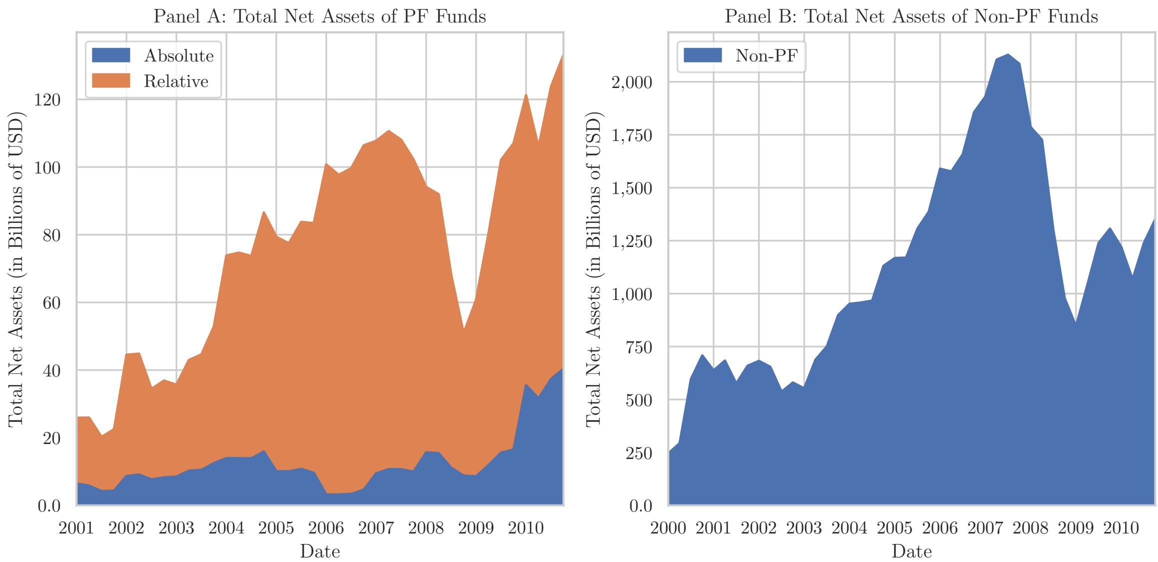
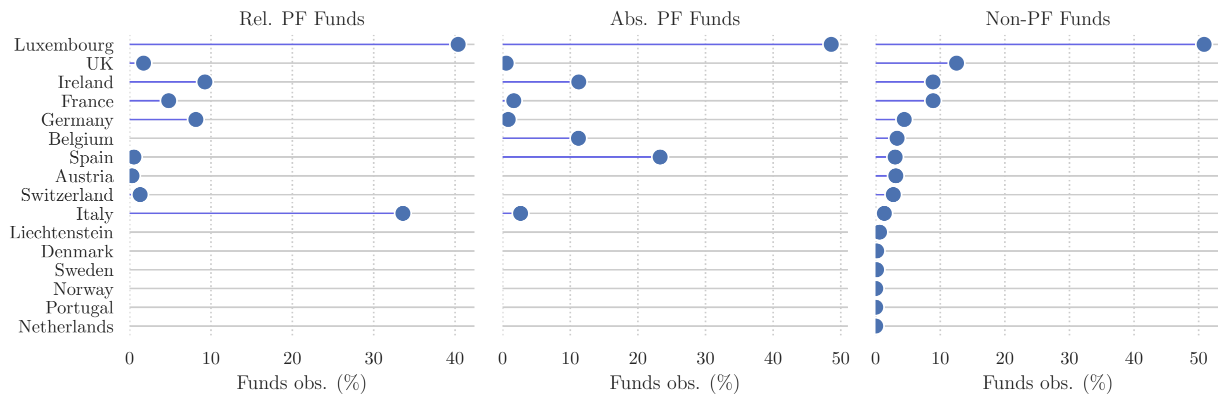


Figure 3: Number of Observations by Country and Category

This figure shows the total number of quarterly fund observations by country of domicile (Panel A) and by fund category (Panel B) for relative performance fee funds, absolute-only performance fee funds, and non-performance fee funds. A missing dot indicates that there are no observations for the corresponding country or category. The sample is from 2000Q1 to 2010Q4 for non-performance fee funds and 2001Q1 to 2010Q4 for performance fee funds.

Panel A: By Country



Panel B: By Fund Category

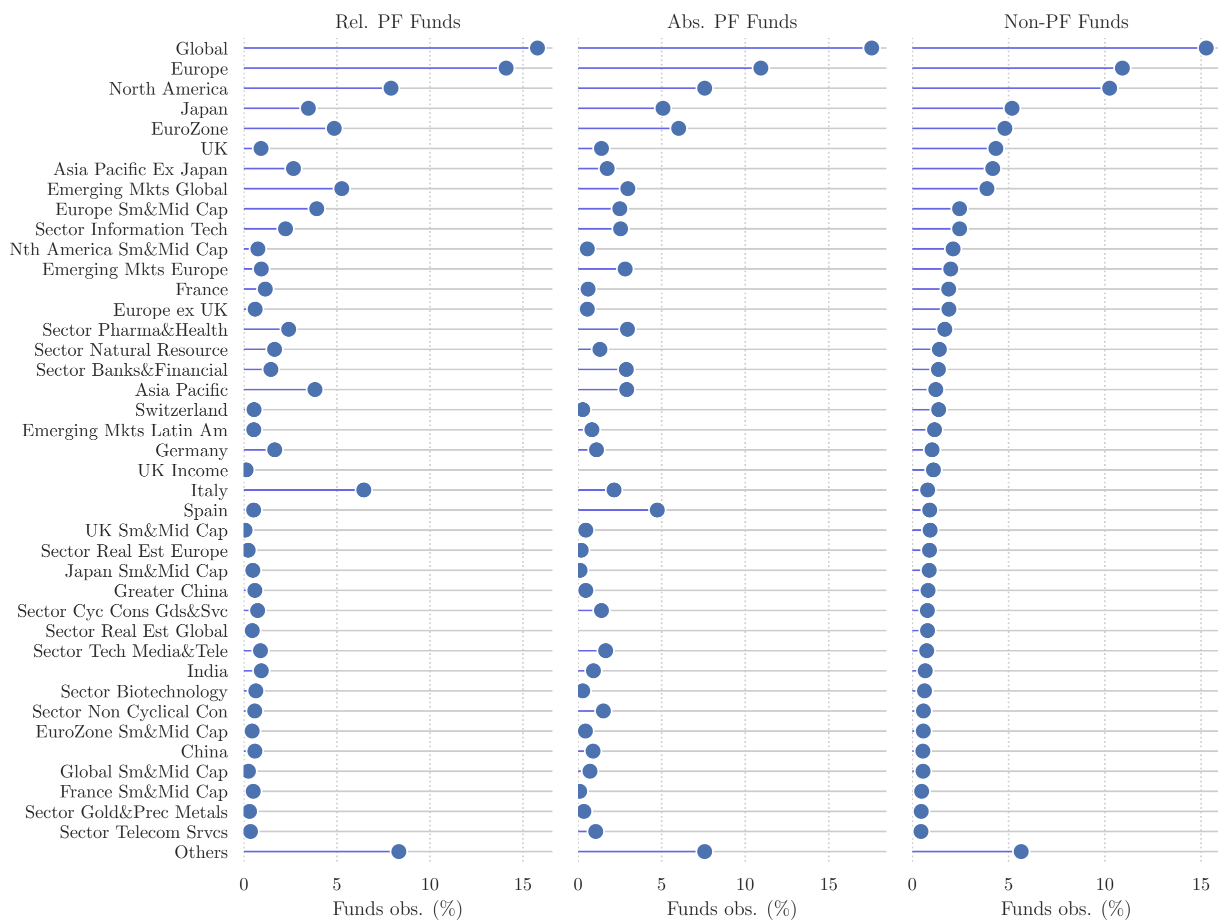


Figure 4: Simulated Incentives: Effect of Benchmark Risk

This figure illustrates the direct incentives (dollar value of expected performance fees per *dollar* increase in AUM over the crystallization period), indirect incentives (present value of fee income over the lifetime of the fund, per dollar of AUM), and the ratio direct/indirect incentives, for a hypothetical performance fee fund. The left (respectively, right) panels plot these quantities as a function of the fund's return volatility (correlation between the fund and its benchmark's returns). The solid red, dashed blue, and dotted black lines correspond to benchmarks with, respectively, high, medium, and low volatility. The remaining parameter values are: $c = 0.019, k = 0.20, h = 0, c_I = 0.14, \tau = 0.5, W_t/Y_t = 0.997, \sigma_W = 0.16$ (rightmost panels), $\rho = 0.8$ (leftmost panels).

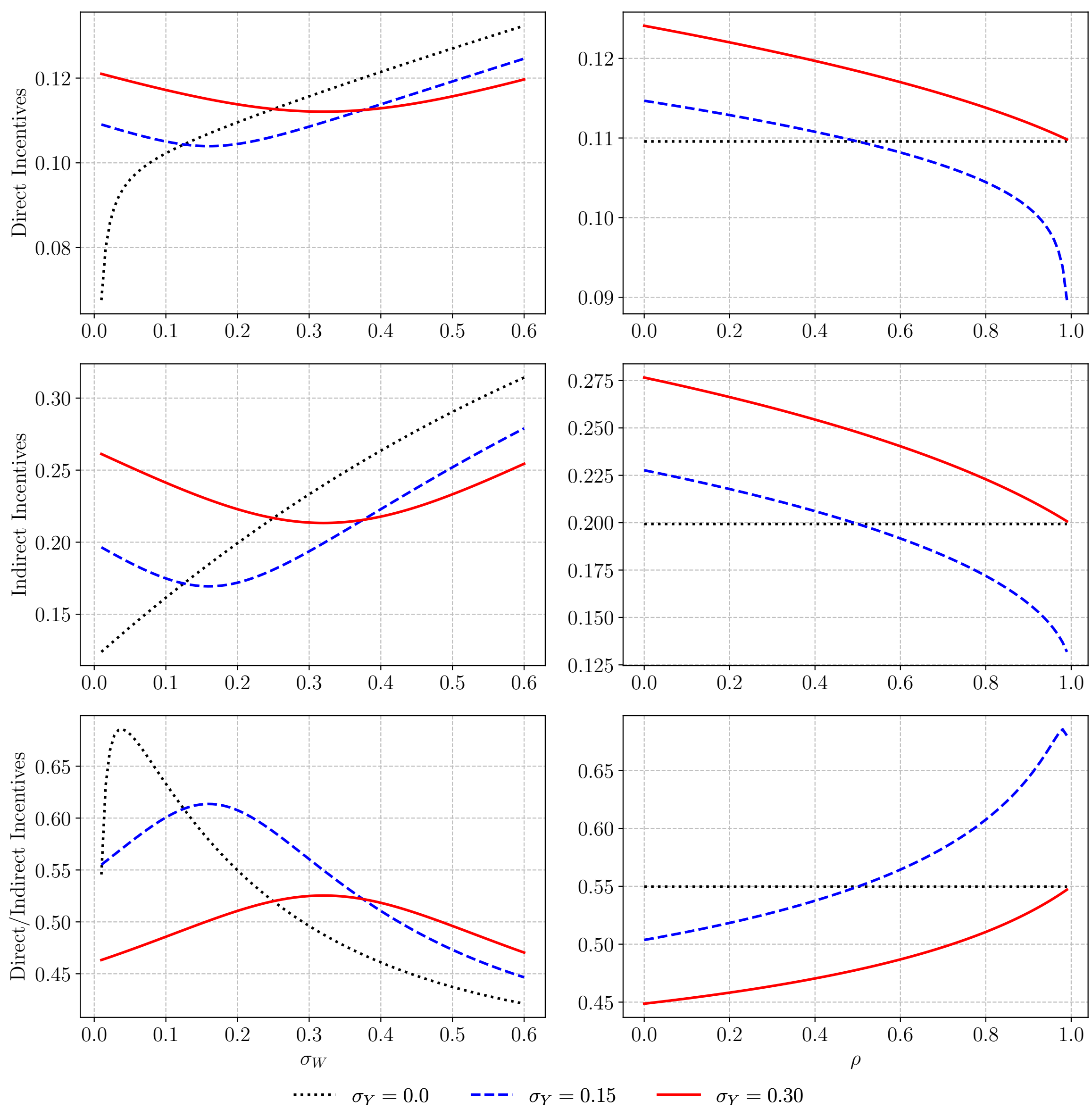


Figure 5: Simulated Incentives: Effect of Interim Relative Performance

This figure illustrates the direct incentives (dollar value of expected performance fees per *dollar* increase in AUM over the crystallization period), indirect incentives (present value of fee income over the lifetime of the fund, per dollar of AUM), and the ratio direct/indirect incentives, for a hypothetical performance fee fund. The left (respectively, right) panels plot these quantities as a function of the fund's return volatility (correlation between the fund and its benchmark's returns). The solid red, dashed blue, and dotted black lines correspond to benchmarks with, respectively, in-the-money, at-the-money, and out-of-the money performance fees. The remaining parameter values are: $c = 0.019, k = 0.20, h = 0, c_I = 0.14, \tau = 0.5, W_t/Y_t = 0.997, \sigma_W = 0.16$ (rightmost panels), $\rho = 0.8$ (leftmost panels).

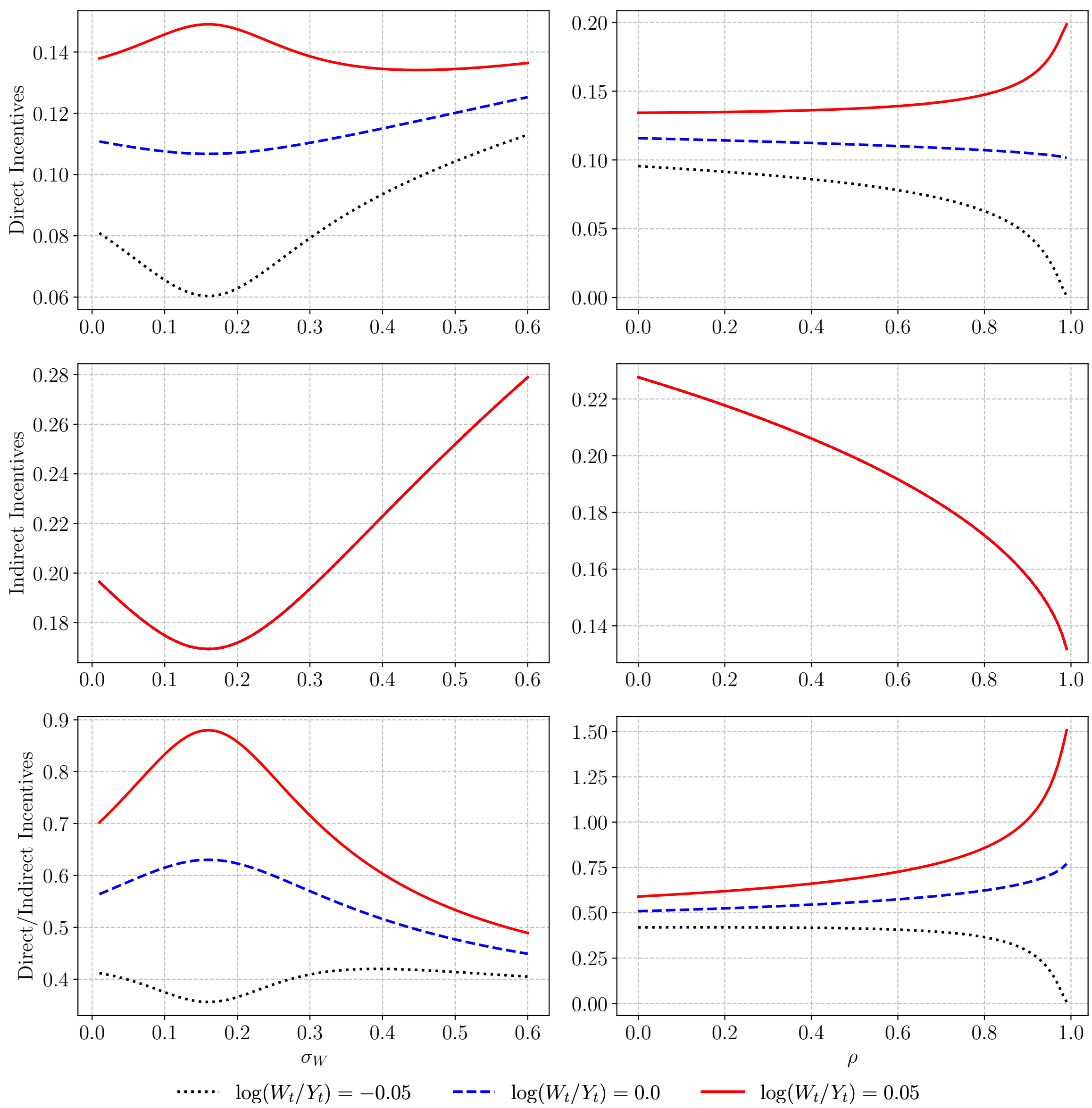


Figure 6: Distribution of Direct and Indirect Incentives

This figure shows the distribution of adjusted direct incentives (Panels A and B) and indirect incentives (Panels C and D) for relative performance fee funds (Panels A and C) and absolute-only performance fee funds (Panels B and D). Observations are at the fund-quarter level, and the size of the points are proportional to the number of observations for each combination of performance fee and incentive. Direct incentives are adjusted for the mechanical effect of performance fees by dividing the direct incentives by the performance fee. Incentives are measured as the benefit to the fund manager per 1$ change in the fund TNA. The sample is from 2001Q1 to 2010Q4.

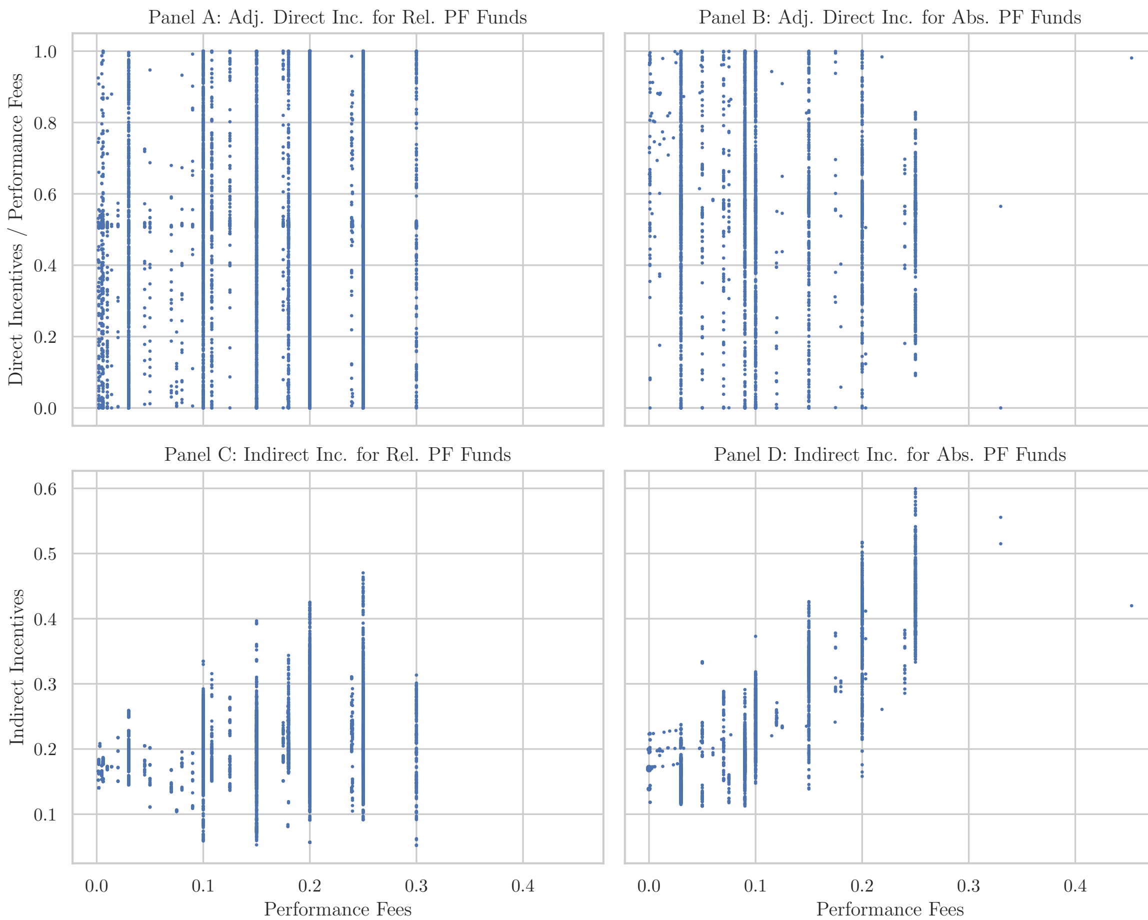


Table 1: Descriptive Statistics

This table reports the descriptive statistics for fund characteristics in Panel A, fund risk in Panel B, and fund performance in Panel C for relative performance-fee funds, absolute performance-fee funds, and non-performance-fee funds. Observations are at the fund-quarter level. The sample spans 2000Q1 to 2010Q4 for non-performance-fee funds and 2001Q1 to 2010Q4 for performance-fee funds.

Panel A: Fund Characteristics

	N. Obs.	Mean	Std. dev.	1%	25%	Median	75%	99%
Fund Age								
Rel. PF Funds	13,594	7.451	5.090	0.6667	3.500	6.500	10.17	21.17
Abs. PF Funds	4,371	6.008	3.804	0.9167	3.167	5.167	8.167	19.75
Non-PF Funds	352,326	7.009	7.021	0.3333	2.333	4.917	9.167	36.50
Fund TNA								
Rel. PF Funds	13,594	186.8	340.9	0.0993	15.85	61.64	202.8	1,720.8
Abs. PF Funds	4,371	114.0	429.8	0.0500	8.085	26.61	83.81	1,285.6
Non-PF Funds	352,326	138.5	473.6	0.0100	5.590	26.14	99.01	1,850.5
Fund Family TNA								
Rel. PF Funds	13,594	8,362.1	11,862.8	10.80	430.9	3,294.3	11,981.0	52,192.2
Abs. PF Funds	4,371	5,570.1	6,782.2	6.845	237.3	2,920.7	9,026.0	25,403.6
Non-PF Funds	352,326	11,129.9	15,646.0	13.00	937.4	4,856.6	14,468.1	71,590.0
Total Expense Ratio								
Rel. PF Funds	13,594	1.88%	0.60%	0.46%	1.58%	1.90%	2.16%	3.62%
Abs. PF Funds	4,371	1.94%	0.82%	0.30%	1.49%	1.74%	2.35%	4.72%
Non-PF Funds	352,326	1.77%	0.74%	0.10%	1.35%	1.75%	2.12%	3.68%
Flows								
Rel. PF Funds	13,472	4.77%	51.93%	-54.55%	-7.04%	-1.87%	3.67%	186.89%
Abs. PF Funds	4,325	4.48%	47.67%	-55.34%	-6.64%	-0.88%	4.60%	171.80%
Non-PF Funds	335,350	9.41%	61.79%	-65.15%	-6.23%	-0.71%	6.12%	316.48%
Category Flow								
Rel. PF Funds	13,594	-0.42%	5.74%	-13.03%	-3.01%	-0.63%	1.69%	20.05%
Abs. PF Funds	4,371	-0.01%	6.49%	-12.56%	-2.75%	-0.40%	1.76%	21.59%
Non-PF Funds	352,283	0.09%	5.86%	-12.36%	-2.48%	-0.26%	2.06%	19.86%
Performance Fee								
Rel. PF Funds	13,594	18.05%	7.12%	0.48%	15.00%	20.00%	25.00%	30.00%
Abs. PF Funds	4,371	10.76%	7.20%	0.05%	3.00%	9.00%	15.00%	25.00%
Hurdle Rate								
Rel. PF Funds	5,410	0.64%	1.81%	0.00%	0.00%	0.00%	0.00%	8.16%
Abs. PF Funds	1,612	1.69%	3.24%	0.00%	0.00%	0.00%	0.00%	10.00%
Non-PF Funds	32	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Table 1: Descriptive Statistics (continued)

Panel B: Fund Risk								
	N. Obs.	Mean	Std. dev.	1%	25%	Median	75%	99%
Tracking Error Vol.								
Rel. PF Funds	12,027	0.0674	0.0440	0.0153	0.0386	0.0557	0.0838	0.2340
Abs. PF Funds	3,873	0.0809	0.0480	0.0145	0.0470	0.0692	0.1025	0.2420
Non-PF Funds	271,448	0.0739	0.0554	0.0139	0.0429	0.0613	0.0897	0.2632
Benchmark β								
Rel. PF Funds	12,027	0.9404	0.3620	0.5150	0.8568	0.9405	1.022	1.440
Abs. PF Funds	3,873	0.9226	0.8520	0.3594	0.8632	0.9553	1.034	1.488
Non-PF Funds	271,448	0.9783	0.3566	0.4416	0.8975	0.9833	1.062	1.528
Benchmark Idio. Vol.								
Rel. PF Funds	12,003	0.0598	0.0400	0.0143	0.0323	0.0485	0.0763	0.2209
Abs. PF Funds	3,855	0.0729	0.0424	0.0111	0.0438	0.0635	0.0911	0.2134
Non-PF Funds	268,328	0.0672	0.0435	0.0133	0.0403	0.0566	0.0818	0.2338

Panel C: Fund Performance								
	N. Obs.	Mean	Std. dev.	1%	25%	Median	75%	99%
Bench.-Adj. Returns								
Rel. PF Funds	13,385	-0.28%	3.53%	-9.88%	-1.99%	-0.45%	1.36%	9.76%
Abs. PF Funds	4,256	-0.28%	4.16%	-11.17%	-2.06%	-0.53%	1.20%	12.71%
Non-PF Funds	344,195	-0.25%	3.82%	-11.45%	-1.89%	-0.30%	1.38%	10.70%
Benchmark-Adj. α								
Rel. PF Funds	11,851	-0.18%	3.04%	-8.31%	-1.70%	-0.31%	1.26%	8.90%
Abs. PF Funds	3,769	-0.19%	3.62%	-9.58%	-1.79%	-0.42%	1.29%	10.56%
Non-PF Funds	268,324	-0.15%	3.32%	-9.69%	-1.75%	-0.21%	1.42%	9.33%
Information Ratio								
Rel. PF Funds	11,827	-0.0676	0.5021	-1.260	-0.3895	-0.0689	0.2427	1.182
Abs. PF Funds	3,751	-0.0566	0.4563	-1.222	-0.3194	-0.0816	0.2156	1.102
Non-PF Funds	265,247	-0.0396	0.4788	-1.236	-0.3299	-0.0425	0.2477	1.188

Table 2: Fee Structure - Number of Funds and Annual Transitions

This table reports the number of funds for each fee structure at the end of the year in Panel A and annual transitions of the fee structure choice in Panel B. In Panel B, annual columns are labeled as the "current year" of the transition, i.e., the column labeled 2000 corresponds to the transitions of funds from the current fee structure in year 2000 to the next fee structure in year 2001. Dropped indicates funds that have dropped out of the sample. The sample is from 2000Q4 to 2010Q1 and includes all funds with data in Q4 of the current year and Q1 of the following year. The data on the performance fee structure begins in 2001.

Panel A: Number of Funds

Structure	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Perf. (Relative)	0	68	168	191	277	251	286	442	498	602	571
Perf. (Absolute)	0	47	122	132	118	81	60	90	79	86	230
Non-perf.	3,374	4,626	5,838	7,185	8,259	9,122	10,231	10,895	11,946	10,725	9,483

Panel B: Transitions

Current	Next	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Perf. (Relative)	Perf. (Relative)	0	61	166	180	251	174	256	314	376	423
	Perf. (Absolute)	0	4	0	4	0	0	2	2	0	27
	Non-perf.	0	2	2	7	23	52	24	94	65	66
	Dropped	0	1	0	0	3	25	4	32	57	86
Perf. (Absolute)	Perf. (Relative)	0	2	0	3	0	31	0	1	3	0
	Perf. (Absolute)	0	38	122	113	93	38	57	41	58	55
	Non-perf.	0	3	0	16	23	12	2	24	7	1
	Dropped	0	4	0	0	2	0	1	24	11	30
Non-perf.	Perf. (Relative)	123	84	19	73	16	92	209	123	237	123
	Perf. (Absolute)	64	64	4	14	7	17	44	26	21	158
	Non-perf.	3,158	4,452	5,796	7,018	8,061	8,842	9,569	10,401	10,879	9,365
	Dropped	29	26	19	80	175	171	409	345	809	1,079

Table 3: Flow-Performance Relationship

This table reports coefficient estimates from a regression of fund flows on lagged fund performance. The dependent variable is flows of fund i in quarter t relative to beginning of quarter total net assets. Exogenous variables are the fund's performance in quarter $t-1$ proxied by net returns, the log of the fund's age, the log of the fund's family size at the beginning of the quarter, the fund's TER in the previous quarter, the fund's performance fee in the previous quarter, and interactions of these fund characteristics with the fund's past performance. Columns (5)-(6) and (9)-(10) include $\mathbb{1}_{RelPerf}$, which is an indicator variable that equals one if the fund is a relative PF fund and zero otherwise. We include as controls the log of the fund's TNA at the beginning of the quarter, the lagged standard deviation of monthly fund returns using a 36-month window, contemporaneous category flows, a dummy variable equal to one if the fund has a clawback mechanism, a dummy variable equal to one if the fund has a fee cap, and a dummy variable equal to one if the fund has a hurdle rate. Fund flows and returns are winsorized at the top and bottom 1% quarterly. Category flows are computed as the value-weighted average winsorized flows within each category. Returns are winsorized at the top and bottom 1% quarterly within fund fee structure groups. Flows, returns, and sizes are in USD. Regressions include investment category and quarter fixed effects. T-statistics clustered by fund and quarter are in parentheses. $^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$. Columns (1) and (2) relate to relative PF funds, columns (3) and (4) relate to absolute PF funds, columns (5) and (6) relate to PF funds, columns (7) and (8) relate to NPF funds, and columns (9) and (10) relate to relative PF funds and NPF funds. The sample is from 2001Q1 to 2010Q4 in columns (1) to (6) and from and from 2000Q1 to 2010Q4 in columns (6) to (10). Observations are at the fund-quarter level.

	Rel. PF Funds		Abs. PF Funds		PF Funds		Non-PF Funds		Non-PF and Rel. PF Funds	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Ret_{t-1}	0.432***	0.854***	0.311**	0.658*	0.795***	0.908	0.407***	0.345***	0.366***	0.353***
	(7.40)	(5.03)	(2.27)	(1.77)	(4.63)	(1.55)	(6.86)	(2.87)	(3.18)	(2.95)
Ret_{t-1} × Log(1+Age)		-0.073		-0.300	-0.104	-0.275		-0.239***	-0.236***	-0.239***
		(-1.22)		(-1.08)	(-1.16)	(-0.92)		(-3.48)	(-3.43)	(-3.47)
Ret_{t-1} × Log(Family Size)$_{t-1}$		-0.020		0.028	-0.011	0.009		0.037***	0.034***	0.036***
		(-0.85)		(0.46)	(-0.31)	(0.17)		(4.42)	(4.27)	(4.37)
Ret_{t-1} × TER_{t-1}		-0.038**		-0.261***	-0.078***	-0.266***		0.117***	0.114***	0.117***
		(-2.09)		(-2.70)	(-3.51)	(-2.62)		(3.39)	(3.38)	(3.36)
Ret_{t-1} × Perf. Fee_{t-1}		-0.246		4.774***	0.573	4.750***			-0.265	-0.457
		(-0.62)		(3.25)	(1.58)	(4.30)			(-0.66)	(-1.09)
$\mathbb{1}_{RelPerf}$					0.002	0.075			-0.006	-0.047
					(0.15)	(1.07)			(-0.74)	(-1.05)
Ret_{t-1} × $\mathbb{1}_{RelPerf}$					-0.101	-0.119			-0.018	0.375***
					(-0.83)	(-0.22)			(-0.24)	(3.12)
Ret_{t-1}× Log(1+Age) ×$\mathbb{1}_{RelPerf}$						0.197				0.138**
						(0.75)				(2.11)
Ret_{t-1}× Log(Family Size)$_{t-1}$ × $\mathbb{1}_{RelPerf}$						-0.028				-0.047**
						(-0.82)				(-1.98)
Ret_{t-1}× TER_{t-1} × $\mathbb{1}_{RelPerf}$						0.232**				-0.145***
						(2.28)				(-2.91)
Ret_{t-1}× Perf. Fee_{t-1} × $\mathbb{1}_{RelPerf}$						-4.977***				
						(-3.71)				
Log(1+Age) ×$\mathbb{1}_{RelPerf}$						-0.024				0.044*
						(-0.57)				(1.83)
Log(Family Size)$_{t-1}$ × $\mathbb{1}_{RelPerf}$						-0.004				-0.008***
						(-0.84)				(-3.78)
TER_{t-1} × $\mathbb{1}_{RelPerf}$						0.024				0.008
						(1.38)				(0.62)
Perf. Fee_{t-1} × $\mathbb{1}_{RelPerf}$						-0.357**				
						(-2.49)				
Log(1+Age)$_t$	-0.076**	-0.075**	-0.053*	-0.050**	-0.072***	-0.052**	-0.126***	-0.123***	-0.122***	-0.123***
	(-2.33)	(-2.32)	(-1.89)	(-1.98)	(-3.19)	(-2.34)	(-13.69)	(-20.12)	(-19.71)	(-20.14)
Log(Family Size)$_{t-1}$	0.013***	0.014***	0.018**	0.018**	0.014***	0.017***	0.018***	0.018***	0.017***	0.018***
	(4.15)	(3.85)	(2.28)	(2.29)	(4.60)	(3.56)	(10.28)	(11.76)	(11.99)	(12.15)
TER_{t-1}	0.014	0.015	-0.016*	-0.013	0.009**	-0.007	0.008	0.006	0.006	0.006
	(1.55)	(1.64)	(-1.68)	(-1.64)	(2.03)	(-0.76)	(1.08)	(1.02)	(1.14)	(1.03)
Perf. Fee_{t-1}	-0.171***	-0.162***	0.181	0.135	-0.102*	0.199			-0.129***	-0.122***
	(-3.60)	(-3.13)	(1.54)	(1.08)	(-1.75)	(1.47)			(-3.42)	(-3.47)
Log(Size)$_{t-1}$	-0.012*	-0.012*	-0.014*	-0.014*	-0.010***	-0.011***	-0.004**	-0.004**	-0.004**	-0.004**
	(-1.75)	(-1.79)	(-1.68)	(-1.72)	(-3.54)	(-3.04)	(-2.26)	(-2.33)	(-2.42)	(-2.50)
Std. Dev.$_{t-1}$	0.015	0.012	0.189	0.176	0.060	0.076	-0.098***	-0.089**	-0.087**	-0.082**
	(0.11)	(0.09)	(1.52)	(1.40)	(0.88)	(0.80)	(-2.76)	(-2.51)	(-2.52)	(-2.30)
Category $Flow_t$	0.924***	0.925***	0.648**	0.666**	0.824***	0.826***	0.988***	0.975***	0.973***	0.973***
	(3.62)	(3.63)	(2.44)	(2.52)	(3.44)	(3.44)	(28.63)	(27.42)	(31.22)	(31.07)
Perf. Char. Dummies	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes
R^2	0.022	0.022	0.015	0.022	0.020	0.023	0.032	0.033	0.033	0.033
N	11,304	11,304	3,531	3,531	14,835	14,835	278,989	278,989	290,293	290,293

Table 4: Direct and Indirect Pay for Performance

This table reports average incentives by fund type and various fund distribution rates c_I. The first five columns report the average incentives per 1$ change in the funds TNA. The last five columns report the average incentives per 1% change in the fund TNA, based on USD values. Columns of differences compare the preceding column with relative performance fee funds using panel regressions that include investment category and quarter fixed effects. T-statistics are in parentheses. T-statistics in column (1) are clustered by fund and quarter. $^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$. Incentives per 1% change in the funds TNA are computed following equations (13) for direct incentives, (14) for indirect incentives, (16) times fund's TNA for indirect incentives attributable to management fees, and (17) times fund's TNA for indirect incentives attributable to performance fees. Incentives per 1$ change in fund TNA are computed following equations (12) for direct incentives, (15) for indirect incentives, (16) for indirect incentives attributable to management fees, and (17) for indirect incentives attributable to performance fees. The sample is from 2000Q1 to 2010Q4 for non-PF funds and from 2001Q1 to 2010Q4 for relative and absolute PF funds.

	Per 1$ change					Per 1% change				
	Rel. PF	Abs. PF	Diff.	Non-PF	Diff.	Rel. PF	Abs. PF	Diff.	Non-PF	Diff.
				$c_I = 5\%$						
Direct Incentives	0.085	0.058	-0.024***			0.184	0.062	-0.110***		
Indirect Incentives	0.333	0.384	0.053	0.254	-0.076***	0.649	0.453	-0.137	0.382	-0.306***
Indirect Incentives (Perf. Fee)	0.086	0.159	0.069			0.153	0.187	0.042		
Indirect Incentives (Mgmt. Fees)	0.247	0.225	-0.017	0.254	0.010**	0.496	0.266	-0.179***	0.382	-0.152***
Indirect/Direct	3.923	6.652				3.529	7.351			
				$c_I = 10\%$						
Direct Incentives	0.085	0.058	-0.024***			0.184	0.062	-0.110***		
Indirect Incentives	0.202	0.245	0.045	0.148	-0.052***	0.388	0.285	-0.067	0.218	-0.191***
Indirect Incentives (Perf. Fee)	0.053	0.105	0.051			0.092	0.123	0.036		
Indirect Incentives (Mgmt. Fees)	0.149	0.140	-0.006	0.148	0.000	0.296	0.162	-0.103**	0.218	-0.098***
Indirect/Direct	2.374	4.252				2.109	4.627			
				$c_I = 15\%$						
Direct Incentives	0.085	0.058	-0.024***			0.184	0.062	-0.110***		
Indirect Incentives	0.145	0.181	0.037	0.104	-0.039***	0.277	0.209	-0.042	0.153	-0.139***
Indirect Incentives (Perf. Fee)	0.038	0.079	0.040			0.066	0.092	0.029		
Indirect Incentives (Mgmt. Fees)	0.107	0.102	-0.002	0.104	-0.001	0.211	0.117	-0.072**	0.153	-0.072***
Indirect/Direct	1.704	3.141				1.505	3.391			

Table 5: Direct and Indirect Pay for Performance by Benchmark Volatility Quintile

This table reports average incentives per 1$ change in the funds TNA by fund type and fund benchmark volatility quintiles, as estimated from monthly returns using the previous 36 months. Incentives per 1$ change in fund TNA are computed following equations (12) for direct incentives, (15) for indirect incentives, (16) for indirect incentives attributable to management fees, and (17) for indirect incentives attributable to performance fees. Fund benchmark volatility quintiles are computed on a quarterly basis from the full sample of funds. The average incentives for each quintile is the time series mean of equal-weighted quarterly means. Statistical significance of differences is assessed using a t-test for the null hypothesis that the average difference between quarterly means is zero. *$p < 0.1$, **$p < 0.05$, ***$p < 0.01$. The sample is from 2000Q1 to 2010Q4 for non-PF funds and from 2001Q1 to 2010Q4 for relative and absolute PF funds.

Bench. Vol.	1	2	3	4	5	5 - 1
Direct Incentives						
Rel. PF Funds	0.072	0.078	0.085	0.090	0.087	0.016***
Abs. PF Funds	0.048	0.047	0.049	0.049	0.062	0.013***
Abs. PF - Rel. PF	-0.023***	-0.031***	-0.036***	-0.041***	-0.026***	-0.002
Indirect Incentives						
Rel. PF Funds	0.199	0.199	0.197	0.198	0.232	0.033***
Abs. PF Funds	0.211	0.210	0.212	0.221	0.259	0.048***
Abs. PF - Rel. PF	0.012*	0.011	0.015	0.023**	0.028*	0.016**
Non-PF Funds	0.144	0.142	0.143	0.147	0.159	0.015***
Non-PF - Rel. PF	-0.055***	-0.057***	-0.053***	-0.051***	-0.072***	-0.017***
Indirect Incentives (Perf. Fee)						
Rel. PF Funds	0.047	0.048	0.050	0.053	0.088	0.040***
Abs. PF Funds	0.063	0.067	0.072	0.081	0.113	0.050***
Abs. PF - Rel. PF	0.016**	0.018**	0.022**	0.029***	0.025	0.010
Indirect Incentives (Mgmt. Fees)						
Rel. PF Funds	0.151	0.151	0.146	0.145	0.144	-0.007***
Abs. PF Funds	0.148	0.144	0.139	0.140	0.146	-0.001
Abs. PF - Rel. PF	-0.004	-0.007**	-0.007**	-0.006***	0.003	0.006*
Indirect/Direct						
Rel. PF Funds	2.773	2.537	2.311	2.206	2.652	
Abs. PF Funds	4.350	4.464	4.339	4.508	4.197	

Table 6: Direct and Indirect Pay for Performance by Fund TER Quintile

This table reports average incentives by fund type and fund total expense ratio quintiles per 1$ change in the funds TNA, based on USD values. Incentives per 1$ change in fund TNA are computed following equations (12) for direct incentives, (15) for indirect incentives, (16) for indirect incentives attributable to management fees, and (17) for indirect incentives attributable to performance fees. Fund TER quintiles are computed on a quarterly basis from the full sample of funds. The average incentives for each quintile is the time series mean of equal-weighted quarterly means. Statistical significance of differences is assessed using a t-test for the null hypothesis that the average difference between quarterly means is zero. $*p < 0.1$, $**p < 0.05$, $***p < 0.01$. The sample is from 2000Q1 to 2010Q4 for non-PF funds and from 2001Q1 to 2010Q4 for relative and absolute PF funds.

TER	1	2	3	4	5	5 - 1
Direct Incentives						
Rel. PF Funds	0.100	0.095	0.086	0.075	0.076	-0.024***
Abs. PF Funds	0.052	0.049	0.045	0.058	0.060	0.009*
Abs. PF - Rel. PF	-0.048***	-0.046***	-0.042***	-0.017	-0.015***	0.033***
Indirect Incentives						
Rel. PF Funds	0.149	0.180	0.203	0.207	0.256	0.106***
Abs. PF Funds	0.177	0.195	0.212	0.239	0.290	0.113***
Abs. PF - Rel. PF	0.027**	0.014**	0.009	0.032	0.034***	0.007
Non-PF Funds	0.080	0.128	0.149	0.170	0.214	0.134***
Non-PF - Rel. PF	-0.070***	-0.052***	-0.054***	-0.037***	-0.042***	0.028***
Indirect Incentives (Perf. Fee)						
Rel. PF Funds	0.064	0.059	0.064	0.044	0.059	-0.005
Abs. PF Funds	0.092	0.075	0.074	0.080	0.089	-0.002
Abs. PF - Rel. PF	0.027**	0.016**	0.010	0.036	0.030***	0.003
Indirect Incentives (Mgmt. Fees)						
Rel. PF Funds	0.085	0.121	0.139	0.163	0.197	0.112***
Abs. PF Funds	0.085	0.120	0.138	0.159	0.201	0.116***
Abs. PF - Rel. PF	-0.000	-0.001	-0.002	-0.004	0.004	0.004
Indirect/Direct						
Rel. PF Funds	1.494	1.899	2.359	2.777	3.383	
Abs. PF Funds	3.407	4.001	4.749	4.134	4.801	

Table 7: Change in Tracking Error in Response to Incentives

This table reports coefficient estimates from a regression of fund risk-shifting on lagged incentives. The dependent variable is the change in the tracking error of fund i in quarter t. The tracking error is estimated over the past 36-month of monthly return over benchmark returns in USD. As a benchmark, columns (1) and (4) include the fund's lagged performance fee as the main exogenous variable with controls. The other columns include direct incentives, indirect incentives, or the two components of indirect incentives separately, and controls. Controls include the log of the fund's age, the log of the fund's TNA at the beginning of the quarter, the log of the fund's family size at the beginning of the quarter, the fund's TER in the previous quarter, and contemporaneous category flows. Regressions include investment category and quarter fixed effects. Changes in tracking errors are winsorized at the top and bottom 1% quarterly within fund fee structure groups. Returns and sizes are in USD. T-statistics clustered by fund and quarter are in parentheses. *$p < 0.1$, **$p < 0.05$, ***$p < 0.01$. Columns (1) to (3) contain relative PF funds, columns (4) to (6) contain absolute PF funds, and column (7) contains non-PF funds. The sample is from 2001Q1 to 2010Q4 in columns (1)-(6) and from 2000Q1 to 2010Q4 in column (7). Observations are at the fund-quarter level.

	Rel. PF Funds			Abs. PF Funds			Non-PF Funds
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Perf. Fee_{t-1}	0.002			-0.006*			
	(1.37)			(-1.78)			
DirectInc_{t-1}		0.029***	0.027***		-0.018	-0.007	
		(3.57)	(3.83)		(-1.18)	(-0.35)	
IndirectInc_{t-1}		-0.016			-0.004*		-0.002
		(-1.43)			(-1.88)		(-0.59)
IndIncMgmt_{t-1}			0.079***			0.023	
			(2.90)			(1.26)	
IndIncPerf_{t-1}			0.000			-0.006*	
			(0.03)			(-1.84)	
$\text{DirectInc}_{t-1} \times \text{IndirectInc}_{t-1}$		-0.119***			0.038		
		(-3.58)			(0.92)		
$\text{DirectInc}_{t-1} \times \text{IndIncMgmt}_{t-1}$			-0.085***			-0.035	
			(-3.49)			(-0.31)	
$\text{DirectInc}_{t-1} \times \text{IndIncPerf}_{t-1}$			-0.161**			0.068*	
			(-2.36)			(1.73)	
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.005	0.019	0.024	0.006	0.006	0.008	0.001
N	10,954	11,362	11,362	3,434	3,541	3,541	242,882

Table 8: Change in Benchmark Beta and Idiosyncratic Volatility in Response to Incentives

This table reports coefficient estimates from a regression of fund risk-shifting of fund i in quarter t on lagged incentives for relative PF funds. The dependent variables are the change in benchmark β in columns (1) to (3) and the change in benchmark idiosyncratic volatility in columns (4) to (6). The benchmark beta is estimated over the past 36-month of monthly return over benchmark returns in USD. The benchmark idiosyncratic volatility is estimated over the past 36-month of monthly return over benchmark returns in USD. As a benchmark, columns (1) and (4) include the fund's lagged performance fee as the main exogenous variable with controls. The other columns include direct incentives, indirect incentives, or the two components of indirect incentives separately, and controls. Controls include the log of the fund's age, the log of the fund's TNA at the beginning of the quarter, the log of the fund's family size at the beginning of the quarter, the fund's TER in the previous quarter, and contemporaneous category flows. Regressions include investment category and quarter fixed effects. Changes in fund βs and idiosyncratic volatility are winsorized at the top and bottom 1% quarterly within relative PF funds. Returns and sizes are in USD. T-statistics clustered by fund and quarter are in parentheses. *$p < 0.1$, **$p < 0.05$, ***$p < 0.01$. The sample is from 2001Q1 to 2010Q4. Observations are at the fund-quarter level.

	ΔBenchmark β			ΔBenchmark Idio. Vol.		
	(1)	(2)	(3)	(4)	(5)	(6)
Perf. Fee$_{t-1}$	0.006			0.001		
	(0.51)			(0.93)		
DirectInc$_{t-1}$		0.015	-0.029		0.025***	0.024***
		(0.26)	(-0.50)		(2.65)	(2.92)
IndirectInc$_{t-1}$		-0.020			-0.010	
		(-0.46)			(-1.15)	
IndIncMgmt$_{t-1}$			0.067			0.057**
			(0.59)			(2.33)
IndIncPerf$_{t-1}$			0.026			0.002
			(0.70)			(0.14)
DirectInc$_{t-1}\times$ IndirectInc$_{t-1}$		0.082			-0.112***	
		(0.22)			(-2.83)	
DirectInc$_{t-1}\times$ IndIncMgmt$_{t-1}$			0.489			-0.089***
			(1.15)			(-3.19)
DirectInc$_{t-1}\times$ IndIncPerf$_{t-1}$			-0.253			-0.140**
			(-0.81)			(-2.14)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.001	0.003	0.004	0.003	0.013	0.016
N	10,954	11,362	11,362	10,931	11,362	11,362

Table 9: Relationship Between Performance and Incentives

This table reports coefficient estimates from a regression of fund performance of fund i in quarter t on lagged incentives for relative PF funds. The performance measure is the benchmark-adjusted returns in columns (1) to (3), the benchmark alpha in columns (4) to (6), and the information ratio in columns (7) to (9). As a benchmark, columns (1), (4), and (7) include the fund's lagged performance fee as the main exogenous variable with controls. The other columns include direct incentives, indirect incentives, or the two components of indirect incentives separately, and controls. Controls include the log of the fund's age, the log of the fund's TNA at the beginning of the quarter, the log of the fund's family size at the beginning of the quarter, the fund's TER in the previous quarter, and contemporaneous category flows. Regressions include investment category and quarter fixed effects. Returns are winsorized at the top and bottom 1% quarterly within fund fee structure groups. Returns and sizes are in USD. T-statistics clustered by fund and quarter are in parentheses. $^*p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$. The sample is from 2001Q1 to 2010Q4. Observations are at the fund-quarter level.

	Bench.-adj. Ret.			Bench. α			Information Ratio		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Perf. Fee_{t-1}	0.001			0.001			0.219		
	(0.15)			(0.08)			(1.24)		
DirectInc_{t-1}		-0.019	0.005		-0.002	0.000		0.723	0.310
		(-0.35)	(0.09)		(-0.04)	(0.01)		(1.10)	(0.46)
IndirectInc_{t-1}		-0.020			0.022			1.026**	
		(-0.57)			(1.06)			(2.26)	
IndIncMgmt_{t-1}			-0.159			-0.091			-4.059***
			(-1.14)			(-0.69)			(-2.60)
IndIncPerf_{t-1}			-0.059			0.003			0.546
			(-1.52)			(0.10)			(1.52)
$\text{DirectInc}_{t-1}\times$ IndirectInc_{t-1}		0.256			0.005			-2.774	
		(1.21)			(0.02)			(-0.97)	
$\text{DirectInc}_{t-1}\times$ IndIncMgmt_{t-1}			0.015			-0.030			0.282
			(0.06)			(-0.13)			(0.08)
$\text{DirectInc}_{t-1}\times$ IndIncPerf_{t-1}			0.469*			0.049			-4.466*
			(1.76)			(0.22)			(-1.77)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.007	0.010	0.011	0.004	0.004	0.004	0.006	0.009	0.011
N	12,332	11,361	11,361	11,152	11,361	11,361	11,129	11,361	11,361

Table 10: Direct Pay for Performance and Flow-Performance Sensitivity

This table reports regressions of performance fee characteristics on the flow-performance sensitivity and other fund characteristics. Columns (1) and (2) present the results of probit regressions with PF indicators as the dependent variable. The indicator in column (1) equals one if the fund is a PF fund and zero otherwise. The indicator in column (3) equals one if the fund is a relative PF fund and zero otherwise. Columns (3) and (4) present the results of a panel OLS regression with the level of performance fee as the dependent variable. In columns (1), (2), and (4), the, F-P sensitivity estimated without using the performance fee interaction by using columns (2), (5), and (8) of Table OA.2. In column (3), it is estimated from the full interaction terms in columns (3), (6), and (8). The sample in column (1) is the full sample and includes all PF funds in columns (1), (2) and (4) The Wald test row reports the test statistic and p-value (in parentheses) for the null hypothesis that $\beta_1 + \beta_2 = 0$, where β_1 is the coefficient on F-P sensitivity and β_2 is the coefficient on the interaction term F-P sensitivity $\times \mathbb{1}_{\text{Rel Perf}}$. This tests whether the net effect of flow-performance sensitivity on performance fees is statistically different from zero for relative performance fee (RPF) funds. The Wald test is reported for columns (3) and (4) where the interaction model is estimated. Panel regressions in columns (3) and (4) include country, investment category, and quarter fixed effects. T-statistics are in parentheses for all estimates except for the Wald test, where p-values are reported in parentheses. T-statistics in columns (3) and (4) are clustered by fund and year. $^*p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$. The sample is from 2000Q1 to 2010Q4 for non-PF funds and from 2001Q1 to 2010Q4 for relative and absolute PF funds.

	Fee Structure		Perf. Fee	
	$\mathbb{1}_{Perf}$	$\mathbb{1}_{RelPerf}$	incl. PF	excl. PF
	(1)	(2)	(3)	(4)
F-P Sensitivity$_{t-1}$	0.253***	-0.518***	0.128***	0.099***
	(13.96)	(-9.70)	(15.27)	(2.63)
F-P Sensitivity$_{t-1} \times \mathbb{1}_{RelPerf}$			-0.154***	-0.088**
			(-11.31)	(-2.06)
Log(Size)$_{t-1}$	-0.023***	0.163***	-0.002	0.000
	(-9.89)	(22.93)	(-1.07)	(0.04)
Bench. Vol.$_{t-1}$	0.422***	-0.874***	0.086**	0.067*
	(8.36)	(-5.98)	(2.19)	(1.70)
$\mathbb{1}_{RelPerf}$			0.273***	0.174***
			(12.08)	(3.67)
Country Dummies	-	-	Yes	Yes
Wald test ($\beta_1 + \beta_2 = 0$)	–	–	4.87**	1.08
			(0.027)	(0.299)
Pseudo R^2	0.003	0.040	–	–
R^2	–	–	0.423	0.366
N	257,799	14,903	14,903	14,903

Table 11: Indirect Incentives and Fund Skills

This table reports panel regression results examining the relationship between lagged fund skill and indirect performance incentives. The dependent variables are total indirect incentives (columns (1)–(3)), management fee-related indirect incentives (columns (4)–(5)), and performance fee-related indirect incentives (columns (6)–(7)), all expressed in terms of dollar income per dollar of return. Skill Ratio$_{t-1}$ is the lagged skill ratio following Berk and Van Binsbergen (2015). The skill ratio is winsorized at the top and bottom 1% and standardized by its cross-sectional standard deviation. Control variables are the log of the fund's age, the log of the fund's TNA at the beginning of the quarter, the log of the fund's family size at the beginning of the quarter, the fund's TER in the previous quarter, the fund's performance fee in the previous quarter, the fund's flows in quarter $t-1$, and the fund's performance in quarter $t-1$ proxied by net returns. Fund flows are winsorized at the top and bottom 1% quarterly. Returns are winsorized at the top and bottom 1% quarterly within fund fee structure groups. Flows, returns, and sizes are in USD. Regressions include investment category and quarter fixed effects. T-statistics are in parentheses and are clustered by fund and quarter. $^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$. The sample is from 2000Q1 to 2010Q4 for non-PF funds and from 2001Q1 to 2010Q4 for relative and absolute PF funds.

	Total Indir. Inc.			Indir. Inc. (mngt)		Indir. Inc. (perf)	
	Rel. PF Funds	Abs. PF Funds	Non-PF	Rel. PF Funds	Abs. PF Funds	Rel. PF Funds	Abs. PF Funds
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Skill Ratio$_{t-1}$	-4.329	11.915*	-0.016	4.656***	3.439	-8.985	8.475
	(-0.74)	(1.75)	(-0.03)	(2.59)	(1.46)	(-1.31)	(1.20)
Log(Size)$_{t-1}$	-0.001**	0.000	0.000	0.000***	0.000**	-0.002**	-0.000
	(-2.10)	(0.44)	(0.93)	(2.67)	(2.13)	(-2.30)	(-0.21)
Log(Family Size)$_{t-1}$	0.001	0.006***	-0.000	0.000	-0.002***	0.001	0.007***
	(1.41)	(2.97)	(-0.28)	(0.11)	(-4.69)	(1.20)	(3.31)
Log(1+Age)$_t$	-0.021***	-0.003	0.001***	0.005***	-0.001*	-0.026***	-0.002
	(-7.61)	(-1.35)	(6.19)	(7.23)	(-1.72)	(-7.63)	(-0.81)
TER$_{t-1}$	0.061***	0.045***	0.068***	0.066***	0.058***	-0.005***	-0.014***
	(40.15)	(9.29)	(59.99)	(72.76)	(36.72)	(-3.09)	(-3.63)
Flow$_{t-1}$	0.000	0.000	-0.000**	-0.000	-0.000*	0.000	0.001
	(0.17)	(0.35)	(-2.44)	(-0.56)	(-1.74)	(0.63)	(0.81)
Ret$_{t-1}$	0.015	-0.011	-0.001**	-0.006***	-0.002	0.021**	-0.009
	(1.59)	(-0.72)	(-2.47)	(-5.07)	(0.00)	(2.08)	(-0.62)
R^2	0.679	0.832	0.957	0.958	0.956	0.405	0.786
N	10,316	3,109	227,528	10,316	3,109	10,316	3,109

Alt Text for Figures and Tables

This section provides alternative text descriptions for all figures and tables in this paper to support accessibility for readers using screen readers or other assistive technologies.

Figures

Figure 1: Distribution of Fees. Two scatter plots showing the joint distribution of total expense ratios (x-axis, 0–10%) and performance fees (y-axis, 0–60%). Panel A shows relative performance fee funds concentrated around 1–2% TER and 10–30% performance fees. Panel B shows absolute performance fee funds with similar TER but more dispersed performance fees. Point sizes indicate observation frequency. Dashed reference lines at 2% TER and 20% performance fee represent common hedge fund thresholds.

Figure 2: Sample Funds Over Time. Two stacked area charts showing total net assets in billions of USD over time. Panel A shows performance fee funds from 2001–2010, with relative PF funds (orange) growing from approximately $20 billion to peak at $120 billion in 2007–2008 before declining, while absolute PF funds (blue) remain smaller at $5–20 billion throughout. Panel B shows non-PF funds from 2000–2010, growing from approximately $250 billion to peak at nearly $2 trillion in 2007 before declining during the financial crisis.

Figure 3: Number of Observations by Country and Category. Six horizontal lollipop charts arranged in two rows. Panel A (top row) shows percentage of fund observations by country of domicile for relative PF, absolute PF, and non-PF funds across 16 European countries. Luxembourg dominates all three fund types (30–50% of observations), followed by UK and Ireland for relative and non-PF funds, and Belgium and Spain for absolute PF funds. Italy shows substantial representation only among absolute PF funds. Panel B (bottom row) shows observations by fund category across approximately 40 investment categories, with Global, Europe, and North America categories having the highest representation (10–15% each) across all fund types.

Figure 4: Simulated Incentives: Effect of Benchmark Risk. Six line plots arranged in a 3×2 grid showing simulated incentives for a hypothetical performance fee fund. Left column plots incentives against fund return volatility (σ_W, ranging 0–0.6); right column plots against fund-benchmark correlation (ρ, ranging 0–1). Top row shows direct incentives (0.07–0.13), middle row shows indirect incentives (0.12–0.28), bottom row shows their ratio (0.43–0.68). Three lines represent low (dotted black, σ_Y=0), medium (dashed blue, σ_Y=0.15), and high (solid red, σ_Y=0.30) benchmark volatility. Key patterns: direct incentives increase with fund volatility for low benchmark volatility but remain relatively flat for high benchmark volatility; indirect incentives show non-monotonic relationships with both variables; the direct/indirect ratio varies considerably with benchmark volatility.

Figure 5: Simulated Incentives: Effect of Interim Relative Performance. Six line plots in a 3×2 grid showing how interim relative performance affects incentives. Left column plots against fund volatility (σ_W, 0–0.6); right column against correlation (ρ, 0–1). Three lines represent out-of-the-money (dotted black, $\log(W_t/Y_t)=-0.05$), at-the-money (dashed blue, $\log(W_t/Y_t)=0$),

and in-the-money (solid red, $\log(W_t/Y_t)$=0.05) performance fees. Top row: direct incentives are substantially higher for in-the-money funds (0.14) versus out-of-the-money (0.06–0.11). Middle row: indirect incentives show less variation across moneyness states. Bottom row: the direct/indirect ratio increases dramatically for in-the-money funds as correlation approaches 1, reaching 1.5 versus approximately 0.3 for out-of-the-money funds.

Figure 6: Distribution of Direct and Indirect Incentives. Four scatter plots in a 2×2 grid. Top row shows adjusted direct incentives (direct incentives divided by performance fee, y-axis 0–1) against performance fees (x-axis 0–40%) for relative PF funds (Panel A) and absolute PF funds (Panel B). Many observations cluster near 1.0, indicating performance fees near maximum expected value. Vertical clustering at common performance fee levels (5%, 10%, 15%, 20%, 25%) is visible. Bottom row shows indirect incentives (y-axis 0.05–0.60) against performance fees for relative PF funds (Panel C) and absolute PF funds (Panel D). Indirect incentives typically range from 0.10 to 0.30 for relative PF funds and show greater dispersion (0.10–0.55) for absolute PF funds, particularly at higher performance fee levels.

Tables

Table 1: Descriptive Statistics. Three-panel table presenting summary statistics. Panel A reports fund characteristics including total net assets, fund age, family size, total expense ratio, and performance fee levels, showing means, standard deviations, and percentiles (5th, 25th, 50th, 75th, 95th) separately for relative PF funds, absolute PF funds, and non-PF funds. Panel B reports risk measures including fund volatility, tracking error, and benchmark beta. Panel C reports performance measures including net returns, benchmark-adjusted returns, alpha, and information ratio. Sample sizes differ by fund type, with substantially more observations for non-PF funds.

Table 2: Fee Structure - Number of Funds and Annual Transitions. Two-panel table showing fee structure dynamics. Panel A displays annual fund counts (2000–2010) by fee structure: relative PF funds grow from approximately 200 to over 400, absolute PF funds remain around 100–150, and non-PF funds grow from approximately 4,000 to over 6,000. Panel B shows a transition matrix for each year indicating how many funds changed fee structures, remained in the same category, or dropped from the sample, with the vast majority of funds maintaining their fee structure year-to-year.

Table 3: Flow-Performance Relationship. Regression table with 10 columns examining the flow-performance relationship. The dependent variable is quarterly fund flows as a percentage of beginning-of-quarter TNA. Key independent variables include lagged returns and their interactions with fund characteristics (age, family size, TER, performance fee). Results are presented separately for relative PF funds (columns 1–2), absolute PF funds (columns 3–4), all PF funds (columns 5–6), non-PF funds (columns 7–8), and combined samples (columns 9–10). Coefficients are shown with t-statistics in parentheses and significance stars. The table demonstrates how flow-performance sensitivity varies across fund types.

Table 4: Direct and Indirect Pay for Performance. Table comparing average direct and indirect incentives across fund types. Rows present: direct incentives, total indirect incentives,

indirect incentives from management fees, and indirect incentives from performance fees. Columns show values for relative PF funds, differences between absolute PF and relative PF funds (with t-statistics), absolute PF fund values, differences between non-PF and relative PF funds, and non-PF fund values. The left half reports incentives per $1 change in TNA; the right half reports incentives per 1% change in TNA. Statistical significance of differences is indicated with asterisks.

Table 5: Direct and Indirect Pay for Performance by Benchmark Volatility Quintile. Table showing how incentives vary with benchmark volatility. For each fund type (relative PF, absolute PF, non-PF), rows display direct incentives, total indirect incentives, management fee-related indirect incentives, and performance fee-related indirect incentives. Columns show average values for benchmark volatility quintiles Q1 (lowest) through Q5 (highest), plus the Q5−Q1 difference with t-statistics testing whether incentives systematically vary across volatility quintiles. Values are incentives per $1 change in fund TNA.

Table 6: Direct and Indirect Pay for Performance by Fund TER Quintile. Table showing how incentives vary with total expense ratio. For each fund type (relative PF, absolute PF, non-PF), rows display direct incentives, total indirect incentives, management fee-related indirect incentives, and performance fee-related indirect incentives. Columns show average values for TER quintiles Q1 (lowest) through Q5 (highest), plus the Q5−Q1 difference with t-statistics testing whether incentives systematically vary across TER quintiles. Values are incentives per $1 change in fund TNA.

Table 7: Change in Tracking Error in Response to Incentives. Regression table with 7 columns examining how incentives affect tracking error changes. The dependent variable is the quarterly change in tracking error (benchmark-relative volatility). Column 1 uses performance fee as the main explanatory variable for relative PF funds; columns 2–3 use direct and indirect incentive measures. Columns 4–6 present analogous specifications for absolute PF funds. Column 7 shows results for non-PF funds using indirect incentives only. Coefficients are reported with clustered t-statistics in parentheses and significance indicators.

Table 8: Change in Benchmark Beta and Idiosyncratic Volatility in Response to Incentives. Regression table with 6 columns for relative PF funds only, examining two dimensions of risk-shifting. Columns 1–3: dependent variable is change in benchmark beta (systematic risk exposure). Columns 4–6: dependent variable is change in idiosyncratic volatility (fund-specific risk). Column 1 and 4 use performance fee as explanatory variable; columns 2–3 and 5–6 decompose effects into direct incentives, indirect incentives, and their subcomponents (management fee-related and performance fee-related). Coefficients with clustered t-statistics show how different incentive components affect risk-taking behavior.

Table 9: Relationship Between Performance and Incentives. Regression table with 9 columns examining performance outcomes for relative PF funds. Three performance measures serve as dependent variables: benchmark-adjusted returns (columns 1–3), benchmark alpha (columns 4–6), and information ratio (columns 7–9). For each measure, column 1/4/7 uses performance fee as the explanatory variable; columns 2–3/5–6/8–9 use direct and indirect incentive measures (total

and decomposed into management fee and performance fee components). Coefficients with clustered t-statistics test whether higher lagged incentives predict better subsequent performance.

Table 10: Direct Pay for Performance and Flow-Performance Sensitivity. Regression table with 4 columns examining the relationship between flow-performance sensitivity and performance fee structures. Columns 1–2 are probit regressions: column 1 predicts whether a fund has any performance fee; column 2 predicts whether a fund has a relative (vs. absolute) performance fee. Columns 3–4 are OLS regressions with performance fee level as the dependent variable, including interactions with a relative PF indicator. Key independent variable is estimated flow-performance sensitivity. Control variables include fund size, benchmark volatility, TER, fund age, and family size. Wald tests assess whether the net effect differs for RPF funds.

Table 11: Indirect Incentives and Fund Skills. Regression table with 7 columns examining how managerial skill relates to indirect incentives. Dependent variables are: total indirect incentives (columns 1–3 for relative PF, absolute PF, and non-PF funds respectively), management fee-related indirect incentives (columns 4–5 for relative and absolute PF funds), and performance fee-related indirect incentives (columns 6–7 for relative and absolute PF funds). Key independent variable is lagged skill ratio (standardized). Control variables include fund age, size, family size, TER, performance fee, lagged flows, and lagged returns. Coefficients with clustered t-statistics test whether skilled managers receive higher indirect compensation.

Online Appendix

Table OA.1: Flow-Performance Relationship - Multiple lags

This table reports coefficient estimates from a regression of fund flows on lagged fund performance. The dependent variable is flows of fund i in quarter t relative to beginning of quarter total net assets. Exogenous variables are the fund's performance in quarters $t-1$ up to $t-11$ proxied by net returns, the log of the fund's age, the log of the fund's family size at the beginning of the quarter, the fund's TER in the previous quarter, the fund's performance fee in the previous quarter, the log of the fund's TNA at the beginning of the quarter, the lagged standard deviation of monthly fund returns using a 36-month window, contemporaneous category flows, a dummy variable equal to one if the fund has a clawback mechanism, a dummy variable equal to one if the fund has a fee cap, and a dummy variable equal to one if the fund has a hurdle rate. Fund flows are winsorized at the top and bottom 1% quarterly. Category flows are computed as the value-weighted average winsorized flows within each category. Returns are winsorized at the top and bottom 1% quarterly within fund fee structure groups. Flows, returns, and sizes are in USD. Regressions include investment category and quarter fixed effects. T-statistics clustered by fund and quarter are in parentheses. $^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$. Columns (1) to (3) contain relative PF funds, columns (4) to (6) contain absolute-only PF funds, and columns (7) to (9) contain non-PF funds. The sample is from 2001Q1 to 2010Q4 in columns (1) to (6) and from and from 2000Q1 to 2010Q4 in columns (7) to (9). Observations are at the fund-quarter level.

	Rel. PF Funds			Abs. PF Funds			Non-PF Funds		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Ret_{t-1}	0.434***	0.354***	0.360***	0.312**	0.360**	0.371**	0.381***	0.377***	0.364***
	(7.87)	(3.90)	(3.59)	(2.28)	(2.44)	(2.24)	(6.81)	(7.73)	(8.20)
Ret_{t-2}	0.085	0.156*	0.126	-0.052	0.011	0.022	0.191***	0.228***	0.218***
	(0.82)	(1.93)	(1.58)	(-0.30)	(0.09)	(0.16)	(3.05)	(4.60)	(4.45)
Ret_{t-3}	0.101	0.205***	0.185***	0.202	0.241	0.181	0.137***	0.165***	0.177***
	(0.00)	(5.80)	(3.92)	(1.62)	(1.53)	(1.39)	(4.51)	(4.71)	(6.11)
Ret_{t-4}		0.021	-0.032		0.206**	0.156*		0.137***	0.163***
		(0.29)	(-0.33)		(2.23)	(1.73)		(5.02)	(6.47)
Ret_{t-5}		-0.029	-0.020		0.115	0.089		0.093***	0.120***
		(-0.27)	(-0.17)		(0.70)	(0.61)		(3.30)	(5.08)
Ret_{t-6}		0.126*	0.123***		0.186**	0.257*		0.082***	0.102***
		(1.69)	(2.63)		(1.97)	(1.85)		(3.40)	(4.58)
Ret_{t-7}		0.026	0.061		0.009	0.034		0.065***	0.059***
		(0.59)	(1.56)		(0.07)	(0.30)		(3.03)	(2.69)
Ret_{t-8}			-0.038			-0.188			0.050**
			(-0.80)			(-1.08)			(2.06)
Ret_{t-9}			-0.094			-0.005			0.035**
			(-1.12)			(-0.03)			(2.22)
Ret_{t-10}			0.008			0.239***			0.052**
			(0.13)			(2.86)			(2.49)
Ret_{t-11}			0.033			-0.022			0.042*
			(0.42)			(-0.24)			(1.78)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Perf. Char. Dummies	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No
R^2	0.022	0.023	0.019	0.016	0.019	0.023	0.025	0.021	0.019
N	11,260	11,116	10,061	3,531	3,499	3,043	273,799	261,704	228,493

Table OA.2: Contemporaneous Flow-Performance Relationship

This table reports coefficient estimates from a regression of fund flows on contemporaneous fund performance. The dependent variable is flows of fund i in quarter t relative to beginning of quarter total net assets. Exogenous variables are the fund's performance in quarter t proxied by net returns, the log of the fund's age, the log of the fund's family size at the beginning of the quarter, the fund's TER in the previous quarter, and the log of the fund's TNA at the beginning of the quarter, the lagged standard deviation of monthly fund returns using a 36-month window, and contemporaneous category flows. Columns (1) to (6) include performance fee characteristics such as the fund's performance fee in the previous quarter, a dummy variable equal to one if the fund has a clawback mechanism, a dummy variable equal to one if the fund has a fee cap, and a dummy variable equal to one if the fund has a hurdle rate. Fund flows are winsorized at the top and bottom 1% quarterly. Category flows are computed as the value-weighted average winsorized flows within each category. Returns are winsorized at the top and bottom 1% quarterly within fund fee structure groups. Flows, returns, and sizes are in USD. Regressions include investment category and quarter fixed effects. T-statistics clustered by fund and quarter are in parentheses. $*p < 0.1$, $**p < 0.05$, $***p < 0.01$. Columns (1) to (3) contain relative PF funds, columns (4) to (6) contain absolute-only PF funds, and columns (7) to (8) contain non-PF funds. The sample is from 2001Q1 to 2010Q4 in columns (1) to (6) and from and from 2000Q1 to 2010Q4 in columns (7) to (9). Observations are at the fund-quarter level.

	Rel. PF Funds			Abs. PF Funds			Non-PF Funds	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Ret_t	0.523***	1.360**	1.482***	0.393**	-0.212	-0.701*	0.427***	0.345***
	(4.71)	(2.28)	(3.03)	(2.57)	(-0.49)	(-1.80)	(5.97)	(3.66)
$Ret_t \times$ Log(1+Age)		-0.477*	-0.477*		0.012	0.034		-0.304***
		(-1.95)	(-1.94)		(0.07)	(0.21)		(-10.47)
$Ret_t \times$ Log(Family Size)$_{t-1}$		0.020***	0.018***		0.070	0.087**		0.059***
		(3.02)	(2.74)		(1.32)	(2.52)		(5.61)
$Ret_t \times TER_{t-1}$		-0.054	-0.062		0.056	-0.008		0.097**
		(-0.75)	(-0.94)		(0.70)	(-0.09)		(2.16)
$Ret_t \times$ Perf. Fee$_{t-1}$			-0.488			4.239**		
			(-0.81)			(2.33)		
Log(1+Age)$_t$	-0.077**	-0.069***	-0.069***	-0.053*	-0.054**	-0.055**	-0.127***	-0.122***
	(-2.35)	(-2.84)	(-2.82)	(-1.89)	(-2.00)	(-1.99)	(-13.62)	(-16.34)
Log(Family Size)$_{t-1}$	0.012***	0.011***	0.012***	0.018**	0.016**	0.017**	0.018***	0.017***
	(3.95)	(3.89)	(3.85)	(2.25)	(2.24)	(2.22)	(10.18)	(8.83)
TER_{t-1}	0.014	0.015	0.015	-0.015*	-0.016	-0.014	0.008	0.006
	(1.61)	(1.46)	(1.53)	(-1.82)	(-1.57)	(-1.48)	(1.13)	(1.09)
Perf. Fee$_{t-1}$	-0.168***	-0.156***	-0.147***	0.189	0.198	0.129		
	(-3.78)	(-3.03)	(-2.75)	(1.64)	(1.62)	(1.33)		
Log(Size)$_{t-1}$	-0.010	-0.009	-0.009	-0.013	-0.013	-0.014*	-0.003*	-0.003*
	(-1.47)	(-1.20)	(-1.21)	(-1.57)	(-1.57)	(-1.67)	(-1.75)	(-1.78)
Std. Dev.$_{t-1}$	0.004	0.002	0.001	0.189	0.186	0.192	-0.112**	-0.103**
	(0.03)	(0.01)	(0.01)	(1.42)	(1.41)	(1.48)	(-2.55)	(-2.45)
Category Flow$_t$	0.867***	0.863***	0.863***	0.590**	0.581**	0.592**	0.933***	0.904***
	(3.55)	(3.61)	(3.60)	(2.47)	(2.55)	(2.56)	(28.60)	(25.70)
$\mathbb{1}_{Clawback}$	0.022	0.019	0.018	0.046	0.043	0.046		
	(0.79)	(0.70)	(0.65)	(1.27)	(1.10)	(1.14)		
$\mathbb{1}_{FeeCap}$	0.008	0.006	0.006	0.071	0.074	0.069		
	(0.47)	(0.43)	(0.40)	(1.27)	(1.32)	(1.25)		
$\mathbb{1}_{Hurdle}$	0.004	0.005	0.005	-0.002	-0.002	-0.000		
	(0.25)	(0.35)	(0.34)	(-0.08)	(-0.09)	(-0.02)		
R^2	0.023	0.029	0.030	0.016	0.017	0.021	0.032	0.035
N	11,304	11,304	11,304	3,531	3,531	3,531	278,989	278,989

Table OA.3: Direct and Indirect Pay for Performance by Benchmark Volatility Quintile - Per 1% Change

This table reports average incentives by fund type and fund benchmark volatility quintiles per 1% change the fund benchmark volatility, as estimated from monthly returns using the previous 36 months. Incentives per 1% change in the funds TNA are computed following equations (13) for direct incentives, (14) for indirect incentives, (16) times fund's TNA for indirect incentives attributable to management fees, and (17) times fund's TNA for indirect incentives attributable to performance fees. Fund benchmark volatility quintiles are computed on a quarterly basis from the full sample of funds. The average incentives for each quintile is the time series mean of equal-weighted quarterly means. Statistical significance of differences is assessed using a t-test for the null hypothesis that the average difference between quarterly means is zero. $^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$. The sample is from 2000Q1 to 2010Q4 for non-PF funds and from 2001Q1 to 2010Q4 for relative and absolute PF funds.

Bench. Vol.	1	2	3	4	5	5 - 1
Direct Incentives						
Rel. PF Funds	0.131	0.207	0.275	0.179	0.189	0.058***
Abs. PF Funds	0.041	0.074	0.065	0.035	0.028	-0.014**
Abs. PF - Rel. PF	-0.090***	-0.132***	-0.209***	-0.144***	-0.161***	-0.072***
Indirect Incentives						
Rel. PF Funds	0.359	0.468	0.546	0.361	0.418	0.059
Abs. PF Funds	0.197	0.384	0.341	0.190	0.136	-0.061***
Abs. PF - Rel. PF	-0.162***	-0.083	-0.206***	-0.171***	-0.282***	-0.120***
Non-PF Funds	0.191	0.249	0.235	0.200	0.213	0.022
Non-PF - Rel. PF	-0.169***	-0.218***	-0.311***	-0.161***	-0.206***	-0.037
Indirect Incentives (Perf. Fee)						
Rel. PF Funds	0.079	0.109	0.132	0.090	0.153	0.074***
Abs. PF Funds	0.067	0.119	0.114	0.069	0.065	-0.002
Abs. PF - Rel. PF	-0.012	0.010	-0.018	-0.021*	-0.088***	-0.076***
Indirect Incentives (Mgmt. Fees)						
Rel. PF Funds	0.280	0.359	0.414	0.271	0.265	-0.015
Abs. PF Funds	0.131	0.265	0.226	0.122	0.072	-0.059***
Abs. PF - Rel. PF	-0.150***	-0.093**	-0.188***	-0.150***	-0.194***	-0.044*
Indirect/Direct						
Rel. PF Funds	2.745	2.261	1.990	2.018	2.213	
Abs. PF Funds	4.774	5.164	5.212	5.487	4.900	

Table OA.4: Direct and Indirect Pay for Performance by Fund TER Quintile - Per 1% Change

This table reports average incentives by fund type and fund total expense ratio quintiles per 1% change the fund TNA, based on USD values. Incentives per 1% change in the funds TNA are computed following equations (13) for direct incentives, (14) for indirect incentives, (16) times fund's TNA for indirect incentives attributable to management fees, and (17) times fund's TNA for indirect incentives attributable to performance fees. Fund TER quintiles are computed on a quarterly basis from the full sample of funds. The average incentives for each quintile is the time series mean of equal-weighted quarterly means. Statistical significance of differences is assessed using a t-test for the null hypothesis that the average difference between quarterly means is zero. *$p < 0.1$, **$p < 0.05$, ***$p < 0.01$. The sample is from 2000Q1 to 2010Q4 for non-PF funds and from 2001Q1 to 2010Q4 for relative and absolute PF funds.

TER	1	2	3	4	5	5 - 1
Direct Incentives						
Rel. PF Funds	0.348	0.298	0.197	0.187	0.060	-0.288***
Abs. PF Funds	0.041	0.082	0.043	0.115	0.033	-0.008
Abs. PF - Rel. PF	-0.307***	-0.216***	-0.154***	-0.073	-0.027***	0.280***
Indirect Incentives						
Rel. PF Funds	0.434	0.489	0.473	0.494	0.190	-0.244***
Abs. PF Funds	0.143	0.367	0.228	0.454	0.237	0.094*
Abs. PF - Rel. PF	-0.290***	-0.122	-0.245***	-0.040	0.047	0.338***
Non-PF Funds	0.159	0.263	0.289	0.255	0.103	-0.056***
Non-PF - Rel. PF	-0.275***	-0.226***	-0.184***	-0.239***	-0.087***	0.188***
Indirect Incentives (Perf. Fee)						
Rel. PF Funds	0.158	0.143	0.137	0.099	0.044	-0.113***
Abs. PF Funds	0.067	0.158	0.088	0.136	0.066	-0.002
Abs. PF - Rel. PF	-0.090***	0.016	-0.049	0.038	0.021	0.112***
Indirect Incentives (Mgmt. Fees)						
Rel. PF Funds	0.276	0.346	0.336	0.395	0.146	-0.130***
Abs. PF Funds	0.076	0.209	0.140	0.318	0.172	0.096***
Abs. PF - Rel. PF	-0.200***	-0.138**	-0.196***	-0.078	0.026	0.226***
Indirect/Direct						
Rel. PF Funds	1.247	1.641	2.397	2.635	3.172	
Abs. PF Funds	3.484	4.453	5.296	3.959	7.200	

Table OA.5: Change in Risk in Response to Incentives - Matched on Domicile

This table reports coefficient estimates from a regression of fund risk-shifting of fund i in quarter t on lagged incentives for relative PF funds matched with non PF funds. The dependent variables are the change in tracking error in columns (1) to (3), the change in benchmark β in columns (4) to (6), and the change in benchmark idiosyncratic volatility in columns (7) to (9). $\mathbb{1}_{RelPerf}$ is an indicator variable that equals one if the fund is a relative PF fund and zero otherwise. Each relative PF fund is matched with the closest non-PF fund within the same quarter, investment category, and country of domicile based on the Mahalanobis distance computed over the logs of total net assets, fund age, and family size. The benchmark beta is estimated over the past 36-month of monthly return over benchmark returns in USD. The benchmark idiosyncratic volatility is estimated over the past 36-month of monthly return over benchmark returns in USD. As a benchmark, columns (1) and (4) include the fund's lagged performance fee as the main exogenous variable with controls. The other columns include direct incentives, indirect incentives, or the two components of indirect incentives separately, and controls. Controls include the log of the fund's age, the log of the fund's TNA at the beginning of the quarter, the log of the fund's family size at the beginning of the quarter, the fund's TER in the previous quarter, and contemporaneous category flows. Regressions include investment category and quarter fixed effects. Changes in fund βs and idiosyncratic volatility are winsorized at the top and bottom 1% quarterly within relative PF funds. Returns and sizes are in USD. T-statistics clustered by fund and quarter are in parentheses. *$p < 0.1$, **$p < 0.05$, ***$p < 0.01$. The sample is from 2001Q1 to 2010Q4. Observations are at the fund-quarter level.

	Δ Tracking Error			ΔBenchmark β			ΔBenchmark Idio. Vol.		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
$\mathbb{1}_{RelPerf}$	-0.000*	-0.000	-0.001*	-0.003*	0.002	0.001	-0.000	-0.001	-0.001
	(-1.77)	(-0.45)	(-1.67)	(-1.65)	(0.39)	(0.21)	(-0.95)	(-0.44)	(-1.26)
Perf. Fee$_{t-1}$	0.001			0.010			-0.001		
	(0.61)			(0.99)			(-0.61)		
DirectInc$_{t-1}$		0.024**	0.023***		-0.010	-0.036		0.021	0.021**
		(2.08)	(2.81)		(-0.25)	(-0.73)		(1.50)	(2.04)
IndirectInc$_{t-1}$		-0.009			0.009			-0.007	
		(-0.89)			(0.38)			(-0.91)	
Indirect Inc.$_{t-1}$ $\times$ $\mathbb{1}_{RelPerf}$		0.001			-0.031			0.002	
		(0.23)			(-0.97)			(0.32)	
IndIncMgmt$_{t-1}$			0.030***			-0.008			0.018**
			(2.98)			(-0.19)			(2.30)
Indirect Inc.$^{mngt}_{t-1}$ $\times$ $\mathbb{1}_{RelPerf}$			0.004			-0.036			0.005
			(1.38)			(-0.92)			(1.30)
IndIncPerf$_{t-1}$			-0.001			0.016			-0.000
			(-0.11)			(0.47)			(-0.04)
DirectInc$_{t-1}$$\times$ IndirectInc$_{t-1}$		-0.098*			0.196			-0.092	
		(-1.90)			(0.69)			(-1.43)	
DirectInc$_{t-1}$$\times$ IndIncMgmt$_{t-1}$			-0.077***			0.484			-0.081**
			(-3.25)			(1.31)			(-2.32)
DirectInc$_{t-1}$$\times$ IndIncPerf$_{t-1}$			-0.119			-0.181			-0.111
			(-1.64)			(-0.62)			(-1.38)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.003	0.009	0.011	0.001	0.002	0.003	0.002	0.007	0.008
N	21,956	21,457	21,457	21,956	21,457	21,457	21,884	21,457	21,457

Table OA.6: Relationship between Performance and Incentives - Matched on Domicile

This table reports coefficient estimates from a regression of fund performance of fund i in quarter t on lagged incentives for relative PF funds. The performance measure is the benchmark-adjusted returns in columns (1) to (3), the benchmark alpha in columns (4) to (6), and the information ratio in columns (7) to (9). $\mathbb{1}_{RelPerf}$ is an indicator variable that equals one if the fund is a relative PF fund and zero otherwise. Each relative PF fund is matched with the closest non-PF fund within the same quarter, investment category, and country of domicile based on the Mahalanobis distance computed over the logs of total net assets, fund age, and family size. As a benchmark, columns (1), (4), and (7) include the fund's lagged performance fee as the main exogenous variable with controls. The other columns include direct incentives, indirect incentives, or the two components of indirect incentives separately, and controls. Controls include the log of the fund's age, the log of the fund's TNA at the beginning of the quarter, the log of the fund's family size at the beginning of the quarter, the fund's TER in the previous quarter, and contemporaneous category flows. Regressions include investment category and quarter fixed effects. Returns are winsorized at the top and bottom 1% quarterly within fund fee structure groups. Returns and sizes are in USD. T-statistics clustered by fund and quarter are in parentheses. $^*p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$. The sample is from 2001Q1 to 2010Q4. Observations are at the fund-quarter level.

	Bench.-adj. Ret.			Bench. α			Information Ratio		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
$\mathbb{1}_{RelPerf}$	-0.000	0.004	0.002	-0.000	0.001	0.002	-0.030	-0.104*	-0.023
	(-0.42)	(0.80)	(0.30)	(-0.18)	(0.27)	(0.28)	(-1.26)	(-1.69)	(-0.29)
Perf. Fee_{t-1}	0.005			0.001			0.181		
	(0.90)			(0.20)			(1.55)		
DirectInc_{t-1}		-0.041	-0.008		-0.024	-0.018		0.590	0.172
		(-0.72)	(-0.12)		(-0.54)	(-0.32)		(0.92)	(0.22)
IndirectInc_{t-1}		0.016			0.026			0.479	
		(0.44)			(1.13)			(1.19)	
Indirect $\text{Inc.}_{t-1} \times \mathbb{1}_{RelPerf}$		-0.037			-0.011			0.369	
		(-1.17)			(-0.45)			(1.11)	
IndIncMgmt_{t-1}			-0.031			-0.047			-2.086**
			(-0.29)			(-0.73)			(-2.27)
Indirect $\text{Inc.}_{t-1}^{\text{mngt}} \times \mathbb{1}_{RelPerf}$			-0.018			-0.014			-0.191
			(-0.44)			(-0.38)			(-0.37)
IndIncPerf_{t-1}			-0.043			0.003			0.671**
			(-1.27)			(0.12)			(2.00)
$\text{DirectInc}_{t-1} \times \text{IndirectInc}_{t-1}$		0.362			0.124			-2.032	
		(1.58)			(0.60)			(-0.74)	
$\text{DirectInc}_{t-1} \times \text{IndIncMgmt}_{t-1}$			0.078			0.066			1.050
			(0.24)			(0.21)			(0.24)
$\text{DirectInc}_{t-1} \times \text{IndIncPerf}_{t-1}$			0.559**			0.164			-3.861
			(2.13)			(0.71)			(-1.55)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.006	0.007	0.007	0.004	0.004	0.004	0.005	0.007	0.008
N	25,312	21,456	21,456	22,414	21,456	21,456	22,344	21,456	21,456