

# Peer versus pure benchmarks in the compensation of mutual fund managers\*

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## ABSTRACT

We examine the role of peer (e.g. Lipper Manager Benchmark) vs. pure (e.g. S&P 500) benchmarks in mutual fund manager compensation. We find that while the majority of portfolio managers are compensated based on some combination of peer and pure benchmarks, 29% (21%) of portfolio managers report compensation based only a peer (pure) benchmark. Funds with peer-benchmark compensated managers charge higher fees, but still outperform on a risk-adjusted net performance basis. Pure-benchmark compensated managers, on the other hand, exhibit lower active share and return gap, as well as higher  $R^2$ , consistent with less effort and/or ability. Managers compensated with peer benchmarks tend to work in fund families with stronger incentives for internal competition; their funds are more likely to be direct distributed and their investors are more sophisticated. Overall, these results are consistent with market segmentation playing a role in the difference between peer and pure benchmarked investment advisors.

Keywords: Mutual funds, fund manager, managerial compensation, incentives, benchmarking, peer benchmarks, closet indexing

JEL Classification: G11, G23, J33, J44

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## 1. Introduction

The role of benchmark-adjusted compensation in an investment manager optimal contracting problem has been well studied in the theoretical literature. Early work by Bhattacharya and Pfleiderer (1985), Stoughton (1993), and Admati and Pfleiderer (1997) suggested that benchmarking might negatively impact managerial effort or risk-taking. Later work examined the optimality of fulcrum<sup>1</sup> versus convex management fees (e.g., Das and Sundaram (2002)) and its equilibrium asset pricing implications (e.g., Cuoco and Kaniel (2011) and Basak and Pavlova (2013)). In all of these models, however, the benchmark was exogenously given and the focus was on other elements of the contract, notably the incentive fee.

A second strand of the literature has focused on the optimal benchmark composition as part of the management contract design (e.g., Ou-Yang (2003), Binsbergen, Brandt, and Kojien (2008), Basak, Pavlova, and Shapiro (2008), Li and Tiwari (2009), Dybvig, Farnsworth, and Carpenter (2010), and Agarwal, Gómez, and Priestly (2012)). Two things are worth highlighting in this literature. First, the benchmarks considered are aggregate market-weighted portfolios of the securities of interest.<sup>2</sup> Second, with the exception of Binsbergen, Brandt, and Kojien (2008) and Li and Tiwari (2009), the investment advisor is compensated as a percentage of the fund's AUM and fund managers compensation and incentives are not distinct from the investment advisor.

While these two assumptions may seem innocuous, they stand in stark contrast to how mutual fund manager compensation works in practice. First, while investment advisors are compensated as a percentage of AUM, fund manager compensation is often determined by fund

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<sup>1</sup> The SEC allows mutual funds to charge fulcrum performance-based fee. The fulcrum fees must compensate and penalize over and underperformance respectively in a symmetric fashion around a pre-specified benchmark.

<sup>2</sup> For example, in Admati and Pfleiderer (1997), the "...benchmark is equal to the passive portfolio that an uninformed investor would hold..." and in Basak, Pavlova, and Shapiro (2007), "...the benchmark...relative to which her performance is evaluated is a value-weighted portfolio..." The only exception is Kapur and Timmermann (2005) where they model the manager's evaluation relative to aggregate average peer performance.

performance relative to a benchmark. Ma, Tang and Gomez (2019), for example, show that less than 20% of fund managers have a bonus determined, in part, by fund AUM, while over 79% of fund managers have a bonus based on performance. Of managers with performance-based compensation, approximately 78% have a bonus that is based on fund performance relative to a benchmark index. Second, while the prototypical example of a fund benchmark is the S&P 500 index, a composite of underlying securities (pure index), benchmarks can also be constructed from groups of competing peer funds (peer index). Lipper, for example, constructs peer group fund indices from the equal-weighted performance of a subset of the “largest funds in the Lipper investment objective grouping”.<sup>3</sup> In this paper, we show that the majority of individual portfolio managers are compensated based on their performance relative to a benchmark and that compensation benchmarks are often based on the performance of groups of competing peer funds. We then examine empirically the implications of peer vs. pure indices in fund manager compensation on fund performance, fees, active management and flows.

In 1993, the SEC passed regulation requiring funds to include in their prospectus a “...broad-based” or pure index as a point of comparison to assist investors in “evaluating fund performance”<sup>4</sup>. During the comment period for this regulation, industry participants suggested to the SEC that investment advisors should be allowed to use peer indices as the comparison benchmark in the prospectus, but the SEC rejected this idea.<sup>5</sup> Even though peer indices cannot be

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<sup>3</sup> For groups with more than 35 funds, the largest 30 funds would be used and the selection of those funds would be subject to a number of other criteria. See the following for additional details: THOMSON REUTERS LIPPER INDEX POLICIES, VERSION 1.0, Calculation ID: CM-1070, Updated: August 17, 2006.

<sup>4</sup> CFR Final Rule: Disclosure of Mutual Fund Performance and Portfolio Managers”, 1993, Securities and Exchange Commission, CFR Financial Assistance to Individuals, 17 C.F.R. § 239, 270, 274 (1993).

<sup>5</sup> “Item 5A(b) requires that a broad-based securities market index, such as the S&P 500, the Nikkei Index, or the Lehman Corporate Bond Index be used in the graphic comparison. The Commission has chosen to require funds to use a broad-based index in order to provide investors with a benchmark for evaluating fund performance that affords a greater basis for comparability than a narrow Index would afford. Several commenters urged the Commission to permit peer group comparisons for all funds. They argued that an investor wants to know how his or her fund performed in comparison with other funds having similar investment objectives. The Commission has not adopted

used as the primary prospectus benchmark, they can be used to benchmark performance in determining manager compensation. In 2005, the SEC began requiring funds to disclose the determinants of each fund manager's compensation.<sup>6</sup> We use these disclosures to identify which managers are compensated based on benchmark-adjusted performance and which benchmarks are used.

To assess the usage of peer vs. pure indices in fund manager compensation, we first collect information from each fund's Statement of Additional Information on the determinants of manager compensation. We focus on the subsample of funds where performance of the manager relative to a benchmark is used, in part, as a determinant of manager compensation. This subsample consists of 1,058 U.S. domestic equity funds across 134 fund families. Across our sample, 21% of portfolio managers report compensation based only a pure benchmark, 29% report compensation based only a pure benchmark and approximately 50% report compensation based on both a peer and a pure benchmark.

In analyzing the performance of managers in the sample, we find that those with peer benchmarks outperform those with pure benchmarks. Across our three risk-adjusted performance measures, 4-factor alpha, prospectus benchmark alpha and Morningstar rating, we find statistically and economically significant performance differences. Managers whose compensation is determined by performance relative to a peer benchmark, outperform those with a pure benchmark comparison by 0.53% (0.52%) annually using 4-factor alpha (prospectus benchmark alpha) as the measure of performance.

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this approach. The index comparison requirement is designed to show how much value the management of the fund added by showing whether the fund "out-performed" or "under-performed" the market, and not so much whether one fund "out-performed" another. A fund could underperform a relevant market, while nevertheless comparing favorably with its peers." - Page 10 of 17 C.F.R. § 239, 270, 274 (1993).

<sup>6</sup> See Ma, Tang, Gomez (2019) for additional details about these SEC changes and the additional compensation detail funds were required to disclose.

In trying to assess the underlying mechanism for this outperformance, we also examine the active share,  $R^2$  and return gap of peer vs. pure-benchmarked managers. In these regressions, we find that managers who are benchmarked relative to pure indices have lower active share, higher  $R^2$ , while peer-benchmarked managers exhibit higher relative return gaps. These results help to explain, in part, the observed outperformance of peer-benchmarked managers and are broadly consistent with two plausible explanations: either peer-benchmarking engenders greater effort on the part of managers or peer-benchmarked compensation attracts or is demanded by superior managers. While we cannot distinguish between these two explanations, the implications for investors remain the same: managers with peer-benchmarked compensation outperforms.

Our results suggesting peer-benchmarked managers exhibit greater effort or have superior investment skill are only one component of the observed outperformance. Because the performance regressions are estimated with net fund returns, the other component of interest is fees. Our analysis of fees finds that funds managed by peer-benchmarked managers charge higher advisory fees and expense ratios relative to pure-benchmarked managers. Combining the manager effort/skill, performance and fee results, the overall picture that emerges is consistent with the following:

- Compensating managers based on peer-benchmarked performance either generates greater managerial effort or attracts higher skill managers.
- This greater effort or higher skill translates in more active management and superior gross fund performance
- The superior performance is, in part, extracted by investment advisors and shared with their fund manager employees, and, in part, shared with investors in the form of superior net performance of the fund.

At the same time, if peer-benchmarked compensation generates superior performance for investors, higher fees for the investment advisor, and plausibly, although we cannot test this premise with our data, higher compensation for fund managers, the question that remains is why peer-benchmarking is not used by all investment advisors.

To better understand the investment advisor's decision to compensate managers based on peer vs. pure benchmarks, we examine this choice as a function of investment advisor characteristics. First, we find that advisors that promote cooperation across managers within the family (i.e., families with a score in the cooperative incentives index of Evans, Porras Prado, and Zambrana (2019)) are less likely use peer-based compensation benchmark. This is consistent with the idea that peer-based benchmark fosters competition rather than cooperation. Second, peer-based compensation benchmarks are less likely when the fraction of the fund TNA sold via the broker channel is high. This evidence is consistent with the evidence documented by prior studies that broker-sold funds face lower performance incentives (e.g., Guercio and Reuter (2014)). Third, we find that pure compensation benchmarks are more likely when the fund has a lower percentage of assets coming from sophisticated investors. Finally, we find that the presence of pure or peer benchmark is positively related to a fund family's expense rank within the fund style. Thus, the design of pure vs peer benchmark is related to family incentive structures, investor sophistication, and family expense ranks. Overall, the differences in determinants between investment advisors compensating managers based on peer and pure benchmarks suggests that market segmentation may separate the two. These differences in underlying client type, distribution channel, and advisor incentive structures suggest differences in underlying business models that help to determine the optimal incentive scheme choice.

Our paper contributes to the large literature on managerial incentives in the asset management industry. First, our study adds to the nascent literature that studies compensation of individual portfolio managers. To the best of our knowledge, this paper is the first to analyze the choice of performance benchmarks in portfolio manager compensation contracts. While the prior literature has focused primarily on the design of the advisory contracts between fund investors and investment advisors due to lack of data, a recent study by Ma, Tang, and Gomez (2019) analyzes the compensation contracts of the actual decision makers – individual portfolio managers.<sup>7</sup> Another recent paper by Lee, Trzcinka, and Venkatesan (2019) examines the risk-shifting implications of performance-based compensation contracts. None of these papers have detailed data on specific compensation benchmarks and analyze the choice of pure vs. peer benchmark like we do.

Second, our study provides new empirical evidence that supports predictions from the theoretical literature. In particular, we document that fund managers compensated with a pure benchmark act more like closet indexers, which is consistent with a number of theoretical models (e.g., Admati and Pfleiderer (1997), Cuoco and Kaniel (2011), and Basak and Pavlova (2013)). Finally, our paper also uncovers novel evidence that peer-based compensation benchmark is associated with more active portfolio management and better risk-adjusted net-of-fee performance, either through inducing managerial effort or attracting more skilled managers. Overall, our findings on the choice of pure vs. peer compensation benchmarks have implications for fund investors, academics, and regulators.

The remainder of this paper proceeds as follows. Section 2 describes data and variable construction. Section 3 presents the empirical results. Section 4 sets forth our conclusions.

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<sup>7</sup> A related study by Ibert, Kaniel, van Nieuwerburgh, and Vestman (2018) examines what factors determine the compensation of mutual fund managers in Sweden.

## **2. Data, Variables, and Descriptive Statistics**

### *2.1. Data*

We construct our sample from several data sources. The first data source is the Morningstar Direct Mutual Fund (MDMF) survivorship-bias-free database, which covers U.S. open-end mutual funds and contains information on fund names, fund tickers, fund CUSIP number, fund net-of-fee returns, AUM, inception dates, expense ratios, portfolio turnover ratios, investment objectives (i.e. Morningstar Category), Morningstar ratings, fund primary and secondary prospectus benchmarks, benchmark portfolio returns, portfolio manager names, advisor names, fund flows, fund family names, and other fund characteristics.

Our sample consists of actively managed U.S. domestic equity funds in the MDMF database over the period 2006-2012. We exclude money market funds, bond funds, balanced funds, international funds, and fund of funds from the sample. We identify and exclude index funds using fund names and index fund indicators from MDMF database. To address the incubation bias documented in Evans (2010), we drop the first three years of return history for every fund in our sample. Since multiple share classes are listed separately in the MDMF database, we aggregate the share class-level data to fund portfolio level. Specifically, we calculate fund TNA as the sum of assets across all share classes and compute the value-weighted average of other fund characteristics across share classes.

Another data source is the SEC EDGAR (Electronic Data Gathering, Analysis, and Retrieval) database. In 2005, the SEC adopted a new federal rule that requires mutual funds to disclose compensation structure of their portfolio managers in the Statement of Additional Information (SAI). The new rule applies to all fund filing annual reports after Feb. 28, 2005.

Following the procedures of Ma, Tang, and Gómez (2019), we retrieve from EDGAR the SAI for each fund in our sample for each year from 2006 to 2012. We then manually collect the information on the structure of and the method used to determine the compensation of portfolio managers. Consistent with Ma, Tang, and Gómez (2019), about 80% of our sample funds have explicit performance-based incentives in their managers' compensation contracts. For those funds that pay their managers based on investment performance, the SEC requires them to identify any benchmark used to measure performance. We find majority of our sample funds comply with this regulation and disclose a clear benchmark in the compensation contract. We exclude those funds that do not identify any benchmark in their contract to minimize data error. In the remaining sample, there are about 80% cases where a clear benchmark such as "Lipper Large-Cap Value" is disclosed, and 20% cases where the benchmark information is relatively vague (e.g., "appropriate benchmark" or "applicable peer groups").

Finally, we obtain data on investment advisor characteristics contained in Form ADV from the SEC. Form ADV is the form used by investment advisors to register with the SEC. This form provides information about the advisor's business practices, AUM, clientele, number of employees, financial industry affiliations, ownership structure, and other advisor-level characteristics. To match the investment advisors of our sample funds to the sample of advisors that filed Form ADV, we use the fund ticker to obtain the SEC File Number, which is a unique identifier that the SEC assigns in Form ADV to each investment advisor.

## *2.2. Key Variables*

### *2.2.1 Pure vs. Peer Compensation Benchmarks*

There are two types of performance benchmarks we analyze in this study. The first is the performance benchmark provided in the fund's prospectus, often referred to as their prospectus benchmark. The second is the benchmark provided in the compensation contract of portfolio managers, which is referred to as compensation benchmark. The choice of prospectus benchmark is constrained by regulation that it must be a broad-based securities market index.<sup>8</sup> In contrast, there is no such regulation in place regarding performance benchmark in portfolio managers' compensation contract. That is, the compensation benchmark can be the same as the prospectus benchmark, a broad-based securities market index; alternatively, the compensation benchmark can be an index based on a fund' peer group. In the former case, the market index benchmark is used to measure how much value added by the active management of a portfolio manager relative to the market; while in the latter case, a portfolio manager's investment performance is evaluated against peer funds with similar investment objectives.

While prior research has looked at fund prospectus benchmarks, compensation benchmarks have received little attention due to the lack of data. Based on information we collected from fund SAI, we use two indicator variables to differentiate the two types of compensation benchmarks: (i) *Pure Benchmark* which equals 1 if the portfolio manager's compensation is based on market index, and (ii) *Peer Benchmark* which equals 1 if the compensation benchmark is peer group, 0 otherwise. Among the subset of funds that employ either a pure or a peer benchmark only, we define a variable *Only Peer Benchmark* which equals 1 if the compensation benchmark is only a peer index and not a market index, and 0 otherwise.

### 2.2.2 Fund Performance

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<sup>8</sup> See this weblink for policy regarding fund prospectus benchmarks: <https://www.sec.gov/rules/final/33-6988.pdf>.

To measure fund performance, we first estimate the factor loadings using the preceding 36 monthly fund returns:

$$R_{i,s} = \hat{\alpha}_{i,t-1} + \sum_{k=1}^N \hat{\beta}_{i,k,t-1} F_{k,s} + \varepsilon_{i,s}, \quad s = t - 36, \dots, t - 1 \quad (1)$$

where  $s$  and  $t$  indicate months,  $i$  indicates funds,  $R_i$  is the monthly excess return of fund  $i$  over one-month T-bill rate, and  $F$  is the monthly returns of either one factor (corresponding market index or peer group returns) or the four factors of Carhart (1997) (i.e. market, size, book-to-market, and momentum factors). We then calculate monthly out-of-sample alpha as the difference between a fund's return in a given month and the sum of the product of the estimated factor loadings and the factor returns during that month:

$$\alpha_{i,t} = R_{i,t} - \sum_{k=1}^N \hat{\beta}_{i,k,t-1} F_{k,t}. \quad (2)$$

The primary performance measures are prospectus benchmark adjusted alpha (*Prospectus Bench.-Adj. Alpha*) and Carhart (1997) four-factor alpha (*Four-Factor Alpha*). We also computed peer benchmark-adjusted alpha (*Peer Bench.-Adj. Alpha*) and supplement the performance measures using Morningstar ratings (*Morningstar Rating*).

### 2.2.3 Other Variables

*Fund Size* is the sum of AUM across all share classes of the fund; *Fund Age* is the age of the oldest share class in the fund; *Expense* is determined by dividing the fund's operating expenses by the average dollar value of its AUM; *Turnover* is defined as the minimum of sales or purchases divided by total net assets of the fund; *Net Flows* is the annual average of monthly net growth in fund assets beyond reinvested dividends (Sirri and Tufano (1998)). Lastly, *Active Share* is

calculated by aggregating the absolute differences between the weight of a portfolio's actual holdings and the weight of its closest matching index (Cremers and Petajisto (2009)). It captures the percentage of a fund's portfolio that differs from its benchmark index. *Manager Tenure* measures the length of time that a manager has been at the helm of a mutual fund, *Team* is a dummy variable that equals 1 if a fund is managed by multiple managers and 0 otherwise, and *R-squared* is constructed as the R-squared of Carhart (1997) four-factor model regressions following Amihud and Goyenko (2013). We describe in detail definitions for all variables in the Appendix table.

### 2.3. Descriptive Statistics

Our final sample consists of 1,058 unique U.S. domestic equity funds from 134 fund families, covering 7,033 fund-year observations that contains at least one benchmark in portfolio manager's compensation contract. We report the summary statistics of compensation benchmark variables, fund performance, and other characteristics for our final sample in Table 1.

[Insert Table 1 about here]

We observe that almost all of our sample funds comply with the SEC and report a market index as the prospectus benchmark. Only less than 0.1% of the sample does not have a prospectus benchmark, and we exclude those from our analysis. In addition to the primary prospectus benchmark, 24.5% of our sample funds also have a secondary prospectus benchmark. In terms of the distribution of prospectus benchmark, the most popular market index is S&P 500 (33%) followed by Russell 1000 Growth (8.64%), Russell 1000 Value (8.59%), Russell 2000 (8.49%), and Russell 2000 Growth (5.49%).

As for the compensation benchmarks, we find that half of the entire U.S. domestic equity fund sample have a clear benchmark in the compensation contract, either a pure benchmark, a peer

benchmark, or both. For our final sample of funds that have a compensation benchmark, 78.8% of the funds contains a broad market index benchmark and 70.5% contains a peer index. Pure and Peer benchmark are not necessarily mutually exclusive. About 50% of the final sample funds have both a pure and peer benchmark in the contract, 21% report only a pure benchmark, and 29% report only a pure benchmark. For those with the peer benchmark, in about 60% cases, the peer benchmark is clearly specified as one of the Lipper index, and the rest are reported as one of the Morningstar benchmark or “applicable group”.

There is little variation in the type of compensation benchmark across funds within the same family. For instance, only 25% of the families exhibit variation across funds on whether to include a peer benchmark in the manger’s contract. When we sort funds by objective according to the Morningstar 3x3 matrix on size and value, we observe variation in the pure benchmark choice across funds within the same objective.

### **3. Empirical Results**

#### *3.1. Compensation Benchmarks and Mutual Fund Performance*

In this section, we examine the relation between fund performance and the choice between pure versus peer as a compensation benchmark for portfolio managers.

We begin by studying the univariate relation between fund performance and compensation benchmark choice. We use three variables to measure fund performance: (i) prospectus benchmark adjusted alpha, (ii) Carhart four-factor alpha, and (iii) a fund’s Morningstar rating. Table 2 reports the univariate comparison results: Panel A compares the performance of funds with and without *Pure Benchmark* and Panel B compares the performance of funds with and without *Peer Benchmark*. The results in Panel A show that funds with pure compensation benchmark

significantly underperform funds without pure benchmark (i.e., funds with only peer benchmark) based on two out of the three performance measures. In contrast, the results in Panel B show that funds with peer compensation benchmark outperform funds without peer benchmark (i.e., funds with only pure benchmark), with the difference being significantly at the 1% level for all three performance measures.

[Insert Table 2 about here]

Next, we carry out multivariate regression analysis using the following OLS specification:

$$Y_{i,t} = \alpha + \beta * Benchmark_{i,t-1} + \gamma * Controls_{i,t-1} + \lambda_k + \mu_{i,t}, \quad (3)$$

where the dependent variable  $Y_{i,t}$  represents the performance of fund  $i$  in year  $t$ ,  $Benchmark_{i,t-1}$  represent compensation benchmark variables of fund  $i$  at year  $t-1$ . We also include a comprehensive set of control variables typically associated with fund performance: *Fund Size*, *Fund Age*, *Expense*, *Turnover*, *Team*, and *Manager Tenure*. All variables are defined in the Appendix. We measure all the independent variables as of the previous year-end to address potential reverse causality concerns. To alleviate the concern that some fund categories use certain type of compensation benchmark and, at the same time, exert a positive impact on fund performance, we include fund category\*year fixed effects ( $\lambda_k$ ). Standard errors are adjusted for heterocedasticity and clustered at the fund level.

For each performance measure, we consider three specifications. In the first specification, we include in the regression the *Pure Benchmark* dummy variable that takes the value of one if the fund uses a pure benchmark in the portfolio manager compensation contract in year  $t-1$ , zero otherwise. In the second specification, we include the *Peer Benchmark* dummy variable that takes the value of one if the fund uses a peer benchmark in the portfolio manager compensation contract

in year  $t-1$ , zero otherwise. In the third specification, both *Pure* and *Peer Benchmark* dummies are introduced simultaneously in the regression.

We report the estimation results in Table 3. In columns (1)-(3), we use the fund's primary prospectus benchmark-adjusted alpha as the measure of fund performance. Column (1) shows that funds using a pure compensation benchmark underperform other funds in our sample by 3.6 basis points (bps) per month (or by 0.43% per year), with the difference statistically significant at the 1% level. Column (2) shows that funds using a peer compensation benchmark outperform the rest of the sample by 5.0 bps per month (or by 0.60% per year), with the difference statistically significant at the 1% level. Given that the sample average prospectus benchmark-adjusted alpha is -0.8 bps per month, the effects we document in these two columns are economically large. The outperformance of funds with peer compensation benchmarks is robust after controlling for the use of pure benchmarks simultaneously in column (3). Moreover, the coefficient on Pure Benchmark in column (3) become insignificant, which suggests that adding a pure benchmark on top of the peer benchmark in the portfolio manager's compensation does not affect fund performance in a significant way.

[Insert Table 3 about here]

The results are very similar when we use Carhart four-factor alpha to measure fund performance in columns (4)-(6). For instance, as shown in column (5), funds whose portfolio managers are evaluated relative to a peer benchmark in determining their compensation outperform other funds by 3.8 bps per month (or 0.46% per year), with the difference statistically significant at the 1% level. The outperformance of these funds increases to 4.3 bps per month (0.52% per year) when we control for the use of a pure index benchmark simultaneously. Results are also similar when we measure fund performance using *Morningstar Rating* in columns (7)-(9).

Regarding the control variables, the results are consistent with the patterns documented in the previous literature. For instance, fund performance decreases with fund size and the expense ratio, and increases with fund age.

Overall, Tables 2 and 3 provide strong evidence that mutual funds that use peer benchmarks in portfolio manager compensation outperform other funds, that is, those using only pure benchmarks.

### *3.2. Fund Activeness and Compensation Benchmarks*

In this section, we examine how fund portfolio management behavior relates to the choice of performance benchmark in portfolio managers' compensation contract. Specifically, we start with examining whether there exists differences in portfolio activeness between funds using peer versus pure compensation benchmarks.

How does compensation benchmark affect fund portfolio management? We draw insight from the theoretical literature on portfolio delegation in the asset management industry. When managers are compensated relative to an exogenous benchmark, this benchmark becomes *de facto* the risk-free asset for the portfolio manager (e.g., Admati and Pfleiderer (1997)). The portfolio manager's safest strategy is, in relative terms, to peg her portfolio to that particular benchmark. Hence, risk-averse managers have incentives to behave as "closet" indexers. This intuition has been carried forward into general equilibrium models including Cuoco and Kaniel (2011) and Basak and Pavlova (2013). We bring this theoretical prediction to the data and study whether indeed portfolio managers behave like closet indexers with respect to the performance benchmarks in their compensation contract.

In particular, we estimate a version of Equation (3) with the dependent variable  $Y_{i,t}$  being either a fund's *Active Share* (Cremers and Petajisto (2009)) or *R-squared* from the four-factor model (Amihud and Goyenko (2013)). Both measures have been widely used in the literature to measure how active portfolio managers are in managing the fund's portfolio. That is, the lower the active share measure or the higher the R-squared measure, the more portfolio managers behave like closet indexers in managing the fund's portfolio. The independent variables and controls are defined as in Equation (1). Standard errors are adjusted for heterocedasticity and clustered at the fund level.

The results are reported in Table 4. Looking at column (1), we find that *Active Share* is 3.8 percentage points lower for portfolio managers compensated relative to a pure benchmark compared to other managers (i.e., those with only peer benchmarks), with the difference statistically significant at the 1% level. This effect is economically significant considering that the average active share measure across all sample funds is 75.8%. In contrast, in column (2), we find that a fund's active share does not depend on whether or not the fund uses a peer compensation benchmark. These results are robust when we introduce both dummy variables simultaneously in the regression in column (3). Thus, both in isolation or jointly with a peer benchmark, fund managers compensated with a pure benchmark are less active and more like closet indexers as predicted by theory (e.g., Admati and Pfleiderer (1997), Cuoco and Kaniel (2011), and Basak and Pavlova (2013)).

[Insert Table 4 about here]

The results are qualitatively similar when we replace *Active Share* with *R-squared* as the dependent variable in columns (4) - (6). Funds with a pure compensation benchmark on average have a 1.1 percentage points higher *R-squared* compared to funds without a pure benchmark. This

result holds both with and without controlling for the presence of peer benchmarks. This effect is also economically significant as the unconditional average of *R-squared* for our sample funds is 93.8%. In general, consistent with the theoretical prediction, fund managers compensated relative to a pure market benchmark are less active and choose portfolios that more closely follow their performance benchmarks.

Finally, we also study whether funds' unobservable actions during the quarter (e.g., in terms of adding or subtracting value for fund shareholders) depend on whether their portfolio managers are compensated relative to a peer versus pure benchmark. We re-estimate Equation (3) except that we use a fund's *Return Gap* of Kacperczyk, Sialm, and Zheng (2007) as the dependent variable. The basic intuition of *Return Gap* from Kacperczyk, Sialm, and Zheng (2007) is to compare the fund return and the return of the portfolio holdings during the same period. If this gap is positive, this signals the manager's intra-quarter trading activities add additional value to fund shareholders. On the other side, if it is negative, it indicates that unobservable trading or agency costs actually destroy value. The average *Return Gap* in our sample is 1.5% per year.

Our results in column (7) show that funds that compensate their portfolio managers relative to a peer benchmark exhibit a return gap that is 1.7 percentage point higher compared to other funds (i.e., those with only pure benchmarks), with the difference being statistically significant at the 1% level. In contrast, when the performance is evaluated with respect to a pure benchmark, there is no impact on the fund's return gap, except when we simultaneously include the peer benchmark dummy in the regression. In that case, the presence of a pure compensation benchmark results is associated with a 1.6 percentage point higher *Return Gap* (significant at the 5% level).

The analysis of the three variables in Table 4 uncovers the differences in active management between portfolio managers evaluated relative to a pure versus a peer benchmark.

Whether measured by active share or R-squared, compensation with respect to a pure benchmark is associated with lower active management and more closet indexing, which is consistent with the prediction from the theoretical literature. In contrast, peer-benchmark based compensation is associated with a higher return gap. This set of evidence together points to the direction that pure benchmark incentivizes portfolio managers to be closet indexers, while peer benchmark incentivizes portfolio managers to be more active in portfolio management.

### 3.3. Mutual Fund Fees and Compensation Benchmarks

We now turn our attention to the relation between fund fees and compensation benchmarks. We replace the dependent variable  $Y_{i,t}$  in Equation (3) with *Advisory Fee Rate* or *Fund Expense Ratio*. The former captures the advisory fee rate charged by fund advisors for their investment advisory services, while the latter captures the total annual expense ratio of operating a fund. We maintain the same controls as in the previous tables. Standard errors are adjusted for heteroscedasticity and clustered at the fund level. The results are reported in Table 5.

[Insert Table 5 about here]

We first analyze fund advisory fee rate in columns (1) - (3). Our results show that funds using pure compensation benchmarks have lower advisory fee rates compared to other funds (i.e., funds with only peer benchmarks). The difference is 6.5 bps per year and statistically significant at the 1% level. This result is also economically meaningful as it represents a 10% decrease relative to the sample average annual advisory fee rate of 65.9 bps. The result is robust when we control for the presence of peer compensation benchmarks simultaneously in column (3). Thus, Peer benchmarks, *per se*, have no significant effect on advisory fees.

We next analyze fund expense ratio in columns (4) - (6). The results are qualitatively similar to that of advisory fee rate. Funds with pure benchmarks are less expensive by 13.3 bps on average, compared to other funds (i.e., funds with only peer benchmarks). This difference is significant at the 1% level and also economically meaningful considering that the sample average fund expense ratio is 1.2% per year.

Analyzing the control variables, we find that both the *Advisory Fee Rate* and the *Expense Ratio* are negatively associated with *Fund Size* and positively associated with *Turnover* and *Manager Tenure*. That is, as expected, fund fees decrease with fund size and increase with portfolio turnover. Managers with more experience are associated with higher advisory fees and expense ratios. It is worth noting that the lower costs of funds with pure benchmarks is robust after we control for *Manager Tenure*. It suggests that this evidence is not driven by pure-benchmark-based compensation being less expensive because it is offered to less experienced managers, arguably with lower capacity for rent-extraction.

Taken together, the results of Tables 3 - 5 suggest that when portfolio managers are compensated relative to their peers, the incentives from this “tournament-type” compensation deliver higher fund performance by inducing managers to implement more active portfolio strategies. The superior performance of these managers is rewarded with higher advisory fees, which is then passed on to fund investors via higher expense ratios. Investors are still better off even after fees (i.e., with higher net alphas) as the outperformance associated with peer compensation benchmarks is more than the difference in fund fees.

### 3.4. Determinants of Portfolio Manager Compensation Benchmarks.

In this section, we carry out a determinant analysis on the choice of performance benchmarks in portfolio manager compensation. In particular, we study which features differ between funds that compensate their portfolio managers based on performance relative to a peer versus a pure benchmark.

The theoretical literature shows that benchmarks can be used to alleviate agency conflicts between the fund advisor and portfolio managers. Examples of these conflicts may be effort induction in the context of moral hazard (e.g., Li and Tiwari (2009), Dybvig, Farnsworth, and Carpenter (2010), and Agarwal, Gómez, and Priestley (2012)) and discrepancies in investment horizon and risk-aversion between managers and the advisory firm (e.g., Binsbergen, Brandt, and Kojen (2008)). To test these ideas from the theoretical literature, we relate the choice of compensation benchmark to a rich set of advisor-, manager-, and fund-level variables.

Specifically, we employ the following logistic model to analyze the determinants of the compensation benchmark choices.

$$y_{i,t}^* = \alpha + \beta \text{Determinants}_{i,t-1} + \varepsilon_{i,t},$$
$$y_{i,t}^j = 1 [y_{i,t}^{*j} > 0], \quad (4)$$

where the dependent variable  $y_{i,t}^j$  represent compensation benchmark choice variables of fund  $i$  at year  $t$ ;  $\text{Determinants}_{i,t-1}$  is a vector of determinant variables such as family-level competitive/cooperative incentives measures of Evans, Porras Prado, and Zambrana (2019), advisor TNA, the percentage of asset sold through broker channel, family expense rank within style, and percentage of assets from sophisticated investors. To alleviate reverse causality concerns, we lag all determinant and control variables by one year. We adjust standard errors accounting for heteroscedasticity and clustering at the fund level.

We report the estimation results in Table 6. We have a number of interesting findings. First, the coefficient on *Cooperative Incentives Index* is negative and significant at the 1% in column (2). It suggests that families with high cooperative incentives index are less likely use peer-based compensation benchmark. This is consistent with the idea that peer-based benchmark fosters competition rather than cooperation. Second, peer-based compensation benchmarks are less likely when the fraction of the fund TNA sold via the broker channel is high. This evidence is consistent with the evidence documented by prior studies that broker-sold funds face lower performance incentives (e.g., Guercio and Reuter (2014)). Third, we find that pure compensation benchmark is more likely when the fund has a lower percentage of assets coming from sophisticated investor. Finally, we find that the presence of pure or peer benchmarks is positively related to a fund family's expense rank within the fund style. In summary, the design of pure vs peer benchmark is related to family incentive structures, investor sophistication, and family expense ranks.

[Insert Table 6 about here]

### 3.5. Mutual Fund Flows

In this section, we examine how fund flows respond to performance measures benchmarked against to different benchmarks. We estimate OLS regressions using net flows in percentage as the dependent variable. In particular, we use interaction terms to test how investors of funds with different compensation benchmarks respond to: (i) prospectus benchmark-adjusted alpha vs. (ii) peer benchmark-adjusted alpha. We control for all the variables in Table 2 as well as Morningstar rating of the fund. We also control fund category\*year fixed effects in the regression.

We report the results in Table 7 of the paper. We find that the coefficients on both interaction terms are positive and significant at the 5% level or better in column (1). This suggests

that both investors flows in both peer and pure compensation benchmarked funds respond to positively to prospectus, pure-benchmarked alpha. In column (2), we find that the coefficient on *Peer Bench.-Adj. Alpha \* Peer Bench* is positive and significant at the 1% level, whereas the coefficient on *Peer Bench.-Adj. Alpha \* Pure Bench* is insignificant. This suggests that only the peer fund investors respond to peer fund benchmarked alpha, and this is not the case for investors of funds with pure compensation benchmarks. Our results highlight the segmentation of the investors of funds with pure vs peer compensation benchmarks. It is possible that the pure benchmarked investors are not aware of the distinction of pure vs peer compensation benchmarks and thus do not respond to the peer benchmark alpha.

[Insert Table 7 about here]

#### **4. Conclusion**

While the empirical and theoretical literature on asset management has long conflated the incentives of fund managers and the investment advisors they work for, a small but growing literature correctly separates the two and examines the importance of manager compensation and incentives. In addition to identifying the determinants of fund manager compensation, these papers have begun to explore the implications for fund and advisor outcomes from these different compensation schemes. In this paper, we explore the use of peer and pure benchmarks as determinants of fund manager compensation.

We find that funds managed by peer-benchmark compensated managers charge higher fees and yet outperform pure-benchmarked managers on a net-return basis. This outperformance is due, in part, to higher effort expended by and/or higher skill associated with managers compensated relative to peer-benchmarks. In trying to assess the determinants of the advisor-level choice of peer vs. pure-benchmarked compensation, we find that differences in advisor size,

incentives for internal cooperation/competition, distribution channel, and investor sophistication are related to the decision. These determinants suggest differences in the underlying business models and possibly segmented markets between peer and pure-benchmarking advisors that may explain the existence of both choices in equilibrium.

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## Appendix: Variable Definitions

Variable	Description
<b>Key variables</b>	
<i>Pure Benchmark</i>	=1 if the portfolio manager has a market index benchmark in her compensation contract based on a fund's Statement of Additional Information (SAI); 0 otherwise.
<i>Peer Benchmark</i>	=1 if the portfolio manager has a peer benchmark in her compensation contract based on a fund's SAI; 0 otherwise.
<i>Only Peer Benchmark</i>	=1 if the portfolio manager only has a peer benchmark, but no market index benchmark, in her compensation contract based on a fund's SAI; 0 otherwise.
<i>Prospectus Bench.-Adj. Alpha</i>	Alpha estimated as in Model 1 with prospectus benchmark returns as the factor.
<i>Four-Factor Alpha</i>	Alpha estimated as in Carhart (1997)
<i>Morningstar Rating</i>	The Morningstar Rating is a measure of a fund's risk-adjusted return, relative to similar funds. Funds are rated from 1 to 5 stars, with the best performers receiving 5 stars and the worst performers receiving a single star.
<i>Active Share</i>	Active Share is a measure of the percentage of stock holdings in a manager's portfolio that differs from the benchmark index.
<i>R-squared</i>	It is constructed as the R-squared of Carhart (1997) four-factor model regressions following Amihud and Goyenko (2013).
<i>Return Gap</i>	The difference between the reported fund return and the return on a portfolio that invests in the previously disclosed fund holdings (Kacperczyk, Sialm and Zheng, 2008).
<i>Expense Ratio</i>	Ratio of the fund's annual operating expenses by the average dollar value of its assets under management.
<i>Advisory Fee Rate</i>	The fee fund manager charges to make investment decisions for managing the mutual fund.
<i>Net Flow</i>	Net Flows is the annual average of monthly net growth in fund assets beyond reinvested dividends (Sirri and Tufano, 1998).
<i>Flow Rank</i>	Net Dollar flows are ranked within fund's investment objective within a year, the rank is between 0 and 1.

## Determinant variables

<i>Cooperative Incentives Index</i>	Index of cooperative manager incentive usage ranked within time and across investment advisors from Evans, Prado, Zambrana (2019).
<i>Competitive Incentives Index</i>	Index of competitive manager incentive usage ranked within time and across investment advisors from Evans, Prado, Zambrana (2019).
<i>Advisor TNA</i>	Total assets managed by an investment advisor including mutual funds, separate accounts and other assets. Taken from the investment advisor's Form ADV.
<i>Pct. Broker Sold</i>	Percentage of advisor's mutual fund assets that are sold through a broker based on the existence of a front load, back load or 12b-1 fee higher than 0.25%.
<i>Family Expense Ratio Rank</i>	Fractional rank (between 0 and 1) of mutual fund expense ratios within time period and style, weighted by fund TNA and averaged across the investment advisor.
<i>Pct. Indexed</i>	Percentage of advisor's mutual fund assets in index funds.
<i>Account Size</i>	The average account size at an investment advisor calculated using the total number of accounts and the total assets managed by an investment advisor taken from the Form ADV.
<i>Pct. Discretionary</i>	The percentage of total discretionary assets managed by an investment advisor from form ADV.
<i>Pct. Sophisticated Investors</i>	The percentage of total assets managed by an investment advisor from three sophisticated investor types: non-mutual fund pooled investment vehicles (i.e. hedge funds, private equity, venture capital); private pension plans (non-governmental); endowment/foundations/charitable organizations. These three are estimated from Form ADV questions 5.D.(f), (g) and (h).
<i>Owner</i>	=1 if the portfolio manager is the founder, controlling owner, partner, or blockholder of the advisor based on a fund's Statement of Additional Information (SAI); 0 otherwise.

**Control variables**

<i>Fund Size</i>	Sum of assets under management across all share classes of the fund.
<i>Fund Age</i>	Age of the oldest share class in the fund
<i>Expense</i>	Ratio of the fund's annual operating expenses by the average dollar value of its assets under management.
<i>Turnover</i>	Fund turnover ratio, computed by taking the lesser of purchases or sales and dividing by average monthly net assets.
<i>Team</i>	=1 if a fund is managed by multiple managers, and 0 otherwise.
<i>Manager Tenure</i>	Average managerial tenure of the portfolio managers of a fund.
<i>Family Size</i>	Sum of assets under management across all funds in the family, excluding the fund itself.

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**Table 1 – Summary Statistics**

Panel A presents the distribution of observations across the two main compensation variables of portfolio managers of US actively managed domestic equity mutual funds in our study. *Peer (Pure) Benchmark* takes a value 1 if the manager’s performance-based incentive is evaluated relative to a peer (pure) benchmark, zero otherwise. Panel B of this table reports summary statistics for the same variables. Among the managers compensated relative to either a pure or peer benchmark only, *Only Peer Benchmark* takes a value of 1 (0) in the case of a peer (pure) benchmark. Panel C contains summary statistics for fund performance and other variables we use in our analysis. All variables in Panel C except indicator variables are winsorized at the 1% and 99% levels. All variables are defined in the Appendix of the paper.

*Panel A. Observations by Benchmark Type*

		<i>Peer Benchmark</i>	
		<i>0</i>	<i>1</i>
<i>Pure Benchmark</i>	<i>0</i>	-	1,486 21.1%
	<i>1</i>	2,068 29.4%	3,479 49.5%

*Panel B. Compensation Benchmarks Distribution*

	N	Mean	Std. Dev	Distribution		
				10th	50th	90th
<i>Pure Benchmark</i>	7,033	0.788	0.408	0	1	1
<i>Peer Benchmark</i>	7,033	0.705	0.455	0	1	1
<i>Only Peer Benchmark</i>	3,554	0.412	0.493	0	0	0

*Panel C. Fund Performance and Characteristics*

	N	Mean	Std. Dev	Distribution		
				10th	50th	90th
<i>Prospectus Bench.-Adj. Alpha</i>	6,216	-0.021	0.462	-0.534	-0.028	0.521
<i>Peer Bench.-Adj. Alpha</i>	6,221	0.014	0.410	-0.459	0.027	0.482
<i>Sec. Peer Bench.-Adj. Alpha</i>	6,228	0.044	0.407	-0.419	0.052	0.523
<i>Four-Factor Alpha</i>	6,228	-0.078	0.452	-0.605	-0.066	0.424
<i>Morningstar Rating</i>	6,418	3.104	0.875	2	3	4.217
<i>Active Share</i>	5,912	0.757	0.230	0.503	0.812	0.967
<i>R-squared</i>	4,858	0.941	0.048	0.877	0.955	0.986
<i>Return Gap</i>	5,787	0.016	0.214	-0.193	0.003	0.242
<i>Advisory Fee Rate</i>	6,568	0.658	0.273	0.246	0.700	0.988
<i>Percentage Flow</i>	7,023	0.011	0.066	-0.024	-0.004	0.043
<i>Flow Rank</i>	6,645	0.487	0.234	0.160	0.498	0.803
<i>Log Fund Size</i>	6,856	19.488	1.858	17.084	19.586	21.759
<i>Log Fund Age</i>	6,880	4.763	0.916	3.555	4.913	5.710
<i>Expense</i>	6,763	1.206	0.442	0.590	1.270	1.702

<i>Log Turnover</i>	6,697	3.955	0.972	2.639	4.078	5.056
<i>Team</i>	6,859	0.721	0.448	0	1	1
<i>Log Manager Tenure</i>	6,859	3.795	0.870	2.615	3.899	4.820

**Table 2 – Compensation Benchmarks and Fund Performance: Univariate Tests**

This table reports univariate comparisons between funds with Pure and Peer benchmark. We use three variables to measure fund performance: (i) prospectus benchmark adjusted alpha, (ii) Carhart four-factor alpha, and (iii) a fund's Morningstar rating. Standard errors are adjusted for heteroscedasticity and clustered by fund. *t*-statistics are reported below the coefficients in parentheses. Coefficients marked with \*\*\*, \*\*, and \* are significant at the 1%, 5%, and 10% level, respectively.

*Panel A. With vs. Without Pure Compensation Benchmarks*

	Prospectus Bench.-		
	Adj. Alpha	Four-Factor Alpha	Morningstar Rating
<i>Pure Benchmark = 1</i>	-0.016	-0.061	3.087
<i>Pure Benchmark = 0</i>	0.021	-0.068	3.170
Difference	-0.037***	0.007	-0.083***
<i>p</i> -value of Difference	0.004	0.573	0.002

*Panel B. With vs. Without Peer Compensation Benchmarks*

	Prospectus Bench.-		
	Adj. Alpha	Four-Factor Alpha	Morningstar Rating
<i>Peer Benchmark = 1</i>	0.007	-0.053	3.157
<i>Peer Benchmark = 0</i>	-0.047	-0.088	2.975
Difference	0.054***	0.035***	0.182***
<i>p</i> -value of Difference	0.000	0.003	0.000

**Table 3 – Compensation Benchmarks and Mutual Fund Performance**

This table reports regression results of fund performance on *Pure* or *Peer* benchmark and other control variables. Fund performance is measured by prospectus benchmark adjusted alpha in Column (1) to (3), four-factor alpha in Column (4) to (6) and Morningstar Ratings in Column (7) to (9). All variables are defined in Appendix. Standard errors are adjusted for heteroscedasticity and clustered by mutual fund. *t*-statistics are reported below the coefficients in parentheses. Coefficients marked with \*\*\*, \*\*, and \* are significant at the 1%, 5%, and 10% level, respectively.

	<u>Prospectus Bench.-Adj. Alpha</u>			<u>Four-Factor Alpha</u>			<u>Morningstar Rating</u>		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
<i>Pure Benchmark</i>	-0.036*** (-2.92)		-0.020 (-1.55)	0.002 (0.13)		0.017 (1.30)	-0.160*** (-3.10)		-0.099* (-1.83)
<i>Peer Benchmark</i>		0.050*** (4.51)	0.044*** (3.80)		0.038*** (3.19)	0.043*** (3.51)		0.197*** (4.38)	0.168*** (3.56)
<i>Log(Fund Size)</i>	-0.007** (-2.03)	-0.008** (-2.29)	-0.008** (-2.26)	-0.010*** (-2.90)	-0.011*** (-3.07)	-0.011*** (-3.10)	0.076*** (5.42)	0.072*** (5.19)	0.073*** (5.26)
<i>Log(Fund Age)</i>	0.022** (2.50)	0.022** (2.43)	0.021** (2.40)	0.035*** (3.86)	0.034*** (3.74)	0.034*** (3.76)	-0.147*** (-4.50)	-0.150*** (-4.61)	-0.152*** (-4.66)
<i>Expense</i>	-0.061*** (-4.43)	-0.057*** (-4.19)	-0.060*** (-4.40)	-0.087*** (-6.24)	-0.089*** (-6.48)	-0.086*** (-6.21)	-0.348*** (-6.61)	-0.328*** (-6.33)	-0.345*** (-6.65)
<i>Log(Turnover)</i>	0.004 (0.71)	0.005 (0.77)	0.005 (0.85)	-0.003 (-0.49)	-0.002 (-0.31)	-0.002 (-0.37)	-0.049** (-2.05)	-0.048** (-1.97)	-0.046* (-1.92)
<i>Team</i>	-0.025** (-2.16)	-0.027** (-2.31)	-0.026** (-2.21)	-0.005 (-0.38)	-0.004 (-0.34)	-0.005 (-0.41)	0.020 (0.50)	0.015 (0.38)	0.019 (0.48)
<i>Log(Manager Tenure)</i>	0.012* (1.73)	0.013* (1.89)	0.013* (1.92)	0.003 (0.47)	0.005 (0.70)	0.004 (0.66)	0.136*** (5.73)	0.140*** (5.96)	0.141*** (6.02)
<i>Constant</i>	0.512** (2.17)	-0.325** (-1.98)	0.489** (2.00)	0.731*** (3.20)	0.725*** (3.00)	0.713*** (3.01)	7.030*** (12.47)	6.897*** (12.14)	6.961*** (11.77)
Category FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	6,449	6,449	6,449	6,467	6,467	6,467	6,545	6,545	6,545
Adjusted R-squared	0.173	0.175	0.175	0.222	0.223	0.223	0.083	0.087	0.088

**Table 4 – Compensation Benchmarks and Fund Activeness**

This table examines the relation between compensation benchmarks and fund activeness. We re-estimate table 3 except the dependent variable is *Active Share* in Column (1) to (3), *R-squared* in Column (4) to (6) and *Return Gap* in Column (7) to (9). Standard errors are adjusted for heteroscedasticity and clustered by mutual fund. *t*-statistics are reported below the coefficients in parentheses. Coefficients marked with \*\*\*, \*\*, and \* are significant at the 1%, 5%, and 10% level, respectively.

	<u>Active Share</u>			<u>R-squared</u>			<u>Return Gap</u>		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
<i>Pure Benchmark</i>	-0.038*** (-4.16)		-0.042*** (-4.06)	0.011*** (3.70)		0.012*** (3.99)	0.008 (1.02)		0.016** (2.00)
<i>Peer Benchmark</i>		0.001 (0.14)	-0.011 (-0.94)		-0.001 (-0.22)	0.003 (1.37)		0.017*** (2.70)	0.022*** (3.35)
<i>Log(Fund Size)</i>	-0.005* (-1.69)	-0.005* (-1.69)	-0.005 (-1.58)	0.001 (0.96)	0.001 (0.82)	0.001 (0.86)	-0.004* (-1.94)	-0.004** (-2.15)	-0.005** (-2.22)
<i>Log(Fund Age)</i>	-0.003 (-0.40)	-0.001 (-0.18)	-0.002 (-0.34)	0.002 (1.38)	0.002 (1.22)	0.002 (1.33)	0.004 (0.78)	0.003 (0.55)	0.003 (0.63)
<i>Expense</i>	0.173*** (10.80)	0.181*** (11.17)	0.173*** (10.78)	-0.017*** (-5.61)	-0.019*** (-6.11)	-0.016*** (-5.46)	0.007 (1.00)	0.005 (0.64)	0.008 (1.05)
<i>Log(Turnover)</i>	0.029*** (4.58)	0.028*** (4.46)	0.029*** (4.59)	0.001 (0.79)	0.001 (1.07)	0.001 (0.78)	0.002 (0.47)	0.002 (0.64)	0.002 (0.57)
<i>Team</i>	0.009 (0.96)	0.008 (0.80)	0.009 (1.00)	0.001 (0.40)	0.001 (0.52)	0.001 (0.41)	-0.016** (-2.33)	-0.016** (-2.35)	-0.017** (-2.43)
<i>Log(Manager Tenure)</i>	0.029*** (5.44)	0.029*** (5.33)	0.029*** (5.40)	-0.002 (-1.40)	-0.001 (-1.19)	-0.002 (-1.33)	-0.006* (-1.67)	-0.006 (-1.45)	-0.006 (-1.46)
<i>Constant</i>	0.790*** (13.72)	0.747*** (13.02)	0.796*** (13.67)	0.989*** (41.49)	1.000*** (40.70)	0.989*** (41.62)	0.233 (1.04)	0.250 (1.12)	0.229 (1.01)
Category FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	6,104	6,104	6,104	5,054	5,054	5,054	5,991	5,991	5,991
Adjusted R-squared	0.558	0.554	0.559	0.415	0.406	0.416	0.101	0.102	0.103

**Table 5 – Compensation Benchmarks and Mutual Fund Fees**

This table reports examines the relation between fund fees (advisory fee in column 1-3, and expense ratio in column 4-5) and compensation benchmarks. We maintain the same controls as in the Table 3. All variables are defined in Appendix. Standard errors are adjusted for heteroscedasticity and clustered by mutual fund. *t*-statistics are reported below the coefficients in parentheses. Coefficients marked with \*\*\*, \*\*, and \* are significant at the 1%, 5%, and 10% level, respectively.

	<u>Advisory Fee Rate</u>			<u>Fund Expense Ratio</u>		
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Pure Benchmark</i>	-0.065*** (-4.32)		-0.064*** (-4.08)	-0.133*** (-5.38)		-0.137*** (-5.33)
<i>Peer Benchmark</i>		0.022 (1.40)	0.003 (0.17)		0.030 (1.20)	-0.011 (-0.43)
<i>Log(Fund Size)</i>	-0.033*** (-7.86)	-0.034*** (-7.99)	-0.033*** (-7.79)	-0.061*** (-8.71)	-0.063*** (-8.74)	-0.061*** (-8.59)
<i>Log(Fund Age)</i>	-0.006 (-0.63)	-0.003 (-0.37)	-0.006 (-0.65)	0.107*** (7.71)	0.113*** (7.94)	0.108*** (7.77)
<i>Log(Turnover)</i>	0.070*** (10.66)	0.070*** (10.58)	0.070*** (10.62)	0.129*** (12.30)	0.129*** (12.07)	0.128*** (12.28)
<i>Team</i>	0.064*** (5.01)	0.063*** (4.86)	0.064*** (5.03)	0.093*** (4.62)	0.089*** (4.41)	0.093*** (4.64)
<i>Log(Manager Tenure)</i>	0.046*** (6.66)	0.045*** (6.62)	0.046*** (6.71)	0.022** (2.12)	0.021** (1.99)	0.022** (2.10)
Constant	1.178*** (14.51)	1.123*** (13.73)	1.178*** (14.52)	2.063*** (6.03)	2.013*** (6.45)	2.067*** (6.08)
Category × Year FEs	Yes	Yes	Yes	Yes	Yes	Yes
Observations	6,752	6,752	6,752	6,916	6,916	6,916
Adjusted R-squared	0.311	0.303	0.311	0.327	0.313	0.327

**Table 6 – Determinant of Portfolio Manager Compensation Benchmarks**

This table reports results from a multinomial logistic regression of the pure vs. peer vs. both (baseline) compensation benchmark choice on a set of control variables. All variables are defined in Appendix. Standard errors are adjusted for heteroscedasticity and clustered by fund. *t*-statistics are reported below the coefficients in parentheses. Coefficients marked with \*\*\*, \*\*, and \* are significant at the 1%, 5%, and 10% level, respectively.

	(1) Pure Benchmark	(2) Peer Benchmark
<i>Cooperative Incentives Index</i>	-1.570 (-0.95)	-6.787*** (-2.69)
<i>Competitive Incentives Index</i>	1.054 (0.43)	-1.576 (-0.58)
<i>Log(Advisor TNA)</i>	-0.069 (-0.45)	-0.257* (-1.72)
<i>Pct. Broker Sold</i>	-1.407 (-1.58)	-2.397** (-2.11)
<i>Family Expense Rank within Style</i>	8.074*** (3.59)	9.747*** (3.58)
<i>Pct. Indexed</i>	1.351 (0.57)	-1.841 (-0.74)
<i>Log(Account Size)</i>	-0.078 (-0.78)	-0.026 (-0.22)
<i>Pct. Discretionary</i>	-4.442 (-0.88)	-3.013 (-0.66)
<i>Pct. Sophisticated Investors</i>	-3.528* (-1.74)	-2.567 (-1.12)
<i>Owner</i>	0.090 (0.15)	-0.833 (-1.00)
<i>Constant</i>	3.803 (0.91)	6.660 (1.40)
Observations		2,686
Pseudo R <sup>2</sup>		0.167

**Table 7 – Fund Flows and Benchmark-Adjusted Fund Performance**

This table reports the estimation results of flows-performance relation. The dependent variable is monthly percentage net flow. The main variables of interest include various performance metrics including prospectus benchmark adjusted alpha and peer benchmark adjusted alpha both interacted with an indicator variable for whether or not the fund manager is compensated based on a peer or a pure benchmark. The rest control variables are defined in Appendix. Standard errors are adjusted for heteroscedasticity and clustered by fund. *t*-statistics are reported below the coefficients in parentheses. Coefficients marked with \*\*\*, \*\*, and \* are significant at the 1%, 5%, and 10% level, respectively.

	<u>Net flows in Percentage</u>	
	(1)	(2)
<i>Prospectus Bench.-Adj. Alpha * Peer Bench.</i>	0.00623*** 2.99	
<i>Prospectus Bench.-Adj. Alpha * Pure Bench.</i>	0.00575** 2.17	
<i>Peer Bench.-Adj. Alpha * Peer Bench.</i>		0.00718*** 2.60
<i>Peer Bench.-Adj. Alpha * Pure Bench.</i>		0.00387 1.05
<i>Morningstar Rating</i>	0.0129*** 28.97	0.0129*** 29.23
<i>Peer Benchmark</i>	0.00359*** 4.62	0.00364*** 4.65
<i>Pure Benchmark</i>	-0.00305*** -3.65	-0.00295*** -3.46
<i>Log(Fund Size)</i>	-0.0216*** -4.42	-0.0216*** -4.41
<i>Log(Fund Size)<sup>2</sup></i>	0.00045*** 3.73	0.00045*** 3.72
<i>Log(Family Size)</i>	0.00098*** 4.77	0.00098*** 4.77
<i>Log(Turnover)</i>	0.00049 1.23	0.00047 1.20
<i>Broker Sold</i>	0.00216*** 2.78	0.00215*** 2.76
<i>Expense</i>	-0.00105*** -3.15	-0.00104*** -3.17
<i>Constant</i>	0.177*** 3.74	0.177*** 3.74
Category × Year FEs	Yes	Yes
Observations	5,749	5,749
Adjusted R-squared	0.059	0.057