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# Pay-performance Sensitivity and Firm Size: Insights From the Mutual Fund Industry

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# Pay-Performance Sensitivity and Firm Size: Insights from the Mutual Fund Industry

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## Abstract

I examine the ex ante decision to make an agent's pay-performance sensitivity an inverse function of organization size. I focus on mutual funds and their decision to use compensation contracts that reduce the advisor's marginal compensation as the fund grows (a declining-rate contract) over the dominant contract type, where marginal compensation is unrelated to fund size (a single-rate contract). I find evidence consistent with the view that declining-rate contracts are a mechanism to keep marginal compensation in line with the advisor's declining marginal product. Specifically, I find that funds with greater exposure to diseconomies of scale are more likely to use a declining-rate contract and to specify a greater amount of compensation decline in their contracts. Consistent with optimal contracting, I find no evidence of a performance difference between funds with declining-rate contracts and funds with single-rate contracts.

## Keywords

Compensation; Pay-performance sensitivity; Mutual funds

## 1. Introduction

“Company size is the most important but not the only source of heterogeneity in calculated pay-performance sensitivities.” Murphy (1999).

Numerous papers find that CEO compensation at large companies is less sensitive to performance than that of CEOs at smaller companies (for example, Jensen and Murphy, 1990, Conyon and Murphy, 2000, Hartzell and Starks, 2003, Schaefer, 1998). This inverse relationship suggests that agency problems are worse at larger firms, because wealth-constrained CEOs “own” less of the company (Murphy, 1999).[1] I examine the ex ante decision to make pay-performance sensitivity an inverse function of size in an environment without wealth constraints, that of mutual funds. I find that funds choose to make pay-performance sensitivity an inverse function of size when the manager's marginal product is also inversely related to size. This suggests that the lower pay-performance sensitivity at larger companies may not be indicative of more severe agency conflicts; rather, it may reflect a reduction in the CEO's marginal product.

Examining a mutual fund manager's compensation offers several advantages over studying realized CEO compensation for industrial firms. First, the fund manager's future compensation is specified at the inception of the fund by the advisory contract. This type of contracting, unique to the mutual fund industry, allows for an examination of the ex ante decision to make an agent's pay-performance sensitivity an inverse function of size. While industrial firms also contract with their CEOs, Gillan et al. (2009) find that only about half of the CEOs in the S&P 500 have employment agreements that provide some details about the CEO's compensation package. However, much of the year-to-year performance component of pay remains at the discretion of the board. Thus, the overall compensation structure is not well specified ex ante for the life of the enterprise.

Second, mutual funds exist in a competitive marketplace with little regulation regarding compensation.[2] In a competitive environment, contracts that do not efficiently reduce agency conflicts, or deliver value, will be competed out of the marketplace (Alchian, 1950). This, combined with the absence of regulatory influences, suggests that the observed contracts are relatively efficient.

One caveat is that, in examining advisory contracts, I do not directly observe the fund manager's compensation. Rather, I observe the compensation earned by the company that manages the fund, the advisory rate. However, the advisory rate is often used to represent the advisor's actual compensation. For example, Berkowitz and Kotowitz, 1993, Coles et al., 2000, Lemmon et al., 2000, Deli, 2002 all use the advisory rate to proxy for the advisor's actual compensation. Additionally, using the advisory rate, Coles et al. (2000) report a pay-performance sensitivity of $5.46 per $1000 increase in investor wealth, similar to the $6.00 reported by Hall and Liebman (1998) for industrial firms.

The advisory rate is analogous to the pay-performance sensitivity at industrial firms because it specifies the percentage of growth that the advisor receives as increased compensation. Funds grow either by growing their current assets (performance), or by attracting capital inflows, which Spitz, 1970, Patel et al., 1994, Ippolito, 1992, Sirri and Tufano, 1998 all find is positively related to performance. Under a single-rate advisory contract, compensation is determined by applying a constant advisory rate to fund assets, while under a declining-rate advisory contract, the manager's compensation is calculated by applying a base rate to the portion of fund assets below a pre-specified size threshold and a reduced rate to the portion of fund assets above the threshold. Therefore, a declining-rate advisory contract represents an ex ante decision to make pay-performance sensitivity an inverse function of size, as the compensation increase is less than under a single-rate advisory contract.

I first present evidence that the choice of a declining-rate advisory contract is economically significant, as managers with declining-rate advisory contracts receive compensation that is approximately 9% lower than comparable managers with single-rate advisory contracts. Second, I present evidence that declining-rate advisory contracts are used to keep marginal compensation in line with declining marginal product. Specifically, (a) actively managed funds, (b) equity funds, and (c) equity funds that pursue aggressive capital appreciation and growth strategies are all more likely to use declining-rate advisory contracts. Interestingly, I find no evidence of a performance difference between funds with declining-rate advisory contracts and those with single-rate advisory contracts, which is consistent with efficient contracting in the mutual fund industry.

My findings suggest that funds ex ante choose compensation schemes that align marginal compensation with marginal product. That is, an advisor whose marginal product is expected to fall as the fund grows receives a contract that reduces marginal compensation (pay-performance sensitivity) as the fund grows. This, in turn, suggests an alternative interpretation of the well-documented inverse relationship between CEO pay-performance sensitivity and firm size; namely, the CEO's pay-performance sensitivity falls as the firm grows because the CEO's marginal product is falling. This is not to suggest that CEOs of large firms are unproductive, simply that the CEO's marginal product was greater when the firm was smaller.

In addition to providing general insights into compensation practices, studying advisory contracts is particularly important for the mutual fund industry. First, there is little theory focusing on the choice of a declining-rate versus a single-rate advisory contract.[3] There is also an absence of empirical work on this issue, which is surprising given that one-third of all funds controlling almost half of the dollars under management have declining-rate advisory contracts. Second, my results have public policy implications. Following the late-trading and market timing scandals, the National Association of State Treasurers, CalPERS, CalSTRS, and others have supported the Mutual Fund Protection Principles (MFPP), a set of best-practice recommendations designed to correct perceived problems in the mutual fund industry. A key recommendation of the MFPP is a requirement that all funds use declining-rate advisory contracts. This appears to be based on the assumption that declining-rate advisory contracts will result in savings from economies of scale being passed along to investors.[4] However, my evidence suggests that declining-rate advisory contracts are not used in this manner. As such, mandating the use of declining-rate advisory contracts is likely to impose substantial costs on many fund investors.

## 2. Literature review

Coles et al., 2000, Deli, 2002 both examine the determinants of the marginal compensation rate, the applicable advisory rate for a fund's size. Both present cross-sectional evidence that the marginal compensation rate is a function of the advisor's marginal product, and that the marginal compensation rate is negatively related to size. The latter is interpreted as evidence of funds passing along economies of scale to investors.

Additionally, Deli (2002) examines "concavity," a measure of the amount of advisory rate decline in the contract, defined as the difference between the highest and lowest advisory rate divided by the marginal compensation rate. However, there is a concern with measuring advisory rate decline this way. Consider the median declining-rate advisory contract, in this study, with four advisory rates: 0.65%, 0.60%, 0.53%, and 0.46%; as a fund grows through this contract, concavity changes from 0.29 to 0.32 to 0.36 to 0.41, while the contract remains unchanged. Because of this, I do not use concavity in my examination of advisory rate decline.

While neither study explicitly examines the choice of a declining-rate advisory contract, their findings suggest two possible rationales. First, if the marginal compensation rate is negatively related to size because funds are passing along economies of scale, then declining-rate advisory contracts may facilitate this. Alternatively, if marginal compensation rates are a function of marginal product, then declining-rate advisory contracts may keep marginal compensation in line with an advisor's declining marginal product.

## 3. The role of the advisor

The role of an active mutual fund advisor is to efficiently acquire, analyze, and act on information. In a rational pricing model, such as Grossman and Stiglitz (1980), where information is asymmetrically distributed and costly to produce, the informed trader (the advisor) gains from trading with the uninformed. However, as more of these opportunities are executed, more effort is required to find the next profitable investment. Assuming that effort is costly, an advisor's compensation is tied to performance to ensure that he or she continues to look for profitable investment opportunities.

In this setting, effort is neither entirely multiplicative (affecting the entire fund) or additive (generating a fixed-dollar reward) (Edmans et al., 2009). As such, it is unclear whether pay-performance sensitivity should be measured as "percentage owned" or as "dollars at stake" (Baker and Hall, 2004). However, declining-rate advisory contracts induce an inverse pay-performance size relation, regardless of how pay-performance sensitivity is measured. In my sample, an advisor with the average single-rate advisory contract "owns" 0.67% of the fund, regardless of how large the fund grows, while an advisor with the average declining-rate advisory contract (with four rates) initially owns 0.66% of the fund, which falls to 0.62%, a 6% reduction by the time the fund reaches the third advisory rate.[5] In terms of dollars at stake, a $100 million increase generates a $670,000 payday for the advisor with a single-rate advisory contract, whereas for the advisor with the four-rate contract, a $100 million increase

generates compensation of $662,152, $606,152, $560,197, and $515,615 as the fund moves through the contract.

One should note that with these general measures of CEO pay-performance sensitivity, performance is simply firm return. When using advisory rates, performance encompasses both fund return and growth through capital inflows. However, as mentioned earlier capital inflows are a function of fund returns.

## 4. Economies and diseconomies of scale

Economies of scale in the mutual fund industry refer to reductions in the expense ratio as the fund grows (Baumol et al., 1990, Latzko, 1999, Latzko, 2002, Barber et al., 2005). An example of these savings is presented by Latzko (1999): if the cost of maintaining an account is $40 and the average account size is $1000, it costs 4% of assets to maintain the account. If the average account size grows to $2500 the cost falls to 1.6% of assets.

Diseconomies of scale refer to the fact that the advisor is unable to generate the same return (marginal product) on the next dollar invested with the fund as on the previous dollar, reducing fund performance (Berk and Green, 2004). Evidence of the negative effect of size on performance is presented by Bris et al., 2007, Chen et al., 2004, Beckers and Vaughan, 2001. The reduction in the advisor's marginal product is potentially caused by hierarchy costs and/or transaction costs.[6]

### 4.1. Hierarchy costs

Hierarchy costs refer to reductions in a fund's use of “soft” information.[7] As a fund grows, the organizational distance between the security analyst and the advisor increases; this increases the likelihood that an advisor will reject an analyst's recommendation based on soft information, decreasing the analyst's incentive to acquire and analyze soft information (Aghion and Tirole, 1997, Stein, 2002). Performance should suffer as the fund relies more heavily on readily verifiable (hard) information, which should already be priced in an efficient market.

Evidence that hierarchy costs contribute to diseconomies of scale is presented in Coval and Moskowitz, 1999, Coval and Moskowitz, 2001. The authors find that funds are able to trade local companies at an information advantage, which they argue arises from soft information acquired through geographical proximity. Moreover, Coval and Moskowitz, 1999, Coval and Moskowitz, 2001, Chen et al., 2004 find that smaller funds' investments in local companies outperform larger funds' investments in local companies, which is consistent with hierarchy costs hindering the ability of larger funds to use soft information.

### 4.2. Transaction costs

Transaction costs can also reduce an advisor's marginal product. As a fund grows and engages in larger trades (dollars and shares), a larger portion of the potential gains are consumed by increasing

transaction costs. Edelen et al. (2007) directly examine the effect of transaction costs on equity fund performance and find that as transaction costs increase, performance decreases.

# 5. Empirical predictions

In this section, I outline my empirical predictions. Implicit in the discussion is the assumption that funds grow. This seems reasonable, as Zhao (2005) finds that smaller funds and those with lower flows are likely to exit the industry. Similarly, Jayaraman et al. (2002) find that smaller funds and funds that experience net redemptions are likely merger targets.

## 5.1. Response to economies of scale

If declining-rate advisory contracts are a means of passing along savings from economies of scale, then funds with greater potential for economies of scale–namely, indexed funds and debt funds–should be more likely to use them. Latzko, 1999, Latzko, 2002 finds that the inverse relationship between expense ratios and size is driven primarily by administrative savings. As administration expenses represent a larger percentage of the costs of an index fund than an actively managed fund, it seems reasonable that index funds have greater potential for economies of scale savings.

Regarding debt funds, Schultz, 2001, Edwards et al., 2007 find that transaction costs decrease with debt trade size. Additionally, Green et al. (2004) find that municipal bond dealers on average earn lower markups on larger trades than on small trades. Contrarily, Chan and Lakonishok, 1995, Chan and Lakonishok, 1997, Keim and Madhaven, 1997 find that transaction costs increase with equity trade size. These findings suggest that debt funds have greater potential for economies of scale than equity funds.

## 5.2. Response to diseconomies of scale

If declining-rate advisory contracts are a contracting mechanism for keeping marginal compensation in line with declining marginal product, then funds with relatively greater exposure to diseconomies of scale should be more likely to use them. Specifically, I would expect declining-rate advisory contracts to be more prevalent among actively managed funds, equity funds, and actively managed equity funds pursuing relatively aggressive strategies, which I define as aggressive capital appreciation or growth.

Actively managed funds should be more likely to use a declining-rate advisory contract because they have greater exposure to both hierarchy costs and transaction costs. An index fund's focus on tracking its index limits its use of soft information, while actively managed funds are predicated on using soft information. This difference exposes actively managed funds to greater hierarchy costs.

Additionally, actively managed funds have greater exposure to increasing transaction costs than index funds. Index funds limit their investments to indexed firms, which tend to have lower transaction costs and greater liquidity.[8] Actively managed funds do not limit their investments to index firms. As such,

the firms that actively managed funds invest in are less liquid, on average. This implies that transaction costs should increase faster for actively managed funds than indexed funds as fund size increases.

As mentioned earlier, transaction costs increase with equity trade size and decrease with debt trade size. This suggests that equity funds have greater exposure to diseconomies of scale than debt funds.

While the predictions above are based on supposition, Chen et al., 2004, Beckers and Vaughan, 2001 document that, among actively managed equity funds, those pursuing more aggressive strategies experience more severe diseconomies of scale. Therefore, if declining-rate advisory contracts keep marginal compensation in line with declining marginal product, then actively managed equity funds pursuing a relatively aggressive strategy should be more likely to use them.

## 6. Data

My analysis uses data from investment companies' form N-SAR filings with the SEC. N-SARs are semiannual filings required of all registered investment companies; the N-SARA covers the first six months of the investment company's fiscal year, and the N-SARB covers the investment company's fiscal year-end. I collect all N-SARBs from the SEC's Edgar Web site for open-end domestic mutual funds filed in calendar year 2002. The N-SAR filings provide details about the fund's portfolio, including whether the fund is actively managed or indexed, whether the fund has a single share class or multiple share classes, whether the fund invests primarily in equity or debt, and for equity funds the general strategy pursued by the fund.[9] The N-SAR also reports turnover (the lesser of purchases or sales divided by average net asset value), year-end size, the family (if applicable), the presence of a front-end or back-end load, the minimum investment required to open an account, and the number of services, beyond portfolio management, required of the advisor.[10]

In addition to these portfolio details, the N-SAR provides details about the advisory contract; specifically, whether it has a single advisory rate or multiple advisory rates (declining-rate advisory contracts). For declining-rate advisory contracts, I collect all advisory rates and the corresponding size breakpoints.

I have a sample of 4413 domestic open-ended mutual fund advisory contracts with the necessary information. Table 1 describes the 4413 funds in the sample.[11] The sample is weighted toward active management and equity funds. Funds with declining-rate advisory contracts represent 32% of my sample, consistent with the 34% reported by Deli (2002).

Table 1. Sample description. I search the SEC's EDGAR Web site for all N-SARB filings during the 2002 calendar year. A declining-rate advisory contract is an advisory contract that specifies several advisory rates that decline as fund size increases. A single-rate advisory contract is an advisory contract that specifies only one advisory rate. I examine a fund's answers to various questions on form N-SAR to determine whether a fund is actively or passively managed and whether the fund invests primarily in equity or debt. Additionally, I collect fund turnover (the lesser of purchases or sales divided by average net asset value), fund size, and the services required by the advisory contract. The N-SAR filing asks specifically if 15 different services are required under the advisory contract. The service variable is the

number of these services that are provided; as such, its maximum value is 15. The N-SAR inquires about (1) occupancy and office rental; (2) clerical and bookkeeping services; (3) accounting services; (4) services of independent audits; (5) services of outside counsel; (6) registration and filing rates; (7) stationery, supplies, and printing; (8) salaries and compensation of interested directors; (9) salaries and compensation of disinterested directors; (10) salaries and compensation of officers who are not directors; (11) reports to shareholders; (12) determination of offering and redemption prices; (13) trading department; (14) prospectus preparation and printing; and (15) other services. For equity funds, I also collect the fund's stated primary investment objective.

**Panel A: Sample composition**

| Fund type | Number | % of sample |
|---|---|---|
| Total sample | 4413 | |
| Declining-rate advisory Contracts | 1423 | 32 |
| Single-rate advisory contracts | 2990 | 68 |
| Actively managed | 4112 | 93 |
| Indexed | 301 | 7 |
| Equity | 3093 | 70 |
| Debt | 1322 | 30 |

**Panel B: Descriptive statistics for turnover, fund and family size, and the number of services required by the advisory contract**

| | Mean | Median | Maximum | 75th percentile | 25th percentile | Minimum |
|---|---|---|---|---|---|---|
| Min. invest ($) | 84.9 | 1.0 | 25,000 | 1.0 | < 1 | < 1 |
| Turnover | 97.5 | 56.0 | 6593.0 | 111.0 | 23.0 | < 1 |
| Fund size ($ million) | 624.0 | 124.3 | 99,162.0 | 412.7 | 33.2 | 1.0 |
| Family size ($ billion) | 43.2 | 10.9 | 686.4 | 67.4 | 2.2 | < 1 |
| Services | 5.6 | 6.0 | 15.0 | 8.0 | 4.0 | 0.0 |

## 7. Univariate analysis

Table 2 presents the univariate analysis of contract characteristics. Panel A shows that the mean marginal compensation rate for the entire sample is 65.5 basis points, similar to Deli (2002). Additionally, panel A shows that the mean marginal compensation rate is lower for declining-rate advisory contracts than for single-rate advisory contracts. In un-tabulated tests, I find that this difference is significant and that it likely results from a size effect. The initial rate in a declining-rate advisory contract is 64.7 basis points (mean), which is insignificantly different (un-tabulated) from the 67 basis points for single-rate advisory contracts. This implies that, while the marginal compensation rates are initially the same for the two contracts, growth pushes the declining-rate advisory contract's marginal compensation below that of the single-rate advisory contract.

Table 2. Univariate analysis. The sample is composed of 4413 funds that filed N-SAR in the 2002 calendar year. *Marginal compensation rate* is the advisory fee applicable given the mutual fund's current size. *Average drop* is the highest advisory rate specified in the advisory contract minus the

lowest advisory rate divided by the number of advisory rate changes. *Range* is the highest advisory rate specified in the advisory contract minus the lowest advisory rate. *Aggressive* is an indicator variable that takes the value of one if the fund's stated strategy is aggressive capital appreciation or growth, and zero otherwise. *Contract waiver* is the dollar compensation that the advisor is entitled to under the advisory contract minus the actual dollar compensation received, divided by the dollar compensation the advisor is entitled to under the contract. *Total discount* is the dollar compensation that the advisor is entitled to under the highest advisory rate in the advisory contract minus the actual dollar compensation received, divided by the dollar compensation the advisor is entitled to under the highest advisory rate specified in the contract. ***, **, * indicates significance at the 1%, 5%, and 10 % levels, respectively.

**Panel A: Descriptive statistics for marginal compensation rate, average drop, and range**

| | **Mean** | **Median** | **Maximum** | **75th percentile** | **25th percentile** | **Minimum** |
|---|---|---|---|---|---|---|
| *Whole sample* | | | | | | |
| Marginal comp. rate (%) | 0.655 | 0.650 | 5.000 | 0.800 | 0.500 | 0.100 |
| *Single-rate contracts* | | | | | | |
| Marginal comp. rate (%) | 0.670 | 0.650 | 5.000 | 0.850 | 0.500 | 0.100 |
| *Declining-rate contract* | | | | | | |
| Marginal comp. rate (%) | 0.622 | 0.600 | 2.000 | 0.750 | 0.500 | 0.500 |
| Average drop | 0.064 | 0.050 | 0.600 | 0.075 | 0.038 | 0.039 |
| Range (%) | 0.148 | 0.125 | 1.200 | 0.200 | 0.090 | 0.090 |

**Panel B: Proportion of funds that use a declining-rate advisory contract**

| | | | |
|---|---|---|---|
| | Actively managed funds | Indexed funds | $\chi^2$ (*P*-value) |
| % of funds with a declining-rate contract | 31.8% | 15.6% | 40.90 (< 0.0001) |
| | Equity funds | Debt funds | $\chi^2$ (*P*-value) |
| % of funds with a declining-rate contract | 31.5% | 34.0% | 2.62 (0.1053) |
| | Aggressive funds | Non-aggressive funds | $\chi^2$ (*P*-value) |
| % of funds with a declining-rate contract | 36.7% | 31.5% | 7.72 (0.0055) |

**Panel C: Proportion of funds that waive a portion of their compensation (*N* = 845 funds)**

| | **Single-rate** | **Declining-Rate** | **$\chi^2$ test for equality in proportions (*P*-value)** |
|---|---|---|---|
| Percentage of funds that waived a portion of their compensation | 60.14% | 57.88% | 228 (0.55) |

| Panel D: Differences in mean, median savings | Mean | | *T*-statistics | Median | | *Z* |
|---|---|---|---|---|---|---|
| | Single-rate (%) | Declining rate (%) | | Single-rate (%) | Declining rate (%) | |
| Contract waiver (%) | 4.1 | 3.2 | 0.9% (0.81) | 0.2 | 0.1 | − 0.80 |
| Total discount (%) | 4.1 | 11.9 | − 7.8%***(− 5.78) | 0.2 | 4.0 | 9.1*** |

Lastly, panel A presents descriptive statistics regarding the amount of advisory rate decline. I examine average drop and range, rather than concavity, because of the bias in concavity discussed in Section 2. Average drop is the mean advisory rate reduction at each breakpoint. Range is the total difference in the advisory rates. The mean average drop and range are 9.6% and 23%, respectively, of the mean single-rate advisory contract's marginal compensation rate.

Panel B of Table 2 reports the proportion of funds that use a declining-rate advisory contract. I find that both actively managed funds and actively managed equity funds pursuing aggressive strategies are more likely to use declining-rate advisory contracts. These results suggest that declining-rate advisory contracts are a response to diseconomies of scale.

It is possible that a fund may use fee waivers to transform a single-rate advisory contract into a declining-rate advisory contract, by waiving progressively more of its fee as it grows. This potentially limits the economic distinction between single-rate advisory contracts and declining-rate advisory contracts.[12] To determine if funds use fee waivers in this manner, I explore the probability that a fund waives some portion of its fee and the amount of the waiver. I first match my sample of actively managed equity funds to the CRSP Survivor-Bias-Free US Mutual Fund Database (hereafter CRSP). This results in a sample of 845 funds, 628 with a single-rate advisory contract and 287 with a declining-rate advisory contract.[13] I apply the advisory contract to the average fund size each month to estimate the entitled compensation. I then aggregate the monthly entitled compensation over the year, subtract the compensation received, and divide this difference by the entitled compensation; I define this as the contract waiver.

Panel C presents the proportion of funds that engage in fee waiving, while panel D compares the average amount of the waiver. I find that funds with declining-rate advisory contracts are just as likely to waive a portion of their compensation and that they waive the same amount as funds with a single-rate advisory contract. This suggests that waivers are not used to change a single-rate advisory contract into an implicit declining-rate advisory contract.

Lastly, I examine the economic significance of using a declining-rate advisory contract, by examining the total discount. This represents the savings from the contract waiver and from contractual reductions in the advisory rate. I take the first (highest) advisory rate in the contract and apply it to the average fund size each month and aggregate this maximum possible compensation over the year; I

then subtract the compensation received and divide this difference by the maximum possible compensation to calculate the total difference.

Panel D of Table 2 reports that the mean (median) total discount for funds with declining-rate advisory contracts is almost three (20) times that of funds with single-rate advisory contracts. The results suggest that the choice of a declining-rate advisory contract is an economically significant decision.

# 8. Contract form

The univariate analysis suggests that the choice of a declining-rate advisory contract is economically significant and that they are a response to potential diseconomies of scale. I further investigate the choice of a declining-rate advisory contract, and the amount of advisory rate decline, in a multivariate setting.

## 8.1. Choosing a declining-rate advisory contract

I use probit analysis to examine the choice of a declining-rate advisory contract. The dependent variable is set to one if a fund uses a declining-rate advisory contract, and zero otherwise.

I control for fund characteristics that Coles et al., 2000, Deli, 2002 find affect marginal compensation rates in the cross-section: turnover, fund size, family size, and services. I also control for fund characteristics that may reduce a fund's exposure to uninformed liquidity-motivated trading (that is, uninformed trading that the advisor engages in to meet the liquidity demands of fund investors). In a Grossman and Stiglitz (1980)-style world, uninformed traders lose to informed traders, suggesting that uninformed liquidity-motivated trading lowers an advisor's marginal product, ceteris paribus. Specifically, I control for whether the fund offers multiple share classes, the presence of a front-end load, a back-end load, and the minimum investment amount.[14]

Table 3 presents the results of the analysis. The intercept represents the probability that a benchmark fund, where all continuous variables are set to their means and indicators to zero, will use a declining-rate advisory contract. In the full sample analysis (column 1), the benchmark fund is an index debt fund; this type of fund has the greatest potential for economies of scale and the lowest potential for diseconomies of scale. The coefficients represent the change in the probable use of a declining-rate advisory contract when an indicator switches from zero to one, or a continuous variable increases by two standard deviations.

Table 3. Probit analysis of choosing a declining-rate advisory contract. I regress an indicator variable set equal to one if the fund uses a declining-rate advisory contract and zero if the fund uses a single-rate advisory contract. The whole sample is composed of 4413 funds that filed an N-SAR during the calendar year 2002. The equity subsample is composed of the 2808 funds in the sample that are actively managed and invest in domestic equity securities. The CRSP equity sample is composed of the 767 actively managed equity funds that I am able to match to the CRSP database. *Active* is an indicator variable that takes the value of one if the fund is actively managed and zero if the fund is passively

managed. *Equity* is an indicator variable that takes the value of one if the fund invests primarily in equity and zero if the fund invests primarily in debt. *Aggressive* is an indicator variable that takes the value of one if the fund's stated strategy is aggressive growth or aggressive capital appreciation and zero otherwise. *Multi class* is an indicator variable that takes the value of one if the fund offers multiple classes of shares and the value of zero if the fund only has one share class. *Front load* is an indicator variable that takes the value of one if the fund has a front-end load and zero otherwise. *Back Load* is an indicator variable that takes the value of one if the fund has a redemption fee or a contingent deferred sales charge and zero otherwise. As *Multi Class* will be perfectly correlated with *front load* and *back load*, I orthogonalize both with respect to *multi class*. *Ln(min invest)* is the natural log of the minimum investment that the fund requires to open an account for an investor. *Turnover* is the lesser of the fund's purchases and sales divided by average net assets. *Ln(size)* is the natural log of the fund's total net assets. *Ln(family size)* is the natural log of all assets controlled by the fund's family. *Services* is the number of services required by the advisory contract. *Sector spread* is the average monthly size range, for funds in the same Strategic Insight Objective Code, in the calendar year preceding the funds introduction. *Sector funds* is the number of funds in the Strategic Insight Objective Code before the fund is introduced. The intercept represents the probability that a fund will choose a declining-rate advisory contract when all dichotomous variables are set equal to zero and all continuous variables are set at their mean. The intercept for column 1 of this table represents the probability that a passively managed domestic debt fund possessing mean turnover, fund size, family size, and services will choose a declining-rate advisory contract. The coefficients reported for the dichotomous variable represent the incremental change in the probable choice of a declining-rate advisory contract when the dichotomous variable changes from zero to one, leaving all other variables unchanged. In the case of the continuous explanatory variables, the reported coefficient represents the change in the probability implied by a two-standard-deviation increase. ***, **, * indicates significance at the 1%, 5%, and 10% level, respectively.

| | **Whole sample** | **Equity sample** | **CRSP equity** |
|---|---|---|---|
| Intercept | 0.109*** | 0.257*** | 0.259*** |
| | (200.69) | (127.24) | (37.06) |
| Active | 0.155*** | | |
| | (40.49) | | |
| Equity | 0.009 | | |
| | (1.33) | | |
| Aggressive | | 0.057*** | 0.148*** |
| | | (9.98) | (15.53) |
| Multi class | 0.045*** | 0.092*** | |
| | (27.89) | (22.27) | |
| Front load | 0.071*** | 0.085* | 0.109*** |
| | (11.09) | (2.91) | (10.00) |
| Back load | − 0.013 | − 0.056 | − 0.032 |
| | (0.49) | (1.65) | (1.00) |
| Ln(min invest) | − 0.037*** | − 0.058*** | |
| | (40.54) | (14.69) | |

| | Whole sample | Equity sample | CRSP equity |
|---|---|---|---|
| Turnover | 0.004 | 0.008 | 0.049 |
| | (0.37) | (0.23) | (2.24) |
| Ln(size) | 0.087*** | 0.156*** | 0.058** |
| | (75.32) | (52.11) | (4.10) |
| Ln(family size) | 0.031*** | 0.074*** | 0.180*** |
| | (11.42) | (11.66) | (20.65) |
| Services | 0.032*** | 0.021 | |
| | (18.00) | (1.61) | |
| Sector spread | | | 0.216** |
| | | | (4.84) |
| Sector funds | | | − 0.206*** |
| | | | (18.01) |
| Obs | 4413 | 2807 | 767 |
| Psuedo-$R^2$ | 0.0733 | 00.0724 | 0.1075 |

The results in column 1 suggest that the use of a declining-rate advisory contract is a response to diseconomies of scale. First, the benchmark fund has a 10.9% probability of using a declining-rate advisory contract, approximately one-third of the unconditional probability. Second, I find that changing from an index fund to an actively managed fund increases the probability that the fund will use a declining-rate advisory contract to 26.4%, a 142% increase.[15] However, I find no evidence of a significant difference in the probable use of a declining-rate advisory contract between debt funds and equity funds.

The results for the actively managed equity fund subsample are presented in column 2. Here the benchmark is an actively managed equity fund with a relatively non-aggressive strategy. While comparing the probability that the benchmark funds will use a declining-rate advisory contract is not a statistical test, the increase from 10.9% to 25.7% is consistent with declining-rate advisory contracts being a response to diseconomies of scale. Changing the fund's strategy from a relatively non-aggressive strategy to an aggressive strategy increases the probability that the fund will use a declining-rate advisory contract by 22%, again suggesting that declining-rate advisory contracts are used to keep marginal compensation in line with declining marginal product.

A potential concern with my analysis is that my arguments refer to the initial advisory contract choice, while the dataset represents a cross-section of the industry as of 2002. However, there are several reasons to suggest that this is not a major problem. First, Warner and Wu (2005) find that funds change advisory contract types infrequently.[16] Second, for the CRSP matched sample, I examine the choice of a declining-rate advisory contract using characteristics as of the fund's first appearance in CRSP. Using CRSP requires that I remove the multiple share class indicator, the minimum investment amount, and services from the analysis, as CRSP does not provide these data.[17] However, I attempt to control for expected fund growth, using the range of fund sizes in the investment sector the year prior (sector spread) and the number of funds in the sector (sector funds). Sector spread represents

variation in how large the fund may grow, and sector funds represent the competitiveness of the sector.

The results, presented in column 3, are consistent with declining-rate advisory contracts being a response to diseconomies of scale. Aggressive funds have a 57% higher probability of using a declining-rate advisory contract than funds following a relatively non-aggressive strategy. Additionally, I find that funds entering sectors with greater size variation are more likely to use a declining-rate advisory contract, while funds entering more competitive sectors are less likely to use a declining-rate advisory contract. These results suggest that declining-rate advisory contracts are more likely when there is more uncertainty regarding how large the fund may grow, and are less likely when competition limits growth potential.

Another potential concern of the analysis is that fund families may choose a single contract type for similar funds. I control for this potential non-independence by grouping funds with similar strategies within a family into a single observation, resulting in a sample of 1476 family-style groups. Table 4 presents the results of this analysis.[18] Column 1 presents the probit analysis, where the dependent variable equals one if any fund in the family-style group uses a declining-rate advisory contract. As the proportion of actively managed funds increases so does the probable use of a declining-rate advisory contract. Additionally, switching from a family-style group that invests in debt to one that invests in equity increases the probable use of a declining-rate advisory contract by 22%.

Table 4. Probit analysis of choosing a declining-rate advisory contract, controlling for family and style influences. I regress an indicator set equal to one if any of the funds in the family-style grouping uses a declining-rate advisory contract and zero otherwise, for the 1476 family-style groupings. *Active %* is the percentage of actively managed funds in the family-style grouping. *Equity* is an indicator variable that takes the value of one if the grouping invests primarily in equity and zero if the fund invests primarily in debt. *Multi class %* is the percentage of funds in the grouping that have multiple classes of shares. *Front load %* is the percentage of funds in the grouping that have a front-end load. *Back load %* is the percentage of funds with a back-end load. *Ln (min invest)* is the median of the natural log of the minimum investment that the fund requires to open an account for an investor for the funds in the group. *Turnover* is the median turnover of the funds in the group. *Ln*(*size*) is the median of the natural log of fund's total net assets in the group. *Ln*(*Family size*) is the natural log of all assets controlled by the fund's family. *Services* is the median number of services required by the advisory contract. In column 1, the intercept represents the probability that a fund will choose a declining-rate advisory contract when all dichotomous variables are set equal to zero and all continuous variables are set at their mean. The intercept for column 1 of this table represents the probability that a passively managed domestic debt fund possessing mean turnover, fund size, family size, and services will choose a declining-rate advisory contract. The coefficients reported for the dichotomous variable represent the incremental change in the probable choice of a declining-rate advisory contract when the dichotomous variable changes from zero to one, leaving all other variables unchanged. In the case of the continuous explanatory variables, the reported coefficient represents the change in the probability implied by a two-standard-deviation increase. ***, **, * indicates significance at the 1%, 5%, and 10% level, respectively.

| | Logit | Percentages |
|---|---|---|
| Intercept | 0.319*** | − 0.406*** |
| | (83.11) | (− 3.96) |
| Active % | 0.077*** | 0.137** |
| | (7.03) | (2.51) |
| Equity | 0.070** | 0.043* |
| | (5.84) | (1.81) |
| Multi class % | 0.023 | 0.032 |
| | (0.71) | (1.21) |
| Front load % | 0.019 | 0.040 |
| | (0.43) | (0.74) |
| Back load % | − 0.023 | − 0.034 |
| | (0.63) | (− 0.62) |
| Ln(min invest) | − 0.093*** | − 0.014*** |
| | (16.19) | (− 4.60) |
| Turnover | − 0.001 | − 0.008 |
| | (0.01) | (− 0.16) |
| Ln(size) | 0.155*** | 0.034*** |
| | (14.84) | (3.90) |
| Ln(family size) | 0.138*** | 0.012* |
| | (10.13) | (1.83) |
| Services | 0.086*** | 0.009*** |
| | (10.22) | (3.00) |
| Family funds | 0.147*** | − 0.001 |
| | (19.01) | (− 0.44) |
| Obs | 1476 | 1476 |
| Psuedo-$R^2$ | 0.1184 | |
| Adjusted-$R^2$ | | 0.0589 |

Column 2, presents the proportion of funds within the family-style group that uses a declining-rate advisory contract. As the proportion of actively managed funds within the family-style group increases, so does the proportion of funds using a declining-rate advisory contract. Similarly, family-style groups investing primarily in equity have a higher percentage of funds using declining-rate advisory contracts. The results presented in Table 3, Table 4 suggest that declining-rate advisory contracts are a response to diseconomies of scale.

## 8.2. The amount of advisory rate decline

Table 2, Table 3, Table 4 all present evidence that the choice of a declining-rate advisory contract is a response to diseconomies of scale; this suggests that declining-rate advisory contracts are a means of keeping marginal compensation in line with declining marginal product. If this is true, then it seems

reasonable that funds with greater exposure to diseconomies of scale should also specify more advisory rate decline in their contracts.

I examine the amount of advisory rate decline in the contracts using a two-stage Heckman sample selection model (as I only observe advisory rate decline for funds with declining-rate advisory contracts).[19] The first stage analyzes the choice of a declining-rate advisory contract (column 1 of Table 3). The second stage estimates the amount of advisory rate decline in the contract, controlling for the selection of a declining-rate advisory contract. The coefficients from the second stage are presented in columns 1 and 3 of Table 5, while columns 2 and 4 present the marginal effects, following Core and Guay (1999).

Table 5. Analysis of the amount of advisory rate decline. This table presents the results from analysis of the amount of decline present in the declining-rate advisory contracts using sample selection methodology. The first stage in this analysis is the probit analysis presented in column 1 of Table 3 which analyzes what funds will choose a declining-rate advisory contract. Columns 1 and 3 present the results from the second stage of the sample selection methodology which examines the amount of decline present in the declining-rate advisory contract. Columns 2 and 4 present the marginal effects of these variables on the amount of decline in the contract, accounting for their influence on the probability that the fund uses a declining-rate advisory contract. The sample is composed of 4366 funds that filed an N-SAR in the 2002 calendar year. *Average drop* is the highest advisory rate specified in the advisory contract minus the lowest advisory rate divided by the number of advisory rate changes. *Range* is the highest advisory rate specified in the advisory contract minus the lowest advisory rate. *Active* is an indicator variable that takes the value of one if the fund is actively managed and zero if the fund is passively managed. *Equity* is an indicator variable that takes the value of one if the fund invests primarily in equity and zero if the fund invests primarily in debt. *Aggressive* is an indicator variable that takes the value of one if the fund's stated strategy is aggressive growth or aggressive capital appreciation and zero otherwise. *Multi class* is an indicator variable that takes the value of one if the fund offers multiple classes of shares and the value of zero if the fund only has one share class. *Breaks* represents the total number of advisory rate breaks specified in the contract. *Front load* is an indicator variable that takes the value of one if the fund has a front-end load and zero otherwise. *Back load* is an indicator variable that takes the value of one if the fund has a redemption fee or a contingent deferred sales charge and zero otherwise. As *multi class* will be perfectly correlated with *front load* and *back load*, I orthogonalize both with respect to *multi class*. *Ln(min invest)* is the natural log of the minimum investment that the fund requires to open an account for an investor. *Breaks* is the number of breakpoints specified in the advisory contract. *Turnover* is the lesser of the fund's purchases and sales divided by average net assets. *Ln(size)* is the natural log of fund's total net assets. *Ln(family size)* is the natural log of all assets controlled by the fund's family. *Services* is the number of services required by the advisory contract. ***, **, * indicates significance at the 1%, 5%, and 10% level, respectively.

| | **Average drop** | **Average drop marginal effects** | **Range** | **Range marginal effects** |
|---|---|---|---|---|
| Intercept | − 0.138*** | | − 0.391*** | |
| | (− 8.93) | | (− 12.52) | |

| | Average drop | Average drop marginal effects | Range | Range marginal effects |
|---|---|---|---|---|
| Active | 0.055*** | 0.024*** | 0.113*** | 0.042*** |
| | (7.93) | | (8.07) | |
| Equity | 0.010*** | 0.007*** | 0.019*** | 0.012*** |
| | (3.35) | | (3.09) | |
| Multi class | 0.012*** | 0.002 | 0.039*** | 0.014*** |
| | (3.67) | | (6.08) | |
| Front load | 0.008 | − 0.007 | 0.049*** | 0.010 |
| | (1.05) | | (3.14) | |
| Back load | 0.002 | 0.010** | − 0.007 | 0.015 |
| | (0.28) | | (− 0.42) | |
| Ln(min invest) | − 0.001** | − 0.0001 | − 0.004*** | − 0.001*** |
| | (− 3.10) | | (− 4.34) | |
| Breaks | − 0.004*** | − 0.004*** | 0.016*** | 0.016*** |
| | (− 9.38) | | (23.10) | |
| Turnover (*$10^{-3}$) | − 0.013 | − 0.012** | − 0.005 | − 0.005 |
| | (− 1.38) | | (− 0.29) | |
| Ln(size) | 0.006*** | 0.001** | 0.014*** | 0.002** |
| | (7.05) | | (7.77) | |
| Ln(family size) | − 0.0003 | − 0.001*** | 0.001 | − 0.001* |
| | (− 0.46) | | (0.84) | |
| Services | 0.002*** | 0.0001* | 0.004*** | 0.001*** |
| | (3.89) | | (4.79) | |
| Obs | 4366 | 4366 | 4366 | 4366 |
| $\rho$ | 0.996*** | | 0.998*** | |
| | (1120.76) | | (1764.42) | |

Regardless of how it is measured, I find that funds with greater exposure to diseconomies of scale, namely actively managed funds and equity funds have larger advisory rate declines. The marginal effect of changing from an index fund to an actively managed fund and from a debt fund to an equity fund increases the average drop by 38%, and 11% of its mean, respectively. These same changes increase the range by 28%, and 8% of its mean, respectively. The results suggest that funds with relatively greater exposure to diseconomies of scale are more likely to use a declining-rate advisory contract and to specify larger advisory rate decline in those contracts.

While my focus is on pecuniary incentives, it is possible that other factors, for example, career concerns, could mitigate the need for high pay-performance sensitivity as a fund grows, and might explain my results. That is, advisors of actively managed funds, equity funds or aggressive equity funds may be more concerned with the prospect of managing a hedge fund than their respective counterpart. However, the majority of the CRSP matched sample started prior to the rapid growth in hedge funds, suggesting that running a hedge fund was not a primary career concern when these contracts where designed. Additionally, Chevalier and Ellison (1999) suggest that an advisor's primary career concern is not receiving a promotion, but avoiding termination.

Fear of termination also has the potential to explain my results, if the sensitivity of terminations to performance increases with fund size faster for actively managed funds, equity funds, and aggressive equity funds than their counterparts. However, Chevalier and Ellison (1999) study the termination of growth equity fund advisors (aggressive equity funds) and find no evidence that size affects the sensitivity of termination to performance. Therefore, in order for fear of termination to explain my findings, the sensitivity of termination to performance for non-aggressive equity funds would have to be negatively related to fund size. While I cannot rule out this possibility, it seems unlikely.

## 8.3. Analysis of the advisory rate drop across breakpoints

The above analysis suggests that declining-rate advisory contracts are a mechanism for keeping marginal compensation in line with declining marginal product. Therefore, examining the advisory rate drops should provide information about how the advisor's marginal product falls as the fund grows.

Each declining-rate advisory contract contains between 1 and 8 breakpoints, with a mean of 2.8 (median of 2) breakpoints, resulting in a sample of 3876 breakpoints. Panel A of Table 6 presents a description of the sample.

Table 6. Descriptive statistics of the breakpoints. I search the SEC's EDGAR Web site for all N-SARB filings during the 2002 calendar year. A declining-rate advisory contract is an advisory contract that specifies several advisory rates, which decline as fund size increases. I collect each advisory rate specified by the declining-rate advisory contract, as well as the number of breaks specified in each contract. In this sample, each break is considered an individual observation. *Advisory rate drop* is the drop in the advisory rate at the breakpoint. *Percent advisory rate drop* is the drop in the advisory rate as a percentage of the advisory rate prior to the drop. *Breaks* represent the total number of advisory rate breaks specified in the contract. *Breaknum* is an ordinal variable, specifying the breakpoint's location in the contract.

| **Panel A. Sample composition** | | | | |
|---|---|---|---|---|
| **Breaks** | **Number of contracts** | **% of sample** | **Observations** | **% of sample** |
| 1 | 333 | 24.2 | 1376 | 35.5 |
| 2 | 451 | 32.8 | 1043 | 26.9 |
| 3 | 240 | 17.4 | 592 | 15.3 |
| 4 | 128 | 9.3 | 352 | 9.1 |
| 5 | 76 | 5.5 | 224 | 5.8 |
| 6 | 28 | 2.0 | 148 | 3.8 |
| 7 | 99 | 7.2 | 120 | 3.1 |
| 8 | 21 | 1.5 | 21 | 0.5 |
| Totals | 1376 | | 3876 | |

| Panel B. Descriptive statistics | | | | | |
|---|---|---|---|---|---|
| | Advisory rate drop | | % advisory rate drop | | |
| BreakNum | Mean | Median | Mean | Median | Observations |
| 1st | 0.073 | 0.050 | 11.3 | 10.0 | 1376 |
| 2nd | 0.053 | 0.050 | 9.3 | 8.3 | 1043 |
| 3 rd | 0.041 | 0.050 | 8.1 | 7.7 | 592 |
| 4th | 0.037 | 0.025 | 7.9 | 6.2 | 352 |
| 5th | 0.026 | 0.020 | 6.0 | 4.8 | 224 |
| 6th | 0.018 | 0.015 | 4.5 | 3.7 | 148 |
| 7th | 0.014 | 0.010 | 3.5 | 2.6 | 120 |
| 8th | 0.011 | 0.010 | 3.1 | 2.3 | 21 |
| Total | 0.052 | 0.050 | 9.1 | 7.1 | 3876 |

Panel B of Table 6 presents the mean and median advisory rate drop, the raw drop in the advisory rate, and the percentage advisory rate drop, the advisory rate drop as a percentage of the prior advisory rate. Breaknum specifies the location of the breakpoint in the contract. Panel B shows that, as the fund grows through its contract, the advisory rate drop at each breakpoint shrinks.[20] This suggests that the advisor's earlier marginal product reductions are more severe than the later reductions.

## 9. Advisory contract type and performance

Lastly, I examine the relationship between advisory contract type and performance. Given the evidence suggesting that declining-rate advisory contracts are a mechanism for keeping marginal compensation in line with declining marginal product, it seems unlikely that there will be a performance difference based on contract type.

Given that the N-SAR filings do not provide information regarding fund performance, I use the CRSP matched sample. I examine monthly raw and four-factor adjusted returns over the five years surrounding the N-SAR cross-section and the five years following the cross-section. The four-factor adjusted returns are based on the Fama and French four-factor model; the factor loadings are estimated using a 36-month rolling window.

Each January, I form mutual fund portfolios, based on strategy and contract type. The average difference between these portfolios is presented in Table 7. Panel A presents the value-weighted portfolio results, where the weights are based on prior year-end fund size. Panel B presents the equally weighted portfolio results. I find no evidence of a relationship between advisory contract type and performance, which is consistent with the mutual fund industry being a competitive marketplace where relatively inefficient contracts are eliminated.

Table 7. Analysis of the effect of contract type on fund performance. Each January, I form portfolios of mutual funds based on their strategy and advisory contract type. The table presents the average monthly difference in portfolio returns. Panel A presents the results for the value-weighted portfolios

where the weights are determined based on fund size in December. Panel B presents the equally weighted portfolio results. The four-factor adjusted returns are based on the Fama and French four-factor model. Factor loadings are calculated using a 36-month rolling estimation window. ***, **, * indicates significance at the 1%, 5%, and 10% level, respectively.

| | **2000–2004** | **2003–2007** |
|---|---|---|
| *Panel A: Value-weighted portfolios* | | |
| Raw | − 0.0004 | − 0.0004 |
| | (− 0.46) | (− 0.76) |
| Four-factor adjusted | 0.0004 | − 0.0001 |
| | (0.65) | (− 0.00) |
| *Panel B: Equally weighted portfolios* | | |
| Raw | − 0.0005 | − 0.0003 |
| | (− 0.66) | (− 1.00) |
| Four-factor adjusted | − 0.0003 | 0.0001 |
| | (− 0.58) | (0.07) |

## 10. Conclusion

I investigate the choice of a declining-rate advisory contract over the predominant single-rate advisory contract. This is the first paper to examine this decision, which is surprising, given that a third of funds use a declining-rate advisory contract, and that these funds manage about half of the dollars under management.

I first demonstrate that the choice of a declining-rate advisory contract is economically significant, as it significantly reduces the compensation that the advisor would have received with a single-rate contract. Additionally, it reduces the price that investors pay for investment management.

I then provide direct evidence that the choice of a declining-rate advisory contract is a response to a fund's exposure to diseconomies of scale. I find that the probability that a fund uses a declining-rate advisory contract, and the amount of advisory rate decline in the contract, is higher for (a) actively managed funds, (b) equity funds, and (c) equity funds that pursue aggressive strategies. These results suggest that a declining-rate advisory contract is a mechanism for keeping marginal compensation in line with an advisor's declining marginal product.

That funds ex ante choose a compensation scheme where the advisor's pay-performance sensitivity is inversely related to size, when the advisor's marginal product is also inversely related to size, has implications for studies of CEO compensation—namely, that the empirically observed inverse relationship between CEO pay-performance and size may not imply that agency problems are more severe at larger firms; the lower pay-performance sensitivity may result from reduction in the CEO's marginal product as the firm grows. This is not to say that these large-firm CEOs are unproductive, only that their marginal product has diminished as the firm has grown.

Lastly, I find no evidence of a performance difference between funds with single-rate advisory contracts and those with a declining-rate advisory contract. This is consistent with the mutual fund industry being a relatively efficient contracting environment.

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[1] Following Murphy (1999), “own” here refers to the amount of a company's cash flow that the CEO is entitled to through stock, options, and bonuses.

[2] Wahal and Wang (2008) find evidence that the mutual fund industry evolved into a highly competitive marketplace during the 1990s. The only compensation prohibition is against asymmetric performance fees, where the manager receives an additional fee directly related to

performance where the fee is larger when the fund performs well and smaller when it performs poorly (Golec and Starks, 2004).

[3] A notable exception is Berk and Green (2004), which shows that in the absence of moral hazard only single-rate advisory contracts are necessary.

[4] The MFPP states, "The management rate schedule shall be reasonable and shall contain breakpoints that provide meaningful economies of scale to shareholders."

[5] Here "owns" refers to the amount of assets the advisor has claim to.

[6] I present the potential sources of diseconomies of scale for completeness.

[7] Stein (2002) defines soft information as information that cannot be verified by anyone other than the person who produces it. An example of soft information in the mutual fund industry is provided by Chen et al. (2004): the ability to talk to a firm's CEO versus simply reading the firm's financial statements. Cashman and Deli (2009) present evidence of the importance of soft information, as funds organize themselves to collocate investment decision rights with soft information.

[8] Chordia, 2002, Hedge and McDermott, 2003, Edmister et al., 1996 all present evidence that, when a company is added to an index, the costs associated with trading the stock decrease and the liquidity of the firm increases significantly. This increased liquidity should allow larger transactions to be executed at lower cost and with relatively less price impact.

[9] I conduct my analysis at the portfolio level and I group multiple share classes within the same fund into a single observation, since the share classes will have the same advisory contract.

[10] The N-SAR filing specifically asks whether the advisory contract requires the advisor to provide 15 different services. A list of these services can be found in Table 1.

[11] I remove all advisory contracts that include a performance fee as part of the advisor's compensation. Keeping these contracts in the sample does not qualitatively change the results presented. Additionally, I remove all money market funds.

[12] Christoffersen (2001) examines money market fund managers' decision to waive fees and argues that fee waivers provide an indirect channel for setting a performance-based fee structure.

[13] I do this for the actively managed equity subsample to make the hand matching manageable. I follow the methodology of Cashman et al. (2009)query. I need CRSP to obtain monthly fund size—simply using year-end size potentially would bias my calculations, as the S&P 500 lost 22% of its value in 2002.

[14] Nanda et al. (2009)query find that funds offering multiple share classes are more exposed to liquidity-motivated trading, while Nanda et al., 2000, Chordia, 1996, Aragon, 2007 find that front-end loads, back-end loads, and minimum investment amounts reduce a fund's exposure to liquidity-motivated trading.

[15] The 26.4% probability comes from adding the 10.9% for the benchmark fund and the 15.5% for the actively managed indicator.

[16] Warner and Wu (2005) find that 1.5% of their sample of year-to-year mutual fund advisory contracts changes type.

[17] Keeping these variables in the analysis at their 2002 levels does not qualitatively change my results.

[18] I obtain similar results when I limit the sample to families that use both types of advisory contracts.

[19] Forty-seven declining-rate advisory contracts contain errors regarding their stated advisory rates; I drop these from my analysis.

[20] This result holds in multivariate analysis, controlling for the first advisory rate in the contract and the fund characteristics in the average drop analysis.