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Mutual Fund Advisory Contracts: An Empirical Investigation

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ABSTRACT

We investigate marginal compensation rates in mutual fund advisory contracts and find the following. Equity and foreign fund advisors receive higher marginal compensation than debt and domestic fund advisors. Advisors of funds with greater turnover receive higher marginal compensation. Also, closed-end fund advisors receive higher marginal compensation than open-end fund advisors. Finally, we find that marginal compensation is lower for advisors of large funds and members of large fund families. We argue that these differences in marginal compensation reflect differences in advisor marginal product, differences in the difficulty of monitoring performance, differences in control environments, and scale economies.

IN SEPTEMBER 1998, the House Subcommittee on Finance and Hazardous Materials conducted hearings on the level of mutual fund fees and competition in the mutual fund industry. The Securities and Exchange Commission (SEC) followed those hearings with the SEC Roundtable on the Role of Independent Investment Company Directors in February 1999 where the role of directors in negotiating lower fees came under close examination. The level of mutual fund fees has also drawn the attention of the popular press with commentators suggesting that fund fees are excessive.[1] Despite the increased level of public scrutiny and an abundance of prescriptive statements, little is actually known about the economic determinants of mutual fund advisory fees.

Coles, Suay, and Woodbury (2000) suggest that optimal fee structures likely vary across funds. There are at least five reasons to think that is the case. First, the marginal product of fund advisors likely varies across fund types. Second, the difficulty of ex post performance measurement is likely to vary across fund types. Third, optimal incentives with respect to risk likely vary across fund types. Fourth, funds are likely to differ in terms of their control environments. Finally, advisory fees will likely reflect economies of scale.

Using a sample of 4,833 advisory contracts, we examine the link between advisor compensation and the nature of the underlying portfolios by relating the sensitivity and shape of advisor payoffs to various fund characteristics.

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[1] For example, see Crenshaw (1998), Gordon (1998), Rehak (1998), Marks and Knight (1999), and Singletary (1999).

We find that *marginal* compensation rates (i.e., the payoff to an advisor for a small change in fund assets given the fund's advisory contract and its current level of assets) are greater for: (a) equity fund advisors than for debt fund advisors, (b) foreign fund advisors than for domestic fund advisors, (c) advisors of funds with higher portfolio turnover, (d) closed-end fund advisors than for open-end fund advisors, (e) advisors of small funds than for large fund advisors, and (f) advisors of funds that are members of small fund families. The differences are economically meaningful as well as statistically significant. For example, for a $100 million increase in fund assets, an equity fund advisor earns $206,000 more than a bond fund advisor. For a similar increase in fund assets, a foreign fund advisor earns $161,000 more than a domestic fund advisor.

We interpret our results as suggesting that the sensitivity of payoffs under advisory contracts is related to the marginal product of fund advisors and the difficulty of monitoring their performance. The greater the marginal product of an advisor and the more difficult it is to monitor performance ex post, the greater the sensitivity of fees to fund performance. We also argue that the higher fees paid to closed-end fund advisors reflect a more difficult control environment associated with closed-end funds relative to open-end funds. It should be noted, however, that while the data support these interpretations, they are also consistent with advisor expropriation of fund investors. Our results with respect to fund size and fund family size, however, are consistent with economies of scale being passed along to investors—suggesting a competitive environment. We contend, therefore, that cross-sectional differences in marginal compensation rates reflect purposeful adaptations designed to mitigate agency conflicts between fund investors and fund advisors.

For the full sample of funds, we find no evidence that the concavity of advisor contracts (defined as the difference between the first and last marginal compensation rate under the advisory contract divided by the applicable marginal compensation rate) is related to portfolio composition. We do find, however, that smaller funds and funds that are members of small fund families have less concavity in their advisory contracts suggesting that they have advisory contracts that motivate fund advisors to take on greater risk. One explanation for that result is that small funds or funds that are members of small fund families must attract new investment to be economically viable. Prior research (Ippolito (1992) and Sirri and Tufano (1998)) finds that the link between fund performance and net new cash flows is only meaningful for the very best performers. Small funds and funds that are members of small fund families, then, have a greater incentive to assume the levels of risk that make such strong positive performance feasible.

This paper makes three contributions to the literature. First, I provide a detailed description of the contracts used in the mutual fund industry. Prior studies emphasize either a broad description of contract types (e.g., Golec (1992)) or cross-sectional variation of compensation schemes in a restricted sample (Coles et al. (2000)). We examine the advisory contracts of a

large sample of both open-end funds and closed-end funds. Thus, our results add to a growing body of research on advisor compensation (Starks (1987), Grinblatt and Titman (1989a), Golec (1992), Stoughton (1993), Heinkel and Stoughton (1994), Admati and Pfleiderer (1997), Coles et al. (2000)).

More generally, we extend the literature on the compensation of decision makers. There is extensive literature examining cross-sectional differences in the sensitivity of decision-maker wealth to shareholder wealth (e.g., Jensen and Murphy (1990a, 1990b), Gibbons and Murphy (1992), Bizjak, Brickley, and Coles (1993), and Hall and Liebman (1998)). That research is hindered by the lack of definitive measures of the important differences across firms. This study extends those studies by examining a broad sample of compensation schemes in a context where important differences across organizations are measurable.

Finally, my results speak to the ongoing debate between the mutual fund industry and regulators over the appropriateness of fund fees. If advisory contracts were purely arbitrary then we would expect little relation between contract form and fund characteristics. That I find such a relation suggests that there is some economic rationale for the choice of contract form. I also find that economies of scale are being passed along to investors. These results, together, suggest that any regulatory initiative aimed at protecting investors from "excessive fees" must carefully consider the potential costs and benefits of alternative fee structures. Also, our analysis highlights the importance of focusing on marginal costs rather than average costs. The current regulatory focus on fund expense ratios (i.e., average costs) is likely to be misguided and may, potentially, lead to incorrect inferences with respect to fund fees.

The rest of the paper proceeds as follows: Section I provides background on advisory contracts and presents preliminary empirical analysis, Section II focuses on percent of assets contracts and provides further analysis, Section III discusses alternative interpretations of our results, and Section IV concludes and suggests possible avenues for future research.

I. Background on Advisory Contracts and Preliminary Analysis

A. Investment Advisory Contracts

Baumol et al. (1990) note that the primary service supplied by mutual fund advisors under advisory contracts is portfolio management.[2] Portfolio management includes such activities as conducting research and making fund investment decisions. Advisors receive compensation (i.e., fees) in return for providing those services. The structure of advisory fees is largely

[2] Baumol et al. (1990) also note that the operation of a mutual fund requires other services, such as (a) shareholder servicing, (b) holding shareholder and directors' meetings, and (c) the issue, transfer, and cancellation of share certificates, which are also often supplied by the fund advisor. The issue of the level of services supplied by the fund advisor is addressed in the empirical analysis.

unconstrained by regulation. The one exception is a prohibition on the use of "performance fees" under section 205(a)(1) of the Investment Advisers Act of 1940 (Securities and Exchange Commission (1992)). Performance fee contracts are those that compensate advisors for portfolio gains, but do not penalize advisors for portfolio losses.[3] Because the structure of advisory fees is largely unconstrained, we suspect the structure of those fees will depend on the underlying contracting environment (Jensen and Meckling (1976)). For example, Murphy (1998) argues that when investors know little about the production function linking managerial action and investors' objective functions, it is optimal for contracts to provide a stronger link between managerial compensation and investor welfare.[4] This argument suggests that in environments associated with greater advisor marginal product, we expect to observe greater sensitivity of the fund advisor payoffs to changes in fund value or investor wealth.

A further possibility is that payoff sensitivities serve as a mechanism for differentiating among potential advisors. Jensen and Murphy (1990a) argue that firms may use the sensitivity between managerial payoffs and shareholder wealth to induce self-selection among managers with high marginal product managers preferring contracts with greater sensitivity and low marginal product managers preferring less sensitivity. Tufano and Sevick (1997) note that advisory contracts are the product of advisory firms themselves (subject to the approval by a majority of the noninterested directors on the fund's board). Thus, while it is unlikely that funds use marginal compensation to sort among potential advisors, it may very well be that advisors use marginal rates to signal marginal product. If marginal compensation rates are used as a mechanism for signaling advisor marginal product, then we expect that in environments requiring greater advisor marginal product, we will observe higher rates of marginal compensation.

Grinblatt and Titman (1989b, 1993) and Daniel et al. (1997) find evidence that aggressive growth and growth fund advisors have some ability to generate excess returns. Their results suggest that the marginal product of those advisors is greater than for advisors of other equity fund types. It seems reasonable to extend that argument to say that it is likely that the marginal product of equity fund managers exceeds that of debt fund advisors. Put differently, we believe that the amount and nature of private information possessed by equity fund managers about equity securities is likely to be of more value than the private information about debt securities held by debt

[3] Advisory contracts that specify that advisors share equally in losses as well as gains are allowed under the Investment Advisers Act of 1940. Also, Loss and Seligman (1995, p. 737) note that advisors are not prevented from using performance fees "if it does so through a subsidiary that satisfies the 'entity segregation' requirements." Thus, it may be possible to create an organizational structure that would contract around the regulatory prohibition on performance fees. Coles et al. (2000, p. 1388) note that possibility and conclude that there are "few, if any, regulatory limitations on the types of compensation contracts that are legally acceptable."

[4] Jensen and Murphy (1990a) note that this is precisely why investors relinquish decision rights to managers in the first place.

fund advisors. Therefore, we contend that equity funds involve greater marginal product on the part of fund advisors. We make a similar argument with respect to foreign funds relative to domestic funds.[5] Also, Ippolito (1992) and Edelen (1999) argue that better informed advisors engage in a greater amount of information-motivated trading. Thus, the level of portfolio trading activity is positively related to the quality of advisor information. This suggests that the marginal product of fund managers is directly related to portfolio turnover. If these arguments are correct, then we expect that equity fund advisors, foreign fund advisors, and advisors of funds with high turnover have higher marginal compensation rates than debt fund advisors, domestic funds advisors, and advisors of funds with low turnover, respectively.

We also expect that marginal compensation rates are related to the difficulty of monitoring advisor actions. Linking advisor payoffs to advisor actions mitigates the agency conflict between investors and advisors when advisor actions are observable. When managerial actions are only observable with some degree of noise, however, linking advisor payoffs to advisor actions becomes problematic (e.g., Mirrlees (1974, 1976), Holmstrom (1979), Shavell (1979), Grossman and Hart (1983), Gompers and Lerner (1996)). The existing literature suggests that when monitoring advisor actions is difficult, tying advisor payoffs to performance (as a summary statistic for advisor actions) becomes optimal. Gompers and Lerner (1996) find evidence consistent with that argument in the hedge fund industry. We assume that the difficulty of monitoring advisor actions is captured by the volatility of fund returns. Khorana (1996) finds that equity funds are more volatile than debt funds and that foreign funds are more volatile than domestic funds. Thus, we expect greater marginal compensation rates for equity fund advisors than for debt fund advisors and greater marginal compensation rates for foreign fund advisors than for domestic fund advisors.

Additionally, Fama and Jensen (1983a, 1983b) argue that open-end mutual funds offer "a special form of diffuse control" because fund investors, by redeeming their shares, may affect what amounts to a partial takeover or liquidation of the fund. The constant threat of withdrawal of fund assets serves as a disciplining mechanism for open-end fund advisors that is not present for closed-end fund advisors.[6] The absence of that disciplining force may result in the use of contractual alternatives to better align advisor and investor interests. This leads us to expect that closed-end fund advisors receive higher rates of marginal compensation (as a means of aligning their interests with those of closed-end fund investors) than open-end fund advisors.

[5] Discussion in the financial press is consistent with this view. For example, Mahar (1998, p. 27) argues that "International stock pickers must be able to track the politics and economics of dozens of nations while sorting through the ambiguities, and just plain bad information that floods world markets in an age of instant communication. Meanwhile, they're juggling variables ranging from currency risk to investor psychology on a global scale."

[6] Consistent with Fama and Jensen's (1983a, 1983b) contention, Barclay, Holderness, and Pontiff (1993) find that discounts to net asset value (NAV) for closed-end funds are at least partially explained by opportunistic behavior by fund managers.

Also of interest is the shape of advisory contracts—contracts vary in their degree of concavity. We contend that contracts that are less concave provide advisors with greater incentives to assume more portfolio risk than more concave contracts. That incentive is likely to be more valuable where the fund type implies riskier investments. This argument suggests that equity fund advisors and foreign fund advisors will have less concave advisory contracts than bond funds and domestic funds. The incentive to take on more risk is also likely to be of greater value to small funds or funds that are members of small fund families. Ippolito (1992) and Sirri and Tufano (1998) find that for the best performers, there is a positive link between fund performance and net cash flows to the fund. If small funds or funds that are members of small fund families must grow to attain an economically viable level of fund assets (assuming economies of scale), then greater levels of risk make such strong positive performance more likely. Thus, we expect small funds and funds that are members of small fund families to have contracts that are less concave.[7]

B. Sample Description and Preliminary Analysis

Our data are from investment company form N-SAR, which provides detailed information on contractual arrangements between advisors and funds. All regulated investment companies are required to file two N-SARs annually, one covering the first six months of the fiscal year (N-SARA) and the second covering the full year (N-SARB). We search the SEC's EDGAR web site for N-SARB filings from the first quarter of 1997 through the second quarter of 1998 for any investment company filing for a fiscal year-end sometime during 1997. These six quarters should provide a nearly exhaustive list of those funds that filed with the SEC for fiscal year 1997.

From the N-SARs, we collect the following data related to fund composition, trading activity, and control environment: whether a fund invests primarily in equity or debt; whether a fund invests primarily in U.S. securities or foreign securities; fund turnover (the lesser of purchases or sales divided by average net asset value); and whether a fund is open-end or closed-end. To capture effects related to economies of scale, we also collect the amount of assets under management and calculate the total assets managed (within sample) by the family to which a fund belongs. Also, to control for the level of services provided under the advisory contract, we collect the number of services supplied by the advisor.[8] Finally, we collect the details of the advisory contract itself and examine answers to the following six questions:

[7] Grinblatt and Titman (1989a) argue that there is a potential cost associated with less concave payoffs. The less concave the payoffs the greater are their incentives to increase fund risk in order to maximize expected fees. Greater expected fees result in lower expected wealth for investors. It is not clear how this potential cost varies in the cross section, so we focus on variation in the benefit of aligning incentives with respect to risk.

[8] See caption to Table I for types of services.

1. Did the fund have an advisory contract during the period?[9]
2. Was the fund's advisory fee based solely on a percentage of its assets?
3. If the fee was based solely on a percentage of assets, was the fee based on a single rate? If so, what was the rate? If the fee was based on multiple rates, what rates applied over what ranges of fund assets?
4. Was the fund's advisory fee based on some combined percentage of its income and assets?
5. Was the fund's advisory fee based in whole or in part on its investment performance?
6. Was the fund's advisory fee based in whole or in part upon the assets, income, or performance of other registrants?[10]

We use funds' answers to these questions to characterize their advisory contracts. To be included in the final sample, each fund must have an observable advisory contract. In addition, each fund must report each of the above data items. Further, we exclude money market funds from the sample. Those restrictions result in a sample of 5,198 funds. Panel A of Table I provides a breakdown of the sample funds and Panel B provides descriptive statistics for various fund characteristics. Sixty-two percent of the funds are equity funds while 38 percent invest primarily in debt securities. The overwhelming majority (82 percent) invest in domestic securities and 92 percent are open-end.

C. Basic Types of Advisory Contracts

As a first look at the sample contracts, we examine fund answers to Question 2: "Was the fund's advisory fee based solely on a percentage of its assets?" We find that 4,833 (93 percent) of the funds had advisory contracts based solely on a percent of assets. This result is consistent with Golec (1992) who finds that 6 percent of his sample of 476 open-end funds have a performance-based component to advisor compensation. It is also consistent with the theoretical arguments of Admati and Pfleiderer (1997). They argue that benchmark-adjusted performance measures are not optimal with respect to efficient risk sharing and incentive alignment.[11] It is also consistent with the conventional wisdom that percent-of-assets contracts define the industry norm.

[9] There are instances in the data where there is no advisory contract. One explanation for missing data is that some funds are not managed by an external advisor, but rather by employees who work directly for the fund itself. In these instances there would be no observable contract between the fund and the advisor.

[10] There is a potentially relevant seventh question on the N-SAR that funds answer: "Was the fund's advisory fee based solely on a percentage of its income?" None of the sample funds, however, had advisory contracts based solely on a percentage of income.

[11] The data do not allow us to identify the details of performance-based contracts. That is, we cannot explicitly identify what fraction of the nonpercent of asset contracts are actually benchmark adjusted. But, given that only seven percent of the sample funds have contracts that are not exclusively percent of assets, we contend that the frequency of benchmark-adjusted contracts is low.

Table I

Descriptive Statistics on All Funds

Our data are from the SEC's Electronic Data Gathering and Retrieval (EDGAR) world wide web site. The source is investment company form N-SARB. We search the EDGAR web site for N-SARB filings from the first quarter of 1997 through the second quarter of 1998 for any investment company filing for a fiscal year-end sometime during 1997. From the N-SARBs, we collect whether a fund invests primarily in equity or debt, whether a fund invests primarily in U.S. securities or foreign securities, fund turnover (the lesser of purchases or sales divided by average net asset value), and whether a fund is open-end or closed-end. To capture effects related to economies of scale and scope, we also collect the amount of assets under management and whether a fund is part of a family of funds. To control for the level of services provided under the advisory contract, we also collect the number of services supplied by the advisor. (Form N-SAR asks specifically if the following were provided under the advisory contract: (1) occupancy and office rental, (2) clerical and bookkeeping services, (3) accounting services, (4) services of independent auditors, (5) services of outside counsel, (6) registration and filing fees, (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. Thus, the number of services provided under the advisory contract ranges from 0 to 15.) Finally, we collect the details of the advisory contract itself. To be included in the final sample, each fund must have an observable advisory contract. In addition, each fund must report each of the above data items. Further, we exclude money market funds from the sample. The final sample consists of 5,198 funds.

Panel A: Sample Composition

	Number (% of Sample)
Total	5,198
Equity funds	3,204 (61.6)
Debt funds	1,994 (38.4)
Foreign funds	929 (17.9)
Domestic funds	4,269 (82.1)
Open-end funds	4,771 (91.8)
Closed-end funds	427 (8.2)

Panel B: Descriptive Statistics for Turnover, Fund Size, and the Number of Services Provided by the Advisor Under the Advisory Contract

	Mean	Median	Maximum	75th Percentile	25th Percentile	Minimum
Turnover	86	57	2,189	108	25	0
Fund size ($ million)	512	104	99,549	309	31	1
Family size ($ billion)	35	7	430	27	1	<1
Services	5.5	6	15	7	4	0

We examine the choice to use an advisory contract that is not based solely on a percent of assets in Table II. Of the 5,198 sample funds, 365 use contracts that contain some nonpercent of assets provision. In the first column of Table II, we perform a LOGIT regression on a dichotomous variable equal

Table II

LOGIT Analysis of the Use of Compensation Other Than Assets Under Management

The sample consists of 5,198 open-end and closed-end funds that filed annual N-SARs with the SEC for 1997. The dependent variable is set equal to one when a fund has a particular type of compensation (e.g., fees based on investment performance) and zero otherwise. *Equity* is a dichotomous variable that takes the value of one if a fund invests primarily in equity securities and zero if it invests primarily in debt securities. *Foreign* is a dichotomous variable that takes the value of one if a fund invests primarily in foreign securities and zero if it invests primarily in domestic securities. *Turnover* is the lesser of fund purchases or sales divided by average net assets value. *Closed-end* is a dichotomous variable that takes the value of one if a closed-end fund and zero if it is open-end. ln *Size* is the natural log of total fund net assets. *Family size* is the natural log of assets under management in the fund family to which the fund belongs. *Services* is the number of services supplied by the advisor under the advisory contract.

Variable	All Types of Nonassets Under Management Compensation	Advisory Fee Based on Some Combined Percentage of Its Income and Assets	Advisory Fee Based in Whole or in Part on Its Investment Performance	Advisory Fee Based in Whole or in Part upon the Assets, Income, or Performance of Other Registrants
Intercept	−14.03	−5.55	−11.82	−23.95
	(0.001)**	(0.001)**	(0.001)**	(0.001)**
Equity	−0.009	−1.69	1.71	0.517
	(0.943)	(0.001)**	(0.001)**	(0.003)**
Foreign	−0.428	−0.052	−0.062	−0.239
	(0.013)*	(0.873)	(0.822)	(0.248)
Turnover	0.589	−2.93	1.78	0.728
($\times 10^{-3}$)	(0.242)	(0.022)*	(0.007)**	(0.304)
Closed-end	−0.041	0.400	0.998	−2.39
	(0.824)	(0.098)	(0.001)**	(0.001)**
ln *Size*	0.127	0.153	0.375	0.044
	(0.001)**	(0.015)*	(0.001)**	(0.270)
Family size	0.588	0.047	0.107	1.18
	(0.001)**	(0.348)	(0.073)	(0.001)**
Services	0.034	0.039	−0.007	−0.037
	(0.075)	(0.180)	(0.833)	(0.175)
pseudo-R^2	17.9%	9.0%	10.9%	38.1%
Observations	5,198	5,198	5,198	5,198

* and ** indicate significance at the five and one percent levels, respectively.

to one if a fund uses an advisory contract that is not based solely on a percentage of assets (i.e., the fund answered "yes" to at least one of Questions 4, 5, or 6) and zero if it is based solely on assets under management. Controlling for the level of services, fund size and fund family size are related to using an advisory contract that is not based solely on a percent of assets. Large funds and funds that are members of large fund families are more likely to use contracts that are not based solely on a percent of

assets. This suggests that there may be some economies of scale associated with the use of nonstandard advisory contracts.[12]

Our variable capturing investment in equity versus debt has no explanatory power with respect to the use of nonstandard advisory contracts. One explanation for our result is that treating the different types of nonstandard advisory contracts as substitutes is inappropriate. To address that possibility, we examine the individual responses to Questions 4, 5, and 6. We create a dichotomous variable equal to one for each question when the fund answers "yes" and zero otherwise. We then repeat the above LOGIT analysis and report the results in the final three regressions of Table II.

The results suggest that it is inappropriate to treat the three as substitutes. In the second regression, equity (debt) fund advisors are less (more) likely to receive compensation based on some combined percentage of income and assets. In the third regression, equity fund advisors are more likely to receive compensation based in whole or in part on investment performance. These results are intuitively appealing and are consistent with contract types matching portfolio composition. Fees linked to income are found among those funds that are generally regarded as income-producing and fees linked to performance are linked to those funds that are generally regarded as performance-producing. These results paint a clearer picture of the use of nonstandard contracts. Because these nonstandard contract provisions are infrequently used, however, we exclude the funds that use them from our sample for the remainder of the paper and focus on the remaining 4,833 funds for which compensation is based solely on a percent of assets under management.

II. Percent of Assets Contracts

As noted above, contracts based solely on a percent of assets comprise an overwhelming majority of advisory contracts. In this section, we first examine marginal compensation rates and then the concavity of percent of assets contracts.

A. Applicable Marginal Compensation

We follow Coles et al. (2000, p. 1390) in defining our measure characterizing the sensitivity of fund advisory contracts to changes in investor wealth. They define the applicable marginal compensation rate as that compensation rate specified in the advisory contract given fund assets. They note that "the applicable marginal compensation rate is the percentage of a relatively 'small' change in NAV that will be captured or lost by the investment advisor." We report descriptive statistics for the applicable marginal compensa-

[12] In a sample of 27 open-end funds with performance-based advisory contracts, Golec (1992) finds that the magnitude of the performance component is negatively related to fund size.

Table III

Univariate Analysis of Marginal Compensation Rates

The sample consists of 4,833 funds that filed annual N-SARs with the SEC for 1997 and that had advisory contracts based solely on a percent of assets under management (i.e., we exclude funds with compensation tied to other factors such as income or performance). *Turnover* is the lesser of fund purchases or sales divided by average net assets value. ln *Size* is the natural log of total fund net assets. *Family size* is the natural log of assets under management in the fund family to which the fund belongs. *Services* is the number of services supplied by the advisor under the advisory contract.

Panel A: Descriptive Statistics for Marginal Rate of Compensation

	Mean	Median	Minimum	Maximum
Marginal rate (%)	0.680	0.650	0.003	7.500

Panel B: Comparison of Mean Marginal Rate of Compensation by Fund Type

	Mean Marginal Rate	Test for Difference
Equity vs. *debt*	0.767	
	0.537	33.18**
Foreign vs. *domestic*	0.862	
	0.639	20.83**
Closed-end vs. *open-end*	0.678	
	0.680	−0.11

Panel C: Comparison of Mean Marginal Compensation Rates by Quartile Ranking of each Explanatory Variable (1 = smallest)

	1	2	3	4	Pearson Correlation (p-value)	Spearman Correlation (p-value)
Turnover	0.606	0.676	0.719	0.718	0.078 (.001)**	0.168 (0.001)**
ln *Size*	0.731	0.696	0.689	0.603	−0.178 (.001)**	−0.174 (.001)**
Family size	0.754	0.700	0.648	0.617	−0.202 (0.001)**	−0.219 (0.001)**
Services	0.661	0.661	0.696	0.698	0.083 (0.001)**	0.053 (0.001)**

* and ** indicate significance at the five and one percent levels, respectively.

tion rate for funds whose advisory contracts are based solely on a percent of assets in Panel A of Table III. The mean (median) applicable marginal compensation rate is 0.680 percent (0.650 percent). In their study of closed-end funds, Coles et al. (2000) find a mean (median) applicable marginal compensation rate of 0.546 percent (0.500 percent). Our marginal compensation rates are comparable, though somewhat greater. For a $100 million increase in fund assets, the mean (median) applicable marginal compensation rate implies a $680,000 ($650,000) increase in advisor compensation.

We provide preliminary evidence on the link between marginal compensation rates and underlying portfolio characteristics using univariate analysis in Panels B and C of Table III. In Panel B, equity fund advisors have significantly greater marginal compensation rates than debt fund advisors (0.767 percent vs. 0.537 percent) and the same is true for foreign fund advisors relative to domestic fund advisors (0.862 percent vs. 0.639 percent). In Panel C we report mean marginal rates across subsamples based on quartile rankings of turnover. We see that marginal compensation rates increase across turnover quartiles from a low of 0.606 percent for funds in the lowest turnover quartile to 0.718 percent for funds in the highest quartile. That result suggests that marginal compensation rates are related to fund trading activity.

The results in Table III also suggest marginal compensation rates are related to fund size and fund family size. In Panel C, we see that mean marginal compensation rate is monotonically decreasing in fund size from a high of 0.731 percent for funds in the smallest size quartile down to 0.603 percent for funds in the largest size quartile (the Pearson and Spearman correlations are significantly negative). Likewise, the mean marginal compensation rate is monotonically decreasing in fund family size from a high of 0.754 percent for funds in the smallest family size quartile down to 0.617 percent for funds in the largest family size quintile (here, as well, the Pearson and Spearman correlations are significantly negative).

In Table IV, we examine marginal compensation rates in a multivariate setting. Christoffersen (1999) finds that among money market funds, it is not uncommon for advisory firms to voluntarily reimburse fund expenses. Her finding introduces the possibility that ex ante contracting (as reflected in the advisory contracts) is affected by the possibility of ex post reimbursement by the advisory firm. To control for that possibility, we include the amount of reimbursed expenses (as reported on form N-SAR) scaled by fund size in the multivariate analysis.[13]

The first column reports regression results for marginal compensation rates for the full sample of advisory contracts. Consistent with the univariate analysis, we find that equity fund advisors and foreign fund advisors receive higher marginal compensation rates. Also, marginal rates are increasing in fund turnover. We also find that closed-end fund advisors have significantly greater marginal compensation rates than open-end fund advisors. Finally, we confirm that marginal compensation rates are declining in fund size and fund family size.

These relations are economically meaningful as well as statistically significant. For example, the marginal compensation rate of equity funds advisors is 0.206 percent greater than debt fund advisors. Likewise, the marginal

[13] The N-SAR data do not allow us to observe whether funds have contractual provisions specifying the reimbursement of expenses beyond some level. Including the amount of reimbursed expenses controls for actual expense reimbursement, but it does not fully capture promised expense reimbursement. Some funds may have promised reimbursements, but did not experience conditions requiring reimbursement.

We also perform the analysis using an indicator variable to capture whether any expenses were reimbursed. The results are the same.

Table IV

Regression Analysis of Marginal Compensation Rates

The sample consists of funds that filed annual N-SARs with the SEC for 1997 and that had advisory contracts based solely on a percent of assets under management (i.e., we exclude funds with compensation tied to other factors such as income or performance). *Equity* is a dichotomous variable that takes the value of one if a fund invests primarily in equity securities and zero if it invests primarily in debt securities. *Foreign* is a dichotomous variable that takes the value of one if a fund invests primarily in foreign securities and zero if it invests primarily in domestic securities. *Turnover* is the lesser of fund purchases or sales divided by average net assets value. *Closed-end* is a dichotomous variable that takes the value of one if a closed-end fund and zero if it is open-end. ln *Size* is the natural log of total fund net assets. *Family size* is the natural log of assets under management in the fund family to which the fund belongs. *Services* is the number of services supplied by the advisor under the advisory contract. *Reimbursed expenses* is the amount of reimbursed expenses scaled by fund size.

		Equity Versus Debt Funds		Foreign Versus Domestic Funds		Closed-end Versus Open-end Funds	
Variable	Full Sample	Equity Funds	Debt Funds	Foreign Funds	Domestic Funds	Closed-end Funds	Open-end Funds
Intercept	0.938	1.245	0.669	1.058	0.939	0.545	0.974
	(28.34)**	(27.59)**	(17.89)**	(11.39)**	(26.42)**	(4.12)**	(28.36)**
Equity	0.206			0.251	0.200	0.206	0.205
	(25.59)**			(8.58)**	(23.72)**	(6.70)**	(24.53)**
Foreign	0.161	0.174	0.162			0.275	0.155
	(16.64)**	(13.68)**	(11.11)**			(8.61)**	(15.08)**
Turnover ($\times 10^{-3}$)	0.247	0.410	0.066	0.339	0.241	0.537	0.234
	(7.46)**	(7.58)**	(2.14)*	(3.11)**	(6.88)**	(3.57)**	(6.87)**
Closed-end	0.097	0.092	0.069	0.155	0.076		
	(7.09)**	(3.19)**	(6.50)**	(5.14)**	(4.89)**		
ln *Size*	−0.022	−0.025	−0.011	−0.022	−0.023	−0.027	−0.022
	(−9.02)**	(−7.36)**	(−3.96)**	(−3.57)**	(−8.39)**	(−2.50)*	(−8.52)**
Family size	−0.014	−0.021	−0.002	−0.017	−0.014	0.020	−0.017
	(−7.90)**	(−8.04)**	(−0.81)	(−3.59)**	(−6.82)**	(3.82)**	(−8.83)**
Services	0.006	0.008	−0.001	0.010	0.005	−0.004	0.006
	(5.20)**	(5.60)**	(−0.79)	(3.19)**	(4.27)**	(−0.81)	(5.36)**
Reimbursed expenses	0.366	0.354	−0.536	−0.174	0.641	15.17	.294
	(0.82)	(0.60)	(−0.92)	(−0.20)	(1.19)	(1.06)	(0.65)
Adjusted R^2	25.6%	14.9%	9.9%	13.2%	19.7%	45.8%	24.6%
Observations	4,833	2,996	1,837	881	3,952	393	4,440

* and ** indicate significance at the five and one percent levels, respectively.

compensation rate of foreign fund advisors is 0.161 percent greater than domestic fund advisors. For an increase of $100 million in fund assets, these differences translate into $206,000 and $161,000 more compensation for equity and foreign fund advisors relative to debt and domestic fund advisors, respectively. For closed-end fund advisors, the marginal compensation rate is 0.097 percent ($97,000 for a $100 million increase in fund assets) greater than for open-end fund advisors. Thus, the evidence is consistent with a strong link between the underlying nature of a fund's portfolio and its control environment and its marginal compensation rate. To ensure that our results are not driven by any particular subset of funds, we repeat the analysis across various fund subsamples. The results, which are reported in the remaining columns of Table IV, are similar.

We also find that marginal compensation rates decline in fund size and are lower for funds that are members of large fund families. The estimated coefficients imply that an advisor of an open-end, domestic equity fund at the 10th percentile of fund size (and setting all other variables to their means) receives a marginal compensation rate of 0.785 percent. The corresponding number for a fund at the 90th percentile of fund size is 0.686 percent. The difference, 0.099 percent, is economically meaningful. The difference between the 10th percentile and the 90th percentile of family size is also an economically meaningful 0.078 percent. These results suggest economies of scale that are being passed along to investors. As fund size increases, or if a fund is a member of a large fund family, costs are spread across more assets. A typical example of such a cost would be expenditures on research. Research becomes less costly as fund size increases (assuming portfolio composition remains the same) or as it can be shared by multiple funds.

The above results are consistent with the argument that differences in marginal compensation rates reflect differences in advisor marginal product, differences in the difficulty of monitoring performance, differences in control environments, and differences in economies of scale. Koski and Pontiff (1999) argue that funds make use of derivatives as a means of reducing the transaction costs necessary to maintain a given portfolio exposure. Trading derivatives may require greater advisor marginal product and therefore the use of derivatives may offer an opportunity to speak directly to the link between advisor marginal product and marginal compensation rates. Similarly, because their management is largely mechanical and they require little in the way of ongoing advisor discretion, index funds may also offer an opportunity to examine the link between advisor marginal product and marginal compensation rates. We examine those possibilities by including in the analysis an indicator variable for the use of derivatives during the reporting period and an indicator variable for whether a fund is an index fund (both from form N-SAR). We find no relation between the use of derivatives and advisor marginal compensation rates, but we do find that advisor marginal compensation rates are 0.396 percent lower for index fund advisors (significant at the one percent level). This result is consistent with low marginal product advisors receiving low marginal compensation rates.

To further explore the determinants of marginal compensation rates, we examine the link between the primary investment objective of the equity funds in our sample (as funds report in form N-SAR) and marginal compensation rates. Form N-SAR requires equity funds to classify their primary investment objective as either: (a) aggressive capital appreciation, (b) capital appreciation, (c) growth, (d) growth and income, (e) income, or (f) total return. We examine the link between investment objectives and marginal rates in Table V. We include a dummy variable for each of the investment objectives except growth and income. The dummy variable coefficients, therefore, capture differences in marginal compensation rates relative to growth and income funds.

In Table V, aggressive capital appreciation, capital appreciation, and growth funds all have significantly greater marginal compensation rates than growth and income funds. Again, relying on the evidence of Grinblatt and Titman (1989b, 1993) and Daniel et al. (1997), it seems likely that those funds involve greater advisor marginal product. It also seems likely that those types of funds involve greater return volatility and hence, greater difficulty in monitoring performance. Thus, these results within equity funds are consistent with those found when examining differences between debt and equity funds.

We also examine the link between portfolio holdings and marginal compensation rates among bond funds. We classify each bond fund according to the type of debt that makes up the largest percentage of its holdings (again, using data from form N-SAR). For the second regression of Table V we classify debt as either government or nongovernment and include a dummy variable to indicate nongovernment debt. Thus, the coefficient on that variable captures the difference in marginal compensation rates between government debt funds and nongovernment debt funds. For the third regression, we classify government debt into specific types and omit a dummy for U.S. Treasuries.

While there is no difference among types of government debt funds, nongovernment debt fund advisors receive greater marginal compensation rates than their government debt fund counterparts. We contend that nongovernment bond funds involve greater advisor marginal product. Also, Khorana (1996) finds that nongovernment debt funds have more volatile returns than government debt funds, suggesting that performance is more difficult to measure for nongovernment debt funds. Thus, these results within debt funds are also consistent with those found when looking at differences between debt and equity funds. Overall, the results within the equity and debt fund subsamples are consistent with differences in advisor marginal compensation rates reflecting differences in advisor marginal product and differences in the difficulty of monitoring performance.

B. Concavity

Our focus to this point has been exclusively on the sensitivity of advisor payoffs to changes in fund assets. Among the 4,833 contracts based solely on a percent of assets, however, we observe two types of contracts: (a) contracts that are linear in fund assets (i.e., there is a single, constant rate that ap-

Table V

Marginal Compensation Rates by Equity and Debt Subsamples

The sample consists of funds that filed annual N-SARs with the SEC for 1997 and that had advisory contracts based solely on a percent of assets under management (i.e., we exclude funds with compensation tied to other factors such as income or performance). Each of the fund type variables (e.g., aggressive growth, capital appreciation, etc.) is dichotomous and takes the value of one if a fund is of that type and zero otherwise. *Foreign* is a dichotomous variable that takes the value of one if a fund invests primarily in foreign securities and zero if it invests primarily in domestic securities. *Turnover* is the lesser of fund purchases or sales divided by average net assets value. *Closed-end* is a dichotomous variable that takes the value of one if a closed-end fund and zero if it is open-end. ln *Size* is the natural log of total fund net assets. *Family size* is the natural log of assets under management in the fund family to which the fund belongs. *Services* is the number of services supplied by the advisor under the advisory contract. *Reimbursed expenses* is the amount of reimbursed expenses scaled by fund size.

Variable	Equity Subsample (Intercept = Domestic Growth and Income Funds)	Debt Subsample (Intercept = Domestic Government Debt Funds)	Debt Subsample (Intercept = U.S. Treasury Funds)
Intercept	1.15	0.656	0.653
	(24.77)	(17.56)**	(17.25)**
Aggressive growth	0.152		
	(5.34)**		
Capital appreciation	0.120		
	(7.64)**		
Growth	0.110		
	(6.55)**		
Income	0.010		
	(0.29)		
Total return	0.008		
	(0.42)		
U.S. agency			−0.004
			(−0.26)
Municipals			0.013
			(0.99)
Nongovernment		0.039	0.046
		(4.31)**	(3.34)**
Foreign	0.150	0.138	0.138
	(11.57)**	(8.91)**	(8.89)**
Turnover ($\times 10^{-3}$)	0.352	0.039	0.053
	(6.58)**	(1.24)	(1.62)
Closed-end	0.086	0.069	.067
	(2.95)**	(6.55)**	(6.32)**
ln *Size*	−0.025	−0.012	−0.012
	(−7.43)**	(−4.30)**	(−4.20)**
Family size	−0.019	−0.001	−0.001
	(−7.45)**	(−0.27)	(−0.52)
Services	0.009	−0.001	−0.001
	(5.72)**	(−0.92)	(−0.95)
Reimbursed expenses	0.399	−0.454	−0.405
	(0.68)	(−0.78)	(−0.69)
Adjusted R^2	17.6%	10.8%	10.8%
Observations	2,996	1,837	1,837

** indicates significance at the one percent level.

plies regardless of the level of fund assets); and (b) contracts that are concave in fund assets (i.e., there are multiple fee rates and those rates decline in fund assets).[14] Within this sample, 66 percent of the contracts are linear and the remaining 34 percent are concave.

We follow Coles et al. (2000) and define the concavity of an advisory contract as the difference between the first and last marginal compensation rates divided by the applicable marginal compensation rate. Thus, our measure of concavity takes the value of zero for linear (i.e., single-rate) contracts and positive values for contracts whose payoffs are concave in fund assets. We provide evidence on the link between concavity and portfolio composition using multivariate analysis in Table VI. There is little relation between underlying portfolio composition and the concavity of advisory contracts.[15] We do find that closed-end funds are less likely to face concave payoffs under their advisory contracts. From the subsample analysis presented in the remaining columns of Table VI, however, it appears that that result is specific to debt funds and domestic funds. We do find that there are strong relations between fund size and concavity and between fund family size and concavity. Small funds and funds that are members of small fund families have less concavity in their advisory contracts.[16] This result suggests that small funds and funds that are members of small fund families have advisory contracts that motivate fund advisors to take on more risk.

III. Discussion

As analyzed in Section II, marginal compensation rates are greater for: (a) equity fund advisors than for debt fund advisors, (b) foreign fund advisors than for domestic fund advisors, (c) advisors of funds with greater portfolio turnover, (d) closed-end fund advisors than for open-end fund advisors, (e) advisors of small funds, and (f) advisors of funds that are members of small fund families. We also find that smaller funds and funds that are members of small fund families have less concavity in their advisory contracts.

[14] Concave advisory contracts have multiple segments. For example, a fund advisor might receive 0.750 percent for the first $500 million of fund assets, 0.650 percent for the next $500 million, and 0.500 percent for all fund assets in excess of $1 billion.

[15] We also follow Coles et al. (2000) in defining an alternative measure meant to capture local concavity. That measure is calculated in the same way but we use the two marginal rates adjacent to the applicable marginal compensation rate. If either of those rates does not exist, we use the applicable marginal compensation rate. Results using this local measure of concavity are similar to those reported for the global measure of concavity.

[16] Heinkel and Stoughton (1994) model the evolution of advisory contracts with a focus on performance-based fees. Their two-period model predicts that for managers that are retained, the second-period contract will provide higher fees and greater performance-based compensation. To the extent their model is descriptive, the relation that we observe between fund size (which is related to prior performance) and managerial compensation reflects both realized economies of scale and their contracting mechanism. Given that their model predicts greater compensation to be related to prior performance (i.e., fund size) this suggests the scale economies are even greater than observed in the data.

Table VI
Regression Analysis of Concavity

The sample consists of funds that filed annual N-SARs with the SEC for 1997 and that had advisory contracts based solely on a percent of assets under management (i.e., we exclude funds with compensation tied to other factors such as income or performance). Concavity is calculated as the difference between the first and last marginal compensation rates divided by the applicable marginal compensation rate. *Equity* is a dichotomous variable that takes the value of one if a fund invests primarily in equity securities and zero if it invests primarily in debt securities. *Foreign* is a dichotomous variable that takes the value of one if a fund invests primarily in foreign securities and zero if it invests primarily in domestic securities. *Turnover* is the lesser of fund purchases or sales divided by average net assets value. *Closed-end* is a dichotomous variable that takes the value of one if a closed-end fund and zero if it is open-end. ln *Size* is the natural log of total fund net assets. *Family size* is the natural log of assets under management in the fund family to which the fund belongs. *Services* is the number of services supplied by the advisor under the advisory contract. *Reimbursed expenses* is the amount of reimbursed expenses scaled by fund size.

		Equity Versus Debt Funds		Foreign Versus Domestic Funds		Closed-end Versus Open-end Funds	
Variable	Full Sample	Equity Funds	Debt Funds	Foreign Funds	Domestic Funds	Closed-end Funds	Open-end Funds
Intercept	−0.215	−0.221	−0.220	−0.143	−0.235	−0.073	−0.230
	(−9.22)**	(−7.69)**	(−5.82)**	(−2.43)*	(−9.21)**	(−0.63)	(−9.65)**
Equity	−0.003			0.040	−0.011	0.045	−0.007
	(−0.51)			(2.16)*	(−1.90)	(1.64)	(−1.21)
Foreign	−0.007	−0.004	−0.037			0.011	−0.015
	(−1.05)	(−0.53)	(−2.58)*			(0.41)	(−2.13)*
Turnover ($\times 10^{-3}$)	−0.049	−0.026	−0.056	−0.054	−.039	0.133	−0.058
	(−2.09)*	(−0.75)	(−1.81)	(−0.79)	(−1.53)	(1.00)	(−2.46)*
Closed-end	−0.032	0.030	−0.062	0.045	−0.055		
	(−3.34)**	(1.59)	(−5.78)**	(−2.34)*	(−4.92)**		
ln *Size*	0.017	0.018	0.016	0.002	0.021	0.018	0.017
	(10.09)**	(8.24)**	(5.57)**	(0.56)	(10.69)**	(1.84)	(9.60)**
Family size	0.006	0.006	0.008	0.010	0.005	0.004	0.004
	(4.83)**	(3.59)**	(4.77)**	(3.34)**	(5.56)**	(0.92)	(5.62)**
Services	0.004	0.004	0.006	0.004	0.005	0.004	0.004
	(5.79)**	(3.74)**	(4.77)**	(1.96)	(5.56)**	(0.92)	(5.62)**
Reimbursed expenses	0.126	0.303	−0.432	−0.703	0.431	−11.25	0.197
	(0.40)	(0.80)	(−0.73)	(−1.32)	(1.12)	(−0.89)	(0.63)
Adjusted R^2	5.1%	4.8%	6.8%	3.6%	6.1%	2.8%	5.8%
Observations	4,833	2,996	1,837	881	3,952	393	4,440

* and ** indicate significance at the five and one percent levels, respectively.

A. Optimality Versus Opportunism

In the above analysis, we assume competition drives cross-sectional variation in contract provisions and find evidence consistent with theory linking the contracting environment and the sensitivity of advisors' payoffs to changes in investor wealth. Our interpretation of the results is implicitly based on the assumption that competition and economic Darwinism drive out suboptimal contractual arrangements. Our results, however, may also be consistent with systematic opportunism by advisors. Barclay et al. (1993) argue that closed-end fund advisors are able to consume private benefits at the expense of investors.[17] Thus, the higher marginal compensation rates received by closed-end fund advisors may simply reflect the ability of closed-end fund advisors to extract rents from investors. A similar argument can be made across fund types within a given fund organizational form. Barclay et al. (1993) argue that differences in portfolios lead to differences in the opportunities to consume perquisites. In particular, they argue that more volatile net asset values make perquisite consumption more difficult to detect in equity funds than in bond funds.[18] Our results with respect to the difficulty of monitoring (as proxied by fund type), then, may merely reflect the greater ability of advisors to extract rents from investors when the monitoring environment is noisy.

While the data are also consistent with opportunism, we consider that explanation less appealing. Barclay et al. (1993) point out that it seems unlikely that advisor opportunism would take the form of high marginal compensation rates which are visible to the investing public at low cost. Also, Baumol et al. (1990) note that advisor opportunism is limited by the extent of competition in the mutual fund industry. We suspect that contracting in the mutual fund industry is best characterized as competitive for at least three reasons. First, our results suggest that economies of scale are passed along to investors in the form of lower marginal fees. If competition did not force funds to pass along economies of scale, it is unclear why larger funds would have lower marginal compensation rates.[19] Second, the sheer number of mutual funds and the seemingly low barriers to entry suggest that it is probably appropriate to characterize the industry as competitive. Finally, we note

[17] Barclay et al. (1993, p. 275) make this argument with respect to a large blockholder. Specifically, they argue that "blockholders are more likely to consume private benefits by diverting existing expenses from profitable activities than by increasing the overall level of expenses. For example, a blockholder may manage the fund's portfolio himself rather than hiring a more competent manager." Also, Khorana, Wahal, and Zenner (1999) find evidence of advisor opportunism around rights offerings by closed-end funds.

[18] Consistent with this argument, Tufano and Sevick (1997) contend that boards of certain types of funds (e.g., foreign funds) are called upon to perform greater oversight than boards of other types of funds (e.g., domestic funds).

[19] We do note, however, that while declining marginal rates are consistent with competition, they do not rule out the possibility of some level of opportunism. Put differently, while funds may pass along some economies of scale to investors, they may not pass along all of the economies of scale.

that Coles et al. (2000) find that closed-end fund premiums are positively related to advisor marginal compensation rates. If advisor marginal compensation rates were driven by perquisite consumption, then we would expect the opposite relation. We acknowledge, however, that this issue is not without contention.

A related issue stems from the use of percent of assets contracts and asymmetric net cash flows in response to fund performance. Brown, Harlow, and Starks (1996) and Chevalier and Ellison (1997) show that, among open-end fund advisors, poorly performing advisors have an incentive to increase fund risk and advisors performing well have an incentive to reduce fund risk. The incentive to manipulate fund risk arises from asymmetries in advisor payoffs which, in turn, arise from asymmetries in net cash flows in response to fund performance (Ippolito (1992), Sirri and Tufano (1998)). Because fund advisors are compensated based on a percent of assets, they face optionlike payoffs. Following good performance, managers have an incentive to decrease risk (i.e., "coast") and following poor performance, they have an incentive to substantially increase fund risk (i.e., "go for broke"). Brown et al. (1996, p. 109) conclude: "Perhaps the most important implication of this research is that it is possible that the current tournament structure of the mutual fund industry truly does provide *adverse* incentives to fund managers" (emphasis added). In particular, they find that small fund managers are the most likely to alter fund risk conditional of prior performance.

Our findings suggest that characterizing these incentives as "adverse" may be inappropriate. In Tables IV and VI, we find that small funds have contracts that have the greatest marginal compensation rates and are the least concave. Low marginal rate, concave advisory contracts tend to attenuate the incentive to alter fund risk. If the incentive to manipulate risk is indeed suboptimal, our results suggest that funds tend to have precisely the wrong types of contracts, that is, they have contracts which are the most likely to induce suboptimal behavior. Given the previous discussion on the competitiveness of the mutual fund industry, we find the argument of systematic miscontracting less compelling.

What, then, explains the use of high-rate linear contracts among small funds? It may be that the cost structures of mutual funds make the risk incentives associated with such contracts optimal rather than suboptimal. For example, if mutual funds involve significant scale economies (which our results suggest is the case), new fund survival may depend on rapid growth in fund assets. In other words, the fund must either "grow or die." In the face of such a cost structure, it may be in the interest of investors in a small fund that has performed poorly to increase fund risk or for a small fund that has done well to lock in its performance by decreasing fund risk.

B. Advisor Compensation and Net New Cash Flows

As noted above, net cash flows to the fund are potentially affected by prior performance. This suggests that an advisor that does well will experience a rise in dollar compensation both because fund assets have grown as a result

of that performance and also because new cash may flow into the fund. With that possibility in mind, it is interesting to explore the relative magnitudes of the two effects.

The results of Sirri and Tufano (1998) offer an opportunity to form at least a rough estimate of the relative magnitudes. They estimate the relation between within-mutual-fund-category performance percentile rankings and net new cash flows for each of five performance quintiles. For funds in the lowest four performance quintiles, they find no relation between performance and fund flows. Thus, for 80 percent of funds, the gains in advisor compensation resulting from performance are entirely a function of the growth in fund assets resulting from that performance.

The results are different for funds in the highest performing quintile of funds. Sirri and Tufano (1998) find that those funds experience an inflow equal to 1.693 percent of fund assets for each percentile performance ranking increase. They note that a five percentile increase for funds in the highest performance quintile (e.g., from the 85th to the 90th percentile) is associated with 8.4 percent greater net cash flow into the fund. Unfortunately, Sirri and Tufano (1998) do not report summary statistics for performance by performance quintile, but if we assume that performance is on the order of 20 percent to 40 percent, this suggests that changes in the dollar compensation resulting from inflows driven by performance are a large fraction of the total dollar gains advisors experience. Overall, we note that for the vast majority of funds (in terms of performance) the marginal compensation rate captures the total sensitivity of advisor compensation to fund performance, but for funds that perform exceptionally well, the marginal rate tends to understate the total sensitivity between advisor compensation and fund performance.

C. Limitations

Our research has several important limitations. First, our focus is on how fund characteristics affect advisor compensation. Our analysis essentially ignores the possibility that advisor compensation may affect fund characteristics. This is potentially the case for fund turnover in particular. We interpret our turnover results as suggesting that higher marginal product advisors have greater marginal compensation rates. Starks (1987) notes the conflict between investors and fund advisors with respect to expending resources (e.g., effort). Higher marginal rates of compensation may lead to greater expenditure of resources which could, in turn, lead to greater portfolio trading activity. Thus, marginal compensation rates could drive turnover. We suspect that elements of both interpretations are likely to be correct.

A second potential problem is the possibility that marginal compensation rates and fund characteristics are both driven by some unaccounted for factor such as advisor marginal product. For example, Nanda, Narayanan, and Warther (2000) argue that high marginal product advisors use lower advisory fees and higher load fees to attract investors with little demand for liquidity. Thus, advisor marginal product drives both fee structure and port-

folio composition. While the specific arguments of Nanda et al. (2000) tend to work against our empirical findings, they do suggest that our empirical analysis is potentially affected by endogeneity.

Also, we are not observing contracts between an individual and a firm. We are observing contracts between two firms—the firm providing the advisory services and the fund itself. We do not observe contracting within the advisory firm. That is, we cannot observe the incentives of individual fund managers. This is potentially problematic. Internal contracts may not provide fund managers with the correct (from the investor's viewpoint) incentives. We suggest, however, that fund investors would rationally forecast the effects of suboptimal contracts and either revalue the advisory firm's services downward or invest their money elsewhere. This suggests that contracting internal to advisory firms will reflect the motivations contained in the contracts between funds and advisory firms. While we have no direct evidence on fund manager compensation, indirect evidence from fund manager turnover is consistent with this notion. We find that equity fund advisors receive greater marginal compensation rates than bond fund advisors. One explanation for that result is that equity fund performance is more difficult to monitor than bond fund performance. Khorana (1996) finds that equity mutual funds are more forgiving of poor performance than bond funds. That is, equity fund managers can experience greater levels of poor performance before being removed. Khorana (1996) interprets that result as evidence that contracting within advisory firms implicitly acknowledges differences in the ability to monitor performance.

It may also be the case that the contracts between funds and the advisory firms and contracts between advisory firms and fund managers take different forms, but act jointly to affect incentives consistent with those of fund investors. In other words, the contract between the fund and the advisory firm may be contingent on contracting internal to the advisory firm. Our empirical analysis, then, is potentially biased due to an omitted variables problem. We suspect, however, that it is unlikely that advisory contracts are written contingent on contracting internal to the advisory firm because the internal contracting of the advisory firm is beyond the influence of the fund's board of directors.

A final possible limitation of our study is that there may be substitutes for compensation under advisory contracts that we fail to observe. One candidate would be ownership in the fund by the advisory firm. For example, it may be the case that bond funds have greater advisor ownership that serves as a substitute for marginal compensation rates under the advisory contract.[20] Our results, then, are subject to the caveat that we are unable to observe substitutes, such as advisory firm ownership, for compensation under advisory contracts.

[20] Barclay et al. (1993), however, find greater managerial ownership of equity funds than bond funds.

IV. Conclusion and Future Research

We find that marginal compensation rates are greater for: (a) equity fund advisors than for debt fund advisors, (b) foreign fund advisors than for domestic fund advisors, (c) advisors of funds with higher portfolio turnover, (d) closed-end fund advisors than for open-end fund advisors, (e) advisors of small funds, and (f) advisors of funds that are not members of fund families. The differences are economically meaningful as well as statistically significant. We interpret our results as suggesting that the sensitivity of payoffs under advisory contracts is related to the marginal product of fund advisors and the difficulty of monitoring their performance. We also argue that the higher fees paid to closed-end fund advisors reflect a more difficult control environment associated with closed-end funds relative to open-end funds. We interpret our results with respect to fund size and fund family size as suggesting that there are scale economies in managing a fund that are passed along to investors.

We find no evidence that the concavity of advisor contracts is related to portfolio composition. We do find, however, that smaller funds and funds that are members of small fund families have less concavity in their advisory contracts, suggesting that those funds have advisory contracts that motivate fund advisors to take on more risk. We suggest that this difference in concavity reflects the need of small funds to grow to an economically viable level of assets or liquidate.

Our paper provides a detailed description of the contracts used in the mutual fund industry. In documenting factors related to advisor compensation, our results speak to the more general issue of the compensation of decision makers. Our results suggest that the sensitivity of decision-maker wealth to shareholder wealth is related to decision-maker marginal product, the difficulty of monitoring performance, and the control environment. Our results also speak to an ongoing debate regarding the appropriateness of mutual fund fees. They suggest that competitive forces drive systematic cross-sectional variation in the sensitivity and shape of advisor compensation.

While our results suggest that cross-sectional differences in marginal compensation rates reflect optimal contracting, they do not allow us to speak to the absolute level of marginal compensation rates. Also, we are unable to examine how industry-wide marginal compensation rates have changed over time. Nor, given the cross-sectional nature of our data, are we able to directly examine how individual advisory contracts evolve over time. Such areas of inquiry represent valuable avenues for future research.

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