

**Expense Shifting:
An Empirical Study of Agency Costs in the Mutual Fund Industry**

Nicolaj Siggelkow

Management Department
Wharton School
2017 Steinberg Hall – Dietrich Hall
University of Pennsylvania
Philadelphia, PA 19104

siggelkow@wharton.upenn.edu
tel: (215) 573-7137
fax: (215) 898-0401

Abstract: Using a data set comprising almost all equity and bond funds in existence in 1996, we find that fund providers shift advertising and distribution expenses via so-called 12b-1 fees onto fund shareholders. It is further shown that bond funds with 12b-1 fees are more risky, while having similar returns, than bond funds without 12b-1 fees. Lastly, we find that fund providers shift part of their research expenses onto fund shareholders by generating soft dollars (rebates in form of research services provided by brokers in return for excess commissions paid by fund providers) and not reducing explicit fees.

Keywords: Mutual Funds, Agency Costs, 12b-1 Fees, Soft Dollars

JEL classification: G23, D23, D82, L14

Draft Date: January 4, 1999

I would like to thank Pankaj Ghemawat, Witold Henisz, Anne Marie Knott, Bruce Kogut, Daniel Levinthal, Michael Porter, Adrian Tschoegl, and Joel Waldfogel for helpful comments.

1. Introduction

Starting with the seminal work of Jensen and Meckling (1976), the principal-agent problem has found considerable attention in both the empirical and theoretical literature on the economics of organizations. For instance, the incentives of managers rather than the benefits to shareholders appear to drive the decisions with respect to firm acquisitions, asset sales, and takeover resistance (e.g., Morck, Shleifer, and Vishny, 1990; Lang, Poulsen, and Stulz, 1995; Walking and Long, 1984). Similarly, contractual arrangements and ownership structures in various franchise and retail settings have provided corroborating, if yet indirect, evidence for moral hazard problems. In these studies, moral hazard is inferred from the particular organizational choices rather than being directly observed (e.g., Brickley and Dark, 1987; Krueger, 1991; Lafontaine, 1992; Shepard, 1993).

In contrast, this paper employs a very direct test of agency problems. If opportunity allows, one of the most straightforward opportunistic actions agents can take is to surreptitiously shift expenses, which they would normally bear, onto the principal(s). Examples of this type of agency problem include the use of company assets for private purposes (e.g., private calls from company phones), or the reimbursement of private, rather than company, expenses. In this paper, we study variants of this “expense shifting” agency problem in the mutual fund industry.

Jensen and Meckling (1976) define an agency relationship “as a contract under which one or more persons (the principal(s)) engage another person (the agent) to perform some service on their behalf which involves delegating some decision making authority to the agent.” In the mutual fund industry, individual investors engage fund providers (such as Fidelity, Merrill Lynch, etc.) to perform financial services on their behalf. The service for which fund shareholders pay fund providers is to invest their financial assets in a pre-specified manner: by buying the appropriate fund, fund shareholders “instruct” fund providers to invest their money, for instance, in long-term corporate bonds, or in large-cap stocks. The details of the implementation of this financial service,

e.g., what securities to hold and what brokers to use, are left, however, to the fund providers. In this sense, each fund provider takes on the role of an agent vis-à-vis individual fund shareholders.

The mutual fund industry is an interesting setting to study agency problems because several factors exist which should curb opportunistic behavior. Thus, if we were to find agency problems in this setting, it would not bode well for other environments which are more prone to agency costs. We can identify five factors which should curb opportunistic behavior:

First, fund shareholders are able to redeem their investments with relatively little cost. Open-end mutual funds, which are the focus of this study, are required to redeem shares at any time at the current value of the underlying security portfolio. Thus, the fund shareholders (principals) do not undertake large commitments (e.g., specific investments) which would tie them to the relationship with the fund provider (agent), but are able to end the relationship with relatively little cost.¹

Second, fund shareholders entrust fund providers with substantial amounts of their wealth. In 1995, investors who had started purchasing mutual fund shares before 1991, held 36% of their household assets in mutual funds. This percentage even excludes mutual fund assets held in employer-sponsored retirement plans. Investors who had started in 1991 or later, held 28% of their household assets in mutual funds (Investment Company Institute 1997). Thus, fund shareholders have a large incentive to check on the agent's behavior and to end the relationship if opportunistic behavior is detected.

Third, for each type of mutual fund many competitors exist. Thus, investors have a number of choices regardless of their wants and needs. They are not forced by insufficient supply to purchase services from knowingly high-agency-cost providers.

Fourth, the industry's success is in part based on the trust that individual investors have placed in it. Individuals entrust substantial amounts of their net assets to organizations with which they perhaps have never had any personal contact. We would expect this important role of trust and

reputation to serve as a deterrent to opportunistic behavior on part of mutual fund providers (Kreps, 1990).

Lastly, at least with respect to the most important measure of service performance for fund shareholders—total return—information is readily available to investors. Moreover, all agency costs are implicitly reflected in (lower) returns. Thus, even though, as will be shown below, expense shifting occurs in ways for which information is not as easily available, investors are able to monitor the final outcomes of the fund provider's actions.

In sum, the mutual fund industry provides an environment in which we would expect agency problems to play only a minor role—contrary evidence would provide a strong indicator of the resilience of agency problems.

Besides offering a demanding setting for a study of agency issues, the mutual fund industry deserves attention in its own right. With its rapid growth over the past decade, the mutual fund industry has become the largest financial intermediary in the U.S. By the end of 1996, 30 million individuals were owners of a mutual fund, entrusting the industry with \$3.5 trillion in assets. While most previous work on mutual funds has centered around the questions whether fund managers add value,² and whether fund returns are persistent,³ agency issues have found only little attention in the literature. Exceptions include Tufano and Sevick (1997) and Chevalier and Ellison (1997). Tufano and Sevick (1997) study the relationship between the composition of fund boards and the fees that are charged by funds (see Section 2.1 below for a description of the organization of mutual funds). They find that fees are lower when fund boards are smaller and have a greater fraction of independent directors, thus indicating agency problems at the level of the fund board. Focusing on the investment strategy of fund managers, Chevalier and Ellison (1997) find that fund managers increase the riskiness of their fund portfolios in the later months of the year after they have experienced low performance early in the year.⁴

In this paper we study a different phenomenon. We explore whether fund providers take advantage of two particular opportunities to shift expenses—which are normally shouldered by them—onto fund shareholders. In particular, we test whether fund providers shift marketing expenses (via 12b-1 fees) and research expenses (via soft dollars). As will be described in further detail in the following section, fund shareholders pay fund providers explicit fees that are used by fund providers to cover expenses. Thus, in our context, “expense shifting” means that fund providers are able to pay for their expenses with money they receive on top of the fees they are charging for managing the funds.

This paper is organized as follows. Section 2 provides background information on the organization of mutual funds and on the history of soft dollars and 12b-1 fees. Section 3 describes the data set and includes a preliminary data analysis. Section 4 tests the impact of 12b-1 fees on the expenses charged by mutual fund providers. Section 5 estimates the extent of soft dollar agreements and tests whether a substitution between soft dollars and charged expenses exists. Section 6 concludes.

2. Background information

2.1. The organization of mutual funds and mutual fund families

Mutual funds, which allow individual investors to pool their assets and pursue common investment goals, can be considered investment services offered by investment management companies. Common with industry practice, we will call an investment management company which offers one or more funds a “fund family” or a “fund provider” in the rest of this paper.

Each mutual fund itself is a legal entity consisting of the capital paid in by mutual fund shareholders and a board of directors who represent the individual shareholders’ interests (see Figure 1). Each board of directors consists of members of the investment management company and of at least 40% independent directors. Formally, the board of directors hires the investment

management company to perform investment activities on behalf of the fund.⁵ In practice, however, the investment management company creates a fund, assigns a fund manager, and appoints a board of directors to monitor the handling of the fund's assets. For its services, the investment management company charges the fund a fee which is expressed as a percentage of assets under management. The fees which are charged by the investment management company are negotiated between each fund board and the management of the investment management company and have to be approved by the independent members of each fund board.

< FIGURE 1 ABOUT HERE >

While the securities held by the mutual funds are owned by the fund shareholders, the investment management company is owned by a separate group of public or private owners. (One exception is The Vanguard Group which itself is also owned by the fund shareholders.) Thus, a shift of expenses from the fund provider onto the fund shareholders benefits (the owners of) the fund provider. In the following two sub-sections, we will elaborate on the two ways in which fund providers may shift expenses onto fund shareholders.

2.2. Expense shifting via soft dollars

In short, soft dollars are rebates given to customers of brokerage houses. For instance, a mutual fund manager might receive from brokers research services worth \$1 for every \$2 of brokerage commissions paid to the broker. In some cases, the research, or other services, are provided directly by the broker; in other cases, they are purchased by the broker from a third-party provider. To put it differently, soft dollars are a method for commission discounting on an account-by-account basis.

The soft dollar business has a long tradition on Wall Street. From its inception in 1792 until 1975, the New York Stock Exchange maintained minimum commission rates. For instance, from the early 1960s to the early 1970s, the mandated commission charge was 39¢ a share (Jarrell, 1984). With price competition having been outlawed, one way for brokerage houses to differentiate themselves was to provide research and other services to clients in exchange for trading business. With deregulation in 1975, two developments took place. First, average commission rates declined dramatically, and secondly, brokerage houses could adopt different strategies: 1) remain a full-service broker, i.e., continue to provide in-house services which were paid for by trading commissions, 2) become a broker using trading commissions to purchase outside research and services and offer these services to clients as a rebate, or 3) become a no-frills brokerage house with lower trading commissions, yet with no provision of services.

With different brokerage commission fees available, money managers faced a new challenge with respect to fulfilling their fiduciary duty. The U.S. Securities and Exchange Commission (SEC) defines fiduciary duty as requiring a money manager to “execute securities transactions for clients in such a manner that the client’s total cost or proceeds in each transaction is the most favorable under the circumstances” (in: Fraser, 1992). Before deregulation, money managers had to be mainly concerned with trade execution, which is, however, very difficult to ascertain. After deregulation, money managers feared that in order to fulfill their fiduciary duty they had to always seek out the lowest commission available, regardless of what services a brokerage house—in return for higher commissions—would offer. “The financial community undertook a massive lobbying effort to preserve the practice of buying services with commissions,” and was successful in amending the fiduciary duty clause (Burgunder and Hartmann, 1986). The Security Act Amendments of 1975, which deregulated commissions, included Section 28(e) which provided money managers with leeway (“a safe harbor”) to make a trade-off between commission charges and services. This section states that a money manager “shall not be deemed to have acted

unlawfully or to have breached fiduciary duty . . . solely by reason of his having caused an account to pay more than the lowest available commission if that person determines in good faith that the amount of the commission is reasonable in relation to the value of the brokerage and research services provided” (in: Fraser, 1992).

The SEC has defined “research services” which can be compensated for by soft dollars to be “any service that provides lawful and appropriate assistance to the money manager in the performance of his investment decision-making responsibilities” (in: Fraser, 1992). Under this definition, research services include, for instance, economic information, quotation equipment, financial databases, training seminars, journal subscriptions, and computer hardware which is dedicated exclusively to research used for the benefit of the client who paid for the equipment.

Despite (or because?) of their ambiguous nature, soft dollars are used aggressively by brokerage houses as a marketing tool. For instance, one investment management company received a list of 581 services available through a Wall Street brokerage. The “research” providers whose services could be paid for with soft dollars included a Baltimore office-supply store, telephone companies including AT&T and Pacific Bell, a lawyer, and a doctor (Schroeder, 1994). Similarly, the *Wall Street Journal* reported on research seminars held in Paris, Madrid, and in Sarajevo during the Winter Olympics in 1984, all paid for with soft dollars (Smith, 1984).

The most serious criticism of soft dollar arrangements is that they constitute hidden management charges. Fund managers are explicitly compensated for their services through the expense fee they charge the funds. These fees are negotiated between the investment management company and the fund board of directors, and have to be displayed prominently in the fund prospectus. When fund managers use, however, inflated brokerage charges to pay indirectly for research, fund managers shift part of their expenses onto fund shareholders, since brokerage costs are not included in the expense fee but are paid by fund shareholders on top of the expense fee. Moreover, individual investors have a much more difficult time assessing actual expenses charged

by the investment management company, since brokerage charges are less easily obtainable. Unlike the expenses charged, the brokerage commissions are not included in the fund prospectus. Fund shareholders have to request from the investment management company a “Statement of Additional Information” in which brokerage expenses are listed.

In the analysis below we will first estimate the amount of rebates received by mutual fund managers. Second, and more importantly, we will test whether fund managers substitute soft dollars for expenses charged. If managers reduce the expense fees they charge explicitly because they obtain research services with soft dollars, then fund shareholders’ concerns about this practice would be alleviated. However, if managers do not reduce their explicit fees, we would have evidence of expense shifting.

Soft dollars create another cost to shareholders. Commission costs are capitalized rather than expensed in funds. Thus, commission costs, inflated by soft dollars, reduce future capital gains, rather than dividend distributions in the current tax year, thereby raising shareholders’ tax burden since capital gains are taxed at a lower rate than dividend income (Findlay, 1995).

In recent years, the practice of soft dollars has attracted increased attention and scrutiny by the SEC, in turn, drawing intense opposition by industry participants. For instance, in 1996, the SEC had to withdraw a disclosure proposal, issued a year before, which would have required investment advisers to render a special report to clients containing detailed and extensive information about commissions, broker’s selection, and research services. “The securities industry strongly objected to this proposal as unduly burdensome, unnecessary and anti-competitive ... Perhaps not so coincidentally, a SEC ‘sweep’ of soft dollar practices followed [shortly after] the withdrawal of the advisory disclosure proposal” (Pickard, 1997). This SEC investigation, completed in late 1998, focused on the legal uses of soft dollars and uncovered several abuses of the safe harbor clause (SEC, 1998).⁶

2.3. Expense shifting via 12b-1 fees

As noted in the previous section, prior to deregulation of commissions in 1975, brokers used the high commission fees to provide clients with research support. Further reciprocal arrangements between money managers and brokers existed. For instance, managers could direct their brokers to “give up” to another party a portion of the commissions they had paid. This other party was usually another broker who had sold shares of a mutual fund for which the manager was the investment advisor (Burgunder and Hartmann, 1986). Since fees of mutual fund providers are linked to assets under management, sales efforts of brokers are of direct benefit to fund providers. Thus, give-ups allowed fund managers to reward brokers for sales efforts, which were beneficial to them, using the fund shareholders’ assets (since fund shareholders footed the commission bill).

However, with the deregulation of commissions and the subsequent decline in commission rates, this traditional source of rewarding brokers for hawking mutual funds dried up. Moreover, at least in the initial years, Section 28(e)—the safe-harbor clause described above—was considered not to cover sales support (Burgunder and Hartmann, 1986). As a result, fund managers were searching for new ways to re-instate bonus payments to brokers. This search was fueled by a general steep recession in the mutual fund industry. In seven of the eight years between 1972–1979, mutual funds experienced net outflows. Investment management companies argued before the SEC that advertising and increased incentives for distributors could stop the net outflows. Moreover, it was argued, since increased inflows caused by marketing would yield scale economies and lead subsequently to lower expenses, *existing* shareholders would benefit from 12b-1 fees. Hence, charging advertising and distribution expenses against fund assets, and thus having current shareholders pay for these services, was not to be considered a breach of the fund managers’ fiduciary duty.

Subsequently, in October 1980, the SEC enacted Rule 12b-1 which permitted investment management companies to deduct an annual fee from fund assets for marketing and distribution.

As Burgunder and Hartmann (1988) note: “The historical circumstances surrounding its preparation ... strongly infer [sic] that the rule is aimed at the possible problems associated with periods of stagnant growth or net redemptions, especially for relatively small mutual funds.”

Regardless of these initial intentions, 12b-1 plans were rapidly adopted by mutual funds of all sizes and continued to be adopted as the industry climate changed for the better. While in 1983 24% of all funds levied 12b-1 fees, in 1986, 48% of all funds, and in 1996, 63% of all (equity- and bond) funds carried this fee.⁷

Partly in response to this explosive growth in adoption, the SEC increased the visibility of the 12b-1 fee over the years. In 1987, the SEC required mutual funds to list 12b-1 fees as a distinct line-item in fund prospectuses. In 1993, the SEC stipulated that funds with 12b-1 fees in excess of 25 basis points (0.25%) were not allowed to call themselves “no-load” funds. Moreover, the SEC capped 12b-1 fees at 100 basis points.

In the analysis below we will test whether 12b-1 fees actually lead to the promised scale economies, i.e., whether 12b-1 fees benefit—or at least do not hurt—existing fund shareholders.

3. Data

The data used in this study have been obtained from Morningstar’s *Principia Plus* database as of December 1996. It contains virtually all equity and bond funds that were available to investors at the end of 1996. In total, 7,784 funds with a total of \$2.33 trillion in assets are captured. The sample splits into 4,289 equity funds with \$1.70 trillion assets and 3,495 bond funds with \$0.63 trillion assets.

The Investment Company Institute (ICI), the industry’s trade organization, reports for 1996 an industry size of \$2.64 trillion, comprising 2,626 equity funds with \$1.75 trillion and 2,679 bond funds with \$0.89 trillion in assets. Thus, the Morningstar data capture the bond fund market slightly less well than the equity fund market.⁸

In 1995 the SEC allowed fund providers to offer the same fund in different “share classes,” thus, not all of the 7,784 funds are truly different funds. Fund share classes differ in the way expenses are charged. For instance, investors might be offered a fund in classes A and B, where class A carries a 5% front-end load (sales fee payable at the time of purchase) and class B carries a 5% back-end load (sales fee payable at the time of redemption). The underlying security portfolio and the fund manager are, however, identical for these share classes.

Due to different share classes, the 7,784 funds are actually only 4,622 truly different “mother-funds” (2,601 equity and 2,021 bond funds). In the following, the term “fund” will continue to denote a particular fund in a particular share class, while the term “mother-fund” will denote a fund including all its share classes.

3.1. Preliminary data analysis

All of the following analysis is conducted using 1996 data. The first variable of interest is the *expense ratio*, which is the percentage of assets paid by the fund for fund expenses. The expense ratio includes management fees, shareholder servicing and reporting costs, custodial fees, transfer agent fees, auditing and legal fees, director fees, interest expense, and 12b-1 fees. It does not include brokerage costs or sales charges (loads). As we can see from Table 1, the median fund had an expense ratio of 1.21% of assets (1.45% for equity funds, 0.96% for bond funds).

< TABLE 1 ABOUT HERE >

It is instructive to look at expense fees not only as a percentage of assets, but also in absolute terms. The median fund in the sample paid \$0.52 million in expenses, while the mean fund charged \$3.01 million, indicating a skewed distribution. For instance, the Fidelity Magellan Fund, holding \$54 billion in assets, generated fees of about \$495 million.

The entire sample captures fees of \$19.3 billion that were charged in 1996. Since expense data are available for only 6,422 funds of 7,784 funds, this estimate is a lower bound. Assuming that the funds for which no expense ratio was available charged an average fee, total fees can be estimated as \$23.4 billion.

With respect to 12b-1 fees, Table 1 shows that 63% of all funds charged a 12b-1 fee in 1996 (60% of equity funds, 67% of bond funds). The median fund with a 12b-1 fee charged 0.5% (0.75% for equity funds, 0.5% for bond funds). In absolute terms, the median fund charged \$0.12 million in 12b-1 fees, yet the average fee charged was \$1.03 million, indicating again large outliers. The leading fund was Dean Witter Dividend Growth B with \$107.6 million. In total, 12b-1 fees of \$4.43 billion are captured in the sample.

Explicit brokerage commissions are usually paid only for equity securities. For fixed-income securities, brokerage charges are included in the bid-ask spread. As a result, brokerage commissions are reported only for equity funds. The median equity fund spent 0.2% of assets for brokerage commissions. In absolute terms, the median fund paid commissions of \$0.13 million, while the average fund paid \$0.85 million. The leading fund was the Magellan fund with brokerage commissions of \$86.2 million. The sample as a whole covers total brokerage commissions of \$2.7 billion.

As described in the Appendix, we compute the dollar amount of trades that each fund executed in 1996 (variable *trade dollars*). The median fund traded securities worth \$77.2 million (\$102.5 million for equity funds, \$55.1 million for bond funds). There are, however, some funds with very high trading activity which push the mean trading activity to \$588.4 million (\$721.6 million for equity funds, and \$442.1 million for bond funds). The Magellan fund traded securities worth a staggering \$172.6 billion. As a percentage of average fund assets (variable *trade*), the median fund traded 172.8% (177.9% for equity funds, and 165.5% for bond funds).

4. The effect of 12b-1 fees on expenses

In this section we analyze whether marketing and distribution expenses in the form of 12b-1 fees benefit or, at least, do not burden current shareholders. As stated above, prior to 1980, fund providers had to pay for marketing themselves, using the fees they had charged the funds. After 1980, fund providers were allowed to charge the funds directly (up to 100 basis points) for marketing and distribution. Fund providers claimed, however, that current shareholders would not be hurt financially, since scale economies, made possible through the increased inflows caused by marketing, would decrease the non-marketing fees they would charge fund shareholders.

4.1. A simple model

A small number of studies have previously looked at the question whether 12b-1 fees are associated with lower expense ratios. We will first update and then refine these studies with a current and much larger data set. Since 12b-1 fees have attracted the criticism of the business press over the last years (e.g., Kahn, 1994; Prochniak, 1995), it is interesting to observe whether the relationship between 12b-1 fees and the expense ratio has changed over time.

Three studies have been conducted employing the same regression model to test for the effect of 12b-1 fees on the expense ratio. These studies allow us to gauge whether the relationship between the two fees has changed over time. Ferris and Chance (1987) study 305 and 292 funds in 1984 and 1985, including 26 and 55 funds with 12b-1 plans, respectively. These authors update their findings for the period 1985–1988 with a new data set employing again about 290 funds each year (Chance and Ferris, 1991). Lastly, McLeod and Malhotra (1994) study the relationship for the period 1988–1991 with a sample of on average 787 funds.

The regression model used in these studies is given in the following equation:

$$\text{expense ratio} = \alpha_0 + \alpha_1 \text{12b-1 dummy} + \alpha_2 \log(\text{fund size}) + \alpha_3 \log(\text{age}) + \alpha_4 \text{load dummy} + \alpha_5 \text{category dummy}_1 + \alpha_6 \text{category dummy}_2 \quad (\text{A})$$

where *expense ratio* is the expense ratio for a given fund, *12b-1 dummy* a variable equal to 1 if the fund charges a 12b-1 fee, and *load dummy* a dummy equal to 1 if the fund has a front- or a back-end load. Variables *category dummy₁* and *category dummy₂* are two category dummies constructed by the authors to distinguish between “growth,” “income,” and “maximum growth” funds. Ferris and Chance (1987; 1991) use year-end fund size, while McLeod and Malhotra (1994) use previous year-end fund size.

While the three studies discussed above pool their data and use straightforward OLS, we allow for group-wise heteroskedasticity, where each mother-fund including all its different share classes forms a group, and drop the assumption of independence for funds belonging to the same mother-fund. All regressions reported in this paper use this methodology.

Since there was no direct way to replicate the previous authors’ coding for the different categories, two different approaches were used. Regression (1) excludes any category dummies. Regressions (2) – (4) include up to 43 category dummies, with categories as defined by Morningstar.⁹ Regressions (1) and (2) use the full data set, Regression (3) uses only equity funds, and Regression (4) only bond funds (see Table 2).

<TABLE 2 ABOUT HERE>

The main result from Table 2 is that the coefficient on *12b-1 dummy* is positive and highly significant in all four regressions. The presence of 12b-1 fees increases the expense ratio by 39 basis points (43 for equity funds and 33 for bond funds). Our results corroborate past studies both in terms of the significance of the 12b-1 coefficient and in the upward trend of the impact that 12b-1 fees have on the expense ratio (see Table 3).¹⁰

<TABLE 3 ABOUT HERE >

4.2. A new model

Quite likely, Regression (A) did not contain all variables that affect the expense ratio. If any of the omitted variables are correlated with the presence of 12b-1 fees and the expense ratio, then the estimate of the 12b-1 fee coefficient is biased.

What variables would we expect to have an impact on the expense ratio and thus should be included in an expense ratio regression? The main variable of interest is the 12b-1 fee. Rather than including a dummy variable for the presence of a 12b-1 fee, our data allow us to include the exact 12b-1 fee in percent (variable *12b-1 ratio*). Thus, we are able to gauge how much of the 12b-1 fee is passed through to the expense ratio. If the 12b-1 fees generate new inflows, leading in turn to a sufficient lowering of the expense ratio to benefit existing shareholders, we would find a negative coefficient. If the 12b-1 fees are generating at least as much new inflows as to yield benefits equal to their costs, we would find a zero coefficient. Lastly, if 12b-1 fees are an added cost borne by existing shareholders, we will find a positive coefficient. A coefficient close to 1 would indicate that 12b-1 fees are merely an additional fee borne by fund shareholders.

The next variables included are *front load*, the front load in percent, and *back load*, the deferred load in percent. Funds which do not charge a front- or back-end load may have higher expenses, since distribution charges are included in the expense ratio. Since back-end loads are frequently not used to compensate sales agents, but are imposed to deter redemptions (Chordia, 1996), we expect the result to be stronger for the front-end sales charge.

Further we include the (natural) logarithm of the average fund size in million of dollars (average of beginning and end of 1996). As has been documented, there are economies of scale in the mutual fund industry (Baumol *et al.*, 1990; Dermine and Röller, 1992). Thus, we expect a negative coefficient. Controlling for fund size might, however, have a confounding effect. If 12b-1

charges lead to larger funds which in turn are able to reduce their expense ratios, then the coefficient on fund size would pick up this beneficial effect of 12b-1 fees on the expense ratio. Hence, we run a separate set of regressions excluding the fund size control.

It is important to keep in mind that the expense ratio is essentially a price: it is the fee that is charged by the investment management company to the fund shareholders. Thus, any economies of scale that we detect is only that fraction that is passed on to fund shareholders (while there might exist much stronger economies of scale enjoyed by the investment management company).

We include the age of the fund (in logarithmic form), to see whether fund families subsidize younger funds (positive coefficient), or whether older funds realize time-specific economies allowing them to lower expenses (negative coefficient). One should note that in the regressions which exclude fund size, the age coefficient is most likely to be biased downward if scale economies exist, since age and fund size are strongly positively correlated.

By including the (relative) past performance of the fund (measured by the difference between the fund's total return and the average return of its category in 1995), we can assess whether funds that had high past performance increase their "price" to fund shareholders or not.

If funds that invest in volatile securities require a large amount of research, we would expect a positive coefficient on *volatility*, the standard deviation of the fund's monthly returns over the year 1996. Similarly, funds that change their portfolio greatly, i.e., are engaged in a large amount of trading, might incur larger (research) expenses. Recall, brokerage costs *per se* are not included in the expense ratio. Using the reported turnover of each fund and the fact whether the fund had net inflows or outflows, we can compute the dollar amount of trades the fund engaged in and divide it by the average assets of the fund to get a measure of trading intensity (variable *trade*). See the Appendix for more details. Conversely, funds that hold a larger percentage of their assets in cash or cash equivalents (variable *cash ratio*) may have a lower expense ratio.

The variables $\log(\text{min purchase}+1)$, the logarithm of the minimum initial purchase required by the fund (plus one dollar),¹¹ and *institutional*, a dummy for funds available only to institutional investors, capture both economies of scale in dealing with large accounts and competitive pressures which force funds to lower their prices in the face of buyer power. Thus, we would expect negative coefficients on these variables. Similarly, the variable *families*—the number of families offering funds in the particular category—captures the effects of competition on the price that funds are charging.

To assess whether funds are able to exercise market power with respect to the fees they are charging, we include the *market share* of the fund, expressed as the percentage of assets that the fund accounts for in its category. Since market share is clearly linked to fund size, we also exclude this variable in the regressions that exclude fund size.

Lastly, we include a set of category dummies (one dummy for each but one Morningstar category) to control for category-specific differences in expenses and a set of 583 family dummies to control for other unspecified family differences. Thus, for instance, scale economies on the level of the family which are passed through to each fund, or the ability to charge higher fees for funds belonging to fund families with well-known brand names would be captured by the family dummies.

In sum, the following regression is run on both the full set of data, and on equity and bond funds separately:

$$\begin{aligned} \text{expense ratio} = & \alpha_0 + \alpha_1 \text{12b-1 ratio} + \alpha_2 \text{front load} + \alpha_3 \text{back load} + [\alpha_4 \log(\text{fund size})] + \\ & \alpha_5 \log(\text{age}) + \alpha_6 \text{past performance} + \alpha_7 \text{volatility} + \alpha_8 \text{trade} + \alpha_9 \text{cash ratio} + \\ & \alpha_{10} \log(\text{min purchase} + 1) + \alpha_{11} \text{institutional} + [\alpha_{12} \text{market share}] + \alpha_{13} \text{families} + \\ & \sum_i \alpha_i \text{ category dummies} + \sum_n \gamma_n \text{ family dummies} \quad (\text{B}) \end{aligned}$$

where the bracketed variables denote those variables that are dropped in the regressions which attribute all size effects to the 12b-1 variable.

4.3. Results

For the regression results of model (B) see Table 4. Regression (1) is on the entire data set, regression (2) is on equity funds, regression (3) on bond funds only. The (b) regressions exclude the variables measuring fund size and market share, thereby attributing all size effects that could have been caused by the 12b-1 fee to the *12b-1 ratio* coefficient.

< TABLE 4 ABOUT HERE >

The main result of this section is given by the coefficient on the *12b-1 ratio*. Across all regressions *12b-1 ratio* is positive and extremely significant. The coefficient on *12b-1 ratio* ranges between 0.844 and 0.980, thus indicating that the 12b-1 fee is (almost) entirely added to fund expenses. In other words, we find evidence that 12b-1 fees are used to shift marketing and distribution expenses onto current shareholders.

While many of the other variables are statistically significant, their economic impact is fairly small (see Table 5). For instance, while the effect of fund size on fund expenses is negative and significant, one standard deviation difference in size for a fund with average asset size implies a difference of only 4 basis points in the expense ratio. The control variable with the largest effect is the competition measure *families*, which measures the number of families which offer funds in the particular category. For equity funds, one standard deviation difference in the number of families implies a 24 basis points lower expense ratio. For bond funds the effect is, however, only 5 basis points.

<TABLE 5 ABOUT HERE>

4.4. Robustness

We test the robustness of the results reported in the previous section in two ways. First, we run regression (B) only on funds which neither have front- nor back-end loads. One might argue that for some funds 12b-1 fees are a substitute for loads, since both are used in part to compensate distributors. Since 12b-1 fees are included in the expense ratio, yet loads are not, the fact that 12b-1 fees increase the expense ratio could reflect that funds use different ways to compensate distributors. Even though we include the front- and the back-end load as control variables, one may be concerned that the effect is not fully controlled for. By including only funds with no front- or back-end loads, we are comparing funds for which the expense ratio contains all expenses borne by the investor. The price we pay is a reduction in sample size to 2,023 funds (1,182 equity and 841 bond funds).

In the second robustness test we increase the available data set by slightly modifying the regression model (B) so that only variables which use data of 1996 are included.

The following regression specification is employed:

$$\begin{aligned} \text{expense ratio} = & \alpha_0 + \alpha_1 \text{12b-1 ratio} + \alpha_2 \text{front load} + \alpha_3 \text{back load} + [\alpha_4 \log(\text{fund size } 96)] + \\ & \alpha_5 \log(\text{age}) + \alpha_6 \text{turnover } 96 + \alpha_7 \text{cash ratio} + \alpha_8 \log(\text{min purchase} + 1) + \\ & \alpha_9 \text{institutional} + [\alpha_{10} \text{market share}] + \alpha_{11} \text{families} + \sum_i \alpha_i \text{ category dummies} + \\ & \sum_n \gamma_n \text{ family dummies} \end{aligned} \tag{C}$$

where *fund size 96* denotes the net assets of the fund at the end of 1996 and *turnover 96* the turnover of the fund in 1996. The regression modification allows us to increase the sample, in comparison to regression (B), by 1,010 funds to 6,343 funds (an additional 655 equity and 355

bond funds) and by 1,087 funds to 6,420 funds (an additional 675 equity and 402 bond funds) when the fund-size measures are excluded.

To conserve space, in Table 6 reports only the coefficients of the *12b-1 ratio* variable for both robustness tests (detailed results are available from the author).

In all regressions, the coefficient on the *12b-1 ratio* is highly significant and close to one. Thus, the finding that 12b-1 fees are almost completely passed through to investors and do not generate benefits to existing shareholders holds in both the sub-sample of funds without front- or back-end loads and in the expanded sample.

<TABLE 6 ABOUT HERE>

4.5. *12b-1 fees and risk of bond funds*

If funds with 12b-1 fees have higher expenses, shouldn't investors be able to notice this fact, especially for bond funds? The impact of higher expenses should be particularly pronounced for bond funds, since firstly the difference in returns of bond funds is highly affected by the expenses charged, and secondly, the mean returns of bond funds are much lower than those of equity funds, i.e., the performance penalty caused by the 12b-1 fee as a percentage of total returns is much more visible. The mean return in our sample of all equity funds in 1996 is 17.16%, while the mean return of all bond funds is only 4.70%. Thus, a 1% 12b-1 fee would "eat up" more than 20% of the return generated by the average bond fund.

Moreover, in other work it has been documented that (past) performance has a significant impact on fund flows (e.g., Gruber, 1996; Chevalier and Ellison, 1997; Sirri and Tufano, 1998). Since the fees charged by investment management companies are linked to assets under management, the 12b-1 fee could, thus, have an unpalatable side-effect for fund providers, by reducing performance and consequently reducing inflows. In addition, not only the fund provider

could suffer, but also the fund manager. As Khorana (1996) shows, fund managers are more likely to be replaced if the performance of their fund is lagging.

For bond funds, there exists, however, a fairly simple “remedy” to the performance penalty imposed by the 12b-1 fee: increasing risk. By increasing risk, mutual fund managers can buoy up the return of funds with 12b-1 fees at a (risk-)cost to the individual investors (Kahn, 1994; Phillips, 1995). While performance differences are very visible to investors, risk differences are much more difficult to perceive.

In this section, we will test whether fund managers are indeed increasing the riskiness of bond funds to overcome the performance drag caused by the 12b-1 fee. In Table 7, we compute the means of various performance and risk measures for bond funds which impose a 12b-1 fee and for bond funds which do not impose such a fee. Performance measures include the total return in 1996, the annualized total return over the last three years, and the annualized total return over the last five years. For all three of these often publicized performance measures, we observe that the two groups of funds do not differ significantly, even though funds without a 12b-1 fee have significantly lower expense ratios (0.70% vs. 1.26%).¹² Thus, managers of funds imposing 12b-1 fees are able (as a group) to generate similar net returns than funds which do not carry a 12b-1 fee.

However, as the differences in the risk-measures in Table 7 show, investors of bond funds which carry a 12b-1 fee are exposed to significantly more risk. Riskiness is measured by the standard deviation of the funds’ monthly returns over the last 3 years and over the last 5 years, by the beta of the fund, and by the “best-fit” beta of the fund.¹³ One way to increase riskiness of bond funds is to increase the duration of the securities held—and indeed, bond funds with 12b-1 fees hold securities with significantly longer durations than funds without 12b-1 fees.¹⁴

One way to interpret these results is that fund managers increase the difficulty to decipher the signals that investors are receiving. While it is true that all expenses that are shifted are ultimately

borne by shareholders, in this case investors would have to look at risk-adjusted returns, rather than at total returns, to realize that expenses were shifted—a much more difficult task.

<TABLE 7 ABOUT HERE>

While the univariate comparisons in Table 7 do not control for any other variables that might affect the riskiness of a fund, the following regression analysis takes other variables into account. One could expect that the riskiness of a fund is negatively impacted by the amount of cash it holds. Moreover, the size of the fund (measured as the average of end-1995 and end-1996 net assets) and the turnover (measured in 1996) of the underlying security portfolio could have an influence on volatility. The dummy variable denoting funds sold to institutional investors (*institutional*) is included because large clients who are presumably better informed might be offered less risky funds. Lastly, dummy variables are included to control for inherent differences in riskiness of different categories. We include dummy variables for convertible bond funds, high-yield bond funds, corporate bond funds, government bond funds, and municipal bond funds. The excluded category is international bond funds.

In sum, we run the following regression:

$$\begin{aligned} \text{risk measure} = & \alpha_0 + \alpha_1 \text{12b-1 ratio} + \alpha_2 \log(\text{fund size}) + \alpha_3 \text{turnover 96} + \\ & \alpha_4 \text{cash ratio} + \alpha_5 \text{institutional} + \sum_i \alpha_i \text{ category dummies} \end{aligned} \quad (\text{D})$$

Results of regression (D) can be found in Table 8. The main result remains: the 12b-1 fee has a positive and significant impact on the riskiness of bond funds. As hypothesized, a larger cash ratio leads to lower variability. While turnover does not appear to affect variability, fund size appears to have a (surprising) positive effect on the volatility of bond fund returns.

<TABLE 8 ABOUT HERE>

5. Brokerage commission and soft dollar analysis

Beginning with this section, we shift our attention to the second method fund providers are potentially using to shift expenses onto fund shareholders. Fund providers usually pay their research expenses out of the fees they explicitly charge fund shareholders. However, by paying inflated commission charges, which are not included in the explicit fees but which are also paid by fund shareholders, fund providers obtain rebates (soft dollars) from brokers in the form of research services. In other words, fund providers are able to use commissions to pay for research services.

Several consequences arise from this practice. First of all, fees are shifted from an explicit measure to a much more opaque area where monitoring, for both fund shareholders and funds' board of directors, is more difficult,¹⁵ increasing the possibility of abuse as documented in Section 2.2. Secondly, the question arises whether fund managers reduce their explicit fees when they obtain services via soft dollars, or whether they are, in a sense, reimbursed twice for their research expenses.

We approach this question in two steps. First we assess the size of the soft dollar practice. Then we test whether fund managers substitute soft dollars for expenses they charge directly to fund shareholders. Since direct brokerage commissions are generally paid only for equity securities, the following analysis contains only equity funds. We were able to obtain brokerage charges for 3,157 equity funds.¹⁶ This is a large improvement over the only other existing study on soft dollars by Livingston and O'Neal (1996) who have data on 240 funds over the period 1989–1993 (from 23 to 220 different funds each year).

With the amount of trades executed and the brokerage commissions paid, we can compute the average amount funds paid for trading \$100 worth of securities, i.e., the brokerage commissions as

a percentage of the dollar amount traded. We define variable *brokerage ratio* as the ratio of commissions to trade dollars.

Computation reveals that the median equity fund paid brokerage commissions equaling to 0.116% of assets traded. Livingston and O'Neal (1996), using a different methodology for estimating trade activity, estimate for their sample a median brokerage commission of 0.138%.

To compute commissions per share, we need to obtain an estimate of the average share price fund managers were faced with. For reference, we compute the market-value weighted average stock price of the 2,793 securities listed on the NYSE. This average was \$40.32 for January 1996 and \$45.10 for December 1996.¹⁷ Assuming an average of \$43, we estimate, using the median commission charge, a 5.0¢ commission per share. This estimate is in line with the 5.0¢ per share that is reported for institutional clients by Abel/Noser Corp., a brokerage firm in New York (Blume, 1993), the results of Livingston and O'Neal (1996), who estimate 6.2¢ for a \$45 share, and the reported mean of 6.0¢ per share of 75 broker-dealers who were part of a recent SEC investigation into soft dollar practices (SEC, 1998).

To obtain an estimate of the amount of soft dollars paid, we compare the actual brokerage commissions paid by fund managers, which include soft dollars, to the brokerage commissions that investors pay for pure trades. To assess brokerage commissions for pure trades, we followed two paths. First, we obtained the per-share brokerage commission fees of several funds which do not deal with soft dollar brokerage houses. For instance, in 1996, Vanguard's Index 500 fund paid on average 1.66¢ per share, the Growth Portfolio Index fund 1.83¢, the Value Portfolio 1.88¢ and the Total Stock Market Index fund 2.16¢ (Vanguard, 1997). Second, we collected the brokerage commission schedules (as of January 1998) of 38 on-line brokerage houses (list available from author) and computed the commissions individual investors would pay for trades which are comparable to trades placed by mutual fund managers. If we assume that fund managers are able to receive (at least) the same price from brokers as individual investors, the difference between the

actual amount paid and the amount paid by individual investors (if positive) would be an estimate of soft dollars.

On-line commission schedules fall roughly into two classes: a) a flat fee regardless of trade size (15 brokerage houses) and b) a flat fee plus a per share fee, e.g., \$14.95 for the first 1,000 shares plus 3¢ per share for any shares beyond 1,000 (23 brokerage houses). With these schedules, commissions are dependent on both trade size and average share price. In a study on institutional trades involving 37 large money management firms, Chan and Lakonishok (1993) report median trade sizes of \$79,000 for buys and \$94,000 for sells. In their data the average share price is \$36.50. Thus, adjusting for the rise in stock prices and assuming that the lot sizes are about the same, a rough estimate for the value of the median trade is \$100,000.

With a share price of \$43 and a trade size of \$100,000 an individual investor paid on average 1.41¢ per share. (Median commissions are lower than average commissions and would have produced even lower estimates.) Including only brokerage houses that do not offer a flat fee, we compute that for the same trade an investor paid an average of 1.98¢. These estimates are in line with other studies. For instance, Bergsman (1996) notes that “most studies report that if one did pure trades, the actual cost is somewhere between 1 and 3 cents a share.”

Above we computed that the median fund manager paid 5.0¢ per share. Thus, if we assume that fund managers are able to obtain similar commission rates as individual investors, we can estimate that fund managers generate around 3¢ of soft dollars per traded share.

A second estimate of soft dollars is not on a per-share basis, but on an absolute commission dollar basis. From the broker schedules we can estimate net commission costs as a percentage of trades, and compare these to the commission costs reported by mutual funds. One way to express the results is to compute how many dollars of brokerage commission “buy” one soft dollar. Thus, for instance, a “conversion rate” of 2.00 would mean that for each \$2.00 of brokerage commission paid to the broker, the broker provides \$1 worth of services.

The following calculations were made for the median equity fund in our sample for which brokerage commission data were available. The median fund traded securities worth \$114 million and paid commissions of \$126,000. Then, with an average trade size of \$100,000 and an average share price of \$43, a fund manager paid \$1.42 in commissions for every \$1 of services.

Including only brokers which do not offer a flat fee, we compute a conversion rate of 1.72, or a rebate of 58%. As a matter of fact, in the business press a conversion rate of 1.60 has been reported (Schroeder, 1994). Similarly, in its recent probe into soft dollar practices, studying 75 broker-dealers and 280 investment advisers and investment companies between November 1996 and April 1997, the SEC found average conversion rates of 1.7 for all brokers and 1.6 for all investment advisers (SEC, 1998). Interestingly, Jarrell (1984) reports that in the late 1960s, brokers provided rebates in the form of research and “give-ups” of also around 60% for institutional-sized orders.

Given that the sample includes about \$2.7 billion of brokerage commissions paid, we can estimate, using the more conservative conversion ratio of 1.72, that in 1996 about \$1.57 billion in commissions were used to purchase research services either in the form of proprietary research (from full-service providers) or from third-party (soft dollar) providers. This calculation is in line with the estimate of \$940 million for the third-party soft dollar industry by Greenwich Associates for 1995 (Scotti, 1996).

In our estimates, we assume that a fund manager pays the same commission as an individual investor. If fund managers receive, however, better trade execution than individual investors, then they could legitimately pay a premium. Unfortunately, our data do not allow us to gauge trade execution. However, Chan and Lakonishok (1993), studying the impact of institutional trading on stock market pricing, report that there appears to be no substitution between better commission prices and price impact. Moreover, some industry observers have claimed that the soft dollar practice can actually lead to inferior trade execution. Since fund managers have to direct some of

their trades to brokers with whom they have soft dollar agreements, fund managers are actually not always able to direct trades to those brokers they might believe to offer best execution for a particular trade (Schroeder, 1994).

5.1. Test of substitution between soft dollars and direct fees

In this section, we analyze the effect of the expense ratio on brokerage commissions per trade dollar after we control for other variables that have an impact on brokerage commissions. In other words, we want to test whether fund managers substitute soft dollars for fees that they explicitly charge fund shareholders. If fund managers use soft dollars, which are also paid for by fund shareholders, to reduce their fees, the soft dollar practice would be less troublesome. A negative sign on the expense ratio would indicate that such substitution is taking place—an insignificant coefficient would indicate that no substitution is taking place.

As control for trading intensity given fund size we include the variable *trade*. In addition, we include the logarithm of the dollar amount of trading to measure whether fund managers are receiving volume discounts. It turns out that this measure is highly correlated with (the logarithm of) fund size ($\rho = 0.95$), yet not very strongly correlated with trading intensity ($\rho = 0.11$). Thus, no further control for fund size is included.

To differentiate between the effects of various load structures, we include the front-load, the back-load, and the 12b-1 fee variable. Further, we control for the fund's market share, because managers of funds that have a large market share might be able to obtain lower brokerage commissions.

Lastly, we include a set of (Morningstar) category dummy variables and family category dummies. Unfortunately, we cannot control directly for the average size of the trades that individual fund managers place, which could have an impact on brokerage commission rates.

However, as long as trading size is correlated with overall trading volume of the fund and/or with the category of the fund, the variables included will partially control for trading size.

Thus, our regression model is as follows:

$$\begin{aligned} \text{brokerage ratio} = & \alpha_0 + \alpha_1 \text{expense ratio} + \alpha_2 \text{front load} + \alpha_3 \text{back load} + \\ & \alpha_4 \text{12b-1 ratio} + \alpha_5 \text{trade} + \alpha_6 \log(\text{trade dollars}) + \alpha_7 \text{market share} + \\ & \sum_i \alpha_i \text{ category dummies} + \sum_n \gamma_n \text{ family dummies} \end{aligned} \quad (\text{E})$$

Results of regression (E) can be found in Table 9, first column.¹⁸ The results in the second column exclude hybrid funds (funds which hold to varying degrees a mix of bonds and stocks).

The coefficient on the expense ratio is positive and insignificant. In the regression which excludes hybrid funds, the positive coefficient actually approaches statistical significance with a p-value of 0.063. Thus, there appears to be no substitution between high brokerage commissions and expenses. An alternative test for fee substitution is to run regression (E) excluding the expense ratio, and to include the residuals of this regression in regression (B), the expense ratio regression. Thus, we test the effect of abnormally high brokerage commissions on the expense ratio. If substitution between these two fees to shareholders took place, we would find a significant negative coefficient on the residuals. We find, however, an insignificant coefficient (-0.01 with a t-statistic of 0.63; results available from the author). In sum, we cannot find any evidence that fund managers use soft dollars to reduce the expenses they charge to funds.

<TABLE 9 ABOUT HERE >

Returning to the results of regression (E), we observe that front- and back-end load funds tend to display higher brokerage commissions. The effect, however, is small. For a fund with a median front- or back-load the effect is less than 3 basis points. In contrast, funds which charge a 12b-1 fee have lower brokerage commissions. Moreover, the effect can be substantial in size. The mean value of *brokerage ratio* for funds included in the regression is 17.2 basis points. From the coefficient on *12b-1 ratio*, we can observe that funds with a one percent 12b-1 fee would have a 6.6 basis points lower commission in absolute terms, or 38% lower commissions in relative terms. One way fund managers can use soft dollars is to reward broker dealers that sell fund shares by not asking for rebates. Thus, soft dollars can be used as an alternative to 12b-1 fees to pay for distribution. This practice, which has attracted an SEC examination (Gasparino, 1998), appears to be picked up by the coefficient on the *12b-1 ratio*.

Once we control for trading intensity, which has a negative impact on brokerage expenses, the absolute amount of trading that the fund is engaged in has surprisingly no effect on brokerage commissions paid. The impact of trading intensity on the commissions is also modest. Funds with a one standard deviation higher value of *trade* have a 2 basis points lower commission. Lastly, funds that have a high market share do not seem to obtain lower brokerage commissions.

6. Conclusion and recommendations

The fund industry has stolen market share from its competitors by building a reputation as the one segment of the financial-services business in which honesty is the customary policy.

Don Phillips, Publisher *Morningstar Mutual Funds* (1994)

The mutual fund industry has experienced tremendous growth over the last decade. Total assets under management increased from \$495 billion in 1985 to \$3,539 billion in 1996. As the above quote from one of the most acute industry observers notes, this growth has been fueled by

the trust of individual investors in the participants of this industry. However, the opportunity to quickly reap profits in this rapidly expanding market has proved to be a high temptation for mutual fund providers to downplay fund shareholders' interests.

Despite several characteristics of the mutual fund industry which should tamper agency problems, we find abuses within this industry: both marketing and research expenses are shifted from fund providers onto fund shareholders. The question arises how these problems could have remained unaddressed for so long. First, as Grossman and Hart (1980) and Shleifer and Vishny (1986) have pointed out, a dispersed ownership structure can lead to low monitoring levels, since individual investors bear the full monitoring costs, yet reap only a small fraction of the benefits. Since the assets of mutual funds are owned by large numbers of small individual shareholders, this argument directly applies. Moreover, it points to the crucial role that fund boards of directors have to play with respect to monitoring the fund providers (see below).

Second, while the agency costs identified in this paper are large in absolute terms, they have been relatively small in comparison to the returns generated by equity funds over the last decade. With a booming stock market generating returns in excess of 16%, additional expenses of 1% may not have loomed large in the eyes of many investors.

The findings with respect to the relationship between 12b-1 fees and the expense ratio lead us to suggest that investors in funds which propose to adopt 12b-1 fees should seriously consider whether such fees will really benefit them. Similarly, fund directors should raise the question with the investment management companies of the rationale and benefit for shareholders of 12b-1 plans. As a matter of fact, the independent directors have to approve 12b-1 fees annually. Moreover, Rule 12b-1 itself states that fund directors not only have the opportunity but the obligation to remove 12b-1 plans, if they feel that existing shareholders do not benefit. Lastly, investors in bond funds should be aware that funds with 12b-1 fees, while often sporting similar returns, tend to have significantly higher volatility than funds without 12b-1 fees.

The results concerning soft dollars suggest at the minimum that soft dollar arrangements should be made more transparent. For instance, investment management companies should be required to report soft dollar rebates in the annual reports. The SEC's requirement to include per share brokerage commission costs in fund prospectuses (beginning in 1996) is a laudable first step. As Chung and Jo (1996) have shown with respect to security analysts' monitoring, larger information dissemination can lead to a reduction of agency costs.

More radically, converting soft dollars into hard dollars, i.e., requiring fund managers to pay true commission costs and to pay explicitly for research should increase accountability.¹⁹ Moreover, once fund managers are forced to pay for research out of their own budgets, it is likely that efficiency would increase. With the current indirect system, there is a temptation to "use up" soft dollars on potentially only marginally valuable services. Furthermore, by unbundling the research services from the trading services, mutual fund managers could again be held directly accountable for using only those brokers who offer best execution. Managers would not have to make the tricky tradeoff between execution and reimbursed services. Lastly, since many brokers are already using third-party service providers, it appears to make little difference whether brokers pay for these services, using soft dollars, or fund managers pay for these services with hard dollars. If mutual fund managers really value the services offered, they will continue to purchase them directly. If they do not value the services from particular providers and quit buying them, then these providers were apparently only artificially sustained by soft dollar arrangements.

Most likely, making soft dollars more transparent will lead to a shake-out in the research and brokerage arena similar to the one experienced in the wake of commission deregulation in 1975, when many medium-sized research firms went out of business (Jarrell, 1984). However, the brokerage market is still fairly fragmented, with a combined market share for the top 10 brokers for Exchange listed issues of 32.8% in 1996 (Plexusgroup, 1997). Thus, anti-competitive behavior caused by concentration is not very likely to occur.

In sum, agency issues are alive in this industry, as in most others. Despite several factors which should have curbed opportunistic behavior in this industry, we find evidence of fund providers shifting expenses, which they would have normally borne, onto fund shareholders. While the mutual fund industry has unquestionably created tremendous value not only for itself but also for individual investors, it cannot rest on its laurels. If it does not address these agency problems, the elemental trust relationship on which this industry is founded is in danger of being undermined..

Figure 1
Organization of Mutual Fund Families

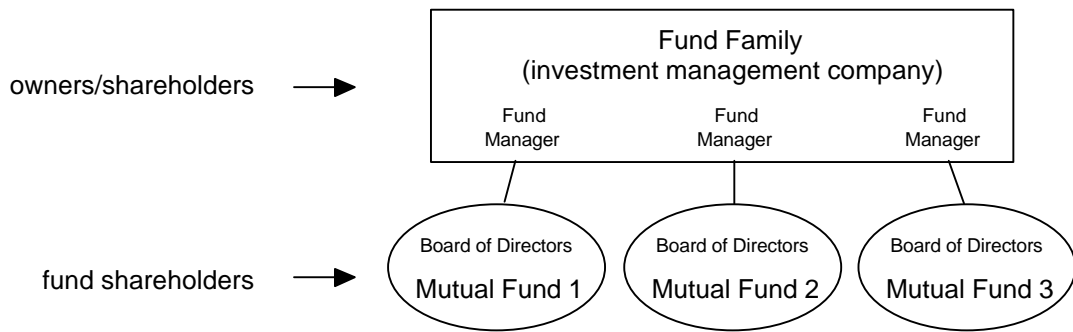


Table 1: Data summary

The table below shows summary statistics of all open-end mutual funds that were included in the analysis. These funds comprise almost all funds that were commercially available in the U.S. as of the end of 1996.

| 12/1996 | All Funds | | | | | | Equity Funds | | | | | | Bond Funds | | | | | |
|---|-----------|-------|--------|--------|--------|------|--------------|-------|--------|--------|--------|------|------------|------|--------|-------|-------|------|
| | obs. | mean | median | min | max | stdv | obs. | mean | median | min | max | stdv | obs. | mean | median | min | max | stdv |
| net assets (\$ mill) | 7784 | 299 | 38.1 | 0.1 | 53988 | 1364 | 4289 | 395 | 46.5 | 0.1 | 53988 | 1750 | 3495 | 180 | 30.2 | 0.1 | 13685 | 598 |
| expense ratio (%) | 6996 | 1.32 | 1.21 | 0 | 7.29 | 0.63 | 3815 | 1.52 | 1.45 | 0 | 7.29 | 0.64 | 3181 | 1.07 | 0.96 | 0 | 4.85 | 0.52 |
| expense fees (\$ mill) | 6422 | 3.01 | 0.52 | 0 | 495 | 11.5 | 3360 | 1.59 | 0.78 | 0 | 495 | 15.2 | 3062 | 1.59 | 0.31 | 0 | 75 | 4.4 |
| 12b-1 ratio^a (%) | 4893 | 0.59 | 0.5 | 0.01 | 1.0 | 0.34 | 2555 | 0.62 | 0.75 | 0.05 | 1.0 | 0.34 | 2338 | 0.56 | 0.5 | 0.01 | 1.0 | 0.34 |
| 12b-1 fees^a (\$ mill) | 4303 | 1.03 | 0.12 | 2E-4 | 108 | 4.33 | 2091 | 1.47 | 0.16 | 2E-4 | 108 | 5.75 | 2212 | 0.62 | 0.09 | 2E-4 | 54 | 2.21 |
| turnover (%) | 6350 | 97 | 65 | 0 | 4263 | 127 | 3403 | 87 | 67 | 0 | 4263 | 114 | 2947 | 109 | 62 | 0 | 1387 | 140 |
| trade dollars^b (\$ mill) | 6013 | 588 | 77 | 0.02 | 172587 | 3130 | 3148 | 722 | 103 | 0.06 | 172587 | 3951 | 2865 | 442 | 55 | 0.02 | 50914 | 1836 |
| trade (%) | 6013 | 231 | 173 | 1.1 | 8563 | 261 | 3148 | 214 | 178 | 3.4 | 8563 | 234 | 2865 | 251 | 166 | 1.1 | 2926 | 287 |
| commissions (\$ mill) | — | — | — | — | — | — | 3157 | 0.85 | 0.13 | 0.002 | 86.2 | 2.90 | — | — | — | — | — | — |
| commission ratio (%) | — | — | — | — | — | — | 3157 | 0.33 | 0.2 | 0.001 | 11.8 | 0.54 | — | — | — | — | — | — |
| brokerage ratio (%) | — | — | — | — | — | — | 2888 | 0.21 | 0.12 | 2E-4 | 8.48 | 0.44 | — | — | — | — | — | — |
| age (years) | 7784 | 5.8 | 3.3 | 0.08 | 73.7 | 8.1 | 4289 | 6.1 | 2.9 | 0.08 | 73.7 | 9.7 | 3495 | 5.4 | 3.7 | 0.08 | 68.7 | 5.34 |
| total return (%) | 6975 | 11.28 | 9.36 | -31.79 | 70.64 | 9.46 | 3684 | 17.16 | 17.18 | -31.79 | 70.64 | 8.69 | 3291 | 4.70 | 3.58 | -11.4 | 66.27 | 4.82 |

^aonly for funds that charge a 12b-1 fee

^b*trade dollars* denotes the dollar amount of securities that each fund traded in 1996, *trade* divides *trade dollars* by the average asset size of the fund, *commissions* denotes the dollar amount the fund paid in brokerage commissions in 1996, the *commission ratio* divides commissions by the average asset size of the fund, and the *brokerage ratio* divides *commissions* by *trade dollars*.

Table 2
The impact of 12b-1 fees on the expense ratio: A simple model

For virtually all open-end mutual funds in existence in 1996 we regress the expense ratio of each fund on a dummy variable equal to one if the fund charged a 12b-1 fee in 1996. As control variables we include the logarithm of fund size, as measured by net assets, the logarithm of fund age, and a dummy equal to one if the fund charged either a front- or a back load. In columns (1) and (2) we report the results for the full sample. Regression (2) includes a set of 44 Morningstar category dummy variables. In column (3) we report the results for equity funds alone, in column (4) for bond funds alone. Below the coefficients we report robust standard errors.

| dependent variable: | (1) | (2) | (3) | (4) |
|----------------------------|---------------------|---------------------|---------------------|---------------------|
| expense ratio | full sample | full sample | equity funds | bond funds |
| constant | 1.188 ^a | 1.397 ^a | 1.633 ^a | 1.382 ^a |
| | 0.020 | 0.070 | 0.116 | 0.073 |
| 12b-1 dummy | 0.394 ^a | 0.387 ^a | 0.430 ^a | 0.329 ^a |
| | 0.021 | 0.017 | 0.025 | 0.021 |
| log(fund size) | -0.019 ^a | -0.052 ^a | -0.068 ^a | -0.034 ^a |
| | 0.005 | 0.004 | 0.006 | 0.005 |
| log(age) | -0.119 ^a | -0.049 ^a | -0.042 ^a | -0.058 ^a |
| | 0.012 | 0.010 | 0.013 | 0.015 |
| load dummy | 0.175 ^a | 0.196 ^a | 0.185 ^a | 0.216 ^a |
| | 0.021 | 0.017 | 0.024 | 0.023 |
| category dummies | — | suppressed | suppressed | suppressed |
| R² | 0.251 | 0.519 | 0.488 | 0.411 |
| obs. | 6432 | 6432 | 3364 | 3068 |

^aSignificant at 0.001 level or better

Table 3
 Empirical results measuring the impact of 12b-1 fees on the expense ratio

Ferris and Chance (1987), Chance and Ferris (1991), and McLeod and Malhotra (1994) use the same regression model on data of various years to estimate the impact of 12b-1 fees on the expense ratio. The model regresses the expense ratio of each mutual fund on a dummy variable equal to one if the fund charged a 12b-1 fee. As control variables these studies include the logarithm of fund size, the logarithm of fund age, and a dummy equal to one if the fund charged either a front- or a back load. To analyze whether the impact of 12b-1 fees on the expense ratio has changed over time, the table lists the coefficients on the 12b-1 dummy variable as reported by these studies and by our regression. Below the coefficients we report the t-statistic.

| | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1996 |
|----------------------------|---------------|---------------|---------------|---------------|---------------|--------------|--------------|---------------|----------------|
| Ferris and Chance (1987) | 0.083 1.79 | 0.159 4.65 | | | | | | | |
| Chance and Ferris (1991) | | 0.186 5.06 | 0.159 4.64 | 0.327 7.92 | 0.330 8.49 | | | | |
| McLeod and Malhotra (1994) | | | | | 0.330 7.63 | 0.31 6.53 | 0.36 8.50 | 0.370 8.80 | |
| Present study | | | | | | | | | 0.387 22.89 |

Table 4
The impact of 12b-1 fees on the expense ratio: A new model

For virtually all open-end mutual funds in existence in 1996 we regress the expense ratio of each fund on the 12b-1 ratio (the 12b-1 fee expressed as a percentage of assets). As control variables we include the front- and the back-load expressed as a percentage of assets, the logarithm of the average fund size and the logarithm of fund age, the past performance of the fund measured by the difference between the fund's return and the average return of its Morningstar category in 1995, the volatility of the fund's portfolio measured by the standard deviation of the fund's monthly returns in 1996, the trading intensity of the fund expressed by the dollar amount traded divided by the average assets of the fund, the cash ratio of the fund, the logarithm of the minimum purchase requirement of the fund, a dummy equal to one if the fund was only available to institutional investors, the market share of the fund within its Morningstar category, the number of fund families that offered funds in the fund's category, and lastly dummy variables for each Morningstar category and for each fund family. Regression (1) is on the entire sample, while regression (2) is on equity funds and regression (3) on bond funds alone. The respective (b) regressions exclude the fund size and market share measures to attribute any size effect caused by the 12b-1 fee onto the 12b-1 ratio. Below the coefficients we report robust standard errors.

| dependent variable: | (1) | (1b) | (2) | (2b) | (3) | (3b) |
|----------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|
| expense ratio | full sample | full sample | equity | equity | bond | bond |
| 12b-1 ratio | 0.8441 ^a 0.0240 | 0.9010 ^a 0.0225 | 0.8878 ^a 0.0396 | 0.9799 ^a 0.0331 | 0.8590 ^a 0.0383 | 0.9019 ^a 0.0346 |
| front load | -0.0034 0.0029 | -0.0018 0.0029 | -0.0003 0.0041 | 0.0025 0.0041 | -0.0032 0.0050 | -0.0015 0.0050 |
| back load | 0.0232 ^a 0.0037 | 0.0138 ^a 0.0034 | 0.0220 ^a 0.0055 | 0.0077 0.0045 | 0.0205 ^a 0.0056 | 0.0138 ^b 0.0052 |
| log(fund size) | -0.0246 ^a 0.0040 | — — | -0.0423 ^a 0.0074 | — — | -0.0166 ^b 0.0053 | — — |
| log(age) | -0.0022 0.0075 | -0.0439 ^a 0.0072 | -0.0189 0.0098 | -0.0722 ^a 0.0092 | 0.0527 ^a 0.0128 | 0.0149 0.0125 |
| past performance | -0.0071 ^a 0.0011 | -0.0079 ^a 0.0012 | -0.0060 ^a 0.0011 | -0.0073 ^a 0.0012 | -0.0156 ^a 0.0043 | -0.0167 ^a 0.0042 |
| volatility | 0.0479 ^a 0.0110 | 0.0477 ^a 0.0111 | 0.0337 ^b 0.0119 | 0.0325 ^b 0.0124 | 0.2043 ^a 0.0327 | 0.2041 ^a 0.0324 |
| trade | -0.0021 0.0049 | -0.0011 0.0050 | -0.0136 0.0097 | -0.0096 0.0104 | -0.0019 0.0039 | -0.0020 0.0040 |
| cash ratio | -0.0011 0.0009 | -0.0011 0.0009 | 0.0006 0.0015 | 0.0003 0.0016 | -0.0036 ^a 0.0010 | -0.0035 ^a 0.0010 |
| log(min purchase+1) | -0.0093 ^a 0.0018 | -0.0079 ^a 0.0019 | -0.0061 ^b 0.0023 | -0.0039 0.0022 | -0.0136 ^a 0.0034 | -0.0128 ^a 0.0034 |
| institutional | -0.0566 ^b 0.0192 | -0.0699 ^a 0.0189 | 0.0216 0.0232 | -0.0069 0.0226 | -0.1164 0.1142 | -0.0901 0.1176 |
| market share | -0.7890 ^a 0.2042 | — — | -0.6200 ^c 0.2429 | — — | -0.7253 0.3796 | — — |
| families | -0.0013 ^b 0.0004 | -0.0013 ^b 0.0004 | -0.0033 ^a 0.0004 | -0.0037 ^a 0.0004 | -0.0014 ^c 0.0006 | -0.0013 ^c 0.0006 |
| category dummies | suppressed | suppressed | suppressed | suppressed | suppressed | suppressed |
| family dummies | suppressed | suppressed | suppressed | suppressed | suppressed | suppressed |
| R² | 0.8341 | 0.8302 | 0.8629 | 0.8549 | 0.8016 | 0.7993 |
| obs. | 5333 | 5333 | 2747 | 2747 | 2586 | 2586 |

^aSignificant at 0.001 level or better ^bSignificant at 0.01 level ^cSignificant at 0.05 level

Table 5
Impact of Variables

For all variables reported in Table 4 that were significant at least at the 5% level we compute their impact on the expense ratio. For the 12b-1 ratio and the back load the impact is expressed as the difference in the expense ratio for a 1% difference in the 12b-1 ratio or back load. For all other variables, z , the impact is computed as the difference in the expense ratios of funds Y and X where fund X has a mean value of z and fund Y's value of z equals to the mean plus one standard deviation of z .

| | (1) full sample | (1b) full sample | (2) equity | (2b) equity | (3) bond | (3b) bond |
|----------------------------|----------------------------------|-----------------------------------|-----------------------------|------------------------------|---------------------------|----------------------------|
| 12b-1 ratio | 0.84 | 0.90 | 0.89 | 0.98 | 0.86 | 0.90 |
| back load | 0.02 | 0.01 | 0.02 | | 0.02 | 0.01 |
| log(fund size) | -0.04 | | -0.07 | | -0.02 | |
| log(age) | | -0.03 | | -0.06 | 0.03 | |
| past performance | -0.04 | -0.05 | -0.04 | -0.05 | -0.05 | -0.05 |
| volatility | 0.07 | 0.07 | 0.05 | 0.05 | 0.09 | 0.09 |
| cash ratio | | | | | -0.03 | -0.03 |
| log(min purchase+1) | -0.02 | -0.02 | -0.01 | | -0.03 | -0.03 |
| institutional | -0.06 | -0.07 | | | | |
| market share | -0.02 | | -0.02 | | | |
| families | -0.08 | -0.08 | -0.24 | -0.27 | -0.05 | -0.05 |

Table 6
Coefficients on the 12b-1 ratio for two robustness tests

In Panel A we report the coefficients on the 12b-1 ratio obtained from the same regression model as described in Table 4, yet including only funds that charge neither a front- nor a back-end load. In Panel B we report the coefficients on the 12b-1 ratio obtained from a slightly modified regression model. The differences between this model and the one described in Table 4 is that fund size is measured by end-of 1996 net assets, the trade intensity is measured by the turnover of the fund in 1996, and both the volatility and past performance measures are dropped. Below the coefficients we report robust standard errors.

| | (1) full sample | (1b) full sample | (2) equity | (2b) equity | (3) bond | (3b) bond |
|--|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|
| Panel A: | | | | | | |
| funds with no front- or back-end load | | | | | | |
| 12b-1 ratio | 0.8579 ^a 0.2007 | 0.9267 ^a 0.0184 | 0.8772 ^a 0.0296 | 0.9721 ^a 0.0254 | 0.8866 ^a 0.0345 | 0.9428 ^a 0.0294 |
| Panel B: | | | | | | |
| results of modified regression | | | | | | |
| 12b-1 ratio | 0.8250 ^a 0.0808 | 0.9095 ^a 0.0807 | 0.8305 ^a 0.1109 | 1.0056 ^a 0.1048 | 0.7019 ^a 0.1347 | 0.7529 ^a 0.1442 |

^aSignificant at 0.001 level or better

Table 7
Performance and risk comparison of bond funds

This table compares various return and risk measures between bond funds that charge 12b-1 fees and those funds that do not charge 12b-1 fees. Return measures include the total return in 1996, the annualized total returns over the last three years, and the annualized total returns over the last five years. The risk measures include the standard deviation of monthly returns over the last three years, the standard deviation of monthly returns over the last five years, the beta of the fund, the best beta of the fund, and the asset-weighted average duration of the securities held by the fund. The beta of a fund is computed by running the following regression using monthly data over the past three years: $(R_{it} - R_{ft}) = \alpha_i + \beta_i(R_{mt} - R_{ft})$, where R_{it} is the return of fund i in month t , R_{ft} is the risk-free rate, and R_{mt} the market return. For the variable *beta*, the Lehman Brother's Aggregate Bond Index is used as market benchmark for all bond funds. For the variable *bestbeta*, Morningstar first determines the index (from a set of 27 indices) which generates the best fit (highest R^2) with the fund's return. Then, this index is used as market benchmark in the regression above.

| | bond funds without 12b-1 | | bond funds with 12b-1 | | t-statistic of difference |
|-----------------------------|--------------------------|------|-----------------------|------|------------------------------|
| | obs. | mean | obs. | mean | |
| total return 96 | 1093 | 4.78 | 2255 | 4.65 | 0.77 |
| total return 3 years | 949 | 8.35 | 1766 | 8.14 | 1.87 |
| total return 5 years | 568 | 6.57 | 835 | 6.49 | 0.71 |
| expense ratio 96 | 1076 | 0.70 | 2170 | 1.26 | 40.77 |
| stdv 3 years | 949 | 4.32 | 1766 | 4.76 | 5.09 |
| stdv 5 years | 568 | 4.71 | 835 | 5.09 | 3.66 |
| beta | 949 | 0.78 | 1766 | 0.82 | 2.74 |
| bestbeta | 949 | 0.86 | 1766 | 0.94 | 6.66 |
| duration | 474 | 5.22 | 1009 | 5.67 | 3.18 |

Table 8
The impact of the 12b-1 ratio on the riskiness of bond funds

This table reports the results of various regressions of risk measures on the 12b-1 ratio and control variables for all bond funds in our sample. As control variables we include the logarithm of fund size, the turnover of the fund in 1996, the cash ratio, a dummy equal to one if the fund was only available to institutional investors, and category dummies for convertible bond funds, high-yield bond funds, corporate bond funds, government bond funds, and municipal bond funds. The excluded category is international bond funds. The risk measures that are used as independent variables are the standard deviation of monthly returns over the last three years, the standard deviation of monthly returns over the last five years, the beta of the fund, the best beta of the fund, and the asset-weighted average duration of the securities held by the fund. See Table 7 for the definitions of beta and bestbeta. Below the coefficients we report robust standard errors.

| | stdv 3 years | stdv 5 years | beta | bestbeta | duration |
|-------------------------|------------------------------|------------------------------|------------------------------|------------------------------|-----------------------------|
| α_0 | 6.968 ^a 0.566 | 6.324 ^a 0.483 | 0.603 ^a 0.053 | 0.713 ^a 0.075 | 5.313 ^a 0.400 |
| 12b-1 ratio | 0.523 ^a 0.141 | 0.306 ^d 0.161 | 0.087 ^a 0.020 | 0.102 ^a 0.022 | 0.411 ^c 0.202 |
| log(fund size) | 0.057 ^c 0.024 | 0.009 0.035 | 0.009 ^b 0.004 | 0.011 ^b 0.004 | -0.025 0.035 |
| turnover96 | 0.075 0.049 | -0.013 0.040 | 0.014 0.008 | 0.008 0.006 | -0.010 0.075 |
| cash ratio | -0.031 ^a 0.009 | -0.034 ^a 0.008 | -0.008 ^a 0.001 | -0.007 ^a 0.002 | -0.006 0.010 |
| institutional | -0.239 0.719 | -1.798 ^a 0.315 | -0.083 0.090 | -0.065 0.116 | — — |
| category dummies | suppressed | suppressed | suppressed | suppressed | suppressed |
| R² | 0.223 | 0.205 | 0.151 | 0.159 | 0.024 |
| obs. | 2381 | 1260 | 2381 | 2381 | 1188 |

^aSignificant at 0.001 level or better

^bSignificant at 0.01 level

^cSignificant at 0.05 level

^dSignificant at 0.06 level

Table 9
 Test of substitution between expense ratio and brokerage costs

For all equity funds for which brokerage commission data are available we regress the brokerage ratio on the expense ratio and other control variables. The brokerage ratio is defined as the brokerage commissions paid by the fund in 1996 divided by the dollar amount traded in 1996. As control variables we include the front, the back-load, and the 12b-1 ratio, all expressed as a percentage of assets, the trade intensity of the fund measured by the dollar amount traded divided by average assets of the fund, the logarithm of the dollar amount traded, the market share of the fund within its Morningstar category, and dummies for 44 Morningstar categories, and for each family. In column (1) all equity and hybrid funds are included. In column (2) the hybrid funds are excluded. Below the coefficients we report robust standard errors.

| dependent variable: brokerage ratio | (1) all funds | (2) excluding hybrid funds |
|--|--------------------------------|---|
| expense ratio | 0.0200 0.0177 | 0.0363 0.0195 |
| front load | 0.0037 ^b 0.0012 | 0.0037 ^b 0.0013 |
| back load | 0.0073 ^a 0.0018 | 0.0065 ^a 0.0018 |
| 12b-1 ratio | -0.0658 ^b 0.0198 | -0.0826 ^a 0.0222 |
| trade | -0.0106 ^b 0.0031 | -0.0149 ^a 0.0034 |
| log(trade dollars) | -0.0029 0.0021 | -0.0020 0.0022 |
| market share | -0.0421 0.1349 | -0.0738 0.1395 |
| category dummies | suppressed | suppressed |
| family dummies | suppressed | suppressed |
| R² | 2745 | 2371 |
| obs. | 0.4788 | 0.4817 |

^aSignificant at 0.001 level or better

^bSignificant at 0.01 level

A.1. Computation of trade dollars

Even though the turnover reported by funds is a natural measure of trading activity, a more precise variable can be constructed. The turnover reported by funds is formally defined as the lesser of purchases or sales divided by the fund's average assets. As a result, a fund which is growing fast can have a lower turnover than a slowly growing fund, while actually trading more.²⁰

Using turnover and the fact whether a fund had a net cash inflow or a net cash outflow, we can derive a direct measure of trading activities. For a fund with a positive net inflow, the value of securities bought must exceed the value of securities sold. Thus, in this case, the fund's turnover represents the percentage of assets sold. For this fund, multiplying the turnover by average assets yields the dollar amount of securities that the fund sold. For the same fund, the dollar amount of securities bought can be computed as the amount sold plus the net inflows. Conversely, for a fund with net outflows, the dollar amount bought equals the turnover times average assets; and the dollar amount sold equals the amount bought minus the net flows (which are negative).

What remains to be computed are the net cash flows, which can be obtained by adjusting the change in asset size of the funds for appreciation (or depreciation) of existing assets. In computing net flows, we want to take into account that flows are neither occurring completely at the end nor at the beginning of the year. Consequently, we assume that flows occur at a constant rate over the year. Moreover, we assume that the returns of the fund are constant over the year.

Reported yearly fund returns are annual ("simple") returns. It is useful to transform these returns r into continuously compounded returns ρ . Thus,

$$e^{\rho} = 1 + r \quad (\text{A1})$$

One dollar that flows into a fund at a constant rate and is compounded instantaneously at the rate ρ grows to:

$$\int_0^1 e^{\rho(1-t)} dt = \frac{e^{\rho} - 1}{\rho} = \frac{r}{\ln(1+r)} \quad (\text{A2})$$

where expression (A1) was used in the second equality.

Let $\mathbf{d} = \frac{r}{\ln(1+r)}$ and let $fund\ size_{(t-1)}$ stand for the size of the fund at the end of year $(t-1)$, then

fund size in year t equals to:

$$fund\ size_t = fund\ size_{(t-1)}(1+r) + \mathbf{d}\ net\ flow_t \quad \text{or}$$

$$net\ flow_t = \frac{fund\ size_t - (1+r_t)fund\ size_{(t-1)}}{\mathbf{d}}$$

With this measure of net flows, we can compute the dollar value of securities sold and bought during year t :

$$sell = \begin{cases} \text{if } net\ flow > 0 : (turnover)(average\ fund\ size) \\ \text{if } net\ flow < 0 : (turnover)(average\ fund\ size - net\ flow) \end{cases}$$

$$buy = \begin{cases} \text{if } net\ flow > 0 : (turnover)(average\ fund\ size) + net\ flow \\ \text{if } net\ flow < 0 : (turnover)(average\ fund\ size) \end{cases}$$

Thus, the total amount traded by each fund is

$$trade\ dollars = buy + sell$$

To adjust for the asset size of the fund, we define

$$trade = \frac{trade\ dollars}{average\ fund\ size}$$

References

- Baumol, W., Goldfield, S., Gorden L., Koehn, M., 1990, *The economics of mutual fund markets: Competition versus regulation*. Boston: Kluwer Academic.
- Bergsman, S., 1996, Soft dollars: Where do we go from here? *Pension World* 32, 24–26.
- Blake, C., Elton, E., Gruber, M., 1993, The performance of bond funds. *Journal of Business* 66, 371–403.
- Blume, M., 1994, Soft dollars and the brokerage industry. *Financial Analysts Journal* 49, 36–44.
- Brickley, J., Dark, F., 1987, The choice of organizational form: The case of franchising. *Journal of Financial Economics* 18, 401–420.
- Brown, S., Goetzman W., 1995, Performance persistence. *Journal of Finance* 50, 679–698.
- Burgunder, L., Hartmann K., 1986, Soft dollars and Section 28(e) of the Securities Exchange Act of 1934: A 1985 perspective. *American Business Law Journal* 24, 139–177.
- Burgunder, L., Hartmann K., 1988, The mutual fund industry and Rule 12b-1 plans: An assessment. *Securities Regulation Law Journal* 15, 364–420.
- Carhart, M., 1997, On persistence in mutual fund performance. *Journal of Finance* 52, 57–82.
- Chan, L., Lakonishok, J., 1993, Institutional trades and intraday stock price behavior. *Journal of Financial Economics* 33, 173–199.
- Chance, D., Ferris, S., 1991, Mutual fund distribution fees: An empirical analysis of the impact of deregulation. *Journal of Financial Services Research* 5, 25–42.
- Chevalier, J., Ellison G., 1997, Risk taking by mutual funds as a response to incentives. *Journal of Political Economy* 105, 1167–1200.
- Chordia, T., 1996, The structure of mutual fund charges. *Journal of Financial Economics* 41, 3–39.
- Chung, K., Jo, H., 1996, The impact of security analysts' monitoring and marketing functions on the market value of firms. *Journal of Financial and Quantitative Analysis* 31, 493–512.
- Dermine, J., Röller, L., 1992, Economies of Scale and Scope in French mutual funds. *Journal of Financial Intermediation* 2, 83–93.
- Elton, E., Gruber, M., Blake, C., 1996, The persistence of risk-adjusted mutual fund performance. *Journal of Business* 69, 133–157.
- Ferris, S., Chance, D., 1987, The effect of 12b-1 plans on mutual fund expense ratios: A note. *Journal of Finance* 42, 1077–1082.
- Findlay, G., 1995, Soft Dollars: Management required. *Government Finance Review* 11, 42.
- Fraser, T., 1992, Time to toughen up on soft dollar commissions? *International Financial Law Review* 11, 22–24.
- Gasparino, C., 1998, SEC probes fund sales via brokers. *Wall Street Journal*, September 10, C1.
- Goetzman, W., Ibbotson, R., 1994, Do winners repeat? *Journal of Portfolio Management* 21, 9–18.

- Grinblatt, M., Titman, S., 1989, Mutual fund performance: An analysis of quarterly portfolio holdings. *Journal of Business* 62, 393–416.
- Grinblatt, M., Titman, S., 1992, The persistence of mutual fund performance. *Journal of Finance* 47, 1977–1984.
- Grossman, S., Hart, O., 1980, Takeover bids, the free-rider problem, and the theory of the corporation. *Bell Journal of Economics* 11, 42–64.
- Gruber, M., 1996, Another Puzzle: The growth in actively managed mutual funds. *Journal of Finance* 51, 783–810.
- Hendricks, D., Patel, J., Zeckhauser, R., 1993, Hot hands in mutual funds: Short-run persistence of relative performance, 1974–1988. *Journal of Finance* 43, 93–130.
- Investment Company Institute, 1997, Mutual fund fact book. Washington D.C.
- Ippolito, R., 1989, Efficiency with costly information: A study of mutual fund performance, 1965–84. *Quarterly Journal of Economics* 104, 1–23.
- Jarrell, G., 1984, Change at the exchange: The causes and effects of deregulation. *Journal of Law and Economics* 27, 273–312.
- Jensen, M., 1968, The performance of mutual funds in the period 1945–1964. *Journal of Finance* 23, 389–416.
- Jensen, M., Meckling, W., 1976, Theory of the firm: Managerial behavior, agency costs, and ownership structure. *Journal of Financial Economics* 3, 305–360.
- Kahn, V., 1994, The 12b-1 hurdle. *Financial World* 163, 82–87.
- Khorana, A., 1996, Top management turnover: An empirical investigation of mutual fund managers. *Journal of Financial Economics* 40, 403–427.
- Kreps, D., 1990, Corporate culture and economic theory. In: Alt, J., Shepsle, K. (Eds.), *Perspectives on positive political economy*, Cambridge University Press, Cambridge, pp. 90–143.
- Krueger, A., 1991, Ownership, agency, and wages: An examination of franchising in the fast food industry. *Quarterly Journal of Economics* 106, 75–101.
- Lafontaine, F., 1992, Agency theory and franchising: Some empirical results. *Rand Journal of Economics* 23, 263–283.
- Lang, L., Poulsen, A., Stulz, R., 1995, Asset sales, firm performance, and the agency costs of managerial discretion. *Journal of Financial Economics* 37, 3–37.
- Livingston, M., O’Neal, E., 1996, Mutual fund brokerage commissions. *Journal of Financial Research* 29, 273–292.
- Malhotra, D., McLeod, R., 1997, An empirical analysis of mutual fund expenses. *Journal of Financial Research* 20, 175–190.
- Malkiel, B., 1995, Returns from investing in equity mutual funds 1971–1991. *Journal of Finance* 50, 549–572.
- McLeod, R., Malhotra, D., 1994, A re-examination of the effect of 12B-1 plans on mutual fund expense ratios. *Journal of Financial Research* 17, 231–240.

- Morck, R., Shleifer, A., Vishny, R., 1990, Do managerial objectives drive bad acquisitions? *Journal of Finance* 45, 31–48.
- Phillips, D., 1994, A trust retained. *Morningstar Mutual Funds*, September 2, S1–S2.
- Phillips, D., 1995, A deal with the devil. *Morningstar Mutual Funds*, May 26, S1–S2.
- Pickard, L., 1997, SEC examines soft dollar practices and compliance by investment advisers. *Prentice Hall Law & Business Insights* 11, 3.
- Plexusgroup, 1997, The rapidly changing scene of institutional brokerage. *Commentary #51* February.
- Prochniak, A., 1995, Does your fund cost too much? *Fortune* 132, 95–96.
- Schroeder, M., 1994, Dangerous liaison. *Business Week*, October 3, 110.
- Scotti, M., 1996, Greenwich outlines banner year ... and ominous trends. *Traders* 9, 35.
- Securities and Exchange Commission, 1998, Inspection report on the soft dollar practices of broker-dealers, investment advisers and mutual funds. September 22.
- Shepard, A., 1993, Contractual form, retail price, and asset characteristics in gasoline retailing. *Rand Journal of Economics* 24, 58–77.
- Shleifer, A., Vishny, R., 1986, Large shareholders and corporate control. *Journal of Political Economy* 94, 461–488.
- Sirri, E., Tufano, P., 1998, Costly search and mutual fund flows. *Journal of Finance* 53, 1589–1622.
- Smith, R., 1984. Pension funds feud with money managers over brokers' rebates. *Wall Street Journal*, October 4, 1.
- Tufano, P., Sevick, M., 1997, Board structure and fee-setting in the U.S. mutual fund industry. *Journal of Financial Economics* 46, 321–355.
- Vanguard, 1997, Vanguard index trust Annual report.
- Volkman, D., Wohar, M., 1995, Determinants of persistence in relative performance of mutual funds. *Journal of Financial Research* 18, 415–430.
- Walking, R., Long, M., 1984, Agency theory, managerial welfare, and takeover bid resistance. *Rand Journal of Economics* 15, 54–68.

Footnotes:

¹ Switching costs do exist in the form of deferred sales charges, which are due at redemption, explicit redemption fees, capital gains taxes, and potentially new sales loads if the investor switches to a new fund. If the investment is in retirement plans, investors might also be limited with respect to alternative investment opportunities.

² For instance, Jensen (1968), Ippolito (1989), Grinblatt and Titman (1989), Blake, Elton, and Gruber (1993), and Malkiel (1995).

³ For instance, Grinblatt and Titman (1992), Hendricks, Patel, and Zeckhauser (1993), Goetzman and Ibbotson (1994), Brown and Goetzman (1995), Volkman and Wohar (1995), Elton, Gruber, and Blake (1996), and Carhart (1997).

⁴ Chevalier and Ellison (1997) further show that the relationship between past performance and cash inflows is positive and convex. Since cash inflows are tied to compensation, fund managers face in essence an option. By increasing the variance of returns, fund managers increase the value of this option while imposing a higher risk on fund shareholders.

⁵ Besides outsourcing the investment function, the fund board also contracts with a custodian, a transfer agent, and a principal underwriter. The custodian is in charge of physically holding the securities owned by the fund. The transfer agent is responsible for record-keeping services for fund shareholders, including distributing dividends and capital gains to fund shareholders. Lastly, the principal underwriter is in charge of selling the shares of the fund to individuals or institutions. Some investment management companies provide the record-keeping and underwriting services themselves, while others use third-party providers for distribution and underwriting.

⁶ For instance, Oakwood Counselors was charged with not disclosing a soft dollar arrangement with Merrill Lynch, which was paying for rent, salaries, legal-, and accounting fees (Pickard, 1997).

⁷ For 1983 and 1986 rates, see Burgunder and Hartmann (1988); rate for 1996 calculated by the author.

⁸ As noted above, there were about \$3.5 trillion invested in mutual funds by the end of 1996. The remaining \$1.2 trillion were invested in money market mutual funds.

⁹ The categories are: Convertible Bond, Diversified Emerging Markets, Diversified Pacific Stock, Domestic Hybrid, Europe Stock, Foreign Stock, High Yield Bond, Intermediate-Term Bond, Intermediate-Term Government, International Bond, International Hybrid, Japan Stock, Large Blend, Large Growth, Large Value, Latin America Stock, Long-Term Bond, Long-Term Government, Mid-Cap Blend, Mid-Cap Growth, Mid-Cap Value, Multisector Bond, Muni National Intermediate, Muni National Long-Term, Muni Short Term, Muni Single-State Intermediate, Muni Single-State Long, Pacific ex-Japan Stock, Short-Term Bond, Short-Term Government, Small Blend, Small Growth, Small Value, Specialty-Communications, Specialty-Financial, Specialty-Health Care, Specialty-Natural Resources, Specialty-Precious Metals, Specialty-Real Estate, Specialty-Technology, Specialty-Unaligned, Specialty-Utilities, Ultrashort Bond, and World Stock.

¹⁰ In Malhotra and McLeod (1997), the authors update their sample for the period 1992–1993 and add several additional control variables to the regression. For equity funds they find a coefficient on the 12b-1 fee dummy variable of 30–32 basis points, for bond funds they find a coefficient of 30 basis point.

¹¹ To avoid losing several hundred funds which have a minimum purchase requirement of zero, we added 1 to the minimum purchase requirement.

¹² It is interesting to note (yet somewhat coincidental) that the difference between the expense ratios, 0.56%, equals the average 12b-1 fee charged by bond funds (see Table 1), thus giving a further validation of the finding that 12b-1 fees are entirely passed through.

¹³ The beta of a fund is computed by running the following regression using monthly data over the past three years: $(R_{it} - R_{ft}) = \alpha_i + \beta_i(R_{mt} - R_{ft})$, where R_{it} is the return of fund i in month t , R_{ft} is the risk-free rate, and R_{mt} the market return. For the variable *beta*, the Lehman Brother's Aggregate Bond Index is used as market benchmark for all bond funds. For the variable *bestbeta*, Morningstar first determines the index (from a set of 27 indices) which generates the best fit (highest R^2) with the fund's return. Then, this index is used as market benchmark in the regression above.

¹⁴ For equity funds we do not find a significant difference in riskiness. However, there appears to be a significant difference in returns. Using annualized total returns over the last three years, equity funds without 12b-1 fees outperformed equity funds with 12b-1 fees by an annual 1.54%, a difference with a t-statistic of 4.37. For annualized total returns over the last five years the difference is 1.11% with a t-statistic of 3.91.

¹⁵ The 1998 SEC probe into the soft dollar practices revealed that fund boards frequently receive only very sketchy information on the kind of services that advisers obtain with soft dollars.

¹⁶ For funds which were offered in different share classes, Morningstar's allocation of brokerage expenses across share classes was flawed. By law, brokerage expenses have to be allocated proportional to asset size. Consequently, we re-allocated brokerage expenses accordingly.

¹⁷ This weighted average excludes Berkshire Hathaway, which had a share price of over \$33,000. Including Berkshire yields a market-value-weighted average share price of \$213 for 1996.

¹⁸ For the regressions in this section the top percentile of funds with respect to *brokerage ratio* are excluded. These funds have extraordinarily and unreasonably high values of *brokerage ratio*, potentially caused by data entry or computation errors made by Morningstar. Unfortunately, Morningstar has not responded to our inquiries concerning these suspect entries.

¹⁹ For instance, early in 1995, the Teachers Insurance and Annuity Association-College Retirement Equities Fund (TIAA-CREF) discontinued its soft dollar arrangements with brokers and decided to pay directly for services (Bergsman, 1996).

²⁰ For example, assume during the previous year fund A bought for \$100 securities and sold none. Then fund A's turnover is reported to be 0, while its trading volume was \$100. In contrast, assume fund B with an average asset size of \$10 bought securities worth \$10 and sold securities worth \$10. Then, its turnover would be reported as 100%, while its trading volume was only \$20.