

MUTUAL FUND BROKERAGE COMMISSIONS

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Abstract

The brokerage commissions paid for portfolio transactions by a large sample of equity mutual funds are investigated. Median brokerage commissions measured as a percentage of net assets are 21 basis points per year with a standard deviation of 27 basis points. The commission levels are negatively correlated with fund size and positively correlated with fund turnover and expense ratio. The average brokerage commission measured as a percentage of assets traded exceeds the typical execution-only commissions for large institutional traders. This finding is consistent with many mutual fund brokerage commissions including payments for research, so-called soft dollar payments. Funds' expense ratios are positively correlated with commissions per trade, inconsistent with the idea that mutual fund managers who pay soft dollars for research have a corresponding reduction in management fees.

I. Introduction

Mutual funds pay well over \$1 billion in brokerage commissions per year.¹ In spite of the large amounts involved, empirical research on mutual fund brokerage commissions is relatively sparse. This lack of research is at least partially explained by the difficulty in obtaining information about mutual fund brokerage commissions. Under Securities and Exchange Commission (SEC) regulations, individual funds report actual brokerage commissions in the statement of additional information, a supplementary report not sent to investors unless

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¹For our sample of mutual funds, the average commission was .226 percent of net assets in 1993. Total assets in all equity funds tracked by Morningstar in 1993 was \$688.7 billion, generating an estimate of \$1.55 billion in commissions paid by equity funds.

specifically requested.² In addition, mutual fund guides typically do not report brokerage costs.

Brokerage commissions are incurred when the mutual fund buys or sells securities for the fund. The commissions are paid from the net assets of the fund and are thus absorbed directly by mutual fund investors. These commissions are important for several reasons. First, information concerning brokerage commissions may help investors make more informed decisions about mutual fund investing. Recent research uncovers a significant relation between fund performance and expenses. Elton, Gruber, Das, and Hlavka (1993) document an inverse relation between performance and expenses for a sample of equity mutual funds. Blake, Elton, and Gruber (1993) show that this relation also exists for bond mutual funds. These studies do not specifically address brokerage commissions. However, since commissions are an explicit fund expense, minimization of that expense should benefit investors. This point is especially important if commissions are correlated with other mutual fund expenses.

A second reason to explore mutual fund brokerage commissions is the SEC's current focus on mutual fund soft-dollar arrangements. Under such arrangements, fund managers can purchase services other than brokerage with commission dollars. Since mutual funds are not required to disclose details of soft-dollar arrangements to investors, incentives to abuse such arrangements may exist. Ideally, mutual fund management fees should be reduced to offset any nonbrokerage services purchased with soft dollars. However, the bundling of brokerage execution with other services complicates the distinction between expenses incurred specifically for trade execution and other expenses that facilitate the administration or management of the fund.

As mentioned, mutual funds report brokerage commissions in the statement of additional information and not in the prospectus. The SEC's form N-1A requires the disclosure of all other fund expenses in the prospectus. These expenses include loads and redemption fees, 12b-1 fees, management fees, and other administrative expenses. All of these fees, except the load or redemption fee, are aggregated into a single expense ratio. This expense ratio is meant to facilitate investors' grasp of the overall amount of expenses incurred annually by investing in the fund shares. If brokerage commissions, which are not included in this expense ratio, are significant relative to the other fund expenses, their disclosure should not be relegated to the statement of additional information.

We quantify the brokerage commissions paid by a large sample of equity mutual funds from 1989 to 1993. The dollar amount of commissions is standardized in two ways. First, brokerage commissions are divided by the total

²Section 28(e) of the Securities and Exchange Act addresses the payment of brokerage commissions by investment companies. SEC form N-1A, part B, item 17 requires the disclosure of brokerage commissions in the Statement of Additional Information.

assets of the fund. This procedure allows the comparison of commissions and expense ratios, which are also measured as a percentage of assets. Second, commissions are standardized by the amount of assets traded. An analysis of this variable gives an idea of the commission rates mutual funds pay.

We find that when measured as a percentage of total assets, commissions average .27 percent of fund assets per year and are 22 percent as large as all other combined expenses of the fund. When commissions are measured as a percentage of total portfolio transactions, the median fund pays 13.8 basis points per transaction. For an average stock price of \$45, this translates to 6.2 cents per share. Commissions as a percentage of assets are correlated positively with fund turnover, negatively with fund size, and are higher for international funds. Commissions as a percentage of assets traded are correlated negatively with both size and turnover and are also higher for international funds. Expense ratio is positively correlated with commissions both as a percentage of assets and as a percentage of assets traded. This finding is consistent with using soft dollars to pay for nonexecution costs that should be paid out of the management fee.

II. Mutual Fund Expenses

Mutual fund expenses can be decomposed into four components as described in equation (1):

$$\begin{aligned} \text{Mutual fund expenses} = & \text{loads (sales commissions)} \\ & + \text{management fees} \\ & + \text{other expenses} \\ & + \text{turnover costs.} \end{aligned} \quad (1)$$

The most obvious expenses are loads and management fees. Loads are one-time sales commissions that investors incur when they purchase fund shares (front-end load) or redeem fund shares (back-end load). Management fees are annual charges paid to the fund to compensate managers for research expenses and security selection. The management fee is generally deducted from the net assets of the fund on prespecified dates and may be partially based upon the performance of the fund. In addition to the management fee, other expenses are paid on an annual basis. These include 12b-1 fees, transfer agent fees, and accounting and legal fees. The annual fees are aggregated into an expense ratio to simplify the comparison of fees across funds.

Numerous studies examine the expenses associated with mutual fund investing. Most of these studies look at expenses relative to the returns earned by mutual funds. Jensen (1968) examines yearly mutual fund performance during 1945–64 and concludes that mutual funds underperform passive investing

strategies even when expense ratios are added back to mutual fund returns. Grinblatt and Titman (1989) examine quarterly performance of portfolios constructed to match the holdings of a sample of mutual funds during 1975–84. The portfolios indicate that some managers may in fact earn abnormal returns, but these abnormal returns disappear when expense ratios are deducted. Elton, Gruber, Das, and Hlavka (1993) present evidence that equity fund performance over 1965–84 is inferior to a passive strategy of holding a mix of S&P 500 stocks, non-S&P stocks, and bonds that approximate the asset allocation of the mutual fund. This underperformance is positively correlated with the magnitude of fund expense ratios. They also find that fund performance is negatively affected by load charges; load funds underperform benchmarks by more than their no-load counterparts. Elton, Gruber, Das, and Hlavka (1993) note that expenses do not appear to change over time in response to the past performance of the fund. Using a sample from 1979–88, Blake, Elton, and Gruber (1993) show that expenses account for most of the amount by which bond funds underperform passive bond portfolios. Grinblatt and Titman (1994) find no relation between abnormal equity fund performance and expense ratios, management fees, or loads during 1975–84. Ferris and Chance (1987) and McLeod and Malhotra (1994) examine the 12b-1 fee, which some funds charge annually as a distribution fee to compensate brokers for selling fund shares. These studies relate fund expense ratios to 12b-1 fees and conclude that 12b-1 fees increase the expense ratio.

Absent from these mutual fund studies is the effect of turnover costs. Turnover costs have two components: market impact costs and brokerage commissions. Market impact costs are changes in the price of a security resulting directly from trading. These costs can be thought of as temporary price movements occurring when large blocks of stock are bought or sold and are implicit in the trading process. Market impact costs are not quantified in mutual fund documents, and some mutual funds are likely unaware of the magnitude of the market impact costs of their trading. Conversely, brokerage commissions are explicit expenses that are paid to effect security transactions and are reported in the statement of additional information.

Berkowitz, Logue, and Noser (1988) and Chan and Lakonishok (1993) examine data sets of institutional transactions to obtain estimates of market impact costs. Berkowitz, Logue, and Noser (1988) conclude that market impact costs are small relative to commissions. Chan and Lakonishok (1993) observe no correlation between market impact costs and commissions. While Berkowitz, Logue, and Noser find a statistically significant relation, they conclude from the magnitude of the correlation that no economic trade-off exists between market impact costs and commissions. This finding supplants the notion that managers pay higher commissions to obtain more favorable execution.

We do not not consider market impact costs here. However, by considering only brokerage commissions, we quantify the bulk of turnover costs and introduce no economically significant bias related to market impact costs.

III. Soft Dollars

The use of soft dollars by institutional investors is receiving a great deal of publicity (see Ambachtsheer (1993), Blume (1993), Johnsen (1992), Mitchell and Starke (1986), Quinn (1988), and Schultz (1989)). Under soft dollar arrangements, institutional investors purchase trade execution and other services related to investment management as a bundled package. Recent estimates are that mutual funds and pension funds spend more than \$1 billion annually on soft dollar deals. Section 28(e) of the Securities and Exchange Act addresses the legality of soft dollar arrangements and provides what are termed “safe harbors” for the payment of soft dollars. Safe harbors are specific services eligible for purchase with soft dollars. According to the Act, the amount of commission must be “reasonable in relation to the value of the brokerage and research services provided.” The precise meaning of reasonable must be interpreted on a case-by-case basis, and the SEC is charged with the enforcement of this provision.

The existence of soft dollar arrangements may lead to an agency conflict between fund managers and fund investors. Fund investors pay an annual management fee to compensate the mutual fund manager for expenses related to research, statistical analysis, and portfolio supervision. Soft dollars allow managers to pay for a portion of these research services directly out of clients’ commissions. However, most investors perceive that the management fee covers such costs, especially since details of soft dollar arrangements are unavailable to fund investors. Soft dollar arrangements reduce managers’ incentives to obtain best execution in portfolio transactions since the commissions buy not only trade execution, but also research services that would otherwise be paid out of the management fee.

Brennan and Chordia (1993) show that the brokerage commission structure observed in the United States may be optimal for the provision of information (i.e., research services). Their model does not consider the specific institutional details of soft dollar arrangements. Blume (1993) documents that soft dollar arrangements often lead institutional managers to use brokers they ordinarily would not employ. We calculate average brokerage commissions on a per-trade basis and compare these with commissions available for execution-only transactions. Our results suggest a substantial portion of brokerage commissions are payments for research services rather than for execution.

IV. Data

We gather data from several sources for our empirical analysis. The key information—the brokerage commissions paid—is not generally available to prospective mutual fund investors. Neither the prospectus nor the annual report contains this information. The statement of additional information for a mutual fund contains a summary of brokerage transactions, including commissions paid over the most recent years. We contacted 175 fund companies representing over 300 equity mutual funds. For each fund, we requested a prospectus, a current annual report, and the statement of additional information. Although we received a prospectus and annual report for each fund, we received statements of additional information for only 240 funds. Even upon repeated inquiry, several funds failed to provide this document.

Using the statements of additional information, we collected the brokerage commissions. In most cases, three years of brokerage commissions are available. Since the data collection period spans early 1993 to mid 1994, the years represented in the sample are 1989 through 1993. For each year a fund provides brokerage commissions, the annual report and prospectus are reviewed for the following information: beginning-of-year net asset value and number of shares, end-of-year net asset value and number of shares, expense ratio, and turnover. Turnover quantifies the amount of trading in which a fund engages throughout the year. The SEC requires that turnover be calculated consistently for all mutual funds as the lesser of buys or sells divided by average net assets. In all, 240 funds provide 659 fund-years worth of complete data (as mentioned, most statements of additional information have three years worth of commissions—either 1989–91, 1990–92, or 1991–93).

Several fund dummy variables are collected from Morningstar. The first is a load dummy that equals one for load funds and zero for no-load funds. We have no reason to suspect a relation between brokerage commissions and loads. However, any significant relation would aid investors in their choice of funds. A series of dummy variables are collected to denote the fund objective. Six dummy variables are used to code the following seven objectives: aggressive growth, growth, growth and income, specialty equity, small company, balanced, and international. The international dummy equals one if Morningstar categorizes the fund as a foreign or world fund and zero otherwise. International funds may face different commission cost schedules from U.S. domestic funds. Perold and Sirri (1994) document typically higher costs for international investment. These greater costs should be reflected in higher commissions paid by international fund managers. Funds investing in the stocks of small companies may actually pay low explicit brokerage commissions since commissions on nonexchange stocks traded through a marketmaker are included implicitly in the bid-ask spread. We may also

find that funds with an aggressive investment focus pay higher commissions. The fund objective allows us to discern whether this relation exists.

Data on discount broker fee schedules permit a comparison of mutual fund brokerage commissions with those available to individual investors. We consulted the 1995 *Institutional Investor* ranking of America's largest brokers (Carroll (1995)) to construct a sample of discount brokers. Only 4 discount brokers rank in the top 100 U.S. brokerage firms on total consolidated capital. These are Charles Schwab, Quick and Reilly, Fidelity Discount Brokerage, and Brown & Company. We requested and obtained commission schedules from each of these firms.³

V. Empirical Results

For brevity, data sample characteristics are presented in Table 1. The average mutual fund size from 1989 to 1993 is \$568 million in total assets, compared with the 1993 average of \$381 million for all equity funds tracked by Morningstar. Our sample has a significantly higher mean than Morningstar. However, the distribution is skewed to the right with a median fund size of \$167 million. The average expense ratio is 1.30 percent for all funds, 1.25 percent for all domestic funds, and 1.73 percent for international funds. These averages are not significantly different from Morningstar's 1993 average expense ratios for these categories of equity mutual funds. The average turnover is 77 percent, again not significantly different from Morningstar.

Brokerage Commissions per Net Assets

The brokerage commissions collected from the statements of additional information are analyzed in two ways to address two issues. The first issue is the size of brokerage commissions as a percentage of net assets. This measure is pertinent to investors intent on reducing the overall expenses incurred by mutual fund investing. The brokerage commissions as a percentage of net assets is denoted as B and is calculated in equation (2):

$$\begin{aligned} B &= (\$ \text{ commissions}) / (\$ \text{ average net assets}) \\ &= \text{brokerage commissions per net assets} \end{aligned} \quad (2)$$

³*SmartMoney* magazine annually ranks discount brokers on a number of service attributes. Conversations with Peggy Edersheim Kalb, author of the 1995 ranking (in *SmartMoney*, July 1995, pp. 92–101), indicated these four brokers account for most U.S. discount broker trading volume.

TABLE 1. Data Sample Characteristics.

Panel A. Quantitative Variables					
Variables	Mean	Median	Std. Dev.	Maximum	Minimum
Expense ratio (%)	1.30	1.15	0.51	4.09	0.41
Size (\$ millions)	568	167	1,545	22,356	1.22
Turnover (%)	77	65	59	329	0
Panel B. Dummy Variables					
Number of Fund-years					
Load dummy					
Load funds		310			
No-load funds		349			
Objective dummy					
Growth		261			
Growth and income		148			
Aggressive growth		60			
Balanced		24			
Specialty equity		12			
Company dummy					
Large		505			
Small		81			
International		73			

Notes: The data sample consists of information on 240 mutual funds. For most funds, three years of data are available. The sample generates 659 fund-years worth of data.

Average net assets is measured as the mean of beginning- and ending-period net assets. Funds without beginning-period net assets (funds that had just begun operations) are not included in the analysis. Descriptive statistics of B are presented in Table 2 for the entire sample and for the sample by years. For the entire sample, the average commission paid is .28 percent of net assets and the median is .21 percent. Although not described in the table, the mean commission per net assets is not significantly different for the small company funds and the domestic large company funds (.23 percent and .26 percent, respectively). The international fund mean commission is .41 percent, which is significantly different from the other two categories at the 1 percent level. For the entire sample, the mean and the median brokerage commission peaks in 1990 but appears to be falling through 1993. Although the mean B for adjacent subperiods is not significantly different, the differences between means in 1990 and 1992 and in 1991 and 1993 are significant at the 10 percent level. The difference between means in 1990 and 1993 is significant at the 1 percent level. Apparently, mutual funds reduced the amount spent on brokerage commissions over this period, at

TABLE 2. Descriptive Statistics of Brokerage Commissions per Year as a Percentage of Net Assets.

	1989-93	1989	1990	1991	1992	1993
Mean	.279	.261	.316	.289	.261	.226
Median	.214	.215	.240	.215	.201	.165
Std. Deviation	.268	.162	.309	.289	.243	.173
Minimum	.000	.0026	.010	.000	.000	.051
Maximum	2.42	.694	2.42	2.07	1.56	1.04
No. Observations	659	23	149	220	201	65

least when measured as a percentage of net assets. In each year, the median B is lower than the mean, indicating unusually high commissions for some funds. Figure I confirms that the distribution is skewed to the right.

Next, we examine the determinants of brokerage commissions per net assets. We anticipate that fund turnover will exert a strong positive influence on paid commissions since higher turnover indicates greater trading. We expect an inverse relation between fund size and commissions per net assets for two reasons. First, large funds may obtain lower commissions as a percentage of the amount traded because of the larger volume of their trades. Broker fee schedules generally increase with trade size, but at a decreasing rate. Second, if commissions have a fixed component (as expected under soft dollar arrangements), large funds will have a greater amount of net assets over which to spread that fixed component. The relation between expense ratio and commissions per net assets may be either positive or negative. If fund managers reduce their fees to offset research services purchased with investors' commissions, we should observe a negative relation between commissions and expense ratio. A positive relation could mean that some managers are simply less resolute about reducing fund expenses. These managers both charge a high expense ratio and pay higher commissions. Alternatively, a positive relation may result from investing in stocks that are both difficult to research (necessitating a high management fee) and difficult to trade (causing higher commissions). *A priori*, we have no reason to expect a difference in commissions between load and no-load funds. However, the load dummy is included since any relation among the various expenses of a fund will interest investors. We also include the objective dummy variables for international funds and small company funds.⁴ The small company dummy variable is included because we expect these funds to pay less in explicit commissions since over-the-counter stocks have commissions included implicitly in the bid-ask spread.

⁴In an unreported set of regressions, all of the investment objective dummy variables were included as explanatory variables. We expected that the more aggressive the focus of the fund, the greater the amount of commissions the fund would pay. However, once turnover and expense ratio were added to the regression, none of the dummies except the international was significant.

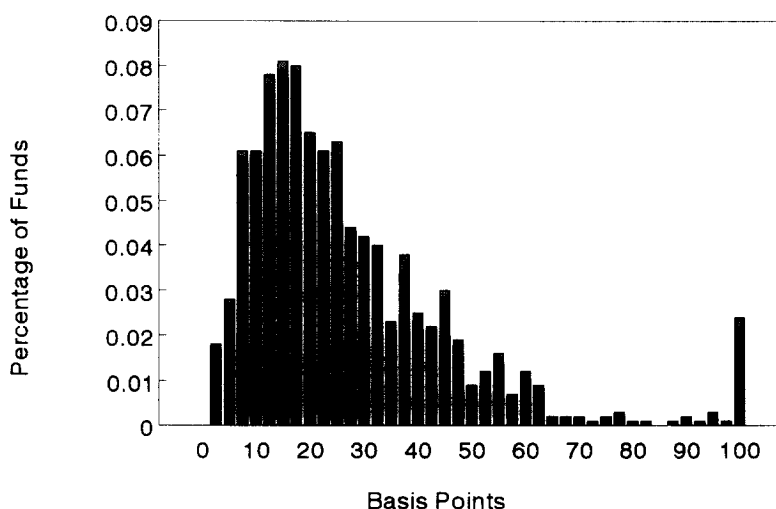


Figure I. Distribution of Brokerage Commissions per Net Assets.

Brokerage commission per net assets, B , is regressed against the quantitative and dummy variables in equation (3).

$$B_{ij} = \beta_0 + \beta_1 * TO_{ij} + \beta_2 * EXP_{ij} + \beta_3 * LNSIZE_{ij} + \beta_4 * LOADD_{ij} + \beta_5 * INTD_{ij} + \beta_6 * SCD_{ij} \quad (3)$$

where

- B_{ij} = the total brokerage commissions paid by fund i in year j measured as a percentage of average assets;
- TO_{ij} = turnover of the fund;
- EXP_{ij} = the actual expense ratio of the fund measured as a percentage of average assets;
- $LNSIZE_{ij}$ = natural log of (beginning net assets plus ending net assets divided by two);
- $LOADD_{ij}$ = one if the fund has a load, zero otherwise;
- $INTD_{ij}$ = one if Morningstar categorizes the fund as a world or foreign stock fund, zero otherwise; and
- SCD_{ij} = one if Morningstar categorizes the fund as a small company fund, zero otherwise.

Turnover of the fund is stated in decimal form (i.e., a fund with 100 percent turnover is designated as having turnover of 1). Both B and EXP are stated in

TABLE 3. Determinants of Yearly Mutual Fund Brokerage Commissions as a Percentage of Net Assets.

$$B = \beta_0 + \beta_1 * TO + \beta_2 * EXP + \beta_3 * LNSIZE + \beta_4 * LOADD + \beta_5 * INTD + \beta_6 * SCD$$

Intercept	TO	EXP	LNSIZE	LOADD	INTD	SCD	Obs.	Adj. R^2
.14** (2.33)	.22*** (14.1)	.084*** (3.91)	-.027*** (-3.79)	-.017 (-0.92)	.12*** (4.14)	-.044 (-1.57)	654	.36

Notes: B is the yearly brokerage commissions paid by the fund as a percentage of net assets; TO is the fund turnover; EXP is the expense ratio of the fund; $LNSIZE$ is the natural log of the average size of the fund over the year; $LOADD$ is a dummy variable that equals one if the fund charges a front- or back-end load and zero otherwise; $INTD$ is a dummy variable that equals one if the fund is predominately international and zero if the fund is predominately domestic; and SCD is a dummy variable that equals one if the fund is a small company mutual fund and zero otherwise. The t -statistics are in parentheses.

**Significant at the 5 percent level

***Significant at the 1 percent level

percent (i.e., a fund with an expense ratio of 1.25 percent is designated as 1.25). The size variable is expressed in millions. Results of this regression are reported in Table 3.

As expected, turnover is positively related to brokerage commissions. Higher fund turnover leads to more trading and higher total commissions for the fund. *Ceteris paribus*, a fund that increases turnover 100 percent (in absolute terms—i.e., from 40 percent to 140 percent) adds 22 basis points to the brokerage commissions per net assets.

Brokerage commissions are positively related to the expense ratio. Funds with higher expense ratios tend to have higher brokerage commissions. Several researchers report that expenses and fund size are highly correlated (Ferris and Chance (1987), Grinblatt and Titman (1989), McLeod and Malhotra (1994)). However, the significance of the expense ratio in the presence of size in the multiple regression shows that this correlation is not the primary reason for the relation between expense ratio and brokerage commissions.

We hypothesize two possible reasons for a positive relation between brokerage commissions and the expense ratio. First, managers may charge high expense ratios for investing in stocks that are difficult to research; these same stocks may also require higher commissions to trade. Small company and international funds are most likely to be difficult to analyze. However, the expense ratio is still highly significant in the regression with these variables included.

Second, some fund managers may not be concerned with cost containment, both charging high management fees and paying high brokerage commis-

sions. The significance of the expense ratio even in the presence of small company and international dummy variables is consistent with this explanation. This explanation is also consistent with the findings of Ferris and Chance (1987) and McLeod and Malhotra (1994), who document that 12b-1 fees only increase the expense ratios of mutual funds. There is no corresponding benefit to investors from paying 12b-1 fees. Similarly, paying a high expense ratio does not appear to obtain lower trading costs for investors. In fact, the opposite is true.

The natural log of size is significantly related to brokerage commissions and in the hypothesized direction. Larger funds pay lower brokerage commissions as a percentage of net assets. As stated, this result is likely due to either volume discounts on trades or spreading the fixed component in commissions over a larger asset base. We are unable to differentiate between these two explanations, and both probably influence the observed relation.

The international fund dummy variable is strongly significant. International funds have higher commissions per net assets than domestic funds. This finding is not surprising given the traditionally higher costs of international investing.

The dummy variable for small company funds has the hypothesized sign but is not significant at traditional levels in the multiple regression model. The dummy variable for load funds is not significant in the analysis. The existence of a load does not affect the amount of brokerage commissions paid.

The most significant finding is that high expense funds display high brokerage commissions per net assets. This finding is important for investors who shop for funds based on expenses. Investors who concentrate on low expense ratio funds also avoid funds that on average pay higher brokerage commissions. As expected, investors can lower their expected commission expenses by seeking out low turnover and large funds. The findings are not so encouraging for the mutual fund industry as a whole. High-expense funds appear to pay higher brokerage commissions even when controlling for fund turnover.

Brokerage Commissions per Trade

Measuring brokerage commissions as a percentage of net assets, we find that higher turnover funds have higher commissions. To adjust commissions for turnover, we examine brokerage costs as a percentage of assets traded, called brokerage commissions per trade. Measuring brokerage commissions per trade requires the total portfolio transactions (or total assets traded). The amount of total assets traded depends primarily on turnover and net new shares of the fund purchased (sold). Turnover as reported in a fund's prospectus is the lesser of buys or sells during the period divided by average net assets over the period. For a fund with positive net new shares purchased, the sells will likely be less than the buys because the new money drawn into the fund is used to purchase securities. Similarly, a shrinking fund will likely have fewer buys than sells as portfolio securities are sold to redeem shares in the mutual fund. Therefore, simply

TABLE 4. Descriptive Statistics of Brokerage Commissions per Year as a Percentage of Assets Traded.

	1989-93	1989	1990	1991	1992	1993
Mean	.174	.172	.182	.178	.160	.183
Median	.138	.153	.151	.144	.128	.136
Std. Deviation	.131	.084	.129	.134	.124	.156
Minimum	.000	.059	.000	.000	.013	.060
Maximum	1.16	.413	.848	.901	.124	1.16
No. Observations	653	23	145	220	200	65

using turnover as an indication of the total assets traded does not consider the security transactions necessitated by net changes in fund shares outstanding and understates the total assets traded.

The measure used for total assets traded is denoted as TRADE and is defined in equation (4).

$$\text{TRADE} = [(\text{TO} \times 2) \times \text{NA}] + [|\text{change in fund shares}| \times \text{NAV}] \quad (4)$$

where

- TO = fund turnover;
- NA = average net assets of the fund; and
- NAV = average net asset value per share.

Both NA and NAV are calculated as the mean of beginning- and ending-period values. Change in fund shares is calculated as the absolute value of ending-period shares minus beginning-period shares. Since turnover is the lesser of buys or sells, multiplying by two provides the buys and sells not associated with net new shareholders. The change in fund shares accounts for the transactions made to accommodate net new shareholders.⁵

The brokerage commissions as a percentage of the amount traded is denoted as PER and is the total brokerage commissions divided by TRADE:

$$\text{PER} = (\$ \text{ commissions}) / \text{TRADE} \quad (5)$$

Descriptive statistics of PER are shown in Table 4. The average for the entire sample is .174 percent of principal traded, and the median is .138 percent. The mean commissions per trade for small company funds, large company

⁵Our measure TRADE does not address changes in the cash account of the mutual fund. For reasonable changes in the cash account, misestimation will be slight.

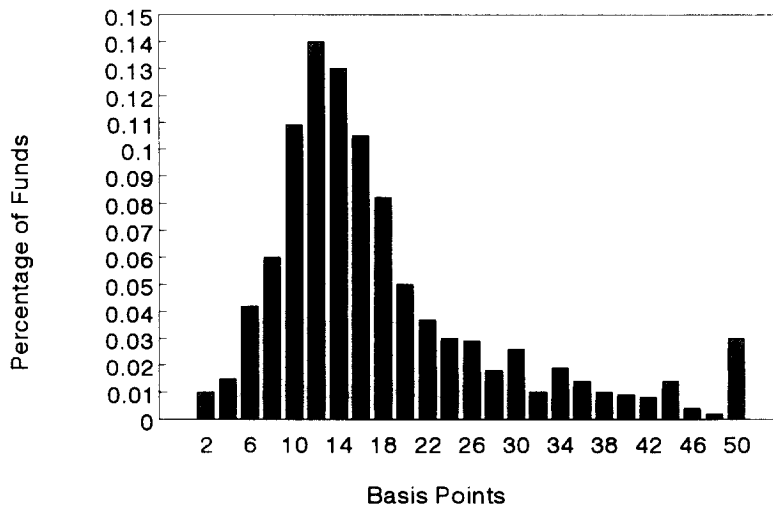


Figure II. Distribution of Brokerage Commissions per Assets Traded.

domestic funds, and international funds are .17 percent, .15 percent, and .29 percent, respectively. The international fund mean is statistically different from the other fund means at the 1 percent level. For the entire sample, we do not observe a trend in either the mean or median over the period. The difference-in-means tests show no statistical significance for any pair of observations in the subsample years. The average commission per trade is close to the .18 percent reported by Berkowitz, Logue, and Noser (1988) for a sample of firms in 1985, quarter 1. Figure II shows the distribution of PER. As expected from the discrepancy between the mean and median, it is skewed to the right.

The median PER is .138 percent or 13.8 basis points. For a \$45 dollar stock (the value-weighted average share price for the 5,141 stocks tracked by MarketBase-E as of mid-year 1992), this equals 6.2 cents per share. Table 5 shows the average costs per share across several average share prices. The costs on both a per-share basis and as a percentage of principal are used in comparisons in the next subsection.

PER is regressed against the explanatory variables used in the regression for brokerage commissions as a percentage of net assets in the previous subsection. However, the relations for commissions as a percentage of trade are expected to be different. We expect the relation between turnover and commissions per trade to be negative. *Ceteris paribus*, funds with higher turnover trade a higher volume of securities. Accordingly, the volume generated by high turnover allows the negotiation of more favorable brokerage deals. Similarly, large funds trade larger volume and should also obtain lower per-trade commissions.

The direction of the relation between PER and expense ratio is not as easy to predict. We might expect managers who charge the highest expenses to

TABLE 5. Brokerage Commissions per Share Assuming Different Average Per-share Prices.

Average Share Price (\$)	Implied Commissions per Share (cents)
30	4.1
40	5.5
45	6.2
50	6.9
60	8.3

Notes: The median brokerage commission as a percentage of assets traded is 13.8 basis points. This table converts this cost into cents per share based on several average share prices. The value-weighted share price for 5,141 stocks traded on NYSE, AMEX, and listed on NASDAQ was \$45.75 for June 30, 1992.

expand the greatest effort to negotiate or search out low-cost commissions. This behavior would lead to a negative relation between PER and expense ratio. However, since previous analysis reveals a positive relation between expense ratio and commissions per net assets, we expect a positive relation between expense ratio and commissions per trade. If so, high-expense funds may be paying high brokerage commissions on a per-trade basis because managers with high expense ratios are less resolute about reducing brokerage expenses.

Finally, we expect that international funds will pay more on a per-trade basis, leading to a positive relation between PER and the international dummy. As with the analysis of commissions per net assets, we expect the small company dummy variable to have a negative coefficient since many over-the-counter trades include no explicit commissions. The load dummy is also included in this regression, and we have no priors about the direction of its relation with PER.

In equation (6), $PER_{i,j}$ is the commission per trade for fund i in period j . All other variables are as defined in equation (3). The empirical results are presented in Table 6.

$$PER_{i,j} = \beta_0 + \beta_1 * TO_{i,j} + \beta_2 * EXP_{i,j} + \beta_3 * LNSIZE_{i,j} + \beta_4 * LOADD_{i,j} + \beta_5 * INTD_{i,j} + \beta_6 * SCD_{i,j} \quad (6)$$

Turnover is highly significant and negatively related to commissions per trade. High-turnover funds pay lower commissions as a percentage of principal traded. This finding is interesting when viewed in conjunction with the findings in the previous subsection. While high-turnover funds display higher brokerage commissions as a percentage of net assets, they procure lower commissions as a percentage of assets traded. Presumably the volume generated by high turnover

TABLE 6. Determinants of Yearly Mutual Fund Brokerage Commissions as a Percentage of Traded Assets.

$$PER = \beta_0 + \beta_1*TO + \beta_2*EXP + \beta_3*LNSIZE + \beta_4*LOADD + \beta_5*INTD + \beta_6*SCD$$

Intercept	TO	EXP	LNSIZE	LOADD	INTD	SCD	Obs.	Adj. R ²
.20*** (6.09)	-.043*** (-4.88)	.033*** (2.57)	-.0093** (-2.33)	.0032 (0.30)	.11*** (6.38)	.0081 (0.52)	653	.16

Notes: PER is the yearly brokerage commissions paid by the fund as a percentage of assets traded; TO is fund turnover; EXP is the expense ratio of the fund; LNSIZE is the natural log of the average size of the fund over the year; LOADD is a dummy variable that equals one if the fund charges a front- or back-end load and zero otherwise; INTD is a dummy variable that equals one if the fund is predominately international and zero if the fund is predominately domestic; SCD is a dummy variable that equals one if the fund is classified as a small company fund and zero otherwise. The *t*-statistics are in parentheses.

**Significant at the 5 percent level

***Significant at the 1 percent level

allows negotiation of better brokerage deals. The same interpretation explains the negative relation between PER and size.

The presence of a significantly positive coefficient for expense ratio is consistent with the finding in the previous subsection.⁶ In telephone conversations in late 1994, SEC officials in the Office of Economic Analysis indicated their *a priori* belief that funds with high brokerage commissions would have low expense ratios because of the substitution of soft dollars for management fees. The empirical findings here are inconsistent with such a scenario. In fact, low- (high-) expense funds are more (less) apt to obtain favorable brokerage commissions.⁷ This finding is particularly disturbing since investors are not made aware of the brokerage costs in a firm's annual reports or its prospectus, or most mutual fund service reports. The result is consistent with Elton, Gruber, Das, and Hlavka (1993) who show that equity mutual fund performance is negatively related to expense ratio. This negative relation may be caused not only by the drag that expense ratios put on returns, but also by the tendency of high-expense managers to pay higher brokerage commissions.

Of the dummy variables, only the international dummy is significant. This result is expected and explains the previous finding that international funds have higher brokerage commissions per net assets than domestic funds. The small company variable and the load dummy are not significant.

⁶Expense ratio explains more of the variation in PER than either turnover or size in simple regressions.

⁷The relation also holds for our sample of U.S. large company funds. By dropping international and small company funds, we eliminate funds that may be expected, *a priori*, to pay differing commissions for trade execution.

An economic interpretation of the coefficients is useful. As a base, consider a domestic no-load fund with turnover of 100 percent, expense ratio of .75 percent, and average net assets of \$100 million. Commissions per trade on this fund would be approximately 13.9 basis points. If the fund increased turnover to 200 percent, the commissions per trade would decrease by 4.3 basis points to 9.6. An otherwise identical fund with an expense ratio of 1.75 percent would have commissions that are 3.3 basis points higher than our base fund (a total of 17.2 basis points). If the fund size was \$1 billion and turnover and expenses remained at the base case, the commissions per trade would be approximately 2.1 basis points less than the base case (a total of 11.8 basis points).

Brokerage Cost Schedules

Because they are high-volume traders, mutual funds should obtain favorable commissions as a percentage of the assets they trade. Although brokerage commission schedules for mutual funds are not available, we have access to fee schedules for several prominent discount brokers. Presumably, funds can procure commissions at least as favorable as those offered to individual investors.

Discount brokers fall into one of two groups based on the way they charge commissions. The first group charges a flat fee plus some percentage of the principal traded. As the amount of principal increases, the percentage decreases. Under this fee structure, larger investors pay lower brokerage commissions per dollar of assets traded. Brokers with this type of commission schedule are commonly called "regular" discount brokers. In our sample, Charles Schwab, Fidelity Discount Brokerage, and Quick and Reilly use this fee structure.

The second group of brokers charge a flat fee for trades under a certain amount. For all trades over that amount, they charge on a cents-per-share basis. We call this group "per-share" brokers. In our sample, Brown and Company charges commissions this way. This type of broker (often called deep-discount brokers) often requires a high level of capital in the brokerage account or trades of substantial size. Mutual funds commonly trade in blocks allowing them to take advantage of the lower per-share commissions. For several different principal amounts, the costs of trading through the brokers are shown as a percentage of principal traded in Table 7. For the per-share broker, we assume an average share price of \$45.

The per-share broker (Brown and Company) offers the lowest commissions. The commissions range as low as 2.3 basis points for very large trades, approaching 1 cent per share. As the principal amount increases, the regular discount brokerage costs decrease but never get as low as those offered by the per-share broker.

Since the median mutual fund brokerage commission per trade is 13.8 basis points, large individual investors apparently can procure brokerage

TABLE 7. Percentage Fees per Trade Available Through Several Discount Brokers.

Brokers	Amount of Trade			
	\$100,000	\$500,000	\$1 Million	\$5 Million
Brokers who charge a flat fee plus % of principal				
Quick and Reilly	.205	.109	.0885	.0721
Charles Schwab	.265	.141	.116	.0951
Fidelity Discount	.265	.141	.116	.0951
Average	.245	.130	.107	.0874
Broker who charges a flat fee plus cents per share				
Brown and Company	.029	.028	.025	.023

Notes: This table shows the total brokerage commission charged as a percentage of principal traded. Percentage principal costs are calculated assuming an average share price of \$45.

commissions substantially lower than commissions paid by many mutual fund managers. Fund managers on average pay substantially more than the commissions available to large traders. Plausibly, soft dollar arrangements are at least partially responsible. Assuming an average attainable brokerage commission of 2 cents per share, two-thirds of the median commission per trade (6.2 cents for a \$45 dollar average stock price) is payment for services other than trade execution.

Although a substantial portion of brokerage commissions appears to be for the purchase of research services, brokers may indeed be the low-cost providers of these services. However, if these services are purchased with soft dollars, management fees should be reduced by the amount of the soft dollar charges for research. The empirical relation between commissions per trade and expense ratios uncovered in the empirical tests casts doubt on whether this reduction in management fees is regularly practiced in the mutual fund industry.

VI. Conclusion

The brokerage commissions paid as a percentage of net assets vary greatly across mutual funds. International funds display higher brokerage commissions than domestic funds. Turnover and expense ratio are positively related to brokerage commissions, while size is negatively related.

We find international funds pay higher commissions per trade than domestic funds, as expected. Turnover and size are negatively related to commissions as a percentage of trade, suggesting economies of scale. The expense ratio is positively related to brokerage commissions per trade. This finding is consistent

with two alternative hypotheses. First, stocks expensive to research may require high brokerage commissions to trade. However, our finding persists even after controlling for international and small company funds (two types of funds that would be difficult to research and trade). A second, more troubling possibility is that some mutual fund managers may be charging investors high management fees even though investors finance much of the research services through soft dollar commissions.

We find several implications both for individual investors and for fund regulators. First, because of the positive correlation between the expense ratio and commissions per net assets, investors can on average reduce exposure to high commissions by concentrating on larger, low expense ratio mutual funds. Second, mutual fund advisory services should report information about brokerage commissions. Third, the SEC should require funds to document the amount of brokerage commissions incurred in the more widely disseminated fund documents. This expense is significant and should not be relegated to the statement of additional information, which most investors do not see.

The existence of soft dollar arrangements complicates any analysis of the brokerage commissions paid by funds. However, the SEC clearly expects mutual fund managers to reduce explicit fees when investors finance research services through soft dollars. The results presented here suggest this reduction does not occur. In addition, a very large portion, perhaps more than half, of all commissions appear to be for purchasing services other than trade execution. All of these findings suggest a need for SEC re-evaluation of the concept of soft dollars and the associated accounting procedures and disclosure requirements.

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