Fund Returns and Trading Expenses: Evidence on the Value of Active Fund Management*

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Abstract

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Abstract

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I. Introduction

Most studies of mutual fund performance conclude that actively managed funds fail to enhance returns sufficiently to recover the costs of administering the fund. Indeed, one of the most robust finding across mutual fund studies is a negative relation between fund returns and expense ratios. [Jensen (1968), Elton and Gruber (1996), Malkiel (1995), Elton, Gruber, and Blake (1996), Carhart (1997) to name a few]. However, the negative relation between fund returns and expense ratios neither supports nor refutes the hypothesis that active fund management adds value. Many items included in expense ratios, such as legal, accounting, and marketing expenses are necessary to administering a fund but are not related to active management. Therefore, the fact that mutual funds fail to recover these costs does not imply that active management does not add value.

The relation between fund returns and trading expenses provides a more powerful test of the value of active fund management. Like expense ratios, trading expenses reduce fund assets. Thus, under the null hypothesis that active management does not add value, trading expenses should be associated with a one for one reduction in fund returns. However, unlike expense ratios, trading expenses are directly linked to active fund management. Under the alternative hypothesis that active management adds value, fund returns should be positively associated with trading expenses.

Along these lines, a number of studies have examined the relation between fund returns and trading *activity*. Elton, Gruber, Das, and Hlavka (1993) and Carhart (1997) find that turnover is negatively related to fund returns, Wermers (2000) finds that turnover is not associated with fund returns, and Dahlquist, Engstrom, and Soderlind (2000), and Chen, Jegadeesh and Wermers (2001) find that turnover is positively associated with fund returns.

Edelen (1999) decomposes funds' trading activity into a non-discretionary component related to flow (i.e., liquidity motivated trading) and a discretionary component and finds that the former is negatively related to fund returns whereas the latter is not related to fund returns. Thus, studies of the relation between fund returns and trading activity have left us with ambiguous conclusions regarding the merits of active management.

We conjecture that this ambiguity may arise because these studies focus on trading activity (turnover) as opposed to the more economically relevant variable – trading expenses. Turnover is likely to be an unreliable proxy for funds trading expenses because it does not account for heterogeneity in the per-unit cost of trading an asset. For example, an uninformed manager that frequently trades assets with low cost-per-trade may incur lower trading expenses than an uninformed manager who infrequently trades assets with high cost-per-trade. *Ceteris paribus*, the estimated relation between fund returns and turnover in this example is positive even though all trading is uninformed. This distinction between turnover and trading expenses (turnover times cost per trade) has been shown to be important in other contexts. Chalmers and Kadlec (1998) show that failure to consider both turnover and cost per trade may lead to incorrect inferences regarding the relation between asset returns and transaction costs.

We estimate equity mutual funds' trading expenses using portfolio holdings and transaction data. We find that the average fund incurs annual trading expenses of 0.75% of assets, and that these expenses vary considerably across funds. Ranking funds into trading expense quintiles, we find a significant -3.2% Carhart-adjusted return differential between the highest and lowest trading expense quintiles. By comparison, we find an insignificant -0.89% Carhart-adjusted return differential between the highest and lowest quintiles when funds are sorted by turnover. Multivariate tests confirm that the negative relation between fund returns

and trading expenses is robust to the inclusion of expense ratios and turnover. In brief, we find evidence that the abnormal returns generated by fund managers' trading activity fall short of the expenses they incur trading.

Grinblatt and Titman (1989) and Wermers (2000) also examine mutual fund trading expenses and, in contrast to our study, conclude that active management adds value. In addition to using different samples, our analysis differs from theirs in two respects. First, we estimate funds' trading expenses directly using portfolio holdings and transaction data whereas Grinblatt and Titman and Wermers use less direct methods. We replicate their procedures for our sample and find that their average estimates of trading expenses are similar to our average estimates, though they have considerably more noise. Second, Grinblatt and Titman and Wermers examine average trading expenses for funds sorted by other fund characteristics such as style and turnover. It is difficult to isolate the effect of trading expenses on fund returns from these univariate sorts, as the sorting variable potentially relates to returns due to independent factors. By directly sorting on the variable in question, and controlling for other factors using multivariate Fama-MacBeth (1973) regressions, we more clearly isolate the association between mutual fund returns and trading expenses.

The debate over the value of active fund management has practical relevance to investors and important implications for theoretical models of trading. Grossman and Stiglitz (1980) show that equilibrium informed trading results in trading profits that just cover trading expenses. Thus, if information motivates fund managers' trades, there should be a nonnegative correlation between net fund returns and trading expenses. Our finding of a strong negative correlation rejects that model of fund managers' trading. Rather, our results are consistent with the analysis of Dow and Gorton (1997), who model trading by informed and uninformed

agents in the context of delegated portfolio management. In their setting, portfolio managers trade even when the cost that fund investors' bear from that trading exceeds the benefit they receive. Ironically, such trade is rational for the fund manager because it signals that the manager has high information-production ability. Thus, the negative relation between fund returns and trading expenses that we document may reflect agency costs brought about by delegated portfolio management.

The remainder of the paper proceeds as follows. Section II describes our sample selection, data sources, and methodology used to estimate funds' trading expenses. Section III provides an analysis of the determinants of fund trading expenses and shows why turnover fails to adequately capture trading expenses. Section IV examines the relation between fund returns and trading expenses. Section V concludes the study.

II. Sample Selection, Data Sources, and Methodology

A. Sample selection and data sources

Following Edelen (1999), 165 funds are randomly sampled from the 1987 summer volume of Morningstar's *Sourcebook*. Twenty-nine funds are dropped because portfolio holdings data are unavailable. Four funds are dropped because the funds held less than 50% of their assets in equity for the entire sample period (1984-1991). We require a minimum of 50% of assets in equity because our trading cost data are limited to equity securities. The final sample contains 132 funds. Using CRSP mutual fund investment objective classifications, the sample is 25% aggressive growth funds, 39% growth funds, 28% growth and income funds, and 8%, income funds. Table 1 panel A provides evidence that our sample is representative of CRSP mutual

funds in terms of style classification, total assets, expense ratio, turnover, average return, age, and survival.

Table 1 panel B provides descriptive statistics of our sample funds' stock holdings. Specifically, we compare the stocks held by the sample funds to the universe of stocks traded on the New York Stock Exchange (NYSE), American Stock Exchange (ASE), or National Association of Security Dealers Automatic Quotation (NASDAQ) market. Each quarter we form deciles for the universe of stocks based on various characteristics.[1] We then compute the average decile of sample fund stocks relative to the universe for each characteristic. From panel B, the average fund holds 82 stocks. Relative to the median (decile 5.5), the stocks held by our sample funds have larger capitalization (decile 9.2), higher dividend yields (decile 7.0), higher share prices (decile 8.7), lower effective spreads (decile 2.1), lower return volatility (decile 3.6), median beta risk (decile 5.4), median book to market ratios (decile 5.2), and higher prior-year returns (decile 6.8). The sample fund holdings are consistent with Del Guercio (1996), Falkenstein (1996), Gompers and Metrick (1998), and Daniel, Grinblatt, Titman and Wermers (1997) who report that institutional investors have preferences for large, liquid stocks with high past returns, and median book-to-market ratios. From table 1 we conclude that our sample is representative of the general population of mutual funds.

B. Estimating fund trading expenses

We consider two components to funds' trading expenses – bid-ask spreads and brokerage commissions. We estimate funds' bid-ask spread expenses using portfolio holdings and transaction data. The holdings data for each fund are hand-collected from volumes of *Spectrum*

[1] Data on stock returns, prices, shares outstanding, and dividend yield are obtained from the CRSP daily returns files. Data on book value of equity is obtained from Compustat's industrial research and tertiary file. Effective spreads are estimated using transaction prices and bid-ask quotes obtained from the Institute for the Study of Securities Markets (ISSM) transaction files.

II. *Spectrum II*, published by CDA Investment Technologies, Inc., provides quarterly snapshots of funds' equity holdings and is used extensively by Grinblatt and Titman (1989) and Wermers (1999).[2] We collect holdings data from January 1984 through December 1991. Quarterly holdings are available for 90% of the sample while 10% are available semi-annually. Using these holdings data, we infer the funds' quarterly (semi-annual) trading activity in each stock from changes in the position of stocks held after adjusting for stock splits and CDA reporting adjustments.[3]

There are potential limitations to estimating funds' trading activity using the CDA data. First, if a stock is bought and sold between disclosure dates we do not capture the trade. Second, we do not capture trades in bonds and other fixed-income securities with these data. We can, however, provide some calibration of our estimates of trading activity. For 75% of our sample observations, the total purchases and sales activity of the fund is recorded in the SEC's N-SAR report. Using this information we find that our estimates capture 87% of the funds' total trading volume.

Data for estimating bid-ask spread costs associated with fund trades are obtained from the Institute for the Study of Securities Markets (ISSM) transaction files. For stocks listed on either the ASE or NYSE, we estimate a funds' spread cost when trading stock i in quarter t using the volume-weighted average effective spread for all trades recorded in the ISSM database for stock i in quarter t:

[2] Wermers (1999) provides an excellent description of the data-collection process used by CDA. Because we have collected the data from hard-copy volumes, our data may not reflect updates that CDA has made to correct errors, and we may have introduced errors by way of data entry.

[3] CDA reports are issued at quarter-end in March, June, September, and December. For funds that report holdings for other quarter-end months, say January, April, July, October, CDA reports January's holdings in March. However, CDA updates the January holdings for any splits or other stock distributions that occur in February or March.

$$\text{effective spread}_{it} = \sum_{k=1}^{K} \left| \frac{P_{ik} - M_{ik-}}{M_{ik-}} \right| \frac{Shrs_{ik}}{\sum_{k=1}^{K} Shrs_{ik}}, \quad (1)$$

where k ranges over the set of all transactions in the ISSM database for stock i in quarter t; P_{ik} is the transaction price; M_{ik-} is the midpoint of the bid and ask quotes immediately preceding transaction k; and $Shrs_{ik}$ is the number of shares traded.

The ISSM transaction data covers stocks that are listed on either the ASE or the NYSE. By value 20% of our sample fund holdings are listed on the NASDAQ, for which we do not have transaction data. To estimate effective spreads for these stocks, each quarter we assign all stocks listed on CRSP (NYSE, ASE and NASDAQ) to deciles based on share price. Within each share-price decile we assign stocks to deciles according to market value of equity. We then estimate the effective spreads of NASDAQ stocks using the median effective spread for the corresponding price-size cell in the ten-by-ten grid of NYSE/ASE effective spreads. As a gauge of the in-sample reliability of these estimates, the average R-square for the cross-sectional regressions of effective spreads on the corresponding price-rank and size-rank for NYSE/ASE stocks is .71.

We compute each fund's quarterly spread expenditures using our estimates of fund trading activity and spread cost. Specifically, a fund's quarterly spread expenditure is computed as the product of the dollar value of each trade multiplied by the effective spread estimated in equation (1) summed over all trades for the quarter and divided by the value of the fund's assets. Finally, our estimates of funds' trading expenses also consider funds' expenditures on brokerage commissions. Semi-annual data on brokerage commissions paid by funds are obtained from the SEC's N-SAR report. These data are available for 99 of the 132 funds. We estimate brokerage

commissions for missing observations by assigning the fund the median brokerage commission paid by funds in its particular investment objective during the semi-annual period.

A potential limitation of our spread expenditure estimates is that we assign the same effective spread for all fund trades (in a given stock during a given quarter) regardless of trade size. Trading costs are likely to depend on the size of the trade package (i.e., the quarterly position change) as well as how the trade package is broken up into individual trades. Using data on actual trade packages of institutional investors, Chan and Lakonishok (1995) find that 78% of institution's trade packages are executed over two or more days and that the estimated price impact cost is 1% for buys and 0.35% for sells. Since we do not know how fund position changes are executed during the quarter we apply the average effective spread for a given stock during a given quarter to all fund trades in that stock during the quarter.

For comparison purposes we also estimate funds' trading expenses using the methodologies of Grinblatt and Titman (1989) and Wermers (2000). Grinblatt and Titman estimate trading expenses by comparing actual (net) fund returns to hypothetical (gross) fund returns. Hypothetical fund returns are calculated using CDA portfolio holdings data and CRSP stock price data. They reflect the returns to the portfolio of stocks held by funds, but, unlike actual fund returns, hypothetical fund returns do not include expense ratios, brokerage commissions, or spread costs. The difference between the two returns provides an estimate of total fund costs. An estimate of trading expenses is obtained by subtracting the expense ratio from the difference in returns.

Following Grinblatt and Titman, we estimate trading expenses for our sample funds. Because their approach implicitly assumes that the fund's portfolio is all equity, we limit our analysis to funds with at least 90% equity in their portfolio, a sample of 88 funds. We find that

the average estimate using their procedure is close to the average estimate using our procedure 1.03 vs 0.92%. These two estimates are statistically indistinguishable. However, their estimates are noisy relative to our estimates.[4] For example, the 25th percentile of the Grinblatt and Titman estimates is –1.09% as compared to 0.26% for our estimates. The noise in their estimates is apparent from the fact that negative trading expenses are not plausible.

Wermers (2000) uses portfolio holdings data to estimate funds' trading volume in each stock then estimates per-unit trading costs by conditioning on three stock characteristics (market capitalization, price, exchange) using a regression model fitted in Keim and Madhavan (1997).[5] Following Wermers (2000), we estimate funds trading expenses for our sample funds. We find that the average estimate using Wermers' procedure is reasonably close to the average estimate using our procedure 1.01% vs. 0.75%. However, the standard deviation of trading expense estimates using Wermers' procedure is roughly three times the standard deviation of trading expense estimates using our procedure. This could be due to the fact that the Keim and Madhavan (1997) model of trade execution cost has an average adjusted R-square of 6%.

III. An analysis of mutual fund trading expenses

Table 2, provides summary statistics of fund expense ratios, spread expenses, brokerage commissions, turnover, and average effective spread of holdings. Panel A reports statistics for the full sample while panel B reports statistics for sub-samples formed by fund investment objective. Expense ratios include advisory, administrative, and 12b-1 distribution fees. From

[4] The noise is due to assumptions that that must be made concerning the price at which stocks are purchased and sold in the hypothetical portfolio during the quarter. Our estimate of trading expenses also relies on estimated prices. We use mid-quarter prices when calculating trade value. However, the trade value is then multiplied by spread cost, which is on the order of 1%. Thus, the impact of errors in price estimates on our transaction cost estimate is small. By contrast, in the indirect approach errors in price estimates carry through directly to the transaction cost estimate.

Panel A, the average expense ratio is 1.09% of assets, comparable to the average expense ratio of 1.08% in Carhart (1997) and 1.13% in Gruber (1996). Expense ratios do not include spread expenses or brokerage commissions. From Panel A, average annual spread expenses are 0.46% of fund assets and average annual brokerage commissions are 0.28% of fund assets. Summing spread expenses and brokerage commissions, funds' trading activities cost an average of .75% of fund assets annually. Thus, the magnitude of these invisible costs, as Bogle (1994) characterizes them, is comparable to that of the more easily observed expense ratio.

In panel B we provide evidence that turnover is an unreliable proxy for funds' trading expenses. For example, consider growth versus income funds. Growth funds have annual turnover of 78% and annual trading expenses of 0.84% while income funds have annual turnover of 90% and annual trading expenses of 0.65%. If one were to infer funds trading expenses on the basis of turnover, they would erroneously conclude that growth funds have lower trading expenses than income funds. The reason for this error is that turnover fails to account for the cost per trade. On average, the assets of growth funds cost more to trade than the assets of income funds. From panel B, the average effective spread of growth funds' holdings is 0.39 while the average effective spread of income funds' holdings is 0.30. As a result, income funds have lower trading expenses than growth funds despite their higher turnover.

Figure 1 further illustrates why turnover is not a reliable proxy for fund trading expenses. We assign funds to quintiles on the basis of their turnover and average effective spread of holdings. We then compute the average trading expense of funds in each cell of the five by five partition. Panel A reports the average trading expense of funds in each cell while panel B reports the number of funds in each cell. From figure 1, there are many cases where funds have

[5] Keim and Madhavan (1997) estimate their regression model using data from 1991-1993, Wermers adjusts the trading cost estimates over time by multiplying the predicted trading cost by a yearly time-adjustment factor taken from Stoll (1995).

relatively low turnover, yet due to their high cost per trade, have relatively high trading expenses. For example, funds in the lowest turnover quintile and highest average spread quintile, have higher trading expenses than half the sample funds. Similarly there are many cases where funds have relatively high turnover, yet due to their low cost per trade, have relatively low trading expenses. For example, funds in the highest turnover quintile and lowest spread quintile, have lower trading expenses than a fourth of the sample funds

Finally, in results not tabulated we examine the relation between fund trading expenses and its determinants (turnover and spread) using regression analysis. Specifically, we estimate cross-sectional regressions of fund trading expenses on turnover and spread each year then take a time-series average of the results. The average adjusted-R^2 from regressions of fund trading expenses on fund turnover is 0.68. By contrast, the average adjusted-R^2 from regressions of fund trading expenses on the product of turnover and average spread is .84. In summary, the evidence in section III suggests that funds trading expenses are of comparable magnitude to fund expense ratios and are not reliably captured by turnover. We now turn to an analysis of the relation between fund returns and fund trading expenses.

IV. Fund returns and fund trading expenses

A. Panel analysis

To the extent that active fund managers possess superior information they should, at a minimum, recover their trading expenses. Table 3 presents panel data on the association between fund returns and trading expenses. In panel A we assign funds to quintiles each quarter based on trading expenses and in panel B we assign funds to quintiles each quarter based on turnover. In each panel we report annualized average expense ratios, spread

expenses, brokerage commissions, and three measures of fund return performance: raw return, CAPM-adjusted return, and Carhart-adjusted return. Raw returns are fund returns net of expenses, fees (excluding load fees), and trading expenses. To compute adjusted returns we use the same procedure as Carhart (1997) for both the CAPM-adjusted returns and the Carhart-adjusted returns.[6] Specifically, the Carhart-adjusted return for fund *j* in month *t* is,

$$\textit{Carhart adjusted return}_{jt} \; ? \; R_{jt} \; ? \; R_{Ft} \; ? \; \hat{b}_{jt?1} RMRF_t \; ? \; \hat{s}_{jt?1} SMB_t \; ? \; \hat{h}_{jt?1} HML_t \; ? \; \hat{p}_{jt?1} PR1YR_t , \qquad (3)$$

where R_{jt} is the return on fund *j* in month t, R_{Ft} is the three-month t-bill in month *t*, $RMRF_t$, SMB_t, HML_t, are Fama and French's (1993) excess return on the market and factor mimicking portfolios for size and book-to-market, and $PR1YR_t$ is the Carhart (1997) factor-mimicking portfolio for one-year return momentum. We estimate the coefficients on the factor mimicking portfolios using three years of monthly data preceding month *t*. The CAPM-adjusted returns are calculated using the same procedure above but exclude the *SMB, HML* and *PR1YR* terms.

Sorting funds by trading expenses produces substantial variation in fund return performance. From panel A, the difference in Carhart-adjusted fund returns from the highest to lowest trading expense quintiles is a significantly negative 3.20%. However, one cannot attribute this difference in return performance solely to differences in trading expenses because of the high correlation between trading expenses and expense ratios. The difference in total fund costs from the highest to lowest trading cost quintiles is 1.83%. Of this, .49% is due to variation in expense ratios and 1.34% is due to variation in trading expenses. Nonetheless, the evidence of panel A suggests that funds fail to recover these costs.

Sorting funds by turnover produces much less variation in fund return performance. From panel B, the difference in Carhart-adjusted fund returns from the highest to lowest

[6] See page 66-67 of Carhart (1997) for this description.

turnover quintiles is an insignificant -.89%. Not surprisingly, sorting by turnover also produces less variation in fund costs. The difference in total fund costs from the highest to lowest turnover quintiles is 1.14%. Of this, .29% is due to variation in expense ratios and .86% is due to variation in trading expenses. Thus, the variation in both fund returns and fund costs captured by turnover is considerably less than that captured by our estimates of trading expenses. These results may explain the rather mixed evidence obtained when using turnover to explain fund returns.

As previously mentioned, Wermers (2000) also finds no variation in Carhart-adjusted returns when funds are sorted by turnover. Since Wermers does not sort funds by trading expenses, we do not know the relation between fund returns and trading expenses for his sample. Nonetheless, when we sort our sample funds using Wermers' estimates of trading expenses we find a significant negative 1.94% difference in Carhart-adjusted returns from the highest to lowest trading expense quintiles. Though not as strong as the results obtained using our estimates of trading expense, this result is consistent with our argument that inferences regarding the relation between fund returns and trading expenses are more powerful using direct estimates of trading expenses as opposed to turnover.

B. Regression analysis

The correlation between expense ratios and trading expenses observed in table 3 suggests that regression analysis is necessary to assess the relative merits of these variables in explaining fund returns. In this section we use Fama-MacBeth (1973) style regressions to more clearly isolate the association between mutual fund returns and trading expenses. Table 4 reports time-series averages of coefficient estimates from cross-sectional regressions of monthly fund returns on expense ratios, spread expenses, brokerage expenses, turnover, and a

new proxy for fund trading expenses created by multiplying fund turnover by the average effective spread of fund holdings.

From column 1 of table 4, the coefficient estimates from regressions of fund returns on expense ratios and turnover confirm the negative association between fund returns and expense ratios documented in prior studies. We find no evidence of a relation between fund returns and turnover. Some striking results emerge when we replace turnover with the direct estimates of fund trading expenses. From column 2 of table 4, the average coefficient estimates for spread expenses are negative and significant in all regressions. The coefficient estimates for brokerage expenses are significant in the regressions using Carhart-adjusted returns. Also note that, the coefficient estimates for expense ratios are now significant only in the regressions using CAPM-adjusted returns. This suggests that, in the absence of a reliable proxy for trading expenses, expense ratios capture some of the variation in fund trading expenses. Furthermore, the fact that turnover has no statistically discernible association with fund returns, while within the same sample, trading expenses are robustly associated with fund returns is consistent with our assertion that turnover is a weak proxy for funds' trading expenses.[7]

The levels of the coefficient estimates in table 4 provide evidence on the value of active fund management. A coefficient greater than 0 indicates that funds' return performance more than offsets their costs, a coefficient equal to 0 indicates that funds' return performance just cover their costs, while a coefficient equal to –1 indicates that funds' return performance fail to recover any of their costs. The coefficient estimates on either spread expense or expense ratio are less than –1 for all return measures. In the case of the expense ratio we cannot reject the hypothesis that the coefficient on the expense ratio is equal to –1 in any of the specifications

[7] In our sample and using Wermers (2000) methodology to estimate transaction expenses, we find that there is also a significantly negative association between returns and transaction expenses.

that include spread expenses in the specification. These results are similar to Malkiel (1995) where he finds a coefficient on expense ratios of -1.92 that is not statistically different from -1. For the CAPM adjusted returns the coefficient on spread expense is more than two standard errors below –1.

We find that trading expenses are an important variable for explaining fund returns and that turnover is an unreliable proxy for these costs. However, from a practical standpoint, trading expenses are difficult to estimate and not readily available from any data source. This raises the question: are there reliable proxies for fund trading expenses? From column 3 of table 4 we consider an alternative to our direct estimates of trading expenses -- the product of fund turnover and average effective spread of holdings. As with our direct estimates, this proxy variable is significantly negatively related to fund return performance in all specifications. Data on fund turnover is readily available. It is conceivable that fund information services could provide data on funds' average spread of holdings. Our evidence suggests that this proxy for trading expenses provides investors with information that is associated with mutual fund returns.

V. Conclusions

Actively managed mutual funds thrive in the money management business. One possible explanation for their success is that fund managers' trades add value. As assumed in Grossman and Stiglitz (1980), this means that the abnormal return generated by trading exceeds the cost of trading. Our findings are at odds with this explanation. We find a strong negative relation between fund returns and trading expenses. In fact, we cannot reject the hypothesis that every dollar spent on trading expenses results in a dollar reduction in fund value.

Our results are consistent with the equilibrium developed in Dow and Gorton (1997). In their model portfolio managers have incentives to churn their portfolios even when no value maximizing trades are found. This churning arises because the optimal compensation contract cannot distinguish between portfolio managers who work hard and then optimally choose to do nothing, from managers that lack talent or shirk. As a result, managers trade even when the trade is an *ex ante* negative NPV proposition for fund investors.

In addition, fund managers are forced to make some trades. Edelen (1999) estimates that roughly a third of fund trades are for liquidity purposes and that these trades have a negative impact on funds' return performance. Thus, it is likely that part of the negative association between fund returns and trading expenses we find is due to liquidity trade. While this may be true, our evidence suggests that fund managers fail to recover any of their trading expenses.[8]

As previously mentioned, evidence from prior studies of the relation between fund returns and trading activity is mixed. The conflicting evidence on this issue raises dissonance for investors and academics alike. For example, Deli (2002) finds that fund manager compensation is positively related trading activity. He argues that high turnover funds utilize higher quality information and, thus, provide higher marginal product in asset management. Based on the presumption that turnover generates value, he suggests that managers of high turnover funds should receive higher compensation than managers of low turnover fund. Thus, how one interprets Deli's (2000) findings depends on the veracity of the proposition that turnover adds value.

[8] A related methodological issue concerns the relation between fund performance and investor flow. It is possible that poor returns cause higher trading expenses because investors migrate out of funds with poor performance. This would impart a negative bias on our estimates of the relation between fund returns and trading expenses. However, Sirri and Tufano (1998) and Edelen (1999) report that while inflows tend to follow good performance, outflows are insensitive to poor performance. Thus, if anything this performance-flow effect imparts a positive bias on our estimates.

In this paper we reject the hypothesis that active fund management enhances performance. We attribute our strong results to our more direct measure of fund trading expenses. In support of this conjecture, we note that in our sample we find a strong negative relation between fund returns and trading expenses, while we find no relation between fund returns and turnover. We believe that this study contributes important new evidence to the debate concerning the value of active fund management.

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Table 1
Sample Characteristics

Panel A: Comparison of sample funds to the CRSP mutual fund database

This table compares sample funds to funds on the CRSP mutual fund database. From CRSP, we identify mutual funds investing more than 50% of their assets in common stocks during 1987. We exclude funds that have an investment policy that is money market, government securities, C & I, bonds, tax-free money market, preferred, and bond and preferred. The CRSP sample includes 341 funds. For consistency, we drop 40 of our 132 sample funds for this comparison because the sample funds do not pass the 50% equity screen during 1987. The columns labeled CRSP represent the 341 funds in the CRSP universe. All data are obtained from the CRSP database. Turnover, expenses, and returns, are annualized. Dead funds refer to funds that are merged or liquidated prior to December 1998.

Fund objective	CRSP	Sample	Year of inception	CRSP	Sample
Maximum Capital Gains	16%	21%	Before 1980	47%	52%
Growth	46%	35%	1980 to 1985	32%	27%
Growth & income	24%	29%	1985	6%	8%
Income	8%	10%	1986	5%	5%
I-G	6%	5%	1987	10%	8%
Other characteristics			**Dead funds**		
Ratio of equity to assets	84%	83%	No	89%	89%
Turnover	87%	86%	Yes	11%	11%
Expenses	.99%	0.92%			
Returns	7.85%	7.14%			
Assets (millions)	490	513			

Panel B: Sample funds' stock holdings

This table characterizes the stock holdings of the sample mutual funds. Number of stocks is the average number of stocks held in the fund portfolio. Standard deviation is the annualized monthly standard deviation of return. Effective spread is the average effective spread of each stock over the quarters in which the stock is held. Prior year return is the raw return of the stock in the year prior to the observation. Rank variables are calculated by assigning each stock holding to deciles based on the universe of stocks available on CRSP (NYSE/AMEX/NASDAQ) (1 low, 10 high). We report the time-series average of the ranks during the sample period 1985-1990.

N=132 Funds	Mean	10%	25%	Median	75%	90%
Number of Stocks	82	39	55	73	98	132
Market Value Equity (millions)	4,662	547	2,514	4,804	7,608	8,674
Rank	9.2	7.0	7.9	8.5	8.8	8.9
Price	39	23	33	40	46	51
Rank	8.7	7.6	8.3	8.9	9.3	9.6
Standard Deviation of return	.36	.27	.30	.34	.39	.47
Rank	3.6	2.2	2.7	3.3	4.2	5.3
Dividend Yield	3.0%	1.0%	1.9%	3.0%	4.0%	4.6%
Rank	7.0	5.0	6.0	7.3	8.0	8.7
Effective Spread	.46%	.29%	.33%	.40%	.50%	.62%
Rank	2.11	1.3	1.5	1.8	2.4	3.2
Beta	1.03	.80	.90	1.01	1.15	1.28
Rank	5.35	4.2	4.8	5.3	6.0	6.6
Prior year return	.20	.10	.14	.18	.26	.35
Rank	6.8	6.1	6.4	6.7	7.1	7.5
Book-to-market	.62	.45	.51	.62	.72	.78
Rank	5.1	4.0	4.5	5.2	5.8	6.3

Table 2
Sample Expense Ratios, Trading Expenses, Turnover and Effective Spreads
Panel A: Full Sample

This table presents summary statistics for variables germane to funds' operating costs. Expense ratio is annual expenses scaled by fund assets as reported by CRSP and does not include sales charges (loads). Spread expenses are the product of effective spreads and the dollar trade size summed over all trades in a given year, for a given fund, scaled by fund assets. Brokerage commissions are obtained from SEC N-SAR reports. Total fund costs are the sum of the expense ratio, spread costs, and brokerage commissions. Turnover is the minimum of purchases or sales divided by fund assets that CRSP reports. The weighted average spread is a weighted average of the effective spreads for the stocks each fund holds. Data are averaged over time for each fund, then cross-sectional statistics are computed. All units are in percent.

Data (% of fund assets)	Mean	10%	25%	Median	75%	90%
Expense ratio (1.09=1.09%)	1.09	.66	.85	1.04	1.30	1.49
Spread expenses	.46	.13	.24	.38	.60	.88
Brokerage commissions	.28	.07	.15	.26	.34	.54
Spread + Brokerage	.75	.28	.44	.67	1.01	1.29
Total Fund Costs	1.84	.99	1.36	1.74	2.26	2.61
Turnover	79	15	35	64	103	156
Weighted Average Spread	.38	.26	.28	.32	.39	.54

Panel B: By Investment Objective

The descriptive statistics of panel A are reported by investment objective as assigned by CRSP. We use the label aggressive growth where CRSP uses maximum capital gains. I-G appears to be synonymous with an investment objective of balanced.

Fund characteristics	**Aggressive Growth**	**Growth**	**Growth & Income**	**Income**	**I-G**
Expense ratio	1.16%	1.16%	0.96%	0.99%	1.09%
Spread expenses	0.64%	0.51%	0.34%	0.33%	0.16%
Brokerage commissions	0.32%	0.33%	0.22%	0.31%	0.08%
Spread + Brokerage	.96%	.84%	.56%	.65%	.24%
Total Fund Expenditures	2.12%	1.99%	1.52%	1.64%	1.33%
Turnover	95	78	62	90	71
Weighted Average Spread	.48%	.39%	.29%	.30%	.29%
Number of funds	32	48	33	11	8

Table 3
Average Fund Returns by Trading Expenses and Turnover Quintiles

Funds are assigned to quintiles each quarter on the basis of trading expenses (panel a) and turnover (panel b). The table presents the average expense ratio, spread expense, brokerage commission, and return for funds in each quintile. Expense ratios are obtained from CRSP. Spread expenses are effective spreads times dollar trade size summed over all trades in a given year, for a given fund, scaled by total assets. Brokerage commissions are obtained from SEC N-SAR reports. Total costs are the sum of expense ratios, spread expenses, and brokerage commissions. Carhart adjusted returns are raw fund returns minus the predicted return from the four-factor model presented in Carhart (1997). CAPM adjusted returns are raw fund returns minus the expected return from the CAPM. t-statistics are reported which test the hypothesis that the mean quintile 1 value minus the mean quintile 5 value is zero. The turnover quintiles exclude 4.6% of the observations because of missing CRSP turnover. All data are annualized.

	(a) Trading Expense Quintile					t-statistic	(b) Turnover Quintiles					t-statistic
	1	2	3	4	5	(Q1-Q5)	1	2	3	4	5	(Q1-Q5)
Expense Ratio	0.76%	0.94%	1.05%	1.13%	1.24%	-33.06**	0.90%	0.87%	1.01%	1.15%	1.19%	-20.03**
Spread expenses	0.12%	0.24%	0.35%	0.54%	0.98%	-63.51**	0.24%	0.29%	0.41%	0.52%	0.78%	-39.00**
Brokerage commissions	0.08%	0.18%	0.26%	0.34%	0.56%	-52.39**	0.16%	0.18%	0.25%	0.34%	0.48%	-33.60**
Total Costs	.96%	1.36%	1.66%	2.01%	2.79%	-78.66**	1.30%	1.35%	1.68%	2.02%	2.44%	-43.84**
Carhart Adjusted Returns	0.22%	-1.00%	-1.24%	-2.50%	-3.42%	4.31**	-1.56%	-0.79%	-1.16%	-2.03%	-2.45%	.97
CAPM Adjusted Returns	-0.29%	-1.20%	-1.73%	-3.50%	-4.95%	4.80**	-2.61%	-1.77%	-2.13%	-2.48%	-2.71%	.10
Returns	13.86%	14.20%	13.28%	12.12%	10.78%	1.23	12.54%	12.91%	13.77%	12.80%	12.19%	.14

Table 4:
Fund Returns, Expense Ratios, Turnover, and Trading Expenses

This table reports Fama-MacBeth (1973) style time-series averages of coefficients from 65 cross-sectional regressions of monthly fund returns on expense ratios, turnover and trading expense variables. Raw fund returns are unadjusted returns measured net of fund expenses, fees, and transaction costs (excluding load fees). CAPM-adjusted returns are raw fund returns minus the expected return as specified by the CAPM. Carhart-adjusted returns are raw fund returns minus the expected return as specified by a four-factor model used in Carhart (1997). Expense ratios and turnover are obtained from CRSP. Spread expenses are effective spreads times dollar trade size summed over all trades in a given year, for a given fund, scaled by total assets. Brokerage commissions are obtained from SEC N-SAR reports. Average spread is the value-weighted average effective spread of the fund's stock holdings. * Indicates p-value < 10% and ** indicates p-value < 5%.

Independent variables	***Carhart-adjusted Returns***			***CAPM-adjusted Returns***			***Raw Fund Returns***		
	1	2	3	1	2	3	1	2	3
Intercept	.14%**	.14%**	.14%**	.17%**	.23%**	.21%**	1.27%**	1.29%**	1.29%**
	(1.89)	(2.08)	(2.06)	(2.23)	(2.82)	(2.71)	(2.32)	(2.43)	(2.40)
Expense Ratio	-3.01**	-1.01	-1.62**	-5.04**	-2.54**	-2.00**	-3.77**	-1.59	-1.50
	(-4.39)	(-1.49)	(-2.61)	(-3.96)	(-2.58)	(-2.39)	(-2.46)	(-1.43)	(-1.40)
Fund Turnover	-.0053			.0048			.0021		
	(-.72)			(.65)			(.33)		
Spread Expenses		-2.35**			-5.13**			-3.32*	
		(-2.16)			(-2.96)			(-1.88)	
Brokerage Commisions		-3.78**			1.06			-.09	
		(-2.22)			(.56)			(-.05)	
Avg Spread*Turnover			-6.53**			-10.48**			-7.09**
			(-3.02)			(-3.38)			(-2.20)
Avg adj.-R^2	2.02%	3.10%	2.66%	3.07%	7.33%	6.66%	2.81%	7.25%	6.40%
Median adj.-R^2	.40%	1.46%	1.11%	2.01%	4.34%	3.88%	1.07%	4.96%	3.32%

Figure 1. Spread expenses, Average Spreads and Turnover.
Each fund is assigned a turnover and spread quintile by ranking funds each year according to turnover and, independently, according to the weighted average effective spread of each fund's holdings. The annual ranks are averaged across years for the 132 funds, and ranked, to determine the classification for each fund. Within quintile-by-quintile sub-samples, we compute the average spread expenses, and the number of funds falling into each of cell. The area of each circle represents the average value of the variable of interest for funds falling into each turnover rank - spread rank cell. The arrows begin at quintile 1 and point in the direction of increasing spread and turnover ranks. Average turnover of funds by turnover quintiles is noted on the horizontal axis and average effective spreads of spread quintiles are noted on the vertical axis.