

Managing Portfolio Turnover: An Empirical Study

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This study compares the return on stocks bought with the return on stocks sold by investment advisors. We look at each pair of buy and sell transactions for the period 1990-1999. To enhance portfolio performance, the spread between the return on stocks bought and sold must exceed the associated transaction costs. We also compare the return and risk of stocks bought to both the return and risk of stocks sold and the return and risk of a market index. The results suggest that some investment advisors consistently enhance portfolio performance with their transactions, while others consistently reduce portfolio performance.

Introduction

The purpose of this study is to see if the turnover of stocks in actively managed portfolios enhances portfolio performance. There is some evidence that the portfolio turnover for many investors is too high. In 2000, total portfolio turnover of New York Stock Exchange stocks was 88 percent.¹ Bogle (1999) reports a turnover rate of 86 percent for mutual funds, Barber and Odean (2000) found a turnover rate of 75 percent for a sample of individual investors, and Ippolito and Turner (1986) found a turnover rate of about 70 percent for private pension funds. Is portfolio turnover too high, or does the turnover of stock holdings enhance portfolio performance? Two studies of individual investors found that, on average, portfolios with high turnover rates underperform portfolios with low turnover rates (Odean, 1999; Barber and Odean, 2000). Similarly, a study of mutual funds showed that mutual funds tend to

¹ Source: *New York Stock Exchange Fact Book*, 2000, page 99.

have high turnover rates and that the turnover hurts return performance (Carhart, 1997). Some investment managers are turning to index funds because these organizations believe they are unable to generate sufficient returns with active management to cover incremental costs (Brancato, 1992). While much of the evidence suggests turnover may be too high, Chen, Jegadeesh, and Wermers (2000) found evidence that “in aggregate, mutual funds buy winners and sell losers,” although it is unclear if the higher return on the stocks bought exceeds transactions costs.

Why might high turnover rates cause inferior performance? Under a rational expectations framework, investors will only sell one stock and buy another if the expected return on the stock to be purchased exceeds the sum of the transaction cost and the expected return on the stock to be sold (Grossman and Stiglitz, 1980). If transactions costs exceed the additional risk-adjusted return generated by the replacement stock, however, the transaction will reduce the wealth of the investor. Odean (1999) estimates the average round-trip cost of commissions plus the bid-ask spread to be 5.9 percent for individual investors. He used this rate in his study of customer transactions at a discount brokerage firm during the seven years ending December 31, 1993. Based on Odean’s estimate of transaction costs, when an investor sells one stock and replaces it with another, the purchased stock must generate a return that is 5.9 percent higher than the return on the replaced stock (on a risk-adjusted basis) simply to break even on the trade. Vaughn (1992) talks about the need for long-term investment plans in which portfolio managers are willing to underperform in the short run while waiting for their investments to prove themselves in the long run. He identifies people such as Warren Buffett, whose portfolio has a very low turnover rate, and Sir John Templeton as followers of long-term investment philosophies.

If it is true that high asset turnover causes inferior portfolio performance, why do portfolio managers engage in active trading? The literature has identified several possible reasons for high portfolio turnover:

- Some investors evaluate short-term performance and rank portfolio managers over short time intervals. Good performance attracts additional investment funds, while poor performance can result in loss of investment funds. Therefore, portfolio managers are under pressure to generate superior short-term performance, which can lead to higher turnover.
- Some portfolio managers engage in a price momentum strategy in which they buy stocks with sharply rising prices and sell stocks when their prices fall or remain flat for a period. This can lead to a price overreaction in which past winners subsequently become losers. (See DeBondt and Thaler, 1985; Wermer, 1999.) This type of investment strategy can lead to high turnover.
- Many investors evaluate the performance of portfolio managers by ranking them against each other. Because portfolio managers do not want to fall

behind the pack, they are easily swept into a crowd psychology so they get on the bandwagon with other portfolio managers where there is safety in numbers. This may be particularly true of young portfolio managers who are more likely to be terminated if portfolio performance is called into question. Young portfolio managers, therefore, may avoid the risk of under-performance by managing their portfolios the way others manage their portfolios. The result is likely to be turnover similar to that of more established portfolio managers.²

- Some portfolio managers may be overconfident of their ability to distinguish between attractive and unattractive stocks. Thus, they act on the belief that they can enhance portfolio performance through short-term trading even if the strategy does not work.³
- Barber and Odean (2000) suggest the need for liquidity, tax minimization, and portfolio risk rebalancing are possible reasons for high turnover rates.
- According to Dow and Gary (1997), some portfolio managers charge substantial management fees and they feel they must demonstrate that they earn those fees. By trading securities, they demonstrate an image of controlling performance. Thus, portfolio turnover may project an illusion of control.

With \$1.9 trillion of equity investments under management at year-end 2000, private pension funds are important players in the equity markets. Only households, which held \$5.8 trillion of equity assets, and mutual funds, which held \$2.8 trillion of equity assets, manage more equity assets than do private pension funds.⁴ The purpose of this paper is to analyze the impact of portfolio turnover on the return performance of 13F institutions, most of which represent pension portfolios.⁵

² In one study, Judith Chevalier, of the Graduate School of Business, University of Chicago, reports that, from a career perspective, falling alone (in portfolio performance) is much worse than falling with the crowd. The conclusion is "the safest career move is to follow the herd, even if the herd is going over the cliff." (See McDermott, 1999.) In another study, Wermer (1999) suggests that one reason institutional investors tend to trade together is to avoid the high penalty associated with falling behind other managers.

³ Shefrin (2000) observes, "Confident people tend to be a little bit too bold. Investors just trade too much and, as a result, hurt themselves." Robert Barker (1999) reported this in, "Saving Yourself from Yourself," *Business Week*, October 11, 1999, p. 188, in his review of the *Beyond Greed and Fear* (Harvard Business School, 1999) by Hersh Shefrin. Odean (1999) provides an excellent discussion of the overconfidence theory of why portfolio turnover is high.

⁴ Source: Federal Reserve Flow of Funds Accounts.

⁵ 13F institutions are investment management organizations such as investment managers that manage over \$100 million in securities and are required to report quarterly to the SEC under regulation 13F. These institutions do not include mutual funds or bank trusts. The largest portions of 13F assets are pension funds, but others are assets for individuals, foundations, endowments, etc.

Although recent studies have looked at the impact of portfolio turnover on the return performance of mutual funds (Carhart, 1997) and household portfolios (Odean, 1999; Barber and Odean, 2000), there have been no recent studies looking at the impact of turnover on the return performance of 13F institutions or pension funds.⁶

The management of funds by 13F institutions differs from the management of mutual funds and household portfolios in several respects. Compared to the management of portfolios by 13F institutions, the short-term performance of mutual funds generally has more significance because decisions about whether to remain invested in a given mutual fund or shift assets to another fund are continuously being made by thousands of individual investors. Conversely, the decision whether to keep assets invested with a particular 13F institution is generally made by a sponsoring corporation or group of trustees.

It can be argued that corporate decision makers and trustees are influenced less by short-term performance. If so, 13F institutions are likely to experience less volatile cash inflows and outflows than the lateral asset transfers experienced by mutual funds. Related to this is the fact that many 13F institutions expect to realize the bulk of their cash outflows when employees retire, and the portfolio managers generally know well in advance when they will retire. The same cannot be said for mutual funds whose investors may decide to remove funds at any time and for any reason.

Another difference between 13F institutions and mutual funds concerns investment objectives. Because most of the funds managed by 13F institutions are exempt from income taxes, these portfolio managers are generally unconcerned about the tax implications of the assets they buy and sell. They also generally are unconcerned about the tax implications related to the timing of transactions. This should result in a low tax-initiated turnover for 13F institutions compared to mutual funds in general. Although some investors hold mutual funds in tax-sheltered accounts such as IRAs, many investors hold mutual funds in accounts that are fully taxable. This could lead mutual fund managers to conduct additional transactions (or avoid transactions) in such a way as to minimize the taxes paid by shareholders.

There are also differences between the management of portfolios by 13F institutions and the management of portfolios by households. When households manage their own portfolios, the perceived problem associated with the need for professional portfolio managers to demonstrate control over the portfolio does not apply. Additionally, the tax consequences associated with certain transactions are more likely to influence the transactions in household portfolios than in portfolios managed by 13F institutions. This is true even though some individual portfolios are held in tax-exempt accounts. Because of the differences between the three types of portfolio

⁶ When Ippolito and Turner (1987) studied pension funds performance, they looked at the implications of turnover. Their findings about the impact of turnover on performance were mixed, and their tests lacked robustness regarding the impact of turnover. Thus, the current authors feel additional work is needed.

managers discussed here (mutual funds, households, and 13F institutions), we feel there is a need to investigate the performance of 13F institutions in a separate study.

The purpose of the current study is to examine the relationships between portfolio turnover and investment performance for a sample of 13F institutions. We seek answers to the following questions:

- What is the spread between the return performance of stocks purchased and stocks sold each year? Is this spread positive or negative? Is the spread large enough to recover related incremental transaction costs?
- Is the spread consistent from year to year for various portfolio managers?

Related Research

Many past studies have evaluated the risk-adjusted performance of professional money managers. Studies by Sharpe (1966), Jensen (1968, 1969) and Malkiel (1995) provided evidence that the average mutual fund does not outperform a naïve buy and hold strategy. Williamson (1972) and McDonald (1974) performed studies of mutual funds during a different period and using different benchmarks and found evidence of managers generating excess returns. A number of other mutual fund studies found evidence that some managers have the ability to generate excess returns through superior stock selection or market timing (Kon and Jen, 1979; Merton, 1981; Sharpe, 1992; and Chen, et al., 1992; among others).⁷ More recent mutual fund studies by Dellva, DeMaskey, and Smith (2001) and Umamaheswar (2001) suggest few mutual funds show the ability to consistently select undervalued stocks.

Several studies look at the performance of pension funds in the U.S. and elsewhere. Blake, Lehmann, and Timmermann (1999) found that UK pension funds lost 34 basis points as a result of their timing activity and gained just 1 basis point from their security selection. About half of the funds they studied generated negative excess returns from asset selection, while 80 percent had negative excess returns from timing activities. Ippolito and Turner (1987) found that pension fund equity portfolios significantly underperformed a buy and hold strategy and equivalent mutual funds during the period of their study. Lakonishok, Shleifer, and Vishny (1992) found that during the 1980s most pension funds underperformed the S&P 500. Ambachtsher, Capelle, and Scheibelhut (1998) studied U.S. and Canadian pension funds and found that the median RANVA (risk-adjusted net value added) after considering a reasonable cost allocation is -60 basis points.

Numerous studies have looked at turnover generated by various groups of investors. Carhart (1997) found that frequent trading was detrimental to the performance of mutual funds, which had average turnover rates of about 77 percent during the

⁷ Other studies include Ang and Chua (1982), Kon (1983), Chang and Lewellen (1984), Hendriksson (1984), Chen and Stockum (1986), Lee and Rahman (1990), and Chen and Chan (1992).

period of the study. Ang, Chen, and Lin (1998) found that the poorer performing mutual funds in their study had higher turnover ratios. Conversely, Chen, Jegadeesh, and Wermers (2000) found that stocks sold by mutual funds had significantly higher returns than the stocks the mutual funds buy. The authors also find evidence that high turnover funds are better at stock picking than low turnover funds. The authors are unsure if the return difference would cover transactions costs. Barber and Odean (2000) studied individual investors and found that while the gross returns were consistent with an efficient market, net returns (after transactions costs) were poor. The average household in their study turned over approximately 75 percent of its common stock portfolio annually. The authors traced the poor performance of the average household to the costs associated with high turnover.

Ippolito and Turner (1987) found that, during the period 1977-1983, trading in the equity portion of pension portfolios had a significant negative impact on net performance of the portfolios. During the 1977-1983-study period, the turnover rate ranged from 60 percent to 80 percent. They also found that, generally, the turnover ratios for larger pension plans were higher than for smaller pension plans. They concluded that the return performance of some pension funds suffer from excessive turnover. Because of the age and methodology of the Ippolito and Turner study, we hope to add to the knowledge about turnover and performance by looking closely at the performance of 13F organizations, a large database composed mostly of pension funds.

Methodology

We seek to answer the questions outlined earlier based on empirical research using the following databases:

<u>File Name</u>	<u>Time Period</u>
Center for Research in Security Prices – NYSE – ASE – Nasdaq	1990-1999
Thomson Financial CDA Spectrum Historical Tape Files for 13F institutions	1990-1999

We study the equity portfolios of institutions that file form 13F over four or more consecutive quarters with the SEC. Common stock holdings analyzed consist of those listed on the NYSE, AMEX, and Nasdaq. The 13F institutions in this study include all of the independent investment advisors that exercise investment discretion over more than \$100 million in securities and which are in the CDA data files. The 13F report shows the stocks and the number of shares owned by each investment advisory organization at the end of each quarter. Kothari and Warner (2001) note that event-study methodologies that evaluate stock trades can provide powerful results. They specifically name CDA (quarterly) and Morningstar (monthly) as sources of such data.

We measure the performance of the investment advisors over ten separate years from the first quarter of 1990 through the fourth quarter of 1999. Based on established procedures used in previous studies,⁸ we assume that all transactions in the portfolios for a given quarter occur at one time during the quarter. Specifically, we assume all transactions take place at the beginning of the quarter. Thus, we include returns on stocks from the beginning of the quarter until the actual date of purchase, even though that return is not really earned. We also ignore the return on stock between the beginning of the quarter and the actual sale date. To judge the impact of this assumption on our test results, we calculated the returns on the same stocks assuming all transactions take place at the end of each quarter. These results appear in Appendix A and can be compared to the results assuming beginning-of-quarter transactions that appear in Table 1. A comparison reveals differences in numerical returns as a result of looking at different periods, but nearly identical relative values between the returns on purchases and the returns on sales (the weighted spread). Thus, our conclusions are unaffected by this assumption.

Table 1—Calendar-Year Returns Based on First-Quarter Transactions

This table contrasts the return generated by stocks purchased and stocks sold each year by investment advisory firms. The weighted difference between the return on stocks bought and stocks sold appears in column 5*. The return on the CRSP value-weighted index is also presented for comparison

Year	CRSP VW Returns	Weighted Return on Purchases	Weighted Return on Sales	Weighted Spread*	Number of Institutions
(1)	(2)	(3)	(4)	(5)	(6)
1990	-0.060	-0.038	-0.066	0.028	506
1991	0.337	0.229	0.163	0.067	549
1992	0.090	0.082	0.043	0.039	613
1993	0.115	0.102	0.051	0.051	691
1994	-0.007	0.002	-0.006	0.009	746
1995	0.367	0.190	0.122	0.067	803
1996	0.213	0.113	0.087	0.026	861
1997	0.305	0.136	0.099	0.038	972
1998	0.226	0.076	0.014	0.063	1089
1999	0.225	0.198	0.085	0.113	1637
Mean Return	0.181	0.109	0.059	0.050	
Standard Deviation	0.144	0.085	0.067	0.029	
Return/Risk	1.262	1.287	0.888		

*To calculate the values in (5), the weighted values in (3) and (4) are weighted again by their respective market values, before being subtracted. Thus, the values in (5) do not result from simple subtraction of (4) from (3)

⁸ Barber and Odean (2000) used beginning of month position statements for households and assumed end-of month pricing. Chen, Jegadeesh, and Wermers (2000) used CDA files containing quarterly portfolios and assumed end-of-quarter prices.

To capture the timeliness of portfolio purchases, the performance of stocks purchased is measured when the stock first appears in the portfolios of that investment advisor. To measure the decisiveness of security sales, the performance of stocks sold will be measured only when the stock holding is completely liquidated. The performance of other portfolio transactions, which merely result in increases or decreases in stock holdings, are not measured because of possible multiple reasons for such portfolio transactions such as generating needed cash, diversification considerations, and asset reallocations (rebalancing). To allow sufficient time for the market to reflect the alleged merits of the investment decisions, the investment rates of return are measured for each transaction over four consecutive quarters. The performance of all the eligible stock purchases and sales are measured separately for each investment advisor in the database. During a given quarter, a firm must have both eligible sale and purchase transactions to be included in the study. Over 11,600,000 transactions were counted in the study over the ten years from 1990 through 1999. In 1990, a low of approximately 706,000 transactions were studied. This increased to 1,662,000 transactions in 1999.

Individual Portfolios The rates of return of each transaction for each institution are market-value weighted. For example, assume an investment advisor bought two new stocks in the first quarter. If it invested \$2 million in stock A and \$8 million in stock B, the returns on stock B will have four times the weight of stock A. Thus, if the return on stock A was 8.0 percent during the next four quarters and the return on stock B was 12.0 percent, the weighted return of the \$10 million of purchases would be $(0.2 \times 8.0 \text{ percent} + 0.8 \times 12.0 \text{ percent})$ or 11.2 percent.

If the same investment advisor liquidated two stocks in the first quarter, these sales would also be market-value weighted. Assume it sold \$2 million of stock C and \$6 million of stock D. If stock C had a return during the subsequent four quarters of 8.0 percent and stock D had a return of minus 2.0 percent, the weighted performance of the \$8 million of liquidations will be $(0.25 \times 8.0 \text{ percent} + 0.75 \times -2.0 \text{ percent})$ or 0.5 percent.

To determine if security turnover enhanced the performance of an investment advisor, we calculate a rate of return spread, called the weighted spread, which measures the returns of the total purchases minus the returns on the total sales based on their respective market-value weights. In the previous example, the investment advisor bought \$10 million of stocks and sold \$8 million of stocks, so the purchases are given more weight than the sales. Based on \$18 million of transactions, the weighted return on the purchases (\$10 million of \$18 million or 55.6 percent) would be $(0.556 \times 11.2 \text{ percent})$ or 6.23 percent, and the weighted return on the sales (\$8 million of \$18 million, or 44.4 percent) would be $(0.444 \times 0.5 \text{ percent})$ or 0.22 percent. The weighted portfolio spread would therefore be $(6.23 \text{ percent} - 0.22 \text{ percent})$

or 6.01 percent.⁹ Assuming a 2.0 percent round trip transaction cost, the net return would be a positive 4.01 percent. In the previous example, the return spread was positive, so that the trades contributed to the performance of the portfolios rather than impeding performance. We calculate spreads only when an investment advisor has both sell and buy transactions during a given quarter.

Findings

The average performance of the eligible transactions for all the investment advisors is presented in Table 1. These data reflect the sale and purchase transactions made during the first calendar quarter in each year. As indicated earlier, we assume all transactions take place at the beginning of the quarter and the calculated returns are for the subsequent four calendar quarters. As a benchmark for the stock market, the annual rate of return for the CRSP value weighted index is shown in column 2. The return on the eligible purchases for each investment advisor are averaged and presented in column 3. The CRSP index had a higher return than the average of the stocks purchased by the investment advisors in eight of the ten years reported. The standard deviation of return for the CRSP Index is substantially higher than the standard deviation of the average stocks purchased. The ratio of return to risk is slightly higher for the average of the stocks purchased than for the CRSP Index.

The eligible sales are shown in column 4. We calculate the values in column 5 by weighting the values in columns 3 and 4 before subtracting column 4 from column 3 (as described earlier). The weights reflect the market value of the stocks in each group. Thus, the values in column 5 are not the result of simply subtracting column 4 from column 3. The positive spread in each of the ten years means that the average trade enhanced the performance of the average portfolio. Over the ten-year period, the purchases outperformed the sales by an average of 5.0 percent per year on a gross return basis. Additionally, on the stocks purchased, the return to risk ratio is higher than for the stocks sold during the study period, suggesting a successful combination of transactions. Using 2.0 percent¹⁰ as the estimated round trip transaction cost, we can estimate the net portfolio return spread at a positive 3.0 percent per year. Column 6 shows that the number of eligible investment advisors reflected in the 13F database gradually increased from 506 in 1990 to 1,637 in 1999.

We look at the same data when stocks are bought and sold during quarters 2, 3, and 4. We again look at the return on those stocks during the subsequent four quar-

⁹ To determine if using a dollar-weighted spread enters a bias into our results, we compared the dollar weighted spread to an equally weighted spread. A difference existed between the dollar weighted spread and the equally weighted spread for only five of the ten years: the difference that existed for four of these years was plus 0.001, and the difference for the other year was -0.001. These differences are not sufficiently large to bias the results.

¹⁰ According to Chang and Lakoniskok (1995), the cost of a round-trip transaction for large institutional investors is about 2 percent.

ters and found the results to be similar. That is, the four-quarter returns and standard deviations for stock purchased and sold during quarter 2, 3, and 4 showed higher returns and standard deviations for the average purchased stocks than for the average sold stocks. Due to the similarity of results and space limitations, we do not report these data here.

Table 2—Stock Selection Consistency Between Nine Different Two Year Periods

Stocks were assigned to quartiles based on relative performance during period "a." The group performance of the firms in each quartile was then compared to the performance of the firms in the other quartiles during the subsequent period to evaluate performance consistency. The significance of the Spearman rank correlation coefficients in eight of the nine years suggests performance consistency between years

(1)	Number of Institutions	Average All Survivors	Spread by Quartile				Spearman (p-value)	Non-Survivors	
			1	2	3	4		Number of Institutions	Average Spread
1.a 1990	473	0.026	0.231	0.075	-0.009	-0.181	0.12**	33	0.056
1.b 1991		0.075	0.108	0.111	0.058	0.026	-0.010		
2.a 1991	503	0.068	0.444	0.168	-0.019	-0.329	0.19**	46	0.050
2.b 1992		0.030	0.057	0.053	0.030	-0.020	0.000		
3.a 1992	581	0.038	0.255	0.086	-0.004	-0.180	0.16**	33	0.0500
3.b 1993		0.047	0.060	0.061	0.050	0.018	0.000		
4.a 1993	640	0.054	0.276	0.101	0.012	-0.181	0.10**	51	0.008
4.b 1994		0.007	0.008	0.028	0.000	-0.007	-0.010		
5.a 1994	698	0.009	0.154	0.040	-0.017	-0.141	0.70*	48	0.013
5.b 1995		0.063	0.057	0.117	0.048	0.027	-0.080		
6.a 1995	731	0.067	0.377	0.142	0.003	-0.255	0.13**	72	0.067
6.b 1996		0.024	0.054	0.029	0.024	-0.013	0.000		
7.a 1996	807	0.029	0.269	0.031	-0.019	-0.233	0.050	54	-0.025
7.b 1997		0.036	0.033	0.194	0.010	0.023	-0.120		
8.a 1997	905	0.041	0.307	0.099	-0.017	-0.235	0.06*	67	-0.009
8.b 1998		0.059	0.074	0.061	0.036	0.066	-0.070		
9.a 1998	1036	0.067	0.422	0.104	-0.020	-0.252	0.15**	53	-0.024
9.b 1999		0.110	0.193	0.102	0.123	0.019	0.000		
Average of Line b 1991-1999		0.047	0.072	0.084	0.042	0.015		Average 1991-1998	0.016

** Significant at the 1 percent level

* Significant at the 10 percent level

Quartile Weighted Spreads. Next we seek to determine the differences in portfolio spreads among the individual investment advisors. In Table 2, we assign each investment advisor that appeared in the database for two consecutive years into quartiles based on the size of their buy-sell spreads. The organizations that did not appear in a following year were assigned to a non-survivor category. For example, among the 506 investment advisors that appeared in the 1990 database, 473 also appeared in the 1991 data file, while the 33 that did not are reported in columns 9

and 10. In 1990, 2.6 percent is the average portfolio spread for the 473 investment advisors, as shown. One-fourth of the organizations with the best spreads were assigned to quartile one, the one-fourth with the next best positive spreads were assigned to quartile two, and so forth. Columns 4, 5, 6, and 7 show the average portfolio spreads for the investment advisors in each quartile, and column 10 shows the average spread for the non-surviving organizations. Line "a" shows the average spread for the investment advisors in each quartile in the year in which they were originally assigned to a quartile. The differences in spreads were substantial between the quartiles in each year. The annual spread for quartile one ranged from 44.4 percent in 1991 to 15.4 percent in 1994. The spreads for quartile four ranged from minus 32.9 percent in 1991 to minus 14.1 percent in 1994. The spreads for quartiles one and two in each year were always positive, while the spreads for quartiles three and four were negative in each year with two minor exceptions.

The non-surviving investment advisors had spreads that were less favorable than the average of the surviving organizations in five out of nine years, three of which were in the last three years of 1996, 1997, and 1998. This may suggest that competition for performance in this latter period intensified leading to the merger or otherwise dropping out of underperformers.¹¹

Next, we look at whether the investment advisors demonstrate their apparent skill or lack of skill in profitably trading stocks consistently over time, or whether the difference in performance is random. The quartile spreads for the investment advisors in each year are shown on the lines designated "a" in Table 2. We compare these spreads to the spreads in the subsequent year in line "b" for the same investment advisors. For example, the organizations in quartile one had an average portfolio spread of 23.1 percent in 1990 and 10.8 percent in 1991. As indicated by the values in line "b", the spreads for the investment advisors in quartiles one and two exceed those of organizations in quartile three and four, except for two modest instances. To measure for consistency of performance between the first years in lines "a" and the performance in the following years (lines "b") we calculated Spearman rank correlation coefficients. Column 8 shows that the spreads are significantly and positively correlated in eight of nine years. This suggests investment advisors tended to retain consistent skills from one year to the next, which either enhances investment performance through trading stocks or, as in the case of quartile four, failed to fully exploit trading in stocks. The bottom line of Table 2 shows the average spread in the follow-up nine years (line "b" for 1991-1999) for the investment

¹¹ There are other possible reasons for non-survivors in the database. Some independent investment advisors may have merged or were acquired by a bank, insurance company, or another type of organization such that its portfolios were reclassified into a different type of institution. To survive in our database in the subsequent year, an institution is required to have at least one eligible purchase and one eligible sale transaction so that we can calculate a portfolio spread.

advisors in their respective quartiles. If we assume that at the end of each year an individual investor shifted his or her investment assets into the portfolios that were ranked in the first quartile the previous year, that investor would have generated an average spread of 7.2 percent from 1991 through 1999 compared to a gross spread of only 1.5 percent if the investor had invested in the portfolios appearing in quartile four. The average spread for the non-survivors (1991-1998) in column 10 was only 1.6 percent, which is low compared to most of the surviving organizations. This suggests the relative poor performance may have resulted in mergers or otherwise withdrawing from the independent investment advisory classification.

Next, we examine how long performance consistency persists. To address this question, we analyze the portfolio spreads of the 506 institutions in the 1990 database over each of the ten years, 1990-1999. Among those 506 institutions in the 1990 database, 372 remained in the 1999 database. In Table 3, the spreads are shown in years after 1990 for those institutions originally assigned to each quartile in 1990. There is some persistence of relative performance over time, yet there is also a tendency for the spreads to converge toward the mean spread of the total sample. Column 2 shows the average spread for the total sample. Over the subsequent nine-year period, the spreads for the institutions in quartile one were larger than the average of the spreads in eight of nine years. Additionally, the spreads for portfolios in quartile two were larger than the average of the spreads in six of the years, while the portfolio spreads in quartiles three and four were larger than the average of the spreads in only three and four years, respectively. The spread for the non-surviving group is smaller than the average of the spreads in seven of nine years (1990-1999), as shown in column seven.

Table 3—Performance Consistency Over the Entire Ten Year Period

Firms remain in quartiles to which they are assigned in 1990 based on relative performance that year. Comparison of quartile spreads to the average for all portfolios each year suggest some performance consistency over the ten-year period

	Average Spread for					
	Total Sample	Spread by Quartile				Non-Survivors
		1	2	3	4	Aggregate Spread
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1990	0.028	0.231	0.075	-0.009	-0.184	0.056
1991	0.075	0.108	0.111	0.058	0.026	0.037
1992	0.032	0.048	0.058	0.028	-0.006	0.028
1993	0.054	0.070	0.090	0.059	-0.006	-0.004
1994	0.006	0.016	0.004	-0.014	0.018	0.010
1995	0.072	0.083	0.079	0.099	0.027	0.016
1996	0.036	0.046	0.009	0.037	0.054	0.013
1997	0.054	0.046	0.063	0.037	0.073	0.014
1998	0.060	0.090	0.041	0.013	0.096	0.005
1999	0.125	0.137	0.225	0.047	0.087	
1991-1999						
Mean	0.057	0.072	0.076	0.040	0.037	0.015

The relative differences in the spreads between quartiles, however, tend to diminish after four or five years. The investment advisors in quartile one had the second highest relative spreads in 1991-1994 and dropped to the third highest in 1995. The investment advisors in quartile two had the highest spreads in 1991-1993, and dropped to the third highest in 1994. The investment advisors in quartile 4 had the lowest (sometimes negative) spreads in 1991-1993, before rising to the highest spreads in 1994 and again in 1996-1998. This suggests that the skill in trading by investment advisors changes only gradually over time, due possibly to changes in investment decision-making methods and/or changes in portfolio managers.

Table 4—The Return on Stocks Purchased by Firms in Each Quartile Each Year Versus a Market Index

Each year, each investment advisory firm is assigned to a quartile based on the return generated by stock purchased that quarter. We compare the return generated by the firms in each quartile to the CRSP value-weighted index

Year	CRSP VW Index	Average Return for All Quartile Returns					Number of Portfolios	Non-Survivors	
		1	2	3	4	Average Return		Number of Portfolios	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1990	-0.060	-0.038	0.084	-0.004	-0.046	-0.184	506	-0.021	33
1991	0.337	0.229	0.507	0.261	0.137	0.015	549	0.232	46
1992	0.090	0.082	0.248	0.098	0.036	-0.053	613	0.080	33
1993	0.115	0.102	0.272	0.122	0.048	-0.033	691	0.082	51
1994	-0.007	0.002	0.105	0.017	-0.013	-0.097	746	-0.003	48
1995	0.367	0.190	0.410	0.213	0.081	0.012	803	0.206	72
1996	0.213	0.113	0.292	0.135	0.062	-0.036	861	0.076	54
1997	0.305	0.136	0.327	0.164	0.077	-0.023	972	0.105	67
1998	0.226	0.076	0.384	0.086	-0.003	-0.161	1089	0.021	53
1999	0.225	0.198	0.677	0.180	0.043	-0.094	1637	N/A	N/A
Mean Return	0.181	0.109	0.331	0.127	0.038	-0.065	N/A	0.086	N/A
Std Deviation	0.144	0.085	0.178	0.083	0.053	0.068	N/A	0.086	N/A
Return/Risk	1.262	1.287	1.862	1.540	0.800	-0.965	N/A	1.000	N/A

Stocks Purchased. Up to now we have focused on the spreads between the returns generated on stock purchased and the returns generated on stocks sold by investment advisors. Now we want to focus only on the skill of these investment advisors in selecting stocks to purchase. Table 1 shows that the CRSP index had higher returns and displayed higher standard deviations than the stocks purchased by the investment advisors in the aggregate. The ratio of return to risk is higher for the stocks purchased by investment advisors than for the CRSP index. But what was the distribution of returns on stocks bought by the investment managers? To investigate, we created Table 4 in which we assign the surviving investment managers to quartiles based on the annual return earned on stock purchased during the first quarter of each year. These mean annual returns for the investment advisors in each quartile

each year are shown in columns 4, 5, 6, and 7. The average returns for non-surviving organizations (those dropped from the database in the following year) are shown in column 9. The purchases made by the investment advisors in quartile 1 generated higher returns than the CRSP index in each year, usually by a substantial margin. Additionally, the average return to risk ratio is higher for the quartile-one organizations than for the CRSP index (see the bottom line of Table 4). The CRSP index generated higher returns than the investment advisors in quartile 2 more than half the time, but the investment advisors in quartile 2 generated a higher return to risk ratio on average than the CRSP index. Conversely, the investment advisors in quartiles 3 and 4 generated returns that are lower than the CRSP index in virtually every period and had lower ratios of return to risk on average. The non-surviving investment advisors generally had lower returns than the index and lower returns than the surviving investment advisors in quartiles 1 and 2 but higher returns than the investment advisors in quartiles 2 and 3. Similarly, the non-surviving organizations had a lower return to risk ratio than the quartile 1 and 2 investment advisors but a higher return to risk ratio than the quartile 3 and 4 investment advisors. This suggests that poor or mediocre performance may be a reason for the disappearance of some organizations. Based on the performance of investment advisors in quartiles 1 and 2, it appears that most of the purchases made by organizations in quartile 1 and many of the purchases made by organizations in quartile 2 performed better than the CRSP index.

Conclusions

The findings in this study suggest that many investment advisors have the skill to identify and purchase stocks that generate a higher return per unit of risk than the market and a higher return per unit of risk than the stocks they sell. Thus, the trading conducted by these organizations appears to enhance portfolio performance. Furthermore, the stock-selecting skill of the better organizations appears to persist over extended periods discounting random success at stock selection. On the other hand, the spreads of some investment advisors suggest that their trades fail to add value to portfolio performance on a net return basis. This lack of skill also tends to persist for extended periods. This suggests that investment advisors should evaluate the trading skill of responsible individuals to determine if portfolio turnover adds value to portfolio performance. If not, these institutions should take actions deemed appropriate to remedy the situation.

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Appendix

Calendar-Year Returns Measured from the End of the First-Quarter

This table was created to investigate the impact of the assumption that transactions are made at the beginning of the quarter as opposed to the end of the quarter. A comparison of the weighted spreads below to those appearing in Table 1 reveals differences in the return numbers resulting from a shift in the period being viewed. The spreads remain positive, however, suggesting the study conclusions are unaffected

Year	CRSP VW Return	Weighted Return on Purchases	Weighted Return on Sales	Weighted Spread*	Number of Institutions
1990	0.120	0.081	0.032	0.049	506
1991	0.137	0.111	0.062	0.049	549
1992	0.152	0.091	0.049	0.042	613
1993	0.026	0.050	0.023	0.028	691
1994	0.128	0.063	-0.047	0.016	746
1995	0.330	0.018	0.126	0.050	803
1996	0.155	0.074	0.049	0.024	861
1997	0.470	0.238	0.158	0.080	972
1998	0.123	-0.001	-0.032	0.031	1089
1999	0.259	0.252	0.109	0.144	1637
Mean Return	0.190	0.098	0.062	0.051	
Standard Deviation	0.128	0.085	0.055	0.037	
Return/Risk	1.480	1.154	1.127		