

# Mutual Fund Managers' Efforts and Performance

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**W**hen mutual fund managers experience subpar performance relative to their peer group, their funds may experience difficulty in attracting new money or in retaining their investors. The shake-up of the nation's largest mutual fund, Fidelity Investments, two years ago reflects the fund's effort to boost its returns.

Mutual fund earnings are a function of both a fund's performance and the amount of funds under management; the latter is in turn a function of performance. It would be expected that poor-performing fund managers are under pressure to take some actions; as a result, they should be trying harder.

Mutual fund managers may choose to exert greater effort in several ways. They may spend more money and time in information acquisition in order to better select stocks or time the market. They could play it safe and cut expenses. Or, they could do the opposite — trade more often in order to capture large short-term gains. Finally, they may decide that increasing marketing effort (promotion, advertising, or incentives to salespeople) could more than offset the withdrawals of funds by the performance sensitive investors.

The purpose of this article is to study the behavior of mutual fund managers according to their previous performance. Three related issues are investigated:

1. Do mutual fund managers with poor

performance records exert greater effort than the better performers? That is, do poor performers try harder? And if they do, in what way?

2. What is the payoff of this extra effort? That is, does the extra effort bring higher subsequent returns?
3. Which types of effort are more effective?

We examine whether fund managers are capable of responding actively to the pressure to perform. It seems reasonable to expect that fund managers who have experienced poor performance will feel more pressure from their low published ranking and/or net outflow of funds. Consequently, they would be expected to have more of an incentive to improve performance. The good performers, on the other hand, would be expected to be fairly satisfied with their current level of performance and allocation of efforts; they should therefore be less likely to spend more money or to take more risk.

The effectiveness of increasing efforts by the fund managers is another interesting issue worth investigating. A priori, one would expect efforts to cut costs to bring small but certain improvements. More effort put into stock selection and/or market timing, however, would seem to be more uncertain.

Studies of mutual fund performance provide somewhat conflicting results. Early studies such as Treynor [1966], Sharpe [1966], and Jensen [1968, 1969] find that

mutual funds do not outperform a naive buy-and-hold strategy. Other studies such as Williamson [1972] and McDonald [1974], however, find that expenses incurred are justifiable using different sample period and benchmarks. Later studies find that a limited number of managers have either some stock selection or market-timing abilities (Kon and Jen [1979], Merton [1981], Ang and Chua [1982], Kon [1983], Chang and Lewellen [1984], Hendriksson [1984], Chen and Stockum [1986], Lee and Rahman [1990], Chen and Chan [1992], Sharpe [1992], and Chen et al. [1992]).

No studies, however, examine mutual fund managers' effort and performance as a result of changing managerial effort.

## MUTUAL FUND MANAGERS' CHOICE OF EFFORTS

In an attempt to improve performance and/or to increase the size of fund under their management (or at least minimize withdrawals), mutual fund managers can increase their efforts in several ways. Some of these relate to efforts to improve performance, such as increasing activities related to stock selection, trading, market timing, or cost-cutting and risk-taking. Others are marketing strategies designed to attract more money into a fund.

The different types of effort can be described as follows:

1. *Stock Selection and Trading.* In contrast to the more passive strategy of holding stocks for a long period (e.g., indexing), some mutual fund managers may choose to earn more short-term returns by exploiting transitory price fluctuations. While a more active investment style would involve more frequent trading, it would also require the acquisition and analysis of more timely information, thereby increasing costs and the size of the research staff. Such increased effort will ultimately result in an increase in the expense ratio. Moreover, more frequent trading could cause in higher portfolio turnover as stocks are being held for shorter periods.
2. *Cost Reducing.* Mutual fund managers can also increase returns by cutting overhead costs including administrative expenses, transaction fees, and information acquisition cost. In this scenario, mutual fund managers take the path of certain but smaller savings versus the alternative of extra expenditures

on information and more frequent trading in order to capture uncertain gains.

3. *Risk-Taking.* High expected returns could come from superior skills, valuable information, or from a greater willingness to assume risks. Short of superior ability, some portfolio managers may choose to take more chances (increase the risks of their portfolios as measured by either greater risk of loss or portfolio beta); commit more funds to risky investments (a reduction of cash holdings); or place larger undiversified bets on fewer potential winners (proxied by an increase in the percentage of the portfolio invested in the single largest position).
4. *Marketing Strategy.* As mutual fund earnings are derived from both the size of a portfolio and realized performance, attracting more funds and/or reducing withdrawals could affect a bottom line more than performance. Mutual fund managers can intensify their marketing efforts in several ways. They can increase advertising and promotion expenses, and devote more of the managers' time to marketing efforts. They can also increase sales charges (giving more incentive to brokers), or reduce sales charges (if investors are sensitive to transaction costs). Although superior performance may be implied in their marketing efforts, there is probably no theoretical basis to relate these two.

Exhibit 1 lists the active strategies whereby mutual fund managers can increase their efforts. Also shown are the hypothesized signs for the proxies; i.e., a positive (negative) sign indicates the direction of more (less) effort.

For example, a mutual fund can increase its stock selection and trading activity, which is proxied by an increase in the expense ratio. Or, the fund can reduce its cost, which is reflected in a decrease in the expense ratio.

According to the *BusinessWeek* definition, the expense ratio represents mutual fund expenses in the last twelve months in percentage of total assets. Sales charge is the percentage load fee; portfolio turnover is an ordinal measurement of a fund's trading activities, where 1 is the lowest, and 5 is the highest. Variable "% cash holdings" represents cash held by a fund as a percentage of its assets. Risk of loss is an ordinal number ranging from 1 to 5, with 1 the lowest (defined as a function of the probability and severity of the portfolio not being able to earn the riskless returns). Beta risk is another risk measure, which represents a fund's volatility relative to the S&P 500 during the past five years. Finally, variable "%

## EXHIBIT 1

### Policies by Which to Improve Performance (and hypothesized signs)

	Active Policies — Mutual Fund Managers Can Increase Effort in:			
	Stock Selection and Trading	Cost- Reducing	Risk- Taking	Mar- keting
1. Expense Ratio	+	—		+
2. Sales Charge				+/-
3. Portfolio Turnover	+			
4. % Cash Holdings	—		—	
5. Risk of loss			+	
6. Beta Risk			+	
7. % Portfolio in Largest Holding			+	

portfolio in largest holding” is the largest-held company by a fund by percentage of its assets.

It would seem reasonable to expect mutual funds that have experienced poor performance to be under greater pressure to perform and therefore to be more likely to exert more effort. Therefore, it is hypothesized that effort levels in terms of all the proxies in Exhibit 1 will be higher for the low-performing funds as a group than for the high-performing funds.

### DATA AND RESEARCH DESIGN

The data for this study, including all the proxies listed in Exhibit 1 and the funds’ returns for various time intervals, are taken from the *BusinessWeek Mutual Fund Scoreboard*. The March 1994 version has a total of 1,832 open-end equity funds. With new additions and deletions, the number of funds with usable data over five- and ten-year periods is 938 and 432, respectively.

The data are analyzed to address three questions: 1) whether there is a difference in the levels of effort exerted by the mutual fund managers who have experienced poor performance compared to those who have experienced superior performance; 2) whether greater managerial efforts deliver better performance; and 3) which types of effort are more effective.

Proxies for the level of effort for the sample of mutual funds indicate: 1) that there are differences in

various effort levels chosen by different mutual funds, and 2) that effort proxies change over time. Therefore, two types of analysis are conducted. To examine the effect of effort variables on short-term returns, cross-sectional regressions are employed to examine how the effort variables affect one-year-ahead returns for both the top- and the bottom-performing quintiles (20%) of mutual funds. Past performance is classified according to prior four-year (intermediate-term) and nine-year (longer-term) returns.

In the second analysis, effort proxies are presented in the format of cumulative changes, and thus are expected to be related to cumulative returns over a longer period. The annualized cumulative returns over the first five years are used to classify top- and bottom-quintile (20%) performers, and the effect of the effort proxies on the annualized cumulative returns for the second five-year is investigated.

### DIFFERENCES IN THE LEVELS OF EFFORT

Mutual funds are sorted into five quintiles according to their prior performance. In the first analysis, the sorting is based on the prior four-year or nine-year returns. The second analysis sorts mutual funds into five quintiles according to the five-year returns prior to the recent five-year returns. Funds from the top quintile (20%) and bottom quintile (20%) are identified for analysis. Information on various effort variables (stock selection and trading, marketing, risk-taking, and cost-cutting) are obtained for each fund.

Both univariate analysis and multiple regressions are employed. In the univariate test of statistical significance, mean values and their corresponding standard deviations of effort proxies are reported for both the top and bottom groups. Tests of statistical differences in their means (t-values) are reported in Exhibits 2 and 3.

Panel A of Exhibit 2 shows that, based on prior four-year returns, the bottom 20% funds in the following year vis-à-vis the top 20% funds tend to: 1) incur higher expenses, in that the average expense ratio is over 40% higher, or, equivalently, experience a 0.5% reduction in returns of assets under management ( $1.853\% - 1.318\% = 0.535\%$ ); 2) hold more cash, i.e.,  $1.866\%$  more assets are held in cash ( $9.866\% - 8.000\%$ ); 3) take more risk of loss; but 4) exhibit less systematic risk (portfolio beta). Although the result is not statistically significant, it is also found that low-performing funds tend to invest more money in one large investment, incur lower

sales charges, and have a slightly higher portfolio turnover.

The results for prior performance classified according to longer-term (nine-year) returns are similar. The poorer long-term performers report statistically significant higher expense ratios, higher risk of loss, and less beta risk. They also report significantly higher portfolio turnover ratios (more trading), and lower cash holdings (although results are not statistically significant).

For the analysis of five-year cumulative effects, Exhibit 3 reports the means and their statistical differences between the subsequent effort proxies of the low versus high performers classified on the basis of previous five-year returns. Because of limited data availability, we obtain the distant five-year returns by subtracting the recent five-year returns from the ten-year returns. We find that the low-performing group subsequently incurs higher expense, conducts more trading, and assumes more risk of loss than the high-performing group.

Our comparison of the levels of effort committed by the bottom versus the top performers indicates that differences exist. That is, the previous poorer performers do seem to adopt more aggressive policies, which result in more expenditures, more trading, and/or taking more risk of loss. The evidence suggests that poorer performers are under more pressure to produce higher returns. Our analysis, therefore, supports the "pressure" hypothesis of mutual fund behavior.

## THE RELATION BETWEEN PERFORMANCE AND EFFORTS

Could the willingness to exert greater effort result in better performance? Although the answer to this question is an empirical one, it would not be unusual for many to cast doubt on such a possibility. In particular, this view would hold that, other than cost-cutting measures, attempts to improve returns by increasing expenditure, research, or trading should be futile. Market efficiency would generally mean that any higher reported returns would be due to a fund's greater willingness to take risk.

If more intense efforts are rewarded, one would expect to observe, in a multiple regression, that effort variables (portfolio turnover, lower cash holdings, higher expense ratios, or even marketing effort) contribute significantly to variations in the dependent variable (measurement of performance), while proxies for risk play a lesser role.

## Mutual Fund Effort and Short-Term Performance

Exhibit 4 presents the regression results relating effort variables to one-year performance for the bottom 20% and top 20% performing groups based on prior four-year (intermediate-term) and nine-year (longer-term) returns. In Panel A (prior four-year return), the effort variables that are found to significantly influence subsequent one-year returns are expense ratio, cash holdings, risk of loss and beta risk.

For the prior low-performing group, higher returns are achieved by reducing expense ratios. This evidence provides support for the cost-reducing effort hypothesis rather than the notion that more expenditures improve stock return. The cash holdings variable, which has a negative coefficient, lends support to either a successful active investment strategy or to greater risk-taking, although it would seem that differences among mutual funds are due mainly to the risk undertaken. Returns increase with more risk of loss but less beta risk; the latter result is due to the stock market's downward pressure during the period, and thus high (low) beta stocks decline more (less).

Interestingly, there are differences in what explains the returns among funds in the previously top-performing group. A positive sign on the expense ratio variable indicates that higher expense does produce higher return for this group; i.e., a 1% increase in expense produces a 4% increase in returns. Thus, in contrast to the low-performing group, the short-term returns to investing in information, research, and staff for the high-performing group are high.

Recall that, in Exhibit 2, the average expense ratio for the low-performing group is 50% higher than for the high-performing counterpart. Combining these two expense results suggests that poorer performers, as a group, actually overinvest in expenditures; funds that have reduced expenses perform better. The high-performing group also report high returns for funds that take higher risk of loss, and have more assets in cash (reflecting the general market decline for the period).

For the longer term (nine-year) low-performing group (Panel B), higher returns are again achieved through expense reductions and the willingness to take more risk, including risk of loss and a larger single position. In the top-performing group the difference in returns among funds is explained only by the differences in the amount of risk that they are willing to take.

Overall, for the short-term return (one-year-ahead), the effort proxies as a group explain about 20% to 30% of the differences in returns within the low- or high-performing group. Higher returns for the poorer performers are achieved through cost reduction and/or greater willingness to take risk. There is no evidence to support a return-enhancing effect from greater marketing intensity, i.e., higher expense ratios or sales charges.

There is also no evidence (or weak evidence) in favor of stock selection where expense ratio and portfolio turnover are either insignificant or with the wrong sign. (In a separate but unreported regression, involving only the set of stock-picking variables (i.e., portfolio turnover, cash holdings and expense ratio), portfolio turnover is found to be negatively (positively) significant for the low- (high-) performing group, suggesting poorer (better) performers could not (could) benefit from more frequent trading.)

Although the statistical significance of cash holdings and largest single holdings in some regressions could be interpreted as an indication of stock selection ability, they are probably more consistent with the more prevalent evidence in favor of an explanation based on greater risk-taking.

Finally, it may be of interest to note the large positive (negative) intercept term in the low- (high-) performing group. That is, subsequent one-year returns are actually higher for the previous poorer performers than for their better performing counterparts. This suggests a reversal of mutual fund returns that is not explained by the effort variables and differences in the degrees of risk in the portfolios.

### Mutual Fund Effort and Long-Term Performance

To broaden the interpretation of our results, annualized five-year cumulative returns are related to the effort proxies, which are now taken as the cumulative sums of previous changes in efforts over several years. The regression results based upon long-term per-

## EXHIBIT 2

### Univariate Test for Sample Means of Effort Variables

Panel A. Sample Classified by Lowest/Highest 20 Percentile of Prior Four-Year Returns

	4-year returns ≤ 8.6%			4-year returns > 16.3%			t-Value
	Mean	SD	N	Mean	SD	N	
Sales Charge	2.594	2.429	192	2.860	2.500	185	1.04
Expense Ratio	1.853	0.783	191	1.318	0.460	185	8.03*
Portfolio Turnover	3.220	1.085	182	3.188	1.098	176	0.28
Cash Holdings	9.866	12.887	187	8.000	7.898	183	1.68**
Risk of Loss	3.690	1.131	155	3.377	1.012	151	2.55*
Portfolio Beta	0.683	0.351	155	1.072	0.277	151	10.75*
Largest Holdings	3.949	3.315	175	3.557	2.631	176	1.23

Panel B. Sample Classified by Lowest/Highest 20 Percentile of Prior Nine-Year Returns

	9-year returns ≤ 11.1%			9-year returns > 15.8%			t-Value
	Mean	SD	N	Mean	SD	N	
Sales Charge	2.474	2.562	87	2.896	2.665	82	1.05
Expense Ratio	1.718	0.984	86	1.036	0.349	82	5.93*
Portfolio Turnover	3.289	1.164	83	3.040	1.096	75	1.38***
Cash Holdings	8.753	11.347	85	8.914	9.536	81	0.09
Risk of Loss	3.589	1.278	73	3.063	1.045	63	2.60*
Portfolio Beta	0.754	0.408	73	1.004	0.315	63	3.96*
Largest Holdings	3.975	3.493	80	3.481	3.190	77	0.93

#### Notes:

1. Four-year returns (4YR) and nine-year returns (9YR) are obtained by subtracting the latest one-year returns (R12M) from five-year returns (5YR) and ten-year returns (10YR). That is:

$$4YR = 100\{[(1 + 5YR/100)^5 / (1 + R12M/100)]^{(1/4)} - 1\} \text{ and}$$

$$9YR = 100\{[(1 + 10YR/100)^{10} / (1 + R12M/100)]^{(1/9)} - 1\}.$$

2. t-value

$$= \text{SQRT}\{[1/(1/N_x + 1/N_y)] \{ [1/((N_x - 1)S_x^2 + (N_y - 1)S_y^2) / (N_x + N_y - 2)] [(M_x - M_y)^2] \}, \text{ where } x \text{ and } y \text{ represent two different groups for their observations (N), standard deviations (S), and means (M), respectively.}$$

\* = significant at 1%, \*\* = at 5%, and \*\*\* = at 10% level, one-tailed test.

formance are reported in Exhibit 5. Although the sample size is reduced with the exclusion of some newer funds because they do not have data for the full ten years, the regressions report higher explanatory power (increasing to 47% for the bottom 20% and 31% for the highest 20%).

For the low-performing groups (classified according to distant five-year returns), higher recent five-year cumulative returns are due to: cost reduction and

increased efficiency of operations, more beta risk, less risk of loss, and more willingness to take a large single position. The signs of the two risk proxies are opposite to those reported earlier for the one-year returns.

The positive effect of beta risk on returns reflects the normal expectations of asset pricing relationship in the longer run as well as an observed positive return on the market portfolio over the second five-year period. Again, the significant size of a single stock position may indicate a greater willingness to take risk as well as confidence in specific information pertinent to a few stocks (some indication of stock selection ability).

For the top 20% performers, higher returns over the longer term are achieved by expense reduction, higher sales charge, and higher beta risk. In contrast to the one-year results, it would seem that over a longer term, mutual funds can more reliably count on cost reduction and streamlining operations to achieve greater returns, as the payoffs to a dollar cost reduction is more than twofold. This suggests that funds that are willing to spend the most could not guarantee the highest quality of information and/or analysis from year to year.

Explanation of the positive and significant sales charge is not as clear. One possibility is that investors are willing to pay more of an entrance fee to invest in a superior performer. Another possibility could be that the sales charge is proxying for some unknown quality.

Finally, strong return reversals as indicated in the opposite signs of the intercepts, are no longer observed, as both intercepts are positive. The intercept for the low-performing group is two times that of the high-performing group, suggesting a milder case of return reversal (or regression toward the mean) over a longer term. That is, previous poorer performers earn higher returns in a subsequent period after adjusting for differences in risk and efforts.

## SUMMARY AND CONCLUSION

An issue of clear interest to investors, whether large institutions or individuals, is whether mutual funds that have not performed well will be pressured to try harder. The answer is yes. To the second question

## EXHIBIT 3

### Univariate Test for Sample Means of Effort Variable

	Sample Classified by Lowest/Highest 20 Percentile of Distant Five-year Returns						
	Distant 5-year Returns ≤ 11.04%			Distant 5-year Returns > 17.29%			t-Value
	Mean	SD	N	Mean	SD	N	
Sales Charge	2.791	2.608	86	3.042	2.618	88	0.636
Expense Ratio	1.589	0.951	85	1.080	0.422	88	4.573**
Portfolio Turnover	3.293	1.181	82	2.910	1.047	78	2.163**
Cash Holdings	8.376	11.118	85	8.534	9.527	88	0.100
Risk of Loss	3.533	1.288	75	2.926	0.982	68	3.144*
Portfolio Beta	0.813	0.439	75	0.825	0.276	68	0.194
Largest Holding	3.605	3.081	76	3.632	2.337	76	0.059

Notes:

1. Distant five-year returns (D5YR) are obtained by subtracting recent five-year returns (R5YR) from ten-year returns (10YR). That is:

$$D5YR = 100\{[(1 + 10YR/100)^{10}/(1 + R5YR/100)^5]^{(1/5)} - 1\}$$

2. t-value

=  $\text{SQRT}\{[1/(1/N_x + 1/N_y)]\{1/[(N_x - 1)S_x^2 + (N_y - 1)S_y^2]/[N_x + N_y - 2]\}[(M_x - M_y)^2]\}$ , where x and y represent two different groups for their observations (N), standard deviations (S), and means (M), respectively.

\* = significant at 1%, and \*\* = at 5% level, one-tailed test.

— whether it matters — our answer is no.

In our study of a large sample of mutual fund performance and activities over several years, we find that previously low-performing mutual funds have an *adverse incentive* to pursue mostly counter-productive activities, in the form of higher expenditures and more trading, as well as succumb to more desperate measures by increasing their willingness to take risk, including taking larger positions in a single stock and taking on more potential of risk of loss for the portfolio. Despite increased efforts, poorer performers were not able to improve their performance in subsequent years. In fact, efforts such as higher expenses and trading lead to poorer performance.

The only activity that a poorer performer can undertake to reliably improve performance is to reduce expenses. That is, while the lower-performing group was found to report expense ratios as much as 40% higher than the top-performing group, the old-fashioned resort to cost-cutting is the only remedy in the mutual fund industry. Our results hold for both longer- and shorter-term returns, as well as for single-year and multiple-year cumulative measures of activity.

Both investors and fund managers should be aware that: 1) too much pressure on fund managers to perform

## EXHIBIT 4

### Relationship between Short-Term (Twelve-Month) Returns and Fund's "Management Effort"

$$(12\text{-Month Returns}) = \beta_0 + \beta_1(\text{Expense Ratio}) + \beta_2(\text{Sales Charge}) + \beta_3(\text{Portfolio Turnover}) + \beta_4(\text{Cash Holdings}) + \beta_5(\text{Risk of Loss}) + \beta_6(\text{Portfolio Beta}) + \beta_7(\text{Largest Holdings}) + \mu$$

Panel A. Intermediate-Term Classified By Prior Four-Year Returns

	$\beta_0$	$\beta_1$	$\beta_2$	$\beta_3$	$\beta_4$	$\beta_5$	$\beta_6$	$\beta_7$
Given Lowest 20 Percentile in 4-Year Returns ( $\leq 8.6\%$ ) N = 142, $R^2 = 0.27$	24.74 (0.00)	-4.68 (0.00)	0.44 (0.18)	-0.49 (0.34)	-0.14 (0.07)	3.54 (0.00)	-14.58 (0.00)	0.04 (0.45)
Given Highest 20 Percentile in 4-Year Returns ( $> 16.3\%$ ) N = 144, $R^2 = 0.23$	-11.39 (0.00)	4.06 (0.01)	-0.04 (0.45)	0.57 (0.22)	0.17 (0.02)	3.01 (0.00)	1.15 (0.40)	0.12 (0.32)

Panel B. Long-Term Classified By Prior Nine-Year Returns

	$\beta_0$	$\beta_1$	$\beta_2$	$\beta_3$	$\beta_4$	$\beta_5$	$\beta_6$	$\beta_7$
Given Lowest 20 Percentile in 9-Year Returns ( $\leq 11.1\%$ ) N = 65, $R^2 = 0.33$	14.73 (0.03)	-4.83 (0.01)	0.26 (0.35)	-0.28 (0.43)	-0.10 (0.25)	3.00 (0.02)	-11.40 (0.01)	1.04 (0.02)
Given Highest 20 Percentile in 9-Year Returns ( $> 15.8\%$ ) N = 57, $R^2 = 0.19$	-8.46 (0.06)	-0.08 (0.49)	0.19 (0.34)	0.87 (0.21)	0.09 (0.20)	2.50 (0.03)	3.41 (0.22)	0.13 (0.35)

Numbers in parentheses are p-values (significance level), one-tailed test.

may lead them to pursue counter-productive activities, i.e., more costly and more risky activities; and 2) it is easier to improve performance by cost-cutting than by trying harder to trade or to acquire costly information.

## REFERENCES

Ang, James S., and Jess H. Chua. "Mutual Funds: Different Strokes or Different Folks?" *Journal of Portfolio Management*, Winter 1982, pp. 43-47.

Chang, Eric C., and Wilbur G. Lewellen. "Market Timing and Mutual Fund Investment Performance." *Journal of Business*, 57 (1984), pp. 57-72.

Chen, Carl R., and Anthony Chan. "How Well Do Asset Allocators Allocate Their Assets? Some Unimpressive Evidence." *Journal of Portfolio Management*, 18 (1992), pp. 81-92.

Chen, Carl R., Cheng F. Lee, Shafiqur Rahman, and Anthony Chan. "A Cross-Sectional Analysis of Mutual Funds' Market Timing and Security Selection Skill." *Journal of Business Finance and Accounting*, 19 (1992), pp. 659-675.

Chen, Carl R., and Steve Stockum. "Selectivity, Market Timing, and Random Beta Behavior of Mutual Funds: A Generalized Model." *Journal of Financial Research*, 9 (1986), pp. 87-96.

Hendriksson, Roy D. "Market Timing and Mutual Fund Performance: An Empirical Investigation." *Journal of Business*, 57 (1984), pp. 73-96.

Jensen, Michael C. "The Performance of Mutual Funds in the Period 1945-1964." *Journal of Finance*, 23 (1968), pp. 389-416.

———. "Risk, the Pricing of Capital Assets and the Evaluation of Investment Portfolios." *Journal of Business*, 42 (1969), pp.

## EXHIBIT 5

### Relationship between Long-Term (Recent Five-Year) Returns and Fund's "Management Effort"

$$(\text{Recent 5-year Returns}) = \beta_0 + \beta_1(\text{Expense Ratio}) + \beta_2(\text{Sales Charge}) + \beta_3(\text{Portfolio Turnover}) + \beta_4(\text{Cash Holdings}) + \beta_5(\text{Risk of Loss}) + \beta_6(\text{Portfolio Beta}) + \beta_7(\text{Largest Holdings}) + \mu$$

	$\beta_0$	$\beta_1$	$\beta_2$	$\beta_3$	$\beta_4$	$\beta_5$	$\beta_6$	$\beta_7$
Given Lowest 20 Percentile ( $< 11.04\%$ )								
In Distant 5-Year Returns	10.70	-2.61	-0.09	-0.15	-0.06	-0.73	7.51	0.48
N = 66, $R^2 = 0.47$	(0.00)	(0.00)	(0.35)	(0.39)	(0.13)	(0.06)	(0.00)	(0.01)
Given Highest 20 Percentile ( $> 17.29\%$ )								
In Distant 5-Year Returns	5.45	-2.18	0.34	0.62	0.01	-7.43	8.09	0.25
N = 57, $R^2 = 0.31$	(0.05)	(0.05)	(0.08)	(0.14)	(0.47)	(0.12)	(0.00)	(0.18)

Numbers in parentheses are p-values (significance level), one-tailed test.

167-247.

Kon, Stanley J. "The Market-Timing Performance of Mutual Fund Managers." *Journal of Business*, 52 (1983), pp. 323-347.

Kon, Stanley J., and Frank C. Jen. "The Investment Performance of Mutual Funds: An Empirical Investigation of Timing, Selectivity, and Market Efficiency." *Journal of Business*, 52 (1979), pp. 263-289.

Lee, Cheng F., and Shafiqur Rahman. "Market Timing, Selectivity, and Mutual Fund Performance." *Journal of Business*, 63 (1990), pp. 261-278.

McDonald, John G. "Objectives and Performance of Mutual Funds, 1960-1969." *Journal of Financial and Quantitative Analysis*, June 1974, pp. 311-332.

Merton, R.C. "On Market Timing and Investment Performance: An Equilibrium Theory of Value for Market Forecasts." *Journal of Business*, 54 (1981), pp. 363-406.

Sharpe, William. "Asset Allocation: Management Style and Performance Measurement." *Journal of Portfolio Management*, Winter 1992, pp. 29-34.

———. "Mutual Fund Performance." *Journal of Business*, 39 (1964), pp. 119-138.

Treynor, Jack. "How to Rate Management of Investment Funds." *Harvard Business Review*, 44 (1966), pp. 131-136.

Williamson, Peter. "Measurement and Forecasting of Mutual Funds Performance: Choosing an Investment Strategy." *Financial Analysts Journal*, 28 (1972), pp. 78-84.