2. Performance of Mutual Funds

2.1 Introduction

One of the reasons that investors buy mutual funds is the anticipation of investment benefits that portfolio managers may achieve. Ultimately, the performance of the manager must be evaluated in light of the results. However, this seemingly straightforward endeavor is deceptively difficult owing to two principal issues in evaluating fund performance: (1) the choice of benchmark, and (2) the choice of model.

In this chapter we review papers that measure performance and in that process chronicle a four-decades' struggle to reach a consensus on appropriate benchmarks and models for performance evaluation. Thus far, no consensus has been reached. We also review papers that relate to persistence of performance, conditional performance, and market timing. In the following few paragraphs we briefly introduce these related areas of inquiry. The papers summarized in the chapter are listed chronologically at the end of the chapter.

Jensen (1968), Grinblatt and Titman (1989), and Malkiel (1995) are among the principal papers that comprehensively evaluate fund performance. Their results are consistent in showing that actively managed funds do not outperform various broad market benchmarks as evidenced by the negative alphas in Table 2.1.

Although benchmarks are the primary focus of Chapter 4 (Style Analysis), we note here that the work of Lehmann and Modest (1987) is one of the earliest mutual fund papers to stress the critical importance of benchmarking for determining "normal performance." Other earlier related seminal works involving

benchmarking include, among others, those of Treynor (1965), Sharpe (1966), and Roll (1978), which are drawn from here.

Table 2.1 – Mutual Fund Performance

Study	Sample Period	Sample Size	Benchmark	Annualized Alpha	T-Ratio
Jensen (1968)	1945-1964	115	S&P500	-1.10%	-0.69
Grinblatt and Titman (1989)	1974-1984	157	CRSP EW Index	-0.03%	-0.99
Malkiel (1995)	1971-1991	239	Wilshire 500	-0.93%	-1.78

Many studies invoke a Capital Asset Pricing Model (CAPM) framework in performance analysis. Such an approach posits the use of a single portfolio as a benchmark. Treynor, Sharpe, and Jensen each use different proxies for the market portfolio. However, Roll contends that using a single market portfolio as a benchmark is logically inconsistent, as the model assumes that investors have homogeneous expectations. Hence the detection of any abnormal performance can only occur when the market portfolio is inefficient.[3] Thus, given evidence that the usual proxies for the market portfolio are mean-variance inefficient, and that there exist several anomalies such as firm size and P/E ratios, the use of CAPM market proxies as benchmarks is questionable. In a related vein Ross (1976) contends that systematic risk need not be represented by a single factor and instead offers that K factors (where K>1) affect the return of securities. Thus, one of the main contributions of this analysis is the question of whether different constructions of K-factors yield similar or dissimilar measures of performance.

In addition to "pure" performance works, we also review papers addressing persistence of performance. The first major paper to tackle this issue is Hendricks, Patel, and Zeckhauser (1993), who find some evidence of persistence. However, other studies of this phenomenon find that consistency of performance from one period to the next is elusive. For example, in the 1970s the top performing funds were more likely to perform well in the next year than they were likely to do so during the 1980s. Also, some studies conclude that "poor" performers are far more consistent than "good" performers. In summary, some managers can beat the market only some of the time as indicated in Table 2.2.

Table 2.2 – Do Winners Repeat?

Study	Sample Period	Sample Size		Successive Period Performance	
				Winners	Losers
Goetzmann and Ibbotson (1994)	1976-1988	728	Winners	62%	38%
			Losers	37%	63%
Brown and Goetzmann (1995)	1976-1988	2274	Winners	57%	44%
			Losers	44%	56%
Malkiel (1995)	1971-1991	1047	Winners	65%	35%
			Losers	35%	65%
Kahn and Rudd (1995)	1983-1993	150	Winners	41%	59%
			Losers	59%	41%

The work that best typifies the findings of investigations in this arena is that of Malkiel (1995), who holds that funds have tended to underperform the market both before and after all reported

expenses. Other topics addressed in this chapter are those issues of market timing and conditional performance.

Kon (1983) reports that fund managers display some ability to time the market. However, multivariate tests show that fund managers overall have little or no special information regarding unanticipated market portfolio returns. Jagannathan and Kroajczyk (1986) show theoretically and empirically that portfolios can be constructed to show artificial timing ability when no true ability exists. Thus, the detection of timing is related to the choice of model. As to conditional performance, Ferson and Schadt (1996) advocate a conditional performance model using measures that are consistent with the assumption of a semi-strong form of market efficiency. Such conditional models allow estimation of time-varying conditional betas, as managers of active portfolios are likely to shift their bets on the market to incorporate information about changing market conditions. We now turn to the papers of interest in chronological order

Close, J., 1952, "Investment Companies: Closed-End versus Open-End," *Harvard Business Review*, 29, 79-88.

Close authored the first academic mutual fund article of which we are aware. In this descriptive work, he discusses the differences between closed-end and open-end funds, and he anticipates many later contributions to the fund literature. Reviewing data on assets under management from 1940 through 1950, the author reports that the open-end portion of the industry passed closed-end funds by the end of 1943. Further, open-end funds (98 of them) had three times the assets of closed-end funds under management by the end of 1950. Close reviews the differences between open- and closed-end funds in an effort to determine if there are any structural reasons for the tremendous growth of open-end funds and the relative stagnancy of closed-end funds.

He argues that the growth in open-end funds is primarily related to the continuous, and well-compensated, sales effort via loads that is undertaken by these funds. In addition, high fixed commission rates on small trades tend to discourage small investments in publicly traded shares, including closed-end funds. Close also contends that the long-standing practice of paying out capital gains by open-end funds could confuse unsophisticated investors.

Close then analyzes the actual investment performance of a sample of open-end funds (37 of the 98 in existence) and the 11 closed-end funds listed on the NYSE. During the period January 1, 1937 to December 31, 1946, and over several sub-periods, the mean NAV returns earned by closed-end fund managers exceeds those earned by the sample of open-end fund managers. Close ends with a caution to potential investors to carefully investigate the expense and management fee arrangements for any fund, open- or closed-end, before committing capital.

Brown, F. and D. Vickers, 1963, "Mutual Fund Portfolio Activity, Performance, and Market Impact," *The Journal of Finance*, 18, 377-391.

Brown and Vickers address the following mutual fund issues: the rates of portfolio turnover, the measurement of performance results, and the impact of trading activity on price formation in the market. The authors reference the findings of their earlier work, "A Study of Mutual Funds" (1962), which investigates the above issues using data from 1953 through 1958. They explain that portfolio performance measures are primarily of interest for shareholders in evaluating a fund's performance relative to its objectives. Market impact has significance insofar as mutual funds can influence conditions in the securities markets. As to portfolio turnover, it is generated by two forces: (1) the investing of new

monies received by the fund, and (2) management's decisions to alter the current portfolio.

They report three findings regarding turnover: (1) turnover rates are inversely related to fund size; (2) the distribution of turnover rates is skewed to the right with considerable dispersion; and (3) turnover rates increase in 1954 and 1958, when the market moves upward strongly. As to performance issues, they first explain that the assessment of performance for different types of funds mandates different criteria. However, funds on average perform no better or worse than the composite markets from which they select securities. In addressing market impact, Brown and Vickers attempt to distinguish long-run from short-run effects. At the aggregate security level there is no evidence that funds channel their inflows into common stocks differently in periods of rising markets than in periods of decline. However, there is some evidence of somewhat destabilizing fund activity with respect to individual securities during declining markets. The authors draw two main conclusions: (1) variations in fund portfolio turnover rates are not associated with variations in performance, and (2) fund portfolio activity influences market prices, especially in the short run for individual securities.

Sharpe, W., 1966, "Mutual Fund Performance," *The Journal of Business,* 39, 119-138.

Sharpe's (1966) article is among the earliest research to evaluate the performance of mutual funds using some of the concepts from modern portfolio theory.[4] Sharpe posits that if sound mutual fund management requires the selection of incorrectly priced securities, effective diversification and selection of a portfolio in a given risk class, then there is ample room for major and persistent difference in fund returns.

He explains that the expected return on an efficient portfolio, $E(R_p)$ and its associated risk (σ_p) are linearly related:

$$E(R_p) = R_F + \beta\sigma_p, \tag{1}$$

where R_F is the risk-free rate and β is the premium for risk. If investors can borrow or lend at the risk-free rate R_F and invest in a portfolio with predicted performance of $[E(R_p), \sigma_p]$, then by allocating funds between the risky portfolio and the risk-free asset, an investor can attain any point on the line:

$$E(R) = R_F + \left[\frac{R_p - R_f}{\sigma_p}\right]\sigma. \tag{2}$$

The optimal portfolio will be the one with the greatest reward-to-variability ratio, which is known today as the Sharpe ratio:

$$\left[\frac{R_p - R_F}{\sigma_p}\right]. \tag{3}$$

To test the implication of this formula, Sharpe examines 34 open-end mutual funds spanning a period 1954-1963. There is considerable variability in the Sharpe ratio, with the best and worst performing funds reporting 0.78 and 0.43, respectively.

Sharpe provides two possible explanations for the results: Those who believe in market efficiency may argue that the cross-sectional variation is either transitory or due to excessive expenditure by the funds. Others may attribute the difference to management skills.

The study also examines the persistence of performance. Using measures from the Sharpe ratio and the Treynor index, results indicate that there is some persistence in fund rankings.[5]

Treynor, J. and K. Mazury, 1966, "Can Mutual Funds Outguess the Market?" *Harvard Business Review*, July, 131-136.

Treynor and Mazury discuss the fund manager-investor relationship wherein investors frequently expect managers to be able to anticipate market moves, and the dilemma of whether or not managers should attempt to market time. To address the issue, the authors devise a test of mutual fund historical success in anticipating major moves in the market. They explain that the only way a fund can translate ability to outguess the market into higher returns for shareholders is to vary the fund's volatility systematically in a manner that results in an upwardly concave characteristic line. Rates of return for 57 funds (1953-1962) are employed to investigate whether the volatility of a fund is higher in years when the market does well than in years when the market does poorly. They compute a characteristic line wherein the rate of return for a managed fund is plotted against the rate of return for a suitable market index. There is no evidence of curvature in characteristic lines for any of the funds. From this, they conclude that none of the managers outguess the market and that these managers should not be held responsible for failing to foresee changes in market direction.

Jensen, M., 1968, "The Performance of Mutual Funds in the Period 1945-1964," *The Journal of Finance,* 23, 389-416.

Jensen's is the first work to measure the absolute performance of mutual funds via the introduction of a model that statistically measures a fund's performance relative to a benchmark. His model is a practical adaptation of the Capital Asset Pricing Model (CAPM), which assumes that all investors are risk averse, have homogeneous expectations, and have the ability to choose among

portfolios on the basis of their risk and return. The equilibrium model for asset pricing is:

$$E(R_j) = R_F + \beta_j(R_M - R_F), \tag{1}$$

where R_j = expected return on portfolio j, R_F = risk-free rate of return, β = systematic risk, and R_M = market return. Extending the single period models to allow heterogeneous horizon periods and continuous trading of securities, the model can be generalized to:

$$E(R_{jt}) = R_{Ft} + \beta_j(R_{Mt} - R_{Ft}) \quad . \tag{2}$$

The measure of risk β_j is approximately equal to the coefficient b_j in the market model:

$$R_{jt} = E(R_{jt}) + b_j\pi_t + \varepsilon_{jt}, \tag{3}$$

where π_t is the unobservable market factor that affects returns of all securities. It is seen that:

$$R_{jt} - R_{Ft} = \beta_j(R_{Mt} - R_{Ft}) + \varepsilon_{jt}. \tag{4}$$

The risk premium of the j^{th} portfolio is equal to β times the risk premium of the market portfolio plus a random error term. A manager who is a superior forecaster will systematically select securities that have an $\varepsilon_{jt} > 0$. Thus, the portfolio may earn more than its "normal" risk premium for its given level of risk as measured by β. Allowing such forecasting ability implies that a regression must have the possibility of a non-zero intercept. The estimating equation then transforms to:

$$R_{jt} - R_{Ft} = \alpha_j + \beta_j(R_{Mt} - R_{Ft}) + u_{jt}, \tag{5}$$

where the constant "α" is termed Jensen's alpha, while the error term u_{jt} has an expected value of zero and is expected to be serially independent. A positive α is an indicator of an ability to generate superior forecasts of security prices. A negative α is an indication of poor security selection and/or the generation of high expenses as a result of frequent trading or other factors.

Jensen uses data for 115 mutual funds spanning 1945-64 and returns for the S&P 500 index to proxy the market. The funds on average earned 1.1% less that they should have earned given their level of systematic risk. Frequency distributions of the funds show a majority of funds with $\alpha < 0$ and only 39 funds reporting $\alpha > 0$. Thus, on average mutual funds do not produce returns to offset their research expenses and management fees. Jensen also evaluates the statistical significance of α and reports that 14 funds have a t-value less than -2 (negative at the 5% level) while only three funds have performance measures that are significantly positive at the 5% level. Thus, he concludes that there is little evidence that any individual fund does better than mere random chance.

Carlson, R., (1970) "Aggregate Performance of Mutual Funds, 1948-1967," *Journal of Financial and Quantitative Analysis,* 1-32.

The purpose of this paper is to show that the issue of mutual fund performance vis-à-vis the market is influenced by fund type, time period of interest, and market index used. For analysis the author initially employs fund data for the period 1948-1967 to construct indices for three types of mutual funds: diversified stock funds, balanced funds, and income funds. Each index is then compared with three popular market indices. Carlson reports that mutual funds should be grouped by broad investment objectives before asking how they perform relative to the market. In Section II the author shows that regressions of fund returns on Standard &

Poor's composite index returns have a high amount of unexplained variance, which is significantly reduced when a mutual fund index is used as the market proxy. This finding which foreshadows issues of style analysis (see Chapter 4) supports the position that an individual portfolio manager should be compared with an index reflecting actual returns from managed portfolios. Section III investigates several potential determinants of fund performance and finds: (1) past performance is seen to have little predictive value for future performance; (2) net returns during the 1958-1967 decade are not influenced by fund size or expense ratios; and (3) performance is positively related to availability of new cash resources (fund flows) for investment purposes.

McDonald, J., 1974, "Objectives and Performance of Mutual Funds, 1960-1969," *Journal of Financial and Quantitative Analysis,* 311-333.

This work evaluates the objectives and performance of 123 mutual funds using monthly data for the period 1960-1969. The paper considers five questions: (1) Are stated fund objectives related to risk and return? (2) How do funds of differing objectives perform in terms of gross- and risk-adjusted returns? (3) Do average excess returns increase with risk? (4) How does the risk-adjusted performance of the average fund compare to that of the overall market? and (5) Do funds at one end of the risk spectrum outperform those at the other end?

In addressing the above questions, the author initially estimates the systematic risk of each fund by regressing monthly excess returns on market excess returns. Funds are partitioned into six subsets. Initial objectives at the beginning of the decade are found to be positively related both to later measures of beta and total variability. Also, more aggressive portfolios appear to outperform lesser aggressive ones. In analyzing performance characteristics,

four measures are examined: (1) Mean monthly excess returns are used as a non-risk-adjusted measure of average return. (2) Mean excess return divided by beta are used as a reward-to-volatility ratio. (3) Jensen's alpha is employed as a measure, and (4) Mean excess return divided by standard deviation is used as a reward-to-variability ratio. The author reports that a majority of the estimated ratios fall below the ratio for the market index. He also reports that the slope of the fund line is not significantly different from that of the market line for the ten-year period. McDonald concludes that, for the mutual fund sample as a whole, the data indicate that funds do not significantly perform differently than the market overall.

Grant, D., 1977, "Portfolio Performance and the 'Cost' of Timing Decisions," *The Journal of Finance*, 32, 837-846.

This work addresses the issue of market timing with regard to: (1) the return attributed to timing, and (2) a previously unspecified "cost" in terms of increased risk. Specifically, the work provides a context for investigating the implications of treating the systematic relative risk of an investment portfolio as a random variable. After a brief review of earlier studies which address mutual fund performance, Grant explains in Section III that the change in risk owing to timing is necessarily unrewarded only if beta and the market return are independent. If they are not independent, the expected return is changed and the portfolio performance may be greater than or less than that of the benchmark. The author compares the performance of a managed portfolio and that of the relative benchmark under the assumption that beta and market return are not independent variables. This section includes a discussion of the potential application of their findings and the role that simulations may play. In Section IV the author contends that neither Jensen's nor Treynor's performance measure is biased

because both incorporate the cost of timing decisions. Grant concludes by noting that the relationships investigated are significant both in theory and in application.

Kon, S. and F. Jen, 1979, "The Investment Performance of Mutual Funds: An Empirical Investigation of Timing, Selectivity and Market Efficiency," *The Journal of Business*, 52, 263-289.

In this work the authors employ both the Sharp-Lintner-Mossine (SLM) and Black models of market equilibrium to evaluate mutual fund stock selectivity performance when management is simultaneously engaged in market timing activities. The methodology employed is a switching regression model. Tests of model specification on a sample of 49 mutual funds reflecting different investment objectives find that for many funds a mixture of regressions better fits the data than does a standard linear model. The null hypotheses of risk-level stationarity and of constant selectivity performance are rejected for many individual funds. Many individual funds generate superior selectivity performance for both the SLM and Black models with funds on average selecting superior portfolios. However, both individually and on average, fund managers are unable to select individual securities well enough to recoup research expenses, management fees, and commission costs.

Miller, T. and N. Gressis, 1980, "Nonstationarity and Evaluation of Mutual Fund Performance," *Journal of Financial and Quantitative Analysis*, 15, 639-654.

After a brief review of the revelant mutual fund literature, Miller and Gressis explain that estimates of fund alpha and beta may provide misleading information if nonstationarity is present in the risk-return relationship and is ignored. They present a partition

regression and a selection rule to estimate the traditional capital asset pricing model (CAPM) wherein they examine the relationship between the excess rates of return for 28 no-load funds and the excess rate of return for the market. The results suggest only one fund has stationary betas, and the number of betas for any given fund over various periods range upward through ten. They report that their findings indicate some weak, positive relationships and some weak, negative relationships between betas and the market return. They conclude that no significant statistical relationships of either type are found.

Kon, S., 1983, "The Market-Timing Performance of Mutual Fund Managers," *The Journal of Business*, 56, 323-347.

Kon addresses the optimal actions and performance measurement of a portfolio manager who is simultaneously focusing on market-timing and stock selection activity. If a manager believes he can make above average forecasts of portfolio market returns, he will adjust his portfolio risk level ahead of market movements; hence the evidence of systematic risk non-stationarity for a fund is consistent with timing activity. A manager who correctly increases systematic risk above the portfolio target level in anticipation of a bull market will earn an additional return dependent on the risk level shift and the market movement. For empirical purposes Kon employs a sample of 37 mutual funds (Jan. 1960 – June 1976) with objectives of growth, growth and income, balanced, and income. To implement the timing performance estimates for both single period and overall timing, the following are required for each fund: (1) the time series of beta estimates, (2) a proxy for the fund's target beta, and (3) a proxy for the consensus expected return on the market. The results show six funds with positive performance in both timing and selectivity and five funds with positive timing and negative

selectivity performance. The sample of funds produces better selectivity than timing performance. Kon concludes that some individual funds display significant timing ability and/or performance. However, multivariate tests show that fund managers overall have little or no special information regarding unanticipated market portfolio returns.

Chang, E. and W. Lewellen, 1984, "Market Timing and Mutual Fund Investment Performance," *The Journal of Business*, 57, 57-72.

In this article the authors employ a parametric statistical procedure that jointly tests for either superior market-timing or security-selection skills to examine the investment performance of a sample of 67 mutual funds during the 1970s. They also briefly discuss several recent studies reporting that mutual funds do not maintain constant risk exposure over time, thus indicating that managers attempt to time the market. These works generally employ a single-factor market model.

Chang and Lewellen employ a market-timing and security-selection test methodology which involves: (1) partitioning the return data into up-market (52 periods) and down-market (56 periods) conditions, (2) estimating the least-squares lines under each condition for every mutual fund, and (3) testing whether the slope-coefficient estimates for the two conditions significantly differ. Using both quarterly and monthly returns series, they find that managers' security selection abilities are significant in magnitude in only five instances out of 67, and three of these five have negative values. Similar statistics are reported for managers' market-timing abilities. None of their results provide evidence of collective portfolio management skill either at the micro- or macro-forecasting level. They conclude that their empirical results are consistent with their model's predictions and that the findings suggest no evidence of skillful market timing or superior security selection abilities.

Jagannathan, R. and R. Korajczyk, 1986, "Assessing the Market Timing Performance of Managed Portfolios," *The Journal of Business*, 59, 217-235.

The authors discuss earlier works which report the puzzling evidence that funds exhibiting significant timing characteristics show negative performance more frequently than positive performance. Jagannathan and Korajczyk demonstrate both theoretically and empirically that portfolios can be constructed to show artificial timing ability when no true ability exists. They propose that certain parametric techniques for determining timing and selectivity performance can yield spurious performance (of the opposite sign) when applied to option-like securities, and offer this as an explanation of funds' tendency to show negative market timing measures. If funds hold assets that are less (more) option-like than the assets in the market proxy, one would expect to see negative (positive) timing measures and opposite signs for measures of security selection.

They propose two methods of testing the specification of market-timing models. The first specification test involves testing linearity by examining the difference between OLS and WLS parameter estimates. The second involves testing restrictions on the coefficients of additional regression independent variables. The tests generally reject linearity when spurious timing is statistically significant. They conclude the work by calling for a useful extension of this analysis involving performance measurements among different mutual fund categories, which may display differences, partially due to artificial timing among groups.

Lehmann, B. and D. Modest, 1987, "Mutual Fund Performance Evaluation: A Comparison of Benchmarks and Benchmark Comparisons," *The Journal of Finance*, 42, 233-265.

In this paper the authors provide empirical evidence on whether the choice of alternative benchmarks has any effect on the measurement of performance. The paper additionally evaluates the efficacy of performance measures that use the standard security market line as a benchmark model.

The model to evaluate fund performance assumes that K-factors affect the returns on individual securities. The return for any mutual fund Rpt can be written as:

$$\tilde{R}_{pt} = \beta_{pt}\tilde{R}_{mt} + \varepsilon_{pt} . \qquad (1)$$

The estimate β_{pt} consists of: (1) the average or target sensitivities of the fund to the K common factors, and (2) deviations from the targeted sensitivities by the manager at any given time. The ability to select stocks is reflected in the residual disturbance term, ε_{pt}. If the manager possesses stock timing ability, then $\varepsilon_{pt} > 0$. In the spirit of Jensen (1968) the regression of R_{pt} on R_{mt} results in:

$$E(R_{pt}) = \tilde{\alpha}_p + \hat{\beta}_p\tilde{R}_{mt} \quad . \qquad (2)$$

If a manager does not have superior skills, then the regression equation in (2) will indicate no abnormal performance ($\alpha = 0$). If a fund manager displays superior skills, then $\alpha > 0$. However, a positive alpha may indicate superior stock selection ability but does not provide insight into market timing ability.[6] The authors reformulate Equation (2) to introduce a squared return for the market:

$$E(R_{pt}) = \tilde{\alpha}_p + \hat{\beta}_{p1}\tilde{R}_{mt} + \hat{\beta}_{p2}\tilde{R}^2_{mt} . \quad (3)$$

In the absence of market timing the coefficient on R_{mt} will be the target beta and the coefficient on R^2_{mt} will be zero.

The authors construct benchmark portfolios in two ways: (1) for CAPM, CRSP equally-weighted and value-weighted indices of NYSE stocks are used, and (2) for APT benchmarks a two-step process is used. First the sensitivities of the common factors are estimated for a collection of securities, and then in the second step the factor loadings are used to construct the APT portfolios.

Results show that the Jensen measures (α) are sensitive to the choice of APT benchmarks. However, the mean Jensen measures as well as the rankings of funds are insensitive to the choice of the number of common factors (5, 10, or 15). The authors conclude that the choice of a benchmark portfolio may significantly impact performance results and thus is the first crucial step in measuring the performance of a mutual fund.

Grinblatt, M. and S. Titman, 1989, "Mutual Fund Performance: An Analysis of Quarterly Portfolio Holdings," *The Journal of Business,* 62, 393-416.

In contrast to earlier studies which examine the actual returns realized by mutual fund investors, Grinblatt and Titman employ both actual returns and gross portfolio returns of funds in this study. They use this data to estimate survivorship bias and total transactions costs in testing for abnormal returns.

Using quarterly data for the 1975-84 period, the authors calculate Jensen Measures of the funds with four sets of benchmark portfolios: (1) the monthly rebalanced equally-weighted portfolios of all listed CRSP securities, (2) the CRSP value-weighted index, (3) ten-factor portfolios in the spirit of

Lehmann and Modest (1988), and (4) an eight-portfolio benchmark based on firm size, yield, and past returns.

Table 2.3 shows correlations between some variables of interest.

Table 2.3 – Correlation Matrix

				Jensen Measures		
	Expense Ratio [A]	Manage-ment [B]	Turn-over [C]	Hypo-thetical	Actual	Differ-ence [D]
Net Asset Value	-.35**	-.38**	-.22**	-.18*	-.06	-.16*
Expense Ratio		.17*	.16	.16*	.05	.15
Manage-ment Fee			.34**	.07	-.07	.19*
Log Turnover				.22**	.24**	-.04
Jensen Hypo-thetical					.73**	.32**
Jensen Actual						-.40**

[A] Expenses less management fees as a percentage of net asset value
[B] Stated management fees as a percentage of net asset value
[C] Dollar purchases plus sales as a percentage of net asset value
[D] The difference between the Jensen Measure of the hypothetical return of the fund and its actual return, which is an estimate of transaction costs.
* Significant at .05 level.
** Significant at .01 level.

Important findings include the following: (1) Survivorship bias is on the order of 0.5% annually and is somewhat larger for smaller funds. (2) Transactions costs are on the order of 2.5% annually and are inversely related to the funds' size. (3) Abnormal gross return performance is inversely related to fund size, as are transactions costs, thereby resulting in actual net returns being unrelated to net asset value; and (4) Actual returns do not display positive abnormal returns on average. However, gross returns of both growth and aggressive growth funds are significantly positive on average.

The authors conclude that while superior performance may exist among growth funds, aggressive growth funds, and smaller funds, these funds have the highest expenses, thereby eliminating abnormal investor returns. Thus, investors can not take advantage of the portfolio managers' skills by purchasing shares in these mutual funds.

Grinblatt, M. and S. Titman, 1993, "Performance Measurement without Benchmarks: An Examination of Mutual Fund Returns," *The Journal of Business,* 66, 47-68.

In this article the authors employ the same sample of mutual funds used in their 1989 piece and introduce a new measure of portfolio performance. They note that the Jensen Measure used earlier is subject to criticisms including: (1) sensitivity to the choice of a benchmark portfolio, and (2) introduction of bias in the evaluation of market timers. They explain that the traditional method of portfolio performance evaluation does not employ information that is frequently available about the composition of evaluated portfolios. Here, they employ portfolio holdings with a measure that does not require the use of a standard benchmark portfolio. They proceed from the Event Study Measure that provides an estimate of the time-series co-variances sums between

portfolio weights and later returns for each portfolio asset. The Event Study Measure uses future returns as a performance benchmark, which introduce serial correlation in return differences. Grinblatt and Titman's new measure, the "Portfolio Change Measure" requires estimates of the expected weight of portfolio assets, is not subject to survivorship bias, has some statistical computational advantages, and is not subject to the benchmark problems earlier discussed by Roll and others.

When investigating fund holdings for 155 funds (1975-84), they find that performance measures for the groups of funds are similar to the measures found in Grinblatt & Titmann (1989), who use the eight-portfolio benchmark that controls for dividend policy, firm size, and past returns. However, performance measures differ considerably from the other three benchmarks employed earlier.

They conclude that the strongest evidence of abnormal performance is seen in the aggressive growth fund category and that fund performance for both superior and inferior results persists across both halves of the sample. They note that the abnormal portfolio performance documented in their work does not indicate that investors can achieve superior returns by investing in mutual funds because transactions costs and fund expenses essentially dissipate any abnormal investment returns. However, it may be possible for investors to attain abnormal returns by mimicking the portfolios of the superior performing mutual funds.

Hendricks, D., J. Patel, and R. Zeckhauser, 1993, "Hot Hands in Mutual Funds: Short-run Persistence of Relative Performance, 1974-1988," *The Journal of Finance,* 43, 93-130.

The authors employ quarterly returns over 1974-1988 for an initial sample of 165 no-load, growth equity funds, in order to test for short-run persistence. They first establish that excess returns net of management fees exhibit serial correlation. Returns are

computed using three benchmarks: (1) single portfolio benchmarks including an equally-weighted index of NYSE equities, (2) an eight-portfolio benchmark similar to that constructed by Grinblatt and Titman (1989), and (3) an equally-weighted index of sample mutual funds.

They find that there is positive performance persistence for four quarters and a reversal thereafter. (Survivorship bias is not considered to be a problem, owing to their sample construction.) They attribute this pattern of returns to possibly an incorrect model specification or to several other likely reasons, including: (1) superior managers get bid away once they build a track record; (2) new funds flow to successful performers leading to a bloated organization and fewer good investment ideas per managed dollar; (3) manager drive is diminished once reputation is established; (4) manager sensitivity is limited to short-term market conditions; and (5) salaries and fees rise in response to recent successes.

The authors rank portfolios into octiles on the basis of the most recent four quarters' returns and find: (1) Mean excess returns increase monotonically with octile rank. A portfolio of better (worse) recent performers does better (worse) in the next quarter. (2) Sharpe's measure, the ratio of mean excess return to standard deviation, also monotonically increases with rank. (3) Jensen's alpha rises monotonically with octile rank, independent of the benchmark used. (4) Estimates of Jensen's alpha are similar across the first set of single portfolio benchmarks, and (5) The evaluation of mutual funds' portfolios is systematically affected by benchmark choice.

The authors confirm their findings of short-term persistence via additional simulations and tests, including another sample of funds for 1989-1990. They also report that "icy hands" occur wherein poor performance persists over time and that this performance is more inferior than "hot hands" performance is superior.

Goetzmann, W. and R. Ibbotson, 1994, "Do Winners Repeat? Patterns in Mutual Fund Return Behavior," *The Journal of Portfolio Management,* Winter, 9-18.

The paper begins with a discussion of the efficient market hypothesis, which implies that excess performance is the result of luck, not skill. The study investigates whether past performance may be used to predict fund relative performance. Three performance issues are addressed: (1) the need for risk adjustment, (2) the issue of survivorship bias, and (3) the dependence of fund returns cross-sectionally.

The authors employ data for 728 mutual funds over the period 1976-1988 and consider two-year, one-year, and monthly gross and Jensen risk-adjusted returns. They find support for the winner-repeat question with both type returns for funds overall, as well as with the relatively homogeneous growth fund subset. Both the top-quartile and lower-quartile performers experience return persistence.

Malkiel, B., 1995, "Returns from Investing in Equity Mutual Funds: 1971 to 1991," *The Journal of Finance,* 50, 549-572.

In a comprehensive study Malkiel employs every diversified equity mutual fund sold to the public for the period 1971-1991 to investigate performance, survivorship bias, expenses, and performance persistence. The author explains that several "cracks" appear in the efficient market edifice during the 1970s and early '80s. Among these for stock returns are: (1) positive and negative correlation among security returns over short and longer time periods, respectively, (2) several seasonal and day-of-the-week patterns, and (3) predictability of stock returns based on variables such as dividend yields, firm size, PE ratios, and price-to-book value ratios. Cracks that appear for mutual funds are: (1) managers' ability to generate returns slightly above the Capital

Asset Pricing Model (CAPM) market line, and (2) past mutual funds returns predict future returns.

Malkiel investigates survivorship bias, performance, performance persistence, and expense ratios, respectively. He reports some impact of survivorship bias as seen in annual returns for all funds of 15.69%, compared to 17.09% and 17.52% for surviving funds and the S&P 500 Index, respectively. These findings contrast with those of Grinblatt and Titman, and Malkiel attributes this to the survivorship bias of those authors' fund sample. To consider performance he calculates the funds' alpha measure of excess performance using the CAPM model.

He finds the average alpha to be - 0.06%, with a T-ratio of only -0.21, thus to be indistinguishable from zero. Using the Wilshire 5,000 Index as a benchmark, he finds the alpha is negative with net returns and positive with gross returns, but neither alpha to be significantly different from zero. He also finds no relationship between betas and total returns. Hence, investors seeking higher returns will generally not obtain them by purchasing high-beta mutual funds.

When investigating the persistence of mutual fund returns, the author analyzes predictability by constructing tables showing successful performance over successive periods. Consistent with earlier studies, he finds that there is some fund return persistence during the earlier decade, but that this persistence does not hold during the second decade. From this he suggests that persistence may have existed earlier, but has since disappeared. However, even when persistence existed during the 1970s, many investors would not have benefited from buying funds with a "hot hand" because of the load charges (up to 8% of asset value) entailed with their purchase.

In his analysis of expense ratios he finds a strong and significant negative relationship between a fund's total expense ratio and its net performance. He does find some evidence that

investment advice expenses are associated with positive returns, but attributes this to a few outlying funds, which suggests that investors are not ultimately rewarded for money spent on investment advisory expenses. In the conclusion Malkiel holds that funds have tended to underperform the market both before and after all reported expenses (except loads). Malkiel documents the persistence phenomenon, but notes that it is likely the result of survivorship bias and may not be robust. He concludes that his findings do not provide any reason to abandon the efficient market hypothesis.

Brown, S. and W. Goetzmann, 1995, "Performance Persistence," *The Journal of Finance*, 50, 679-698.

The major contribution of this performance persistence paper is its robust methodology and the use of a data set free of survivorship bias. The authors' analysis of fund data for the period 1976-1988 shows that 1,304 past winners are repeat winners; 1,237 past losers are repeat losers; and 1,936 funds reverse roles. Thus, a majority of funds have persistent performance. However, persistence is not found to be a result of a winning management style each year. Judging performance on an absolute basis in comparison to the S&P 500 Index, the authors report that absolute repeat winners and repeat losers follow approximately the same trend as those of relative repeat winners and losers. It is seen that performance persistence is more likely due to repeat-losers than to repeat-winners, and that poor performance is the strongest predictor of closure.

The table below shows second year returns and alphas for a portfolio strategy where equal amounts are invested in funds ranked by performance in the first year. Top-octile funds do well in the second year; while bottom octile funds do poorly. The results are not sensitive to benchmark choice. Disaggregated

results show that previous years' rankings are strong predictors of negative alphas (9 out of 12 years the bottom octile has a negative alpha) but are not necessarily good predictors of positive alphas (7 out of 12 years the top octile has a positive alpha).

Table 2.4 - Summary Statistics for Equally-Weighted Portfolios of Funds in Second Year Ranked by Total Annual Return in the First Year

	1 Worst	2	3	4	5	6	7	8 Best
Excess Return	1.48	5.23	4.41	5.51	6.48	6.53	7.22	10.17
SD	9.84	12.78	11.21	12.15	13.15	14.88	14.88	17.48
Beta	0.98	1.00	1.01	1.01	1.02	1.02	1.02	1.02
Alpha	-3.98	-0.30	-1.14	-0.01	1.04	0.99	1.65	4.64
	-1.69	-0.17	-0.76	-0.01	0.59	0.51	0.75	1.46

The implication of this paper for investors is that past patterns yield clues about which funds to avoid but do not provide strong indications about which funds will outperform their benchmark in the future. The authors call for future research to address the issues of cross-fund correlations and the persistence of poor performers.

Kahn, R. and A. Rudd, 1995, "Does Historical Performance Predict Future Performance?" *Financial Analysts Journal*, 51, 43-52.

This study uses "style analysis" to stratify funds in order to analyze funds' performance relative to a set of style indices. This contrasts with a single index model, which is used in many earlier works.

The authors employ 300 equity funds and a large sample of taxable bond funds (1983-1993) for analysis. Thirty-six month in-sample data are used to classify the funds' style, and performance

is calculated with out-of-sample data. To measure persistence, performance in the out-of-sample period is regressed against the in-sample performance. Persistence would be indicated by positive regression slope coefficients.

Results show no evidence of persistence among equity mutual funds but some evidence of persistence among fixed-income funds. The authors conclude that investors need to include information other than historical performance to select their funds for investments.

Ferson, W. and R. Schadt, 1996, "Measuring Fund Strategy and Performance in Changing Economic Conditions," *The Journal of Finance,* 51, 425-461.

In this paper the authors address the effects of incorporating informational variables in an attempt to more accurately capture the performance of managed portfolios such as mutual funds. Traditional methods of performance evaluation use unconditional expected returns in their models. However, if expected returns and risk vary over time, such an approach is likely to be unreliable.

Ferson and Schadt advocate a conditional performance model using measures that are consistent with the assumption of a semi-strong form of market efficiency. The authors modify the traditional Jensen (1968) model as well as the market timing models of Treynor and Mazuy (1966) and Henricksson and Merton (1981) to incorporate conditioning information. The conditional models allow estimation of time-varying conditional betas, as managers of active portfolios are likely to shift their bets on the market to incorporate information about changing market conditions. During up markets they are likely to increase their exposure to high beta stocks and vice-versa during down markets.

Using 67 mutual funds, over the period 1968-1990, Ferson and Schadt find that risk exposure changes in response to publicly

available information about the economy. The use of conditioning information is both statistically and economically significant. Traditional measures of performance produce results with more funds having negative Jensen's alpha than positive. In contrast, Ferson and Schadt's conditional models produce alphas that have a mean value of zero. Also, conditional market timing models remove the evidence of perverse market timing, as suggested by traditional models.

Ferson, W. and V. Warther, 1996, "Evaluating Fund Performance in a Dynamic Market," *Financial Analysts Journal*, 52, 20-28.

The authors explain that common measures of fund performance are unconditional models that use historical average returns to estimate expected performance. Like Ferson and Schadt (1996), this paper also posits that the traditional unconditional models ignore common dependencies between mutual fund betas and expected market returns.

In contrast, the conditional approach includes lagged instrument variables used to represent public information. They present an example that illustrates the efficacy of the conditional model: Assume that the market return in a bull market is 20% and 10% in a bear market. A fund manager holding the market portfolio in the bull market and cash in the bear market, will have its bull market conditional portfolio beta as 1.0, the fund's expected return as 20%, and alpha as zero. Conditional on the bear market, the beta is zero, expected return is equal to the risk-free rate (5%), and alpha is zero. The conditional model correctly evaluates the fund alpha to be zero.

As taken from the paper:

> The unconditional beta of a fund is 0.6. The fund's unconditional expected return is 0.5(0.20) + 0.5(0.05) = 0.125. The unconditional expected return of the S&P 500 is 0.5(0.20) + 0.5(0.10) = 0.15, so the fund's unconditional alpha is therefore (0.125 – 0.05) – 0.6(0.15 – 0.05) = 0.015. The unconditional approach leads to the mistaken conclusion that the manager has positive abnormal performance.

Ferson and Warther present a conditional or dynamic model which utilizes three factors: the S&P 500 Index, the lagged value of the market dividend yield, and the lagged value of the short-term Treasury yield. These additional factors account for the dynamic strategies followed by many fund managers.

Using monthly returns for 63 funds, the authors' results show that unlike the unconditional models, funds do not routinely underperform the S&P 500 Index on a risk-adjusted basis. The performance is neutral, as would be expected in an efficient market.

Gruber, M., 1996, "Another Puzzle: The Growth in Actively Managed Mutual Funds," *The Journal of Finance*, 51, 783-810.

The growth of mutual funds over the period 1974-1994 has been spectacular with an annual compounded growth rate of 22%. With over $2.1 trillion in investment as of 1994, mutual funds are the second largest financial intermediary in the United States. Equity mutual funds comprise 40% of all mutual funds and own 12.2% of all corporate equity.

Gruber offers four reasons for the popularity of mutual funds: (1) customer service, including record-keeping and the ability to

move money into and out of funds easily, (2) low trading costs, (3) diversification benefits, and (4) professional portfolio management.

It is the fourth benefit that distinguishes actively managed funds from passive index funds. Open-end funds sell at net asset value, therefore their pricing does not reflect managerial ability. However, an interesting argument is that management is priced in the long run as superior managers are likely to raise their fees for service.

Gruber uses three measures of abnormal fund performance:

$$R_{it} - R_{mt}, \tag{1}$$

$$R_{it} - R_{ft} = \alpha_i^1 + \beta_{mi}^1 (R_{mt} - R_{ft}) + e_i, \text{ and} \tag{2}$$

$$R_{it} - R_{ft} = \alpha_i^4 + \beta_{mi}^4 (R_{mt} - R_{ft}) + \beta_{si} (R_{st} - R_{lt}) + \beta_{gi} (R_{gt} - R_{vt}) + \beta_{di} (R_{dt} - R_{ft}) + e_i \tag{3}$$

where equation (1) measures the fund return relative to a market return, equation (2) measures α_i^1 as the excess return from a single index model, and equation (3) measures α_i^4 as the excess return from a four-index model. In these equations R_{it} = return for fund i, R_{mt} = market return, R_{ft} = risk-free return, R_{st} - R_{lt} = difference in return between the small cap and large cap portfolios, R_{gt} - R_{vt} = difference in return between the growth and value portfolios, and R_{dt} - R_{ft} = difference in return between the bond and risk-free portfolios.

Gruber prefers results from equation (3) as the model spans the major types of securities that are usually held by the funds. In addition, to avoid survivorship bias, the paper uses a "follow the money" approach. When a fund changes policy or merges, Gruber assumes that investors place their money in the average surviving funds.

Using a sample of 270 funds for the period 1985-1994, Gruber finds that mutual funds underperform the market by 1.94% per year. With a single index model the underperformance is 1.56%, and with the four-index model the underperformance is 0.65% per year. Non-

surviving funds underperform the market by 2.75% per year, and the average fund's expense is 1.13%. Gruber also tests index funds and finds that they have an average annualized alpha of -20.2 basis points with average expenses of 22 basis points. Finally, the paper also cites some evidence of persistence in performance.

Anderson, S., B. Coleman, D. Gropper, and H. Sunquist, 1996, "A Comparison of the Performance of Open- and Closed-end Investment Companies," *Journal of Economics and Finance*, 20, 3-11.

Reminiscent of Close (1952), Anderson, et al., investigate the impact of fund structure on return performance and related operational characteristics of open-end mutual funds versus closed-end funds. Using a series of regressions and employing a sample of matched open-end and closed-end funds for the period 1984-1993, they test several hypotheses: (1) Mutual fund turnover is greater than closed-end fund turnover; (2) Mutual fund returns are less than closed-end fund returns; and (3) Mutual fund expenses are greater than closed-end fund expenses.

The authors report that both bond and equity open-end funds have higher turnover than do respective closed-end funds. Stock mutual funds tend to outperform stock closed-end funds; whereas bond closed-end funds outperform bond mutual funds. Stock mutual funds have higher expenses than closed-end funds. In contrast, bond mutual funds exhibit lower expenses than bond closed-end funds.

Carhart, M., 1997, "On Persistence in Mutual Fund Performance," *The Journal of Finance*, 52, 57-82.

Following a brief review of earlier works on fund performance persistence, Carhart investigates the persistence issue using a sample

of equity funds (free of survivorship bias) from 1962-1993. The sample comprises 1,892 funds divided among aggressive growth, long-term growth, and growth-and-income categories. He employs two models for performance measurement: (1) the Capital Asset Pricing Model, and (2) his four-factor model involving excess returns on a market proxy and returns on factor-mimicking portfolios for size, book-to-market equity, and one-year return momentum.

Initially, portfolios of funds are formed on lagged one-year returns and performance is estimated. With the CAPM model, post-formation excess returns on the decile portfolios decrease monotonically in rank and exhibit an annualized spread of approximately 8%, compared to 24% in the ranking year. In contrast, the four-factor model explains much of the spread among portfolios (the size and momentum factors account for most of the explanation). He reports that expenses and turnover are related to performance with decile ten having higher than average expenses and turnover. It does not appear that fund size, age, or load fees account for the large spread in performance of portfolios. Thus, the strong persistence of short-run mutual fund returns is largely explained by common-factor sensitivities, expenses, and transactions costs.

The author repeats the earlier analyses using two-to-five-year returns in assorted portfolios. Over the longer periods, only top and bottom decile funds maintain their rankings more than would be expected randomly. Decile one funds have a 17% probability of remaining in decile one, and decile ten funds have a 46% probability of remaining in decile ten or disappearing. He concludes that the spread in mean return, unexplained by common factors and fees, is primarily attributable to strong underperformance by funds in decile ten. Expense ratios appear to reduce performance a little more than one-for-one, and turnover reduces performance nearly 1% for every round-trip transaction. The average load fund underperforms no-loads by approximately 80 basis points annually. There is only slight

evidence that any mutual fund managers beat the market. Although decile one funds earn back their investment costs, most funds underperform by the amount of their expenses.

Hendricks, D., J. Patel, and R. Zeckhauser, 1997, "The J-shape of Performance Persistence Given Survivorship Bias," *Review of Economics and Statistics*, 79, 161-166.

The authors discuss that social scientists must generally base their inferences on observations of non-experimental information, thereby presenting a challenge to unbiased robust inference from this data. For example, employee competition often eliminates weaker workers, leaving a survivorship bias for those remaining observations. They discuss how Brown et al. (1992) investigate the problems of survivorship bias in assessing the ability of mutual funds (with heterogeneous performance variances) to deliver superior performance. They explain that for groups with performances above the population mean, relative ranks will be positively correlated across sub-periods. Thus, considering all survivorship-biased sample groups, they contend that a spurious j-shaped relation exists between first- and second-period performances.

The authors employ a simple regression-based approach to discriminate between a j-shaped pattern of persistence performance and a monotonic persistence in performance. The method appears to be effective in the simulations conducted. They conclude that mutual funds exhibit a monotonic increasing pattern effected by true performance persistence.

Volkman, D., 1999, "Market Volatility and Perverse Timing Performance of Mutual Fund Managers," *The Journal of Financial Research*, 22, 449-470.

The author investigates fund managers' security-selection and market-timing abilities over the 1980s and performance persistence prior to and after the 1987 crash. To measure managers' selectivity and timing performance, he employs a model incorporating Carhart's (1997) four-factor model and Bhattacharya and Pfleiderer's (1983) quadratic-timing-factor model adjusted for perverse timing performance. Three measures of abnormal fund performance are utilized: Jensen's alpha, Bhattacharya and Pfleiderer's selectivity measure, and an adjusted timing model. He uses monthly net asset values, distributions, fees, loads, and goals for analysis of 332 funds (1980-1990). His findings suggest: (1) the average fund does not exhibit abnormal selectivity performance when assuming either a stationary or a nonstationary risk parameter; and (2) fund managers demonstrate significant perverse timing ability. There is negative correlation between a fund's timing and selectivity performance, which suggests that managers focus on one source of performance to the detriment of the other source. Next, three systematic factors: management compensation, size, and desired risk exposure, are tested for impact on performance. Timing performance is not different between funds with and without incentive fees. Larger funds generate higher returns via security selection, but demonstrate a lack of timing ability. Low-risk funds are more likely to shift from equities to debt in anticipation of declining markets. Lastly, the average fund manager displays no ability to accurately select undervalued investments either before or after the crash of 1987. He concludes that during periods of high volatility few funds correctly anticipate market movements, although many funds outperform the market via security selection.

Becker C., W. Ferson, D. Myers, and M. Schill, 1999, "Conditional Market Timing with Benchmark Investors," *Journal of Financial Economics,* 52, 119-148.

The authors investigate the market-timing ability of mutual funds employing models that: (1) allow the manager's payoff function to depend on excess returns over a benchmark, and (2) distinguish timing based on public information from timing based on superior information. They present a simple model of market timing wherein a manager maximizes single-period utility given a normally distributed private signal about future market returns in excess of a risk-free return. Parameters are estimated that describe the public information environment, the manager's risk aversion, and the accuracy of the fund's market-timing signal.

The authors employ two fund samples (more than 400) from *Morningstar*, which are classified according to objectives: (1) a broad sample of domestic equity funds, and (2) a sample of domestic asset allocation and balanced funds (asset allocators). The initial evidence is reminiscent of prior studies which report "negative" market timing, which makes no economic sense. Hence, they contend that an unconditional model is misspecified, which gives impetus for evaluation of their conditional market-timing model. They follow with several estimates, including an analysis of equity fund groups, asset allocation funds, and portfolio holdings. For all of these, market timing is not a significant factor. In contrast to the unconditional analysis for detecting timing which yields a "wrong" sign, the conditional market timing model removes the negative market timing, but yields no significant evidence of conditional timing. They conclude that their conditional market-timing model yields more reasonable estimates than those reported in the prior literature on market timing.

Lunde, A., A. Timmermann, and D. Blake, 1999, "The Hazards of Mutual Fund Underperformance: A Cox Regression Analysis," *Journal of Empirical Finance,* 6, 121-152.

This paper investigates the relationship between funds' conditional probability of closure and their return performance. The authors explain that the process governing fund attrition rates is important for several reasons: (1) The survivorship bias frequently encountered in the studies of mutual funds is impacted by the average life of funds and their relative performance. (2) The duration profile of funds is important for understanding the incentive environment in which fund managers operate. (3) The termination process might provide information about investor strategies related to poor performance; and (4) Temporal issues of funds closings may provide information on investor assessment of fund performance.

The paper identifies and measures the significance of various factors which influence the process by which, and rate at which, funds are terminated. The authors employ a data set containing monthly returns on a nearly complete sample of U.K. open-ended funds (unit trusts) during the period 1972-1995. The numbers of dead and surviving funds are 973 and 1402, respectively. They initially estimate the hazard and survivor functions nonparametrically. Selected statistics for the rate of fund births and deaths over the period are reported to be approximately 12% and 5%, respectively.

The authors present several reasons why funds are terminated: (1) never reaching critical mass in market capitalization, (2) merging a poorly performing fund with a similar, more successful fund in the same family, (3) merging a poorly performing fund with a similar one after mergers of two fund families, and (4) closing a poorly performing fund to improve family group

performance overall. All of these ultimately are related to fund performance, which the authors use to explain fund deaths.

They find that both peer group comparisons and risk-adjusted return comparisons show that negative performance is associated with a higher hazard rate. Since closing funds have higher persistence than funds that survive, excluding them from analysis leads to a decline in persistence estimates. Also, a fund's performance over the past three years is more significant for its closure probability than only its prior year's performance.

Indro, D., C. Jiang, M. Hu, and W. Lee, 1999, "Mutual fund Performance: Does Size Matter?," *Financial Analysts Journal*, 55, 74-87.

In light of Magellan Funds closing its doors to new subscribers in 1997, this paper explores the question: "Does size of fund have any adverse impact on the performance of a fund?"

The authors explain that added economic value can result from having the optimal amount of assets under management. Growth in assets under management can be advantageous because larger transaction volume lowers brokerage commissions. In addition, economies of scale can ultimately impact other costs such as data, research, and administrative expenses.

However, high growth may create some cost disadvantages. Trading large blocks of stocks may result in higher impact costs. Size also draws attention, thus making it difficult for a manager to exploit information asymmetries. Additionally, increased size may result in administrative complexities and may induce the manager to deviate from the fund's stated objectives.

Results from data for 683 funds (1993-1995) show that three-year returns increase as fund size increases. Larger funds have lower expense ratios and lower turnovers. Results from regression analysis yield the following: (1) Funds with higher systematic and

unsystematic risk have higher returns; (2) Fund returns are negatively correlated with expense ratios and turnover; and (3) There are diminishing marginal returns from increasing total assets under management. The authors conclude that the optimal fund size for growth, value, and blend funds is approximately $1.4 billion, $0.5 billion, and $1.9 billion, respectively.

Wermers, R., 2000, "Mutual Fund Performance: An Empirical Decomposition into Stock-Picking Talent, Style, Transactions Costs, and Expenses," *Journal of Finance*, 55, 1655-1695.

The majority of past mutual fund performance studies conclude that actively managed funds on average underperform passively managed funds. However, despite such seemingly overwhelming evidence in favor of passive indexing, investors continue to pour large amounts of money into actively managed funds. This paper asks a simple question, "Do mutual fund managers who actively trade stocks add value?"

The author uses a dataset that merges the data from CDA Investment Technologies with the CRSP database. The resulting database provides a complete record of the stock holdings for a given fund, along with turnover ratio, expense ratio, net returns, investment objective, and total net assets under management during each year of a fund's existence. This information allows fund returns to be empirically decomposed into factors attributable to: (1) skills in stock picking, (2) stock holdings, (3) trade-related costs, (4) fund expenses, and (5) differences attributable to other holdings of the fund.

The results of the study indicate that in the past 20 years, growth funds have become the most popular segment of the mutual fund universe and that trading activity in funds doubled from 1975 to 1994. However, the annual trading costs (per dollar invested in

mutual funds) in 1994 is one-third their 1975 level. In contrast, the average expense ratio in 1994 is somewhat higher than in 1975.

The author reports that mutual funds on average hold stocks that outperform the market index by 130 basis points per year. This amount roughly equals the expenses and transactions costs combined. On average, funds choose stocks that outperform characteristic benchmarks by 71 basis points per year, but the average net fund return is 100 basis points lower than the CRSP index. Of the 2.3% difference between the return on stock holdings to the net return, about 0.7% is attributable to lower average returns for the non-stock holdings component of the portfolio. The remaining 1.6% is split between expense ratios and transactions costs. High-turnover funds incur significant transactions costs and higher expense ratios, but also hold stocks that have significantly higher average returns than do low-turnover funds. A portion of the higher returns for the high-turnover funds comes from the stock picking skills of the manager. The author concludes that actively managed funds outperform the Vanguard 500 Index on a net return basis.

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