

THE SIZE OF MUTUAL FUNDS AND RISK-ADJUSTED PERFORMANCE: SOME NEW EVIDENCE

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ABSTRACT

This paper provides recent evidence regarding the relationship between mutual fund size and risk-adjusted performance. A sample of 64 no-load funds was grouped into four size quartiles based on the total assets under administration at the beginning of each year for the 1970-1984 period. Standard measures of portfolio performance were then computed for each quartile. Consistent with a size effect, the results of this study provide some evidence of higher returns for smaller mutual funds. However, the abnormal returns are not statistically significant when performance is evaluated using Jensen's Index.

I. INTRODUCTION

The relationship between the size of mutual funds and their performance has drawn considerable attention in the popular business press recently [1]. The empirical evidence compiled by Perritt (1985) suggests that on a non-risk-adjusted basis, smaller mutual funds have greater returns than larger funds. In accordance with this belief, a number of mutual fund managers have closed their funds to new assets to keep their funds from becoming "too big." Investment theory suggests that smaller funds may yield superior returns than larger funds due to a number of factors. First, larger funds which hold widely distributed assets (i.e., those who "buy the market") are relegated to returns paralleling the overall return on the market portfolio. Second, since larger funds generally possess significant holdings of individual securities, the disposal of these securities could adversely affect share prices. Finally, small funds may be in a better position to purchase small capitalization securities which Banz (1981) and Rein-ganum (1981) have shown to yield ab-

normal risk-adjusted returns. On the other hand, defenders of larger funds argue that their size buys superior management and research. Furthermore, large fund proponents suggest that small funds remain small simply because they are inferior performers. Finally, it may be argued that smaller funds generally have higher total risk due to their lower levels of diversification.

The purpose of this paper is to re-examine whether the risk-adjusted investment performance of mutual funds is related to their total assets under administration. Previous empirical studies of this issue are confined to time periods ending in the 1960's. For example, two such studies-Sharpe (1965) and Carlson (1970)-found no relationship between the size of mutual funds and risk-adjusted performance as measured by Sharpe's Performance Index. Ideally, however, a performance measure should take into consideration the usefulness of a mutual fund in a portfolio context. Therefore, an evaluation

of mutual fund performance should also include Jensen's (1968) Abnormal Performance Index (alpha), which represents the additional return on a fund above that required by investors given the fund's contribution to the risk of a diversified portfolio. In contrast to Sharpe's and Carlson's studies, which consisted largely of load funds, this paper utilizes a sample of no-load funds with complete data for the 1970-1984 time period. Furthermore, this study uses Jensen's Abnormal Performance Index to evaluate the risk-adjusted performance of mutual funds.

The remainder of this paper is organized as follows: Section II outlines the data and empirical methodology. Section III discusses the empirical results. Finally, Section IV presents the summary and conclusions.

II. DATA AND METHODOLOGY

The following general research design employed by Basu (1977) was used to examine the relationship between the size and investment performance of mutual funds. For each time period under consideration, four portfolios consisting of mutual funds with similar total assets under administration are formed. The risk-return characteristics of these portfolios are compared and their performance is evaluated in terms of standard measures.

The sample for this study consists of 64 no-load mutual funds with complete annual observations for the entire 15 year time period, 1970-1984. Net asset value, dividend, and capital gain information for the 64 funds was obtained from the Weisenberger Investment Company Service. The return for each fund was computed as follows:

$$R(j,t) = [\text{NAV}(j,t+1) - \text{NAV}(j,t) + D(j,t) + \text{CG}(j,t)] / \text{NAV}(j,t) \quad (1)$$

where:

$R(j,t)$ is the total return for fund j

during year t ;

$\text{NAV}(j,t)$ is the net asset value of fund j at the beginning of year t ;

$D(j,t)$ is the dividend distribution for fund j during time t ;

$\text{CG}(j,t)$ is the capital gain distribution for fund j during time t .

Starting with 1970, we collected the total assets under administration at the beginning of the year for each fund from Weisenberger's Investment Company Service. We then ranked the funds by total assets figures and grouped them into four quartiles [2]. At the beginning of each subsequent year, the groupings were readjusted to reflect changes in the sizes of the mutual funds giving 15 years (1970-1984) of return data for each of the quartiles. The annual returns for each of the quartiles were computed by assuming an equal investment in each of their respective funds and then a buy and hold policy for the remainder of the year.

If the capital markets are dominated by risk-averse investors and a risk premium is incorporated into portfolios returns, then the appropriate measure of mutual fund performance should incorporate both risk and return. As a product of the research on the capital asset pricing model, three composite portfolio measures have been developed to aid in examining the historical risk-return performance of mutual funds [3]. The Sharpe performance index indicates the risk premium per unit of total risk and is computed as:

$$S_p = [R(p) - R(f)] / SD(p) \quad (2)$$

where:

$S(p)$ is the Sharpe performance index for portfolio p ;

$R(p)$ is the average return on portfolio p ;

$R(f)$ is the average risk-free rate as measured by the return on 30 day T-Bills; and

$SD(p)$ is the standard deviation of returns on portfolio p .

The Sharpe measure includes both diversifiable and nondiversifiable risk in the denominator.

The Treynor index [T(p)] is calculated in a similar manner except that only the non-diversifiable risk as measured by beta is used, i.e., [4]:

$$T(p) = [R(p) - R(f)] / \beta(p) \quad (3)$$

Like the Sharpe measure, the Treynor index is a relative measure which must be compared with the values of other portfolios and an aggregate market index in order to determine relative performance rankings.

In contrast to the Sharpe and Treynor measures, the Jensen differential performance index enables one to determine whether the abnormal returns are statistically significant. Jensen developed the concept of abnormal return (or alpha) which is estimated by regressing the excess returns of the portfolio on the excess returns of the market:

$$\frac{[R(p,t) - R(f,t)]}{[R(m,t) - R(f,t)]} = \alpha(p) + \beta(p) + e(p,t) \quad (4)$$

where:

$\beta(p)$ is the beta coefficient measuring the covariability of portfolio returns with the market returns;

$R(m,t)$ is the average return on the market portfolio as measured by the return on the S&P 500 Index;

$e(p,t)$ is the random error term; and the other variables are as previously defined.

A statistically significant positive value for $\alpha(p)$ can be viewed as evidence of superior risk-adjusted investment performance, whereas a significant negative value is indicative of inferior performance.

III. EMPIRICAL RESULTS

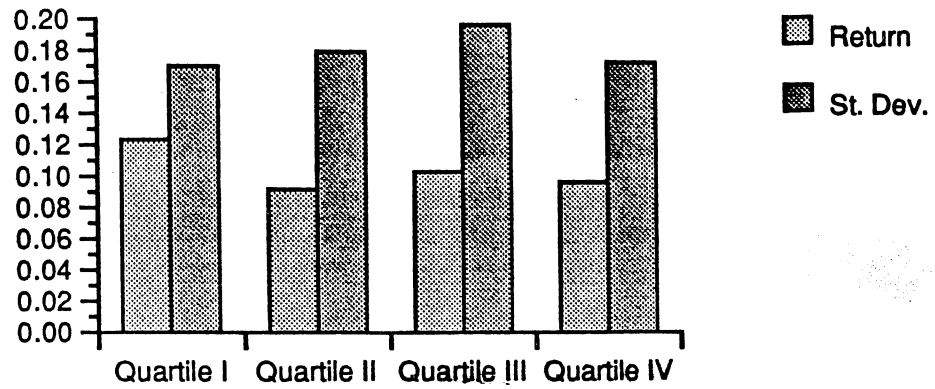
The mean return, standard deviation,

beta, coefficient of determination, and the Sharpe, Treynor, and Jensen performance measures are computed for each of the four quartiles (1=smallest, 2, 3, and 4=largest). The results are given in Table I. As suggested by Perritt (1985), the mean return for mutual funds appears to be negatively associated with the total assets under administration. The lowest size quartile has the highest mean return (.131), whereas the highest size quartile has the smallest mean return (.0893). However, both measures of risk-standard deviation and beta-also appear to be negatively related to the size of the mutual funds. Quartile I has the highest levels of total risk (standard deviation) and non-diversifiable risk (beta), whereas quartile III has the smallest values for these variables. In addition, the level of diversification can be measured by computing the coefficient of determination (R squared) between the returns for an individual quartile and the returns on the market portfolio. As indicated in Table I, there seems to be a direct relationship between the size of the quartile and the level of diversification. The smallest quartile has the lowest degree of diversification, whereas the largest quartile has the highest.

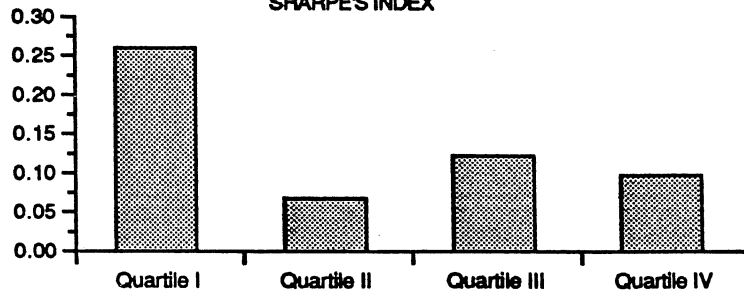
It is also useful to analyze the returns and risk measures for each quartile in comparison to those for the market. Both quartiles I and II have higher mean returns than the S&P 500. On the other hand, the returns of quartiles III and IV are less than those of the market portfolio. All four quartiles have higher levels of total risk (standard deviation) than the overall market. However, only quartile I has a beta greater than the market portfolio.

Table I indicates that there is an indirect relationship between fund size and each of the three measures of composite portfolio performance. In accordance with the findings of Shawky (1982), the three measures give equivalent rankings, that is, the results

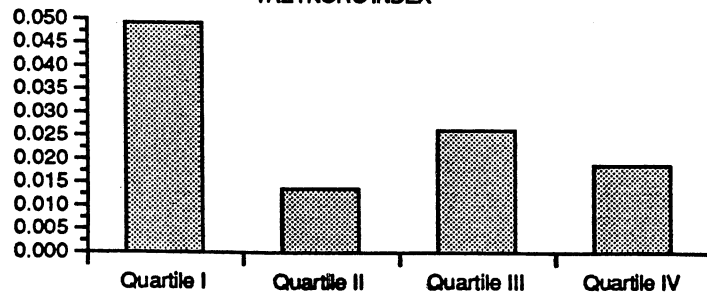
RETURNS & STANDARD DEVIATIONS OF THE QUARTILES



SHARPE'S INDEX



TREYNORS INDEX



JENSENS ABNORMAL PERFORMANCE INDEX

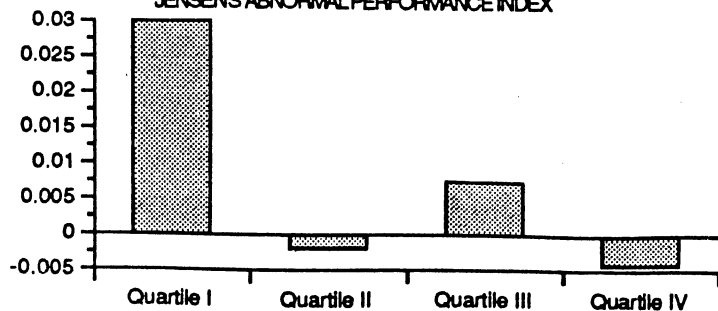


TABLE I
THE INVESTMENT PERFORMANCE OF
NO-LOAD MUTUAL FUNDS
1970 - 1984 ANNUAL DATA

	<u>Quartile</u>			
	(Smallest) I	II	III	(Largest) IV
Mean Return	.131	.112	.0952	.0893
Standard Deviation	.2274	.2166	.1961	.1980
Beta	1.038	.984	.968	.997
Jensen's Index (t in parenthesis)	.0351 (.6245)	.0230 (.5816)	.0003 (.0112)	-.0079 (-.3121)
R squared	.8540	.8424	.9162	.9458
Sharpe's Index	.2291	.1602	.0831	.0520
Treynor's Index	.0502	.0353	.0168	.0103

Market

Return	.1017
Stand. Dev.	.1775

of the Sharpe and Treynor performance indices are similar to the Jensen differential performance measure. In each instance, quartile I has the best risk-adjusted investment performance and quartile IV has the worst. However, for each quartile Jensen's alpha is not statistically different from zero. This indicates that none of the quartiles offer risk-adjusted returns significantly different from those of the market portfolio. Thus, on average, an investor would not be able to utilize information on mutual fund size to achieve superior portfolio performance [5]. Therefore, the results of this paper are consistent with the previous empirical findings of Jensen (1968) and Shawky (1982), among others.

IV. SUMMARY AND CONCLUSIONS

This paper has re-examined the relationship between mutual fund size and risk-adjusted investment perfor-

mance. A sample of 64 no-load mutual funds was divided into four quartiles on the basis of total assets under administration at the beginning of each year. Standard measures of composite portfolio performance were computed for each quartile. The results of this study indicate that smaller mutual funds have higher mean returns, but also higher levels of risk. In addition, smaller funds appear to be less well diversified. Although the results provide some indication of higher risk-adjusted returns for smaller mutual funds, the abnormal returns are not statistically significant. Thus, it does not appear that an investor could outperform the market using information on the size of mutual funds.

FOOTNOTES

1. See, for example, Weiss (1985).
2. Although the construction of four portfolios is arbitrary, this number

represents a balance between obtaining as large a spread in the total assets under administration as possible and a reasonable number of mutual funds in each portfolio.

3. These composite measures of portfolio performance are not without problems. Roll (1978) has argued that the theoretical market portfolio should contain all risky assets in the economy. Therefore, the choice of inefficient benchmark indices, such as the S & P 500, may lead to ambiguous performance measurement results.
4. The Treynor measure implicitly assumes that portfolios are completely diversified so that systematic risk is the relevant measure of risk. If a portfolio is completely diversified, the Sharpe and Treynor measures should give identical rankings.
5. A number of researchers, including Brown and Warner (1980) and Murphy (1977), have illustrated the difficulty in detecting superior investment performance using Jensen's Abnormal Performance Index due to variability in the return series.

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