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ABSTRACT

This paper examines the mutual fund market as a market for the sale of management services using an unbalanced panel of 860 US equity funds over the 1976-1993 period. From among the performance measures for which investors have the necessary information to compute, we find that the Jensen measure best explains the change in market shares over time. It is found, however, that investors actually value the systematic component of risk more than indicated by the use of Jensen's performance measure. Our results also suggest that investors in load funds are less responsive to both components of performance (risk and return) than are investors in no-load funds. Investors, moreover, value recent past performance differently for funds with different attributes. An important result of the paper relating to the incentives provided with the widely used fixed-fee compensation schemes is that past fund performance influences individual investment decisions and hence future net asset values of funds, implying strong incentives for managers to increase their performance and by doing so, their compensation.

Management Compensation and the Performance of Mutual Funds

Driven by the boom in retirement savings, mutual funds now hold record assets of $3.1 trillion, exceeding bank deposits in the U.S. as well as the gross domestic products of Britain and Canada. Of this sum, about $1.47 trillion represents investment in U.S. equities with 83% of the stock investment being made during the past five years. As the baby boomer generation ages and their disposable income continues to increase, the size of their investment in mutual funds is also expected to grow. Along with this explosion of capital being invested in the industry, almost unnoticed has been the sizeable management fees which are being taken out on an annual basis. Conservatively, management fees at 1% of net asset value would extract more than $30 billion each year from the value of the unitholders' investment.

Why hasn't this sum attracted more attention in both the finance literature and among investors? From the standpoint of investors, one reason they appear unconcerned with the size of this massive transfer payment may be that the S&P 500 composite index rose an average of 15.3% per year on a pre-tax basis over the last 10 years so that management fees have been dwarfed by comparison to the capital gains and dividends which investors realized. In the academic literature, the void of papers examining the structure of management fees has been filled with papers focussing on performance measurement[2], the persistence of that performance over

[2] See Lehmann & Modest (1987); Grinblatt & Titman (1993); and Ferson & Schadt (1996), among others.

time[3] and tests of whether or not fund managers cover their fees[4].

Little work has been directed toward looking at the incentive effects associated with this immense transfer of wealth annually from unitholders to managers even though alternative performance-based remuneration schemes are possible[5]. The exceptions include the work by Berkowitz & Kotowitz (1993) who show that the strong link between historical performance and fund market share provides Canadian equity fund managers with substantial monetary incentives which may explain why more fund managers have not chosen performance-based remuneration schemes over the widely accepted asset-based remuneration mechanisms. In a related paper that focuses on the agency conflict between investors and fund managers, Chevalier and Ellison (1995) find mutual fund managers alter their investment portfolios by taking on greater risk over the latter third of the year in a manner consistent with their incentives. Using a tournament framework that compares funds on the basis of their relative performance, Brown, Harlow & Starks (1996) find a result similar to Chevalier and Ellison, i.e., fund managers likely to end up losers manipulate fund risk differently from those fund managers likely to end up winners.

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[3] Goetzmann & Ibbotson (1991); Brown, Goetzmann, Ibbotsman & Ross (1992); Hendricks, Patel & Zeckhauser (1993); Shukla & Trzcinska (1994); Elton, Gruber & Blake (1995); and Christopherson, Ferson & Glassman (1995), Carhart (1997) among others.

[4] Ippolito (1989); Elton, Gruber, Das & Hlavka (1993); and Malkiel (1995), among others.

[5] Section 205 of the Investment Advisers Act of 1940 permits performance fee contracts and requires that compensation paid under a performance fee contract must increase and decrease proportionately with the investment fund under management in relation to the investment record of an appropriate index of security prices or other measure of investment performance as the Commission may specify. According to Carole Gould (**New York Times**, October 24, 1993), Lipper Analytical Services listed only 59 of 3682 existing mutual funds at the time that charged management fees based upon contingent performance. As of February 1994, Morningstar identified for us 68 funds that used performance-based remuneration schemes. This is in sharp contrast from the boom times of the late 1960's and early 1970's when performance-based fees were much more popular. Gould suggests that the evolution toward flat fees was given impetus by legislation in 1970 that mandated "fulcrum" fees. Prior to this ruling, fund managers could be rewarded for superior performance without an offsetting decline in income when performance lagged.

In his presidential address to the American Finance Association, Martin Gruber (1996) raised a question about the way in which open ended mutual funds are priced. Unlike Gruber, our approach to the question of mutual fund pricing is to view the mutual fund market as a market for the sale of portfolio management services. In this respect, the market is similar to the sale of other professional services, such as medical or legal services. A common feature among these services is that buyers are generally less informed than sellers[6], leading to potentially serious moral hazard and adverse selection problems. In the case of medical and legal services, these problems are partially resolved by regulations setting qualifications for entry, minimum standards of service and adjudication processes.

These regulations are largely absent in the case of mutual funds, where controls are typically directed toward preventing the misappropriation of entrusted money and to rules of disclosure. An alternative solution is to design a contract that perfectly aligns the interests of managers and unitholders. The problem with doing so is the lack of agreement between parties regarding the acceptable criteria for evaluation. Moreover, while some signalling is associated with the form of the existing contract, most management contracts are fairly standard. Managers receive a fee for their services which includes expenses incurred (e.g. research, trading, administrative, etc.) as well as selling expenses (e.g. advertising, sales commissions (load and 12b-1), etc.). Hence, there is little flexibility for signalling quality.

The market for management services is mainly disciplined by competition among the many

[6] For most consumer goods, buyers are generally less informed than sellers. What distinguishes services from other consumer goods is that the purchaser of a service is unable to examine the good prior to its purchase. Although examination of a good prior to its purchase does not eliminate the moral hazard and adverse selection problems, not being able to observe the good attenuates these problems.

sellers of such services. The question which arises is whether, in the face of relative consumer ignorance, which generates considerable perceived product differentiation, such competition is sufficient to insure efficiency. That is, will competition among sellers align the incentives of managers and unitholders so as to insure both the appropriate effort and risk-taking on the part of managers? Moreover, does this competition result in competitive prices (fees) for management services?

The source of the differentiation between funds can be found in both the objective and subjective characteristics of funds. The objective characteristics include differences in managerial style, risk, ability of managers and differences in consumer tastes for risk, etc. On the other hand, the subjective characteristics are associated with a general lack of knowledge by consumers. That is, consumers are unable to distinguish between managerial characteristics due to a large element of firm specific randomness.

As in other differentiated services, the main source of market discipline arises through reputation. Consumers make their investment choice according to the reputation of the managers. This is reflected in past performance as well as by word of mouth, advertising and broker recommendations, which in turn are also partly reflected in past performance.

The question is, in the presence of these market imperfections, is competition strong enough to generate the appropriate incentives for managers to supply the desired quality at competitive prices? To answer this question, we need to estimate the demand for individual funds. Using these results we can then investigate the incentives to perform in the unitholder's interests.

Our study differs from other work in the following ways. First, we model demand for individual funds on the basis of an explicit consumer choice model which has been found to be very useful in modelling the demand for differentiated products using public information available at the decision time. Second, we explicitly test and evaluate alternative measures of performance from among those available to consumers, to see how consumers evaluate risk. Third, we examine the rationality of consumer choices. Finally, we employ an extensive data base that allows the analysis to take advantage of panel procedures.

The paper is organized as follows. Section 1 describes the underlying consumer choice model while Section 2 evaluates alternative performance criteria. Section 3 describes the data used in the study. Section 4 presents the empirical results. Section 5 examines whether investors are acting rationally when they base their decision on past performance. Section 6 examines the specific incentive properties of asset-based mechanisms. Finally, Section 7 is by way of summary.

1.0 The Consumer Choice Model

A random effects consumer choice model à la McFadden (1974) is used to estimate the demand for individual mutual funds. This consumer choice approach has been widely used in the past to develop models used to estimate the demand for a variety of consumer related services such as transportation and energy as well as for brand choice modelling.

We assume that investors choose between alternative mutual funds on the basis of their expected performance.[7] We further assume that investors' expectations of future performance are a function of past relative performance and other variables like advertising, managerial changes,

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[7] A discussion of performance measurement is deferred to Section 2.0

etc. that are in the public domain. Investors are also assumed to form their expectations of future performance on the basis of private information received by each investor and which is not available to other investors. For simplicity we assume that these private messages are random and uncorrelated with the publicly available information.

Formally, let U_{ijt} be investor i's expectation of the performance of fund j in period t where

$$U_{ijt} = EV_{jt} + \mu_{ikt} + \epsilon_{ijt} \tag{1}$$

with EV_{jt} being the component of expected performance which is the same for all investors. The investor-specific variables are represented by μ_{ikt} and ϵ_{ijt}. μ_{ikt} represents the unobserved component of expected performance associated with investor i's information about the k-th available investment class (e.g., bonds, stocks, mutual funds, etc.) and ϵ_{ijt} is the unobserved component of expected performance associated with investor i's information about the j-th mutual fund. We assume that ϵ_{ijt} is iid extreme value distributed each period as is ($\mu_{ikt}+\epsilon_{ijt}$). We further assume that expectations of future performance are based upon past performance.

In order to impose minimum restrictions on the nature of expectations, it is assumed that expectations are generated by an autoregressive moving average process (ARMA) of order p,q.[8] Specifically, let

$$EV_{jt} = \sum_{l=1}^{q} b_l x_{jt-l} + \sum_{l=1}^{p} \lambda_l EV_{jt-l} + \xi_{jt} + \gamma_j \tag{2}$$

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[8] See Harvey (1990) for a discussion of the rationale for the use of ARMA processes.

where x_{jt-l} represents the performance of fund j in t-l; ξ_{jt} is the information about fund j in period t which is the same for all investors (e.g. advertising) and γ_j refers to the information about fund j which is constant across investors as well as time (e.g. load). Investors choose simultaneously whether to invest in equity mutual funds and if so, which fund(s) to invest in to maximize expected performance.

It follows that the market share of fund j in period t, given that the investor chooses to invest in mutual funds[9], is:

$$M_{jt/k} = \frac{e^{EV_{jt}}}{\sum_{n=1}^{N_{kt}} e^{EV_{nt}}} \qquad \textbf{(3)}$$

where N_{kt} is the number of alternatives (funds) available in investment class k in period t.[10] Taking

the logarithm of (3),

$$Ln(M_{jt/k}) = EV_{jt} - Ln[\sum_{n=1}^{N_{kt}} e^{EV_{nt}}] \qquad \textbf{(4)}$$

and for any t-l period

$$Ln(M_{jt-l/k}) = EV_{jt-l} - Ln[\sum_{n=1}^{N_{kt}} e^{EV_{nt-l}}] \qquad \textbf{(5)}$$

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9 Refer to McFadden (1974) for the derivation of market shares when the errors are distributed according to an extreme value distribution.

10 Although our sample is representative of the Morningstar equity fund sample, it should be recognized that N_{kt} should be the total population of equity funds available to investors. This introduces an additional error in the estimated market shares.

Substituting (5) into (2) and then the revised (2) into (4), we obtain the following fixed effects equation:

$$Ln(M_{jt/k}) = Q_t + \sum_{l=1}^{p} \lambda_l Ln(M_{jt-l/k}) + \sum_{l=1}^{q} b_l x_{jt-l} + \xi_{jt} + \gamma_j \qquad \textbf{(6)}$$

where $Q_t = \sum_{l=1}^{p} \lambda_l Ln[\sum_{n=1}^{N_{kt}} e^{EV_{nt-l}}] - Ln[\sum_{n=1}^{N_{kt}} e^{EV_{nt}}]$.

Equation (6) is the basic market share estimation equation with time dummies substituted for the unobservable Q_t. Because we would like to test for the presence of non-linearities in the performance variable as well as for the possibility that the b_l coefficients may vary across funds and

not be constant as expressed in (6), we use the following equation for our empirical estimation of the model:

$$Ln(M_{jt/k}) = Q_t + \sum_{l=1}^{p} \lambda_l Ln(M_{jt-l/k}) + \sum_{l=1}^{q} b_l x_{jt-l}[1 + \sum_{k=1}^{m} \delta_k A_{kj}] + \sum_{l=1}^{q} c_l x^2_{jt-l} + \xi_{jt} + \gamma_j \qquad \textbf{(7)}$$

We examine the hypothesis that the b_l coefficients are functions of specific fund attributes by crossing the b_l with m alternative fund characteristics (A_{kj}). This introduces a non-linearity in the coefficients so that OLS can no longer be used. Instead, we adopt a non-linear estimation technique to jointly estimate the coefficients of the lagged performance variables (b_ls) and the coefficient of each attribute, δ_k. Furthermore, there are reasons to believe that investors respond to past performance in a non-linear fashion, giving higher weights to extreme performances, possibly because of increased publicity. Funds are more likely to heavily advertize superior performance and avoid advertizing poor performance. The financial press, moreover, tends to highlight extreme performances at either end of the spectrum. Consequently, the nature of the non-linearity is likely to vary for positive and negative performance.[11]

2.0 The Evaluation of Performance

Performance evaluation for the sophisticated investor suffers a number of problems. The correct relationship between risk and return remains unresolved as do questions regarding the correct measure of risk to use and how to account for shifting parameters of the performance measure when portfolios are actively managed. While various studies have analyzed the components of investment performance[12], most investors in mutual funds lack the required information to determine the components of these measures and therefore do not use this information to determine their allocation of resources to alternative funds.[13]

The information typically provided by the media are holding period returns over 3-month through 10-year periods, most recent risk measures (e.g. standard deviation of returns and beta) and comparative benchmarks such as the return on the S&P 500. One of objectives of this paper is to identify the available information actually used by individuals investing in mutual funds.

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[11] As well, survivorship bias affects funds with poor results, but not those funds with good results, eliminating poor funds from the sample and possibly weakening the non-linearity at the bottom of the performance scale.

[12] See, for example, Fama (1972) and Moses, Cheyney and Veit (1987). Reilly (1989), moreover, has shown that the rank correlation coefficients among alternative measures are all above .900 when measured over a specific common, constant time period. We find that the correlation among alternative performance measures, on a moving basis over time varies with the performance measure. Over the sample period 1976-93, Table 3 shows that the Sharpe and Treynor measures have a correlation of .99 or higher, depending upon the objective of the fund. However, the Jensen measure has a much lower correlation with the Sharpe measure, depending upon the fund objective, ranging from .38 for Growth & Income funds to .61 for Small Company Growth funds.

[13] Investors who are assessing their investment portfolios make decisions to buy or hold alternative funds in their choice sets based upon their expectations of the future performance of the available funds. These expectations are revised over time with the addition of new information so that a moving average performance measure must be used to represent this process. This is in contrast to usual performance evaluation which is based upon **ex post** measurement over a constant period of time.

Initially, the optimal lag structure must be determined for the model specified in (6). Consistent with the view of limited available information considered by the typical investor in mutual funds, we have chosen for this purpose to measure fund performance using the Jensen (1968) performance measure (alpha), i.e., $R_{it} - R_{ft} - \beta_{it}(R_{Mt}-R_{ft})$ where R_{it} is the return on fund i in quarter t, R_{ft} is the risk-free rate of return in t measured by the 90-day T-Bill rate, R_{Mt} is the market rate of return as measured by the return on the S&P 500 over the quarter and β_{it} is the systematic risk of fund i in quarter t. If our hypotheses about investor behavior is correct, the results of this study should provide some insight into the way mutual fund investors evaluate risk, regardless of the theoretical justification for such evaluation.

3.0 Description of Data

The sample of mutual funds used in this study was derived from two sources. The Morningstar (June 1994) OnDisk provided monthly return data on 3439 U.S. funds over the period January 1976 - December 1993. Quarterly net asset values funds were obtained from Lipper Analytical Securities for 1551 equity funds over the period January 1981 - December 1993. The focus of the study was limited to U.S. equity funds so that we constructed a merged data base consisting of aggressive growth, growth, growth and income, small company growth and equity-income funds common to both the Morningstar and Lipper data bases. This resulted in an unbalanced panel consisting of 860 funds. Table 1 describes the representativeness of the sample. When compared to the overall sample of 1174 U.S. equity firms in the Morningstar database, our sub-sample is very similar with respect to size distribution, load, tenure of manager and age of fund, but somewhat more heavily weighted toward growth funds with a commensurate underweighting of those funds with an equity income objective.

4.0 Empirical Results

In order to determine the optimal lag structure for the general model specified in (6), alternative lag structures were run for both the exogenous and endogenous variables using the fixed coefficient model with and without time dummy variables to denote the quarter. The Schwarz Criteria[14] was used to determine the order of the ARMA process identified in equation (6). The criteria uses Bayesian arguments for choosing the most likely posterior model. The optimal lag structure is the one that minimizes the value of the criteria. The results shown in Table 2 suggest that for lagged exogenous variables (i.e., performance) in the range of 4-10 lags, the Schwarz Criteria reaches a minimum with three lagged endogenous variables (i.e., historic market shares) and changes little thereafter. Over all lagged exogenous variables, given three lagged endogenous variables, moreover, the Schwarz Criteria reaches a minimum with 8 lags with little change thereafter. Hence, we chose to work with a specification of 8 lagged exogenous and 3 lagged endogenous variables.

Since the focus of this paper is on the effect of past performance on managerial compensation, we examined the future effect of a one-time-only increase in performance on the

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[14] Refer to Judge, et al (1985). The Schwarz Criteria, SC(k), is defined as:

$$SC(k) = Ln\ \sigma_k^2 + \frac{k\ \ln T}{T}$$

where T is the number of observations, k is the number of lags and σ_k^2 is the variance of the residuals. Strictly speaking, the Schwarz criteria does not apply to the case of panel data. However, because our model employs time dummies, model specification testing using the Schwarz criteria is reasonable.

change in market share for 1-3 lagged endogenous variables given 4 and 8 lags in the exogenous variables. Figure 1 presents the graphs based upon 4 lagged exogenous variables while Figure 2 is based upon 8 lagged exogenous variables. Each graph shows that the change in future market shares is quite similar for the one time increase in performance regardless of the assumed lag in the endogenous variable. With 4 lagged exogenous variables, market share increases at an increasing rate each quarter for the first year and then increases but at a decreasing rate during the ensuing periods. For 8 exogenous variables, there is an additional spurt in market share in each quarter of the second year followed by increases at a decreasing rate thereafter.

The basic results of equation (6) are presented in columns 1 and 2 of Table 4. By all the usual criteria the results are highly significant and support the model. Past performance over the preceding 8 quarters affects market shares in a consistent manner, with heavier weights accorded the more recent year. A very strong pattern of persistence is apparent, though the results are clearly statistically different from unit root.[15] In terms of our expectations model, expectations of future performance appear to be based upon past performance with increasing weights over the last 8 quarters and decreasing thereafter.

The high degree of persistence suggests that expectations are revised very slowly. This is consistent with the fact that, due to a large degree of individual fund performance variance, the information contained in any quarterly performance measure is very noisy and must be heavily discounted, leading to expectations being revised gradually over time. The existence of

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[15] There is no test for unit root in panel data. However, is we use the test statistics provided by Fuller (1976) treating our data as if they came from a single time series sample, the unit root hypothesis is rejected at the 1% level.

transactions costs will tend to reinforce this effect.[16] As investors tend to hold funds for a relatively long period, they use past performance information to forecast **long term** performance of funds and hence discount short-term variations.

Columns 3-9 examine the non-linearity hypotheses specified in equation (7). Column 3 shows the basic model appended by squared performance terms, separated for positive and negative values of alpha. The results showed consistent positive non-linear effects for the last 4 quarters for positive alphas, but no systematic pattern for the next 4 quarters of positive performance, or for negative performance over all 8 quarters. Hence, we present only the results for the first 4 quarters.

It is clear that positive performance affects market share in a non-linear fashion. These results are consistent with those of Chevalier & Ellison (1995). However, in contrast to Chevalier & Ellison, we fail to find a non-linear effect of negative performance.[17] The significance of the non-linear effect associated with positive performance supports the hypothesis that heavy advertizing associated with positive performance increases investors' responses to these very positive performance levels. At the same time, the absence of a non-linear effect for the poor performers supports the hypothesis that funds tend to not advertize their failures.

These non-linearities also lead to incentives for excessive fund-specific risk taking on the

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[16] Transactions costs which discourage switching funds involve front-end and back-end loads, as well as the costs of continuously monitoring and evaluating one's investment portfolio. These informational costs can be very high for unsophisticated investors.

[17] As suggested before, the lack of a non-linear response to negative results may be due to survivorship bias. However, Chevalier & Ellison's study also suffers from such bias. It is possible that the differences are due to Chevalier & Ellison's use of annual data rather than quarterly data and their failure to account for risk in their performance evaluation.

part of risk neutral (or only slightly risk averse) managers. Note, however, that such incentives are related to the alphas and therefore apply only to risks which are uncorrelated with the market.

The basic model does not allow for differences among funds, except for those affecting the constant terms which are absorbed by the fixed effects. However, there are reasons to believe that the effects of past performance on market share may differ across funds in a systematic way. Columns 4-6 in Table 4 show the effects of two fund attributes (load and size) which had a significant effect on the performance coefficients within the linear specification while columns 7-9 present the results for the non-linear specification.[18] Focussing on the non-linear models because of their greater level of explanation, the results suggest that fund size tends to increase the sensitivity of market share to past performance in a non-linear way. The market share of large funds with assets in excess of $1.5 billion at the end of 1993 was significantly more responsive to past performance than was smaller funds.[19] We believe that this is due to the fact that large funds are more widely known by investors and their performance is much more extensively publicized, whether by the financial press or due to their own advertizing.

We also find a significant difference in investor responses to the past performance of load and no-load funds. Load funds are significantly less sensitive to past performance. This is probably because investors in load funds are more likely to rely on the advice of financial planners and brokers, who tend to benefit from directing investors to load funds. Such investors are likely

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[18] Other fund attributes (e.g., tenure of manager as of December 1993, management company and objective of the fund) were also examined with none of these variables exhibiting significant additional explanatory power. We also examined the effect of excluding funds with minimum initial investments of at least $25,000 and funds less than two years of age as did Chevalier & Ellison (1995), but unlike these authors, we found our results robust to the inclusion of these funds.

[19] We tested different cutoff levels for fund size as well as a linear effect. The effects were generally present for various specifications, but were best for the division reported.

to be less informed and possibly more risk averse than better informed investors.[20] As a consequence, they are less responsive to past performance in their fund choice.[21]

An alternative argument suggests that loads are likely to increase investor inertia, i.e. investors in load funds invest for a longer time horizon than those investing in no-load funds. To examine this proposition we tested for differences between the persistence coefficients for load and no-load funds. While the results are consistent with this hypothesis, they are largely insignificant. There is no significant differences in persistence between the two types of investments. All investor types appear to invest for the long haul.

The issue of the "correct" measure of performance bedevils much of the theoretical and empirical literature. The problem involves first, the nature of the valuation and the relevant components of risk which are appropriate for discounting raw returns and second, the relationship between **ex ante** evaluation of risk and **ex post** measures. In the choice of measures, we have concentrated on relatively simple measures based upon information which is generally available to investors. In particular we compare the following measures and their components: raw returns, the Jensen measure (alpha), the Treynor measure and the Sharpe measure.[22]

In contrast to most empirical studies which evaluate **ex post** performance using a measure of variance or beta calculated over the entire **ex post** period, we focus on the **ex ante** evaluation

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[20] See further discussion of this issue in the next section.

[21] There is an argument that financial advisers may cause excessive movement between funds in order to benefit from new sales commissions. However, the existence of trailer fees and long-term client relationships reduce this incentive. Our evidence clearly does not support this argument.

[22] Fama (1972) has suggested a finer breakdown of overall performance into the return for selectivity and the return for undertaking risk. Moses, Cheney and Veit (1987), moreover, have also developed a portfolio measure that differentiates between selection, diversification and timing ability. Reilly (1989) shows that the rank correlation coefficients among alternative measures are all above 0.900.

of risk based upon the information available at the time. Thus, we use a time varying measure of beta (or variance) for each fund estimated over the prior 36 month period. As can be seen from Figure 3, these estimates of beta vary considerably over the period, from an average high of 1.14 in 92:4 to a low of .95 in 89:1, with many individual fund betas exhibiting considerable variation as shown in Figure 4. These estimates of beta enable us to distinguish among some of the different measures of performance and to evaluate risk measures even in the presence of time dummy variables required for our model.[23] Table 5 compares the four performance measures using the basic model. It is clear that the Jensen measure is superior to the raw returns[24] and to the Sharpe and Treynor measures.

To further investigate the nature of risk discounting, we disaggregated the Jensen measure into its return and risk components. The results, presented in Table 6, suggest that market risk is more heavily discounted by investors than would be indicated by alpha. The additional risk measures in column 2 are all highly significant and their sum is about equal, in absolute value, to the sum to the sum of the coefficients on alpha. Thus, the effect of an increase in market risk on investor allocations appears to be twice as large as the effect of the same increase in unadjusted returns.

It is difficult to evaluate whether this greater weight attached to the estimated market risk is due to a higher degree of risk aversion than allowed for in the Jensen measure, or because of a

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[23] The use of time varying betas also significantly reduces the multicollinearity among the alternative performance measures. Refer to Table 3 which shows the correlation between the Jensen and Sharpe measures to range from .38 to .61 depending upon the fund's objective.

[24] Due to the existence of time dummies we cannot distinguish between the raw returns and the excess returns above the market and the excess returns above the risk free rate.

greater confidence in the evaluation of risk. As the variance in the alphas of each fund is far greater than that of the betas, investors should discount the information contained in limited period alphas more heavily than the information contained in the betas, leading to the observed results. We can not, however, distinguish between this forecasting error effect and the level of risk aversion.

Table 6 shows that these results are robust to the inclusion of variable effects and non-linearities. Similarly, the non-linearities are unaffected by the inclusion of separate risk variables or fund characteristics. However, the risk effects do vary by size and load characteristics. Investors in large funds appear to be more responsive to recent returns **and** to risk. This supports the hypothesis that investors are more likely to have information about these funds.

In contrast, investors in load funds are less sensitive to returns **and** risk. While the first part of this statement is straightforward, the second part, suggesting that load funds are also less sensitive to risk requires some explanation. Since the coefficient of XLBIRT-LOAD is negative, as is the sum of the LBIRT coefficients, the product of these terms has a positive effect upon the original negative influence of the systematic risk component. Therefore, investors in load funds are less sensitive to risk than are investors in no-load funds. This supports our previous argument that investors in load funds are likely to be less informed rather than more risk averse.

Advisory services frequently rate funds on the basis of their performance in up and down phases of the market cycle. In order to test whether investors respond differently to past performance under different market conditions, we identified a market trough as a period in which there was a net outflow of capital from mutual funds to other investments. We approximated the net flow of capital into funds each quarter by calculating the percentage change in the sum of the net asset values for the funds existing each quarter in our sample less the return on the S&P 500 in that quarter. For the 53 quarters between 1980:4 and 1993:4, we were able to identify 14 periods in which there was a net outflow. Table 7 examines whether recent past performance during bearish trough periods had a different effect upon future market shares relative to performance in those boom periods in which there were a net inflows into funds. The first model focuses on the Jensen performance measure and suggests that performance during trough periods has less effect upon future market shares than does performance during boom periods. The second model shows the Jensen measure and the systematic risk premium as separate explanators. The results show that past performance levels have less effect upon future market share during trough periods than they do during boom periods. These results suggest that investors discount performance during trough periods and weigh more heavily available information during boom periods in making their investment decisions.

5.0 Are Investors Acting Rationally?

The expectations upon which predicted market shares are based in equation (7) rest upon investors choosing between funds on the basis of the relative historic performance of the funds in their choice set. The empirical evidence presented in this paper strongly suggests that investors use historic performance measures in making their investment decisions. Because investors are assumed to regularly adjust their portfolio holdings using available historic information, the question that arises is, are they acting rationally over time? To examine this question, we regressed the excess return in quarter t, as well as the two-quarter through six-quarter mean excess return, against the past eight quarters of the excess return.

Table 8 shows the relationship between future performance and past fund performance. Although the historic performance measures are only weakly related to future quarterly excess returns, the coefficients of the past performance variables increase in significance and are consistently positive as the expected holding period increases beyond half a year. The picture which emerges from this table is consistent with the time pattern of weights assigned to past performance in Table 4, where the implicit forecasts of future performance are more heavily weighted by the last four quarters of past performance. The fact that recent past performance is a better predictor of performance over more than one quarter is also consistent with the high persistence we found in the market share behavior of funds over time. These results are consistent with those of Gruber (1996) who also finds a significant relationship between past alphas and future performance.

Because the sample used in the regression analysis consists of only those funds that survived to December 1993, a bias may be introduced into any conclusion regarding the persistence of managers. On the one hand, the funds that failed to survive have had a history of poor performance. Their historic returns, though negative, are positively correlated. Excluding these positively correlated poor performers reduces the positive correlation among the remaining funds in the sample that survived. Hence, the bias caused by excluding the funds that failed to survive is against the finding of positive correlation over time. On the other hand, common factors in stock returns and persistent differences in expenses and transactions costs have been shown by Carhart (1997) to possibly induce positive serial correlation in risk-adjusted returns which might otherwise be interpreted as reflecting superior ability of fund managers. At the same time, Wermers (1996) has shown that momentum strategies may explain performance persistence in the absence of expenses and transactions costs. Therefore, although our results are consistent with investors acting rationally, there may very well be factors other than the stock picking ability of managers that explain the observed positive serial correlation in risk adjusted returns.

6.0 Incentive Properties of Asset-Based Fees

The incentive properties of asset-based fees are closely linked to the market's response to past fund performance. All other things equal, a one-time increase in fund return produces a corresponding permanent increase in cash flows to the manager. Hence, there is a strong incentive with the asset-based fee structure for managers to improve their performance. To see this we assume for simplicity a single lag structure for the endogenous component of our model. We can then examine the predictions with respect to the incentive effects.

To begin, we define the asset-based fee per dollar of net asset value as f and let A_t be the net asset value of the fund in period t. It follows that the product of these two variables, fA_t, represents the compensation to the manager, π_t. Starting from a steady state in which market shares in each period are equal, i.e. $M_t = M_{t-1} = ... = M_0$, we have

$$\pi_t = f\, e^{\frac{a(1-\lambda^t)}{1-\lambda}} M_0^{\lambda^t} e^{gt} \sum A_0 \qquad \textbf{(8)}$$

where g is the growth rate of total industry assets so that $\Sigma A_t = e^{gt}\Sigma A_0$; λ is the period-to-period persistence in market share; and a is the growth rate of the fund which is unrelated to the fund's performance. By assumption, moreover, $x_t = 0$ for all t.

Suppose now that we have a one-time-only change in return in t=0. The effect is:

$$\frac{d\pi_t}{dx_0}\frac{1}{M_0} = \frac{\pi_t}{M_0}\frac{dLnM_0}{dx_0} = fb\lambda^t \, e^{\frac{a(1-\lambda^t)}{1-\lambda}} M_0^{\lambda^t - 1} e^{gt} \sum A_0 \qquad \textbf{(9)}$$

where $b = \sum_{i=1}^{8} b_i \lambda^{8-(i+1)}$[25]. Since Ln M_0 = a/(1-λ) in the steady state, it then follows that the change in the present value of the net compensation benefits (Π) relative to the initial net asset value, A_0 , is:

$$\frac{d\Pi}{dx_0}\frac{1}{A_0} = \frac{1}{A_0}\int_0^T \frac{d\pi_t}{dx_0} e^{-rt} dt \simeq \frac{fb}{g-r-(1-\lambda)}[e^{(g-r-(1-\lambda))T} - 1] \qquad \textbf{(10)}$$

where r is the quarterly discount rate and T is the expected tenure of the manager. For T→∞ and r+(1-λ) > g,

$$\frac{d\Pi}{dx_0}\frac{1}{A_0} = \frac{fb}{r+(1-\lambda)-g} > 0 \qquad \textbf{(11)}$$

We can now look at the empirical estimates of our model in order to understand the incentive implications for the manager. Suppose we assume a 1 percent increase in the annual performance, or .25% in a single quarter. From Table 4 (Column 1), b≈1.86 and (1-λ)≈.026. Average fund growth over the 82:4 to 93:4 period (g) was approximately .0292[26] per quarter which we use to approximate the steady-state rate of growth. The condition for r+(1-λ)>g is

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[25] Note that this expression for b holds for periods greater than 2 years and is reduced for shorter horizons.

[26] Average fund growth was approximated by calculating the average growth in fund assets over the period less the average growth in the number of funds over the same period.

satisfied for $r>.003$. As a benchmark, assume that managers fully diversify their individual wealth and use the risk-free quarterly discount rate which is approximately .0162. It follows that the change in lifetime compensation for a one-time increase in performance of .25% is 35% of the performance increase. It is clear that the incentives are very sensitive to the manager's discount rate. If the degree of diversification is less than perfect, a higher discount rate will be used. For example, a discount rate of .0429 which is the average quarterly return on the S&P 500 over the period would reduce the effect of lifetime earnings to 12% of the change in performance.

7.0 Summary and Conclusions

This paper examined the mutual fund market over the 1976-1993 period. From among the performance measures which investors have the required information to calculate, it was found that the Jensen measure best explained the change in market shares over time. An interesting result of the empirical analysis was that investors appear to actually weigh the systematic component of risk more than suggested by the use of the Jensen measure. Investors, moreover, value recent past performance differently for funds with different attributes (e.g., size and load). An important result of the paper is that investors use historic performance measures in making their investment decisions. The effect of this result is that there are strong incentives for managers to increase their performance and by doing so, their compensation under a fixed-fee remuneration mechanism. The paper also finds evidence that is consistent with investors acting rationally over time. While they rely upon past performance to make their investment decisions, the past performance of funds is positively related to the future performance. Investors appear, moreover, to use historic performance measures over a long time horizon when they have long expected holding periods. Hence, the fixed-fee compensation mechanism adopted by most funds not only provides strong incentives, but there is evidence that these incentives may be based upon rational behavior of investors in the marketplace and so are extremely stable and consistent over time.

Table 1

REPRESENTATION OF SAMPLE

Size ($MM)	**Morningstar**	**%**	**Sub-Sample**	**%**
5000+	15	1.2	10	1.1
1000-4999	93	8.0	74	8.6
500-999	91	7.9	81	9.4
100-499	346	29.6	257	29.9
50-99	200	17.1	150	17.4
10-49	273	23.4	192	22.3
10-	150	12.8	96	11.2
Objective				
Aggressive Growth	70	6.0	64	7.4
Growth	542	46.2	440	51.2
Growth & Income	297	25.3	208	24.2
Small Company	186	15.8	144	16.7
Equity Income	79	6.7	4	.5
Load				
Front-end	444	37.8	343	39.9
Deferred	138	11.8	102	11.9
No-Load	592	50.4	415	48.3
Fund Manager Tenure (Years)*				
20+	26	2.3	20	2.4
10-19	89	7.9	76	9.1
5-9	274	24.2	219	26.3
1-4	693	61.3	497	59.8
0	48	4.2	19	2.3
Age of Fund (Years)				
50+	40	3.4	35	4.1
30-49	78	6.6	60	7.0
10-29	251	21.4	219	25.5
5-9	292	24.9	216	25.1

3-4	193	16.4	137	16.0
2	203	17.3	135	15.7
1	117	10.0	58	6.7

* Subsample sum does not add up to 860 due to non-reporting of tenure by 29 firms.

Table 2

LAG STRUCTURE

Dependent variable: Ln(M_t)

Lagged Exog.	Lagged Endog.	No Time Dummies Var. of Res.	No Time Dummies No. of Obs.	Schwarz Criteria	Time Dummies Var. of Res.	Time Dummies No. of Obs.	Schwarz Criteria
4	1	0.0118	12212	-4.4392	0.0114	12212	-4.4701
4	2	0.0116	12203	-4.4488	0.0114	12203	-4.4769
4	3	0.0108	12194	-4.5241	0.0105	12194	-4.5507
4	4	0.0107	12185	-4.5297	0.0105	12185	-4.5549
4	5	0.0107	12174	-4.5304	0.0105	12174	-4.5556
5	1	0.0118	11769	-4.4399	0.0114	11769	-4.4723
5	2	0.0106	11760	-4.5439	0.0103	11760	-4.5738
5	3	0.0108	11751	-4.5252	0.0105	11751	-4.5536
5	4	0.0107	11742	-4.5295	0.0105	11742	-4.5564
5	5	0.0107	11733	-4.5326	0.0104	11733	-4.5593
6	1	0.0117	11346	-4.4469	0.0113	11346	-4.4812
6	2	0.0106	11337	-4.5478	0.0102	11337	-4.5794
6	3	0.0107	11328	-4.5333	0.0104	11328	-4.5641
6	4	0.0107	11319	-4.5373	0.0104	11319	-4.5665
6	5	0.0106	11310	-4.5405	0.0103	11310	-4.5694
7	1	0.0114	10934	-4.4715	0.0110	10934	-4.5103
7	2	0.0104	10925	-4.5632	0.0101	10925	-4.5980
7	3	0.0104	10916	-4.5614	0.0100	10916	-4.5972
7	4	0.0103	10907	-4.5643	0.0100	10907	-4.5983
7	5	0.0103	10898	-4.5667	0.0100	10898	-4.6001
8	1	0.0103	10534	-4.5698	0.0099	10534	-4.6124
8	2	0.0098	10525	-4.6231	0.0095	10525	-4.6583
8	3	0.0092	10516	-4.6874	0.0089	10516	-4.7218
8	4	0.0091	10507	-4.6915	0.0089	10507	-4.7234
8	5	0.0091	10498	-4.6933	0.0088	10498	-4.7242
9	1	0.0101	10149	-4.5920	0.0098	10149	-4.6341
9	2	0.0095	10140	-4.6459	0.0092	10140	-4.6820
9	3	0.0089	10131	-4.7155	0.0086	10131	-4.7499
9	4	0.0089	10122	-4.7203	0.0086	10122	-4.7522

9	5	0.0089	10113	-4.7216	0.0086	10113	-4.7528
10	1	0.0101	9781	-4.5945	0.0097	9781	-4.6376
10	2	0.0096	9772	-4.6446	0.0092	9772	-4.6823
10	3	0.0089	9763	-4.7150	0.0086	9763	-4.7560
10	4	0.0088	9754	-4.7240	0.0086	9754	-4.7579
10	5	0.0088	9745	-4.7249	0.0085	9745	-4.7580

Table 3

CORRELATION OF PERFORMANCE MEASURES BY OBJECTIVE

	Sharpe	Treynor
Jensen		
All Funds	.4573	.4483
Aggressive Growth	.5396	.5251
Growth	.4474	.4374
Growth & Income	.3828	.3800
Small Company	.6053	.5805
Sharpe		
All Funds	-	.9916
Aggressive Growth	-	.9917
Growth	-	.9908
Growth & Income	-	.9927
Small Company	-	.9919

FIXED EFFECTS OLSQ MODEL

(TIME DUMMIES INCLUDED/EXPLANATORS CROSSED WITH LAGGED EXOG.)

Dependent variable: $\Delta Ln(M_t)$

MODEL	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
$Ln(M_{t-1})$	-0.0255[c]	0.0341[b]	0.0268[b]	0.0263[b]	0.0303[b]	0.0234[a]	0.0150[c]	0.0203[c]	0.0126[c]
$Ln(M_{t-1})$		0.008	0.0161	0.0081	0.01020	0.0101	0.0107	0.0135	0.0126
$Ln(M_{t-3})$		-0.0713[c]	-0.0733[c]	-0.0642[c]	-0.0707[c]	-0.0639	-0.0577[c]	-0.0664[c]	-0.0578[c]
$ALPHA_{t-1}$	0.321[c]	0.255[c]	0.204[c]	0.236[c]	0.324[c]	0.296[c]	0.151[c]	0.244[c]	0.208[c]
$ALPHA_{t-2}$	0.223[c]	0.119[c]	0.122[c]	0.119[c]	0.151[c]	0.147[c]	0.057[b]	0.050	0.074[b]
$ALPHA_{t-3}$	0.366[c]	0.323[c]	0.294[c]	0.297[c]	0.392[c]	0.360[c]	0.215[c]	0.341[c]	0.279[c]
$ALPHA_{t-4}$	0.374[c]	0.338[c]	0.305[c]	0.287[c]	0.396[c]	0.339[c]	0.079[c]	0.135[c]	0.101[c]
$ALPHA_{t-5}$	0.105[c]	0.066[a]	0.069[a]	0.074[b]	0.067[a]	0.079[b]	0.077[c]	0.078[b]	0.088[c]
$ALPHA_{t-6}$	0.164[c]	0.132[s]	0.118[c]	0.130[c]	0.135[c]	0.139[c]	0.126[c]	0.153[c]	0.141[c]
$ALPHA_{t-7}$	0.214[c]	0.189[s]	0.170[c]	0.180[c]	0.224[c]	0.214[c]	0.152[c]	0.217[c]	0.190[c]
$ALPHA_{t-8}$	0.229[c]	0.209[s]	0.197[c]	0.181[c]	0.250[c]	0.217[c]	0.147[c]	0.243[c]	0.185[c]
$DSALPHA_{t-1}$			0.071[c]				0.020[c]	0.019[c]	0.019[c]
$DSALPHA_{t-2}$			0.048[c]				0.015[c]	0.018[c]	0.015[c]
$DSALPHA_{t-3}$			0.011[a]				0.020[c]	0.017[c]	0.019[c]
$DSALPHA_{t-4}$			0.006				0.051[c]	0.049[c]	0.051[c]
X-SIZE				0.880[c]		0.697[c]	1.501[c]		1.138[c]
X-LOAD					-0.321[c]	-0.312[c]		-0.377[c]	-0.378[c]
Adj R^2	0.1877	0.1948	0.2197	0.2289	0.2270	0.2307	0.2442	0.2403	0.2452
Var of Res.	0.00895	0.009	0.00860	0.00850	0.0085	0.00848	0.00833	0.00837	0.00832

[a] Significant at 5%.
[b] Significant at 1%.
[c] Significant at .1%.

Note: $Ln(M_t)$ is the logarithm of market share at end of t;
$ALPHA_{t-1} = R_{it-1} - \beta_{it-1}(R_{Mt-1} - R_{ft-1}) - R_{ft-1}$;
SIZE refers to dummy variable for those funds exceeding $1.5 billion in NAV during the last quarter of 1993;
LOAD is the dummy variable for those funds which charge either front-end or rear-end load fees; and
$DSALPHA_{t-1}$ is the square of the excess return in t-1for those funds with non-negative values of $ALPHA_{t-1}$

Table 5

FIXED EFFECTS OLSQ MODEL
ALTERNATIVE PERFORMANCE MEASURES

Dependent variable: $\Delta Ln(M_t)$

	MODEL 1 Jensen	MODEL 2 Returns	MODEL 3 Sharpe	MODEL 4 Treynor
$Ln(M_{t-1})$	0.0341[b]	0.0536[c]	0.0472[c]	0.0452[c]
$Ln(M_{t-2})$	0.0078	0.0147	0.0011	0.0029
$Ln(M_{t-3})$	-0.0713[c]	-0.0991[c]	-0.0766[c]	-0.0775[c]
X_{t-1}	0.255[c]	0.177[c]	1.91[c]	0.220[c]
X_{t-2}	0.119[c]	0.013	0.916[b]	0.103[b]
X_{t-3}	0.323[c]	0.228[c]	2.81[c]	0.292[c]
X_{t-4}	0.338[c]	0.262[c]	3.12[c]	0.324[c]
X_{t-5}	0.066[a]	0.034	0.750[b]	0.748[b]
X_{t-6}	0.132[c]	0.044	1.22[c]	0.119[c]
X_{t-7}	0.189[c]	0.141[c]	1.30[c]	0.155[c]
X_{t-8}	0.209[c]	0.200[c]	2.01[c]	0.227[c]
Adj R^2	0.1948	0.1833	0.1878	0.1885
Var of Res.	0.00888	0.00900	0.00895	0.00894

[a] Significant at 5%.
[b] Significant at 1%.
[c] Significant at .1%.

Note: $Ln(M_t)$ is the logarithm of market share at end of t;
X_{t-1} =Performance measure in t-1.

FIXED EFFECTS OLSQ MODEL
(TIME DUMMIES INCLUDED/EXPLANATORS CROSSED WITH LAGGED EXOG.)

Dependent variable: $\Delta Ln(M_t)$

MODEL	1	2	3	4	5	6	7	8
$Ln(M_{t-1})$	-0.0247[c]	0.0388[c]	0.0309[b]	0.0344[b]	0.0275[b]	0.0192[a]	0.0243[a]	0.0163
$Ln(M_{t-2})$		0.0179	0.0188	0.0203	0.0209	0.0213	0.0241	0.0234
$Ln(M_{t-3})$		-0.0856[c]	-0.0789[c]	-0.0845[c]	-0.0784[c]	-0.0722[c]	-0.0804[c]	-0.0719[c]
$ALPHA_{t-1}$	0.301[c]	0.229[c]	0.212[c]	0.299[c]	0.273[c]	0.121[c]	0.207[c]	0.177[c]
$ALPHA_{t-2}$	0.221[c]	0.099[b]	0.101[c]	0.132[c]	0.130[c]	0.035	0.016	0.051
$ALPHA_{t-3}$	0.362[c]	0.311[c]	0.290[c]	0.383[c]	0.357[c]	0.199[c]	0.327[c]	0.270[c]
$ALPHA_{t-4}$	0.366[c]	0.322[c]	0.275[c]	0.381[c]	0.329[c]	0.063[a]	0.113[a]	0.086[a]
$ALPHA_{t-5}$	0.096[b]	0.053	0.062[a]	0.051	0.065[a]	0.066[b]	0.061	0.076
$ALPHA_{t-6}$	0.144[c]	0.105[c]	0.105[c]	0.102[b]	0.108[c]	0.101[c]	0.114[c]	0.110[c]
$ALPHA_{t-7}$	0.200[c]	0.172[c]	0.164[c]	0.207[c]	0.198[c]	0.135[c]	0.201[c]	0.175[c]
$ALPHA_{t-8}$	0.215[c]	0.193[c]	0.168[c]	0.236[c]	0.207[c]	0.131[c]	0.229[c]	0.173[c]
$LBIRT_{t-1}$	-0.135[a]	-0.221[c]	-0.192[b]	-0.251[c]	-0.221[c]	-0.224[c]	-0.286[c]	-0.253[c]
$LBIRT_{t-2}$	-0.318[c]	-0.418[c]	-0.400[c]	-0.459[c]	-0.440[c]	-0.431[c]	-0.493[c]	-0.471[c]
$LBIRT_{t-3}$	-0.268[c]	-0.257[c]	-0.246[c]	-0.285[c]	-0.272[c]	-0.269[c]	-0.308[c]	-0.293[c]
$LBIRT_{t-4}$	-0.150[a]	-0.138[a]	-0.144[a]	-0.170[b]	-0.174[b]	-0.196[c]	-0.223[c]	-0.227[c]
$LBIRT_{t-5}$	-0.236[c]	-0.231[c]	-0.205[c]	-0.258[c]	-0.232[c]	-0.214[c]	-0.266[c]	-0.239[c]
$LBIRT_{t-6}$	-0.344[c]	-0.347[c]	-0.346[c]	-0.375[c]	-0.372[c]	-0.369[c]	-0.396[c]	-0.396[c]
$LBIRT_{t-7}$	-0.107[a]	-0.109[a]	-0.107[a]	-0.114[a]	-0.112[a]	-0.114[a]	-0.132[a]	-0.121[a]
$LBIRT_{t-8}$	-0.002	0.000	0.011	-0.018	-0.006	-0.016	-0.045	-0.032
$DSALPHA_{t-1}$						0.022[c]	0.022[c]	0.021[c]
$DSALPHA_{t-2}$						0.017[c]	0.019[c]	0.017[c]
$DSALPHA_{t-3}$						0.021[c]	0.019[c]	0.020[c]
$DSALPHA_{t-4}$						0.052[c]	0.050[c]	0.052[c]
XALPHA-SIZE			0.873[c]		0.668[c]	1.614[c]		01.159[c]
XLBIRT-SIZE			0.133[c]		0.121[a]	0.114[a]		0.103[a]
XALPHA-LOAD				-0.374[c]	-0.339[c]		-0.430[c]	-0.438[b]
XLBIRT-LOAD				-0.108[a]	-0.106[a]		-0.106[a]	-0.104[a]
Adj R^2	0.1957	0.2044	0.2386	0.2370	0.3406	0.2546	0.2517	0.2564
Var of Res.	0.00887	0.00877	0.00839	0.00841	0.00837	0.00822	0.00825	0.00820

[a] Significant at 5%.
[b] Significant at 1%.
[c] Significant at .1%.

Note: $Ln(M_t)$ is the logarithm of market share at end of t;
$ALPHA_{t-1} = R_{it-1} - \beta_{it-1}(R_{Mt-1} - R_{ft-1}) - R_{ft-1}$;
$LBIRT_{t-1} = \beta_{it-1}(R_{Mt-1} - R_{ft-1})$;
SIZE refers to dummy variable for those funds exceeding $1.5 billion in NAV during the last quarter of 1993;
LOAD is the dummy variable for those funds which charge either front-end or rear-end load fees; and
$DSALPHA_{t-1}$ is the square of the excess return in t-1for those funds with non-negative values of $ALPHA_{t-1}$

Table 7

THE EFFECT OF MARKET CYCLE CHANGES

Dependent variable: $\Delta Ln(M_t)$

	Jensen	**Jensen-Split**
$Ln(M_{t-1})$	0.0331[b]	0.0380[c]
$Ln(M_{t-2})$	0.0085	0.0189
$Ln(M_{t-3})$	-0.0712[c]	-0.0859[c]
$ALPHA_{t-1}$	0.285[c]	0.250[c]
$ALPHA_{t-2}$	0.141[c]	0.108[b]
$ALPHA_{t-3}$	0.339[c]	0.314[c]
$ALPHA_{t-4}$	0.383[c]	0.363[c]
$ALPHA_{t-5}$	0.090[a]	0.077[a]
$ALPHA_{t-6}$	0.174[c]	0.149[c]
$ALPHA_{t-7}$	0.143[c]	0.127[c]
$ALPHA_{t-8}$	0.217[c]	0.206[c]
$LBIRT_{t-1}$		-0.210[c]
$LBIRT_{t-2}$		-0.422[c]
$LBIRT_{t-3}$		-0.245[a]
$LBIRT_{t-4}$		-0.131[c]
$LBIRT_{t-5}$		-0.205[c]
$LBIRT_{t-6}$		-0.343[c]
$LBIRT_{t-7}$		-0.091
$LBIRT_{t-8}$		0.007
$CALPHA_{t-1}$	-0.133[a]	-0.088
$CALPHA_{t-2}$	-0.098	-0.037
$CALPHA_{t-3}$	-0.061	0.005
$CALPHA_{t-4}$	-0.224[b]	-0.209[b]
$CALPHA_{t-5}$	-0.097	-0.093
$CALPHA_{t-6}$	-0.162[a]	-0.163[b]
$CALPHA_{t-7}$	0.151[a]	0.147[b]
$CALPHA_{t-8}$	-0.034	-0.045
Adj R^2	0.1969	0.2060
Var of Residuals	0.00885	0.00875

[a] Significant at 5%.
[b] Significant at 1%.
[c] Significant at .1%.

Note: $Ln(M_t)$ is the logarithm of market share at end of t;
$ALPHA_{t-1} = R_{it-1} - \beta_{it-1}(R_{Mt-1} - R_{ft-1}) - R_{ft-1}$;
$LBIRT_{t-1} = \beta_{t-1}(R_{Mt-1} - R_{ft-1})$; and
$CALPHA_{t-1}$ = Value of $ALPHA_{t-1}$ multiplied by dummy variable =1.0 for trough periods and 0 otherwise.

Table 8

FUTURE PERFORMANCE VS. PAST PERFORMANCE
(Without Lagged Market Share Variable)

Dependent Variable

	$ALPHA_t$	**M2**	**M3**	**M4**	**M5**	**M6**
C	-.261[b]	-.281[b]	-.335[b]	-.390[b]	-.422[b]	-.457[b]
$ALPHA_{t-1}$	.0005	.021[a]	.036[b]	.059[b]	.022[b]	.026[b]
$ALPHA_{t-2}$	.011	.064[b]	.082[b]	.023[b]	.026[b]	.061[b]
$ALPHA_{t-3}$	.126[b]	.119[b]	.040[b]	.042[b]	.063[b]	.043[b]
$ALPHA_{t-4}$	.108[b]	.015[a]	.027[b]	.065[b]	.048[b]	.028[b]
$ALPHA_{t-5}$	-.080[b]	-.019[a]	.026[b]	.011	.0008	.004
$ALPHA_{t-6}$	.036[b]	.060[b]	.032[b]	.012[a]	.024[b]	.012[a]
$ALPHA_{t-7}$	.096[b]	.056[b]	.019[a]	.026[b]	.011[a]	-.005
$ALPHA_{t-8}$	.018	-.020[a]	.011	-.008	-.009	.003
Adj R^2	.051	.056	.043	.045	.038	.041
Var of Res.	14.209	7.224	4.982	3.960	3.453	2.895

Note: $ALPHA_t = R_{it} - \beta_{it}(R_{Mt} - R_{ft}) - R_{ft}$ where ALPHA is expressed in percentage terms

$$Mi = \sum_{k=0}^{i-1} \frac{ALPHA_{t+k}}{i}$$

[a] Significant at 5%
[b] Significant at 1%

REFERENCES

[1] Berkowitz, M.K. and Kotowitz, Y. (1993), "Incentives and Efficiency in the Market for Management Services: a Study of Canadian Mutual Funds",*Canadian Journal of Economics*, November, 850-866.

[2] Brown, K.C., Harlow, W.V. and Starks, L.T. (1996), "Of Tournaments and Temptations: An Analysis of Managerial Incentives in the Mutual Fund Industry", *Journal of Finance*, March, 85-110.

[3] Brown, S.J., Goetzmann, W., Ibbotson, R.G. and Ross, S.A. (1992), Survivorship Bias in Performance Studies",*The Review of Financial Studies*, Number 4, 553-580.

[4] Carhart, M.M. (1997), "On Persistence in Mutual Fund Performance",*Journal of Finance*, March, 57-82.

[5] Chevalier, J. and Ellison, G. (1995), "Risk Taking by Mutual Funds as a Response to Incentives", NBER, working paper.

[6] Christopherson, J.A., Ferson, W.E. and Glassman, D.A. (1994), "Conditioning Manager Alphas on Economic Information: Another Look at the Persistence of Performance", University of Washington, working paper.

[7] Elton, E.J., Gruber, M.J. and Blake, C.R. (1995), "The Persistence of Risk-Adjusted Mutual Fund Performance", Stern School of Business, working paper.

[8] Elton, E.J., Gruber, M.J., Das, S. and Hlavka, M. (1993), "Efficiency with Costly Information: A Reinterpretation of Evidence from Managed Portfolios",*The Review of Financial Studies*, Number 1, 1-22.

[9] Fama, E.F. (1972), "Components of Investment Performance",*Journal of Finance*, June, 551-567.

[10] Ferson, W.E. and Schadt, R.W. (1996), "Measuring Fund Strategy and Performance in Changing Economic Conditions",*Journal of Finance*, June, 425-462.

[11] Grinblatt, M. and Titman, S. (1993), "Performance Measurement Without Benchmarks: An Examination of Mutual Fund Returns",*Journal of Business*, No. 1, 47-68.

[12] Goetzmann, W.N. and Ibbotson, R.G. (1994), "Do Winners Repeat? Patterns in Mutual Fund Performance",*Journal of Portfolio Management*, No. 20, 9-17.

[13] Gruber, M.J. (1996), "Presidential Address: Another Puzzle: The Growth in Actively Managed Mutual Funds",*Journal of Finance*, July, 783-810.

[14] Harvey A. (1990), *The Economic Analysis of Time Series*, 2nd ed.(Cambridge MA: MIT Press)

[15] Hendricks, D., Patel, J. and Zeckhauser, R. (1993), "Hot Hands in the Mutual Funds: Short-Run Persistence of Relative Performance, 1974-1988", *Journal of Finance*, March, 93-130.

[16] Ippolito, R.A. (1989), "Efficiency With Costly Information: A Study of Mutual Fund Performance, 1965-1984", *The Quarterly Journal of Economics*, February, 1-23.

[17] Judge, G.G., Griffiths, W.E., Hill, R.C., Lütkepohl, H. and Lee, T. (1985), *The Theory and Practice of Econometrics*, second edition, John Wiley & Sons.

[18] Lehmann, B.N. and Modest, D.M. (1987), "Mutual Fund Performance evaluation: A Comparison of Benchmarks and Benchmark Comparisons", *Journal of Finance*, June, 233-266.

[19] Malkiel, B.G. (1995), "Returns from Investing in Equity Mutual Funds 1971 to 1991", *Journal of Finance*, June, 549-572.

[20] McFadden, D. (1974), "Conditional Logit Analysis of Qualitative Choice Behavior," in *Frontiers in Econometrics*, ed. P. Zarembka (New York: Academic Press)

[21] Moses, E.A., Cheyney, J.M. and Veit, T.E. (1987), "A New and More Complete Performance Measure", *Journal of Portfolio Management*, 13, 24-33.

[22] Shukla, R. and Trzcinka, C. (1994), "Persistent Performance in the Mutual Fund market: Tests with Funds and Investment Advisers", *Review of Quantitative Finance and Accounting*, 4, 115-135.

[23] Wermers, R. (1996), "Momentum Investment Strategies of Mutual Funds, Performance Persistence, and Survivorship Bias, University of Colorado Graduate School of Business Administration, working paper.

Figure 1

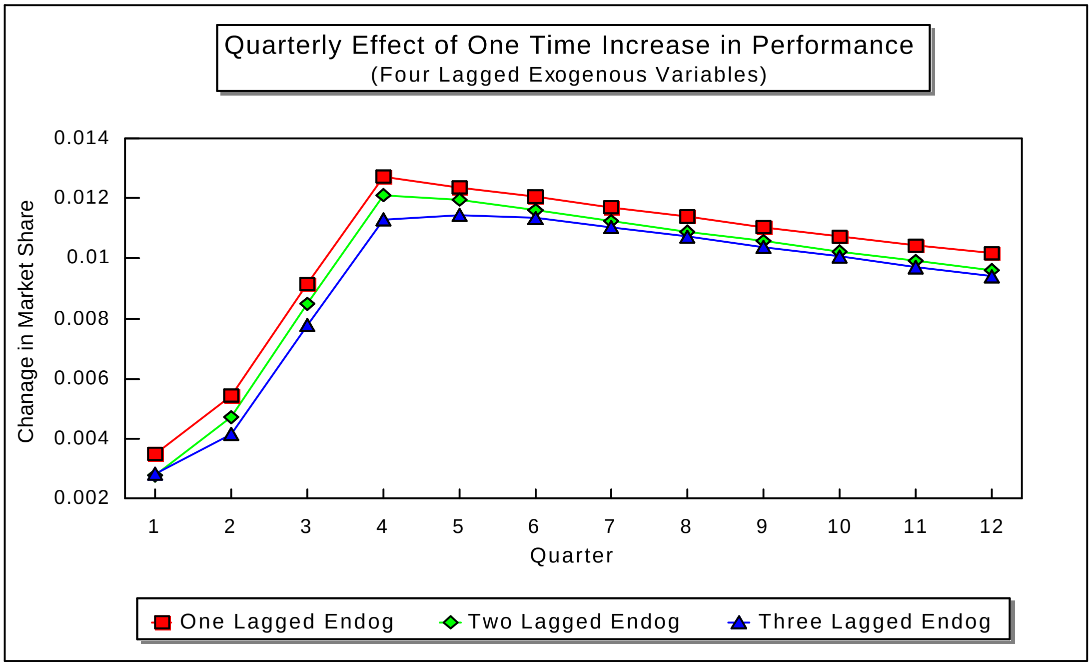

Figure 2

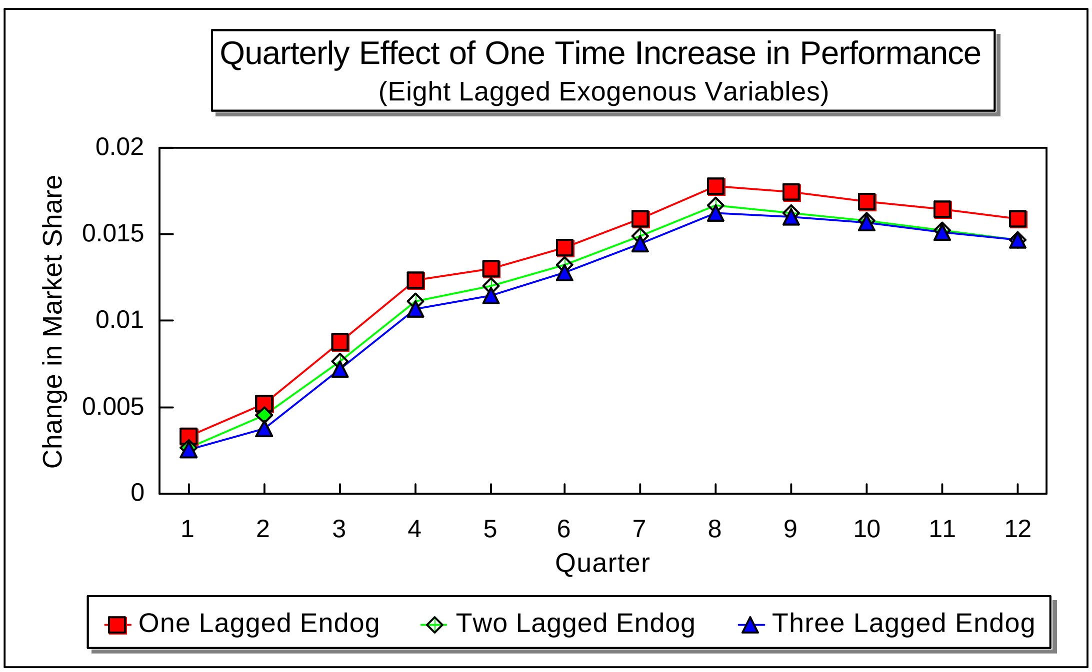

Figure 3

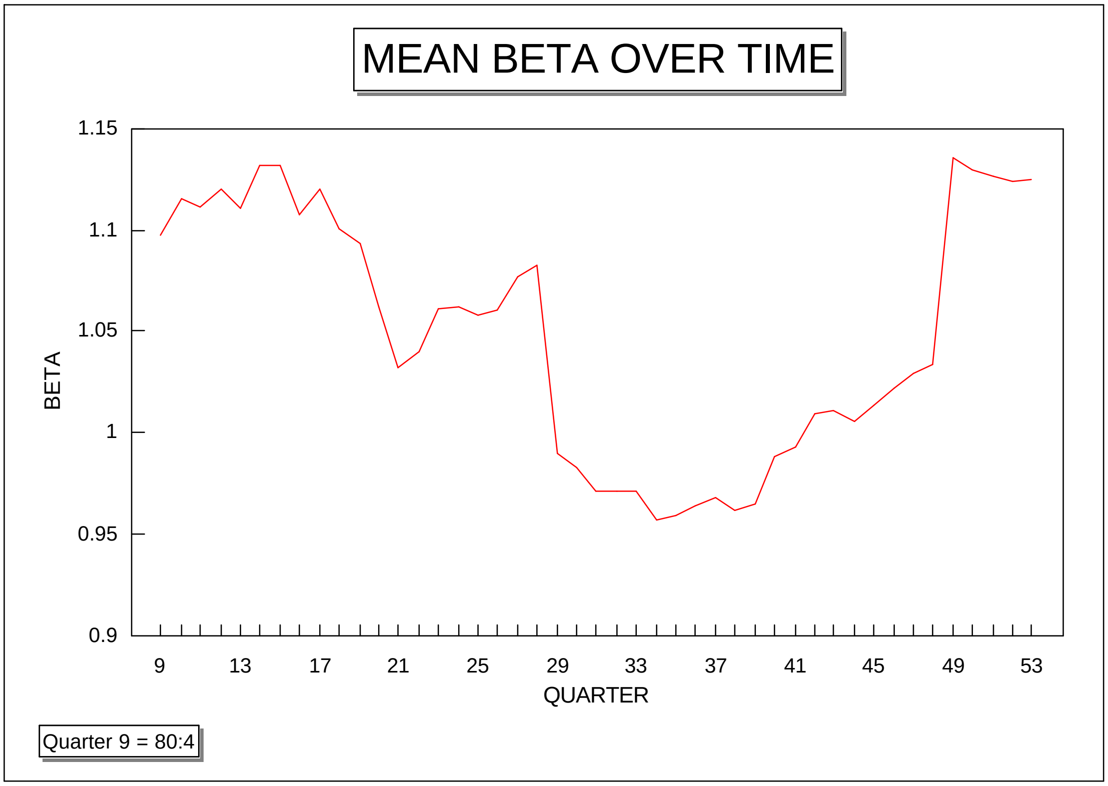

Figure 4