Morningstar Ratings and Mutual Fund Performance

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Abstract

This study examines the degree to which the well-known Morningstar rating system is a predictor of out-of-sample mutual fund performance, an important issue given that high-rated funds receive the lion's share of investor cash inflow. We use a data set based on domestic equity mutual funds (of various ages and investment objective styles) that is free from survivorship bias and adjusted for load fees to examine the predictive qualities of the rating system. In addition, we use various performance metrics over different time horizons and sample periods. We also compare the predictive qualities of the Morningstar rating system with those of alternative predictors: a "naïve" predictor of in-sample historical average monthly returns, one- and four-index in-sample alphas, and in-sample Sharpe ratios. The results indicate several main findings that are robust across different samples, ages and styles of funds, and different out-of-sample performance measures. First, low ratings from Morningstar generally indicate relatively poor future performance. Second, for the most part, there is little statistical evidence that Morningstar's highest-rated funds outperform the next-to-highest and median-rated funds. Third, Morningstar ratings, at best, do only slightly better than the alternative predictors in terms of predicting future fund performance.

JEL code: G23

I. Introduction

In recent years, there has been increasing attention paid to the persistence of mutual fund performance in the finance literature.[1] Yet, to date, there has been considerably less attention devoted to the predictive qualities of the Morningstar 5-star mutual fund rating service that many investors use as a guide in their mutual fund selections. This study attempts to fill that void by examining the ability of the Morningstar ratings to predict both unadjusted and risk-adjusted returns, using performance metrics common in the performance literature.

The question of whether Morningstar ratings predict out-of-sample performance is an important one, given that several studies in the performance literature have documented that new cash flows from investors are related to past performance ratings. (See, e.g., Sirri and Tufano (1998) and Gruber (1996).) In fact, there is evidence that high-rated funds experience cash inflows which are far greater in size than the cash outflows experienced by low-rated funds. (See, e.g., Sirri and Tufano (1998) and Goetzmann and Peles (1997).) Hence, examining performance across funds grouped by Morningstar rankings will indicate if these cash flows are justified by subsequent relative performance.

As evidence of the importance of the Morningstar five-star rating service (where a 5-star rating is the best and a 1-star rating is the worst), consider a recent study reported in both the Boston Globe and the Wall Street Journal.[2] This study found that 97 percent of the money flowing into no-load equity funds between January and August 1995 was invested into funds which were rated as 5-star or 4-star funds by Morningstar, while funds with less than 3 stars suffered a net outflow of funds during the same period. Moreover, the heavy use of Morningstar ratings in mutual fund advertising suggests that mutual fund companies *believe* that investors care about Morningstar ratings. Indeed, in some cases, the only mention of return performance in the mutual fund advertisement is the Morningstar star rating. Finally, the importance of the Morningstar ratings has been underscored by some recent high-profile publications (e.g., Blume (1998) and Sharpe (1998)) which have investigated the underlying properties of the Morningstar rating system.

Despite the importance of the Morningstar ratings service, there is, to our knowledge, only one extant academic study on the predictive abilities of the Morningstar ratings. Khorana and Nelling (1998) examine the question of persistence of the Morningstar ratings themselves. Specifically, the authors compare the Morningstar ratings from a group of funds in December

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[1] For example, Hendricks, Patel and Zeckhauser (1993), Goetzmann and Ibbotson (1994), Malkiel (1995), Brown and Goetzmann (1995), Elton, Gruber and Blake (1996a) and Carhart (1997).

[2] Charles Jaffe, "Rating the Raters: Flaws Found in Each Service." *Boston Globe*, August 27th, 1995, p. 78. The same survey was also reported by Karen Damato, "Morningstar Edges Toward One-Year Ratings." *Wall Street Journal*, April 5th, 1996.

1992 to the ratings those same funds received in June 1995. They find evidence of persistence, in that highly rated funds are still highly rated and low-rated funds are still low rated. However, there are a number of problems with the study. First, there is a survivorship bias problem, since the funds were selected at the end of the sample period rather than at beginning. Hence, any fund which had merged, liquidated or changed its name between the beginning and ending of the sample period was not included in the sample. Second, because Morningstar uses a 10-year risk-adjusted return as a major component of its ratings, and because there are only 2 and ½ years of data between the beginning and end of their sample, the ratings are based on overlapping data. Consequently, the findings of persistence in the ratings are endemic to the data. Finally, their study only examines performance persistence as measured by Morningstar ratings; it does not examine how well Morningstar ratings predict other, more standard, measures of performance.[3]

In this paper we examine the question, Does the Morningstar five-star system have any predictive power for the future performance of funds? Our data and methodology are sensitive to many key issues in mutual fund research. Namely:

1) Our paper uses a mutual fund data set generated at the time the funds were actually rated by Morningstar. We then follow the out-of-sample performance of all of these funds. This methodology allows us to circumvent the well-known survivorship bias problem that is described by Brown, Goetzmann, Ibbotson and Ross (1992), Elton, Gruber and Blake (1996b) and others.

2) Unlike most previous studies of mutual fund performance and prediction, returns are adjusted for front-end and deferred loads. We do this because the Morningstar rating system also adjusts for loads.

3) We compare the predictive qualities of the Morningstar ratings with those of alternative predictors: in-sample historical average monthly returns, one- and four-index in-sample alphas, and in-sample Sharpe (1966) ratios.

4) We examine different out-of-sample horizons, i.e., one-year, three-year and five-year horizons, so that we can give both short- and long-term analyses of the predictive qualities of Morningstar ratings and the alternative predictors. Moreover, these time

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[3] It should be noted that Morningstar reports an in-house study conducted by Laura Lallos (1997) in which 45 percent of the 5-star funds in 1987 receive five stars in 1997. However, no other comparisons are provided and few details of the study are reported.

horizons are consistent with the historical returns that prospective investors are often provided with when considering a mutual fund.

5) We examine the predictive qualities of the Morningstar ratings and the alternative predictors at different times. Hence, we can examine how well they predict in up and down markets.

6) A number of studies, e.g. Brown (1999), Brown and Goetzmann (1997), Elton, Gruber, Das and Hlavka (1993) and Goetzmann and Ibbotson (1994), state that performance predictability may be due to the style of funds examined rather than skill. We examine this issue by separating domestic equity funds according to investment style (i.e., Aggressive Growth, Equity-Income, Growth, Growth-Income, and Small Company funds) at the time they were rated.

7) We explore whether the age of a fund affects performance predictability by separating funds into "young," "middle", and "old" age groups.

8) We measure out-of-sample performance using several well-known performance metrics including the Sharpe Ratio, mean monthly excess returns, a modified version of Jensen's alpha (1968) and a 4-index alpha.

9) We analyze the results using parametric and non-parametric tests.

The rest of the paper is organized as follows. Section II extensively describes the data that we use in the paper and relates the method in which the funds where chosen, how Morningstar calculates their ratings, and how the returns data were collected and calculated. Section III describes the methodology of the paper, Section IV presents the Morningstar rating results, Section V presents the alternative predictor results, and Section VI provides the conclusion.

II. Data

To better organize the description of the data, this section is divided it into seven subsections: sample groups and fund selection criteria, problem funds, Morningstar ratings, Morningstar scores, alternative predictors, out-of-sample evaluation periods, and the returns and load adjustments.

II.A. Sample Groups and Fund Selection Criteria

We examine two broad sample groups in this study. For simplicity we terms these samples: *Old Funds 1992-1997* and *Complete Funds 1993*.

II.A.1. Old Funds 1992-1997

For the first sample group we use the beginning-of-the-year Morningstar On-Disk or Principia programs from 1992 to 1997 to select mutual funds.[4] We use the beginning-of-the-year disks as a way of simplifying the data so that we are always examining calendar years. Moreover, we start at the beginning of the year 1992 since this corresponds to the first beginning-of-the-year On-disk program.[5]

By using the actual Morningstar disks we know all the funds which were available to investors selecting funds based on Morningstar ratings at the time of the Morningstar evaluation. In this way, we circumvent any possible survivorship bias problems. Data previous to the beginning of the On-disk program are available from Morningstar on a proprietary basis, however, these data include only the surviving funds; funds that were rated at the time of the Morningstar rating and yet have merged or liquidated at some later date are not available.[6] Since the use of such data would introduce a severe survivorship bias, they are not used in our study.

From the beginning-of-the-year disks we then select funds based on three criteria. First, we select only "domestic equity" funds as identified by Morningstar's "Investment Class." From the domestic equity funds, we then select all funds within each of the following five Morningstar "Investment Objectives" (styles): Aggressive Growth, Equity-Income, Growth, Growth and Income, and Small Company. This allows us to examine whether or not there is a "style effect" on fund performance predictability. It is important to note here that the designation of the "investment objective" is determined by Morningstar, usually based on the wording in the fund's prospectus. However in some cases, Morningstar may give a fund an investment objective different from that implied by the fund's name or in the fund's prospectus if Morningstar determines that the fund invests in a way not keeping with the wording in its prospectus.

Since we are examining the out-of-sample performance of the funds, we also examine if the funds retain their classifications by Morningstar in the out-of-sample periods. We find that in

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[4] These correspond to the January 1992 On-Disk, January 1993 On-Disk, January 1994 On-Disk, January 1995 On-Disk, January 1996 On-Disk, and the January 1997 Principia. In October 1996 On-disk changed to Principia.

[5] The On-Disks begin in October 1991.

[6] We thank Peter Carrillo of Morningstar for this point.

every sample examined, at least 85 percent of the funds retain their style classification at the end of the sample period.[7] Hence, according to Morningstar, the vast majority of funds do not change their style of management.

The second criterion was that each fund had to have at least 10 years of returns at the time it was rated by Morningstar. In other words, funds rated by Morningstar in January 1993 had to have returns data starting from, at the latest, January 1983. We used the 10-year cut off for two reasons. First, the 10-year in-sample period utilizes Morningstar's *base-line* rating system. As stated earlier, Morningstar provides each mutual fund with a 1- to 5-star summary rating. To obtain this summary rating, Morningstar takes a weighted average of the 3-year, 5-year and *10-year* risk-adjusted returns, where the weights are 20 percent on the 3-year return, 30 percent on the 5-year return, and 50 percent on the 10-year return. Due to the importance of the 10-year time period in their rankings, we used this as a criterion in selecting funds. Second, because we track each fund's out-of-sample returns through all mergers, name changes and liquidations, and because of the enormous growth in the number of mutual funds in recent years, including all funds regardless of their age in each of our subsamples would have resulted in an extremely onerous identification and data collection process. (For example, the 1997 sample alone would have included over 2000 funds!)

The third and last selection criterion used was that funds had to be open at the time they were rated by Morningstar. Any fund that was closed to new investors at the time of the rating by Morningstar was excluded from our analysis. The purpose of this was to maintain a sample of funds that could actually be invested in at the time of the ratings.[8]

II.A.2. Complete 1993 Sample

One of the problems with the above sample group is that we exclude many Morningstar-rated funds simply because of our criterion that funds must have 10 years of in-sample data at the time they are rated. While their base-line rating system uses a combination of the 3-year, 5-year and 10-year returns, Morningstar still rates funds with less than 10 years of returns. So long as a fund has at least 3 years of returns history, it can receive a summary star rating from Morningstar. Funds with between 3 and 5 years of returns history are rated using a system that puts a 100 percent

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[7] To obtain this percentage we examine only the funds in the sample that did not merge nor were liquidated during the out-of-sample period. Table 7 shows the actual number of funds that did change their classification.

[8] The number of closed funds that meet our other criteria was as follows: January 1992 sample: 11 funds; January 1993 sample: 11 funds; January 1994 sample: 19 funds; January 1995 sample: 19 funds; January 1996 sample: 28 funds; January 1997 sample: 37 funds.

weighting on their 3-year past performance; funds with between 5 and 10 years of returns history are rated using a system that put a 40 percent weighting on the 3-year return and a 60 percent weighting on the 5-year return.

Moreover, by excluding younger funds we miss out on another interesting aspect of the Morningstar rating system. Since younger funds are rated on only short-term returns (i.e., the 3-year return) whereas older funds are rated on a combination of the 3-year, 5-year and 10-year returns, the younger fund ratings are particularly sensitive to the overall performance of the market. For example, in a bull market (as in the late 1990's), young equity funds could receive higher ratings not because they have better short-term performance, but rather because the rating system only evaluates them during a time when the market was doing exceptionally well.[9] This could alter the predictive ability of the ratings.

As mentioned above, the problem with including younger funds in our first sample group is that the number of funds to examine is much too unwieldy and onerous. As a compromise, we create another sample in which we include *all* open Aggressive Growth, Equity-Income, Growth, Growth-Income, and Small Company funds that were rated by Morningstar in January 1993.[10] By using the 1993 data, we only have to examine the out-of-sample performance of 635 funds as opposed to well over 2000 funds if we were to use the 1996 or 1997 On-Disk/Principia Programs. Furthermore, by using January 1993 rated funds, we are still able to follow out-of-sample performance out to five years.

In summary, the complete funds 1993 sample includes all open funds rated by Morningstar and listed as Aggressive Growth, Equity-Income, Growth, Growth-Income or Small Company. Hence, this includes *young* funds (funds with between 3 and 5 years of return history at the time they were rated), *middle-aged* funds (funds with between 5 and 10 years of historical returns at the time they were rated) and *old funds* (funds with 10 or more years of returns at the time they were rated).

As with the old funds samples, we also examine the number of funds that change their investment objective in the out-of-sample periods. Similar to the old funds sample, at least 85 percent of the funds do not change their Morningstar investment objective over the course of the out-of-sample period.[11]

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[9] Blume (1998), in a study utilizing only 1996 data, provides some evidence that there is a relatively high percentage of young funds that are classified as 5-star or 1-star funds.

[10] There were 24 funds that meet our other criteria and yet were listed as closed funds in January 1993.

[11] As with our "old funds" sample, we examine only the funds in the sample that did not merge or liquidate during the out-of-sample period to obtain this percentage. Table 8 shows the actual number of

II.B. Problem Funds

In this paper we examine the out-of-sample forecasting ability of Morningstar's ratings. As described in the previous section, we select funds at the time the funds were rated by Morningstar. To examine the out-of-sample forecast ability, we then obtain the out-of-sample monthly returns of these funds. For a majority of the funds, obtaining the out-of-sample returns is simply a matter of following the previously rated fund. However, because a minority of funds have either gone through a name change, a merger, a combination of both, or because they have liquidated, identifying out-of-sample returns for those funds is more complicated. In this section, we describe how we handle these problematic funds.

For name changes, we use the Morningstar data[12] and *The Wall Street Journal* to identify the name changes. We then simply use the new named fund's returns as the out-of-sample returns.

For the merger funds we used the Morningstar data and *The Wall Street Journal* to ascertain the month of the fund merger. However, when these two sources did not provide the necessary information, we called the individual mutual fund companies. Once the merger month was identified, we then collected the out-of-sample returns by the following procedure. First, until the fund merges, we simply use the out-of-sample returns of the fund in question. After the fund merges into its partner fund, we assume the investor randomly re-invests into one of the other surviving funds with the same investment objective as the merged fund in our sample. Hence, the out-of-sample returns from the merger month onwards are equally weighted monthly averages of the returns of all the other surviving funds in our sample with the same investment objective as the merged fund.[13]

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funds in our "complete" sample that did change their classification.

[12] The Morningstar On-Disk and Prinicipia disks (after 1993) both provide a list of funds that have recently undergone name changes, mergers and liquidations.

[13] The assumption of random reinvestment into any surviving fund regardless of its ranking may seem at first blush to be irrational, given that investors should prefer superior funds. But we are examining Morningstar predictability, not just for superior, but also for inferior performance. Forcing random reinvestment into only high-ranked funds could have biased the predictability results. Furthermore, an investor may be interested in using Morningstar rankings not just for investment in superior funds, but also for *avoiding* investment in inferior funds. (Even so, we did examine the results obtained by assuming an investor randomly chose a surviving fund from those rated only three stars or better; the results were virtually identical.) An alternative approach would be to use the "follow-the-money" approach introduced in Elton, Gruber and Blake (1996b), where a merged fund's returns are spliced to its "merge partner" fund's returns to form a complete time series. But because of the way we calculate our out-of-sample performance alphas for disappearing funds, we would require a complete in-sample time series of returns for the "merge partner" fund, and in some cases the partner fund did not exist long enough to obtain such a series.

For the liquidated funds we first define when the fund was liquidated. Again, this information was obtained from Morningstar or *The Wall Street Journal*. As with the merger funds, from the month of liquidation and onwards, we assume the investor randomly re-invests in the current sample of funds with the same investment objective as the merged fund.

II.C. Morningstar ratings

To calculate its ratings, Morningstar first classifies funds into one of four categories: Domestic Equity, Foreign Equity, Municipal Bond and Taxable Bond.[14] The ratings are then based upon an aggregation of the 3-year, 5-year and 10-year risk-adjusted return for funds with 10 years or more of return history, 3-year and 5-year risk-adjusted returns for funds with 5 to less than 10 years of return data, and 3-year risk-adjusted returns for funds with 3 to less than 5 years of return data. The risk-adjusted return is calculated in the following manner. First they calculate a load-adjusted return for the fund by adjusting the returns for expenses such as 12b-1 fees, management fees and other costs automatically taken out of the fund, and then by adjusting for front-end and deferred loads.[15] Next, they calculate a "Morningstar Return" in which they take the expense- and load-adjusted excess return divided by the higher of two variables: the excess average return of the fund category (domestic stock, international stock, taxable bond, or municipal bond) or the average 90-day U.S. T-bill rate:

$$\frac{\text{(Expense and Load Adjusted Return on the Fund} - \text{T-Bill)}}{\text{Higher of (Average Category Return} - \text{T-Bill or T-Bill)}} \qquad (1)$$

Morningstar divides through by one of these two variables to prevent distortions caused by having low or negative average excess returns in the denominator of equation (1). Such a situation might occur in a protracted down market. [16]

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[14] Note that originally Morningstar used only three categories: Domestic Equity, Municipal Bond, and Taxable Bond. The Foreign Equity funds were placed in the Domestic Equity category. The Foreign Equity category was started in 1996.

[15] Blume (1998), p. 4-5, provides an excellent description of how Morningstar accounts for loads in the Morningstar Returns. The load adjustment process is the following. Assume L is the load adjustment. If there is no load of any type, then L is equal to 1. If there is a load, L is less than one, i.e., a 4 percent front-end load, would make L equal to 0.96. The load-adjusted return is then the (return of the fund)*L. Note that the front-end load is always assumed to the be the maximum possible load. The deferred load adjustment is reduced as the holding period is increased. Later in the data section of the paper we explain more about how we adjust the return data for loads.

[16] Principia Manual, p. 97.

Morningstar then calculates a "Morningstar Risk" measure. This measure is calculated differently from traditional risk measures, such as beta and standard deviation, which both see greater-than and less-than-expected returns as added volatility. Morningstar believes that for most investors their greatest fear is losing money, which they define as underperforming the risk-free rate of return an investor can earn from the 90-day Treasury Bill. Hence, their risk measure only focuses on downside risk.[17] To calculate the Morningstar risk, they plot the monthly returns in relation to T-bill returns. They add up the amounts by which the fund trails the T-Bill return each month and then divide that total by the time horizon's total number of months. This number, the average monthly underperformance statistic, is then compared with those of other funds in the same broad investment category to assign the risk scores. The resultant Morningstar risk score expresses how risky the fund is relative to the average fund in its category.[18] To illustrate the Morningstar risk calculation, we provide an example where we define the time horizon as 1 year. Table 1 presents hypothetical results for a mutual fund.

To calculate a fund's summary star-rating, Morningstar calculates the 3-year, 5-year and 10-year Morningstar Return and Risk. For each time horizon, the Morningstar Risk scores are then subtracted from the Morningstar Return scores. The three numbers (one for each time horizon) are then given subjective weights.[19] The 3-year number receives a 20 percent weighting, the 5-year a 30 percent weighting, and the 10-year a 50 percent weighting. As stated above, in the case of "young" funds (funds with 3 to less than 5 years of return data), the 3-year number receives a 100 percent weighting; in the case of "middle-aged" funds (funds with 5 to less than 10 years of return data) the 3-year number receives a 40 percent weighting and the 5-year number receives a 60 percent weighting. With these weights, Morningstar then calculates the weighted average of the numbers. The resulting number is then plotted along a bell curve to determine the fund's star rating. If the fund scores in the top 10 percent of its broad investment category, it receives a rating of 5 stars; if the fund falls in the next 22.5 percent it receives 4 stars; if it falls in the middle 35 percent it receives 3 stars; if it lies in the next 22.5 percent the fund receives 2 stars, and if it is in the bottom 10 percent it receives 1 star. Morningstar, with a few minor exceptions, has used this same summary rating system throughout its history.[20]

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[17] The notion of focusing only on downside risk is not unique to Morningstar nor new. For example, it has been explored by Markowitz (1959) and incorporated into an asset-pricing model by Bawa and Lindenberg (1977).

[18] Principia Manual, p. 98.

[19] Morey and Morey (1999) present a methodology that endogenously determines these weights.

[20] The Morningstar technical staff verified this point. See Blume (1998) p. 3 for more on this issue.

Table 2 presents the distribution and average star ratings in our January 1992 through January 1997 "old" fund subsamples. Several qualities about the data should be noted here. One, the number of funds in each sample grows. This is not surprising, since with each year the number of funds that meet the criteria grow. Two, there are more 5-star funds than 1-star funds and the average star rating of each sample is above 3. This skewness in the ratings of the sample indicates that Aggressive Growth, Equity-Income, Growth, Growth-Income and Small Company funds with 10 years or more of returns performed slightly better than other funds in the Morningstar domestic equity category.[21] Three, the standard deviation of the ratings is about the same in each sample indicating that the distribution of the ratings does not differ much from one sample to another. Four, for the load-funds, most have front-end loads and relatively few have deferred loads. Five, most of the funds are grouped within the Growth and Growth-Income investment objectives.

Table 3 presents the distribution of stars by style (investment objective) for each of our "old" fund subsamples. Examing the average star rating shows that, for most of our sample years, Aggressive Growth and Small Company funds have fewer funds and lower averages than the other styles. Moreover, in many samples, the Aggressive Growth, Equity-Income and Small Company styles have few, if any, funds in the lowest or highest star categories. Also, as in Table 2, the standard deviations are about the same in each subsample within each investment style, with the notable exception being the 1993 Aggressive Growth subsample.

Tables 4, 5 and 6 show the distribution of stars, stars by style and stars by age for the "complete fund 1993" sample. These tables show that, as with the "old" funds sample, the average star rating for this sample is above 3 and that there are relatively more five-star funds than there are 1-star funds. The average rating exceeding three stars is a result of other investment objectives being grouped into the domestic equity category (see footnote 21). The tables also show several other interesting findings. First, most of the funds in the sample are in the old and middle-aged category; only 14 percent of the funds are young funds. Second, more than half of the funds are load funds. So again, loads seems to be an important factor to consider. Third, as with the old funds sample, most of the funds are clustered in the Growth and Growth-Income styles. Fourth, Aggressive Growth funds fare worse than the other investment objectives in terms of star ratings. Fifth, there is not much of a difference in the average star ratings of young, middle-aged and older

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[21] The higher average star ratings could be due to "old" funds performing slightly better, or it could be a result of other investment objectives (styles), besides those used in this study, being grouped into the domestic equity category. These other investment objectives include domestic hybrid funds, convertible bond funds, funds termed by Morningstar to be miscellaneous funds, and even international funds up until 1996. Blume (1998) has documented that these other investment objective funds generally have lower performance and are rated lower than the Aggressive Growth, Equity-Income, Growth, Growth-Income,

funds, yet the distribution is quite different. In fact, there are no 1-star young funds. As stated above, young funds receive their stars based upon the past 3 years of returns, so it may be that the 3 years prior to January 1993 did not drive any new funds into the bottom rating category.

II.D. Morningstar Scores

Since January 1994, Morningstar has provided the 3-, 5- and 10-year Morningstar Return and Risk numbers for all the mutual funds that it evaluates. This information, plus the subjective weights, (20%, 30% and 50% for the 3-, 5- and 10-year horizons) allows us to calculate the resultant scores and to numerically rank the funds evaluated here. These scores then allow us to conduct non-parametric rank correlation tests. (Since the data are not provided before 1994, we do not conduct these tests for the "old" 1992 and 1993 samples, nor for the complete funds 1993 sample.)

II.E. Alternative Predictors

We compare the predictive the Morningstar rankings and scores with those of four alternative predictors. Each of our alternative predictors is calculated during the "in-sample" period just prior to fund selection, either during the ten-year period prior to the out-of-sample evaluation periods when examining old funds 1992-1997 sample, or during the three-year period prior to the out-of-sample evaluation periods when examining the complete funds 1993 sample only.

For a "naïve" predictor, we use the fund's average monthly in-sample return.

A second alternative predictor we use is the in-sample Sharpe ratio:

$$Sharpe_i = \frac{\overline{R_i - R_F}}{\sigma_i}$$

(2)

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and Small Company funds.

where:

$\overline{R_i - R_F}$ = the mean excess (net of the 30-day T-bill rate) monthly return for the ith mutual fund during the in-sample period.

σ_i = the standard deviation of the excess monthly returns for the ith mutual fund during the in-sample period.

For two additional alternative predictors, we use Jensen single-index and 4-index alphas. The following time-series regression model is used:

$$R_{it} = a_i + \sum_{k=1}^{K} b_{ik} I_{kt} + e_{it} \qquad (3)$$

where

R_{it} = the excess total return (net of the 30-day T-bill return) for fund i in in-sample month t

a_i = the alpha for fund i, used as a performance predictor

b_{ik} = the sensitivity of fund i's excess return to index k

I_{kt} = the return for index k in in-sample month t

e_{it} = the random error for fund i in in-sample month t

For Jensen alphas, $K = 1$ and I_{1t} = the excess total return of the S&P 500 in month t. For the 4-index alphas, $K = 4$, I_{1t} = the excess total return of the S&P 500 in month t, I_{2t} = the excess total return of Lehman Aggregate Bond Index in month t, I_{3t} = the difference in return between a small-cap and large-cap stock portfolio based on Prudential Bache indexes in month t, and I_{4t} = the difference in return between a growth and value stock portfolio based on Prudential Bache indexes in month t.[22] We utilize the 4-index model because, as shown in Elton, Gruber and Blake (1996a), this model provides for better risk adjustment for mutual funds than does the single-index model.

II.F. Out-Of-Sample Evaluation Periods

Investors, when evaluating performance, are typically presented with the 1-year, 3-year, 5-year and (when possible) 10-year past performance windows. Similarly, we use 1-, 3- and 5-year periods to examine the out-of-sample forecasting ability of Morningstar's ratings (the 10-year window is outside the bounds of our sample). This provides us with twelve subsamples for performance evaluation for our old funds 1992-1997 sample and three additional subsamples for our complete

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[22] See Elton, Gruber and Blake (1996a) for a detailed description of the Prudential Bache portfolios used in the 4-index model.

funds 1993 sample. Table 7 presents, for each sample period of our old funds subsamples, the number of funds, the number of merger funds, the number of liquidated funds and the number of funds that changed their Morningstar objective during the out-of-sample evaluation period (e.g., from Growth to some other objective). Table 8 presents the same information for the complete fund 1993 sample.

II.G. Returns Data and Load Adjustments

For the out-of-sample returns and the in-sample returns used in the alternative predictors, the data consist of monthly returns from the Morningstar On-Disk and Prinicipia programs. These returns data are adjusted to account for management, administrative, and 12b-1 fees and other costs automatically taken out of fund assets. However, unlike the Morningstar risk-adjusted ratings, the monthly return data do not adjust for sales charges such as a front-end and deferred loads.[23] Consequently, if we use the monthly return data for the out-of-sample returns, the returns on load funds are overstated.

Very little attention in the mutual fund performance literature is given to the treatment of loads in return data. Although some authors (e.g., Gruber (1996)) have presented results separately for load and no-load funds, most studies (e.g., Hendricks, Patel and Zeckhauser (1993), Elton, Gruber and Blake (1996a), Malkiel (1995), and Carhart (1997)) provide no direct adjustment for loads in their returns data. However, loads may be important, especially in this paper since the Morningstar ratings encompass load-adjusted returns. But the question is how to deal with loads? There is not a simple answer. For example do you use front-end loads, deferred loads, or both? When and for how long to do you apply the load? What if the mutual fund has reduced its load over time (especially the deferred load)? Do you use an average load adjustment for each month or do you use an annualized load? If you decide to use an annualized load, what interest rate do you use to discount the load factor?

In light of all these difficulties, we adjust the monthly returns of each mutual fund using an approach similar to Rea and Reid (1998). For both front-end and deferred loads, we consider an investor who buys and holds the load shares for a fixed number of months, i.e., 12 months (1 year), 36 months (3 years) or 60 months (5 years). For front-end loads, the investor buying the fund pays a load in a lump sum at the time the fund is purchased. To spread the front-end load across the period that the shares are held, we use Rea and Reid's assumption that the investor borrows the amount necessary to pay the load up front and then repays the loan as an annuity in equal, monthly

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[23] Principia Manual (1998), p. 107.

installments during the holding period. Hence, the monthly load adjustment reflects the amount that was borrowed and the interest on the loan.

Mathematically, our front-end load adjustment process is the following:

$$f^m = \frac{f}{\sum_{j=1}^{h}(1+r)^{-j}} \qquad (4)$$

where

r = the monthly interest rate (the monthly geometric average of the 1-, 3-, or 5-year Treasury yield over the holding period)

f = the front-end load (expressed as a percent)

h = the number of months the fund is held

f^m = the monthly front-end load adjustment

Hence, the front-end load adjusted returns are:

$R_{it}^{FLA} = R_{it} - f^m$, where

R_{it} = the monthly return of fund i in month t

R_{it}^{FLA} = the monthly front-end-load-adjusted return of fund i in month t

As an example of the above adjustment, consider a one-year investment in Fidelity's Magellan fund starting in January 1992. As of January 1992, that fund had a front-end load of 3%, and the 1-year Treasury yield was 3.84%, giving a monthly average rate of 0.31%. Therefore, for the 1-year holding (out-of-sample) period, $f = 3\%$, $r = 0.0031$, and $h = 12$, giving $f^m = 0.255\%$. We then subtract 0.255% from each of the Magellan fund's 12 monthly returns during 1992 to obtain the load-adjusted returns.

For the deferred-load adjustment, the process is slightly different. The difference lies in the fact that the payment of the deferred load does not occur until the end of the holding period. To convert the deferred load into a monthly payment, the investor is assumed to prepay the load in equal monthly installments. The amount of the monthly prepayment reflects the deferred load less the interest earned on the prepayments.

Thus the equation for the monthly deferred-load adjustment is:

$$d^m = \frac{d}{\sum_{j=1}^{h}(1+r)^{j}} \qquad (5)$$

where

d = the deferred load (expressed as a percent)

d^m = the monthly deferred-load adjustment

Hence, the deferred-load-adjusted returns are:

$R_{it}{}^{DLA} = R_{it} - d^m$, where

R_{it} = the monthly return of fund i in month t

$R_{it}{}^{DLA}$ = the monthly deferred-load-adjusted return of fund i in month t

As with the front-end loads, we use the monthly geometric average of the 1-, 3-, or 5-year Treasury yield over the holding period for the interest rate. However, in contrast to the front-end load adjustment, we reduce the amount of the deferred load as the holding period, h, increases. We do this because Morningstar also reduces the deferred load as the holding period increases. Hence, for a holding period of 12 months, the full amount of the deferred load is imposed. For the 36-month holding period we apply only half of the original deferred load, and in the 60-month holding period the deferred load completely disappears. Table 2 (for the old funds) and Table 4 (for the complete funds 1993) presents some summary data on the load structure of the funds in our samples.

III. Methodology

To measure out-of-sample performance we use four performance metrics: The Sharpe (1966) ratio, mean monthly excess returns, a modified version of Jensen's (1969) alpha, and a 4-index alpha. To examine the out-of-sample predictive performance of the Morningstar ratings and the alternative predictors, we use two methods: Dummy variable regression analysis and the non-parametric Spearman-Rho rank correlation test. In this section we describe this methodology.

IIIA. Out-of-Sample Performance Measurement

As stated above, we use four performance metrics from the existing performance literature to measure out-of-sample performance: the Sharpe (1966) ratio, the mean monthly excess return, a modified version of Jensen's (1969) alpha, and a modified version of a 4-index alpha. For each performance metric we examine both *non-load-adjusted* and *load-adjusted* versions. However, in the paper we report results only for the *load-adjusted* Sharpe ratio, the *load-adjusted* excess mean monthly return, the *non-load-adjusted* modified Jensen alpha and the *non-load-adjusted* modified 4-index alpha. The results for the metrics that are not reported, i.e. those for the *non-load-adjusted* Sharpe ratio, the *non-load-adjusted* excess mean monthly return, the *load-adjusted* modified Jensen alpha and the *load-adjusted* modified 4-index alpha, are essentially the same as their

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load/non-load counterparts.[24] We next explain, in detail, the four out-of-sample performance metrics.

III.A.1. The Sharpe Ratio

The load-adjusted Sharpe ratio for fund *i* is:

$$Sharpe_i = \frac{\overline{R_i^{LA} - R_F}}{\sigma_i} \tag{6}$$

where $\overline{R_i^{LA} - R_F}$ = the mean excess (net of the 30-day T-bill rate) *load-adjusted* monthly return for the *i*th mutual fund during the evaluation (out-of-sample) period.

σ_i = the standard deviation of the excess *load-adjusted* monthly returns for the *i*th mutual fund during the evaluation period.

The non-load adjusted Sharpe ratio is essentially the same as equation (2) except that it uses the out-of-sample period.

III.A.2. Excess Mean Monthly Returns

The *load-adjusted* mean monthly excess returns are simply equal to $\overline{R_i^{LA} - R_F}$.

The *non-load-adjusted* mean monthly excess return is $\overline{R_i - R_F}$.

III.A.3. Modified Jensen and 4-index alphas

The *non-load-adjusted* modified Jensen and 4-index alphas are calculated using a methodology similar to that of Elton, Gruber and Blake (1996a). Specifically, for each "old" funds sub-sample, we utilize a time series period of monthly *non-load-adjusted* returns going back ten years from the selection date and forward to the end of the out-of-sample evaluation period to obtain an estimate of the intercept from either the single index or 4-index model regression (equation (3)). For our "complete funds 1993" sample group, we utilize a time series period of monthly *non-load-adjusted* returns going back three years from the selection date and forward to the end of the out-of-sample evaluation period to obtain an estimate of the intercept from either the single-index or 4-index model regression (equation (3)).

To obtain the alphas, we add the average monthly residual during the evaluation period to the intercept. For example, to obtain a modified Jensen alpha for an "old" fund's 1-year out-of-

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[24] These results are available on request.

sample performance measure in the 1992 subsample, we run the 1-index model on monthly returns starting in January 1982 and ending in December 1993 (11 years) to obtain an estimate of the intercept. We then add the average of the fund's residuals during the one year after the selection date (the evaluation period) to the estimated intercept to obtain the fund's modified Jensen alpha.

To obtain alphas for funds that merged or liquidated during the evaluation period, we proceed as follows. First, we run two regressions: (1) a regression using the fund's returns going back either ten or three years from the selection date and ending in the month prior to the fund's disappearance, and (2) a regression run over the entire regression period using the returns on an equally weighted portfolio formed each month from the existing funds in the sample. We then form a weighted average of: (1) the fund's estimated intercept plus the fund's average residual during the time it survived in the evaluation period and (2) the estimated intercept plus the average residual during the remaining time in the evaluation period of the equally weighted portfolio, where the fund's weight is the fraction of the evaluation period it survived and the equally weighted portfolio's weight is the remaining fraction. This provides a performance measure for an investor who buys a remaining fund in the sample at random if the original fund merges or liquidates. (See footnote 13.)

For the *load-adjusted* modified Jensen and 4-index alphas we actually do *not* use load-adjusted returns, since we use both out-of-sample and in-sample data for these measures. We could apply loads to the in-sample data, however doing so would bring up a number of problems. First, the loads may be quite different during the in-sample period than the out-of-sample period. Second, and more importantly, it is not clear how we should deal with loads before an investor owns a fund. Again, our assumption in this paper is that the investor selects the funds at the time they are rated by Morningstar. Moreover, our load adjustment depends upon how long the investor holds the fund. If we were to assume instead that the investor already owned the fund before the out-of-sample period started, and hence paid loads during the in-sample period, it would be difficult to determine the correct load to assess for the out-of-sample period.

As an alternative, we adjust the single-index and 4-index alphas for loads by using an added (0,1) dummy variable in the upcoming equation (7), where 1= load funds and 0 = no-load funds.

III.B. Dummy variable regression analysis

The first method we use to examine out-of-sample predictive performance is a cross-sectional dummy variable regression analysis. This approach allows us to examine the Morningstar star ranking group differences in performance predictability.

In addition, in order to make the results for the alternative predictors comparable to those for the Morningstar star groups, we divide the funds into five subgroups after ranking them in descending order by each of their alternative predictors. These five alternative predictor subgroups are not quintiles, since we wanted to preserve the same number funds in each alternative predictor subgroup as we have in each of the five Morningstar star groups. As an example, consider our January 1992 "old" fund subsamples. The same 263 funds are in each of these subsamples: 18 5-star funds, 93 4-star funds, 111 3-star funds, 33 2-star funds, and 8 1-star funds (see Table 2). Therefore, for our 1992 "old" fund subsamples, for any one of our alternative predictors, group 5 has the 18 funds with the highest alternative predictor, group 4 has the next highest 93 funds, etc.

For the dummy variable regression analysis, we estimate the following equation for each of our 12 samples shown in Table 7 for the old funds and the 3 samples shown in Table 8 for the 1993 complete set.

$$S_i = \gamma_0 + \gamma_1 D4_i + \gamma_2 D3_i + \gamma_3 D2_i + \gamma_4 D1_i + u_i \qquad (7)$$

where:

> S_i = out-sample performance metric for fund i, i.e. the load-adjusted Sharpe ratio, load-adjusted mean monthly return, the non-load adjusted single index alpha, the non-load adjusted 4-index alpha.
>
> $D4 = 1$ if a 4-star fund or if in "naïve" predictor group 4, 0 if not,
> $D3 = 1$ if a 3-star fund or if in "naïve" predictor group 3, 0 if not,
> $D2 = 1$ if a 2-star fund or if in "naïve" predictor group 2, 0 if not,
> $D1 = 1$ if a 1-star fund or if in "naïve" predictor group 1, 0 if not,
> $i = 1$ through N, where N is the total number of funds in the subsample.

In the above equation, the 5-star fund group or the alternative predictor group 5 is the reference group for the dummy variable regression.[25] Hence, when using the load-adjusted Sharpe ratio as the out-of-sample performance measure, the coefficient, g represents the expected load-adjusted Sharpe ratio when all the dummy variables are equal to 0, and the coefficients g through g represent the differences between the dummy variables and the reference group. For example, a

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[25] It should be noted here that we also performed all of the dummy variable regressions using the 3-star funds or the alternative predictor group 3 as the reference group. The results did not change when using this reference group. These results are available from the authors upon request.

negative g implies the group of 4-star funds performs worse than the group of 5-star funds; a positive g implies the group of 4-star funds outperforms the 5-star fund group. The t-statistics on the coefficients provide a test of the significance of the difference between an individual dummy group and the reference group.

We use the 5-star funds or alternative predictor group 5 as a reference group because they provide a ceiling from which we can compare the performance of the lower group funds. If the star ratings or alternative predictors accurately predict out-of-sample performance we should see increasingly negative (and significant) coefficients as we move from g to g.

III.C. Spearman-Rho Rank Correlation Test

As a final test we use the two-tailed Spearman-Rho rank correlation test to examine the rank correlations of both the Morningstar scores and the "naïve" predictors with the out-of-sample performance measures. Since Morningstar provides the data to rank the funds beginning in 1994, we only examine this test for samples that begin in 1994 or later. The Spearman-Rho has a null hypothesis of no correlation between the two rankings and is a non-parametric test.

For this test we follow the methodology of Elton, Gruber and Blake (1996a). For each fund in the sample, we examine the four different out-of-sample measures: the (load-adjusted) Sharpe ratios, the (load-adjusted) mean monthly excess returns, the Jensen alphas, and the 4-index alphas. We first sort all the funds in descending order by either their in-sample Morningstar scores or, in the case of the alternative predictors, by their in-sample predictor's performance. We then organize the data into deciles and compute the average for each decile. Our goal is then to examine whether the decile ranking given by either the Morningstar scores or by the alternative predictors corresponds to the decile rankings of the four out-of-sample performance measures. If the Morningstar system or the alternative predictors predict well out-of-sample, then there should be close correlation between the in-sample rankings and the out-of-sample rankings.

IV. Morningstar Rating Results

We present the predictive ability of the Morningstar Ratings in two broad sections. First we report the results using the 1992-1997 "old funds" subsamples. In this subsection we show the dummy variable results for the overall samples, the dummy variable results for the samples organized by style groups, the Spearman-Rho rank correlation results for the overall samples and the Spearman-Rho rank correlation test for the samples organized by style groups. In the second section we report the results of the "complete funds 1993" sample. Note that all the regressions in Section IV

were tested for heteroscedasticity using the White (1980) test. None of regression residuals exhibited evidence of heteroscedasticity at the 10 percent level.

IV.A. 1992-1997 Old Funds Sample Results

IV.A.1 Dummy Variable Regression Analysis on Overall Samples

Tables 9A-C presents the dummy variable regression analysis in which we examine how well the Morningstar stars predict the out-of-sample fund performance for the entire sample. For the out-of-sample performance measures we use the load-adjusted Sharpe ratio, non-load-adjusted single-index alpha, and the non-load-adjusted 4-index alpha respectively. Since the samples are not divided by investment objective, we do not report the load-adjusted mean monthly return results here. Funds with different styles will likely have different mean monthly returns. In the next section, in which we organize samples into their respective style groups, we use the load-adjusted mean monthly returns as one of the out-of-sample measures.

Each table first presents the one-year samples, and then presents the three-year and five-year samples.

IV.A.1.a.   The Load-Adjusted Sharpe Ratio

The Sharpe ratio results (Table 9A) show several interesting findings. First, the g coefficients, the constants in the dummy variable regressions, are quite different from sample to sample. The 1992 constant is close to zero and insignificant, the 1994 constant is well below zero and significant, and the 1993 and 1995-1997 constants are all positive and significant. These results indicate that the reference group (the 5-star funds) perform quite differently in different years. The up-and-down performance of the 5-star Sharpe ratios is consistent with the performance of the S&P 500 index's mean excess monthly returns. For comparison, Table 10 presents the mean monthly excess return of the S&P 500 for the different sample periods.

Second, the results show that the 4-star and 3-star funds do not diverge from the 5-star funds in terms of out-of-sample performance. Only 3 of the 24 coefficients (g and g for the 12 samples) are significant, indicating that for most samples there is not a significant difference in out-of-sample performance of median-rated funds and the top-rated funds. In fact, in many cases, even the signs on the coefficients are the opposite of what one would expect.

Third, there is some evidence that the Morningstar's ratings do seem to predict the low-performing funds. The g and g coefficients are generally negative and significant (12 of the 24 g and g coefficients), indicating that the performance of 1- and 2-star funds is significantly worse than that of the 5-star funds.

Fourth, the R^2 and F-statistic values for the samples differ dramatically. For example, the 1992-1year sample has an R^2 of 0.02 while the 1997-1year sample has an R^2 of 0.17.

IV.A.1.b The Modified Jensen Alpha and 4-Index Alpha

As with the Sharpe ratio, Tables 9B and 9C show that the modified Jensen and 4-index alphas continue to demonstrate the same patterns: relatively little, if any, significant difference between the 5-star, 4-star and 3-star rated funds (with the 1993 5-year sample providing the only evidence of significance in the right direction), some evidence of negative and significant differences between the low-rated funds and the 5-star funds, and wide swings in the constant and R-square values. In addition, the 1-index and 4-index models show that in most cases the 5-star funds have negative (and sometimes significant) alphas (the g coefficient).

IV.A.2 Dummy Variable Regression Analysis on Samples Organized by Style Groups

Tables 11A through 11J report the ability of the Morningstar stars to predict out-of-sample performance when the samples are broken into the five style groups. Since the results were very similar across out-of-sample performance measures, we report only the results in which we use the load-adjusted mean monthly return and the non-load-adjusted 4-index alphas. (The results for the other out-of-sample performance measures are available upon request.)

The results are very similar to the dummy variable analysis on the unbroken sample. First there is very little ability to predict significant negative differences between the 5-star , 4-star and 3-star funds. In fact, for the out-of-sample load-adjusted mean monthly return, 33 of the 60 coefficients for g (the 3-star fund) are positive rather than negative. Second, the Growth and Growth-Income styles ratings show some ability to predict low-performing funds. However, this result does not extend to the other styles: the low ratings of Aggressive Growth, Equity-Income and Small Company funds show relatively little ability to detect significant differences in out-of-sample performance. Third, there are vast differences in the constant term across styles and samples. For example, using the 1994 1-year sample, the Small Company 5-star funds post a solid gain, while every other style shows a negative value for the constant.

It should be noted that the results for the Aggressive Growth and Equity Income styles, and to a lesser extent for Small Company funds, should be interpreted carefully since there are relatively few of these funds in the "old" funds samples. In fact, for a number of samples, the Equity-Income style does not have a single 1-star fund. The small sample for these styles may be the reason that the stars for Growth and Growth-Income funds can predict low future performance better than those for the other styles.

IV.A.3. Spearman-Rho Rank Correlation Tests for Overall Old Funds Samples

Table 12 displays the Spearman-Rho rank correlation test results. As with the overall dummy variable results (section *IV.A1*) we do not examine the load-adjusted mean monthly return. Each table shows the decile averages of the performance measures, the Spearman-rho rank correlations on the entire 10 deciles, and the Spearman-rho correlations for both the top-5 deciles and the bottom-5 deciles. The results show the same basic pattern found in the dummy regression analysis on the overall sample: the low scores predict poor future performance and the high scores have, at best, only mixed ability to predict future performance. In examining the rank correlation coefficients on all 10 deciles, several of the performance measures are relatively well correlated with the in-sample Morningstar Scores. In fact, in 4 of the 6 samples for the Sharpe ratio and 2 of 6 samples for the Jensen single index alpha, we cannot reject the null hypothesis of no correlation in the rankings at the 95 percent confidence level. However, upon examination of the correlation coefficients of the top-5 deciles and bottom-5 deciles, we see that overall rank correlation results are largely based on the ability of the low scores to predict poor future performance. In most cases, the correlation coefficients for the bottom-5 decile are much larger than those for the top-5 decile. Generally, the rank correlation coefficients for the top-5 deciles are actually negative, indicating that the high scores do not accurately predict future performance.

IV.A.4. Spearman-Rho Rank Correlation Tests for Sample Organized by Style Groups

Tables 13A-E report the Spearman-Rho rank correlation tests for the samples when broken into their respective style groups. As with the dummy variable results for the samples broken into style groups we examine (and now report) the out-of-sample load-adjusted mean monthly return, the load-adjusted Sharpe ratio, the non-load-adjusted single-index alpha and the non-load-adjusted 4-index alpha. The results mirror the dummy variable results when the samples are organized by style. For the Aggressive Growth, Equity-Income and to a lesser extent the Small Company sample groups, we do not see much positive correlation between the Morningstar scores and the out-of-sample metrics. This is true for the overall 10 deciles, and the top-5 decile and bottom-5 decile rank tests. Again, the reason for this may be that the sample sizes are not large.[26] However, with the Growth and Growth-Income samples, we do see the same pattern as the overall Spearman-rho rank correlations tests in Table 12 suggest: low correlations using the top-5 deciles and higher correlations using the bottom-5 deciles. In fact, in the Growth fund sample, every bottom-5 decile

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[26] For the equity-income sample we did not perform the test over many samples since there were not enough observations to create the deciles. We required there to be at least 20 observations so that each decile would have at least two observations.

rank correlation is higher in value than the top-5 decile rank correlation. The results again suggest that the Morningstar scores are weak in terms of predicting high future performance and yet have some ability to predict underperforming funds.

IV.B. Complete Funds 1993 Sample Results

The "complete funds 1993" results are organized in three sections: dummy variable regressions for the overall sample, dummy variable regressions for samples organized by age, and dummy variable regressions organized by style.

IV.B.1. Dummy variable regressions for the overall sample

The results are presented on Table 14. They show the same patterns that were showcased in the "old" funds overall sample results. First, there is a relatively strong ability to predict low-performing funds, especially in the longer out-of-sample terms. Of the 18 coefficients for γ_3 (2-star) and γ_4 (1-star), 15 are negative and significant, indicating that low-rated funds do perform significantly worse in terms of risk-adjusted performance. Second, there is only weak ability to predict high-performing funds. Only 2 of the 9 coefficients for γ_2 (3-star) and 0 of the 9 coefficients for γ_1 (4-star) are negative and significant. In fact, only 5 of the 9 γ_1 (4-star) coefficients have the "correct" negative sign. Third, the Morningstar stars do a slightly better job of predicting out-of-sample performance when using the 4-index alpha. This may be the result of the fact that this measure takes into consideration more types of risk than the other out-of-sample performance metrics.

IV.B.2. Dummy variable regressions for samples organized by age

Tables 15A through 15C present the results for the dummy variable regressions in which we use samples organized by age. Table 15A reports the results for young funds (3 to less than 5 years of in-sample returns); Table 15B reports the middle-aged funds (5 to less than 10 years of in-sample returns); Table 15C reports the old funds (10 or more years of in-sample returns). The results show that there is evidence of an ability to predict poor future performance, especially among old and particularly middle-aged funds. Using the 4-index alpha for the middle-aged funds shows that the Morningstar stars have a strong ability to predict weak performance, as most of the coefficients for the lower rated funds are negative and strongly significant. Among the young funds, we do not see much evidence of ability to predict weak performance, but this is probably because there are no 1-star funds in the young funds sample group and relatively few young funds in the sample.

In terms predicting the high-performing funds, the Morningstar stars are, at best, mildly successful. In the middle-aged and old-fund sub-samples, only 5 of the 18 coefficients for γ_2 (3-star) are significant and negative, and yet 2 of the 18 are significant *and positive*, indicating that the 3-star funds perform better out-of-sample than the 5-star funds. Among the young funds many of the coefficients have the predicted negative signs, yet there is little ability to detect significantly different performance between median and high-rated funds.

IV.B.3. Dummy variable regressions for samples organized by style

Tables 16A through 16C show the dummy variable regressions where the samples are organized by style. As with the results of the old funds samples 1992-1997, we only report the results of two out-of-sample performance measures: the load-adjusted mean monthly return and the non-load-adjusted 4-index alpha. (The other out-of-sample performance are not presented but show essentially the same results; these results are available from the authors upon request.)

The results for low-performing funds are very similar to the old fund samples' results when the samples are organized by style. We see that only in the Growth and Growth-Income styles is there a relatively strong ability to predict low performance, as many of the coefficients for γ_3 (2-star) and γ_4 (1-star) are negative and significant. This is particularly the case in the longer out-of-sample periods.

In terms of predicting the high-performing funds, the Small Company, Aggressive Growth and Equity Income funds do not illustrate much ability in this regard. However, for the Growth and Growth-Income funds, there is evidence of ability to predict winning funds. For both the Growth and Growth-Income subsamples, almost all of the coefficients show the postulated negative sign, and many of the coefficients are significant for the Growth-Income subsample. Of course, the success of these subsamples may be largely related to the sample period. In our earlier analysis of the old funds samples, the 1993 subsamples provide some of the strongest support (albeit not that strong) for Morningstar stars predicting high-performing funds. It is questionable whether these results would carry over to other sample periods.[27]

IV.C. Load/No Load Counterparts for Out-of-Sample Data

As mentioned in Section IIIA, all the results of section IV were calculated using the load/no load counterparts of the out-of-sample performance measures, i.e. non-load-adjusted Sharpe ratios, non-load-adjusted excess mean monthly returns, and load-adjusted (using a dummy variable for loads in

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[27] The 1993 old fund samples show more predictability than most other samples whether using the Morningstar stars or the alternative predictors (see section V).

equation (7)) modified Jensen and 4-index alphas. The results were generally the same as those reported above.

V. Alternative Predictor Results

The results so far indicate that Morningstar ratings do not generally predict superior fund performance but do have some predictive power for poor-performing funds. Could an investor do as well by choosing funds based on alternative predictors?[28]

As stated in section IIE, to answer this question we examine several alternative predictors: a "naïve" predictor that uses in-sample mean monthly returns, an in-sample Sharpe ratio, an in-sample single-index alpha and an in-sample 4-index alpha.

As with the Morningstar star and score tests, we use the alternative predictors on both the old funds 1992-1997 sample group and the complete funds 1993 sample group. Hence we again have two different sets of results. Presenting all of the results for each alternative predictor in the same way as we did earlier in this paper for the Morningstar stars and scores would result in an unwieldy number of additional tables. Therefore, we summarize our results in just eight tables (Tables 17-20 for the old funds 1992-1997 sample and Tables 21-24 for the complete funds 1993 sample).

It also should be noted here that the results presented in Section V are primarily for the overall samples. Except for Table 24, we do not report the results for the samples that are organized by style or age. The alternative predictor results for the samples organized by style and age were generally similar to those presented in Section IV. They are available from the authors by request. Finally, as with section IV, all the regression results reported in section V were tested for heteroscedasticity using the White (1980) test. None of regression residuals exhibited evidence of heteroscedasticity at the 10 percent level.

V.A. 1992-1997 Old Funds Sample Results
V.A.1. Dummy Variable Regression Results

As mentioned in section IIIB, our approach for the alternative predictors is to rank the funds based on the in-sample alternative predictor. The funds are then put into five groups that match the number of funds that we have in each of the five Morningstar star groups. Hence, in this way we can construct the same dummy variable regression analysis as we used for the Morningstar stars.

Although there are nominally four alternative predictors, we actually have five different predictors, since we use two variants for the "naïve" predictor. The first variant allocates the

rankings simply on the basis of the in-sample mean monthly returns. Hence, if there were 15 5-star funds and 25 4-star funds, the highest 15 funds according to their in-sample mean monthly return would receive 5's and the next 25 would receive 4's. In the second variant, we first examine how many Morningstar stars were given within each style group. We then allocate rankings by rank ordering the funds by their in-sample mean monthly return within their various style groups. For example, in the 1992 sample there were 24 Aggressive Growth funds of which 0 funds received 5 stars, 5 funds received 4 stars, 8 funds received 3 stars, 6 funds received 2 stars and 5 funds received 1 star. Hence, we would rank the 24 Aggressive Growth funds by their in-sample mean month return and then give the top 5 Aggressive Growth funds 4's, the next 8 Aggressive Growth funds 3's, etc. In this way we use mean monthly returns as an alternative predictor and yet can still be sensitive to style differences.

For each of the five alternative predictors, equation (6) is then estimated for the 12 samples and for the 3 different out-of-sample performance measures. Hence, for each alternative predictor we calculate results that are similar in form to Tables 9A-C. Instead of presenting a multitude of tables[29] we summarize these results in Tables 17-19.

Table 17 summarizes the significance level results. The left-hand column reports the number of times out of 144 coefficients (4 coefficients, 12 samples, and 3 out-of-sample performance measures) that the predictor produces a significantly negative coefficient for γ_1, γ_2, γ_3, or γ_4. The next column reports the number of times that the predictor produces a significantly positive coefficient for γ_1, γ_2, γ_3, or γ_4. Hence, high numbers in the first column indicate a considerable amount of predictive ability for the predictor and high numbers in the second column indicate that the predictor is not very successful. The other columns give an indication of which of the coefficients, γ_1, γ_2, γ_3, or γ_4, were significantly negative. The results show several interesting findings. First, the Morningstar stars are in the middle of the pack in terms of predicting future performance. The naïve predictor that uses the styles and the single-index alpha predictor have very similar predictive performance to the Morningstar stars. The naïve predictor in which no adjustment is made for styles and the 4-index alpha generally does worse, and the Sharpe ratio does considerably better than the Morningstar stars. Second, for every predictor, including the Morningstar stars, the ability to predict high-performing funds is quite weak and yet the ability to predict low-performing funds is quite high. This result is consistent with those found in some other studies on performance predictability (see, e.g., Carhart (1997)), which have shown it is possible to predict losers but not winners in terms of mutual fund performance.

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[28] We thank Stephen Brown for suggesting an examination of that question.

Tables 18 and 19 complement Table 17. Table 18 provides information on where the negative and significant cases are located with respect to the out-of-sample measures. In general, the results are relatively evenly spread out among the three out-of-sample performance measures.

Table 19 examines the relative coefficient signs rather than the significance levels. Specifically, it reports the number of times that the coefficient sign for highly rated funds is greater than that for funds which are two levels worse in terms of ratings. That is, it examines the number of cases (out of a total of 36) where $\gamma_{0\,(5\text{-star})} > \gamma_{2\,(3\text{-star})}$, $\gamma_{1\,(4\text{-star})} > \gamma_{3\,(2\text{-star})}$, or $\gamma_{2\,(3\text{-star})} > \gamma_{4\,(1\text{-star})}$. The results are similar to those shown in the rest of the paper. First, on the basis of these coefficient signs, the Morningstar stars do not illustrate significantly better predictive ability than the other predictors. The Morningstar stars are again in the middle of the pack in terms of their success at predicting future performance. Second, all the predictors, regardless of what type, have more ability to predict low-performing funds. In fact, in at least 90 percent of the cases, the $\gamma_{2\,(3\text{-star})} > \gamma_{4\,(1\text{-star})}$ condition is satisfied for *every* predictor. Third, all the predictors, with the notable exception of the Sharpe ratio, have problems in predicting high-performing funds. For most predictors, the $\gamma_{0\,(5\text{-star})} > \gamma_{2\,(3\text{-star})}$ condition is satisfied 50 percent of the time or less.

V.A.2. Spearman-Rho Rank Correlation Results

Table 20 summarizes the Spearman-Rho rank correlation results for the alternative predictors.[30] The Spearman-Rho rank correlation tests are the same as those presented in Section *IV.A3* except that we use the alternative predictors to rank the funds rather than using the Morningstar scores. Again we use decile averages as described in section IIID. There are 6 samples (1994-1year, 1995-1year, 1996-1year, 1997-1year, 1994-3year, 1995-3year) and 3 out-of-sample performance metrics (load-adjusted Sharpe ratio, non-load-adjusted single-index alpha, and non-load-adjusted 4-index alpha).

Table 20 shows three columns: the number of cases (out of 18) in which the Spearman-Rho rank correlation coefficient for the entire 10 deciles is greater than 0.5; the number of cases in which the correlation for the top-5 deciles is greater than 0.5; the number of cases in which the correlation for the bottom-5 deciles is less than 0.5. The results show essentially the same findings as illustrated in the dummy variable results for the alternative predictors. First, the Morningstar scores are similar in predictive ability to other alternative predictors. Second, all the predictors, with the exception of the Sharpe ratio, have much higher Spearman-Rho rank correlations in the

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[29] These tables are available upon request from the authors.

[30] We do not use the predictor in which we allocate rankings using mean monthly returns by their style.

bottom-5 deciles than in the top, indicating that the predictors are better able to predict low-performing funds than high-performing funds.

V.B. Complete Funds 1993 Sample Results

V.B.1. Dummy Variable Regression Analysis

For the complete Funds 1993 sample, the alternative predictors are the same as those used above except that instead of ten years of in-sample data, we use three years of in-sample data to create the predictors. This is done because the young and middle-aged funds do not have the necessary ten years of in-sample data and all the funds must have a minimum of 3 years of historical returns to be rated by Morningstar.

The results for the alternative predictors using the complete funds 1993 sample are presented in Tables 21-24, which provide the same kind of information that Tables 17-19 provide for the 1992-1997 old funds sample. The difference is that the number of cases is much smaller since we only have three samples to work with rather than twelve. The results show that, unlike those from the old funds sample, the Morningstar star method does significantly better than the alternative predictors at predicting future performance. Table 21 reports that even though the alternative predictors have roughly the same number of significantly negative coefficients as the Morningstar stars, the alternative predictors generally produce many more significantly positive coefficients. This result may lead one to believe that the Morningstar method is superior, since it does not have nearly as many prediction errors. Moreover, as shown in Table 22, the significant and negative coefficient cases shown by the alternative predictors tend to be clustered when using the non-load-adjusted 4-index out-of-sample performance metric. The Morningstar stars, by contrast, have significantly negative coefficients spread more evenly across the three out-of-sample measures.

The apparent success of the Morningstar Star system is further demonstrated in Table 23. The Morningstar stars system produces coefficient signs that are in line with what one would expect if they had predictive ability. On the other hand, the alternative predictors do not have such strong results, particularly in the $\gamma_{0\ (5\text{-star})} > \gamma_{2\ (3\text{-star})}$ and $\gamma_{1\ (4\text{-star})} > \gamma_{3\ (2\text{-star})}$ cases.

A natural question arises at this stage: why does the Morningstar method fare better against the alternative predictors in the complete fund 1993 sample, when its predictive abilities were very similar to the alternative predictors in the 1992-1997 old funds sample? One possible answer to this question is that the Morningstar stars are based on up to ten years of return data. That is, a fund which has ten years or more of data will be judged not only on its 3-year returns,

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This is because it impossible to rank order all the funds using this method..

but also its 5-year and 10-year returns. A fund which has more than five years of return data will be judged on the 3-year and 5-year returns. However, our alternative predictors in the complete funds 1993 sample are all based on just *three* years of return data. Hence, for the majority of the funds (545 out of 635), Morningstar is using more information to allocate their stars than our alternative predictors.

To explore this issue further, we constructed Table 24. That table shows two sections: Young Funds and Old Funds. In the Young Funds section we examine the ability of the Morningstar stars and the "naïve" predictor which utilizes style differences to produce significantly negative coefficients. When just examining young funds, the Morningstar stars do not have an informational advantage since they are using the same three years of return data history. Table 24 shows clearly that there is very little difference between the Morningstar stars and the naïve predictor in terms of predictive ability when just examining the young funds.

In the Old Funds section we examine the predictive ability of the Morningstar stars, the naïve predictor in which we use three years of in-sample return history and the naïve predictor in which we use ten years of in-sample return history. The results are very illustrative and support our hypothesis. The naïve predictor that uses just three years of in-sample return data fares quite poorly relative to the Morningstar stars at predicting future performance. In fact, in nine of the 36 cases, it produces a significantly *positive* coefficient as compared to none for the Morningstar stars. However, when we compare the Morningstar stars to the naïve predictor that utilizes ten years of in-sample return data, the results are quite similar. Hence, it appears that the superior ability of the Morningstar stars reported in Tables 21-23 is more related to the fact that it using more information than the alternative predictors.

V.C. Load/No Load Counterparts for Out-of-Sample Data

As mentioned in Section IIIA, all the results of section V were calculated using the load/no load counterparts of the out-of-sample performance measures, i.e. non-load-adjusted Sharpe ratios, non-load-adjusted excess mean monthly returns, and load-adjusted (using a dummy variable for loads in equation (6)) modified Jensen and 4-index alphas. The results were generally the same as those reported above.

VI. Conclusions

This paper has investigated the degree to which the well-known Morningstar 5-star rating system is a predictor of out-of-sample mutual fund performance. This is an important issue because several past studies (e.g., Sirri and Tufano (1998) and Goetzmann and Peles (1997)) have shown that highly ranked funds attract the greatest investor cash inflow. We have used a data set based on domestic equity mutual funds which is free from survivorship bias, adjusted for load fees, and which allows us to examine the predictive qualities of the rating system over different time horizons, periods, fund investment styles, fund ages and with different out-of-sample performance metrics. We have also compared the predictive qualities of the Morningstar rating system with those of alternative predictors: a "naïve" predictor of in-sample historical average monthly returns, one- and four-index in-sample alphas, and in-sample Sharpe ratios. The results indicate several main findings.

First, Morningstar is able to "predict" low-performing funds. Generally speaking, funds with less than 3 stars generally have much worse future performance than other groups of funds. This result is relatively robust over different samples, ages of funds, styles of funds, out-of-sample performance measures, and whether load or non-load adjusted returns are used for the out-of-sample returns. Second, there is only weak statistical evidence that the 5-star (highest rated) funds out-perform the 4- and 3-star funds (next-to-highest and median-rated funds). Again, these results are robust over different samples, ages, out-of-sample performance measures, load assumptions, and styles. Third, the Morningstar ratings, at best, do only slight better, than alternative predictors in terms of predicting future fund performance. These alternative predictors include relatively naïve predictors such as those that use mean monthly returns, as well as Sharpe ratios, and Jensen and 4-index alphas. These results suggest that other approaches to developing predictors, such as a style approach (e.g., Brown and Goetzmann (1997) and Sharpe (1992), may be more informative.

It should be noted here that the first two results of our paper are broadly consistent with much of the mutual fund performance persistence literature: while it is relatively easy to predict poor performance, it is much more difficult to predict superior performance. The results listed above also suggest that investors should be very cautious about associating a highly rated fund with having superior future performance. Given that previous studies have shown that high-rated funds attract the bulk of investor cash inflows, our results suggest that those cash inflows are not necessarily justified by subsequent superior performance.

Finally, it should be noted that these results do not refute the Morningstar rating system. In almost all their publications, Morningstar states that the star ratings are not predictors of future performance, but rather "achievement" marks. However, the fact is that that many investors and

mutual funds use the ratings as indicators of future performance. Studies show that high Morningstar ratings are strongly related to large capital inflows and are well-used in marketing mutual funds to the public. This research has provided an answer to an important question that investors should ask: Do the star ratings actually predict out-of-sample performance?

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Table 1: Understanding Morningstar Risk

Month	Fund Return(%)	T-Bill Return	Underperformance
1	2.0	0.5	NA
2	-1.5	0.5	2.0
3	3.2	0.5	NA
4	1.2	0.4	NA
5	-4.0	0.6	4.6
6	2.1	0.5	NA
7	0.7	0.5	NA
8	2.3	0.5	NA
9	-1.7	0.5	2.2
10	2.4	0.4	NA
11	1.2	0.6	NA
12	-3.1	0.5	3.6
Total Underperformance			**13.2**

$$\frac{\text{Total Underperformance}}{\text{Total Number of Months}} = \frac{13.2}{12} = 1.10 \text{ is the average monthly underperfomance}$$

$$\frac{\text{Average Monthly Underperformance}}{\text{Average monthly Underperformance of investment category}} = \text{1-year Morningstar Risk}$$

Table 2: The Distribution, Average Star Ratings and Load Information for the Various Samples of the Old Funds 1992-1997 Sample Group. All funds have 10 years or more of in-sample returns.

January 1992

Total funds: 263
5-star funds: 18
4-star funds: 93
3-star funds: 111
2-star funds: 33
1-star funds: 8
Avg. Star Rating: 3.30
Std. Dev. of Star Rating: 0.89

Load-Funds:160

Front-Load Funds: 149
Avg.Annual Front-Load (of the 149): 5.55
Deferred-Load Funds: 11
Avg. Annual Def. Load (of the 11): 4.02
No-Load Funds: 103

Style Breakdown

Aggressive Growth funds: 24
Equity-Income funds: 17
Growth funds: 135
Growth-Income funds: 66
Small Company funds: 21

January 1993

Total funds: 269
5-star funds: 15
4-star funds: 92
3-star funds: 126
2-star funds: 33
1-star funds: 3
Avg. Star Rating: 3.31
Std. Dev. Of Star Rating: 0.80

Load-Funds: 160

  Front-Load Funds: 146
  Avg. Annual Front-Load (of the 146): 5.50
  Deferred-Load Funds: 15
  Avg. Annual Def. Load (of the 15): 4.27
No-Load Funds: 109

Style Breakdown

Aggressive Growth funds: 21
Equity-Income funds: 14
Growth funds: 134
Growth-Income funds: 73
Small Company funds: 27

January 1994

Total funds: 292
5-star funds: 16
4-star funds: 82
3-star funds: 136
2-star funds: 52
1-star funds: 6
Avg. Star Rating: 3.17
Std. Dev. of Star Rating: 0.86

Load-Funds: 160

Front-Load Funds: 143
Avg. Annual Front-Load (of the 143): 5.26
Deferred-Load Funds: 17
Avg. Annual Def. Load (of the 17): 4.29
No-Load Funds: 132

Style Breakdown

Aggressive Growth funds: 20
Equity-Income funds:14
Growth funds: 141
Growth-Income funds: 84
Small Company funds: 33

January 1995

Total funds: 332
5-star funds: 18
4-star funds: 87
3-star funds: 151
2-star funds: 65
1-star funds: 11
Avg. Star Rating: 3.11
Std. Dev. of Star Rating: 0.89

Load-Funds: 173

  Front-Load Funds: 153
  Avg. Annual Front-Load (of the 153): 5.13
  Deferred-Load Funds: 20
  Avg. Annual Def. Load (of the 20): 4.30
No-Load Funds: 159

Style Breakdown

Aggressive Growth funds: 25
Equity-Income funds: 15
Growth funds: 158
Growth-Income funds: 97
Small Company funds: 37

Table 2 continued:

January 1996	**January 1997**
Total funds: 371	Total funds: 408
5-star funds: 27	5-star funds: 24
4-star funds: 111	4-star funds: 115
3-star funds: 167	3-star funds: 160
2-star funds: 56	2-star funds: 96
1-star funds: 10	1-star funds: 13
Avg. Star Rating: 3.24	Avg. Star Rating: 3.10
Std. Dev. Of Star Rating: 0.89	Std. Dev. of Star Rating: 0.93
Load-Funds: 183	**Load-Funds: 203**
Front-Load Funds: 159	Front-Load Funds: 174
Avg. Annual Front-Load (of the 159):5.17	Avg. Annual Front-Load (of the 174):5.16
Deferred-Load Funds: 24	Deferred-Load Funds: 24
Avg. Annual Def. Load (of the 24): 4.00	Avg. Annual Def. Load (of the 24): 4.03
No-Load Funds: 188	No-Load Funds: 205
Style Breakdown	**Style Breakdown**
Aggressive Growth funds: 25	Aggressive Growth funds: 30
Equity-Income funds: 24	Equity-Income funds: 27
Growth funds: 170	Growth funds: 184
Growth-Income funds: 105	Growth-Income funds: 114
Small Company funds: 47	Small Company funds: 53

Table 3: Distribution of Stars by Style for 1992-1997 Old funds sample group. All funds listed have 10 years or more of in-sample returns.

Sample: 1992

Aggressive Growth (AG)	**Equity-Income (EI)**	**Growth (GR)**	**Growth-Income (GI)**	**Small Company (SC)**
Total funds: 24	Total funds: 17	Total funds: 135	Total funds: 66	Total funds: 21
MorningstarStar Breakdown	MorningstarStar Breakdown	MorningstarStar Breakdown	MorningstarStar Breakdown	MorningstarStar Breakdown
5-star funds: 0	5-star funds: 1	5-star funds: 11	5-star funds: 5	5-star funds: 1
4-star funds: 5	4-star funds: 10	4-star funds: 41	4-star funds: 34	4-star funds: 3
3-star funds: 8	3-star funds: 6	3-star funds: 69	3-star funds: 21	3-star funds: 7
2-star funds: 6	2-star funds: 0	2-star funds: 13	2-star funds: 6	2-star funds: 8
1-star funds: 5	1-star funds: 0	1-star funds: 0	1-star funds: 0	1-star funds: 2
Avg. Star Rating: 2.52	Avg. Star Rating: 3.71	Avg. Star Rating: 3.36	Avg. Star Rating: 3.58	Avg. Star Rating: 2.67
Std.Dev Star Rating: 1.06	Std.Dev.Star Rating: 0.99	Std.Dev.Star Rating: 0.80	Std. Dev. Star Rating: 0.77	Std.Dev.Star Rating: 1.02

Sample: 1993

Aggressive Growth (AG)	**Equity-Income (EI)**	**Growth (GR)**	**Growth-Income (GI)**	**Small Company (SC)**
Total funds: 21	Total funds: 14	Total funds: 134	Total funds: 73	Total funds: 27
MorningstarStar Breakdown	MorningstarStar Breakdown	MorningstarStar Breakdown	MorningstarStar Breakdown	MorningstarStar Breakdown
5-star funds: 0	5-star funds: 1	5-star funds: 11	5-star funds: 2	5-star funds: 1
4-star funds: 5	4-star funds: 7	4-star funds: 38	4-star funds: 38	4-star funds: 4
3-star funds: 8	3-star funds: 5	3-star funds: 68	3-star funds: 28	3-star funds: 17
2-star funds: 7	2-star funds: 1	2-star funds: 16	2-star funds: 4	2-star funds: 5
1-star funds: 1	1-star funds: 0	1-star funds: 1	1-star funds: 1	1-star funds: 0
Avg. Star Rating: 2.81	Avg. Star Rating: 3.57	Avg. Star Rating: 3.31	Avg. Star Rating: 3.49	Avg. Star Rating: 3.04
Std.Dev Star Rating: 3.57	Std.Dev.Star Rating: 0.70	Std.Dev.Star Rating: 0.82	Std. Dev. Star Rating: 0.71	Std.Dev.Star Rating: 0.71

Sample: 1994

Aggressive Growth (AG)	**Equity-Income (EI)**	**Growth (GR)**	**Growth-Income (GI)**	**Small Company (SC)**
Total funds: 20	Total funds: 14	Total funds: 141	Total funds: 84	Total funds: 33
MorningstarStar Breakdown	MorningstarStar Breakdown	MorningstarStar Breakdown	MorningstarStar Breakdown	MorningstarStar Breakdown
5-star funds: 0	5-star funds: 1	5-star funds: 12	5-star funds: 2	5-star funds: 1
4-star funds: 6	4-star funds: 9	4-star funds: 28	4-star funds: 34	4-star funds: 5
3-star funds: 6	3-star funds: 2	3-star funds: 73	3-star funds: 40	3-star funds: 15
2-star funds: 7	2-star funds: 2	2-star funds: 26	2-star funds: 5	2-star funds: 12
1-star funds: 1	1-star funds: 0	1-star funds: 2	1-star funds: 3	1-star funds: 0
Avg. Star Rating: 2.85	Avg. Star Rating: 3.64	Avg. Star Rating: 3.16	Avg. Star Rating: 3.32	Avg. Star Rating: 2.85
Std.Dev Star Rating: 0.93	Std.Dev.Star Rating: 0.84	Std.Dev.Star Rating: 0.87	Std. Dev. Star Rating: 0.78	Std.Dev.Star Rating: 0.80

Table 3 continued:

Sample: 1995

__Aggressive Growth (AG)__	__Equity-Income (EI)__	__Growth (GR)__	__Growth-Income (GI)__	__Small Company (SC)__
Total funds: 25	Total funds: 15	Total funds: 158	Total funds: 97	Total funds: 37
MorningstarStar Breakdown	MorningstarStar Breakdown	MorningstarStar Breakdown	MorningstarStar Breakdown	MorningstarStar Breakdown
5-star funds: 3	5-star funds: 0	5-star funds: 7	5-star funds: 4	5-star funds: 4
4-star funds: 6	4-star funds: 3	4-star funds: 42	4-star funds: 27	4-star funds: 9
3-star funds: 9	3-star funds: 10	3-star funds: 67	3-star funds: 50	3-star funds: 15
2-star funds: 5	2-star funds: 2	2-star funds: 35	2-star funds: 14	2-star funds: 9
1-star funds: 2	1-star funds: 0	1-star funds: 7	1-star funds: 2	1-star funds: 0
Avg. Star Rating: 3.12	Avg. Star Rating: 3.07	Avg. Star Rating: 3.04	Avg. Star Rating: 3.18	Avg. Star Rating: 3.22
Std.Dev Star Rating: 1.13	Std.Dev.Star Rating: 0.59	Std.Dev.Star Rating: 0.92	Std. Dev. Star Rating: 0.80	Std.Dev.Star Rating: 0.95

Sample: 1996

__Aggressive Growth (AG)__	__Equity-Income (EI)__	__Growth (GR)__	__Growth-Income (GI)__	__Small Company (SC)__
Total funds: 25	Total funds: 24	Total funds: 170	Total funds: 105	Total funds: 47
MorningstarStar Breakdown	MorningstarStar Breakdown	MorningstarStar Breakdown	MorningstarStar Breakdown	MorningstarStar Breakdown
5-star funds: 3	5-star funds: 2	5-star funds: 12	5-star funds: 5	5-star funds: 5
4-star funds: 7	4-star funds: 9	4-star funds: 49	4-star funds: 34	4-star funds: 12
3-star funds: 7	3-star funds: 11	3-star funds: 70	3-star funds: 58	3-star funds: 21
2-star funds: 6	2-star funds: 2	2-star funds: 35	2-star funds: 5	2-star funds: 8
1-star funds: 2	1-star funds: 0	1-star funds: 4	1-star funds: 3	1-star funds: 1
Avg. Star Rating: 3.12	Avg. Star Rating: 3.46	Avg. Star Rating: 3.18	Avg. Star Rating: 3.31	Avg. Star Rating: 3.26
Std.Dev Star Rating: 1.17	Std.Dev.Star Rating: 0.78	Std.Dev.Star Rating: 0.92	Std. Dev. Star Rating: 0.76	Std.Dev.Star Rating: 0.94

Sample: 1997

__Aggressive Growth (AG)__	__Equity-Income (EI)__	__Growth (GR)__	__Growth-Income (GI)__	__Small Company (SC)__
Total funds: 30	Total funds: 27	Total funds: 184	Total funds: 114	Total funds: 53
MorningstarStar Breakdown	MorningstarStar Breakdown	MorningstarStar Breakdown	MorningstarStar Breakdown	MorningstarStar Breakdown
5-star funds: 1	5-star funds: 2	5-star funds: 11	5-star funds: 9	5-star funds: 1
4-star funds: 4	4-star funds: 11	4-star funds: 50	4-star funds: 42	4-star funds: 8
3-star funds: 10	3-star funds: 10	3-star funds: 65	3-star funds: 54	3-star funds: 21
2-star funds: 10	2-star funds: 4	2-star funds: 54	2-star funds: 8	2-star funds: 20
1-star funds: 5	1-star funds: 0	1-star funds: 4	1-star funds: 1	1-star funds: 3
Avg. Star Rating: 2.53	Avg. Star Rating: 3.41	Avg. Star Rating: 3.05	Avg. Star Rating: 3.44	Avg. Star Rating: 2.70
Std.Dev Star Rating: 1.04	Std.Dev.Star Rating: 0.84	Std.Dev.Star Rating: 0.95	Std. Dev. Star Rating: 0.78	Std.Dev.Star Rating: 0.87

Table 4: Summary of the Complete Funds 1993 Sample Group

Total funds: 635

Morningstar Star Breakdown
5-star funds: 54
4-star funds: 203
3-star funds: 282
2-star funds: 89
1-star funds: 7
Avg. Star Rating: 3.33
Std. Dev. of Star Rating: 0.86

Age of Fund Breakdown (age as of Jan. 1993)
Young Funds: 90   (3 to 5 years of historical returns)
Middle-Aged Funds: 276   (5 to 10 years of historical returns)
Old-Funds: 269   (over 10 years of historical returns)

Style Breakdown (listed as the following style ("investment objective") in 1993)
Aggressive Growth Funds: 44
Equity-Income Funds: 45
Growth Funds: 302
Growth-Income Funds: 164
Small Company Funds: 80

Load-Breakdown
Load Funds: 358
   Front-Load Funds: 301
   Avg. Annual Front -Load (of the 301): 5.14%
   Deferred-Load Funds: 58
   Avg. Annual Def. Load (of the 58): 4.67%
No-Load Funds: 277

Table 5: Fund Breakdown by Style for the Complete Funds 1993 Sample Group

Aggressive Growth (AG)	Equity-Income (EI)	Growth (GR)	Growth-Income (GI)	Small Company (SC)
Total funds: 44	Total funds: 45	Total funds: 302	Total funds: 164	Total funds: 80
MorningstarStar Breakdown	MorningstarStar I Breakdown	MorningstarStar Breakdown	MorningstarStar Breakdown	MorningstarStar Breakdown
5-star funds: 3	5-star funds: 2	5-star funds: 30	5-star funds: 7	5-star funds: 12
4-star funds: 10	4-star funds: 16	4-star funds: 89	4-star funds: 65	4-star funds: 23
3-star funds: 17	3-star funds: 25	3-star funds: 135	3-star funds: 77	3-star funds: 28
2-star funds: 11	2-star funds: 2	2-star funds: 45	2-star funds: 14	2-star funds: 17
1-star funds: 3	1-star funds: 0	1-star funds: 3	1-star funds: 1	1-star funds: 0
Avg. Star Rating: 2.98	Avg. Star Rating: 3.40	Avg. Star Rating: 3.33	Avg. Star Rating: 3.38	Avg. Star Rating: 3.38
Std.Dev Star Rating: 1.02	Std.Dev.Star Rating: 0.65	Std.Dev.Star Rating: 0.88	Std. Dev. Star Rating: 0.73	Std.Dev.Star Rating: 0.99

MorningstarStar Breakdown	% of AG funds	MorningstarStar Breakdown	% of EI funds	MorningstarStar Breakdown	% of GR funds	MorningstarStar Breakdown	% of GI funds	MorningstarStar Breakdown	% of SC funds
Young Funds: 2	4%	Young Funds: 12	27%	Young Funds: 46	15%	Young Funds: 19	12%	Young Funds: 11	14%
Middle Funds: 21	48%	Middle Funds: 19	42%	Middle Funds: 122	40%	Middle Funds: 72	44%	Middle Funds: 42	53%
Old Funds: 21	48%	Old Funds: 14	31%	Old Funds: 134	45%	Old Funds: 73	44%	Old Funds: 27	33%

Table 6: Fund Breakdown By Age for the Complete Funds 1993 Sample Group

Young Funds		Middle-Aged Funds		Old Funds	
Total funds: 90		**Total funds: 276**		**Total funds: 269**	
MorningstarStar Breakdown	% of young funds	MorningstarStar Breakdown	% of middle funds	MorningstarStar Breakdown	% of old funds
5-star funds: 10	11%	5-star funds: 29	11%	5-star funds: 15	6%
4-star funds: 23	25%	4-star funds: 88	32%	4-star funds: 92	34%
3-star funds: 41	46%	3-star funds: 115	42%	3-star funds: 126	47%
2-star funds: 16	18%	2-star funds: 40	15%	2-star funds: 33	12%
1-star funds: 0	0%	1-star funds: 4	2%	1-star funds: 3	1%
Avg. Star Rating: 3.30		Avg. Star Rating: 3.36		Avg. Star Rating: 3.31	
Std. Dev. of Star Rating: 0.33		Std. Dev. of Star Rating: 0.91		Std. Dev. of Star Rating: 0.80	
Style Breakdown:	% of young funds	Style Breakdown:	% of middle funds	Style Breakdown:	% of old funds
Aggressive Growth: 2	2%	Aggressive Growth: 21	8%	Aggressive Growth: 21	8%
Equity-Income: 12	13%	Equity-Income: 19	7%	Equity-Income: 14	5%
Growth: 46	51%	Growth: 122	44%	Growth: 134	50%
Growth-Income: 19	21%	Growth-Income: 72	26%	Growth-Income: 73	27%
Small Company: 11	12%	Small Company: 42	15%	Small Company: 27	10%

Table 7: Summary of number of funds in each out-of-sample period for the 1992-1997 Old Funds Sample Group.

All funds have 10 or more years of in-sample returns.

Sample Name	Date of Morningstar Rating	Out of Sample Period (date)	Number of funds in the sample	Number of merger and liquidated funds	Number of Funds* that change their Morningstar style** by the end of the out-of-sample period
92-1year	January 1992	1992	263	8	7
92-3year	January 1992	1992-1994	263	21	17
92-5year	January 1992	1992-1996	263	27	30
93-1year	January 1993	1993	269	8	9
93-3year	January 1993	1993-1995	269	15	16
93-5year	January 1993	1993-1997	269	28	28
94-1year	January 1994	1994	292	4	7
94-3year	January 1994	1994-1996	292	16	20
95-1year	January 1995	1995	332	4	8
95-3year	January 1995	1995-1997	332	21	23
96-1year	January 1996	1996	371	12	18
97-1year	January 1997	1997	408	10	8

* funds that merged or were liquidated by the end of the sample period were not counted

** synomous with "investment objective".

Table 8: Summary of number of funds in each out-of-sample period for the Complete Funds 1993 Sample Group

Sample Name	Date of Morningstar Rating	Out of Sample Period (date)	# of funds in the sample	Number of merger and liquidated funds	# funds that change their Morningstar style** by the end of the out-of-sample period
93-1year	January 1993	1993	635	24	16
93-3year	January 1993	1993-1995	635	67	46
93-5year	January 1993	1993-1997	635	97	68

* funds that merged or were liquidated by the end of the sample period were not counted
** synomous with "investment objective".

Table 9A: Dummy Variable Regressions Using Morningstar Stars

Sample: Funds with 10 years or more of in-sample returns (Old Funds 1992-1997 Sample Group)

Out-of-Sample Performance Measure: The Load-Adjusted Sharpe Ratio

Sample	γ_0 (constant)	γ_1 (4-star)	γ_2 (3-star)	γ_3 (2-star)	γ_4 (1-star)	R^2	F-stat
One-Year							
1992-1year	0.06	0.11*	0.07	0.06	0.01	0.02	1.13
	(1.09)	(1.76)	(1.12)	(0.78)	(0.10)		
1993-1year	0.26**	-0.03	-0.05	-0.11	-0.21	0.02	1.27
	(4.13)	(0.42)	(0.78)	(1.51)	(1.40)		
1994-1year	-0.18**	-0.05	-0.05	-0.09*	-0.32**	0.05	4.11**
	(3.92)	(1.02)	(1.02)	(1.69)	(3.74)		
1995-1year	0.69**	0.14*	0.10	-0.03	-0.42**	0.11	10.31**
	(9.29)	(1.77)	(1.37)	(0.35)	(3.51)		
1996-1year	0.25**	0.05	0.02	-0.03	-0.15**	0.06	5.82**
	(8.19)	(1.51)	(0.55)	(0.92)	(2.67)		
1997-1year	0.39**	-0.03	-0.07**	-0.15**	-0.35**	0.17	20.28**
	(12.69)	(0.91)	(2.23)	(4.36)	(6.72)		
Three-Year							
1992-3year	0.01	0.05	0.04	0.06*	0.01	0.02	1.01
	(0.07)	(1.50)	(1.36)	(1.84)	(0.21)		
1993-3year	0.28**	-0.03	-0.06*	-0.14**	-0.12	0.08	5.51**
	(8.99)	(1.02)	(1.70)	(3.66)	(1.57)		
1994-3year	0.26**	-0.01	-0.02	-0.08**	-0.32**	0.15	12.88**
	(8.87)	(0.01)	(0.61)	(2.23)	(5.68)		
1995-3year	0.42**	0.03	0.01	-0.04	-0.26**	0.12	11.66**
	(12.61)	(0.74)	(0.34)	(1.10)	(4.79)		
Five-Year							
1992-5year	0.24**	0.01	-0.01	-0.01	-0.11**	0.03	2.30*
	(9.91)	(0.18)	(0.32)	(0.31)	(2.50)		
1993-5year	0.34**	-0.04	-0.06**	-0.13**	-0.08	0.08	6.09**
	(12.65)	(1.31)	(2.06)	(4.03)	(1.25)		

T-statistics are in parenthesis.
* indicates significance at the 10 percent level.
**indicates significance at the 5 percent level.

Table 9B: Dummy Variable Regressions Using Morningstar Stars

Sample: Funds with 10 years or more of in-sample returns (Old Funds 1992-1997 Sample Group)

Out-of-Sample Performance Measure: The Non-Load-Adjusted Jensen Index Model Alpha

Sample	$\gamma_{0\ (constant)}$	$\gamma_{1\ (4\text{-star})}$	$\gamma_{2\ (3\text{-star})}$	$\gamma_{3\ (2\text{-star})}$	$\gamma_{4\ (1\text{-star})}$	R^2	F-stat
One-Year							
1992-1year	-0.21*	0.23*	0.26**	0.25*	0.22	0.02	1.06
	(1.77)	(1.77)	(2.05)	(1.68)	(1.02)		
1993-1year	0.25*	-0.01	-0.02	-0.01	-0.49	0.01	0.61
	(1.80)	(0.09)	(0.15)	(0.08)	(1.47)		
1994-1year	-0.18	-0.09	-0.09	-0.28**	-1.38**	0.13	11.15**
	(1.48)	(0.68)	(0.70)	(1.96)	(5.80)		
1995-1year	-0.36**	0.17	0.10	-0.08	-1.01**	0.12	10.95**
	(2.62)	(1.11)	(0.68)	(0.53)	(4.49)		
1996-1year	-0.47**	0.30**	0.26**	0.09	-0.22	0.06	5.60**
	(5.04)	(2.93)	(2.56)	(0.78)	(1.25)		
1997-1year	-0.40**	-0.13	0.03	-0.34**	-1.09**	0.11	12.18**
	(2.65)	(0.77)	(0.21)	(2.02)	(4.25)		
Three-Year							
1992-3year	-0.14*	0.12	0.11	0.18**	-0.01	0.02	1.32
	(1.93)	(1.50)	(1.41)	(2.01)	(0.05)		
1993-3year	-0.02	-0.04	-0.13	-0.32**	-0.33	0.06	4.55**
	(0.27)	(0.40)	(1.39)	(2.90)	(1.50)		
1994-3year	-0.27**	0.06	-0.01	-0.20*	-1.07**	0.16	14.05**
	(2.71)	(0.56)	(0.14)	(1.80)	(5.70)		
1995-3year	-0.48**	0.23**	0.20*	0.04	-0.66**	0.13	12.39**
	(4.74)	(2.03)	(1.86)	(0.35)	(4.00)		
Five-Year							
1992-5year	-0.13**	0.05	-0.02	0.02	-0.41**	0.08	5.55**
	(2.05)	(0.76)	(0.23)	(0.20)	(3.55)		
1993-5year	-0.06	-0.09	-0.20**	-0.37**	-0.34*	0.10	7.21**
	(0.73)	(1.02)	(2.45)	(3.94)	(1.81)		

T-statistics are in parenthesis.
* indicates significance at the 10 percent level.
**indicates significance at the 5 percent level.

Table 9C: Dummy Variable Regressions Using Morningstar Stars

Sample: Funds with 10 years or more of in-sample returns (Old Funds 1992-1997 Sample Group)

Out-of-Sample Performance Measure: The Non-Load-Adjusted 4-Index Model Alpha

Sample	γ_0 (constant)	γ_1 (4-star)	γ_2 (3-star)	γ_3 (2-star)	γ_4 (1-star)	R^2	F-stat
One-Year							
1992-1year	-0.20**	0.16	0.18*	0.10	-0.24	0.04	2.78**
	(2.03)	(1.55)	(1.77)	(0.82)	(1.41)		
1993-1year	0.11	0.02	0.07	0.04	-0.60*	0.02	1.46
	(0.91)	(0.17)	(0.51)	(0.28)	(1.95)		
1994-1year	-0.08	-0.09	-0.13	-0.30**	-1.31**	0.13	10.55**
	(0.68)	(0.68)	(1.04)	(2.17)	(5.67)		
1995-1year	0.07	-0.05	-0.14	-0.19	-1.09**	0.10	9.38**
	(0.55)	(0.32)	(1.00)	(1.34)	(5.21)		
1996-1year	-0.06	0.12	0.08	0.05	-0.18	0.02	1.48
	(0.74)	(1.34)	(0.86)	(0.48)	(1.12)		
1997-1year	-0.08	0.08	0.15	0.16	-0.30*	0.03	2.71**
	(0.74)	(0.66)	(1.27)	(1.31)	(1.65)		
Three-Year							
1992-3year	-0.12**	0.09	0.07	0.11	-0.25**	0.05	3.58**
	(2.00)	(1.30)	(1.10)	(1.38)	(2.25)		
1993-3year	0.02	-0.04	-0.06	-0.19*	-0.32	0.02	1.66
	(0.19)	(0.41)	(0.62)	(1.72)	(1.47)		
1994-3year	-0.03	-0.04	-0.06	-0.11	-1.05**	0.13	10.78**
	(0.33)	(0.40)	(0.60)	(1.09)	(5.88)		
1995-3year	-0.02	0.03	-0.01	-0.02	-0.61**	0.10	9.11**
	(0.20)	(0.38)	(0.17)	(0.28)	(4.77)		
Five-Year							
1992-5year	-0.03	0.02	-0.01	-0.06	-0.39**	0.09	6.56**
	(0.57)	(0.26)	(0.22)	(0.91)	(4.01)		
1993-5year	0.06	-0.08	-0.08	-0.16*	-0.26	0.02	1.34
	(0.90)	(1.12)	(1.12)	(1.93)	(1.53)		

T-statistics are in parenthesis.
* indicates significance at the 10 percent level.
**indicates significance at the 5 percent level.

Table 10: Excess Mean Monthly Returns of S&P500 Index Across Different Sample Periods

Sample	S&P 500 Excess Mean Monthly Return
1992	0.35
1993	0.57
1994	-0.17
1995	2.24
1996	1.37
1997	2.10
1992-1994	0.25
1993-1995	0.88
1994-1996	1.15
1995-1997	1.90
1992-1996	0.87
1993-1997	1.22

Excess Returns calculated by subtracting the one -month T-Bill rate from the Monthly return.

Sample: ***Aggressive Growth*** funds with 10 years or more of in -sample returns (Old Funds 1992 - 1997 Sample Group)

Out-of-Sample Performance Measure: ***Load-Adjusted Excess Mean Monthly Returns***

Sample	γ_0 (constant)	γ_1 (group4)	γ_2 (group 3)	γ_3 (group 2)	γ_4 (group 1)	R^2	F-stat
One-Year							
1992-1year	0.69**	-0.43	-0.29	-0.53	NA	0.07	0.52
	(2.08)	(0.92)	(0.68)	(1.18)			
1993-1year	0.33	0.49	0.46	0.74	NA	0.06	0.37
	(0.44)	(0.59)	(0.58)	(0.92)			
1994-1year	-1.32	0.27	0.46	0.28	NA	0.02	0.11
	(1.53)	(0.29)	(0.50)	(0.31)			
1995-1year	1.49**	0.46	0.53	-0.73	0.34	0.17	1.03
	(2.17)	(0.54)	(0.67)	(0.84)	(0.32)		
1996-1year	0.35	0.10	0.37	0.43	-0.38	0.17	1.01
	(1.04)	(0.23)	(0.91)	(1.05)	(0.70)		
1997-1year	0.70	0.37	0.29	-0.12	0.51	0.06	0.40
	(0.66)	(0.32)	(0.26)	(0.11)	(0.44)		
Three-year							
1992-3year	0.08	0.04	0.08	0.12	NA	0.02	0.14
	(0.57)	(0.22)	(0.43)	(0.61)			
1993-3year	0.47	0.23	0.36	0.05	NA	0.06	0.34
	(0.70)	(0.33)	(0.53)	(0.07)			
1994-3year	0.28	0.35	0.43	0.21	NA	0.02	0.11
	(0.31)	(0.37)	(0.45)	(0.22)			
1995-3year	1.03**	0.26	0.27	0.20	0.20	0.06	0.34
	(4.95)	(1.02)	(1.12)	(0.75)	(0.61)		
Five-year							
1992-5year	0.26	0.32	0.48**	0.53**	NA	0.28	2.54*
	(1.65)	(1.45)	(2.39)	(2.49)			
1993-5year	0.70*	-0.05	0.20	0.13	NA	0.07	0.45
	(1.77)	(0.12)	(0.47)	(0.30)			

T-statistics are in parenthesis.   NA—indicates no funds with this star rating.
 * indicates significance at the 10 percent level.
**indicates significance at the 5 percent level.

Table 11B: Dummy Variable Regressions Using Morningstar Stars–Samples Broken into Style Groups

Sample: *Equity-Income* funds with 10 years or more of in -sample returns (Old Funds 1992 -1997 Sample Group)

Out-of-Sample Performance Measure: *Load-Adjusted Excess Mean Monthly Returns*

Sample	γ_0 (constant)	γ_1 (group4)	γ_2 (group 3)	γ_3 (group 2)	γ_4 (group 1)	R^2	F-stat
One-Year							
1992-1year	0.10	0.40	0.11	NA	NA	0.10	0.75
	(0.20)	(0.74)	(0.19)				
1993-1year	1.07**	-0.32	-0.79**	-0.50	NA	0.39	2.17
	(2.96)	(0.84)	(1.98)	(0.98)			
1994-1year	-0.63	-0.06	-0.35	-0.13	NA	0.07	0.26
	(1.43)	(0.13)	(0.65)	(0.24)			
1995-1year	1.52**	NA	-0.01	-0.15	NA	0.04	0.22
	(9.41)		(0.03)	(0.57)			
1996-1year	0.98**	-0.11	-0.34*	-0.62**	NA	0.34	3.46**
	(5.43)	(0.54)	(1.74)	(2.44)			
1997-1year	1.69**	-0.18	-0.55**	-0.35	NA	0.41	5.38**
	(9.81)	(0.97)	(2.93)	(1.66)			
Three-year							
1992-3year	0.09	0.08	0.03	NA	NA	0.01	0.09
	(0.33)	(0.28)	(0.10)				
1993-3year	0.68**	-0.08	-0.13	0.13	NA	0.10	0.38
	(2.91)	(0.34)	(0.50)	(0.40)			
1994-3year	0.62**	0.01	-0.01	0.13	NA	0.03	0.11
	(2.28)	(0.04)	(0.02)	(0.38)			
1995-3year	1.44**	NA	-0.10	-0.38**	NA	0.30	2.52
	(13.33)		(0.83)	(2.20)			
Five-year							
1992-5year	0.55**	0.05	0.10	NA	NA	0.02	0.17
	(2.83)	(0.23)	(0.46)				
1993-5year	0.91**	-0.06	-0.08	0.14	NA	0.07	0.27
	(3.98)	(0.26)	(0.31)	(0.42)			

T-statistics are in parenthesis.   NA —indicates no funds with this star rating.
* indicates significance at the 10 percent level.
**indicates significance at the 5 percent level.

Table 11C: Dummy Variable Regressions Using Morningstar Stars–Samples Broken into Style Groups

Sample: *Growth* funds with 10 years or more of in -sample retur ns (Old Funds 1992 -1997 Sample Group)

Out-of-Sample Performance Measure: *Load-Adjusted Excess Mean Monthly Returns*

Sample	$\gamma_{0\ (constant)}$	$\gamma_{1(group4)}$	$\gamma_{2\ (group\ 3)}$	$\gamma_{3\ (group\ 2)}$	$\gamma_{4\ (group\ 1)}$	R^2	F-stat
One-Year							
1992-1year	0.21	0.11	0.15	0.02	-0.02	0.01	0.28
	(1.18)	(0.56)	(0.80)	(0.07)	(0.04)		
1993-1year	0.62**	-0.16	-0.25	-0.47**	-0.23	0.04	1.20
	(3.45)	(0.78)	(1.29)	(2.00)	(0.37)		
1994-1year	-0.61**	0.01	-0.11	-0.40**	-1.27**	0.12	4.50**
	(3.91)	(0.05)	(0.64)	(2.12)	(3.08)		
1995-1year	1.82**	-0.10	-0.28	-0.34	-1.32**	0.16	7.45**
	(8.42)	(0.43)	(1.23)	(1.42)	(4.36)		
1996-1year	0.83**	0.13	0.02	-0.14	-0.35	0.05	2.15*
	(5.87)	(0.83)	(0.13)	(0.86)	(1.24)		
1997-1year	1.41**	-0.01	-0.05	-0.29	-1.51**	0.13	6.73**
	(7.60)	(0.01)	(0.26)	(1.40)	(4.18)		
Three-year							
1992-3year	0.02	0.06	0.06	0.09	0.03	0.01	0.10
	(0.22)	(0.48)	(0.53)	(0.61)	(0.09)		
1993-3year	0.78**	-0.14	-0.24**	-0.52**	-0.23	0.12	4.25**
	(7.26)	(1.21)	(2.08)	(3.70)	(0.61)		
1994-3year	0.72**	0.05	0.02	-0.15	-1.02**	0.13	5.10**
	(7.09)	(0.40)	(0.21)	(1.24)	(3.81)		
1995-3year	1.43**	0.01	-0.11	-0.14	-0.73**	0.11	4.83**
	(0.19)	(0.01)	(0.68)	(0.82)	(3.29)		
Five-year							
1992-5year	0.62**	0.01	-0.01	0.01	-0.02	0.01	0.02
	(7.22)	(0.07)	(0.05)	(0.04)	(0.06)		
1993-5year	1.04**	-0.15	-0.19*	-0.44**	-0.19	0.10	3.77**
	(11.06)	(1.37)	(1.83)	(3.60)	(0.58)		

T-statistics are in parenthesis.
* indicates significance at the 10 percent level.
**indicates significance at the 5 percent level.

Table 11D: Dummy Variable Regressions Using Morningstar Stars–Samples Broken into Style Groups

Sample: *Growth-Income* funds with 10 years or more of in -sample returns (Old Funds 1992 -1997 Sample Group)

Out-of-Sample Performance Mea sure: *Load-Adjusted Excess Mean Monthly Returns*

Sample	γ_0 (constant)	γ_1 (group4)	γ_2 (group 3)	γ_3 (group 2)	γ_4 (group 1)	R^2	F-stat
One-Year							
1992-1year	0.05	0.26	0.34*	0.71**	NA	0.14	3.37**
	(0.31)	(1.37)	(1.73)	(2.99)			
1993-1year	0.03	0.36	0.56	0.43	-0.28	0.09	1.75
	(0.08)	(1.05)	(1.63)	(1.07)	(0.48)		
1994-1year	-0.45	-0.17	-0.24	-0.37	-1.72**	0.27	7.45**
	(1.32)	(0.45)	(0.68)	(0.90)	(3.92)		
1995-1year	1.55**	0.07	0.02	-0.01	-1.63**	0.25	7.62**
	(7.33)	(0.29)	(0.12)	(0.05)	(4.43)		
1996-1year	1.23**	-0.27	-0.35*	-0.37	-0.95**	0.08	2.32*
	(6.22)	(1.28)	(1.68)	(1.30)	(2.93)		
1997-1year	1.77**	-0.19	-0.37**	-0.36*	-1.00**	0.10	12.45**
	(12.45)	(1.20)	(2.42)	(1.76)	(2.25)		
Three-year							
1992-3year	-0.05	0.15	0.24**	0.28**	NA	0.09	1.94
	(0.52)	(1.36)	(2.03)	(2.00)			
1993-3year	0.51**	0.12	0.10	0.05	-0.18	0.03	0.56
	(3.06)	(0.69)	(0.57)	(0.24)	(0.63)		
1994-3year	0.66**	0.13	0.10	0.06	-1.13**	0.40	13.18**
	(3.21)	(0.63)	(0.48)	(0.23)	(4.23)		
1995-3year	1.43**	-0.02	0.04	-0.01	-1.59**	0.38	14.31**
	(9.53)	(0.07)	(0.28)	(0.05)	(6.12)		
Five-year							
1992-5year	0.58**	0.05	0.14	0.14	NA	0.08	1.72
	(7.32)	(0.54)	(1.58)	(1.25)			
1993-5year	1.00**	-0.09	-0.03	-0.06	-0.16	0.03	0.52
	(7.02)	(0.64)	(0.21)	(0.36)	(0.66)		

T-statistics are in parenthesis.   NA —indicates no funds with this star rating.
* indicates significance at the 10 percent level.
**indicates significance at the 5 percent level.

Table 11E: Dummy Variable Regressions Using Morningstar Stars—Samples Broken into Style Groups

Sample: **_Small Company_** funds with 10 years or more of in-sample returns (Old Funds 1992-1997 Sample Group)

Out-of-Sample Performance Measure: **_Load-Adjusted Excess Mean Monthly Returns_**

Sample	γ_0 (constant)	γ_1 (group4)	γ_2 (group 3)	γ_3 (group 2)	γ_4 (group 1)	R^2	F-stat
One-Year							
1992-1year	-0.39	0.84	0.74	0.80	0.31	0.10	0.45
	(0.53)	(0.99)	(0.95)	(1.03)	(0.34)		
1993-1year	0.67	0.19	0.17	0.27	NA	0.01	0.08
	(1.20)	(0.30)	(0.30)	(0.44)			
1994-1year	0.87**	-1.43**	-1.28**	-1.36**	NA	0.27	3.53**
	(2.09)	(3.13)	(2.98)	(3.15)			
1995-1year	1.98**	-0.27	-0.38	0.19	NA	0.09	1.10
	(4.99)	(0.58)	(0.87)	(0.40)			
1996-1year	0.32	0.58**	0.33	0.55*	0.85	0.11	1.35
	(1.29)	(1.96)	(1.19)	(1.73)	(1.39)		
1997-1year	1.52*	-0.29	-0.31	-0.40	-1.97**	0.18	2.64**
	(1.77)	(0.32)	(0.34)	(0.45)	(1.99)		
Three-year							
1992-3year	-0.06	0.40	0.25	0.48	0.03	0.20	0.98
	(0.15)	(0.94)	(0.61)	(1.23)	(0.07)		
1993-3year	0.44	0.28	0.44	0.59	NA	0.09	0.77
	(1.02)	(0.58)	(1.02)	(1.27)			
1994-3year	1.24**	-0.61	-0.40	-0.38	NA	0.09	0.93
	(3.39)	(1.52)	(1.06)	(1.02)			
1995-3year	1.30**	0.01	0.04	0.04	NA	0.01	0.03
	(6.87)	(0.03)	(0.20)	(0.19)			
Five-year							
1992-5year	0.65**	0.13	-0.01	0.27	-0.10	0.34	2.09
	(2.93)	(0.50)	(0.01)	(1.17)	(0.39)		
1993-5year	0.68**	0.44	0.31	0.34	NA	0.11	0.99
	(2.89)	(1.67)	(1.28)	(1.31)			

T-statistics are in parenthesis.   NA —indicates no funds with this star rating.
* indicates significance at the 10 percent level.
**indicates significance at the 5 percent level.

Table 11F: Dummy Variable Regressions Using Morningstar Stars–Samples Broken into Style Groups

Sample: *Aggressive Growth* funds with 10 years or more of in -sample returns (Old Fund s 1992-1997 Sample Group)

Out-of-Sample Performance Measure: *Non-Load-Adjusted 4-Index Model Alpha*

Sample	γ_0 (constant)	γ_1 (group4)	γ_2 (group 3)	γ_3 (group 2)	γ_4 (group 1)	R^2	F-stat
One-Year							
1992-1year	-0.32	0.28	0.42	0.01	NA	0.09	0.69
	(1.16)	(0.69)	(1.16)	(0.04)			
1993-1year	-0.68	1.24*	1.07	1.17*	NA	0.16	1.09
	(1.06)	(1.75)	(1.57)	(1.71)			
1994-1year	-0.45	0.13	0.01	-0.10	NA	0.01	0.07
	(0.51)	(0.13)	(0.02)	(0.10)			
1995-1year	-0.34	0.40	0.49	-0.49	0.53	0.13	0.77
	(0.53)	(0.50)	(0.67)	(0.61)	(0.52)		
1996-1year	-0.25	0.01	0.31	0.32	-0.49	0.15	0.87
	(0.73)	(0.03)	(0.74)	(0.75)	(0.83)		
1997-1year	-0.15	0.18	0.14	-0.01	0.39	0.02	0.16
	(0.16)	(0.17)	(0.14)	(0.01)	(0.38)		
Three-year							
1992-3year	-0.41**	0.42**	0.44**	0.39**	NA	0.25	2.29
	(2.87)	(2.06)	(2.42)	(1.99)			
1993-3year	-0.42	0.42	0.49	0.22	NA	0.06	0.38
	(0.66)	(0.66)	(0.74)	(0.32)			
1994-3year	-0.35	0.20	0.16	0.07	NA	0.01	0.03
	(0.40)	(0.20)	(0.17)	(0.07)			
1995-3year	-0.33	0.25	0.32	0.23	0.45	0.08	0.42
	(1.31)	(0.84)	(1.12)	(0.73)	(1.15)		
Five-year							
1992-5year	-0.59**	0.59**	0.69**	0.68**	NA	0.44	5.27**
	(3.96)	(2.78)	(3.62)	(3.36)			
1993-5year	-0.28	0.12	0.29	0.28	NA	0.05	0.30
	(0.66)	(0.25)	(0.65)	(0.61)			

T-statistics are in parenthesis.   NA —indicates no funds with this star rating.
* indicates significance at the 10 percent level.
**indicates significance at the 5 percent level.

Table 11G: Dummy Variable Regressions Using Morningstar Stars–Samples Broken into Style Groups

Sample: *Equity-Income* funds with 10 years or more of in -sample returns (Old Funds 1992 -1997 Sample Group)

Out-of-Sample Performance Measure: *Non-Load-Adjusted 4-Index Model Alpha*

Sample	$\gamma_{0 \text{ (constant)}}$	$\gamma_{1 \text{(group4)}}$	$\gamma_{2 \text{ (group 3)}}$	$\gamma_{3 \text{ (group 2)}}$	$\gamma_{4 \text{ (group 1)}}$	R^2	F-stat
One-Year							
1992-1year	-0.60	0.55	0.34	NA	NA	0.34	3.61*
	(2.65)	(2.32)	(1.41)				
1993-1year	0.41	-0.20	-0.17	0.01	NA	0.05	0.16
	(1.10)	(0.52)	(0.41)	(0.01)			
1994-1year	-0.30	0.12	0.03	0.07	NA	0.02	0.06
	(0.80)	(0.30)	(0.06)	(0.15)			
1995-1year	-0.24*	NA	0.30*	0.03	NA	0.30	2.57
	(1.77)		(1.96)	(0.13)			
1996-1year	-0.13	0.10	0.11	-0.09	NA	0.07	0.53
	(0.77)	(0.56)	(0.63)	(0.38)			
1997-1year	-0.16	0.12	0.03	0.11	NA	0.04	0.30
	(0.88)	(0.62)	(0.16)	(0.49)			
Three-year							
1992-3year	-0.19	0.14	0.09	NA	NA	0.04	0.28
	(0.96)	(0.66)	(0.41)				
1993-3year	-0.07	0.04	0.06	0.29	NA	0.10	0.36
	(0.30)	(0.16)	(0.25)	(0.87)			
1994-3year	-0.22	0.13	0.08	0.12	NA	0.05	0.18
	(1.17)	(0.66)	(0.33)	(0.55)			
1995-3year	-0.08	NA	0.03	-0.18	NA	0.28	2.37
	(1.12)		(0.39)	(1.56)			
Five-year							
1992-5year	-0.17	0.16	0.13	NA	NA	0.06	0.44
	(1.03)	(0.90)	(0.71)				
1993-5year	-0.05	0.04	-0.03	0.12	NA	0.08	0.27
	(0.26)	(0.23)	(0.15)	(0.46)			

T-statistics are in parenthesis.   NA —indicates no funds with this star rating.
* indicates significance at the 10 percent level.
**indicates significance at the 5 percent level.

Table 11H: Dummy Variable Regressions Using Morningstar Stars–Samples Broken into Style Groups

Sample: *Growth* funds with 10 years or more of in -sample returns

Out-of-Sample Performance Measure: *Non-Load-Adjusted 4-Index Model Alpha* (Old Funds 1992-1997 Sample Group)

Sample	γ_0 (constant)	γ_1 (group4)	γ_2 (group 3)	γ_3 (group 2)	γ_4 (group 1)	R^2	F-stat
One-Year							
1992-1year	-0.12	0.11	0.13	-0.10	-0.10	0.03	1.15
	(1.03)	(0.82)	(1.01)	(0.62)	(0.24)		
1993-1year	0.21	-0.14	-0.10	-0.30	-0.13	0.02	0.70
	(1.36)	(0.80)	(0.60)	(1.51)	(0.24)		
1994-1year	-0.14	-0.05	-0.09	-0.33**	-1.21**	0.12	4.84**
	(1.07)	(0.31)	(0.63)	(2.12)	(3.51)		
1995-1year	0.04	-0.01	-0.20	-0.24	-1.05**	0.16	7.53**
	(0.23)	(0.01)	(1.03)	(1.18)	(4.08)		
1996-1year	-0.05	0.19	0.05	-0.02	0.08	0.04	1.53
	(0.37)	(1.38)	(0.35)	(0.17)	(0.31)		
1997-1year	-0.03	0.05	0.12	0.02	-0.96**	0.09	0.09
	(0.21)	(0.32)	(0.72)	(0.12)	(3.17)		
Three-year							
1992-3year	-0.10	0.06	0.03	-0.01	-0.02	0.01	0.22
	(1.11)	(0.61)	(0.34)	(0.12)	(0.07)		
1993-3year	0.08	-0.11	-0.19*	-0.44**	-0.18	0.10	3.73**
	(0.75)	(0.97)	(1.76)	(3.40)			
1994-3year	-0.06	-0.03	-0.08	-0.20*	-0.95**	0.12	4.85**
	(0.62)	(0.26)	(0.78)	(1.80)	(3.86)		
1995-3year	-0.04	0.10	-0.06	-0.07	-0.46**	0.11	4.78**
	(0.34)	(0.71)	(0.43)	(0.52)	(2.62)		
Five-year							
1992-5year	-0.02	0.01	-0.05	-0.08	-0.07	0.01	0.49
	(0.24)	(0.02)	(0.66)	(0.80)	(0.27)		
1993-5year	0.08	-0.09	-0.16*	-0.36**	-0.15	0.11	3.79**
	(1.04)	(0.98)	(1.85)	(3.41)	(0.54)		

T-statistics are in parenthesis.   NA —indicates no funds with t his star rating.
* indicates significance at the 10 percent level.
**indicates significance at the 5 percent level.

Table 11I: Dummy Variable Regressions Using Morningstar Stars–Samples Broken into Style Groups

Sample: *Growth-Income* funds with 10 years or more of in-sample returns (Old Funds 1992 -1997 Sample Group)

Out-of-Sample Performance Measure: *Non-Load-Adjusted 4-Index Model Alpha*

Sample	$\gamma_{0 \text{ (constant)}}$	$\gamma_{1 \text{(group4)}}$	$\gamma_{2 \text{ (group 3)}}$	$\gamma_{3 \text{ (group 2)}}$	$\gamma_{4 \text{ (group 1)}}$	R^2	F-stat
One-Year							
1992-1year	-0.15	0.08	0.12	0.45**	NA	0.14	3.23**
	(1.16)	(0.59)	(0.85)	(2.62)			
1993-1year	-0.42*	0.54**	0.64**	0.57*	-0.44	0.18	3.63**
	(1.67)	(2.10)	(2.47)	(1.86)	(1.01)		
1994-1year	-0.30	0.16	0.05	-0.29	-1.43**	0.36	11.05**
	(1.02)	(0.55)	(0.15)	(0.85)	(3.80)		
1995-1year	0.24*	-0.28**	-0.30**	-0.35**	-2.50**	0.61	36.62**
	(1.82)	(1.97)	(2.22)	(2.38)	(11.06)		
1996-1year	0.22	-0.23	-0.18	-0.08	-0.92**	0.14	4.00**
	(1.43)	(1.41)	(1.16)	(0.39)	(3.69)		
1997-1year	-0.16	0.09	0.17	0.22	0.16	0.03	0.73
	(1.41)	(0.72)	(1.34)	(1.28)	(0.44)		
Three-year							
1992-3year	-0.13	0.08	0.12	0.14	NA	0.03	0.69
	(1.52)	(0.83)	(1.22)	(1.19)			
1993-3year	-0.19	0.17	0.11	0.05	-0.20	0.09	1.65
	(1.41)	(1.23)	(0.82)	(0.29)	(0.87)		
1994-3year	-0.02	-0.02	-0.08	-0.19	1.37	0.49	19.20**
1995-3year	0.14	-0.21*	-0.14	-0.18	-1.93**	0.62	37.72**
	(1.34)	(1.92)	(1.31)	(1.52)	(10.88)		
Five-year							
1992-5year	-0.03	-0.01	0.01	-0.01	NA	0.01	0.03
	(0.48)	(0.08)	(0.10)	(0.04)			
1993-5year	0.02	-0.05	-0.05	-0.11	-0.25	0.05	0.84
	(0.18)	(0.51)	(0.46)	(0.94)	(1.53)		

T-statistics are in parenthesis.   NA —indicates no funds with this star rating.

* indicates significance at the 10 percent level.

**indicates significance at the 5 pe rcent level.

Table 11J: Dummy Variable Regressions Using Morningstar Stars–Samples Broken into Style Groups

Sample: ***Small Company*** funds with 10 years or more of in-sample returns (Old Funds 1992-1997 Sample Group)

Out-of-Sample Performance Measure: ***Non-Load-Adjusted 4-Index Model Alpha***

Sample	$\gamma_{0 \text{ (constant)}}$	$\gamma_{1 \text{(group4)}}$	$\gamma_{2 \text{ (group 3)}}$	$\gamma_{3 \text{ (group 2)}}$	$\gamma_{4 \text{ (group 1)}}$	R^2	F-stat
One-Year							
1992-1year	-0.75	0.95	0.70	0.74	-0.02	0.30	1.71
	(1.52)	(1.66)	(1.33)	(1.40)	(0.04)		
1993-1year	-0.13	0.47	0.43	0.57	NA	0.04	0.31
	(0.23)	(0.76)	(0.77)	(0.95)			
1994-1year	1.26**	-1.39**	-1.22**	-1.28**	NA	0.26	3.47**
	(3.14)	(3.17)	(2.94)	(3.06)			
1995-1year	0.26	0.05	-0.16	0.29	NA	0.07	0.84
	(0.78)	(0.12)	(0.42)	(0.71)			
1996-1year	-0.23	0.41	0.24	0.37	1.28**	0.14	1.75
	(1.05)	(1.58)	(1.01)	(1.34)	(2.40)		
1997-1year	0.38	-0.12	-0.08	0.10	-1.10	0.17	2.53*
	(0.62)	(0.19)	(0.13)	(0.16)	(1.56)		
Three-year							
1992-3year	-0.31	0.49	0.25	0.43	-0.09	0.37	2.33*
	(1.19)	(1.61)	(0.88)	(1.54)	(0.26)		
1993-3year	-0.12	0.14	0.36	0.53	NA	0.11	0.94
	(0.30)	(0.31)	(0.86)	(1.19)			
1994-3year	0.44	-0.53	-0.27	-0.26	NA	0.09	0.97
	(1.22)	(1.32)	(0.71)	(0.68)			
1995-3year	0.11	0.10	0.07	0.21	NA	0.04	0.42
	(0.61)	(0.44)	(0.35)	(0.97)			
Five-year							
1992-5year	-0.04	0.22	0.04	0.29	-0.12	0.38	2.50*
	(0.22)	(0.93)	(0.16)	(1.32)	(0.46)		
1993-5year	0.01	0.08	0.23	0.30	NA	0.09	0.72
	(0.01)	(0.27)	(0.82)	(1.02)			

T-statistics are in parenthesis.   NA —indicates no funds with this star rating.
* indicates significance at the 10 percent level.
**indicates significance at the 5 percent level.

Table 12: Average Performance Values by Decile and Spearman Rho Rank Correlation Tests using Morningstar Scores. All funds have 10 years or more of in-sample returns (Old Funds 1992-1997 Sample Group).

Sample: 94-1 year		Morningstar Score	Sharpe Ratio (load adjusted)	Jensen alpha (non-load adjusted)	4-index alpha (non-load adjusted)
Decile					
Top	1	0.66	-0.22	-0.31	-0.18
	2	0.42	-0.20	-0.20	-0.09
	3	0.30	-0.22	-0.26	-0.17
	4	0.23	-0.21	-0.22	-0.16
	5	0.15	-0.20	-0.19	-0.13
	6	0.07	-0.24	-0.28	-0.21
	7	0.01	-0.26	-0.33	-0.26
	8	-0.10	-0.23	-0.27	-0.24
	9	-0.27	-0.30	-0.66	-0.60
	10	-0.67	-0.28	-0.55	-0.44
Rank Correlation of Morningstar Score to Out-of-Sample Performance:			.806	.600	.806
Two-tailed p-value:			(.005)	(.067)	(.005)
Rank Correlations of Top-5 Deciles:			-.200	-.700	-.400
Two-tailed p-value:			(.747)	(.188)	(.505)
Rank Correlations of Bottom-5 Deciles:			.600	.600	.800
Two-tailed p-value:			(.285)	(.285)	(.104)

Sample: 95-1 year		Morningstar Score	Sharpe Ratio (load adjusted)	Jensen alpha (non-load adjusted)	4-index alpha (non-load adjusted)
Decile					
Top	1	1.33	0.64	-0.44	0.02
	2	0.66	0.81	-0.18	0.05
	3	0.31	0.88	-0.10	0.09
	4	0.13	0.88	-0.22	-0.01
	5	-0.01	0.86	-0.15	-0.07
	6	-0.14	0.84	-0.23	-0.05
	7	-0.24	0.75	-0.35	-0.16
	8	-0.45	0.74	-0.33	-0.12
	9	-0.65	0.67	-0.34	0.05
	10	-1.36	0.51	-0.85	-0.55
Rank Correlation of Morningstar Score to Out-of-Sample Performance:			.430	.467	.648
Two-tailed p-value:			(.214)	(.174)	(.043)
Rank Correlations of Top-5 Deciles:			-.700	-.500	.600
Two-tailed p-value:			(.188)	(.391)	(.285)
Rank Correlations of Bottom-5 Deciles:			1.000	.700	.300
Two-tailed p-value:			(.000)	(.188)	(.624)

Table 12 Continued: Average Performance Values by Decile and Spearman-Rho Rank Correlation Tests using Morningstar Scores. All funds have 10 years or more of in-sample returns (Old Funds 1992-1997 Sample Group).

Sample: 96-1 year			Out-of-Sample Performance Measures	
Decile		Morningstar Score	Sharpe Ratio (load adjusted)	Jensen alpha (non -load adjusted)	4-index alpha (non -load adjusted)
Top	1	0.97	0.26	-0.44	-0.01
	2	0.53	0.31	-0.17	0.07
	3	0.37	0.29	-0.17	0.00
	4	0.24	0.30	-0.09	0.07
	5	0.14	0.30	-0.14	0.08
	6	0.07	0.26	-0.17	0.03
	7	-0.03	0.23	-0.33	-0.07
	8	-0.14	0.25	-0.24	0.01
	9	-0.27	0.22	-0.26	0.09
	10	-0.83	0.19	-0.54	-0.16
Rank Correlation of Morningstar Score to Out-of-Sample Performance:			.758	.370	.079
Two-tailed p-value:			(.011)	(.293)	(.829)
Rank Correlations of Top-5 Deciles:			-.400	-.900	-.900
Two-tailed p-value:			(.505)	(.037)	(.037)
Rank Correlations of Bottom-5 Deciles:			.900	.700	.300
Two-tailed p-value:			(.037)	(.188)	(.624)

Sample: 97-1 year			Out-of-Sample Performance Measures	
Decile		Morningstar Score	Sharpe Ratio (load adjusted)	Jensen alpha (non -load adjusted)	4-index alpha (non -load adjusted)
Top	1	0.78	0.41	-0.28	-0.03
	2	0.50	0.34	-0.35	-0.07
	3	0.35	0.36	-0.32	-0.01
	4	0.24	0.34	-0.26	0.04
	5	0.13	0.36	-0.20	0.12
	6	0.03	0.31	-0.28	0.16
	7	-0.08	0.31	-0.51	0.05
	8	-0.23	0.26	-0.60	0.01
	9	-0.43	0.26	-0.66	0.08
	10	-0.93	0.14	-1.26	-0.07
Rank Correlation of Morningstar Score to Out-of-Sample Performance:			.927	.648	-.297
Two-tailed p-value:			(.000)	(.043)	(.405)
Rank Correlations of Top-5 Deciles:			.500	-.700	-.900
Two-tailed p-value:			(.391)	(.188)	(.037)
Rank Correlations of Bottom-5 Deciles:			.900	1.000	.700
Two-tailed p-value:			(.037)	(.000)	(.188)

Table 12 Continued: Average Performance Values by Decile and Spearman Rho Rank Correlation Tests using Morningstar Scores. All funds have 10 years or more of in-sample returns (Old funds 1992-1997 Sample Group)

Sample: 94-3 year		Out-of-Sample Performance Measures		
Decile	Morningstar Score	Sharpe Ratio (load adjusted)	Jensen alpha (non-load adjusted)	4-index alpha (non-load adjusted)
Top 1	0.66	0.24	-0.31	-0.08
2	0.42	0.27	-0.18	-0.07
3	0.30	0.28	-0.16	-0.04
4	0.23	0.27	-0.22	-0.06
5	0.15	0.27	-0.20	-0.05
6	0.07	0.24	-0.26	-0.08
7	0.01	0.23	-0.34	-0.11
8	-0.10	0.27	-0.23	-0.04
9	-0.27	0.16	-0.60	-0.34
10	-0.67	0.14	-0.62	-0.25
Rank Correlation of Morningstar Score to Out-of-Sample Performance:		.685	.673	.442
Two-tailed p-value:		(.029)	(.033)	(.200)
Rank Correlations of Top-5 Deciles:		-.100	-.200	-.700
Two-tailed p-value:		(.873)	(.747)	(.747)
Rank Correlations of Bottom-5 Deciles:		.700	.700	.600
Two-tailed p-value:		(.188)	(.188)	(.285)

Sample: 95-3 year		Out-of-Sample Performance Measures		
Decile	Morningstar Score	Sharpe Ratio (load adjusted)	Jensen alpha (non-load adjusted)	4-index alpha (non-load adjusted)
Top 1	1.33	0.37	-0.56	-0.06
2	0.66	0.44	-0.20	0.03
3	0.31	0.45	-0.23	0.04
4	0.13	0.46	-0.25	-0.03
5	-0.01	0.47	-0.16	-0.04
6	-0.14	0.45	-0.19	0.01
7	-0.24	0.43	-0.32	-0.05
8	-0.45	0.39	-0.35	-0.06
9	-0.65	0.35	-0.51	0.05
10	-1.36	0.31	-0.65	-0.26
Rank Correlation of Morningstar Score to Out-of-Sample Performance:		.491	.382	.261
Two-tailed p-value:		(.150)	(.276)	(.467)
Rank Correlations of Top-5 Deciles:		-1.000	-.600	-.100
Two-tailed p-value:		(.000)	(.285)	(.873)
Rank Correlations of Bottom-5 Deciles:		1.000	1.000	.400
Two-tailed p-value:		(.000)	(.000)	(.505)

Table 13A: Spearman-Rho Rank Correlation Tests of Average (Decile) Performance Values—Organized by Style (Old funds 1992-1997 Sample Group)

Sample: *Aggressive Growth* funds with 10 years or more of in-sample returns

	Spearman-Rho Rank correlation of Morningstar Scores to:			
Sample	Load Adjusted Mean Monthly Returns	Load-Adjusted Sharpe Ratio	Non-Load Adjusted Single Index alpha	Non-Load Adjusted 4-index alpha
1994-1year—All 10 Deciles	**-.103**	**-.115**	**-.030**	**.152**
Top-Five Deciles	-.200	.300	.100	.200
Bottom-Five Deciles	-.400	-.400	-.400	-.400
1995-1year—All 10 Deciles	**.091**	**-.018**	**-.200**	**-.030**
Top-Five Deciles	-.100	-.700	-.600	-.500
Bottom-Five Deciles	.400	.600	.300	.300
1996-1year—All 10 Deciles	**-.139**	**-.321**	**-.358**	**-.055**
Top-Five Deciles	.500	.100	-.100	.600
Bottom-Five Deciles	.000	.000	.100	.300
1997-1year—All 10 Deciles	**.248**	**.503**	**.248**	**.212**
Top-Five Deciles	.600	.700	.200	.700
Bottom-Five Deciles	-.500	-.500	-.400	-.900
1994-3year—All 10 Deciles	**-.042**	**.018**	**-.200**	**-.030**
Top-Five Deciles	-.400	-.300	-.100	-.300
Bottom-Five Deciles	-.300	-.400	-.500	-.500
1995-3year—All 10 Deciles	**-.297**	**-.176**	**-.358**	**-.358**
Top-Five Deciles	-.500	-.300	-.500	-.700
Bottom-Five Deciles	.400	.300	.200	.000

* indicates significance at the 10 percent level.

**indicates significance at the 5 percent level.

Table 13B: Spearman-Rho Rank Correlation Tests of Average (Decile) Performance Values—Organized by Style (Old funds 1992-1997 Sample Group)

Sample: _Equity-Income_ funds with 10 years or more of in-sample returns

Sample	Spearman-Rho Rank correlation of Morningstar Scores to:			
	Load Adjusted Mean Monthly Returns	Load-Adjusted Sharpe Ratio	Non-Load Adjusted Single Index alpha	Non-Load Adjusted 4-index alpha
1994-1year—All 10 Deciles	**NA**	**NA**	**NA**	**NA**
Top-Five Deciles	NA	NA	NA	NA
Bottom-Five Deciles	NA	NA	NA	NA
1995-1year—All 10 Deciles	**NA**	**NA**	**NA**	**NA**
Top-Five Deciles	NA	NA	NA	NA
Bottom-Five Deciles	NA	NA	NA	NA
1996-1year—All 10 Deciles	**.879****	**.648****	**.067**	**-.176**
Top-Five Deciles	1.000**	.700	.200	.391
Bottom-Five Deciles	1.000**	.000	.900**	.900**
1997-1year—All 10 Deciles	**.552***	**.491**	**.055**	**-.103**
Top-Five Deciles	.600	.500	.100	-.600
Bottom-Five Deciles	.200	-.900**	-.400	.000
1994-3year—All 10 Deciles	**NA**	**NA**	**NA**	**NA**
Top-Five Deciles	NA	NA	NA	NA
Bottom-Five Deciles	NA	NA	NA	NA
1995-3year—All 10 Deciles	**NA**	**NA**	**NA**	**NA**
Top-Five Deciles	NA	NA	NA	NA
Bottom-Five Deciles	NA	NA	NA	NA

NA—Indicates there was not enough observations to calculate decile averages, i.e. less than 20 observations.

* indicates significance at the 10 percent level.

**indicates significance at the 5 percent level .

Table 13C: Spearman-Rho Rank Correlation Tests of Average (Decile) Performance Values—Organized by Style (Old Funds 1992-1997 Sample Group)

Sample: *Growth* funds with 10 years or more of in -sample returns

	Spearman-Rho Rank correlation of Morningstar Scores to:			
Sample	Load Adjusted Mean Monthly Returns	Load-Adjusted Sharpe Ratio	Non-Load Adjusted Single Index alpha	Non-Load Adjusted 4-index alpha
1994-1year—All 10 Deciles	**.745****	**.515**	**.406**	**.600**
Top-Five Deciles	.300	-.100	.100	.600
Bottom-Five Deciles	.600	.600	.600	.600
1995-1year—All 10 Deciles	**.685****	**.600***	**.527**	**.697****
Top-Five Deciles	.300	-.300	-.200	.500
Bottom-Five Deciles	.900**	1.000**	.900**	.700
1996-1year—All 10 Deciles	**.709****	**.685****	**.648****	**.600***
Top-Five Deciles	-.900**	-.700	-.900**	-.800
Bottom-Five Deciles	.500	.600	.500	.000
1997-1year—All 10 Deciles	**.927****	**.915****	**.782****	**.067**
Top-Five Deciles	.600	.600	.200	-.100
Bottom-Five Deciles	1.000**	1.000**	1.000**	.700
1994-3year—All 10 Deciles	**.479**	**.770****	**.612***	**.636****
Top-Five Deciles	-.300	.200	.200	.200
Bottom-Five Deciles	.400	.600	.600	.700
1995-3year—All 10 Deciles	**.503**	**.733****	**.612***	**.552***
Top-Five Deciles	.500	.300	-.100	.600
Bottom-Five Deciles	.900**	.900**	.900**	.900**

* indicates significance at the 10 percent level.

**indicates significance at the 5 percent level .

Table 13D: Spearman-Rho Rank Correlation Tests of Average (Decile) Performance Values—Organized by Style (Old Funds 1992-1997 Sample Group)

Sample: *Growth-Income* funds with 10 years or more of in-sample returns

	Spearman-Rho Rank correlation of Morningstar Scores to:			
Sample	Load Adjusted Mean Monthly Returns	Load-Adjusted Sharpe Ratio	Non-Load Adjusted Single Index alpha	Non-Load Adjusted 4-index alpha
1994-1year—All 10 Deciles	**.600***	**.661****	**.382**	**.636****
Top-Five Deciles	.500	.200	-.300	-.100
Bottom-Five Deciles	.900**	.900**	1.000**	1.000**
1995-1year—All 10 Deciles	**.503**	**.467**	**.333**	**.758****
Top-Five Deciles	.100	-.300	-.900**	-.600
Bottom-Five Deciles	.300	.500	.300	.600
1996-1year—All 10 Deciles	**.673****	**.733****	**.539**	**.212**
Top-Five Deciles	1.000**	.900**	.700	.100
Bottom-Five Deciles	.100	.400	.300	.300
1997-1year—All 10 Deciles	**.709****	**.733****	**-.103**	**-.673****
Top-Five Deciles	.600	.300	-.800	-.900**
Bottom-Five Deciles	.400	.900**	-.100	.200
1994-3year—All 10 Deciles	**.018**	**.503**	**.552***	**.418**
Top-Five Deciles	-.800	.100	.000	-.400
Bottom-Five Deciles	.900**	.800	.900**	.900**
1995-3year—All 10 Deciles	**-.164**	**.782****	**.394****	**-.042**
Top-Five Deciles	-.300	.300	-.700	-.600
Bottom-Five Deciles	.300	.900**	.900**	.300

* indicates significance at the 10 percent level.

**indicates significance at the 5 percent level .

Table 13E: Spearman-Rho Rank Correlation Tests of Average (Decile) Performance Values—Organized by Style (Old Funds 1992-1997 Sample Group)

Sample: ___Small Company___ funds with 10 years or more of in -sample returns

	Spearman-Rho Rank correlation of Morningstar Scores to:			
Sample	Load Adjusted Mean Monthly Returns	Load-Adjusted Sharpe Ratio	Non-Load Adjusted Single Index alpha	Non-Load Adjusted 4-index alpha
1994-1year—All 10 Deciles	**.079**	**-.261**	**.018**	**-.018**
Top-Five Deciles	.100	.100	-.100	.200
Bottom-Five Deciles	-.100	-.300	-.300	-.300
1995-1year—All 10 Deciles	**.152**	**.261**	**.079**	**-.067**
Top-Five Deciles	.900**	-.300	-.400	-.200
Bottom-Five Deciles	-.900**	.800	-.500	-.900**
1996-1year—All 10 Deciles	**-.091**	**-.152**	**-.273**	**-.279**
Top-Five Deciles	-.500	-1.000**	-1.000**	-.500
Bottom-Five Deciles	-.800	-.300	-.500	-.800
1997-1year—All 10 Deciles	**.721****	**.758****	**.564****	**.115**
Top-Five Deciles	.000	.100	.000	.100
Bottom-Five Deciles	.800	.300	.800	-.300
1994-3year—All 10 Deciles	**-.297**	**-.152**	**-.139**	**-.406**
Top-Five Deciles	-.300	-.700	-.700	-.600
Bottom-Five Deciles	-.400	.500	-.300	-.400
1995-3year—All 10 Deciles	**.442**	**.248**	**-.006**	**-.321**
Top-Five Deciles	-.500	-.600	-.900	-.500
Bottom-Five Deciles	-.100	-.800	.600	-.500

* indicates significance at the 10 percent level.

**indicates significance at the 5 percent level .

Table 14: Dummy Variable Regressions Using Morningstar Stars

Sample: All Funds from 1993 (635 total funds) (Complete Funds 1993 Sample Group)

Out-of-Sample Performance Measure: The Load-Adjusted Sharpe Ratio

Sample	$\gamma_{0\ (constant)}$	$\gamma_{1\ (4\text{-}star)}$	$\gamma_{2\ (3\text{-}star)}$	$\gamma_{3\ (2\text{-}star)}$	$\gamma_{4\ (1\text{-}star)}$	R^2	F-stat
1993-1year	0.25**	0.01	-0.03	-0.08*	-0.07	0.013	2.14*
	(6.98)	(0.36)	(0.66)	(1.72)	(0.70)		
1993-3year	0.26**	-0.01	-0.02	-0.08**	-0.13**	0.05	7.90**
	(16.48)	(0.25)	(1.14)	(3.79)	(2.72)		
1993-5year	0.28**	0.02	0.01	-0.05**	-0.08*	0.08	6.00**
	(20.86)	(1.10)	(0.49)	(2.66)	(1.94)		

Out-of-Sample Performance Measure: The Non-Load-Adjusted Jensen Index Alpha

Sample	$\gamma_{0\ (constant)}$	$\gamma_{1\ (4\text{-}star)}$	$\gamma_{2\ (3\text{-}star)}$	$\gamma_{3\ (2\text{-}star)}$	$\gamma_{4\ (1\text{-}star)}$	R^2	F-stat
1993-1year	0.26**	-0.01	-0.05	-0.10	0.01	0.01	0.59
	(3.37)	(0.01)	(0.57)	(1.04)	(0.01)		
1993-3year	-0.10**	0.02	-0.04	-0.16**	-0.34**	0.04	6.72**
	(2.30)	(0.35)	(0.76)	(2.97)	(2.67)		
1993-5year	-0.21**	0.07*	0.03	-0.10*	-0.26**	0.04	7.31**
	(5.45)	(1.70)	(0.65)	(1.94)	(2.29)		

Out-of-Sample Performance Measure: The Non-Load-Adjusted 4-Index Alpha

Sample	$\gamma_{0\ (constant)}$	$\gamma_{1\ (4\text{-}star)}$	$\gamma_{2\ (3\text{-}star)}$	$\gamma_{3\ (2\text{-}star)}$	$\gamma_{4\ (1\text{-}star)}$	R^2	F-stat
1993-1year	0.13**	-0.02	-0.04	-0.20**	-0.58**	0.07	4.47**
	(2.00)	(0.23)	(0.59)	(2.36)	(2.96)		
1993-3year	0.05	-0.06	-0.10**	-0.20**	-0.41**	0.04	6.20**
	(1.18)	(1.20)	(2.22)	(3.67)	(3.26)		
1993-5year	0.06**	-0.04	-0.09**	-0.15**	-0.31**	0.04	7.05**
	(1.99)	(1.25)	(2.64)	(3.88)	(3.35)		

T-statistics are in parenthesis.
* indicates significance at the 10 percent level.
**indicates significance at the 5 percent level.

Table 15A : Dummy Variable Regressions Using Morningstar Stars–Organized By Age

Sample: **Young** funds (less than 5 years of in-sample returns) from the complete funds 199 3 sample group

Out-of-Sample Performance Measure: **The Load-Adjusted Sharpe Ratio**

Sample/Age	$\gamma_{0\ (constant)}$	$\gamma_{1\ (4\text{-star})}$	$\gamma_{2\ (3\text{-star})}$	$\gamma_{3\ (2\text{-star})}$	$\gamma_{4\ (1\text{-star})}$	R^2	F-stat
1993-1year Young	0.33** (3.33)	-0.05 (0.44)	-0.04 (0.40)	-0.25** (1.99)	NA	0.07	2.06
1993-3year Young	0.28** (7.27)	-0.06 (1.31)	0.01 (0.02)	-0.06 (1.31)	NA	0.06	1.97
1993-5year Young	0.29** (8.39)	-0.01 (0.15)	0.03 (0.88)	-0.01 (0.06)	NA	0.03	0.89

Out-of-Sample Performance Measure: **The Non-Load-Adjusted Jensen Index Alpha**

Sample/Age	$\gamma_{0\ (constant)}$	$\gamma_{1\ (4\text{-star})}$	$\gamma_{2\ (3\text{-star})}$	$\gamma_{3\ (2\text{-star})}$	$\gamma_{4\ (1\text{-star})}$	R^2	F-stat
1993-1year Young	0.42** (1.99)	-0.16 (0.61)	-0.18 (0.75)	-0.31 (1.14)	NA	0.02	0.44
1993-3year Young	-0.04 (0.46)	-0.10 (0.92)	-0.01 (0.01)	-0.07 (0.63)	NA	0.02	0.72
1993-5year Young	-0.15* (1.79)	-0.01 (0.03)	0.07 (0.74)	0.07 (0.64)	NA	0.02	0.50

Out-of-Sample Performance Measure: **The Non-Load-Adjusted 4-Index Alpha**

Sample/Age	$\gamma_{0\ (constant)}$	$\gamma_{1\ (4\text{-star})}$	$\gamma_{2\ (3\text{-star})}$	$\gamma_{3\ (2\text{-star})}$	$\gamma_{4\ (1\text{-star})}$	R^2	F-stat
1993-1year Young	0.24 (1.43)	-0.13 (0.64)	-0.11 (0.60)	-0.35 (1.63)	NA	0.04	1.10
1993-3year Young	0.09 (0.99)	-0.14 (1.30)	-0.11 (1.12)	-0.17 (1.52)	NA	0.03	0.83
1993-5year Young	0.12* (1.75)	-0.09 (1.10)	-0.14* (1.89)	-0.13 (1.56)	NA	0.04	1.34

T-statistics are in parenthesis.
 * indicates significance at the 10 percent level.
**indicates significance at the 5 percent level.

Table 15B : Dummy Variable Regressions Using Morningstar Stars–Organized By Age

Sample: *__Middle-Aged__* funds (greater than 5 and less than 10 years of in -sample returns) from the complete funds 1993 sample group

Out-of-Sample Performance Measure: *__The Load-Adjusted Sharpe Ratio__*

Sample/Age	$\gamma_{0\ (constant)}$	$\gamma_{1\ (4\text{-}star)}$	$\gamma_{2\ (3\text{-}star)}$	$\gamma_{3\ (2\text{-}star)}$	$\gamma_{4\ (1\text{-}star)}$	R^2	F-stat
1993-1year Middle	0.21** (4.45)	0.08 (1.42)	0.01 (0.05)	0.01 (0.22)	0.05 (0.33)	0.02	1.24
1993-3year Middle	0.24** (12.38)	0.03 (1.44)	-0.01 (0.01)	-0.04 (1.46)	-0.14** (2.49)	0.07	5.09**
1993-5year Middle	0.25** (15.14)	0.05** (2.74)	0.04** (2.06)	-0.01 (0.52)	-0.09* (1.77)	0.08	6.25**

Out-of-Sample Performance Measure: *__The Non-Load-Adjusted Jensen Index Alpha__*

Sample/Age	$\gamma_{0\ (constant)}$	$\gamma_{1\ (4\text{-}star)}$	$\gamma_{2\ (3\text{-}star)}$	$\gamma_{3\ (2\text{-}star)}$	$\gamma_{4\ (1\text{-}star)}$	R^2	F-stat
1993-1year Middle	0.23** (2.23)	0.07 (0.57)	-0.03 (0.23)	-0.09 (0.66)	0.10 (0.34)	0.01	0.69
1993-3year Middle	-0.13** (2.39)	0.07 (1.08)	-0.01 (0.24)	-0.11 (1.53)	-0.40** (2.53)	0.06	4.42**
1993-5year Middle	-0.30** (5.73)	0.17** (2.86)	0.13** (2.25)	-0.04 (0.62)	-0.27* (1.79)	0.09	7.03**

Out-of-Sample Performance Measure: *__The Non-Load-Adjusted 4-Index Alpha__*

Sample/Age	$\gamma_{0\ (constant)}$	$\gamma_{1\ (4\text{-}star)}$	$\gamma_{2\ (3\text{-}star)}$	$\gamma_{3\ (2\text{-}star)}$	$\gamma_{4\ (1\text{-}star)}$	R^2	F-stat
1993-1year Middle	0.13 (1.36)	0.02 (0.15)	-0.08 (0.73)	-0.24* (1.90)	-0.49* (1.82)	0.04	2.53**
1993-3year Middle	0.08 (1.42)	-0.04 (0.65)	-0.14** (2.25)	-0.20** (2.77)	-0.47** (2.98)	0.07	4.86**
1993-5year Middle	0.07* (1.77)	-0.01 (0.12)	-0.10** (2.37)	-0.16** (3.10)	-0.35** (3.08)	0.09	7.11**

T-statistics are in parenthesis.
 * indicates significance at the 10 percent level.
**indicates significance at the 5 percent level.

Table 15C : Dummy Variable Regressions Using Morningstar Stars–Organized By Age

Sample: *Old* funds (10 years or more of in-sample returns) from the complete funds 1993 sample group

Out-of-Sample Performance Measure: *The Load-Adjusted Sharpe Ratio*

Sample/Age	$\gamma_{0 \text{ (constant)}}$	$\gamma_{1 \text{ (4-star)}}$	$\gamma_{2 \text{ (3-star)}}$	$\gamma_{3 \text{ (2-star)}}$	$\gamma_{4 \text{ (1-star)}}$	R^2	F-stat
1993-1year	0.26**	-0.03	-0.05	-0.11	-0.19	0.02	1.15
Old	(4.13)	(0.42)	(0.78)	(1.48)	(1.28)		
1993-3year	0.28**	-0.03	-0.06*	-0.14**	-0.11	0.07	5.28**
Old	(8.97)	(1.02)	(1.69)	(3.62)	(1.38)		
1993-5year	0.34**	-0.04	-0.06**	-0.13**	-0.08	0.08	6.00**
Old	(12.61)	(1.30)	(2.04)	(4.01)	(1.22)		

Out-of-Sample Performance Measure: *The Non-Load-Adjusted Jensen Index Alpha*

Sample/Age	$\gamma_{0 \text{ (constant)}}$	$\gamma_{1 \text{ (4-star)}}$	$\gamma_{2 \text{ (3-star)}}$	$\gamma_{3 \text{ (2-star)}}$	$\gamma_{4 \text{ (1-star)}}$	R^2	F-stat
1993-1year	0.20	0.01	0.01	-0.01	-0.04	0.01	0.01
Old	(1.45)	(0.10)	(0.04)	(0.01)	(0.12)		
1993-3year	-0.08	-0.01	-0.09	-0.28**	-0.25	0.06	4.18**
Old	(0.86)	(0.09)	(0.96)	(2.61)	(1.13)		
1993-5year	-0.09	-0.06	-0.15*	-0.29**	-0.27	0.07	5.03**
Old	(1.18)	(0.71)	(1.85)	(3.22)	(1.46)		

Out-of-Sample Performance Measure: *The Non-Load-Adjusted 4-Index Alpha*

Sample/Age	$\gamma_{0 \text{ (constant)}}$	$\gamma_{1 \text{ (4-star)}}$	$\gamma_{2 \text{ (3-star)}}$	$\gamma_{3 \text{ (2-star)}}$	$\gamma_{4 \text{ (1-star)}}$	R^2	F-stat
1993-1year	0.07	0.02	0.05	-0.06	-0.62**	0.03	1.88
Old	(0.58)	(0.16)	(0.37)	(0.44)	(2.17)		
1993-3year	-0.03	-0.01	-0.03	-0.18*	-0.28	0.03	2.08*
Old	(0.32)	(0.11)	(0.29)	(1.71)	(1.32)		
1993-5year	0.01	-0.04	-0.03	-0.14*	-0.21	0.03	1.70
Old	(0.13)	(0.55)	(0.46)	(1.77)	(1.35)		

T-statistics are in parenthesis.
 * indicates significance at the 10 percent level .
**indicates significance at the 5 percent level.

Table 16A : Dummy Variable Regressions Using Morningstar Stars–Organized By Style

Sample: *Aggressive Growth* funds from the complete funds 1993 sample group

Out-of-Sample Performance Measure: *The Load-Adjusted Mean Returns*

Sample	γ_0 (constant)	γ_1 (4-star)	γ_2 (3-star)	γ_3 (2-star)	γ_4 (1-star)	R^2	F-stat
1993-1year Ag. Growth	1.22** (3.15)	-0.34 (0.78)	-0.42 (1.02)	-0.22 (0.22)	-0.67 (1.23)	0.05	0.55
1993-3year Ag. Growth	0.98** (3.39)	-0.16 (0.47)	-0.25 (0.79)	-0.50 (1.52)	-0.63 (1.54)	0.12	1.27
1993-5year Ag. Growth	0.84** (4.17)	-0.07 (0.28)	-0.06 (0.27)	-0.11 (0.47)	-0.26 (0.92)	0.03	0.28

Out-of-Sample Performance Measure: *The Non-Load Adjusted 4-Index Alpha*

Sample	γ_0 (constant)	γ_1 (4-star)	γ_2 (3-star)	γ_3 (2-star)	γ_4 (1-star)	R^2	F-stat
1993-1year Ag. Growth	0.70* (1.88)	-0.34 (0.80)	-0.42 (1.05)	-0.47 (1.12)	-1.61** (3.05)	0.23	2.84**
1993-3year Ag. Growth	0.30 (1.03)	-0.16 (0.48)	-0.20 (0.65)	-0.56* (1.74)	-0.79* (1.95)	0.18	2.14*
1993-5year Ag. Growth	0.18 (0.86)	-0.16 (0.65)	0.13 (0.57)	-0.34 (1.39)	-0.55* (1.83)	0.13	1.43

Sample: *Equity-Income* funds from the complete funds 1993 sample group

Out-of-Sample Performance Measure **:** *The Load-Adjusted Mean Returns*

Sample	γ_0 (constant)	γ_1 (4-star)	γ_2 (3-star)	γ_3 (2-star)	γ_4 (1-star)	R^2	F-stat
1993-1year Eq-Income	0.66* (1.93)	-0.08 (0.21)	-0.13 (0.36)	-0.41 (0.86)	NA	0.02	0.33
1993-3year Eq-Income	0.61** (3.62)	-0.03 (0.18)	0.03 (0.16)	0.06 (0.26)	NA	0.02	0.24
1993-5year Eq-Income	0.89** (6.51)	-0.02 (0.16)	0.02 (0.16)	0.06 (0.33)	NA	0.03	0.28

Out-of-Sample Performance Measure: *The Non-Load Adjusted 4-Index Alpha*

Sample	γ_0 (constant)	γ_1 (4-star)	γ_2 (3-star)	γ_3 (2-star)	γ_4 (1-star)	R^2	F-stat
1993-1year Eq-Income	0.13 (0.53)	-0.04 (0.14)	-0.11 (0.41)	-0.04 (0.11)	NA	0.06	0.17
1993-3year Eq-Income	-0.06 (0.41)	0.01 (0.03)	-0.01 (0.02)	0.12 (0.61)	NA	0.02	0.24
1993-5year Eq-Income	-0.01 (0.02)	-0.01 (0.04)	-0.07 (0.59)	0.01 (0.04)	NA	0.04	0.62

T-statistics are in parenthesis.
* indicates significance at the 10 percent level.
**indicates significance at the 5 percent level.

Table 16B : Dummy Variable Regressions Using Morningstar Stars–Organized By Style

<u>Sample: **Growth** funds from the complete funds 1993 sample group</u>

<u>Out-of-Sample Performance Measure</u>: ***The Load-Adjusted Mean Returns***

Sample	$\gamma_{0 \text{ (constant)}}$	$\gamma_{1 \text{ (4-star)}}$	$\gamma_{2 \text{ (3-star)}}$	$\gamma_{3 \text{ (2-star)}}$	$\gamma_{4 \text{ (1-star)}}$	R^2	F-stat
1993-1year Growth	0.63** (5.37)	-0.06 (0.41)	-0.19 (1.51)	-0.26* (1.74)	0.17 (0.43)	0.02	1.57
1993-3year Growth	0.74** (12.24)	-0.09 (1.32)	-0.17** (2.60)	-0.30** (3.83)	-0.31 (1.56)	0.06	4.86**
1993-5year Growth	0.98** (19.74)	-0.06 (1.12)	-0.10* (1.78)	-0.22** (3.40)	-0.20 (1.21)	0.05	3.62**

<u>Out-of-Sample Performance Measure:</u> ***The Non-Load Adjusted 4-Index Alpha***

Sample	$\gamma_{0 \text{ (constant)}}$	$\gamma_{1 \text{ (4-star)}}$	$\gamma_{2 \text{ (3-star)}}$	$\gamma_{3 \text{ (2-star)}}$	$\gamma_{4 \text{ (1-star)}}$	R^2	F-stat
1993-1year Growth	0.10 (1.15)	0.02 (0.16)	-0.04 (0.37)	-0.19* (1.71)	0.01 (0.01)	0.02	1.51
1993-3year Growth	0.01 (0.21)	-0.04 (0.68)	-0.12* (1.93)	-0.26** (3.68)	-0.23 (1.26)	0.06	5.06**
1993-5year Growth	0.02 (0.45)	-0.02 (0.39)	-0.08* (1.72)	-0.19** (3.65)	-0.14 (1.06)	0.07	5.41**

<u>Sample: **Growth-Income** funds from the complete funds 1993 sampl e group</u>

<u>Out-of-Sample Performance Measure</u>: ***The Load-Adjusted Mean Returns***

Sample	$\gamma_{0 \text{ (constant)}}$	$\gamma_{1 \text{ (4-star)}}$	$\gamma_{2 \text{ (3-star)}}$	$\gamma_{3 \text{ (2-star)}}$	$\gamma_{4 \text{ (1-star)}}$	R^2	F-stat
1993-1year Growth-Inc	0.50** (2.53)	-0.03 (0.17)	-0.07 (0.32)	-0.15 (0.64)	-0.75 (1.35)	0.02	0.62
1993-3year Growth-Inc	0.66** (7.47)	-0.03 (0.27)	-0.05 (0.58)	-0.13 (1.19)	-0.33 (1.30)	0.02	1.01
1993-5year Growth-Inc	0.99** (12.45)	-0.06 (0.69)	-0.06 (0.75)	-0.15 (1.56)	-0.16 (0.70)	0.02	0.83

<u>Out-of-Sample Performance Measure</u>: ***The Non-Load Adjusted 4-Index Alpha***

Sample	$\gamma_{0 \text{ (constant)}}$	$\gamma_{1 \text{ (4-star)}}$	$\gamma_{2 \text{ (3-star)}}$	$\gamma_{3 \text{ (2-star)}}$	$\gamma_{4 \text{ (1-star)}}$	R^2	F-stat
1993-1year Growth-Inc	0.10 (0.66)	-0.03 (0.18)	-0.03 (0.15)	-0.26 (1.37)	-0.82* (1.85)	0.05	1.91
1993-3year Growth-Inc	0.02 (0.21)	-0.06 (0.73)	-0.10 (1.19)	-0.17* (1.83)	-0.41* (1.87)	0.05	1.90
1993-5year Growth-Inc	0.03 (0.67)	-0.05 (0.99)	-0.10** (2.03)	-0.16** (2.66)	-0.27** (2.01)	0.09	4.01**

T-statistics are in parenthesis.
* indicates significance at the 10 percent leve l.
**indicates significance at the 5 percent level.

Table 16C : Dummy Variable Regressions Using Morningstar Stars–Organized By Style

Sample: *Small Company* funds from the complete funds 1993 sample group

Out-of-Sample Performance Measure: *The Load-Adjusted Mean Returns*

Sample	$\gamma_{0 \text{ (constant)}}$	$\gamma_{1 \text{ (4-star)}}$	$\gamma_{2 \text{ (3-star)}}$	$\gamma_{3 \text{ (2-star)}}$	$\gamma_{4 \text{ (1-star)}}$	R^2	F-stat
1993-1year Small Com.	0.71** (4.30)	0.23 (1.11)	0.24 (1.24)	-0.04 (0.17)	NA	0.05	1.27
1993-3year Small Com.	0.74** (6.35)	0.07 (0.50)	0.13 (0.96)	0.13 (0.84)	NA	0.01	0.37
1993-5year Small Com.	0.83** (12.32)	0.13 (1.63)	0.20** (2.49)	0.11 (1.29)	NA	0.08	2.11

Out-of-Sample Performance Measure : *The Non-Load Adjusted Multi-Index Alpha*

Sample	$\gamma_{0 \text{ (constant)}}$	$\gamma_{1 \text{ (4-star)}}$	$\gamma_{2 \text{ (3-star)}}$	$\gamma_{3 \text{ (2-star)}}$	$\gamma_{4 \text{ (1-star)}}$	R^2	F-stat
1993-1year Small Com.	0.08 (0.49)	0.04 (0.21)	0.10 (0.51)	-0.21 (0.96)	NA	0.04	1.07
1993-3year Small Com.	0.12 (1.09)	0.02 (0.18)	0.06 (0.45)	0.05 (0.34)	NA	0.01	0.08
1993-5year Small Com.	0.17** (2.48)	0.04 (0.46)	0.06 (0.75)	0.01 (0.14)	NA	0.01	0.26

T-statistics are in parenthesis.
* indicates significance at the 10 percent level.
**indicates significance at the 5 percent level.

Table 17: Summary of the Ability of the Alternative Predictors and Morningstar Stars to Forecast Out-of-Sample Performance: Significance Levels

Samples Examined Old Fund Samples (not broken up into style categories), i.e., 1992 -1year, 1992-3year, 1992-5year, 1993-1year, 1993-3year, 1993-5year, 1994-1year, 1994-3year, 1995-1year, 1995-3year, 1996-1year, 1997-1year.

Out-of-Sample Metrics Examined Load-Adjusted Sharpe Ratio, Non -Load Adjusted Single -index alpha, Non -Load Adjusted 4-index alpha.

Test Examined: The Alternative Predictor is used to allocate the stars. The frequency of the stars is the same as with the Morningstar Stars except that they are allocated on the basis of the Alternative Predictor rather than the Morningstar Method. With these stars, we then examine equation (6). Hence, there are 36 equations estimated (12 samples , 3 out-of-sample performance metrics) of which each equation has 4 coefficients, $\gamma_1, \gamma_2, \gamma_3, \gamma_4,$ (not including the constant). Hence there are 144 coefficients examined for each Alternative Predictor.

Predictor	# of times (out of 144) that the predictor produces a significantly* negative coefficient for $\gamma_1, \gamma_2, \gamma_3,$ or $\gamma_4,$	# of times (out of 144) that the predictor produces a significantly* positive coefficient for $\gamma_1, \gamma_2, \gamma_3,$ or $\gamma_4,$	# of cases (out of 36) in which the coefficient, $\gamma_{1\,(4\text{-star})}$, is significant and negative.	# of cases (out of 36) in which the coefficient, $\gamma_{2(3\text{-star})}$, is significant and negative.	# of cases (out of 36) in which the coefficient, $\gamma_{3\,(2\text{-star})}$, is significant and negative.	# of cases (out of 36) in which the coefficient, $\gamma_{4\,(1\text{-star})}$, is significant and negative.
Stars allocated using the 10-year mean returns and their style.	35	14	1	2	8	24
Stars using 10-year mean returns no adjustment for styles	39	38	5	5	7	22
Stars using 10-year Sharpe ratio	49	1	3	8	9	29
Stars using 10-year single-index alpha	36	7	0	3	6	27
Stars using 10-year 4-index alpha	27	48	1	2	5	19
Morningstar Stars	39	10	0	4	13	22

* At the 10 per cent level of significance.

Table 18: Summary of the Ability of the Alternative Predictors and Morningstar Stars to Forecast Out-of-Sample Performance: Significance Levels (Organized by Out-of-Sample Performance Measure

Samples Examined Old Fund Sample s (not broken up into style categories), i.e., 1992 -1year, 1992-3year, 1992-5year, 1993-1year, 1993-3year, 1993-5year, 1994-1year, 1994-3year, 1995-1year, 1995-3year, 1996-1year, 1997-1year.

Out-of-Sample Metrics Examined Load-Adjusted Sharpe Ratio, Non -Load Adjusted Single -index alpha, Non -Load Adjusted 4-index alpha.

Test Examined: The Alternative Predictor is used to allocate the stars. The frequency of the stars is the same as with the Morningstar Stars except that they are allocated on the basis of the Alternative Predictor rather than the Morningstar Method. With these stars, we then examine equation (6). Hence, there are 36 equations estimated (12 samples, 3 out -of-sample performance metrics) of which each equation has 4 coefficients, $\gamma_1, \gamma_2, \gamma_3, \gamma_4$, (not including the constant). Hence there are 144 coefficients examined for each Alternative Predictor and there are 48 coefficients for each out of sample performance metric.

Predictor	# of times (out of 48) that the predictor produces a signific antly* negative coefficient for $\gamma_1, \gamma_2, \gamma_3,$ or $\gamma_4,$ using the **Load-Adjusted Sharpe Ratio** as the Out-of Sample Performance Metric	# of times (out of 48) that the predictor produces a significantly* negative coefficient for $\gamma_1, \gamma_2, \gamma_3,$ or $\gamma_4,$ using the **Non-Load-Adjusted Single-Index Alpha** as the Out-of Sample Performance Metric	# of times (out of 48) that the predictor produces a significantly* negative coefficient for $\gamma_1, \gamma_2, \gamma_3,$ or $\gamma_4,$ using the **Non-Load-Adjusted 4-Index Alpha** as the Out-of Sample Performance Metric
Stars using the 10-year mean returns in which stars are allocated by style	9	11	15
Stars using 10-year mean returns no adjustment for styles	7	9	23
Stars using 10-year Sharpe ratio	17	21	11
Stars using 10-year single -index alpha	11	15	10
Stars using 10-year 4-index alpha	5	5	17
Morningstar Stars	15	13	11

* At the 10 percent level of significance

Table 19: Summary of the Ability of the Alternative Predictors and Morningstar Stars to Forecast Out-of-Sample Performance: Coefficient Signs

Samples Examined Old Fund Samples (not broken up into style categories), i.e., 1992 -1year, 1992-3year, 1992-5year, 1993-1year, 1993-3year, 1993-5year, 1994-1year, 1994-3year, 1995-1year, 1995-3year, 1996-1year, 1997-1year.

Out-of-Sample Metrics Examined Load-Adjusted Sharpe Ratio, Non-Load Adjusted Single -index alpha, Non -Load Adjusted 4-index alpha.

Test Examined: The Alternative Predictor is used to allocate the stars. The frequency of the stars is the same as wi th the Morningstar Stars except that they are allocated on the basis of the Alternative Predictor rather than the Morningstar Method. With these stars, we then examine equation (6). Hence, there are 36 equations estimated (12 samples, 3 out -of-sample performance metrics).

Predictor	# of cases (out of 36) in which the coefficient signs are such that: $\gamma_{0\ (5\text{-star})} > \gamma_{2\ (3\text{-star})}$	# of cases (out of 36) in which the coefficient signs are such that $\gamma_{1\ (4\text{-star})} > \gamma_{3\ (2\text{-star})}$	# of cases (out of 36) in which the coefficient signs are such that $\gamma_{2(3\text{-star})} > \gamma_{4\ (1\text{-star})}$
Stars using the 10-year mean returns in which stars are allocated by style	14 (2)	28 (8)	34 (27)
Stars using 10-year mean returns no adjustment for styles	14 (5)	21 (7)	33 (28)
Stars using 10-year Sharpe ratio	30 (9)	33 (18)	35 (28)
Stars using 10-year single-index alpha	20 (3)	35 (16)	33 (30)
Stars using 10-year 4-index alpha	10 (2)	20 (13)	35 (29)
Morningstar Stars	18 (4)	29 (19)	36 (24)

Parenthesis indicate the number of the cases in which the coefficients were as indicated and the difference in the coefficients was significant at the 10 percent level using a Wald Test.

Table 20: Spearman-Rho Summary Results for Alternative Predictors and Morningstar Scores

Samples Examined Post 1993 Old Fund Samples: 1994-1year, 1994-3year, 1995-1year, 1995-3year, 1996-1year, 1997-1year

Out-of-Sample Metrics Examined Load-Adjusted Sharpe Ratio, Non-Load Adjusted Single-index alpha, Non-Load Adjusted Sample

Predictors: 10-year mean monthly returns, 10-year Sharpe ratios, 10-year single index alphas, 10-year 4-index alpha, Morningstar Score.

Test Examined: Spearman-Rho tests based on decile averages. We test the 10 deciles, the top-5 deciles, and the bottom 5-deciles. Since there are 6 samples with 3 out of sample performance metrics, there are 18 total tests for each predictor.

Predictor	# of cases (out of 18) in which the Spearman-rho rank test is greater than 0.5 for the *10 deciles*	# of cases (out of 18) in which the Spearman-rho rank test is greater than 0.5 for the *top-5 deciles*	# of cases (out of 18) in which the Spearman-rho rank test is greater than 0.5 for the *bottom-5 deciles*
10-year mean monthly returns no adjustment for styles	2	1	5
10-year Sharpe ratio	13	10	9
10-year single-index alpha	9	4	15
10-year 4-index alpha	5	0	5
Morningstar Score	9	1	15

Table 21: Summary of the Ability of the Alternative Predictors and Morningstar Stars to Forecast Out-of-Sample Performance: Significance Levels

Samples Examined Complete Funds 1993 Samples (All Ages included), i.e., 1993 -1year, 1993-3year, 1993-5year.

Out-of-Sample Metrics Examined Load-Adjusted Sharpe Ratio, Non -Load Adjusted Single-index alpha, Non -Load Adjusted 4-index alpha.

Test Examined: The Alternative Predictor is used to allocate the stars. The frequency of the stars is the same as with the Morningstar Stars except that they are allocated on the basis of the Naïve Predictor rather than the Morningstar Method. With these stars, we then examine equation (6). Hence, there are 9 equations estimated (3 samples, 3 out -of-sample performance metrics) of which each equation has 4 coefficients, $\gamma_1, \gamma_2, \gamma_3, \gamma_4,$ (not including the constant). Hence there are 36 coefficients examined for each Naïve Predictor.

Predictor	# of times (out of 36) that the predictor produces a significantly* negative coefficient for $\gamma_1, \gamma_2, \gamma_3,$ or $\gamma_4,$	# of times (out of 36) that the predictor produces a significantly* positive coefficient for $\gamma_1, \gamma_2, \gamma_3,$ or $\gamma_4,$	# of cases (out of 9) in which the coefficient, $\gamma_{1\,(4\text{-star})},$ is significant* and negative.	# of cases (out of 9) in which the coefficient, $\gamma_{2(3\text{-star})},$ is significant* and negative.	# of cases (out of 9) in which the coefficient, $\gamma_{3\,(2\text{-star})},$ is significant* and negative.	# of cases (out of 9) in which the coefficient, $\gamma_{4\,(1\text{-star})},$ is significant* and negative.
Stars using the 3 -year mean returns in which stars are allocated by style	16	6	5	3	3	5
Stars using 3-year mean returns no adjustment for styles	19	7	4	4	4	7
Stars using 3-year Sharpe ratio	18	3	5	3	3	7
Stars using 3-year single -index alpha	19	6	4	4	4	7
Stars using 3-year 4-index alpha	20	4	4	4	4	8
Morningstar Stars	17	1	0	2	8	7

* At the 10 percent level of significance.

Table 22: Summary of the Ability of the Alternative Predictors and Morningstar Stars to Forecast Out-of-Sample Performance: Significance Levels Organized by Out-of-Sample Performance Metric

Samples Examined Complete Funds 1993 Samples (All Ages included), i.e., 1993 -1year, 1993-3year, 1993-5year.

Out-of-Sample Metrics Examined Load-Adjusted Sharpe Ratio, Non-Load Adjusted Single -index alpha, Non -Load Adjusted 4-index alpha.

Test Examined: The Alternative Predictor is used to allocate the stars. The frequency of the stars is the same as with the Morningstar Stars except that they are allocated on the basis of the Naïve Predictor rather than the Morningstar Method. With these stars, we then examine equation (6). Hence, there are 9 equations estimated (3 samples, 3 out -of-sample performance metrics) of which each equation has 4 coefficients, $\gamma_1, \gamma_2, \gamma_3, \gamma_4$, (not including the constant). Hence there are 36 coefficients examined for each Naïve Predictor. Hence there **are 12 coefficients for each out-of-sample performance metric.**

Predictor	# of times (out of 12) that the predictor produces a significantly* negative coefficient for $\gamma_1, \gamma_2, \gamma_3,$ or $\gamma_4,$ using the **Load-Adjusted Sharpe Ratio** as the Out-of Sample Performance Metric	# of times (out of 12) that the predictor produces a significantly* negative coefficient for $\gamma_1, \gamma_2, \gamma_3,$ or $\gamma_4,$ using the **Non-Load-Adjusted Single-Index Alpha** as the Out-of Sample Performance Metric	# of times (out of 12) that the predictor produces a significantly* negative coefficient for $\gamma_1, \gamma_2, \gamma_3,$ or $\gamma_4,$ using the **Non-Load-Adjusted 4-Index Alpha** as the Out-of Sample Performance Metric
Stars using the 10-year mean returns in which stars are allocated by style	3	2	11
Stars using 10-year mean returns no adjustment for styles	2	4	12
Stars using 10-year Sharpe ratio	2	3	12
Stars using 10-year single -index alpha	2	5	12
Stars using 10-year 4-index alpha	2	6	12
Morningstar Stars	5	4	8

* At the 10 percent level of significance

Table 23: Summary of the Ability of the Alternative Predictors and Morningstar Stars to Forecast Out-of-Sample Performance: Coefficient Signs

Samples Examined Complete Funds 1993 Samples (All Ages included), i.e., 1993-1year, 1993-3year, 1993-5year.

Out-of-Sample Metrics Examined Load-Adjusted Sharpe Ratio, Non-Load Adjusted Single-index alpha, Non-Load Adjusted 4-index alpha.

Test Examined: The Alternative Predictor is used to allocate the stars. The frequency of the stars is the same as with the Morningstar Stars except that they are allocated on the basis of the Alternative Predictor rather than the Morningstar Method. With these stars, we then examine equation (6). Hence, there are 9 equations estimated (3 samples, 3 out-of-sample performance metrics) of which each equation has 4 coefficients, γ_1, γ_2, γ_3, γ_4, (not including the constant).

Predictor	# of cases (out of 9) in which the coefficient signs are such that: γ_0 (5-star) > γ_2 (3-star)	# of cases (out of 9) in which the coefficient signs are such that: γ_1 (4-star) > γ_3 (2-star)	# of cases (out of 9) in which the coefficient signs are such that: γ_2 (3-star) > γ_4 (1-star)
Stars using the 3-year mean returns in which stars are allocated by style	4 (3)	3 (0)	8 (6)
Stars using 3-year mean returns no adjustment for styles	4 (4)	3 (1)	9 (8)
Stars using 3-year Sharpe ratio	5 (3)	3 (2)	9 (8)
Stars using 3-year single-index alpha	4 (4)	3 (0)	9 (7)
Stars using 3-year 4-index alpha	4 (4)	4 (1)	9 (7)
Morningstar Stars	7 (2)	9 (8)	8 (7)

Parenthesis indicate the number of the cases in which the coefficients were as indicated and the difference in the coefficients was significant at the 10 percent level using a Wald Test.

Table 24: Comparison of Morningstar Stars Against An Alternative Predictor Organized by Age (Young and Old Funds)

Samples Examined: Complete Funds 1993 Samples (All Ages included), i.e., 1993 -1year, 1993-3year, 1993-5year.
Out-of-Sample Metrics Examined: Load-Adjusted Sharpe Ratio, Non -Load Adjusted Single -index alpha, Non -Load Adjusted 4-index alpha.

Test Examined: The Altern ative Predictor is used to allocate the stars. The frequency of the stars is the same as with the Morningstar Stars except that they are allocated on the basis of the Alternative Predictor rather than the Morningstar Method. With these stars, we then exami ne equation (6). Hence, there are 9 equations estimated (3 samples, 3 out -of-sample performance metrics) of which each equation has 4 coefficients, γ_1, γ_2, γ_3, γ_4, (not including the constant).

Young Funds (n=90) (Funds with less than 5 years of returns as of Jan. 1993)

Predictor	# of times (out of 36) that the predictor produces a significantly* negative coefficient for γ_1, γ_2, γ_3, or γ_4,	# of times (out of 36) that the predictor produces a significantly* positive coefficient for γ_1, γ_2, γ_3, or γ_4,	# of cases (out of 9) in which the coefficient signs are such that: $\gamma_{0\ (5\text{-star})} > \gamma_{2\ (3\text{-star})}$	# of cases (out of 9) in which the coefficient signs are such that: $\gamma_{1\ (4\text{-star})} > \gamma_{3\ (2\text{-star})}$	# of cases (out of 9) in which the coefficient signs are such that: $\gamma_{2(3\text{-star})} > \gamma_{4\ (1\text{-star})}$
Stars using the 3 -year mean returns in which stars are allocated by style*	2	0	7 (1)	6 (0)	NA
Morningstar Stars	2	0	6 (1)	5 (1)	NA

Old Funds (n=269) (Funds with 10 or more years of returns as of Jan. 1993)

Predictor	# of times (out of 36) that the predictor produces a significantly* negative coefficient for γ_1, γ_2, γ_3, or γ_4,	# of times (out of 36) that the predictor produces a significantly* positive coefficient for γ_1, γ_2, γ_3, or γ_4,	# of cases (out of 9) in which the coefficient signs are such that $\gamma_{0\ (5\text{-star})} > \gamma_{2\ (3\text{-star})}$	# of cases (out of 9) in which the coefficient signs are such that $\gamma_{1\ (4\text{-star})} > \gamma_{3\ (2\text{-star})}$	# of cases (out of 9) in which the coefficient signs are such that: $\gamma_{2(3\text{-star})} > \gamma_{4\ (1\text{-star})}$
Stars using the 3 -year mean returns in which stars are allocated by style*	7	9	2 (0)	1 (0)	9 (9)
Stars using the 10 -year mean returns in which stars are allocated by style**	11	0	8 (2)	7 (6)	9 (5)
Morningstar Stars	10	0	7 (3)	7 (6)	9 (1)

* star allocation based on 635 funds of which only the young or old funds are tested. **star allocation based on 269 funds (old fund sample).
Parenthesis indicate the number of the cases in which the coefficients were as indicated and the difference in the coefficients was significant at the 10 percent level using a Wald Test.