Should you carry the load?
A comprehensive analysis of load and
no-load mutual fund out-of-sample performance

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Received 2 April 2001; accepted 31 October 2001

Abstract

This paper compares the out-of-sample performance of no-load and load mutual funds. Unlike previous studies, this paper provides a more comprehensive analysis as it uses methodologies to incorporate loads directly into the returns. We find two important results. First, after adjusting for loads in the returns data, no-load funds are found to perform much better than load funds, with the differences found to be significant at the 1% level across many different performance metrics. Second, we find that within load funds themselves there is little significant difference in out-of-sample performance between high-load funds and low-load funds even after adjusting for loads.

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1. Introduction

In spite of empirical evidence that would seem to suggest that no-load mutual funds outperform or perform at least as well as do load mutual funds, there has recently been a relative increase in the number of load funds that are available to

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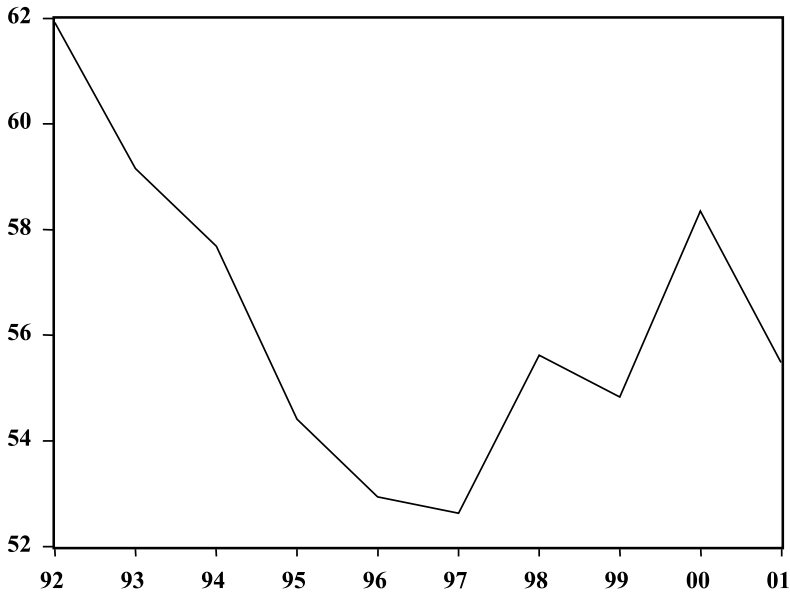*E-mail address:* mmorey@pace.edu (M.R. Morey).

Fig. 1. Percentage of domestic equity funds that are classified as load funds (1992–2001) where a load fund is defined as a fund that had a deferred or front load.

investors. As shown in Fig. 1, the percentage of domestic equity funds that have a load (front and/or deferred) has trended upward from its low in 1997. [1] This trend towards more load funds is also supported by other developments in the fund industry. For example, the Boston-based Financial Research Corporation stated that in 1995, 45% of the money flowing into mutual funds was invested into no-load, directly sold mutual funds. However, by 2000, this number had dropped to 35% and by 2005 it is predicted to fall to 20%. [2] Finally, the clearest sign that no-load funds are declining in their importance appeared in 2000 when the 100% no-load Mutual Fund Council (NMFC), the major trade group that represented no-load funds, folded. The NMFC's decline was largely a result of the declining number of diehard no-load funds. Indeed, a new organization has splintered off into a separate group called the Mutual Fund Education Alliance, whose focus is on "investing smartly

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[1] Fig.1 is based on Morningstar's definition of Domestic Equity funds. The graph plots the percentage of Domestic Equity funds that are load funds, i.e., funds that had a front and/or deferred load, for each year starting in 1992 and ending in 2001. The January Morningstar data disks (from 1992–2001) were used to calculate these percentages. Note that the Domestic Equity is the broadest category as it includes diversified US equity funds as well as Hybrid and Specialty funds. Also note that before November 1996, Morningstar did not separate Foreign Equity funds into their own category and instead simply grouped them into the Domestic Equity category. Also, before November 1996, Hybrid funds were given their own category and/or rated differently than other funds.

[2] The Wall Street Journal, Scudder considers switch away from no-loads, October 16, 2000, page C1.

and with an eye toward costs'' rather than the NMFC's pledge of investing directly without sales charges. [3]

Why is this increase in load funds occurring? Indeed, many fund experts predicted that with the increase in the popularity of mutual funds exactly the opposite would have taken place. Investors would realize that they could avoid costly load charges by buying no-load funds. Moreover, the Internet would provide many cheap sources of information that would allow investors to monitor funds on their own, without the help of an advisor or broker.

The answer to this question is not simple as there are many issues affecting the industry. However, there are some basic explanations that have been discussed in the press. One of these explanations is that many firms have found it difficult and costly to sell no-load mutual funds directly to the public as the no-load business has become extremely competitive with large firms, like Fidelity and Vanguard, having economies of scale advantages. Indeed, the process of advertising directly to the public is very expensive, ranging from $300 to $500 just to lure a new customer to call. [4] Another explanation for the trend is that there is some anecdotal evidence that customers, now more than ever, want the advice and extra services that come with load funds. Industry experts point out that because the number of funds available to investors has jumped 10-fold in the last decade, and because there is so much more information on funds in general, many investors are asking (and hence willing to pay) for advice and services. [5] Indeed, Kihn (1996) argues that the majority of mutual fund investors are more concerned with customer services than with financial performance.

While there may be other explanations for this trend towards more load funds, the object of this paper is not to examine why this change is occurring but rather to assess the costs for investors buying load funds as compared to no-load funds. In other words, we ask, what are the costs to investors in terms of fund performance for the advice that usually comes with buying a load fund?

This question already has received some treatment in the literature. Various papers by Carlson (1970), Ippolito and Richard (1989), Elton et al. (1993), Grinblatt and Titman (1994), Droms and Walker (1994), Gruber (1996), and Fortin and Michelson (1995) have examined the performance of load and no-load funds and, in general, they find that before the effect of loads is incorporated there is no significant difference in returns between load and no-load funds. [6] However, our paper differs

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[3] Jaffe, Charles, "Load, No-Load a Dead Issue: Consider Costs", The Boston Globe, May 24, 2000, page D4.

[4] New York Times, November 5, 2000, page C8.

[5] Various recent newspaper articles make this point. See for example, "Death of the Fund Salesman Has Been Greatly Exaggerated", The New York Times, October 8, 2000, "Investments-No Load? No Way! Ten years ago, no-load funds were poised to take over the industry. Today, fund companies proudly add load products", Financial Planning, May 1, 2000, "Scudder Considers Switch Away From No-Loads", The Wall Street Journal, October 16, 2000, and "Load versus No-Load: It's a question of paying for advice", USA Today, September 1, 2000.

[6] One paper that comes up with a different result is Ippolito and Richard (1989) who suggests that "Load funds earn rates of returns that plausibly off-set the load charge" (see Ippolito and Richard, 1989, pp. 14–15).

from these others in that it provides the most comprehensive study of this issue to date, incorporating many features that the other papers do not utilize, or if they do, they do not do so in as comprehensive a manner as this paper. Specifically, these features include:

1. A direct incorporation of loads into the out-of-sample returns. As a result we are able to examine the *load-adjusted* performances of load funds and no-load funds. This approach allows us to compare the two types of funds on a level playing field. This method differs from all of the previous papers that have simply examined non-load-adjusted returns and hence could not directly quantify the difference in realized performance between investors in load and no-load funds.

2. Mutual fund data generated at the time the funds were actually available to investors. 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 et al. (1992), Elton et al. (1996b) and others. Other than Ippolito and Richard (1989), Elton et al. (1993) and Gruber (1996) our paper is the only load/no-load paper of those listed above that does not have a survivorship bias problem.

3. A large sample of funds that allows for a more precise characterization of performance. Indeed, we examine all of the domestic equity funds that were rated by Morningstar on December 31, 1992. This amounts to 635 funds of which 304 were no-load funds and 331 were load funds. As a result, with the exception of the sample used by Fortin and Michelson (1995), our sample is more than twice the size of any sample used in the other studies. Furthermore, while the Fortin and Michelson sample is larger than ours, it suffers from a severe survivorship bias problem as they sample funds from the January 1994 Morningstar data disk and simply look backwards to 1976 to examine the returns. Any funds that dropped out of the sample from 1976 to 1994 were excluded from their sample.

4. A sample of funds that allows us to examine the load versus no-load performance of funds across different styles and ages of funds. The only other papers to examine style effects are within the load and no-load context is (Fortin and Michelson, 1995). To our knowledge, none of the existing papers has examined age effects in the context of the load/no-load funds.

5. A sample of funds that also allows us to assess whether the size of the load contributes to differences in performance by investors in no-load and load funds. Furthermore, *within* the load fund group we are able to assess whether performance varies from low-load and high-load funds. None of the other papers have examined these types of effects.

6. Four different measures of performance: Mean monthly returns adjusted for the style of the fund, a Sharpe ratio, a Jensen-type alpha and a 4-index alpha. These measures are similar to those used by Gruber (1996) and are slightly different than the two measures (single index and a 3-index model) used in Elton et al. (1993) and the two measures (the 10-factor portfolios and eight characteristic-based

portfolios) used in Grinblatt and Titman (1994). The other related papers generally only use one or two performance measures with usually those being the Jensen's alpha, Treynor index or mean returns.

7. A data set with out-of-sample returns covering the period of 1993–1997. Although not absolutely current, these data are much closer to the present than the data used in the other existing studies.

The rest of the paper is organized as follows. Section 2 extensively describes the data that we use in the paper. Section 3 describes the methodology of the paper, Section 4 presents the results and Section 5 provides the conclusions.

2. Data

To better organize the description of the data, this section is divided into five subsections: Fund selection criteria, the out-of-sample evaluation period, the types of data used, merger and problem funds, and the load-adjusted returns.

2.1. Fund selection criteria

To select funds we use the January 1993 Morningstar On-Disk. This provides data for all funds that were available to US investors as of December 31, 1992. Our rationale in using the 1993 disk rather than a later disk is that it enables us to examine the out-of-sample performance of a smaller number of funds (635) as opposed to well over 2000 funds if we were to use the 1996 or 1997 On-Disk/Principia Data Disks. This lower number of funds is important because the process of tracking each fund's out-of-sample returns through all mergers, name changes and liquidations is quite onerous.

From this disk we then select all open [7] funds with at least three years of return history [8] that are within each of the following five Morningstar "Investment objectives" (styles): aggressive growth, equity-income, growth, growth and income, and small company. This produced the sample of 635 funds. Our rationale for selecting only open funds is that we wanted all the funds selected to be actually available to investors as of December 31, 1992. We use the three-year history criterion since it ensures that each fund will contain enough in-sample data to calculate some of our performance metrics (see Section 3.3 for more on this issue). Finally, the use of different styles allows us to examine whether or not there is a "style effect" in the out-of-sample performance. In regards to this style effect, it should also be noted here that the five styles used in our analysis are assigned by Morningstar, meaning

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[7] There were 24 funds that meet our other criteria and yet were listed as closed funds in January 1993. These funds were excluded from the sample.

[8] That is, the inception dates of the funds must begin before December 31, 1989.

that the style designations are much more accurate and up-to-date than the style information provided by the funds themselves. [9] Moreover, these five styles make up the vast majority of domestic equity funds and the use of these five styles is in the tradition of Blume (1998).

2.2. The out-of-sample evaluation period

For each of the 635 funds we then examine the out-of-sample performance for five years, from 1993 to 1997. We use five years since this a common middle-term interval of time for evaluating performance.

2.3. Types of data used

With this sample of 635 funds we then acquire the following data for each fund:

1. *The in-sample monthly return history from 1990 to 1992*. This again is available from the January 1993 Morningstar disk. These return data account for management, administrative, and 12b-1 fees and other expenses automatically taken out of fund assets, however they do *not* account for loads. [10]
2. *The out-of-sample monthly return history from 1993 to 1997*. This information is taken from later Morningstar data disks (quarterly data disks ranging from 1993 to 1998). As with the monthly returns from 1990 to 1992, these returns account for management, administrative and 12b-1 fees and other costs, but they do *not* account for loads.
3. *The front-load of the fund as of December 31, 1992*. This information is taken from the January 1993 Morningstar data disk.
4. *The deferred load of the fund* (*as of December 31, 1992*) *assuming that the fund was held for a period of five years*. This information is taken from the January 1993 Morningstar disk. We only include these deferred loads as we assume that each fund will be held for this length of time. Any deferred load that is applied to holding periods less than five years is not considered (we explain these data more in Section 2.5).
5. *The age and style of the fund as of December 31, 1992*. This information is taken from the January 1993 Morningstar disk.

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[9] We also examined if the funds retained their style classifications by Morningstar in the out-of-sample period. We found that, in our sample, more than 87% of the funds retain their style classification at the end of the sample period. Hence, according to Morningstar, the vast majority of funds did not change their style of management. We did, however, conduct an analysis in which we use the styles of the funds at the end of the out-of-sample period (December 1997). These results were very similar to those using the styles at the beginning of the out-of-sample period. These results are available in Table 5.

[10] See the Morningstar Principia Manual (1998, p. 107). Note also that are a number of papers (e.g. Detzler, 1999) that have found that fund expenses are negatively related to performance.

2.4. Problem funds

As described in the previous section, we select funds at the time the funds were listed by Morningstar. To examine the out-of-sample performance, 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 fund's future performance. 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 [11] and *The Wall Street Journal* to identify the name changes. We then simply use the renamed 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. If 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 merged, we simply use the out-of-sample returns of the fund in question. After a fund has merged into its partner fund, we assume the investor randomly re-invests into one of the other surviving funds of the same style *and the same load preference*, i.e., load or no-load. [12] Hence the out-of-sample returns from the merger month and onwards are equally weighted averages of the returns of all the other surviving funds in our sample with the same style *and load preference*, with the load and style status determined as of December 31, 1992. For example, the returns from the merger month onward of no-load growth fund would be the equally weighted average returns of all the other surviving *no-load* growth funds. If instead the merger fund was a growth fund with a *load*, its returns from the merger month onward would be the equally weighted average returns of the surviving load growth funds. [13]

For the liquidated funds we first identify 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 into those funds in our sample with the same investment objective *and load preference* as the liquidated fund.

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

[12] We classify any fund that has a front load and/or a deferred load (for the five-year holding period) as a load fund. Any other fund is classified as a no-load fund.

[13] Of course, an alternative approach would be to use the "follow-the-money" approach introduced in (Elton et al., 1996b), where a merged fund's returns are spliced to its "merge partner" fund's returns to form a complete time series. However, we did not use this method since we require a complete in-sample time series of returns, i.e., 1990–1992, for the merge partner fund, and in some cases the partner fund did not exist long enough to obtain such a series.

It should be noted here that as a robustness check, we calculated our results using two additional methods for the merger/liquidation funds. First, we assumed that after a fund merged or liquidated, its returns were a equally weighted average of the returns of the surviving funds of just the same style. For example, the returns from the merger month onward of a growth fund would be the equally weighted average returns of all the other surviving growth funds, regardless of whether they were load or no-load funds. For the second method, we assumed that once a fund merged or liquidated, its returns were an equally weighted average of the returns of the surviving funds that were of the same style *and possessed a 3-star or better overall Morningstar rating at the time the fund merged*. This rule required that we check the Morningstar ratings of the surviving funds at the time of the merger. The reason we incorporated this second additional method was to incorporate a rule that allowed the investor to re-invest their money into a high performing fund of the same style. This being said, both additional merger/liquidation methods were found to produce similar results to those presented in the Section 4. Hence, we do not report these results, however, they are available upon request.

2.5. Returns data and load adjustments

For the out-of-sample returns and the in-sample returns, the data consist of monthly returns from the Morningstar On-Disk and Prinicipia programs. As stated earlier, these returns data are adjusted to account for management, administrative, and 12b-1 fees and other costs automatically taken out of fund assets, however, these monthly return data do not adjust for sales charges such as front and deferred loads. [14] Consequently, if we use the monthly return data for the out-of-sample returns, investor returns on load funds are overstated. The question is, thus, how to incorporate loads into the monthly return data?

Very little attention in the mutual fund performance literature is given to the treatment of loads in return data. Although some authors (e.g., Elton et al., 1993; Grinblatt and Titman, 1994; Gruber, 1996) have presented results separately for load and no-load funds, all the no-load/load context studies provide no direct adjustment for loads in their returns data. As a result, previous studies have only been able to hint at the true difference in returns between load and no-load funds.

Rather than follow previous approaches, we wanted to directly adjust our results for loads by using load-adjusted returns. To do this we use an approach similar to that in Rea and Reid (1998). For front loads, we consider an investor who buys and holds the load shares for our holding period of 60 months (five years). As with most front loads we assume that the investor buying the fund pays a load in a lump sum at the time the fund is purchased. To spread the front 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 installments during the holding period. Hence, the

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[14] Morningstar Principia Manual (1998, p. 107).

monthly load adjustment reflects the amount that was borrowed and the interest on the loan.

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

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

where r is the monthly interest rate (the monthly periodic interest rate of five-year Treasury yield in January 1993), f the front-load (expressed as a percent), h the number of months the fund is held and f^{m} the monthly front-load adjustment.

Hence, the front load-adjusted (for front loads) returns are

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

where R_{it} is the non-load-adjusted monthly return of fund i in month t, where t goes from 1 to 60. R_{it}^{FLA} is the monthly front load-adjusted return of fund i in month t.

As an example of the above adjustment, consider a five-year investment in Fidelity's Magellan fund starting in January 1993. As of January 1993, that fund had a front-load of 3%, and the five-year Treasury yield was 5.83%, giving a monthly periodic rate of 0.4853%. [15] Therefore, for the five-year holding (out-of-sample) period, $f = 3\%$, $r = 0.004853$, and $h = 60$, giving $f^{\mathrm{m}} = 0.0577\%$. We then subtract 0.0577% from each of the Magellan fund's 60 monthly returns from 1993 to 1997 to obtain the front load-adjusted returns.

For the deferred load adjustment, the process is different in a number of ways. First, we only define a fund has having a deferred load if the fund has "five-year holding period deferred load" as of December 31, 1992. That is, as of December 31, 1992, the fund must show evidence that even if the investor holds the fund for a period of five years (1993–1997), a deferred load is still charged. Any deferred load that is applied to holding periods less than five years is not considered.

Second, we assume in our analysis that the five-year holding period deferred load that is stated in December 31, 1992 is in fact applied five years later. Any changes in the deferred loads from December 31, 1992 to December 31, 1997 are not accounted for. While at first blush this may seem to be problematic, this assumption is consistent with the general industry practice of "locking-in" the deferred loads at the time the fund is purchased. Of course, funds could have changed their deferred loads during the out-of-sample period, but we found no evidence of such after calling all of the existing deferred load funds in our sample. [16]

Third, deferred loads are often calculated differently than front loads. Specifically, deferred loads are sometimes calculated on the value of the fund at the time

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[15] These data are from the Federal Reserve Database at www.econmagic.com.

[16] We called 20 mutual funds (31 deferred load funds minus 11 that had merged or liquidated since August 2001). All 20 funds reported that they lock in the deferred load structure at the time the fund was purchased. Moreover, this policy was followed by all 20 funds since December 31, 1992. It should also be noted here that while all 20 funds followed the lock-in policy on deferred loads, the funds could have legally not followed this policy. See National Association of Security Dealers (NASD) rule 2830 and the Investment Company Act of 1940 (Rule 6c-10) for more information.

the investor sells rather than the up-front costs. If the investor has invested very successfully this can mean that the amount paid for a small deferred load can actually be greater than that of a large front load. [17] In our paper we assume that all deferred loads are calculated using the up-front costs because a strong majority of the fund companies that we called also followed this method. [18]

Fourth, the last difference between deferred and front loads of course 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 deferred 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

$$d^{\mathrm{m}} = \frac{d}{\sum_{j=1}^{h}(1+r)^{j}} \tag{2}$$

where d is the deferred load (expressed as a percent), d^{m} the monthly deferred load (assuming a five year holding period) adjustment.

Hence, the deferred load-adjusted returns are

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

where R_{it} is the monthly return of fund i in month t, R_{it}^{DLA} the monthly deferred load-adjusted return of fund i in month t.

Note finally that if a fund has no deferred load for the five-year holding period and no front load, then it is considered a no-load fund.

3. Methodology

To measure out-of-sample performance we use four performance metrics: The mean monthly excess returns, the Sharpe (1966) ratio, a modified version of Jensen's (1968) alpha, and a 4-index alpha. For each performance metric we examine both *non-load-adjusted* and *load-adjusted* versions. We now explain, in detail, the four out-of-sample performance metrics.

3.1. Excess mean monthly returns

The non-load-adjusted excess monthly returns for the ith mutual fund during the out-of-sample period are signified by $R_{it} - R_{ft}$, where R_{ft}, is the 30-day T-bill rate.

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[17] We thank an anonymous referee for this point.

[18] Nineteen of the twenty funds that we called reported that they charged the deferred load on the up-front costs. The only fund in our sample that did not use up-front costs was the Quantitative Growth and Income Fund which charged the deferred load on the ending value. It should be noted that this information, about how the deferred load is specifically calculated, is not available in the Morningstar data.

The non-load-adjusted *mean* monthly excess return for the ith mutual fund during the out-of-sample period is $\overline{R_i - R_f}$.

The load-adjusted excess monthly returns for the ith mutual fund during the out-of-sample period are signified by $R_{it}^{\text{LA}} - R_{ft}$, where $R_i^{\text{LA}} = R_{it} - f^{\text{m}} - d^{\text{m}}$. The load-adjusted *mean* monthly excess returns are simply equal to

$$\overline{R_i^{\text{LA}} - R_f}.$$

3.2. The Sharpe ratio

The non-load-adjusted Sharpe ratio is

$$\text{Sharpe}_i = \frac{\overline{R_i - R_f}}{\sigma_i} \tag{3}$$

where is σ_i is the standard deviation of $R_{it} - R_{ft}$.

The load-adjusted Sharpe ratio for fund i is

$$\text{Sharpe}_i = \frac{\overline{R_i^{\text{LA}} - R_f}}{\sigma_i^{\text{LA}}} \tag{3a}$$

where σ_i^{LA} is the standard deviation of $R_{it}^{\text{LA}} - R_{ft}$.

3.3. Modified Jensen and 4-index alphas

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

$$R_{it} - R_{ft} = \alpha_i + \sum_{k=1}^{K} \beta_{ik} I_{kt} + \varepsilon_{it} \tag{4}$$

where $R_{it} - R_{ft}$ is the excess total return (net of the 30-day T-bill return) for fund i in in-sample month t, α_i is the alpha for fund i, used as a performance predictor, β_{ik} is the sensitivity of fund i's excess return to index k, I_{kt} is the return for index k in in-sample month t and ε_{it} is the random error for fund i in in-sample month t.

For Jensen alphas, $K = 1$ and I_{1t} is the excess total return of the S&P 500 in month t. For the 4-index alphas, $K = 4$, I_{1t} is the excess total return of the S&P 500 in month t, I_{2t} is the excess total return of Lehman Aggregate Bond Index in month t, I_{3t} is the difference in return between a small-cap and large-cap stock portfolio based on Prudential Bache indexes in month t, and I_{4t} is the difference in return between a growth and value stock portfolio based on Prudential Bache indexes in month t. [19] We utilize the 4-index model because, as shown in Elton et al. (1996a), this model provides for better risk adjustment for mutual funds than does the single-index model.

The non-load-adjusted modified Jensen and 4-index alphas are calculated using a methodology similar to that of Elton et al. (1996a). Specifically, we utilize a time

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[19] See Elton et al. (1996a) for a detailed description of the Prudential Bache portfolios used in the 4-index model.

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 (Eq. (4)). As mentioned in Section 2, to be included in the sample each fund had to have three years of in-sample returns.

To obtain the alphas, we add the average monthly residual during the evaluation period to the intercept. For example, to obtain the modified Jensen alpha, we run the 1-index model on monthly returns starting in January 1990 and ending in December 1997 (8 years) to obtain an estimate of the intercept. We then add the average of the fund's residuals during the five years after the selection date (1993–1997) 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 starting in January 1990 and ending in the month prior to the fund's disappearance and (2) a regression run over the entire sample period (1990–1997) using the returns of an equally weighted portfolio formed each month from the existing funds of the *same style and load preference*. [20] 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.

For the load-adjusted modified Jensen and 4-index alphas we use the same methodology described above however, we use the excess load-adjusted returns, $R_{it}^{LA} - R_{ft}$, for the out-of-sample returns. That is, we use the excess non-load-adjusted returns for the in-sample data (1990–1992) and the excess load-adjusted returns for the out-of-sample period (1993–1997). Our rationale for not using load-adjusted returns during the in-sample period is that we assume the investor has not yet bought the fund and hence a load should not be subtracted from the returns. Moreover, the loads may be quite different during the in-sample period than during the out-of-sample period and hence it would be difficult to know what load to apply and for how long to apply it.

4. Results

The results are organized into six subsections: Summary statistics on the sample; overall results; style effects; age effects; size of the load effects and size of the load effects in load funds.

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[20] Hence for the second regression there are 10 different equally weighted portfolios (five styles and two load preferences). We use the equally weighted portfolio that matches the style of the merger/liquidated fund.

4.1. Summary statistics on the sample

The summary statistics of the sample are presented in Tables 1 and 2. Table 1 shows the number of load and no-load funds, the average front load, the average deferred load, the number of liquidated funds, and the number of merger funds. Table 1 also shows the same information organized across styles and ages of the funds. Table 2 shows the same information organized across the size of the loads. Again, the load numbers, styles and ages are all as of December 31, 1992.

The two tables show several interesting findings. First, 97 of the 635 funds in our sample (about 15%) merged or liquidated during the out-of-sample period, hence survivorship bias is obviously an important issue to consider in this paper. [21] Second, the average front load was 5.15% with equity-income funds having the highest average front load. The highest front load of any fund was 8.5% while the lowest was 1.5% with majority of front-load funds having loads between 4.50% and 6.49%. Third, there were 31 funds with deferred loads (for the five-year holding period). [22] Interestingly enough, all of these 31 funds had a 1% deferred load given this five-year holding period and only one of these funds also had a front load. Fourth, there are many more growth and growth-income funds in the sample than there are aggressive growth, equity-income and small company funds. Fifth, young funds (funds with more than three but fewer than five years of return history) make up the smallest share of the sample. Middle-aged funds (funds with more than five but fewer than 10 years of return history) and seasoned funds (funds with 10 or more years of return history) together make up about 86% of the sample.

It should also be noted here that of the 304 no-load funds shown in Table 1, ten of these funds were index funds. This is important to note since the presence of index funds could affect our final results as they performed quite well over the out-of-sample period of 1993–1997. In most of the upcoming results, in addition to examining the full sample of funds, we also examine the results in which we exclude these 10 no-load index funds from the sample. [23]

4.2. Overall results

Table 3 shows the overall out-of-sample results for all eight performance metrics. The results indicate that when using non-load-adjusted returns, there is no significant difference in average performance between no-load and load funds when using the

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[21] The timing of the mergers and liquidations was somewhat biased towards the first half of the out-of-sample period. Indeed, 60 of the merger/liquidations took place before July 1995 (the middle point of the out-of-sample period) and 37 occurred after this time.

[22] 58 of the 635 funds had deferred loads but only 31 of the 58 had deferred loads that were still applied given the five-year holding period.

[23] There was also one load fund that was an index fund, however we do not exclude this fund from our sample as it does not affect the results at all.

Table 1
Summary statistics of the sample of funds

Samples organized by		No. of funds	Average front load (%)	Average deferred load (%)	No. of funds that liquidated between 1993 and 1997	No. of funds that merged between 1993 and 1997
Overall	No-load funds	304	NA	NA	8	24
	Load funds	331	See below	See below	12	53
Load funds	Front-load funds	300	5.15	NA	10	45
	Deferred-load funds	30	NA	1.00	2	7
	Funds with front and deferred loads	1[a]	2.50	1.00	0	1
Style of fund						
Aggressive growth	No-load funds	17	NA	NA	0	1
	Front-load funds	26	4.67	NA	2	2
	Deferred-load funds	1	NA	1.00	0	0
Equity income	No-load funds	22	NA	NA	1	1
	Front-load funds	20	5.48	NA	0	3
	Deferred-load funds	3	NA	1.00	0	2
Growth	No-load funds	141	NA	NA	6	14
	Front-load funds	149	5.16	NA	4	26
	Deferred-load funds	12	NA	1.00	0	4
Growth-income	No-load funds	73	NA	NA	1	6
	Front-load funds	82	5.17	NA	3	11
	Deferred-load funds	9	NA	1.00	2	1

Small company	No-load funds	51	NA	NA	0	2
	Front-load funds	23	5.30	NA	1	3
	Deferred-load funds	5	NA	1.00	0	0
	Funds with front and deferred loads	1	2.50	1.00	0	1
Age of fund						
Young (three to less than five years)	No-load funds	48	NA	NA	3	4
	Front-load funds	41	4.77	NA	3	7
	Deferred-load funds	1	NA	1.00	0	0
Middle-aged (five years to less than 10 years)	No-load funds	138	NA	NA	5	13
	Front-load funds	114	4.82	NA	7	18
	Deferred-load funds	24	NA	1.00	2	7
Seasoned (10 years or greater)	No-load funds	118	NA	NA	0	7
	Front-load funds	145	5.52	NA	0	20
	Deferred-load funds	5	NA	1.00	0	0
	Funds with front and deferred loads	1	2.50	1.00	0	1

The total number of funds is 635 funds. Loads, styles and ages of funds are as of December 31, 1992. Note that a deferred-load fund is a fund that still applied a deferred load after the investor had held the fund for five years. Note also that funds with front and or deferred loads are considered to be load funds.

[a] The one fund that had a front and deferred load was a seasoned small company fund.

Table 2
Summary statistics organized by the size of the load

Load of the fund	No. of funds	No. of funds that were liquidated between 1993 and 1997	No. of funds that merged between 1993 and 1997
Front-load funds			
Funds with front loads from 1.50% to 2.49%	5	0	0
Funds with front loads from 2.50% to 3.49%	15	0	3
Funds with front loads from 3.50% to 4.49%	29	4	4
Funds with front loads from 4.50% to 5.49%	120	4	18
Funds with front loads from 5.50% to 6.49%	99	2	16
Funds with front loads from 6.50% to 7.49%	12	0	2
Funds with front loads from 7.50% to 8.50%	20	0	2
Total front-load funds	300		
Deferred-load funds			
Funds with deferred loads (assuming the investor held the fund for five years) of 1%	30	2	7
Total deferred-load funds	30		
Funds with front and deferred loads (2.5% front-load and a 1% deferred load)	1	0	1

Note that a deferred-load fund is a fund that still applied a deferred load after the investor had held the fund for five years. Also note that the loads are defined as of December 31, 1992.

mean monthly returns and the Sharpe ratio. On the other hand, the results for the modified Jensen's alpha and the 4-index alpha indicate that the performance of no-load funds is significantly *higher* than that of load funds *even before adjusting* for loads in the returns (although in the case of the 4-index alpha significance is only at the 10% level). When using load-adjusted returns, all four of the performance metrics show significantly higher performance for the no-load funds (at the 1% level). Hence, these results show that the average performance of load funds is somewhat similar to that of no-load funds before adjusting for loads, however, after adjusting for loads, the average performance of load funds is far lower than that of no-load funds.

Table 3 also shows the average performance metrics when excluding the 10 no-load index funds. The results of this analysis are very similar to those where the index funds are included. Indeed, using the non-load-adjusted returns, the results for mean monthly returns and the Sharpe ratio show no significant difference between the load and no-load funds. However, the Jensen and 4-index alpha results indicate that the performance of no-load funds is significantly higher than the load funds. Using the load-adjusted returns, we again see that the results of all four performance metrics indicate that the no-load funds perform significantly better than the load funds at the 1% level of significance.

Table 3
Overall out-of-sample performance statistics[a]

	No. of funds	Average mean monthly return (using non-load-adjusted returns)	Average mean monthly return (using load-adjusted returns)	Average Sharpe ratio (using non-load-adjusted returns)	Average Sharpe ratio (using load-adjusted returns)	Average Jensen alpha (using non-load-adjusted returns)	Average Jensen alpha (using load-adjusted returns)	Average 4-index alpha (using non-load-adjusted returns)	Average 4-index alpha (using load-adjusted returns)
No-load funds	304	0.9357	0.9357***	0.3025	0.3025***	−0.1612**	−0.1612***	0.0003*	0.0003***
Load funds	331	0.9295	0.8373	0.2931	0.2640	−0.2232	−0.3138	−0.0321	−0.1193
Excluding index funds (excludes 10 no-load index funds from the sample)									
No-load funds	294	0.9306	0.9306***	0.3007	0.3007***	−0.1637**	−0.1637***	0.0004*	0.0004***
Load Funds	301	0.9295	0.8373	0.2931	0.2640	−0.2232	−0.3138	−0.0321	−0.1193

* Indicates the difference between the no-load funds and load funds is significant at the 10% level.

** Indicates the difference between the no-load funds and load funds is significant at the 5% level.

*** Indicates the difference between the no-load funds and load funds is significant at the 1% level.

[a] The out-of-sample performance statistics are for the five-year period from 1993 to 1997. Funds with front and or deferred loads are considered to be load funds.

4.3. Style effects

Table 4 presents the average performance results organized by style of fund using the styles as defined at the beginning of the out-of-sample period, December 31, 1992. There are two basic findings. First, unless you have a large enough sample of funds, it is difficult to see any strong pattern of significant differences in performance between no-load and load funds. This is evident in the findings for the aggressive growth and equity-income funds and to a lesser extent, for small company funds. Indeed for the aggressive growth and equity-income funds no significant differences are found and for the small company funds we find that two of the performance metrics (the load-adjusted Sharpe ratio and load-adjusted Jensen index) show that no-load funds significantly outperform load funds while one metric (the non-load-adjusted 4-index alpha) shows the opposite finding. Second, the patterns seen in Table 3 (the overall analysis) are again evident with respect to the growth and growth-income funds. That is, with non-load-adjusted returns performance measures we do not generally see much of a difference in performance between load and no-load funds. However, when using the load-adjusted returns all four of the performance metrics show that the no-load funds have significantly higher performance (at the 1% level) than do the load funds.

The bottom of Table 4 also shows the results from excluding the 10 no-load index funds (seven index funds were growth-income funds and three were small company). As with overall results in Table 3, the results are very similar to results on the full sample of funds.

In addition to examining the style effects using the styles as defined on December 31, 1992, we also examined the results using the styles of the funds *at the end of the sample period*, December 31, 1997. [24] The results of this analysis are presented in Table 5 and are similar to those presented in Table 4. The only major difference between Tables 4 and 5 is with the equity-income results. Table 4 shows that the difference in performance between the equity-income no-load and equity-income load funds is rarely significant, while Table 5 shows that there are three cases where that equity-income no-load funds significantly outperform equity-income load funds.

4.4. Age effects

Table 6 examines the effect that the age of the fund has on out-of-sample performance. As with the previous tables we examine the full sample of funds and a sample in which we exclude the no-load index funds. [25] We find two results. First, in general,

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[24] The only exception is for merger and liquidated funds. For these funds we use the style of the fund defined during the quarter before they merged or liquidated. Note that none of the merger or liquidated funds changed their style from the beginning of the sample to the quarter before they merged or liquidated. Also note that 22 of the surviving funds changed styles outside of the five styles (aggressive growth, equity-income, growth, growth-income, small company) from the beginning of the sample to the quarter before they merged. We excluded these funds from the sample used in Table 5. Hence the sample consists of 613 funds.

[25] The index funds that were excluded included two young funds, six middle-aged funds and two seasoned funds.

Table 4
Out-sample performance statistics organized by style of fund (using style described by Morningstar as of December 31, 1992)[a]

Fund style	Type of fund examined	No. of funds	Average excess mean monthly return (%) using non-load adjusted returns	Average excess mean monthly return (%) using load-adjusted returns	Average Sharpe ratio using non-load adjusted returns	Average Sharpe ratio using load adjusted returns	Average Jensen alpha using non-load adjusted returns	Average Jensen alpha using load adjusted returns	Average 4-index alpha using non-load adjusted returns	Average 4-index alpha using load adjusted returns
Agg. growth	No-load	17	0.7420	0.7420	0.2037	0.2037	−0.4711	−0.4711	−0.0461	−0.0461
	Load	27	0.8611	0.7734	0.2054	0.1850	−0.4764	−0.5625	−0.0089	−0.0919
Equity-income	No-load	22	0.9222	0.9222	0.3800	0.3800*	0.0198	0.0198	−0.0620	−0.0620
	Load	23	0.9714	0.8734	0.3772	0.3389	0.0469	−0.0495	−0.0184	−0.1110
Growth	No-load	141	0.9372	0.9372***	0.2951	0.2951***	−0.1840**	−0.1840***	−0.0249*	−0.0249***
	Load	161	0.9028	0.8097	0.2786	0.2500	−0.2789	−0.3705	−0.0752	−0.1633
Growth-income	No-load	73	0.9810	0.9810***	0.3474	0.3474***	−0.0587	−0.0587***	−0.0375	−0.0375***
	Load	91	0.9578	0.8649	0.3426	0.3090	−0.0909	−0.1822	−0.0640	−0.1519
Small company	No-load	51	0.9370	0.9370	0.2582	0.2582**	−0.2195	−0.2195**	0.1665*	0.1665
	Load	29	1.0195	0.9352	0.2332	0.2140	−0.3077	−0.3905	0.2745	0.1948
Excluding index funds										
Growth-income	No-load	66	0.9657	0.9657***	0.3434	0.3434***	−0.0602	−0.0602***	−0.0376	−0.0376***
	Load	91	0.9578	0.8649	0.3426	0.3090	−0.0909	−0.1822	−0.0640	−0.1519
Small company	No-load	48	0.9334	0.9334	0.2564	0.2564*	−0.2218	−0.2218**	0.1717*	0.1717
	Load	29	1.0195	0.9352	0.2332	0.2140	−0.3077	−0.3905	0.2745	0.1948

* Indicates the difference between the no-load funds and load funds is significant at the 10% level.
** Indicates the difference between the no-load funds and load funds is significant at the 5% level.
*** Indicates the difference between the no-load funds and load funds is significant at the 1% level.
[a] Note that the out-of-sample performance statistics are for the five-year period from 1993 to 1997. Also note that funds with front and deferred loads are considered load funds.

Table 5
Out-sample performance statistics organized by style of fund (using styles described by Morningstar as of December 31, 1997)[a]

Fund style	Type of fund examined	No. of funds	Average excess mean monthly return (%) using non-load adjusted returns	Average excess mean monthly return (%) using load-adjusted returns	Average Sharpe ratio using non-load adjusted returns	Average Sharpe ratio using load adjusted returns	Average Jensen alpha using non-load adjusted returns	Average Jensen alpha using load adjusted returns	Average 4-index alpha using non-load adjusted returns	Average 4-index alpha using load adjusted returns
Agg. growth	No-load	18	0.7859	0.7859	0.1791	0.1791	−0.4747	−0.4747	−0.0198	−0.0198
	Load	24	0.8393	0.7527	0.1986	0.1787	−0.5113	−0.5964	−0.0102	−0.0921
Equity-income	No-load	18	0.9724	0.9724**	0.3919	0.3919**	0.0276	0.0276*	−0.0727	−0.0727
	Load	25	0.9656	0.8693	0.3758	0.3381	0.0404	−0.0543	−0.0236	−0.1147
Growth	No-load	125	0.9510	0.9510***	0.2979**	0.2979***	−0.2001***	−0.2009***	−0.0242*	−0.0242***
	Load	157	0.9013	0.8079	0.2722	0.2440	−0.2935	−0.3853	−0.0727	−0.1611
Growth-income	No-load	75	1.0093	1.0093***	0.3610	0.3610***	−0.0346**	−0.0346***	−0.0267	−0. 0267***
	Load	86	0.9875	0.8959	0.3485	0.3161	−0.0850	−0.1750	−0.0608	−0.1475
Small-company	No-load	55	0.9227*	0.9227	0.2558	0.2558*	−0.2185	−0.2185*	0.1380*	0.1380
	Load	30	1.0140	0.9273	0.2403	0.2197	−0.2849	−0.3701	0.2503	0.1683
Excluding index funds										
Growth-income	No-load	68	0.9974	0.9974***	0.3585	0.3585***	−0.0335***	−0.0335***	−0.0257	−0.0257***
	Load	86	0.9875	0.8959	0.3485	0.3161	−0.0850	−0.1750	−0.0608	−0.1475
Small-company	No-load	52	0.9185*	0.9185	0.2540	0.2540	−0.2206***	−0.2206*	0.1411*	0.1411
	Load	30	1.0140	0.9273	0.2403	0.2197	−0.2849	−0.3701	0.2503	0.1683

* Indicates the difference between the no-load funds and load funds is significant at the 10% level.
** Indicates the difference between the no-load funds and load funds is significant at the 5% level.
*** Indicates the difference between the no-load funds and load funds is significant at the 1% level.

[a] The styles are the fund styles as described by Morningstar on December 31, 1997, unless the fund was a merger or liquidated fund in which case we used the style as defined on the quarter before the fund merged or liquidated. Note that 22 funds that were classified as either aggressive growth, equity-income, growth, growth-income or small company in December 1992, were classified as something other than one of these styles as of December 31, 1997. Hence these funds were excluded from the sample. Consequently the sample size was 613 funds. Note also that the out-of-sample performance statistics are for the five-year period from 1993 to 1997 and that front-load and deferred-load funds are considered load funds.

Table 6
Age, loads and out-of-sample performance[a]

Age of fund	Fund type	No. of funds	Average Sharpe ratio (using non-load adjusted returns)	Average Sharpe ratio (using load adjusted returns)	Average Jensen alpha (using non-load adjusted returns)	Average Jensen alpha (using load adjusted returns)	Average 4-index alpha (using non-load adjusted returns)	Average 4-index alpha (using load adjusted returns)
Young	No-load funds	48	0.3342	0.3342***	−0.0784	−0.0784***	0.0182	0.0182**
	Load funds	42	0.3045	0.2750	−0.1383	−0.2275	−0.0074	−0.0931
Middle-aged	No-load funds	138	0.3082*	0.3082***	−0.1535***	−0.1535***	0.0151	0.0151***
	Load funds	138	0.2858	0.2602	−0.2447	−0.3255	−0.0211	−0.0989
Seasoned	No-load funds	118	0.2829	0.2829	−0.2038	−0.2038***	−0.0243	−0.0243***
	Load funds	151	0.2967	0.2643	−0.2272	−0.3272	−0.0490	−0.1453
Excluding index funds								
Young	No-load funds	46	0.3318	0.3318**	−0.0806	−0.0806**	0.0203	0.0203**
	Load funds	42	0.3045	0.2750	−0.1383	−0.2275	−0.0074	−0.0931
Middle-aged	No-load funds	132	0.3064*	0.3064***	−0.1554**	−0.1554***	0.0159	0.0159***
	Load funds	138	0.2858	0.2602	−0.2447	−0.3255	−0.0211	−0.0989
Seasoned	No-load funds	116	0.2819	0.2819	−0.2062	−0.2062***	−0.0253	−0.0253***
	Load funds	151	0.2967	0.2643	−0.2272	−0.3272	−0.0490	−0.1453

* Indicates the difference between the no-load funds and load funds is significant at the 10% level.

** Indicates the difference between the no-load funds and load funds is significant at the 5% level.

*** Indicates the difference between the no-load funds and load funds is significant at the 1% level.

[a] Note that young funds have at least three but less than five years of return history as of December 31, 1992; middle-aged funds have five years to less than ten years of returns as of December 31, 1992; and seasoned funds have ten years or more of returns as of December 31, 1992. Also note that funds with front and deferred loads are considered load funds. The out-of-sample performance statistics are for the five-year period from 1993 to 1997.

we find the same results as those in Table 3. Across different ages of funds, there is little difference in the performance of load and no-load funds when using non-load-adjusted performance metrics. Indeed, across the three performance metrics [26] there are only two cases (Sharpe ratio and Jensen alpha for middle-aged funds) where there is a significant difference between load and no-load funds when using non-load-adjusted returns. However, when the load-adjusted performance metrics are used, we find strong evidence that no-load funds significantly outperform the load funds.

Second, we find that the young funds dominate in terms of performance. In every single performance metric, whether load adjusted or not, the young funds have the highest average performance metrics. These results are consistent with others (e.g. Chevalier and Ellison, 1997) who find that young funds significantly outperform older funds.

4.5. Size of the load effect

Another issue we investigate is whether the size of the load helps explain the difference in performance between no-load and load funds. To investigate this issue we examine differences in average performance between no-load funds and load funds organized by the size of the load. To do this we classify the load funds into four groups: *deferred* load funds (which all have deferred loads of 1%), *low front* load funds [27] (funds with front loads of 4% or less), *middle front* load funds (funds with front-loads between 4.01% and 5.99%) and *high front* load funds (funds with front-loads of 6% or more). [28] These results are presented in Table 7. [29]

We find that in most cases (all but two cases) the raw differences indicate that no-load funds outperform the load funds, however the difference is only significant in about half the cases. More specifically, the results show that only four of the 12 differences between no-load funds and low-load funds (deferred and low-front load funds) are in fact significant. On the other hand, when examining the difference between no-load and higher-load funds (middle-front load and high-front load funds), the results show much stronger evidence that no-load funds significantly outperform load funds. Indeed, we find that the difference between no-load funds and middle-load funds and the difference between no-load and high-load funds are significant across all three performance metrics when using load-adjusted performance. Hence, although the results show more significant differences between no-load and high-load funds, the fact that the differences generally indicate that no-load fund perform

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[26] We did not use mean monthly returns since the use of different styles would yield inconsistent results.

[27] Note that the one fund which had both a deferred load and a front-load was classified as a low-front load fund.

[28] Note that other breakdowns were used, however in no instance was there a substantial change in the results.

[29] Note that the results reported are those in which we excluded the ten no-load index funds. The results were very similar when we included the index funds. Also note that we did not use mean monthly returns since the use of different styles would yield inconsistent results.

Table 7
Difference in average performance between no-load and load funds organized by size of load[a]

	No. of load funds	Average load (%)	Non-load adjusted Sharpe ratio	Load-adjusted Sharpe ratio	Non-load adjusted Jensen alpha	Load-adjusted Jensen alpha	Non-load adjusted 4-index alpha	Load adjusted 4-index alpha
Difference between no-load and *deferred-load* funds	30	1.0	0.0146	0.0240	0.0704	0.0988*	0.0128	0.0400
Difference between no-load and *low-front-load* funds	50	3.38	−0.0034	0.0191	0.0172	0.0844*	0.0623*	0.1269***
Difference between no-load and *middle-front-load* funds	214	5.16	0.0124	0.0428***	0.0755**	0.1725***	0.0230	0.1165***
Difference between no-load and *high-front-load* funds	37	7.47	−0.0110	0.0358**	0.0155	0.1513***	0.0631*	0.1938***

Note: Deferred-load funds: 1% loads (assuming the investor held onto the fund for the five-year holding period) as of December 31, 1992. *Low-front load funds*: 1.5–4.0% loads as of December 31, 1992. *Middle-front-load funds*: 4.01–5.99% loads as of December 31, 1992. *High-front-load funds*: 6.0–8.5% loads as of December 31, 1992.

* Indicates the difference between the no-load funds and load funds is significant at the 10% level.

** Indicates the difference between the no-load funds and load funds is significant at the 5% level.

*** Indicates the difference between the no-load funds and load funds is significant at the 1% level.

[a] Note that for no-load fund performance calculations we *excluded* the 10 no-load index funds. All the out-of-sample performance statistics are for the five-year period from 1993 to 1997. Also note that the one fund that had both a front and deferred load was considered to be a low-front load fund.

Table 8
Load size and out-of-sample performance: A regression analysis[a]

Out-of-sample performance metric	γ_0	γ_1
Non-load adjusted Sharpe ratio	0.2801***	0.0027
Load-adjusted Sharpe ratio	0.2768***	−0.0027
Non-load adjusted jensen alpha	−0.2428***	0.0041
Load-adjusted jensen alpha	−0.2562***	−0.0121
Non-load adjusted 4-index alpha	−0.0229	−0.0019
Load-adjusted 4-index alpha	−0.0356	−0.0176**

Note also that for the one fund that had a deferred and front load we converted the deferred load to a front load and added this to the existing front load.

** Significant from zero at the 5% level.

*** Significant from zero at the 1% level.

[a] The following are the results of the equation: $S_i = \gamma_0 + \gamma_1(\text{load})_i + u_i$, where S_i is the out-of-sample performance metric value for the period 1993–1997, and load_i is the front load of the fund or the deferred load (for the five year holding period) converted into a front load. Hence load_i only measures the front load. All loads are found from the December 31, 1992 data disk. Note also that only load funds (both deferred and front-load funds) are examined. Hence, the sample of each regression is 331 funds.

better than load funds indicates that even across the size of the load, no-load funds generally outperform load funds.

4.6. Size of load effect in load funds

One last issue we examine is whether the size of the load influences the performance of load funds. This issue is particularly relevant for the investor who has decided to buy a load fund but is using the size of the load to determine the selection. To investigate this issue we examined the following equation:

$$S_i = \gamma_0 + \gamma_1 \text{load}_i + u_i \tag{5}$$

where S_i is the risk-adjusted out-of-sample performance metric value for the period 1993–1997 for the ith fund. load_i is the front load of the fund or the deferred load of the fund (for the five-year holding period) converted into a front load. [30] In the regression, only load funds are examined. Hence, the sample size of each regression was 331 funds (300 front-load funds, 30 deferred load funds, and one fund with a front and deferred load). [31] The results are presented in Table 8.

We find, surprisingly, that there is little evidence of a statistically significant relationship between the out-of-sample performance metric and the level of the front-load. Indeed, the γ_1 terms for all the performance metrics except for the load-adjusted 4-index alpha are all close to zero and clearly not significant. Although

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[30] In order to include deferred-load funds into the regression we had to normalize the deferred loads into front loads. To do this we converted each deferred load (for the five-year holding period) into its equivalent front load. More specifically, we assumed that instead of pre-paying the deferred load as indicated in Eq. (2), we assume that the investor borrows the amount necessary. A 1% deferred load was thus a 0.7427% front load.

[31] For the one fund that had a deferred and a front load we combined the front load with the converted deferred load to get the load for the fund.

Table 9
Load size and out-of-sample performance: Average out-of-sample performance organized by the size of the load[a]

Fund type	No. of load funds	Average load (%)	Average Sharpe ratio (using non-load adjusted returns)	Average Sharpe ratio (using load adjusted returns)	Average Jensen alpha (using non-load adjusted returns)	Average Jensen alpha (using load adjusted returns)	Average 4-index alpha (using non-load adjusted returns)	Average 4-index alpha (using load adjusted returns)
Deferred-load funds	30	1.0	0.2860	0.2767	−0.2341	−0.2625	−0.0124	−0.0396[b]
Low-front-load funds: Funds with loads of 1.5–4%	50	3.38	0.3041	0.2816	−0.1809	−0.2481	−0.0619	−0.1265
Middle-front-load funds: Funds with loads of 4.01–5.99%	214	5.16	0.2883	0.2579	−0.2392	−0.3362	−0.0226	−0.1161[b]
High-front-load funds: Funds with loads of 6.0–8.5%	37	7.47	0.3117	0.2649	−0.1792	−0.3150	−0.0627	−0.1934[b]

Note that one front load fund also had a deferred load. Hence the returns for this one fund are front and deferred load adjusted. This fund was part of the low-front-load funds group.

[a] The 331 load funds[1] (as of December 31, 1992) are rank ordered into four groups by their load as of December 31, 1992. The out-of-sample performance of each of the four groups is then examined. The out-of-sample performance period is 1993–1997.

[b] We tested to see if the there were any significant differences between the types of load funds. There was a significant difference found (at the 5% level) between the load-adjusted 4-index alpha of high-front-loads funds and the load-adjusted 4-index alpha of deferred load funds. There was also a significant difference found (at the 5% level) between the load-adjusted 4-index alpha of high-front load funds and the load-adjusted 4-index alpha of middle-front-load funds. There were no other significant differences found.

insignificant, the signs on the γ_1 coefficients illustrate that when using non-load-adjusted returns, there is a tendency for higher-load funds to have *higher* out-of-sample performance. Conversely, when using load-adjusted returns, the signs are reversed indicating that the higher the load the lower the out-of-sample performance.

To further illustrate our results we present Table 9 which shows the average performance metrics for deferred-load funds, low-front load funds, middle-front load funds and high-front load funds. The results here show similar overall findings to those of Table 8: high-load funds perform slightly better than low-load funds before adjusting for loads, however, this performance difference reverses itself when loads are factored into the returns.

The only exception to this conclusion from Table 9 concern the results for the 4-index alpha which shows that the deferred load funds (hence very low load funds) actually have higher performance for *both* the non-load and load-adjusted returns. Furthermore the results for the load-adjusted 4-index alpha metric also show that deferred load funds significantly outperform high-load funds and that middle-front funds load significantly outperform high-load funds.

Nevertheless, the general picture of these results suggest that if an investor wants to hold a load fund, the size of the load is not a strong sign of future non-load or load-adjusted performance. Before loads are assessed, high-load funds may perform just slightly better than low-load funds, yet that difference is not enough to compensate for the higher loads.

5. Conclusions

In light of a recent industry trend towards load funds and away from no-load funds, this paper has examined and compared the out-of-sample performance of no-load and load mutual funds. Unlike the previous literature on this topic, this paper provides a more comprehensive analysis as it uses methodologies to incorporate loads directly into the returns, utilizes a large sample of funds free of survivorship bias, and evaluates performance across many different performance metrics and different ages and styles of funds. We find two important results.

1. Before adjusting for loads in the returns, no-load funds perform somewhat better than load funds although the differences are often not significant. However, after adjusting for loads in the return data, no-load funds are found to perform much better than do load funds, with the differences found to be significant at the 1% level across many different performance metrics. This difference is also found when funds are disaggregated by age, style and to some degree, by size of the load. Since this paper is first to incorporate loads directly into the performance numbers, it provides the first quantifiable indication of the difference between investor-realized return performance of load and no-load funds. Our findings indicate that investors are sacrificing a significant degree of performance to hold load funds. Indeed, the load adjustment that is used here is calculated during a time of low interest rates (1993). If in fact interest rates had been higher at the time the investor bought a load fund, the loss in performance arising from the load adjustment would have even been more severe.

2. Although we document a substantial difference in performance between no-load and load funds, we also find that among load funds there is little significant difference in out-of-sample performance between high-load funds and low-load funds even after adjusting for loads. Indeed, high-load funds only perform slightly better than low-load funds before loads are assessed and only slightly worse after loads are assessed. Hence, this study documents that for the investor who prefers the services provided by load funds, the size of the load has little predictive ability in determining future fund performance. Of course, this paper has also shown that if performance is what investors are mainly concerned with, they should not consider load funds.

Acknowledgements

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