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How Do Mutual Fund Fees Affect Investor Choices?

Evidence from Survey Experiments

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LABOR AND POPULATION

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Abstract

Over the past few decades, risks associated with providing for financial security in retirement have increasingly shifted from employers to employees as employer-provided pensions have shifted from defined-benefit to defined-contribution (DC) plans. Recent work in behavioral finance suggests that investors do not make optimal investment decisions in their DC plans. We designed and administered a pair of mutual fund choice experiments to over 1000 survey respondents who participate in the RAND American Life Panel. Our analysis sheds light on the question of how mutual fund investors respond to variation in fees in a hypothetical scenario in which fees should be obvious to the investor. The results show that some aspects of individual behavior are consistent with rational wealth-maximization and the majority of the respondents are able to provide estimates of fees that lie within a benchmark range. However, we find that respondents tend not to minimize expected fees and are more averse to back-end load fees than to front-end loads. The trade-off between expense ratios and loads is found to be somewhat sensitive to the expected holding period in a manner consistent with expected-wealth maximization, but investors may tend to be too averse to loads. Differences in measured financial literacy predict differences in behavior, with lower rates of literacy among women accounting for differences in choice behavior by gender. We also find that financial literacy mediates individual responses to the presentation of information intended to enhance decision making.

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1 Introduction

Over the past few decades, risks associated with providing for financial security in retirement have increasingly shifted from employers to employees as employer-provided pensions have shifted from defined-benefit (DB) to defined-contribution (DC) plans. According to calculations based on the Survey of Consumer Finances, among those workers reporting any pension coverage in 1983, 12% reported having a DC plan only, 26% reported both a DC and DB plan, and 62% reported having a DB plan only. By 2004, fully 80% of covered workers reported having a DC plan (63% DC only, 17% both) (Munnell & Sundén, 2006). DC plans require employees not only to bear investment risk but also to make financial decisions for which they may be poorly prepared.

Recent work in behavioral finance suggests that investors do not make optimal investment decisions in their DC plans. Mottola & Utkus (2008) examine data from over 2,000 DC plans and nearly 2.9 million 401(k) participants in a sample of Vanguard investors and find that only about 45 percent of investors are constructing portfolios with equity allocations that may be consistent with expert advice. Other research has found that most investors tend to use heuristics or simple decision rules to make their allocation decisions. Madrian & Shea (2001), for example, examine 401(k) allocation behavior by a group of employees from a Fortune 500 company. They find that an individual's allocation of regular contributions to a 401(k) plan is sensitive to enrollment default options.

Recent litigation and congressional inquiries have focused attention on 401(k) plan fees: what fees are charged, who receives these fees, and what plan fiduciaries and participants know about the levels of these fees and their impact on financial returns (Government Accountability Office, 2006). The U. S. Department of Labor, which maintains regulatory oversight, is engaged in ongoing efforts to improve the disclosure of fees and expenses to plan fiduciaries and participants, as well as to the regulator. However, it is unclear how improved disclosure will ultimately impact investor behavior and outcomes. That is, even if participants know the fees they will be charged, will they use this information optimally when they make investment decisions?

To address this question, we administered a mutual-fund choice experiment to a sample of over 1000 adults who participate in the RAND American Life Panel (ALP), a national longitudinal survey administered via the Internet. The design was inspired by the experiments in Choi et al. (2006) , who find that a sample of Harvard undergraduates, Wharton business school students and Harvard employees tended not to maximize expected returns net of fees. Our study may be interpreted in part as a replication of elements of their study, albeit with a larger and more heterogeneous population. We also supplement the experiment with additional treatments, including variation in the expected holding period, as well as follow-up questioning to directly assess the ability of participants to calculate fees and the desire of participants to change their decisions after making these calculations. The ALP data also include important information about participants, especially indicators of financial literacy, collected in other waves of interviews.

Some other academic studies have focused attention on how fees and expenses affect the decisions of individual investors. Barber et al. (2005) analyze mutual fund flows and find that purchase decisions are sensitive to salient fees, such as front-end loads and brokerage commissions. In contrast, purchases are insensitive or perhaps positively related to management fess as indicated by expense ratios. A positive relationship could be explained by marketing, the costs of which may be included in the expense ratios.

Wilcox (2003) conducted experiments to assess how mutual fund and investor attributes affect choices among funds. He finds that individuals tend to avoid loads, overweighting their negative

impact relative to management fees. This finding is actually stronger among highly educated and wealthy individuals. Moreover, members of these two groups are also found to overemphasize the importance of past performance relative to fees.

Without an experimental design that controls the information presented to decision makers, it is difficult to understand how fees and expenses affect behavior without knowing what individuals actually know about these costs. According to conventional wisdom, individual investors know little about the fees and expenses that they directly or indirectly pay. Survey evidence seems to bear this out for a large fraction of the population. For instance, a telephone survey of 3,000 mutual fund investors in 1991 found that almost 40 percent of respondents did not know whether they held shares in load or no-load funds (Capon et al., 1996). A 1995 survey conducted on behalf of the Office of the Comptroller of the Currency and the Securities and Exchange Commission found that few investors could provide estimates of mutual fund fees that they face (Alexander et al, 1997). Over 80% of 401(k) plan participants in a 2007 AARP study reported that they do not know how much they pay in fees and expenses associated with their own plan AARP (2007). Recent findings from RAND American Life Panel (ALP) surveys of 401(k) participants and other mutual fund investors are in line with previous results (Dominitz, Hung, and Yoong, 2008).

Our analysis therefore sheds light on the question of how mutual fund investors respond to variation in fees in a hypothetical scenario in which fees should be obvious to the investor. Section 2 describes the experimental design. In Section 3, we discuss how expected-wealth- maximizing investors would solve the decision problems we pose and how expected fees would be calculated. Section 4 reviews the data and summary statistics. Section 5 presents empirical results from the survey experiments, and Section 6 concludes.

2 Experimental Design

Our survey module includes two sets of hypothetical choice questions embedded in a questionnaire. Respondents receive a lump sum payment of $10 after completion of the survey. In Experiment A, we designed questions to assess sensitivity to loads versus expense ratios, while varying the expected holding period. In Experiment B, inspired by the primary experiment in Choi et al. (2006), we designed questions to to assess the extent to which respondents attempt to minimize fees when choosing among otherwise (nearly) identical mutual funds. Respondents are randomly assigned to complete either Experiment A or B first. We begin by discussing Experiment A.

2.1 Experiment A: Value Fund Choice Experiment

In Experiment A, respondents are asked to choose value funds in which to invest. They are first presented with a series of education screens that describe value funds, front-end and back-end loads and expense ratios. Definitions are highlighted and accessible to respondents at all times during the experiment.

Respondents are then asked to make a series of choices between a no-load value fund with a given expense ratio, and an otherwise identical value fund with a load but a lower expense ratio. The choice concerns the hypothetical investment of $1000. Both funds require an initial investment of at least $1000, so the problem becomes one of binary choice.

The respondent is first given a choice between a no-load fund with an expense ratio of 1.47%,and a load fund with an expense ratio of 0.82%. The load is 2.25% (see Table 1). We refer to this question as VF1.

If the respondent *chooses the no-load fund* in VF1, then the second question is identical but for the decrease of the other funds load by one-half of a percentage point to 1.75%. Subsequent questions continue to decrease the load by 0.50% until the respondent (a) chooses the load fund, (b) reports that he is indifferent between the two funds, or (c) reaches the final value fund choice question with a load of just 0.25%.

If, on the other hand, the respondent initially *chooses the load fund* in VF1, then the second question is identical but for the increase of that funds load one-half of a point to 2.75%. Subsequent questions continue to increase the load by 0.50% until the respondent (a) chooses the no-load fund, (b) reports that he is indifferent between the two funds, or (c) reaches the final choice question with a load of 4.25%.

If the respondent reports that he is *indifferent between the load fund and no-load fund* in VF1, then his subsequent questions are randomly determined to be either the sequence of decreasing load questions or increasing load questions, with the sequence ending whenever a strict preference is reported.

Based on an individual's pattern of responses to the subsequent choice questions, we are able to calculate what may be labeled as the *maximum acceptable load*. We define this as the load of the offered fund with the highest load that the respondent weakly prefers to the no-load fund.

We administered two cross-cutting treatments in Experiment A. Firstly, to assess understanding of the trade-off between loads and expense ratios, respondents are randomly assigned with probability one-half to either a *1-year horizon* or *5-year horizon* treatment. In the 1-year (5-year) treatment, respondents are asked to suppose that they expect to hold this investment for at least one (five) years. Secondly, to assess sensitivity to the nature of the load, respondents are also randomly assigned with probability one-half to either a *front-end load* or the *back-end load* treatment. The numerical values of the fees are identical but for the description of the load as front-end (paid at time of purchase) or back-end(paid at time of sale).

2.2 Experiment B: Index Fund Choice Experiment

In Experiment B, respondents are asked to allocate money among S&P 500 index funds, in an experimental setup that is similar to the primary experiment in Choi et al. (2006). In this case, respondents are first presented with screens that describe S&P 500 Index funds as funds that seek investment results that approximate those of the S&P 500 Composite Stock Price index. Respondents are also given a description of the S&P 500 Composite Stock Price index.

Respondents are asked to allocate $10,000 among four different S&P 500 index funds, all of which are front-load funds. They are instructed that they expect to hold the purchased funds for at least 10 years. They are then presented with a table that describes the fees associated with each fund. This table is very similar to the table presented to subjects in the Fees Treatment group in Choi et al. (2006) (see Table 2.) Fund 1 is clearly the lowest cost fund, having both the lowest expense ratio and the lowest front-end load.

We also administered two cross-cutting treatments in Experiment B. First, to test the efficacy of a visual aid that reinforces the importance of fees, respondents are randomly assigned with probability one-half to either a *fees graph* or *no graph* treatment. Those in the fees graph treatment group see an additional screen prior to making the allocation decision, whereas the other respondents do not. The screen displays the graphic shown in Figure A, adapted from a recent report by the U.S. Government Accountability Office demonstrating the impact of an additional 1% in annual fees (Government Accountability Office, 2006). The second experimental treatment is designed

to assess the effect of the investment company name on allocation decisions. Respondents are randomly assigned with probability one-half to one of two treatments: *Allegiant lowest* or *Morgan Stanley lowest*. In the first group, respondents are presented with the choices in the fees table above (corresponding to actual fee information collected by Choi et al. (2006)), in which Fund 1 is named Allegiant. Respondents in the second group are presented with an identical table in which the names "Allegiant" and "Morgan Stanley" are swapped, such that Morgan Stanley appears to be the lowest cost fund.

2.3 Follow-up Questions

At the conclusion of both experiments, all respondents are asked to rate, on a 5-point scale, the degree to which they agree or disagree with the following statements:

- I am very confident that I made the decisions that would be best for me.
- The differences in fees charged are so small, it really doesnt matter.
- The fees charged by these funds are pretty typical for mutual funds available to people like me.
- I would trust Morgan Stanley to make wise investments with my money.
- I would trust Allegiant to make wise investments with my money.

Next, the survey includes questions intended to gauge how well respondents comprehend the fee information that was presented to them in the hypothetical choice questions. In particular, respondents are asked to estimate some fees. Respondents who received Experiment B last are given the S&P 500 Index Fund Fees Table again and presented with the following two scenarios:

1. Suppose two investors, Terry and Lynn, each purchase $1,000 worth of shares in the Mason Street Index 500 Stock Fund.
    - Terry sells the shares after one year and receives $1,050, after all fees are paid.
    - Lynn sells the shares after five years and receives $1,200, after all fees are paid.
2. Suppose, instead, that these two investors, Terry and Lynn, each purchase $1,000 worth of shares in the UBS S&P 500 Index Fund.
    - Terry sells the shares after one year and receives $1,050, after all fees are paid.
    - Lynn sells the shares after five years and receives $1,200, after all fees are paid.

For each scenario, respondents are asked to estimate the amount of fees that Terry and Lynn each paid. Each respondent is then reminded of his or her allocation decision for the index funds and given the option to change the allocation.

Respondents who received Experiment A last are instead given the initial Value Fund Fee Table from question VF1 again, and presented with the following two scenarios:

1. Suppose two investors, Terry and Lynn, each purchase $1,000 worth of shares in the no-load value fund

- Terry sells the shares after one year and receives $1,050, after all fees are paid.
- Lynn sells the shares after five years and receives $1,200, after all fees are paid.

2. Suppose, instead, that these two investors, Terry and Lynn, each purchase $1,000 worth of shares in the back(front)-end load value fund.
   - Terry sells the shares after one year and receives $1,050, after all fees are paid.
   - Lynn sells the shares after five years and receives $1,200, after all fees are paid.

For each scenario, these respondents are asked to estimate the amount of fees that Terry and Lynn each paid. Each respondent is then reminded of his or her initial choice in question VF1 and is given the option of changing the response.

3 Predicted Responses Under Expected Wealth-Maximizing Behavior

The expected-wealth-maximizing choices in these scenarios depend on expectations of holding periods and the evolution of fund share prices. In this paper, we remain purposely agnostic about the latter, assuming that each individual has his or her own (unobserved) subjective expectations about the evolution of asset prices. Even under this assumption, however, we are able to describe important aspects of individual responses that allow us to comment on the optimality of observed choices and the accuracy of fee calculations.

3.1 Experiment A: Value Fund Choice Experiment

Consider first the choice between no-load and load value funds. If the instructions are taken literally, expectations for the prices of fund holdings and hence the gross return (i.e., before fees) should be identical across the two funds. Differences in expectations of the returns net of fees should only be attributable to differences in the load and the expense ratio. Note that even if one had perfect foresight over the gross return, the questionnaire deliberately does not supply enough information to calculate the net return, because it omits any mention of the time at which the management fee (i.e., expense ratio) is applied.

We summarize the fees calculation for VF1 corresponding to a hypothetical scenario with a fixed gross annual return of 5% in Table 3. Note that the nominal fees paid to the investment company will vary across load types even when net returns to a front-end load and back-end load fund do not. Thus, in Experiment A, fee minimization does not imply wealth maximization, even when the underlying fund holdings are identical. Note also that the nominal fees paid for the back-end load fund will exceed those of the front-end fund, which is generally true if the gross returns are positive.

Prediction A1: The wealth-maximizing choice of fund is not affected by load type

Consider two funds with an identical load L. Suppose that the funds are administered identically (i.e. the same management fees are deducted at the same time) but for the fact that one fund has a front-end load and the other has a back-end load. For any given holding period, the investors expectation of gross returns net of management fees, R, is therefore identical for both funds. For an investment of X, an investor in a front-end load fund will

receive his principal (less initial sales load) multiplied by the period return net of expenses $[(1-L)X](1+R)$. An investor who puts X into the back-end load fund instead receives his principal multiplied by the same gross return net of management fees, R, less the sales load L applied at the end of the period. The final proceeds from investing in the back-end load fund are thus $[X(1+R)](1-L)$, identically equal to the proceeds from investing in the front-end load fund. Whether the load is applied at the time of purchase or the time of sale does not affect the net expected returns to the investment and, therefore, optimal choices are insensitive to the type of load.

Prediction A2: Relative expected returns to picking the load fund weakly increase with holding period

If the investor expects to sell the fund shares in one or two years, then the no-load fund will have higher expected net returns except under very unusual beliefs about the time series of prices. Given that the load fund has a higher expense ratio, however, as the investment horizon increases, *ceteris paribus*, the load fund becomes more likely to be the optimal choice.

Prediction A3: Extreme values of willingness-to-pay for loads are unlikely to maximize expected wealth

For every choice of a load versus no-load fund, there exists a break-even value for the load, at which point expected net returns are equivalent. The break-even value depends, intuitively, on the relative expense ratios and the expected holding period: if the no-load fund has a relatively high expense ratio, then the investor may be willing to consider a fund with a relatively high load but a low expense ratio. Since expenses are paid each year, but the load is paid only once, investors are also willing to consider higher loads when the holding period is longer. The exact break-even point in each case varies with subjective beliefs on returns and holding periods. In general, however, the subset of investors who accept relatively high loads or reject relatively low loads given the same specified holding period and expense ratios may not be maximizing their expected proceeds, behaving instead as if there is a non-pecuniary benefit or cost arising from the load.

We illustrate these points with the following numerical example: Suppose a respondent expects that the fund holdings will yield a 5% annual rate of return before fees each and every year, and suppose that management fees are collected at year-end. For the no-load and front-end load funds, the reported holdings equal the proceeds from a sale after five years, whereas the back-end load holdings do not. However, the final proceeds from investing in the front and back-end load funds, shown by the last two columns, are equal (A1).

Now, suppose the investor will sell the fund after one year. Table 4 shows that the proceeds from the no-load fund would be almost \$1,035, corresponding to a net rate of return of about 3.5%. In contrast, the proceeds in the baseline fund case (question VF1 with a load of 2.25%) would be just \$1,018, or a 1.8% rate of return. Should the investor instead hold the fund for five years, the load fund would yield a higher return, with proceeds of \$1,197 as opposed to proceeds of \$1,185. The no-load is the optimal choice in the shorter holding period, whereas the load fund is the optimal choice in the longer holding period (A2). In this example with this set of questions, this relationship holds as long as the load exceeds 0.25% in the former case and does not exceed 2.75% in the latter case.

Continuing this scenario, an investor with a horizon of one year has a break-even load of 0.61% (while an investor with a horizon of 5 years has a higher break-even load of 3.21%). Figure 1

illustrates the break-even point graphically for a 1-year horizon under an assumed annual gross return of 5%. The strategy that maximizes expected proceeds would be to select the load fund if and only if the load is below 0.61%. Investors who are willing to accept a load fund with loads higher than the break-even load (loads to the right of the intersection) would have higher expected proceeds were they to pick the no-load fund. On the other hand, investors who choose no-load funds over funds with loads below the break-even point (loads to the left of the intersection) are in effect paying a premium in order to avoid the load (A3).

3.2 Experiment B: Index Fund Choice Experiment

In this setting, if respondents believe that the underlying fund holdings are identical across funds, then the choice among S&P500 funds is relatively straightforward. The fund holdings, in fact, are not identical, so expectations of the gross returns to these funds can legitimately differ. However, the descriptions of these funds could reasonably be interpreted to indicate that expectations should be identical. In this case, unlike Experiment A, fee minimization implies wealth maximization.

Prediction B1: The expected-wealth-maximizing strategy for any expected holding period is to allocate all wealth to the lowest cost fund

The menu of options presented includes one option that strictly dominates all others, Fund 1. This option is the fund named Allegiant in the *Allegiant lowest* treatment group but appears as Morgan Stanley in the *Morgan Stanley lowest* treatment group. Since Fund 1 has both the lowest expense ratio (0.59%) and the lowest front-end load (2.50%), it strictly dominates the other choices.

Prediction B2: Allocating any money to Mason Street is unlikely to be optimal under expected wealth maximization

Investors may believe that the different funds will vary in their ability to deliver high returns. Investors may therefore choose to allocate money to more well-known funds or funds that are perceived to have a reliable brand-name. At the time of the survey, the Mason Street fund had been discontinued for over a year, whereas the three other funds are still operating and have identical Morningstar fund ratings as of 2008. While brand name and trust effects may differentiate the three remaining funds to some degree for potential investors, these effects are less plausible for Mason Street. Mason Street is therefore neither the cheapest fund (expense ratio of 0.80% and load of 4.75%), nor is it likely to be regarded as the most reliable or trusted alternative.

3.3 Fee Estimation

Finally, we also consider the actual estimation of fees. Recall that respondents are randomly selected to either estimate fees paid for the load fund and no-load fund presented in question VF1, or to estimate fees paid for one of the lower cost index funds (UBS, Fund 4) and one of the higher cost index funds (Mason Street, Fund 2). In both cases, fee estimates are elicited for 1-year and 5-year horizons, with net proceeds that indicate a positive return.

To establish a benchmark for normatively desirable responses, we compute benchmark fees for each of these scenarios under a baseline in which annual gross returns are assumed to be constant over the holding period and proceeds are equal to those specified in the questionnaire (see Table

5. While there is no objectively right or wrong answer for the fee estimates, individuals whose fee estimates are extremely different from these may have unorthodox expectations about asset returns or, perhaps more likely, may have made some sort of computational error in the estimation of fees.

4 Data Description and Summary Statistics

4.1 The RAND American Life Panel

The RAND American Life Panel (ALP) is an Internet panel of respondents 18 and over. ALP members are recruited from among individuals age 18 and older who respond to the monthly Survey of Consumers conducted by the University of Michigan's Survey Research Center. The monthly survey produces, among other measures, the widely used Index of Consumer Sentiment and Index of Consumer Expectations. Each month, approximately 500 households are interviewed, of which about 300 households are a random-digit-dial (RDD) sample and 200 are re-interviewed from the RDD sample surveyed six months previously. MS respondents who meet eligibility requirements for this study are told that the University of Michigan is undertaking a joint project with RAND and asked if they would object to SRC sharing their information about them with RAND so that they can be contacted later and asked if they would be willing to actually participate in an Internet survey. Names, contact information, demographic information, whether and where they have Internet access are entered into a secure electronic database for future contact. Internet respondents with Internet access receive approximately $10 per 15 minutes of interview time. Respondents without initial Internet access receive a web-TV and free Internet access.

Upon joining the panel, ALP members complete the "My Household" questionnaire, which they are prompted to update each time they log in to a new module. This questionnaire yields a series of demographic characteristics of interest, including age, gender, education, race, ethnicity, labor force status, and household income.Since January 2006, over 40 survey modules have been fielded, partly in the area of financial decision making and partly in other fields, including the effect of political events on self-reported well-being, inflation expectations, joint retirement decisions, retirement preferences, health decision making, Social Security knowledge and expectations, measurement of health utility, and numeracy.

Members of the ALP tend to have more education and income than the broader U.S. population. There are two main reasons for this sample selection. First, the Michigan respondents tend to have more education than the population at large, as described by Census data. Second, the great majority of ALP members have their own Internet access, and Americans with Internet access tend to have more education and income than the broader population.

4.2 MS 11 Survey and Supplemental Data

The fund choice survey is referred to as the MS11 Survey of the ALP. As described above, respondents answer two sets of hypothetical choice questions and provide estimates of fees charged by mutual funds in one of the two choice experiments. MS11 was first administered in June 2007 and 1027 total panel members completed the questionnaire.

In addition, previous data collection efforts within the ALP have gathered information concerning basic financial abilities, as well as knowledge of and attitudes about investing. One previous survey - MS5, administered from May 2006 to November 2007 - assessed the level of basic and advanced financial literacy using a questionnaire developed by Lusardi & Mitchell (2007b). The

basic literacy questions concern compound interest, inflation, and time discounting, as previously fielded in the Health and Retirement Study. The more advanced questions cover such topics as the difference between stocks and bonds, the function of the stock market, the working of risk diversification, and the relationship between bond prices and interest rates. Appendix 1 contains the precise wording of the questions. Another previous survey, MS 8, asks respondents about their own investment in stocks or mutual funds.

For the analysis sample, we restrict our attention to respondents who completed MS11, MS8 and MS5 and for which a full set of demographic characteristics is available, yielding a final sample of 664. Table 6 presents descriptive statistics for the sample as a whole while Table 7 gives the randomized treatment assignments for each treatment group by experiment.

5 Descriptive Analysis

Simple descriptive analysis of the response data suggests that, overall, peoples choices do not fully reflect information about fees and expenses even when explicitly presented with such information in this experimental setting, although some aspects of behavior are indeed consistent with predictions based on expected wealth-maximization.

5.1 Experimental Treatments

For Experiment A, the Value Fund Experiment, we look at two principal outcome variables. The key outcome of interest is the calculated value of the maximum acceptable load using all the available information. We also look at a binary indicator for whether or not the respondent weakly preferred a load in the baseline case of question VF1, which is less informative but helps provide supporting intuition.

The top panel of Table 8 shows the mean values of both the maximum acceptable load and the willingness to accept loads, by treatment group. Firstly, in line with A1, we find that the average maximum acceptable load consistently increases with time horizon. In the baseline VF1 scenario, almost twice as many respondents accept a given load when the expected horizon is 5 years instead of 1 and the average maximum acceptable load is approximately 0.70% higher. Note however that magnitude of the difference in maximum acceptable loads between the 1 and 5 year horizon is relatively small compared to what we would expect under the assumptions underlying the example in Figure 1. In this case, an investor who maximizes expected net returns over a 5-year period would be willing to pay a maximum load that is about 2.6% higher than the maximum acceptable load if the holding period were to be just one year.

We also find suggestive evidence contrary to A2: respondents are not indifferent to the type of load, even though it should not affect the expected net returns to the investment. In the baseline scenario, respondents are significantly more likely to pick the load over the no-load fund when faced with a front-end as opposed to a back-end load ; on average, the maximum acceptable load is consistently about 0.3% higher in the front-end load treatment group.

Finally, these results imply that some individuals are not likely to be optimally trading off between loads and expense ratios, as suggested in A3, particularly in the 5-year horizon group. Given expected-wealth maximizing behavior, most respondents in the 1 year horizon would choose the no-load fund, and, conversely, most respondents in the 5 year horizon would choose the load fund. However, a large minority in fact do the opposite: approximately, a quarter of respondents

instead choose the load fund in the 1 year-horizon, and half choose the no-load fund in the 5 year horizon (Table 8 .

Figure 2(a) shows the empirical distribution of maximum acceptable load by treatment group. Notably, in the 1-year horizon groups, most responses lie within our computed break-even range. In the 5-year horizon groups, however, the proportion of responses in the benchmark range is much smaller. The majority of responses lie below the range i.e. these individuals appear to be load-averse.

We fit local polynomials to these empirical cumulative distribution functions in Figure 2(b), the features of which summarize these observations. Firstly, the CDFs for 5 year horizons lie everywhere below those of the 1 year horizon groups; secondly, the CDFs for back-end load groups lie everywhere above those of the front-end load groups and thirdly, a substantial area under the CDF for each the 5-year horizon groups lies to the left of the break-even range starting at 2.75%.Thus, investors are willing to pay higher loads for a longer time horizon, and, for any given time horizon, they are willing to accept higher front-end loads than back-end loads.

In Experiment B, the Index Fund Choice Experiment, we look not only at the raw outcome variables (the total amount allocated to each of the funds) but also performance indicators of varying stringency. The first most stringent performance criteria is a binary indicator for whether the individual minimized fees i.e. placed all the portfolio allocation into the lowest-cost fund, Fund 1. The second is the portfolio share allocated to the lowest-cost fund. Finally, we compute the total expected portfolio fee given our benchmark assumptions.

Table 8 shows that, on average, most money is allocated to the lowest cost fund, while the next most popular fund, UBS, is next lowest in cost. We find that most people do not minimize fees paid (implicitly failing to maximize their net returns), contrary to Prediction B1. Only 33% of the full sample do so across all treatments. In addition, Prediction B2 is also violated, as almost 11% of the average portfolio is allocated to Mason Street, our high-cost "undesirable" fund. This cannot be explained simply by some respondents allocating their money according to the $1/n$ rule. 6.2% of respondents split the $10,000 equally among 4 funds, and 14.0% split it equally between two funds - overall, the average number of funds held is 2.3, with the median respondent choosing 2. However, fully 39% of our respondents hold a non-zero allocation to Mason Street.

We also find that respondents are sensitive to the presentation of these choices. The lower panel of Table 8 shows that, on average, individuals are likely to hold more money in the lowest cost fund when the fund is named Morgan Stanley as opposed to Allegiant, and that more people place all their money in that fund. On the other hand, perhaps unexpectedly, it appears that the graphical treatment may have inconsistent or even negative effects: respondents who viewed the graph hold less money on average in the lowest cost fund and more money in Mason Street, our high-cost "undesirable" fund.

5.2 Fees Estimation

Next, we consider the responses of individuals who were randomly selected to estimate fees in each experiment. There are a few notable features of the fee-estimate distributions for both experiments (see Figure 4(a) and 4(b)). Note that while the interquartile range around the median tends to be rather tight, we find a number of extreme outliers in both cases. Therefore, both the mean and the standard deviation of the estimates for each hypothetical scenario tend to be very high. We find that the median values of the fee estimates, however, are very close to our benchmark computations for both value and index funds, and the implied ranking is consistent.

To understand the effect of explicitly performing these fee estimations, we compare the final choices of respondents to their original choices . We first consider Experiment A. Overall 26% of people in this group changed their initial response to question VF1, after performing the fee estimations. The top panel of Table 9 shows the average number of people willing to accept a load in VF1 before and after the fee estimations exercise. Note that on average, being asked to estimate the fees results in outcomes that are more consistent with our initial predictions: more individuals in the 5-year horizon treatment choose the load fund and there is greater convergence between the front and back-end load treatments.

Results for respondents who were randomly requested to make fee estimations for Experiment B are shown in the lower panel of Table 9. There are small positive changes the final choices show that respondents on average re-allocate money towards the lowest cost, are slightly more likely to minimize fees and pay lower fees overall. These results must not be overstated, as the changes are small in magnitude and not statistically significant. Note however that this effect may be partly attributed to the fact that many fewer respondents choose to change their answer than in the case of the Experiment A (indeed only 26 individuals, or 7.3% of the randomly selected group, do so) . This result may arise from differences in burden on the respondent. Here, the respondent was asked whether she would like to change her response. Respondents who answer "yes" then proceed to select four new investment amounts that sum to $10,000. In contrast, respondents to the comparable question in Experiment A were presented with question VF1 again.

6 Average Treatment and Demographic Effects

We next analyze the data more formally in a regression framework, firstly in order to capture potential treatment interaction effects and secondly to consider the relationship between basic demographic characteristics and individual decision making, independent of treatments. In each experiment, our initial multivariate linear specification for predicting outcome Y includes dummy variables for each of the two cross-cutting treatments T_1 and T_2 and their interaction as well as a vector X of individual demographic controls (age, education, gender, income and previous stock market experience) . The estimating equation for individual i, is written

$$Y_i = \alpha + \beta_1 T_{1i} + \beta_2 T_{2i} + \beta_{12} T_{1i} T_{2i} + \gamma X_i + \epsilon_i \tag{1}$$

where the β coefficients give the estimated average treatment effects. We use ordinary least squares estimation for continuous outcome variables and probit estimation for the binary outcome variables. Estimation results are reported for the outcomes discussed in the previous section in Table 10.

We find strong treatment effects in Experiment A, but none in Experiment B. The first two columns show the results for the outcomes of Experiment A (with the omitted group being the *1 year horizon/front-end load* treatment) and we observe that the effects suggested by the purely descriptive analysis are borne out. We estimate a 0.3% premium for front-end loads, and a 0.7% increase in the maximum acceptable load as the expected horizon increases to 5 years. This is reflected in a 20% increase in the likelihood of accepting the load in VF1 when the horizon increases to 5 years.

In Experiment B (with the omitted group being the *Allegiant lowest / No graph* treatment), average treatment effects are less precisely estimated. In general, the point estimates suggest that the graphical treatment on the whole has a negative effect, and the switch to Morgan Stanley, a positive effect, on performance. We find that there are no large interaction effects in Experiment

A, although the magnitude and sign of the estimates for Experiment B suggest that there are important offsetting interaction effects between the naming and graph treatments.

When considering the demographic effects, however, the situation is reversed: in Experiment A, no demographic variables except for previous stock experience have strong predictive power but in Experiment B, several interesting relationships prevail. Firstly, education plays a significant role: respondents with a bachelors degree are predicted to be more likely to choose cost-minimizing portfolio allocations, to hold a higher proportion of the lowest cost fund, and to hold a lower proportion of the Mason Street fund than those who do not have a bachelors degree, conditional on other predictor variables. They are also less likely to report excessively high or low values of the maximum acceptable load in the value fund experiments, although these estimates are less precise. We also find that older respondents, respondents who already have investments in stocks and/or mutual funds and those with higher household incomes each make normatively superior choices conditional on other predictors, suggesting a role for previous experience and motivation that we will return to later. Finally, women are predicted to make normatively inferior choices relative to men, even conditional on the other predictors such as income and education.

7 Financial Literacy

We then focus attention on the role of financial literacy in decision making. Following Lusardi & Mitchell (2007a), we construct a financial literacy score S_{Li} for each individual based on their responses to a series of questions about finance and investing, fielded in MS5. These questions cover respondents' ability to perform simple calculations, understand how compound interest works and understand inflation. Respondents are also asked to answer a set of more specific questions about investing that assess knowledge of assets, risk diversification, the working of market institutions and the relationship between bond prices and interest rates[1]. We perform a factor analysis using binary indicators for correct answers to all the questions using the iterated principal factor method, and compute the financial literacy score using the Bartlett Method, retaining one principal factor.

7.1 Direct Effects

For each outcome, we now estimate

$$Y_i = \alpha + \beta_1 T_{1i} + \beta_2 T_{2i} + \beta_{12} T_{1i} T_{2i} + \gamma X_i + \psi S_{Li} + \epsilon_i \tag{2}$$

in order to analyze both the relationship of financial literacy to choice behavior as well as its potential role in mediating the effects of other observable characteristics such as gender and experience.

The estimation results in Table 11 describe the additional predictive value of including the financial literacy score along with the predictors from the previous specification. Financial literacy has a strong independent effect across both experiments, consistently predicting wealth-maximizing behavior in both experiments, even conditional on other observable characteristics such as formal education and investment experience. Respondents who score higher are more likely to choose the no-load fund in Experiment A, and cost-minimizing index-fund portfolio allocations in Experiment B, conditional on formal educational attainment, investment experience and other predictors.

[1]These questions are found in Appendix C and the responses are listed in Table 6

The financial literacy score also accounts for some of the disparities between demographic groups observed in the previous results. The estimated relationship between formal education and predicted behavior is reduced once the literacy indexes are included in the estimation. The estimated predictiveness of age, current investment holdings and income in the prior specifications are also reduced, suggesting that these relationships may arise from variation in financial literacy developed as investment experience is acquired over a longer time frame. Note also that the relationship between predicted behavior and gender also weakens once financial literacy is accounted for. This suggests, as highlighted by Lusardi & Mitchell (2008), gaps in financial literacy may account for observed discrepancies in behavior between men and women.

7.2 Moderating Effects on Experimental Treatments

We next investigate the hypothesis that financial literacy not only directly affects choices, but also potentially moderates the effects of our experimental interventions. In our linear specification, we now include interactions between financial literacy and the treatment dummies. We first estimate:

$$Y_i = \alpha + \beta_1 T_{1i} + \beta_2 T_{2i} + \beta_{12} T_{1i} T_{2i} + \psi S_{Li} + \psi_1 T_{1i} S_{Li} + \psi_2 T_{2i} S_{Li} + \psi_{12} T_{1i} T_{2i} S_{Li} + \gamma X_i + \varepsilon_i \quad (3)$$

The results in Table 12 show that in Experiment 1, there is a positive relationship between financial literacy and the willingness to accept loads in the 5-year horizon group (Prediction A1), as a higher literacy score is correlated with being more likely to (correctly) accept the load in VF1 and express a higher maximum acceptable load. For Experiment B, the relative size and sign of the estimated coefficients on the literacy interactions (compared to the treatment dummies) imply that it is more financially literate that respond more to both the graph and name switch treatment by moving towards more wealth-maximizing allocations.

The distribution of financial literacy scores ranges from -4 to 1, and is highly right-skewed with a long left-tail below the median score (Figure 5) . In order to clarify effects specifically for the group with lowest financial literacy, we define low financial literacy as being below the median of the distribution and reestimate the equation above substituting dummies for low literacy for the scores. The coefficient estimates in Table 12 imply that in the group with low financial literacy,receiving these interventions may leave individuals worse off relative to receiving no treatment at all. In particular, the estimated negative relationship between the presentation of a fee graph and cost-minimizing choice behavior appears to arise from choices made by respondents scoring below the median in financial literacy. This result calls attention to the possibility that presenting additional information to investors may have unintended consequences, especially when those investors are not sufficiently literate to interpret and make best use of the information. Similarly, Agnew & Szykman (2005) find that knowledge has a strong mediating effect on individual responses to various features of DC plans. In particular, they find that individuals who are less financially literate are more susceptible to information overload and more likely to opt for default allocations that may be sub-optimally conservative. The authors strongly suggest that more careful plan design, rather than a one size fits all approach, is necessary to ensure that the less literate are not placed at further disadvantage by features that ostensibly promote better financial decision making.

8 Financial Literacy,Fee Estimates and Choices

We previously observed that the median values of the elicited fee estimates distribution are close to our benchmark estimates, but the results described above show that behavior ultimately does not

appear to reflect wealth-maximizing behavior taking these estimates into account. We therefore next explore further the correspondence between the fee estimates and respondents' initial choices.

We consider three ways in which financial literacy affects this relationship. Firstly, respondents with low literacy may be the ones who are most likely to make systematic errors in their fee estimates. Secondly, respondents with low literacy may not consider fees important when making choices i.e. conditional on the level of their fee estimates, they may be less likely to state that fees matter. Finally, such respondents may also not be able to implement cost-minimizing strategies : i.e. conditional on the same fee estimates and the same level of concern, these respondents may still be less likely to choose optimally.

Using our fee estimates, we first construct a measure of estimated relative prices. For Experiment A, we compute the ratio of the load fund to the no load fund fee estimates given by the respondents, both for the 1 year and 5 year scenario. For Experiment B, we compute the ratio of the Mason Street fund fees to the UBS fund fees for the more relevant 5 year scenario only, given that the expected horizon for respondent decisionmaking is 10 years.

To see if relative prices bear any relationship to the estimated choices, we first predict these choices excluding literacy. In columns (1) and (2) of Table 14, we regress willingness to pay for loads in VF1 on the price ratio of load to no load funds for those individuals asked to estimate fees in the 1 year horizon and 5 year horizon treatment groups respectively, controlling for the type of load. In column (3), we predict the amount held in Mason Street funds using the relative price of Mason Street. Note that Figure 6 shows the distribution of these ratios: like the fee estimates themselves, we observe a number of highly extreme values. We therefore also include a dummy variable in each regression for outliers (below the 5th and 95th percentile of the relevant ratio distribution). Table 14 shows a significant and consistent relationship between relative prices and accepting loads : respondents who find load funds cheaper are more likely to choose them. Column (3) also show that the tendency to give extreme fee estimates is also positively related to holding a higher (undesirable) allocation in Mason Street.

We also include a measure of whether or not the respondent agrees that the difference in fees is too small to matter. This variable is measured on a scale of 1-5, where higher values indicate greater reported indifference. In Columns (4) - (6) we include this additional measure in the estimating equation. The results suggest that attitudes matter: respondents who are relatively indifferent are more likely to accept loads and allocate more money to the costly Mason Street fund, independent of the actual level of fee estimates

We next investigate the relationship between fee ratios, indifference to fees and financial literacy by predicting the level of indifference as well as the ratio using our financial literacy score. Column (1)-(4) in Table 15) shows that the more financially literate are less likely to express indifference to fees, and are more likely to place a high relative price on load funds.

Finally, we include financial literacy, reported indifference measures and fee ratios in the regression simultaneously. In Experiment A, including these new measures in addition to financial literacy significantly weakens the direct effect of financial literacy, suggesting that the main effects of financial literacy in Experiment A operate through fee estimation and the reported indifference measure. In Experiment B, however, we find that financial literacy still has an independent effect on the allocation to Mason Street, even controlling for relative fee estimates and indifference. This is interesting, given that Experiment A requires the respondent to make a binary choice based primarily on the fee estimates, while in Experiment B, the overall portfolio allocation exercise requires a more complex series of decisions.

9 Conclusions and Further Work

We designed and administered a pair of mutual fund choice experiments to over 1000 survey respondents who participate in the RAND American Life Panel. Our analysis sheds light on the question of how mutual fund investors respond to variation in fees in a hypothetical scenario in which fees should be obvious to the investor.

Overall, we find that respondents tend not to minimize expected fees and are more averse to back-end load fees than to front-end loads. The trade-off between expense ratios and loads is found to be somewhat sensitive to the expected holding period in a manner consistent with expected-wealth maximization, but investors may tend to be too averse to loads. Differences in measured financial literacy predict differences in behavior, with lower rates of literacy among women accounting for differences in choice behavior by gender. We also find that financial literacy mediates individual responses to the presentation of information intended to enhance decision making. These results point to the need for further research into financial literacy and the channels through which it affects financial decision making.

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A Figures

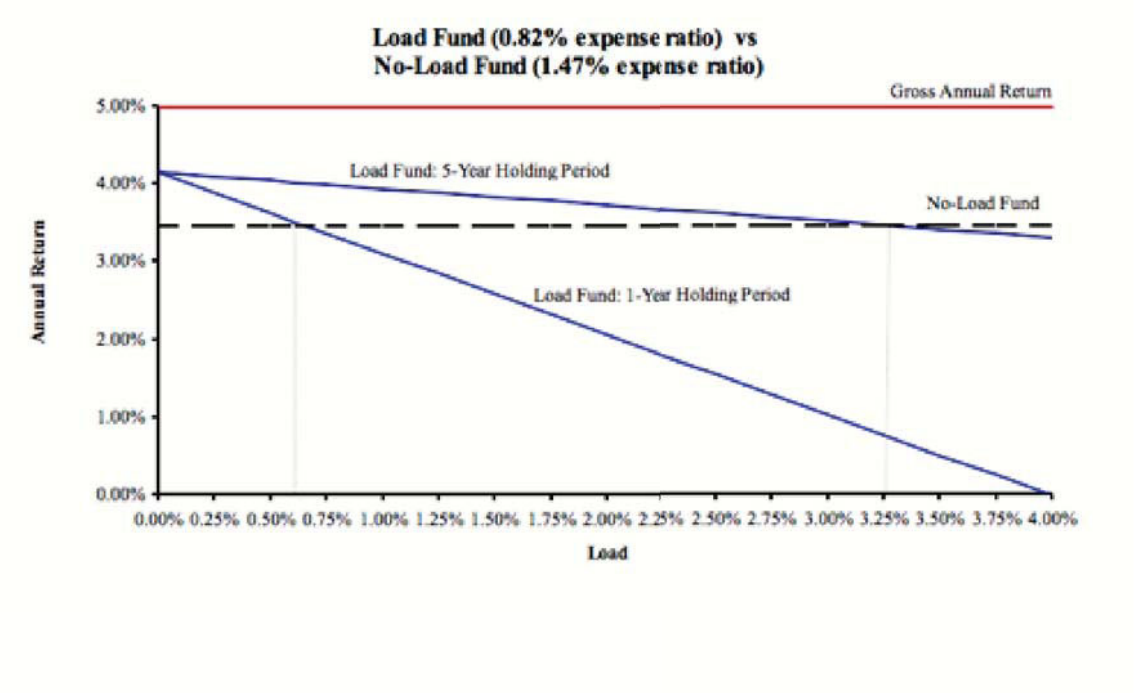
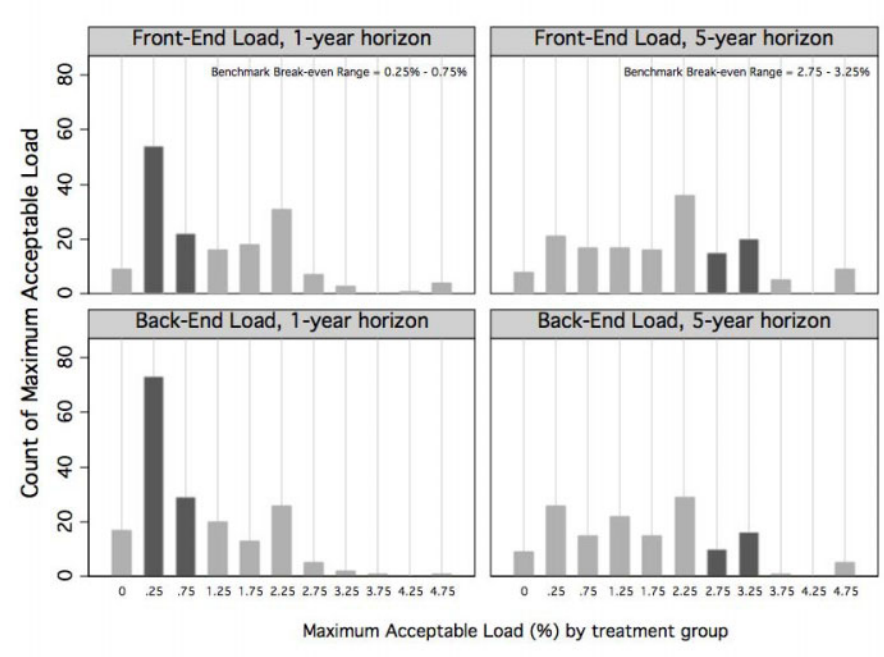
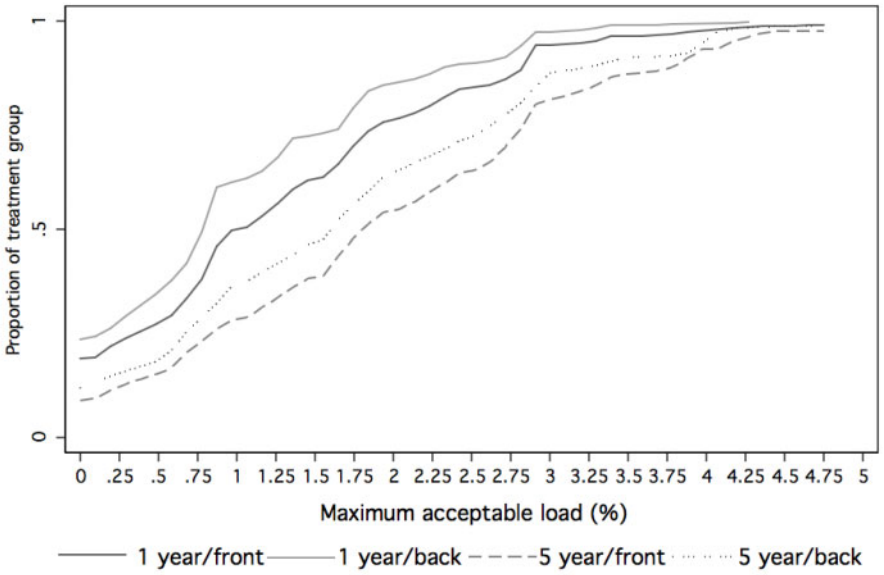


Figure 1: Returns Comparison Between Load and No-Load Funds (Experiment A)



(a) Empirical CDF



(b) Fitted Local Polynomials

Figure 2: Maximum Acceptable Loads (%) By Treatment Group (Experiment A)

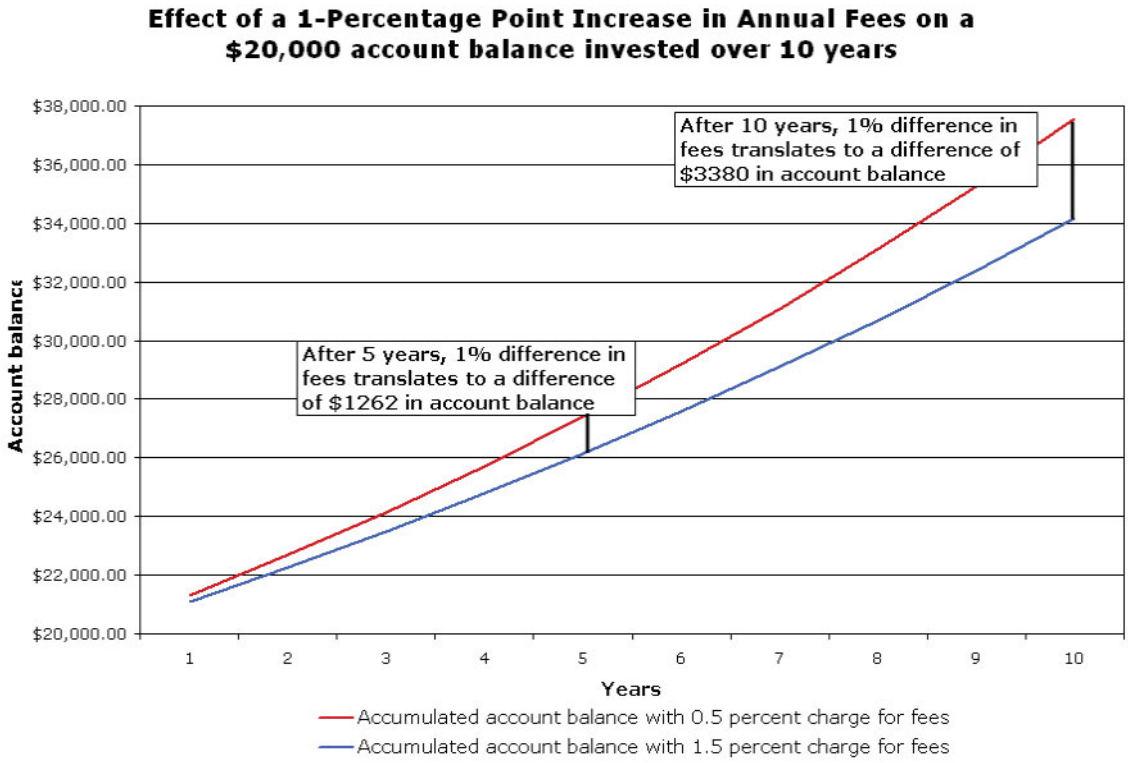
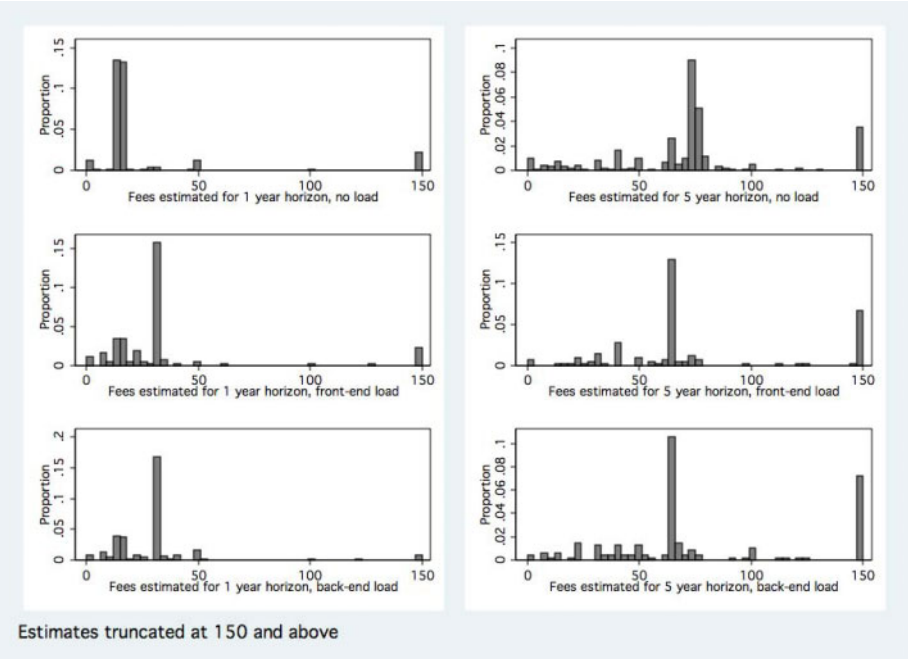
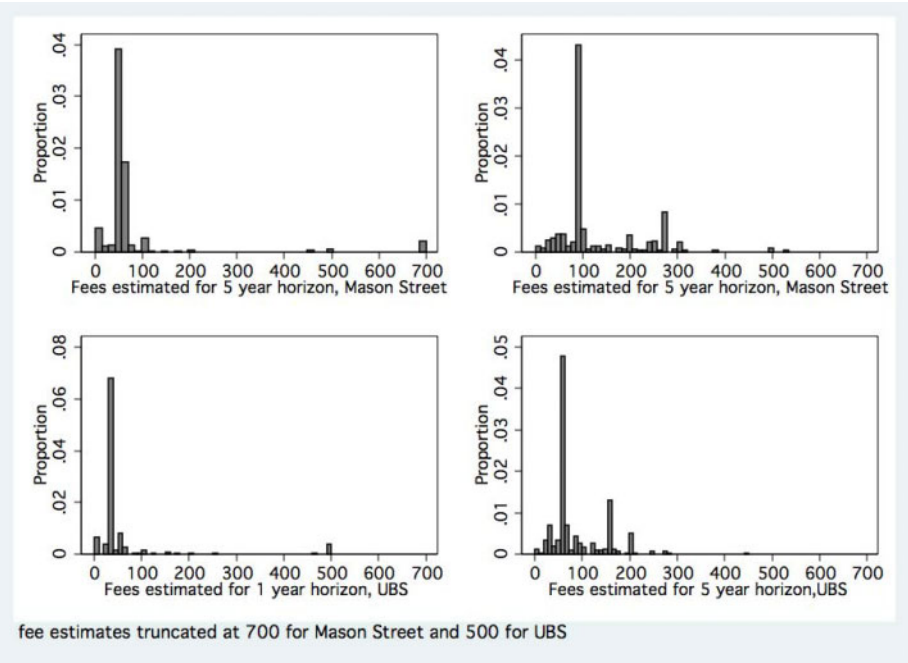


Figure 3: Illustrative graphic based on Government Accountability Office, 2006 (Government Accountability Office, 2006)



(a) Experiment A



(b) Experiment B

Figure 4: Histograms of Fee Estimates By Treatment Group

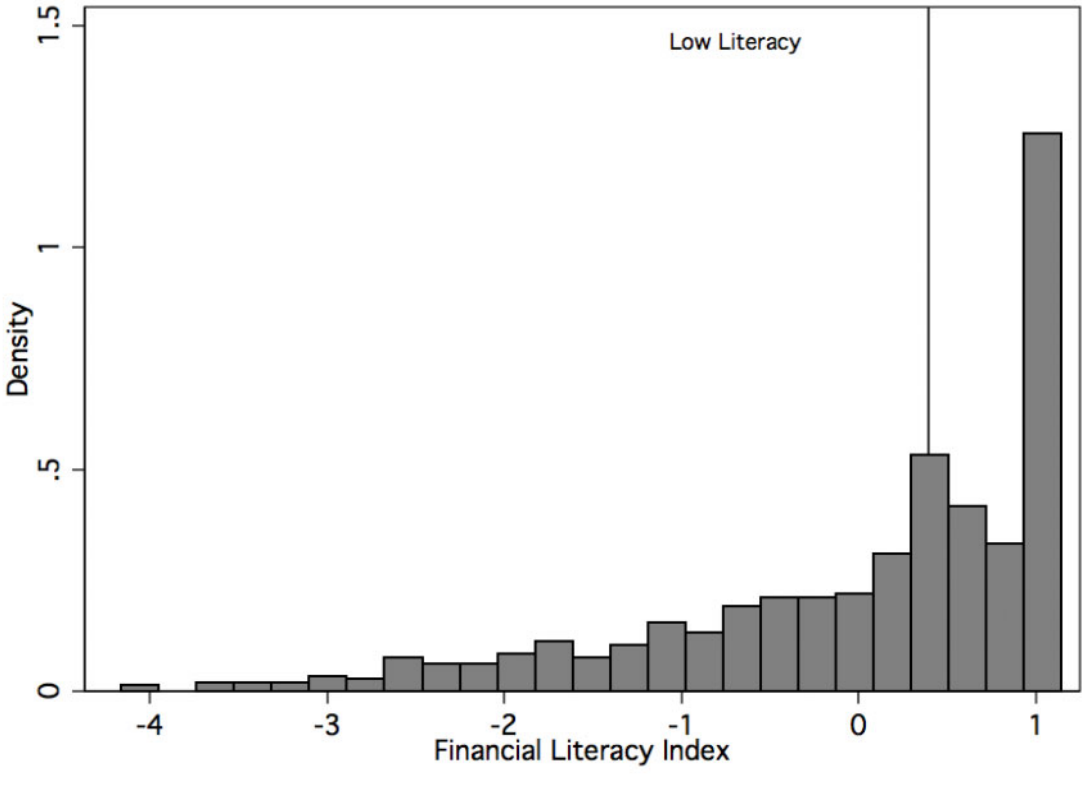
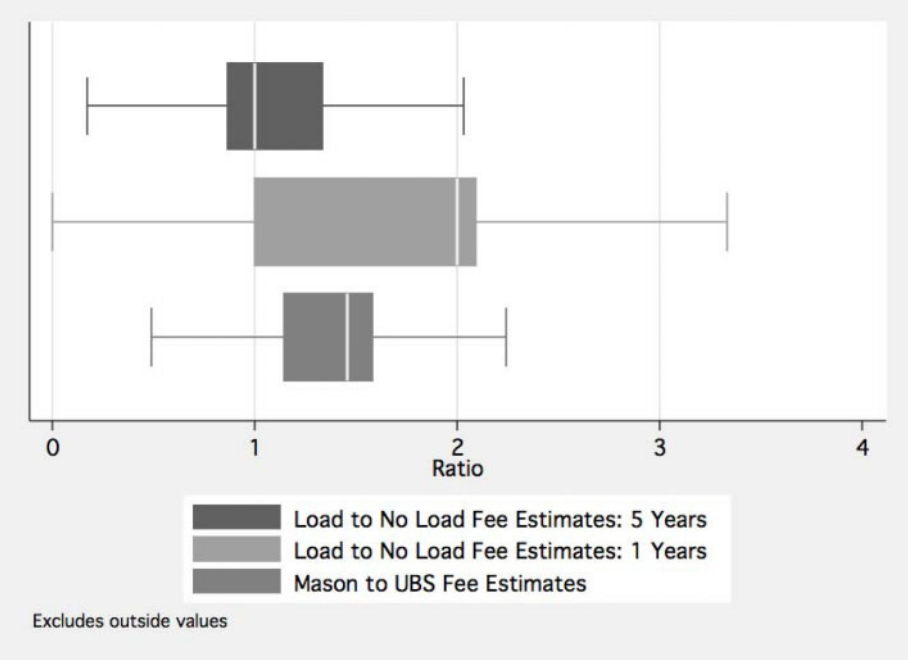


Figure 5: Histogram of Financial Literacy Score



	Minimum	5th percentile	Median	95th percentile	Max
Load / No Load 5 Year Horizon	0	.5	2	2.21	100
Load / No Load 1 Year Horizon	0	.44	1	2.42	100.79
Mason/UBS 5 Year Horizon	0	.64	1.46	2.03	360.94

Figure 6: Boxplots of Fee Estimate Ratios

B Tables

Mutual Fund Choices	Minimum Initial Investment	Expense Ratio	Approx. annual fee ($1,000 bal.)	Load	Load fee per $1000 sold/bought
No-load value fund	$1,000	1.47%	$14.70	0.00%	$0.00
Back-end load value fund	$1,000	0.82%	$8.20	2.25%	$22.50

Table 1: Experiment A: Initial Value Fund Fee Table (VF1)

Mutual Fund Choices	Minimum Initial Investment	Expense Ratio	Approx. annual fee ($1,000 bal.)	Load	Load fee per $1000 sold/bought
Fund 1: Allegiant S&P 500 Index Fund	$500	0.59%	$5.90	2.50%	$25.00
Fund 2: Mason Street Index 500 Stock Fund	$1,000	0.80%	$8.00	4.75%	$47.50
Fund 3: Morgan Stanley S&P 500 Index Fund	$1,000	0.64%	$6.40	5.25%	$52.50
Fund 4: UBS S&P 500 Index Fund	$1,000	0.70%	$7.00	2.50%	$25.00

Table 2: Experiment B: S&P 500 Index Funds Fee Table

Fund Choices	Assumed Gross Annual Return	Expense Ratio	Sales Load	Expected Tot. Nominal Fees (Sold at Period End) Year 1	Year 5
No-load	5%	1.47%	0.00%	$15.44	$82.70
Front-End Load	5%	0.82%	2.25%	$30.92	$68.21
Back-End Load	5%	0.82%	2.25%	$32.04	$74.32

Table 3: Illustrative Value Fund Fees for VF1 (Experiment A)

Fund Choices	Assumed Gross Annual Return	Expense Ratio	Sales Load	Period End Holdings		Period End Proceeds	
				Year 1	Year 5	Year 1	Year 5
VF1:							
No-load	5%	1.47%	0.00%	$1,035	$1,185	$1,035	$1,185
Front-End Load	5%	0.82%	2.25%	$1,018	$1,197	$1,018	$1,197
Back-End Load	5%	0.82%	2.25%	$1,041	$1,225	$1,018	$1,197
Decreasing Loads:							
Front-End Load	5%	0.82%	1.75%	$1,023	$1,203	$1,023	$1,203
Back-End Load	5%	0.82%	1.75%	$1,041	$1,225	$1,023	$1,203
Front-End Load	5%	0.82%	1.25%	$1,028	$1,209	$1,028	$1,209
Back-End Load	5%	0.82%	1.25%	$1,041	$1,225	$1,028	$1,209
Front-End Load	5%	0.82%	0.75%	$1,034	$1,216	$1,034	$1,216
Back-End Load	5%	0.82%	0.75%	$1,041	$1,225	$1,034	$1,216
Front-End Load	5%	0.82%	0.25%	$1,039	$1,222	$1,039	$1,222
Back-End Load	5%	0.82%	0.25%	$1,041	$1,225	$1,039	$1,222
Increasing Loads:							
Front-End Load	5%	0.82%	2.75%	$1,013	$1,191	$1,013	$1,191
Back-End Load	5%	0.82%	2.75%	$1,041	$1,225	$1,013	$1,191
Front-End Load	5%	0.82%	3.25%	$1,008	$1,185	$1,008	$1,185
Back-End Load	5%	0.82%	3.25%	$1,041	$1,225	$1,008	$1,185
Front-End Load	5%	0.82%	3.75%	$1,002	$1,179	$1,002	$1,179
Back-End Load	5%	0.82%	3.75%	$1,041	$1,225	$1,002	$1,179
Front-End Load	5%	0.82%	4.25%	$997	$1,173	$997	$1,173
Back-End Load	5%	0.82%	4.25%	$1,041	$1,225	$997	$1,173

Table 4: Illustrative Holdings and Proceeds (Experiment A)

Fund Choices	Holding Period	Expense Ratio	Sales Load	Specified Net Proceeds	Implied Average Annual Return	Implied Fee Estimate
Value Funds						
No-load	1 Year	1.47%	0.00%	$1,050	6.60%	$15.67
Front-End Load	1 Year	0.82%	2.25%	$1,050	8.30%	$31.18
Back-End Load	1 Year	0.82%	2.25%	$1,050	8.30%	$33.05
No-load	5 Year	1.47%	0.00%	$1,200	5.28%	$83.36
Front-End Load	5 Year	0.82%	2.25%	$1,200	5.05%	$68.28
Back-End Load	5 Year	0.82%	2.25%	$1,200	5.05%	$74.46
Index Funds						
Mason Street	1 Year	0.80%	4.75%	$1,050	11.10%	$55.97
UBS	1 Year	0.70%	2.50%	$1,050	8.50%	$32.41
Mason Street	5 Year	0.80%	4.75%	$1,200	5.58%	$91.71
UBS	5 Year	0.70%	2.50%	$1,200	4.99%	$64.01

Table 5: Benchmark Fee Estimates (Value Funds and Index Funds)

Variable	%
Male	44.9
Married or living with a partner	66.7
Own Stocks or Mutual Funds	70.6
Age: 18-44	26.4
45-64	57.5
65+	16.1
Education: Grades 1-12, no diploma	2.0
High school graduate	14.9
Incomplete college or associates degree	33.4
Bachelors	26.1
Grad/Prof Degree	23.6
Employment: Working Now	63.7
Unemployed and looking for work	1.8
Temporarily laid off, leave	0.5
Disabled	4.4
Retired	19.6
Homemaker	6.0
Other	4.1
Income: $0-$25000	11.5
$25000-50000	21.4
$50000-75000	23.8
>$75000	43.4
Race/Ethnicity: White/Caucasian (non Hispanic)	89.2
African American (non Hispanic)	4.8
Hispanic / Latino	2.9
Native American	0.5
Asian or Pacific Islander	2.4
Other	0.3
Correctly Answered Financial Literacy Questions:	
Numeracy	92.8
Compound Interest	76.1
Inflation	90.8
Time Value of Money	79.1
Money Illusion	75.2
Function of Stock Market	74.4
Knowledge of Mutual Funds	70.8
Relation between Interest Rates and Bond Prices	36.6
Safer: company stock or mutual fund?	77.3
Riskier: stocks or bonds?	81.2
Long Period Returns	81.9
Highest Fluctuations	69.0
Risk Diversification	88.1
Number of Observations	664

Table 6: Summary Statistics

	No fee-calculation		Fee-calculation	
	1 Year Horizon	5 Year Horizon	1 Year Horizon	5 Year Horizon
Front-end Load	86	97	79	67
Back-end Load	111	60	76	88
	No fee-calculation		Fee-calculation	
	Allegiant Lowest	Morgan Stanley Lowest	Allegiant Lowest	Morgan Stanley Lowest
No Fee Graph	82	76	109	81
Fee Graph	83	69	84	80

Table 7: Number of Observations by Treatment Group

	1-Year Horizon		5-Year Horizon		
Experiment A: Outcomes	Front-end	Back-end	Front-end	Back-end	Total
Max. Acceptable Load (%)	1.23	0.94	1.93	1.65	1.41
Proportion Willing to Accept Load in VF1	28%	21%	55%	47%	47%
	Allegiant Lowest		Morgan Stanley Lowest		
Experiment B: Outcomes	No Graph	Graph	No Graph	Graph	Total
Fund 1: Allegiant/MS - Lowest ($)	5518.32	5382.63	5821.66	5748.32	5607.53
Fund 2: Mason Street ($)	821.99	1205.39	713.38	927.52	1077.11
Fund 3: MS/ Allegiant ($)	1028.80	1353.29	1114.65	789.93	916.42
Fund 4: UBS ($)	2630.89	2058.68	2350.32	2534.23	2398.95
Proportion of fee minimizers	32%	32%	33%	36%	33%
Expected Total Fees ($)	109.27	111.26	108.67	108.87	109.54

Table 8: Mean Outcomes by Treatment Group

	1-Year Horizon		5-Year Horizon		
Experiment A Fee Calculation: Outcomes	Front-end	Back-end	Front-end	Back-end	Total
Before:					
Proportion Willing to Accept Load in VF1	35%	21%	46%	44%	37%
After:					
Proportion Willing to Accept Load in VF1	34%	28%	55%	55%	42%
	Allegiant Lowest		Morgan Stanley Lowest		
Experiment B Fee Calculation: Outcomes	No Graph	Graph	No Graph	Graph	Total
Before:					
Fund 1: Allegiant/MS - Lowest ($)	5536.70	5833.33	6043.21	5225.00	5652.54
Fund 2: Mason Street ($)	894.50	1065.48	462.96	1002.50	860.73
Fund 3: MS/ Allegiant ($)	866.97	1133.33	956.79	758.75	926.27
Fund 4: UBS ($)	2701.84	1967.86	2537.04	3013.75	2560.45
Proportion of fee minimizers	33%	38%	35%	28%	33%
Expected Total Fees ($)	109.18	109.82	107.28	109.75	109.03
After:					
Fund 1: Allegiant/MS - Lowest ($)	5821.10	5732.14	6000.00	5427.50	5751.98
Fund 2: Mason Street ($)	802.75	1083.33	450.62	950.00	822.03
Fund 3: MS/ Allegiant ($)	775.23	1210.71	944.44	743.75	910.17
Fund 4: UBS ($)	2600.92	1973.81	2604.94	2878.75	2515.82
Proportion of fee minimizers	36%	37%	33%	31%	34%
Expected Total Fees ($)	108.34	110.15	107.28	109.28	108.74

Table 9: Change in Outcomes After Fee Calculation Treatments By Initial Treatment Group

	(1) Load In VF1 =1	(2) Max Accept. Load (%)	(3) Total In Lowest Cost Fund ($)	(4) Fees Minimized=1	(5) Est. Total Fees ($)
5-year	0.231**	0.687**			
	(0.051)	(0.123)			
Back-end Load	-0.105	-0.301*			
	(0.054)	(0.120)			
5-year/Back-end load (d)	0.003	0.014			
	(0.076)	(0.174)			
Graph			-74.423	0.001	1.765
			(357.647)	(0.051)	(1.024)
Morgan Stanley Lowest			199.261	0.001	-0.282
			(364.076)	(0.052)	(1.043)
Graph/Morgan Stanley Lowest			78.430	0.034	-1.896
			(525.127)	(0.077)	(1.504)
Female	-0.010	-0.112	-769.398**	-0.110**	1.534*
	(0.038)	(0.088)	(265.773)	(0.038)	(0.761)
Age (years)	-0.001	-0.004	13.338	0.002	-0.102**
	(0.001)	(0.003)	(10.124)	(0.001)	(0.029)
Bachelor's	-0.049	-0.034	1416.956**	0.173**	-4.065**
	(0.040)	(0.092)	(277.801)	(0.038)	(0.796)
Family Income:$25-50000	-0.037	-0.023	-137.865	-0.019	-0.311
	(0.066)	(0.160)	(484.666)	(0.072)	(1.388)
Family Income: $50-75000	-0.033	0.001	-185.679	-0.071	-0.034
	(0.068)	(0.163)	(493.595)	(0.070)	(1.413)
Family Income >$75000	-0.067	-0.059	898.231	0.061	-3.586**
	(0.066)	(0.156)	(471.902)	(0.070)	(1.351)
Any Stock Experience	-0.059	-0.216*	922.845**	0.153**	-2.236*
	(0.047)	(0.106)	(320.378)	(0.042)	(0.917)
_Constant		1.710**	3602.758**		118.850**
		(0.235)	(707.652)		(2.026)
N	664	664	664	664	664
R-squared		0.12	0.13		0.15

P-values: *0.05 **0.01

Table 10: Experiment A and B: Basic Specification

	(1) Load In VF1 =1	(2) Max Accept. Load (%)	(3) Total In Lowest Cost Fund ($)	(4) Fees Minimized=1	(5) Est. Total Fees ($)
5-year	0.231**	0.681**			
	(0.051)	(0.122)			
Back-end Load	-0.120*	-0.316**			
	(0.055)	(0.119)			
5-year/Back-end load	0.020	0.031			
	(0.077)	(0.173)			
Graph			19.478	0.005	1.442
			(346.532)	(0.051)	(0.977)
Morgan Stanley Lowest			299.908	0.011	-0.629
			(352.793)	(0.052)	(0.995)
Graph/Morgan Stanley Lowest			-2.518	0.028	-1.617
			(508.533)	(0.077)	(1.434)
Female	-0.051	-0.166	-361.100	-0.055	0.127
	(0.040)	(0.090)	(264.449)	(0.039)	(0.746)
Age (years)	0.001	-0.002	-1.391	0.000	-0.051
	(0.002)	(0.003)	(10.046)	(0.001)	(0.028)
Bachelor's	-0.004	0.034	906.773**	0.109**	-2.307**
	(0.042)	(0.095)	(279.561)	(0.040)	(0.788)
Family Income: $25-50000 (d)	-0.008	0.022	-471.107	-0.057	0.837
	(0.069)	(0.160)	(471.857)	(0.070)	(1.330)
Family Income: $50-75000 (d)	-0.000	0.052	-580.338	-0.118	1.326
	(0.070)	(0.163)	(481.494)	(0.067)	(1.358)
Family Income > $75000 (d)	-0.014	0.018	333.536	-0.009	-1.640
	(0.068)	(0.158)	(464.602)	(0.070)	(1.310)
Any Stock Experience	-0.005	-0.142	364.105	0.088	-0.311
	(0.048)	(0.109)	(321.226)	(0.046)	(0.906)
Financial Literacy Score (S_L)	-0.085**	-0.123**	923.441**	0.127**	-3.182**
	(0.021)	(0.047)	(138.111)	(0.023)	(0.389)
Constant		1.505**	5118.391**		113.628**
		(0.247)	(721.624)		(2.035)
N	664	664	664	664	664
R-squared		0.13	0.19		0.23

P-values: *0.05 **0.01

Table 11: Effects of Including Financial Literacy

	(1) Load In VF1 =1	(2) Max Accept. Load (%)	(3) Total In Lowest Cost Fund ($)	(4) Fees Minimized=1	(5) Est. Total Fees ($)
5-year	0.231**	0.678**			
	(0.051)	(0.122)			
Back-end Load	-0.125*	-0.315**			
	(0.056)	(0.119)			
5-year/Back-end Load	0.028	0.034			
	(0.078)	(0.173)			
5-year $\times S_L$	0.068	0.224*			
	(0.047)	(0.109)			
Back-End $\times S_L$	-0.008	-0.033			
	(0.048)	(0.107)			
5-year/Back-end Load $\times S_L$	0.007	-0.031			
	(0.066)	(0.152)			
Graph			5.511	-0.002	1.447
			(346.306)	(0.053)	(0.974)
Morgan Stanley Lowest			271.544	-0.001	-0.546
			(352.651)	(0.054)	(0.992)
Graph/Morgan Stanley Lowest			23.392	0.036	-1.640
			(508.303)	(0.080)	(1.429)
Graph $\times S_L$			488.827	0.031	-2.042*
			(306.312)	(0.054)	(0.861)
MS Lowest $\times S_L$			655.024*	0.048	-2.017*
			(331.274)	(0.055)	(0.932)
Graph/MS Lowest $\times S_L$			-692.075	-0.035	3.415**
			(450.943)	(0.079)	(1.268)
Financial Literacy Score (S_L)	-0.116**	-0.203*	535.216*	0.099**	-2.028**
	(0.035)	(0.080)	(234.888)	(0.037)	(0.661)
Constant		1.593**	5167.071**		113.433**
		(0.248)	(722.867)		(2.033)
N	664	664	664	664	664
R-squared		0.14	0.19		0.24

Regressions control for age, education, gender, previous stock experience and family income. P-values: *0.05 **0.01

Table 12: Interaction Effects With Financial Literacy Score

	(1) Load In VF1 =1	(2) Max Accept. Load (%)	(3) Total In Lowest Cost Fund ($)	(4) Fees Minimized=1	(5) Est. Total Fees ($)
5-Year	0.279**	0.897**			
	(0.072)	(0.175)			
b Back-end load	-0.211*	-0.450**			
	(0.084)	(0.170)			
5 year/back-end load	0.156	0.139			
	(0.122)	(0.246)			
5-Year × Low S_L	-0.097	-0.411*			
	(0.096)	(0.245)			
Back-end × Low S_L	0.173	0.289			
	(0.119)	(0.237)			
5-Year / Back-end × Low S_L	-0.207*	-0.250			
	(0.104)	(0.346)			
Graph			294.802	0.021	-0.030
			(498.772)	(0.069)	(1.433)
Morgan Stanley Lowest			777.182	0.053	-1.486
			(500.838)	(0.069)	(1.439)
Graph/MS Lowest			-345.560	0.004	0.241
			(722.834)	(0.100)	(2.077)
Graph × Low S_L			-705.546	-0.048	3.432*
			(687.854)	(0.099)	(1.976)
MS Lowest × Low S_L			-1088.851	-0.122	2.224
			(701.285)	(0.094)	(2.015)
Graph/MS Lowest × Low S_L			736.937	0.071	-3.906
			(1010.772)	(0.164)	(2.904)
Low S_L	0.070	0.078	-1427.415**	-0.192**	3.990**
	(0.079)	(0.179)	(493.095)	(0.071)	(1.417)
Constant		1.717**	5498.902**		113.582**
		(0.267)	(768.575)		(2.208)
N	664	664	664	664	664
R-squared		0.14	0.20		0.21

Regressions control for age, education, gender, previous stock experience and family income. P-values: *0.05 **0.01

Table 13: Experiment A and B: Low vs High Financial Literacy

	(1) Load In VF1 =1	(2) Load In VF1 =1	(3) Total In Mason ($)	(4) Load In VF1 =1	(5) Load In VF1 =1	(6) Total In Mason ($)
Female	0.001	0.007	83.630	0.005	0.019	16.734
	(0.038)	(0.091)	(155.622)	(0.042)	(0.091)	(154.663)
Age (years)	-0.001	0.001	-23.823**	-0.002	0.002	-22.887**
	(0.002)	(0.003)	(5.846)	(0.002)	(0.004)	(5.776)
Bachelors	-0.050	-0.153	-507.486**	-0.053	-0.142	-413.448*
	(0.048)	(0.095)	(159.601)	(0.053)	(0.096)	(160.247)
Back-end load	-0.059	-0.087		-0.058		-240.707
	(0.043)	(0.090)		(0.046)		(153.175)
Family Income: $25-50000	0.099	-0.206	-137.052	0.077	-0.190	-102.943
	(0.126)	(0.136)	(292.009)	(0.123)	(0.136)	(288.124)
Family Income: $50-75000	0.044	-0.149	-585.328*	0.019	-0.143	-559.137*
	(0.106)	(0.137)	(303.471)	(0.104)	(0.139)	(299.332)
Family Income > $75000	0.066	-0.123	-640.193*	0.072	-0.106	-625.665*
	(0.099)	(0.135)	(286.519)	(0.107)	(0.137)	(283.000)
Any Stock Experience	-0.029	0.005	-56.201	-0.025	0.012	-32.364
	(0.052)	(0.114)	(192.793)	(0.056)	(0.113)	(190.530)
Load/No Load Fees: 1 Year	-0.127**			-0.119**		
	(0.022)			(0.021)		
Outlier 1 Year Ratio	-0.107**			-0.117**		
	(0.038)			(0.041)		
Load/No Load Fees 5 Years		-0.149*			-0.162*	
		(0.071)			(0.071)	
Outlier 5 Year Ratio		0.054			0.023	
		(0.168)			(0.171)	
Mason/UBS Fees			-4.959			-4.528
			(3.649)			(3.606)
Outlier Mason/UBS Ratio			364.108			321.011
			(258.308)			(256.493)
Fees too small to matter				0.054*	0.078	261.301**
				(0.030)	(0.058)	(98.243)
Constant			2692.484**			2145.883**
			(389.614)			(462.239)
N	147	143	341	147	143	340
R-squared			0.13			0.16

Table 14: Experiment A and B: Including Fee Estimates

	(1) Fees Don't Matter (5=Agree)	(2) Load Fee Ratio (1Y)	(3) Load Fee Ratio (5Y)	(4) Mason to UBS Fee Ratio	(5) Load In VF1 =1	(6) Load In VF1 =1	(7) Total In Mason ($)
Female	0.003	0.989	1.626	-0.993	-0.012	-0.018	-41.697
	(0.066)	(0.738)	(1.024)	(2.455)	(0.048)	(0.097)	(158.208)
Age (years)	-0.000	-0.000	0.033	0.046	-0.001	0.003	-20.491**
	(0.003)	(0.028)	(0.040)	(0.092)	(0.002)	(0.004)	(5.934)
Bachelors	-0.104	0.485	-0.837	-1.668	-0.036	-0.122	-331.089*
	(0.070)	(0.790)	(1.108)	(2.561)	(0.055)	(0.098)	(165.496)
Back-end load		-0.762	-0.063		-0.064	-0.093	
		(0.711)	(0.994)		(0.050)	(0.091)	
Family Income: $25-50000	0.172	-0.183	-3.034*	-13.840**	0.102	-0.212	-13.750
	(0.118)	(1.322)	(1.825)	(4.498)	(0.143)	(0.137)	(292.380)
Family Income: $50-75000	0.251*	-0.287	-3.435*	-13.103**	0.034	-0.128	-432.834
	(0.120)	(1.307)	(1.808)	(4.731)	(0.122)	(0.141)	(306.787)
Family Income > $75000	0.080	0.484	-2.435	-12.925**	0.112	-0.080	-493.987*
	(0.116)	(1.254)	(1.727)	(4.503)	(0.128)	(0.139)	(293.024)
Any stock experience	-0.022	-0.301	0.469	-3.022	0.003	0.046	37.604
	(0.081)	(0.922)	(1.288)	(3.001)	(0.058)	(0.125)	(193.260)
Financial Literacy Score	-0.183**	0.599	0.992*	0.682	-0.054	-0.060	-161.348*
	(0.035)	(0.412)	(0.565)	(1.288)	(0.033)	(0.056)	(84.552)
Load/No Load Fees: 1 Year					-0.109**		
					(0.023)		
Outlier 1 Year Ratio					-0.133**		
					(0.046)		
Fees too small to matter					0.057*	0.070	249.177*
					(0.033)	(0.060)	(98.695)
Load/No Load Fees: 5 Years						-0.156*	
						(0.071)	
Outlier 5 Year Ratio						-0.008	
						(0.173)	
Mason/UBS Fees							-4.186
							(3.599)
Outlier Mason/UBS Ratio							291.487
							(255.556)
_cons	2.235**	1.595	1.850	15.990*			1776.642**
	(0.175)	(1.979)	(2.781)	(6.371)			(468.484)
N	663	288	291	341	147	143	340
R-squared	0.09	0.03	0.04	0.05			0.16

Table 15: Experiment A and B: Literacy And Fee Estimates

C Financial Literacy Questions

The basic index is constructed using factor analysis. Using the methodology of Lusardi & Mitchell (2007a), we construct indicator variables for the correct answers to the literacy questions, and apply the iterated principal factor method. We retain one factor that is interpreted as basic literacy. The index is generated by computing factor scores using the Bartlett method. For further details, see Lusardi & Mitchell (2007a).

1. Numeracy :

   Suppose you had $100 in a savings account and the interest rate was 2% per year. After 5 years, how much do you think you would have in the account if you left the money to grow? (i) More than $102; (ii) Exactly$102; (iii) Less than $102; (iv) Do not know (DK); (v) Refuse.

2. Compound Interest :

   Suppose you had $100 in a savings account and the interest rate is 20% per year and you never withdraw money or interest payments. After 5 years, how much would you have on this account in total? (i) More than $200; (ii) Exactly$200; (iii) Less than $200; (iv) DK; (v) Refuse.

3. Inflation :

   Imagine that the interest rate on your savings account was 1% per year and inflation was 2%per year. After 1 year, how much would you be able to buy with the money in this account? (i) More than today; (ii) Exactly the same; (iii) Less than today; (iv) DK; (v) Refuse.

4. Time Value of Money :

   Assume a friend inherits $10,000 today and his sibling inherits $10,000 3 years from now. Who is richer because of the inheritance? (i) My friend; (ii) His sibling; (iii) They are equally rich; (iv) DK; (v) Refuse.

5. Money Illusion :

   Suppose that in the year 2010, your income has doubled and prices of all goods have doubled too. In 2010, how much will you be able to buy with your income? (i) More than today; (ii) The same; (iii) Less than today; (iv) DK; (v) Refuse.

6. Function of Stock Market:

   Which of the following statements describes the main function of the stock market? (i) The stock market helps to predict stock earnings; (ii) The stock market results in an increase in the price of stocks; (iii) The stock market brings people who want to buy stocks together with those who want to sell stocks (iv) None of the above (v) DK; (vi) Refuse.

7. Knowledge of Mutual Funds:

   Which of the following statements is correct? (i) Once one invests in a mutual fund, one cannot withdraw the money in the first year; (ii) Mutual funds can invest in several assets, for example invest in both stocks and bonds (iii) Mutual funds pay a guaranteed rate of return which depends on their past performance; (iv) None of the above; (v) DK; (vi) Refuse.

8. Relation between Interest Rates and Bond Prices :

   If the interest rate falls, what should happen to bond prices? (i) Rise; (ii) Fall; (iii) Stay the same; (iv) None of the above; (v) DK; (vi) Refuse.

9. Safer: Company Stock or Mutual Fund :

   True or false? Buying a company stock usually provides a safer return than a stock mutual fund. (i) True; (ii) False; (iii) DK; (iv) Refuse.

10. Riskier: Stocks or Bonds :

    True or false? Stocks are normally riskier than bonds. (i) True; (ii) False; (iii) DK; (iv) Refuse.

11. Long Period Returns :

    Considering a long time period (for example 10 or 20 years), which asset normally gives the highest return? (i) Savings accounts; (ii) Bonds; or (iii) Stocks; (iv) DK; (vi) Refuse.

12. Highest Fluctuations :

    Normally, which asset displays the highest fluctuations over time? (i) Savings accounts, (ii) Bonds, (iii) Stocks; (iv) DK; (v) Refuse.

13. Risk Diversification :

    When an investor spreads his money among different assets, does the risk of losing money: (i) Increase, (ii) Decrease (iii) Stay the same; (iv) DK; (v) Refuse