IQ and Mutual Fund Choice*

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Abstract

This study analyzes IQ's influence on mutual fund choice. Using a comprehensive dataset of Finnish males, it finds that high-IQ investors are less likely to own balanced funds, actively managed funds, and funds marketed through a retail network. This behavior tends to reduce high-IQ investors' fund fees. Moreover, within each asset class and service category, and controlling for other investor attributes, high-IQ investors prefer the lowest-fee funds, further reducing the fees incurred. IQ's effect on fees is robust to the addition of fund family dummies and applies even to the most affluent.

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Higher mutual fund fees tend to reduce the risk-adjusted returns earned by fund investors.[1] This observation has spawned a common "folk wisdom" in finance: that smart investors should avoid funds that charge high fees, typically actively managed funds. Fama and French (2010) write, "… [alpha] estimated on the net (post-expense) returns realized by investors is negative by about the amount of fund expenses" and any attempt to identify positive alpha managers "… is largely based on noise." This point is echoed in the 2008 presidential address to the American Finance Association, in which French (2008) observes, "a representative investor who switches to a passive market portfolio would increase his average annual return by 67 basis points from 1980 to 2006." The 67 basis points is the expense ratio of a typical actively managed equity fund.

This begs the question, "Do smart investors actually choose low-fee funds or index funds?" The finance and economics literature, lacking data, is largely silent about whether consumer or investor behavior is tied to objective measures of individual intelligence. We present here the first study to address the role of IQ on mutual fund selection,[2] and show that high-IQ investors tend to avoid high-fee funds in two ways. First, they avoid funds distributed through a retail network, actively managed funds, and balanced funds. These categories of funds tend to have higher fees. Logit regressions also indicate that high-IQ investors, controlling for other investor characteristics, avoid high-fee funds, even after holding fund asset class and service type fixed. IQ's sensitivity to this "idiosyncratic component" of fees lowers the fees paid by high-IQ

[1] Blake et al. (1993), Elton et al. (1993) Malkiel (1995), Gruber (1996), Carhart (1997), Otten and Bams (2002), and Gil-Bazo and Ruiz-Verdú (2009) conclude that higher mutual fund fees tend to reduce the risk-adjusted returns earned by fund investors.

[2] The only papers we are aware of that link IQ to consumer behavior in any industry are Zagorsky (2007) and Agarwal and Mozumdar (2011), who study credit card behavior.

investors beyond that obtainable from a low-fee asset class or service type. For example, within the class of actively managed equity funds, constrained even further to a single fund family, high-IQ investors tend to choose funds with the lowest management fees. The significant interaction between IQ and fees in fund selection controls for the investor's wealth, education (university or business), and profession (here, working in the financial services industry). The methodology used to demonstrate separate IQ-related preferences for the common and idiosyncratic fee components also allows us to analyze preferences across asset classes and service types separate from fees. For example, high-IQ investors would have a preference (albeit an insignificant one) for actively managed funds if these funds charged the same fees as passively managed funds in the same assets. It is only the fee difference that leads high-IQ investors to gravitate towards the passively managed funds.

The role of expenses in mutual fund selection has been studied extensively, but with mixed results. Müller and Weber (2010) and Bailey, Kumar, and Ng (2011) report that experience and financial literacy are negatively associated with the loads investors pay for their funds; the results for fees tend to be weaker and are generally insignificant. By contrast, Wilcox (2003) and Engström (2007) find that highly educated, wealthy, and more experienced investors invest relatively more in funds with *high* fees or loads. Finally, using data from Harvard and Wharton students and staff, Choi et al. (2010) find no relationship between the subjects' SAT scores and the fees of the funds selected.[3]

None of these studies uses real IQ data on individuals. The closest proxy for an intelligence test, the SAT score in Choi et al. (2010), obtains its data from experiments in which

[3] In addition, Barber and Odean (2005) and Korkeamaki and Smythe (2004) contend that investors are not terribly sensitive to less visible fees. Zhang (2007) and Ivković and Weisbenner (2009) seem to refute this evidence.

subjects allocate money (provided to the subjects by the experimenter) to index funds in exchange for call option-like rewards; however, there is relatively little variation in intelligence among subjects in the experiment. The IQ data we study are from a test specifically designed to measure intellectual ability. The test, administered to virtually all male Finnish investors who reach military draft, mimics the design of other well-known IQ tests, like the Wechsler Adult Intelligence Scale. We have the scores of every individual who took the test since 1982. The IQ test is mandatory and is also unique because of its timing—at the age of induction into military service (about 19 or 20), a time in life prior to any post-high school education or any significant participation in financial markets. Our study also uses data on real-world investment choices. We generally observe these mutual fund choices many years and sometimes decades after the IQ assessment. It is admittedly a noisy assessment, but that only implies that significant findings are likely to be conservative judgments about the role played by IQ in fund selection.

The paper's analysis also extends its service-related controls to all fund attributes that can be captured by fund asset class, distribution channel, and fund family dummies. The fund family dummies in particular control for many more omitted service differences than in prior studies. We also show that the IQ-fee relationship is, if anything, slightly stronger for the wealthiest investors.

The paper is organized as follows: Section I describes the institutional setting, the data, and provides summary statistics. Section II presents multiple regression results. Section III concludes the paper by interpreting the regression results.

I. Institutional Setting, Data, and Summary Statistics

A. The Finnish Mutual Fund Market

The market for mutual funds in Finland differs from the U.S. market in size, advisory fee transparency, distribution, asset focus, and tax treatment.

Size. Compared to the U.S., the Finnish mutual fund market is small. According to the 2009 Investment Company Handbook, the number of funds and assets under management are less than 5% and 1% of comparable figures for the U.S., respectively.

Advisory fee transparency. For the vast majority of Finnish mutual funds (and for all funds in the sample we analyze), the "management fee" is equivalent to the expense ratio in the U.S. Distribution fees, like the 12b-1 fees charged by U.S. funds, are part of the management advisory fee rather than being allocated to the expense ratio portion that is separate from the management fee. Management fees account for over 90% of Finnish advisory firm revenue.[4] The relatively small amount of other revenue is collected from the loads that most Finnish funds charge. Front-end loads tend to be lower than those for U.S. load funds, usually 1% for equity and balanced funds, and 0.5% for bond funds. Because loads are one-time events, and are relatively small, we do not study their role in mutual fund selection.

Distribution. Finnish investors tend to buy funds directly from an intermediary representing the fund company, most often the local bank branch selling fund products of that bank.[5] We refer to the funds distributed by banks with extensive branch outlets as "retail bank

[4] We verified this from the year 2006 income statements of the fund management companies in our sample.

[5] Some banks or asset management houses also sell more specialized products (e.g., North America or Japan funds) produced by foreign subcontractors under their own brands. Only one bank with a relatively small retail network sells mutual fund products of its domestic competitors.

funds" or sometimes just "retail funds" and refer to all other funds as non-retail funds. The retail funds come with advice on how to invest and a great deal of hand holding. While brokers are not used to buy funds, some investors buy funds through a voluntary pension insurance plan or at the recommendation of free "independent" advisors.[6]

Fund sales are concentrated among large banks with extensive retail distribution networks; the three largest banks account for about two thirds of the market. A retail network generally does not distribute index funds, which are far less popular in Finland than in the U.S. There also are many smaller asset management houses or other players in the market, such as one major Swedish bank, Handelsbanken, (but it has no retail distribution network to speak of).

Asset focus. Finland's equity and debt markets are relatively small, leading most Finnish funds to invest predominantly in the equity and bonds of foreign markets. The tendency to invest outside of Finland has become more prominent as the Finnish mutual fund market has matured. Some funds invest in emerging markets and our analysis distinguishes general equity and bond funds investing in international stocks and bonds from emerging markets funds.

Tax treatment. Finnish mutual funds, like U.S. funds, do not pay tax on undistributed interest or dividend income or capital gains realized by the fund. Investors are subject to taxation only when they receive dividend distributions from the funds or when they realize capital gains by selling shares in the fund. However, in contrast to the U.S., Finnish mutual funds are not compelled to distribute interest, dividend, or capital gains income. Indeed, Finnish mutual funds have tranches that reinvest these sources of income in the fund rather than distribute the income

[6] This type of advisor (as opposed to the management advisory firm) makes money by negotiating volume discounts with the funds (including an exemption from the front-load fee), pocketing the difference. In practice, the volume discounts often generate little incentive for the advisers to recommend the funds, so they tend to advise clients to buy *more expensive* products (e.g., nontransparent insurance products) that offer the advisor fatter margins.

to investors as fund dividend distributions. The vast majority of Finnish investors prefer these tax-advantaged tranches. Their existence implies that Finland's relatively unpopular index funds lack the same relative tax advantage that U.S. index funds possess. Likewise, balanced funds, which are more popular in Finland than in the U.S., lack U.S. balanced funds' tax disadvantage from rebalancing. During the period studied, our sample of Finnish investors paid a flat 28% rate (in 2004, a flat 29% rate) on their capital income. (See Grinblatt and Keloharju (2004) for a more exhaustive description of personal taxation in Finland.)

B. Data Sources

We obtain data from four sources, described below. To link individuals across the data sets, we employ a unique identification number, similar to a social security number.

Finnish Tax Administration (FTA). The FTA collects fund shareholder data from all Finnish-domiciled mutual funds. The filings we obtained, from end-of-years 2004-08, are highly reliable, both because what the fund reports in the filing is subject to enforceable statutory requirements and because the filings are submitted and stored in electronic format. Each individual's holdings are reported on a fund-by-fund basis. The individual's mutual fund wealth is the sum of the values of his fund holdings.

Statistics Finland. Statistics Finland collects data from many government agencies. It provided us with career and education information for a randomly selected sample of about five per cent of the individuals born between 1955 and 1984. From this data set, we identified whether the individual works in the finance profession, has a business education, or a university degree.

The 1984 end date restricts the sample to those who were at least 20 years old when making mutual fund decisions at the beginning of the our mutual fund sample period (2004).

Finnish Armed Forces (FAF). The FAF provides data on intellectual ability. Around the time of induction into mandatory military duty in the Finnish armed forces, typically at ages 19 or 20, males in Finland take a battery of psychological tests. One portion consists of a 120-question intelligence test for which we have comprehensive data beginning January 1, 1982. Since financial investment is relatively rare among youth of military recruitment age, we typically observe investment behavior many years and sometimes decades after the IQ score is generated.

The FAF test measures intellectual ability in three areas: mathematical ability, verbal ability, and logical reasoning. The FAF constructs a composite ability score from the results in these three areas. We use the composite ability score in our analysis, referring to it as "IQ". As noted in Grinblatt, Keloharju and Linnainmaa (2011), the FAF ability score significantly predicts life outcomes, such as income, wealth, and marital status. The scores on the ability test are standardized to follow the stanine distribution (integers 1-9, approximating the normal distribution with each stanine representing one half of a standard deviation).

Mutual Fund Report, a monthly publication, details for our purposes fees, fund category, and distribution outlet of all actively managed mutual funds and index funds sold in Finland. We have all issues of the report over our sample period of 2004-08. Because we analyze all funds from all reports, survivorship bias concerns do no apply to our study. We exclude funds with incentive fees, hedge funds, miscellaneous funds, and any funds whose fees are not transparent from the report. The six fund categories we study are short-term bond, long-term general bond, long-term emerging markets bond, general equity, emerging markets equity, and balanced funds.

C. Summary Data on Funds, Their Fees, and Their Investors

Table 1 presents end-of-2008 summary statistics from our sample of 335 Finnish mutual funds. For each fund category, it reports the number of funds, aggregate assets under management, number of investors holding fund shares in the category, summary statistics on the fees charged by management, and average IQ of those who invest in that category. Table 1 indicates that our sample of funds managed over 30 billion Euros in assets, with almost 40% concentrated in general equity, emerging markets equity, and balanced funds—an equity fraction comparable to the U.S. This fraction declined substantially from 2007 because of asset declines and equity fund outflows in 2008 stemming from the world financial crisis. Despite the crisis, all categories witnessed a net increase in the number of funds over the 2004-08 sample period.

Table 1 indicates that balanced funds tend to have higher fees than a mix of general bond and equity funds that replicate the typical balanced fund's allocation of 60% in stocks and 40% in bonds. Except for the relatively small emerging markets fund categories and balanced funds, funds distributed through a retail network tend to have higher fees. Emerging markets funds also tend to have higher fees, while passively managed (index) funds have lower fees.

D. Summary Data on IQ

Table 1 also shows that the average investor in balanced funds and in retail funds tends to possess lower IQ than other investors and that the IQs of those in index funds tend to be larger. Thus, high-IQ investors tend to concentrate in the lower-fee fund categories. The exception, short-term bond funds, will be discussed later.

Table 2 reports the distribution of the IQ variable (Panels A) and the averages of other key variables conditional on IQ. Panel A indicates that there are slightly fewer individuals in

stanines 1-4 and slightly more in stanines 5-9, compared to the theoretical stanine distribution. Bigger differences arise when we focus on mutual fund investors. They tend to be quite a bit smarter than the theoretical distribution would predict. This is consistent with Grinblatt, Keloharju, and Linnainmaa (2011), who find that smart investors are more likely to hold a mutual fund. Panel B confirms that high-IQ Finns are also more likely to be highly educated, have a business degree, and work as finance professionals.

II. Multivariate Results

Table 1 indicated that high-IQ investors tend to hold certain types of funds and shy away from others. Within asset classes, high-IQ shareholders are more prevalent in fund types with lower fees: the non-retail and passively managed funds. High-IQ investors also tend to avoid balanced funds, which have fees similar to equity funds but far higher fees than bond funds. These findings are intriguing, but based only on the simple bivariate relationship between IQ and choice of fund type. IQ is correlated with wealth and education, as well as profession. These other investor attributes are also likely to influence fund choice. Including wealth in our regressions has the added benefit of allowing us to control for differences in access to services that investors of varying wealth might have. To better understand whether and how IQ influences fund choice, we need to control for investor characteristics that correlate with IQ. Motivated by this consideration, this section uses a multivariate logit regression framework to study fund selection. Our analysis controls for education (2 variables), finance career, and (fund) wealth.

We study the fund choices of all holders of mutual funds with an FAF IQ score in our sample. These subjects are necessarily male. The first part of our analysis focuses on the choice of fund type without separate regard for abnormally large or small fund fees within the fund

category. The second part studies how fund type, abnormal fund fees within the fund category, and investor characteristics interact to identify desirable and undesirable funds.

In these regressions, IQ score, coded by the Finnish Armed Forces as an integer from 1 to 9, is rescaled with a linear transformation to vary from -1 to 1. This rescaling, which has no effect on test statistics, facilitates the interpretation of the IQ coefficient. The coefficient on the rescaled IQ variable represents the effect of being a stanine-9 rather than a stanine-5 (median IQ) investor, or a stanine-5 rather than a stanine-1 investor. In the second part of our analysis, which allows IQ to interact with fees, the transformation allows us to add or subtract the interaction coefficient to understand how much more (or less) sensitive stanine-9 and stanine-1 investors are to fees compared to stanine-5 investors.

A. The Choice of Asset Class and Fund Service Type Controlling for Other Investor Attributes

Table 3 analyzes the role of IQ and other investor attributes in selecting nine particular categories of funds. Table 3 Panel A presents results for seven logit regressions, each estimating the probability that an investor holds at least one fund in an asset class as a function of five attributes: his IQ, mutual fund wealth, whether he holds a university degree, whether he has had business education, and whether he is a finance professional. Two of the asset class regressions are for balanced funds, one for a subset of investors desiring equity and bond exposure. Panel B displays two logit regressions that use Panel A's regressors to predict holdings of funds distributed by banks with a retail network and of funds that are actively managed. For eight of Table 3's nine regressions, the sample sizes are identical as the unit of observation is an investor-year (for investors who own at least one mutual fund that year). For Panel A's homemade

balanced fund regression, we use a subsample consisting of investors who own either (i) balanced funds (alone or in combination with any other funds) or (ii) general equity and general long-term bond funds, but no balanced funds. We refer to the latter as "homemade balanced funds."

The coefficients from Table 3's regressions effectively summarize whether investors of differing IQ, education, profession, and fund wealth select funds from each of the nine categories. Standard errors cluster residuals at the investor level, while allowing for heteroskedasticity across investors using robust estimation methods.[7] We also include dummies for each year. The most striking observation from this table is that high-IQ investors are reluctant to hold balanced funds (specification 6). The balanced fund regression's IQ coefficient, which represents a four-stanine shift in IQ, is of similar magnitude as the coefficients for university degree, business education, and finance profession, and is far more significant than the latter two coefficients.

One possible explanation for this finding is that high-IQ investors perceive balanced funds' services to be overpriced. Recall from Table 1 that among the three most popular fund classes—general bond, equity, and balanced funds—the balanced fund class exhibits the highest fees. On average, they charge 43 basis points more per year than a 60-40 mix of typical equity and bond funds. To further investigate the fee explanation, the homemade balanced fund regression (specification 7) uses a subset of investors with bond and equity market exposure from fund holdings, thus controlling for risk aversion. These investors either own a balanced fund (without or with additional funds from any asset class) or a homemade balanced fund. The regression assesses the probability of holding a homemade balanced fund as a function of the five investor characteristics. There is a significantly positive IQ coefficient in specification 7's

[7] See, for example, Wooldridge (2003).

homemade balanced fund regression. Specification 7's finding is consistent with high-IQ investors recognizing that constructing a homemade balanced fund generates lower fees than an otherwise identical balanced fund.

Do the higher balanced fund fees also explain the balanced funds' significant negative coefficient in specification 6? One way to address this issue is to compare the magnitude of the IQ coefficients in specifications 6 and 7. The IQ coefficient in specification 7, 0.30, is 2.3 times larger in magnitude than in specification 6. There are, however, 2.3 times more subjects in specification 6, arising from the inclusion of subjects who own neither a homemade balanced fund nor a balanced fund. These additional subjects must possess the same average IQ as those who own balanced funds, or specification 6's IQ coefficient would not shrink by a factor of 2.3. This strongly suggests that when high-IQ investors avoid balanced funds, they substitute homemade balanced funds for the balanced funds rather than funds in other asset classes. The relative coefficient magnitudes cast further doubt on explanations other than fees as the driver of the significant negative coefficient in specification 6's balanced fund regression.

Table 3 Panel A also indicates that high-IQ investors are less willing to hold short-term bond funds. It is possible that high-IQ investors are better at finding profitable alternatives to short-term bond funds that charge 37 basis points for a low-yield financial instrument. Bank CDs come to mind. However, this explanation is difficult to reconcile with finance professionals' preference for short-term bond funds, as seen in Panel A's first column. One possibility is that finance professionals are more active traders in the financial markets (as documented by Grinblatt and Keloharju, 2009) and need the extra liquidity provided by a short-term bond fund compared to a CD. At this point, however, we lack evidence to support or refute this conjecture.

High-IQ investors also exhibit a general equity fund preference in Table 3 Panel A. Such a preference could arise from a better understanding of the risk-reward trade-off of equity or, alternatively, from IQ being correlated with an omitted variable like risk tolerance. Investors with university degrees show a similar preference for equity funds but the equity fund preferences of finance professionals are weaker and insignificant. If holdings of individual stocks are substitutes for equity fund holdings, finance professionals may be more inclined to engage in this substitution than high-IQ investors. Grinblatt, Keloharju, and Linnainmaa (2011, Table 2) show that the finance professional dummy is a stronger predictor of Finnish investors' holdings of individual stocks than a four-stanine increase in IQ.

Table 3 Panel B analyzes the choice of retail vs. non-retail funds (column 1) and of actively managed versus passively managed funds (column 2). The retail funds dependent variable is one if the investor holds a retail fund. Its IQ regressor coefficient (as well as the unreported marginal coefficient) is negative while that for the passively managed funds is positive. Similar patterns exist for the university and business education dummies; the coefficients for the finance professionals are of the same sign but not significant. Thus, high-IQ, highly educated and business-educated investors exhibit a relative preference for non-retail and passively managed funds. These happen to be types of funds with lower fees (as seen in Table 1). Marginal effects (not reported) indicate that the effect of a four-stanine change in IQ (corresponding to a one-unit change in rescaled IQ) on avoidance of high-fee retail funds is about 50% greater than the effect from obtaining a university degree or a business education, and three times the effect of being a finance professional.

B. High-IQ Investors Avoid High-Fee Funds Other Things Equal

Table 4 reports logit coefficients (Panel A) and marginal effects (Panel B) from a single logit regression. In contrast to Table 3, it assesses the degree to which fees per se, measured as logged percentage fee, influence fund choice, separate from fee correlates like asset class and fund service type. In this regression, the decision to own a fund is the dependent variable and IQ's effect on fees is measured by the coefficient on the interaction term that multiplies IQ by the fee charged. A viable alternative would be to use fund-investor pairings as data points, using all funds held by an investor, and regress the fund's fee on the investor's IQ. However, this regression tells us only about the relative fees of funds held by investors of varying IQ. The funds that are not held by the investor, and whether their fees are high or low, play no role in the estimation. (The paper's conclusion discusses results from this alternative approach.)

Table 4's regression is far more computationally intensive than the regressions in Table 3. Unlike Table 3, where the unit of observation is every investor-year combination, the unit of observation here is an investor-fund-year. The change in the observation unit allows inclusion of a fee regressor. We lower computational time by a factor of about twenty-five, while preserving highly accurate coefficient estimates, by randomly sampling funds that the investor does not own so that each investor is perceived to select from a universe of 20 funds.[8] Table 4 uses estimation techniques that are robust to heteroskedasticity, cluster residuals at the fund level, and contain (unreported) fixed effects for calendar year.

The four columns on the right report the regression's "interaction coefficients;" these describe how investor characteristics, particularly IQ, alter their row's main effect coefficient in

[8] For an investor holding k distinct funds, we sample max (20-k, 0) funds that the investor does not own. There are very few investors who hold 20 or more funds.

the leftmost column. For example, the fee row indicates how IQ, university education, business education, and having a finance career alter the sensitivity of fund choice to the fee regressor. Including both asset class and fund service type as regressors ensures that the fee component associated with the fund's asset class and service type (retail vs. non-retail, active vs. passive) does not influence the fee coefficient: only the fee's idiosyncratic variation within asset class and type matters.

The fee's effect on holding propensity depends on the investor's attributes (columns) and the level of the fee. More generally, by comparing coefficients in a particular row or column with those in a different row and column, we can see how the logged odds ratio of the holding propensity is jointly influenced by investor and fund characteristics. The main effects of fund attributes are addressed in the leftmost column; coefficients in this column describe how logged odds ratios change in response to changes in fund characteristics for a "benchmark investor" having median IQ, no university or business education, and zero logged fund wealth (i.e., 1 Euro of fund wealth). The "main effects of investor attributes" row describes how logged odds ratios change in response to changes in investor characteristics for a benchmark consisting of an average actively-managed non-retail short-term bond fund.

Panel A's main-effects column indicates that having relatively high fees within an asset class increases the likelihood of the benchmark investor holding a fund. Consistent with this finding, weighting a fund's fees by its number of shareholders produces a weighted average fee that exceeds the average fee. The higher investor-weighted fee (not reported) exceeds the average for all funds, as well as within all but one small asset class.

The IQ column coefficients assess how stanine-9 or (if subtracting) stanine-1 investors react to fund attributes in comparison to stanine 5. The IQ column asset class coefficients

measure IQ-related preferences relative to the omitted asset class category—short-term bonds. The relative preferences expressed by the IQ column's asset class coefficients hold fees constant. Thus, they cannot be compared to IQ coefficients from Table 3 Panel A, as the latter regressions lack controls for fees. Table 4's asset class coefficients measure whether there is an IQ-related (or for other columns, wealth-, education-, or profession-related) preference for the asset class over short-term bonds that is separate from preferences about it based on its fee and service type. In other words, Table 3 analyzes each asset class and fund type decision separately whereas Table 4 investigates their impact on fund choice jointly, controlling for fees.

Table 4's IQ column indicates that as IQ increases, the value to the investor from holding shares in any of the five listed asset classes rises relative to short-term bond funds. The significant balanced fund coefficients in Panels A and B are merely a statement that for high-IQ investors, balanced funds are preferred to short-term bond funds, other things equal. What is more interesting is that the balanced fund coefficient is larger than (but does not differ significantly from) the long-term general bond fund coefficient (both in Panels A and B). The reason smart investors prefer homemade balanced funds in light of this is purely the effect of the fee coefficient in the same column of Table 4: homemade balanced funds win out over balanced funds because high-IQ investors also place great value on the former funds' lower fees.

Table 4's IQ column also indicates that smart investors place relatively lower value on retail bank funds' services but have no significant preference difference from others when choosing active over passive management, other things (including fees) equal. Once we consider the differing fees between service types, smart investors' preference for non-retail funds and for passively managed funds becomes far stronger. Indeed, running the Table 4 regression without a

fee regressor generates a significant interaction coefficient between the passively managed dummy and IQ (coefficient 0.450, t=3.86 vs. Table 4's coefficient=0.174, t=1.03).

No other investor characteristic, besides being university-degreed, has a significant influence on the passive-fund attribute's impact on fund choice. Moreover, according to Table 4, business degree is the only investor characteristic besides IQ with a significant fee interaction coefficient. Being a finance professional significantly increases fee sensitivity at the 10% level but not at the 5% level, and this career category does not significantly alter sensitivity to either service type. These findings are consistent across both of Table 4's panels, as Panel B's marginal effects generally match the sign and significance of Panel A's corresponding logit coefficients.

To illustrate the economic size of the effects in Table 4, consider Panel B's a marginal effects coefficient of -0.025 in the fee row and business degree column. The -0.025 indicates (at the regressor values listed in the table's legend), that a fund doubling its management fee from, say, 50 to 100 basis points (a 100% increase) lowers the probability of being owned by a business-educated investor by 2.5% more than a non-business educated investor. This is a considerable drop given that the unconditional (or reference) probability of owning a randomly selected fund is 4.7%.

C. Omitted Service Attributes

Table 4 makes the striking observation that fees matter more to high-IQ and educated individuals controlling for asset classes and a pair of fund service attributes. However, service surely has more than the two dimensions of passive vs. active and retail vs. non-retail. Anyone familiar with the U.S. mutual fund market knows that fund families differ in the quality of their

advice, service speed, software for executing transactions or monitoring portfolio value, and quality of tax reports. Service hours and number of walk-in branches also vary widely. These service differences are likely to influence the types of investors that select into different fund families. Alexander et al. (1997) find that investors self select into different distribution channels based on their overall level of financial literacy while Del Guercio et al. (2010) find systematic differences in the portfolio managers employed by funds sold through different channels. Likewise, one might reasonably expect that investors of differing knowledge or intellectual ability attach differing values to the services offered by different fund families.

Motivated by the observation that fund families attract different clienteles, and that these clienteles stratify by different levels of service, we augment Table 4's regression by including dummies for each fund family and the dummies' interactions with investor attributes. The regression thus allows fee preferences, which vary with investor characteristics, to be orthogonal to observable asset class and service dummies, and any unobservable fund family variables.

Table 5 adds the 22 fund family dummies and their interactions with each of the investor attributes to Table 4's regression. As the fund family dummies are perfectly collinear with the retail network dummy, we omit the latter variable from the analysis. Table 5 shows that the interaction between fees and IQ remains highly significant (the *t*-statistic increases from -2.69 in Table 4 to -3.17 in Table 5), suggesting that high-IQ investors shun high-fee funds, even within a the same fund family, asset class, and management philosophy (passive vs. active).

D. Wealthy Investors

Table 6 repeats Table 4's regression using only the wealthiest 10% of investors (measured by wealth invested in mutual funds). The median mutual fund wealth of this group is over 70,000 Euros. This table is of interest for two reasons. First, if smart investors within the wealthiest class care as much about fees as those of lower wealth, there are significant amounts of money being saved by avoiding high-fee funds. This helps dispel the argument that Table 4's results might only apply to low-wealth investors and that its results would be of little interest because the amount of money lost by selecting high-fee funds would be small. Finding a greater high-IQ preference for low-fee funds among the wealthiest also would demonstrate that constraints on fund choice, like minimum account sizes, might play a role in our results. Wealthy investors face fewer of these constraints.

Table 6's IQ-fee relation is significantly negative (*t*-statistic = -2.13), suggesting that also high-IQ investors shun high-fee funds. Although not reported formally, a comparison of the marginal effects in Tables 4 and 6 suggests that affluent investors have, if anything, a more negative IQ-fee interaction coefficient than the full sample: its magnitude is larger even as a percentage of the reference probability (29.5% vs. 25.5%) of holding a given fund. Thus, high-IQ investors could be finding low-fee funds with high minimums to a greater extent when they are affluent. Relatively poor high-IQ investors may not have access to these funds and therefore have no need to identify them.

IV. Summary and Conclusion

Mutual fund fees vary widely, even among funds with identical investment objectives, minimum investment requirements, and past performance.[9] If investors receive nothing in exchange for the higher fees, there is a violation of equilibrium's so-called "law of one price". Using remarkable data from Finland, including measurement of individual investor IQ, we find that fee heterogeneity is sustained by lower-IQ investors investing in higher-fee funds.

High-IQ investors' choices of lower-fee funds partly reflect asset class and service categories that tend to have low fees. However, controlling for asset class and service, we also observe a relative preference for low-fee funds. Service is measured first in two dimensions—distribution network (retail vs. non-retail) and fund manager philosophy (active vs. passive)—then with 22 fund family dummies along with manager philosophy. The latter approach represents a powerful way to control for services that tend to be omitted from most analyses because they are so difficult to name and quantify. Fund family fixed effects have little effect as an additional set of controls in studying the IQ-fee relationship.

We control for four other investor characteristics when studying IQ: mutual fund wealth, having a university or business degree, and working as a finance professional. Better educated, business-educated, and finance career investors, prefer lower-fee funds for the component of fees related to observable service differences. However, controlling for the joint effect of investor attributes does not eliminate the IQ-fee relationship. This leads us to conclude that high-IQ investors achieve lower fees for two reasons: first, because they have different preferences (apart

[9] See Elton, Gruber, and Busse (2004) and Hortaçsu and Syverson (2004).

from fees) for some asset classes and service types; and second, because they have different attitudes about fees than low-IQ investors.

It is comforting to know that an alternative methodology and specification does not change our conclusion about the importance of IQ as predictor of low-fee fund holdings. The alternative methodology looked at whether a fund's fee could be predicted by the individual attributes of its fund shareholders, particularly IQ. In this regression, an observation is every fund-shareholder pairing. The IQ of the investor turns out to be a highly significant predictor of the management fee (t = -2.81), controlling for the other characteristics of the investor and the fund with the variables you are now familiar with. For the specification alternatives, we found that while IQ (combined with the usual regressors as controls) explains whether an investor tends to own low-fee funds, it does not explain the size of the investment in the fund conditional on owning fund shares (t = -0.91).

We have no way to study Finnish investors' holdings of funds domiciled outside of Finland because we lack comparable data. However, we suspect the foreign-domiciled funds represent a negligible portion of the Finnish mutual fund market. Aside from anecdotal observation, evidence for this is found in the prevalence of Finnish retail networks as the primary distribution outlet for funds domiciled in Finland. Moreover, if we were able to include foreign fund holdings in our study, we suspect that they would strengthen our significant IQ-fee results. First, as documented by Khorana, Servaes, and Tufano (2008), fees on foreign funds are on average lower than those for Finnish-domiciled funds. Second, smart investors are more likely to know about and therefore invest in (inexpensive) foreign funds. This behavior would enhance the IQ-fee relationship beyond the relationship documented for the Finnish-domiciled funds.

To our best knowledge, this is the first study to address the role of intellectual ability and education on consumer behavior in the fund industry. Its analysis would be difficult to extend to other industries. Because the primary attribute of the product sold by funds is a risk-return trade-off that many in the profession think is the same for all funds, mutual funds seem like the ideal industry to focus on. Service differences across funds are far less complex than the attributes of other goods and services, making it easier to argue that our controls are adequate for capturing service differences. For example, medical services may vary along many dimensions—skill of the doctor at diagnosing and treating many different disease categories, hospital one can be admitted to, waiting time when seeking medical help, bedside manner, etc. Some of these are unique to the provider. Similarly, the utility obtained from a fashionable line of clothing or cosmetics may differ along dimensions that are unique to the provider. The sheer dimensionality of these differences makes controlling for them more complex. The inability of other producers to mimic each of these preference dimensions may contribute to demand functions that are just too complex to make sense of.

Policy makers will want to draw conclusions from this study about the competitiveness of the mutual fund market. This question is hard to address to with any degree of certainty. Obviously, there may be differences in services, separate from alpha, which low-IQ investors find useful and are willing to pay for. Some funds have more hand holding, easier to use websites, more offices for doing business in person, better hours, more experienced or helpful telephone operators, and superior educational instruction on the topics of investing and saving. Other funds may be more lenient about early withdrawal penalties or account minimums. These services cost money. A high-IQ person may find it easier to go without some of these services. He may substitute a homemade balanced fund for a balanced fund. The high-IQ investor may

also find it easier to mitigate the impact of penalties or minimums with electronic fund transfers or skillful manipulation of the rest of his asset portfolio. These possibilities suggest that markets could be competitive and we would expect see a relationship between IQ and fees if we do not control for services.

However, there also is evidence in our paper that some fee heterogeneity could stem from cognitive frictions. Being "dumb" makes it harder to fully understand the fees collected by the fund manager or its consequences to wealth. In this case, higher-fee funds may earn rents from the "less cognitively gifted," for the same reasons that rents can be earned when there are search costs. (See Diamond (1978) for a model of these rents.) This would be evidence of a non-competitive market. The significant IQ-fee interaction coefficient in the fund family fixed effects regression, which arguably controls for services effectively, lends support to this thesis.

Because services are a bit more opaque to the researcher, but not the customer, one can never say for certain that fee heterogeneity in mutual funds is not entirely due to service difference. However, whatever one's opinion is on the competitiveness of the mutual fund market, it is clear that IQ makes a difference in the fees one pays.

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Table 1

Descriptive statistics on funds in the sample

For each asset class, Table 1 lists 2008 values of the number of funds, average fee, standard deviation of the fee within the category, aggregate assets under management (AUM), and number of investors in all funds in the category along with their average IQ. Each Finnish-domiciled mutual fund in the category at the end of 2008 is a data point. Hedge funds as well as any funds with any performance-related fee components or nontransparent fees are excluded from the sample. Long-term bond funds include intermediate- and long-term bond funds. Retail funds are funds run and distributed by fund families affiliated with commercial banks.

	Pure asset classes					Balanced funds
	Short-term bond	Long-term general bond	Long-term emerging market bond	General equity	Emerging markets equity	
All funds						
Number of funds	32	61	8	153	42	39
Average fee, bp	37.4	61.1	98.8	146.7	259.9	155.7
Sd of fee, bp	13.2	26.9	30.0	56.1	55.1	44.8
AUM, mill. Euros	9,018	10,580	249	7,268	1,456	2,788
Number of investors	191,051	89,157	2,912	749,939	405,905	322,075
Average investor IQ	5.85	6.39	6.73	6.22	6.26	5.87
Retail funds						
Number of funds	21	42	4	81	28	29
Average fee, bp	39.6	64.3	92.5	162.1	237.7	155.7
Sd of fee, bp	14.1	28.7	25.0	46.3	46.8	41.7
AUM, mill. euros	6,981	8,877	197	5,352	1,160	2,404
Number of investors	179,646	79,772	1,861	705,029	386,546	309,790
Average investor IQ	5.69	6.27	6.74	6.07	6.15	5.81
Non-retail funds						
Number of funds	11	19	4	72	14	10
Average fee, bp	33.0	54.2	105.0	129.1	304.3	155.8
Sd of fee, bp	10.3	21.3	37.0	61.2	42.9	55.3
AUM, mill. euros	2,036	1,703	52	1,916	296	385
Number of investors	11,405	9,385	1,051	44,910	19,359	12,285
Average investor IQ	7.00	7.00	6.73	7.12	7.20	6.94
Actively managed funds						
Number of funds	32	54	8	138	42	39
Average fee, bp	37.4	65.6	98.8	157.2	259.9	155.7
Sd of fee, bp	13.2	25.0	30.0	48.3	55.1	44.8
AUM, mill. euros	9,018	9,607	249	6,668	1,456	2,788
Number of investors	191,051	88,097	2,912	736,297	405,905	322,075
Average investor IQ	5.85	6.38	6.73	6.15	6.26	5.87
Passively managed funds						
Number of funds		7		15		
Average fee, bp		26.1		50.8		
Sd of fee, bp		9.6		19.4		
AUM, mill. euros		973		599		
Number of investors		1,060		13,642		
Average investor IQ		6.59		7.26		

Table 2

IQ and investor variables

Panel A reports the theoretical stanine distribution and its empirical equivalents for both the full sample and the sample of mutual fund holders. The full sample randomly selects Finns who are born between 1955 and 1984. The percent of fund holders is the proportion of individuals who have some fund holdings in each stanine. Panel B summarizes investor attributes in the total sample of mutual fund holders. Each investor at the end of each year 2004-08 is the unit of observation. Fund wealth is the value of all fund holdings at the end of a year. Highest education is the proportion of investors whose highest degree is basic, vocational, high school, or university. Business education refers to having earned a degree in business or economics. Finance professionals work in the finance industry.

Panel A: IQ distribution										
	IQ stanine									
	1	2	3	4	5	6	7	8	9	*N*
Theoretical	4.0%	7.0%	12.0%	17.0%	20.0%	17.0%	12.0%	7.0%	4.0%	
Full sample	2.5%	6.0%	7.4%	16.9%	22.3%	16.8%	15.0%	7.1%	6.1%	34,490
Mutual fund holders	1.3%	3.7%	5.2%	12.6%	20.8%	18.4%	18.2%	10.3%	9.6%	7,454
% of fund holders	10.4%	12.7%	14.6%	15.4%	19.1%	22.4%	25.0%	29.9%	32.4%	20.5%

Panel B: IQ stratified averages of variables										
	IQ stanine									
	1	2	3	4	5	6	7	8	9	Total
Fund wealth, euros	4,043	6,530	7,114	7,952	8,609	8,926	13,361	15,243	33,262	12,447
Number of funds	1.4	1.6	1.6	1.7	1.9	2.0	2.1	2.4	2.6	2.0
Highest education										
Basic	26.4%	25.8%	19.0%	13.5%	7.2%	5.6%	5.4%	3.5%	3.6%	8.0%
Vocational	68.1%	65.3%	70.7%	66.7%	58.3%	41.7%	30.7%	21.5%	11.4%	43.5%
High school	2.0%	4.0%	2.7%	7.3%	9.1%	14.7%	14.0%	17.4%	15.8%	11.8%
University	3.6%	4.8%	7.6%	12.4%	25.5%	38.1%	49.9%	57.6%	69.1%	36.7%
Business education	1.0%	1.0%	1.2%	3.0%	4.9%	7.9%	8.5%	10.4%	8.5%	6.5%
Finance professional	0.0%	1.9%	1.3%	1.9%	3.8%	4.2%	4.0%	4.9%	5.4%	3.7%

Table 3

Choice of asset class and fund type

This table reports coefficients and their associated *t*-values, in parentheses, from logit regressions that explain investor *i*'s decision to hold any funds in an asset class (Panel A) or service type (Panel B) at the end of year *t*, where *t* ranges from 2004 to 2008. The dependent variable is one if the investor holds at least one fund in the category. Except for Panel A's specification 7, which restricts the sample to investors who hold some balanced funds or a combination of equity and bond funds ('homemade balanced funds'), an observation is an investor-year. Long-term bond funds include intermediate- and long-term bond funds. Independent variables are the IQ stanine rescaled to vary from -1 to 1, logged wealth (in Euros) held in mutual funds at the end of year *t* and dummies for having a university or a business degree and working in the finance industry. All regressions include unreported fixed effects for the five calendar years of observation, 2004-08. Standard errors used to compute test statistics are clustered at the investor level and are robust to heteroskedasticity.

Panel A: Asset classes and balanced funds							
Dependent variable	Pure asset classes					Balanced funds	
	Short-term bond	Long-term general bond	Long-term emerging market bond	General equity	Emerging markets equity	Balanced	Home-made balanced
Specification	1	2	3	4	5	6	7
IQ score	-0.30	0.06	0.19	0.30	0.27	-0.13	0.30
	(-4.53)	(0.61)	(0.72)	(5.36)	(4.28)	(-2.34)	(2.69)
Ln (Wealth)	0.31	0.39	0.76	0.12	0.18	0.14	0.32
	(16.00)	(15.95)	(10.16)	(10.19)	(14.15)	(11.46)	(11.27)
University degree	-0.03	0.27	-0.19	0.22	0.12	-0.13	0.28
	(-0.54)	(3.01)	(-0.63)	(3.91)	(2.04)	(-2.33)	(2.67)
Business degree	0.04	0.07	-0.31	0.03	0.15	-0.15	0.18
	(0.39)	(0.50)	(-0.65)	(0.26)	(1.36)	(-1.37)	(1.05)
Finance professional	0.28	0.19	0.49	0.11	0.33	-0.11	0.63
	(2.47)	(1.08)	(0.99)	(0.97)	(2.73)	(-0.96)	(3.37)
Pseudo-R^2	0.055	0.080	0.177	0.023	0.040	0.014	0.075
Number of observations	24,820	24,820	24,820	24,820	24,820	24,820	11,068

Panel B: Fund types		
Dependent variable	Retail fund	Passively managed fund
Specification	1	2
IQ score	-0.82	0.82
	(-5.74)	(4.27)
Ln (Wealth)	-0.23	0.33
	(-7.27)	(7.82)
University degree	-0.51	0.89
	(-3.82)	(4.88)
Business degree	-0.47	0.63
	(-2.73)	(3.15)
Finance professional	-0.20	0.31
	(-1.02)	(1.34)
Pseudo-R^2	0.075	0.124
Number of observations	24,820	24,820

Table 4

Logit regressions of fund choice

This table reports coefficients and marginal effects and their associated *t*-values, in parentheses, from a logit regression that explains investor *i*'s decision to own fund *j* at the end of year *t*. For investor *i*'s holding in fund *j* at the end of year *t*, shadow holdings are drawn randomly from the set of funds the investor does not hold so that the minimum number of observations for the investor at the end of each year is 20. The regression includes main effects for each fund and investor attribute and the interaction of each fund attribute with each investor attribute. Fund variables are the management fee, six dummy variables for asset classes (short-term bond funds omitted) and two dummy variables—for funds that are run and distributed by a retail bank, and for passively managed funds. Long-term bond funds include intermediate- and long-term bond funds. Management fee is the logged percentage fee of the fund. The main effects of fund attributes are reported in column 1. The first row of columns 2 through 6 report the main effects of investor attributes. The IQ score from 1 to 9 is rescaled to vary from -1 to 1 and ln(Wealth) is investor *i*'s logged Euros held in mutual funds at the end of year *t*. The remaining rows in columns 2 through 5 report the coefficients on interactions of the investor attribute in the column and the fund attribute in the row. The regression includes unreported year fixed effects for the five calendar years of observation, 2004-08. Funds with non-transparent fees and missing information on the underlying asset class are excluded from the sample. Standard errors used to compute test statistics are clustered at the fund level and are robust to heteroskedasticity.

Panel A: Coefficients						
Dependent variable	Ownership dummy					
Specification	Logit					
	Main effects of fund attributes	Main effects and interactions				
		IQ	University degree	Business degree	Finance profession	Ln (Wealth)
Main effects of investor characteristics		0.24	0.31	-0.35	-0.24	0.56
		(1.54)	(2.24)	(-2.11)	(-0.75)	(7.90)
Management fee	1.72	-0.28	-0.18	-0.56	-0.58	-0.06
	(3.12)	(-2.69)	(-1.58)	(-4.63)	(-1.86)	(-1.49)
Long-term general bond fund	-3.87	0.42	0.35	0.23	0.12	0.16
	(-3.23)	(2.61)	(2.40)	(1.24)	(0.35)	(2.02)
Long-term emerging market bond fund	-7.74	0.56	-0.15	-0.91	1.01	0.54
	(-4.37)	(2.95)	(-0.81)	(-2.16)	(1.19)	(3.82)
General equity fund	-1.95	0.71	0.31	0.70	0.59	-0.01
	(-1.49)	(3.54)	(1.67)	(3.65)	(1.35)	(-0.07)
Emerging market equity fund	-2.60	0.88	0.39	1.04	1.04	0.10
	(-1.67)	(3.70)	(1.77)	(4.25)	(1.83)	(0.99)
Balanced fund	-0.88	0.51	0.20	0.62	0.35	-0.07
	(-0.66)	(2.49)	(1.04)	(3.09)	(0.81)	(-0.86)
Retail fund	5.55	-0.69	-0.50	-0.14	-0.05	-0.37
	(16.88)	(-10.08)	(-6.09)	(-1.63)	(-0.40)	(-14.12)
Passively managed fund	-0.10	0.17	0.87	-0.02	-0.42	-0.02
	(-0.12)	(1.00)	(3.79)	(-0.12)	(-1.04)	(-0.27)
Pseudo-R^2	0.153					
Number of observations	484,845					

Panel B: Marginal effects						
Dependent variable	Ownership dummy					
Specification	Logit					
	Main effects of fund attributes	Main effects and interactions				
		IQ	University degree	Business degree	Finance profession	Ln (Wealth)
	1	2	3	4	5	6
Main effects of investor characteristics		0.011	0.014	-0.013	-0.010	0.025
		(1.55)	(2.14)	(-2.38)	(-0.83)	(7.20)
Management fee	0.077	-0.012	-0.008	-0.025	-0.026	-0.002
	(3.21)	(-2.67)	(-1.55)	(-4.38)	(-1.89)	(-1.52)
Long-term general bond fund	-0.083	0.019	0.018	0.011	0.006	0.007
	(-4.89)	(2.54)	(2.05)	(1.14)	(0.33)	(2.08)
Long-term emerging market bond fund	-0.051	0.025	-0.006	-0.027	0.072	0.024
	(-11.38)	(2.83)	(-0.87)	(-3.26)	(0.82)	(3.67)
General equity fund	-0.095	0.032	0.015	0.042	0.034	0.000
	(-1.26)	(3.37)	(1.49)	(2.72)	(1.08)	(-0.07)
Emerging market equity fund	-0.058	0.039	0.020	0.074	0.075	0.004
	(-3.20)	(3.53)	(1.48)	(2.84)	(1.25)	(0.99)
Balanced fund	-0.029	0.023	0.010	0.037	0.018	-0.003
	(-0.90)	(2.42)	(0.95)	(2.37)	(0.70)	(-0.86)
Retail fund	0.261	-0.031	-0.020	-0.006	-0.002	-0.016
	(10.70)	(-7.82)	(-5.63)	(-1.71)	(-0.40)	(-11.12)
Passively managed fund	-0.004	0.008	0.057	-0.001	-0.016	-0.001
	(-0.12)	(1.00)	(2.63)	(-0.12)	(-1.29)	(-0.27)
Reference probability	0.047					

Table 5

Controlling for omitted services

This table adds 22 fund family dummies and their interactions with all the investor attributes to the regression in Table 4 (fund family dummies and interactions not reported for brevity). Coefficients and their associated *t*-values, in parentheses, are reported. Standard errors used to compute test statistics are clustered at the fund level and are robust to heteroskedasticity.

Dependent variable	Ownership dummy					
Specification	Logit					
	Main effects of fund attributes	Main effects and interactions				
		IQ	University degree	Business degree	Finance profession	Ln (Wealth)
	1	2	3	4	5	6
Main effects of investor characteristics		-0.30	0.10	-0.36	0.07	0.32
		(-1.83)	(1.07)	(-2.14)	(0.27)	(5.72)
Management fee	2.09	-0.30	0.04	-0.39	-0.58	-0.09
	(4.64)	(-3.17)	(0.50)	(-3.26)	(-1.63)	(-2.68)
Long-term general bond fund	-4.19	0.43	0.26	0.17	0.20	0.18
	(-3.83)	(3.08)	(2.23)	(0.95)	(0.66)	(2.40)
Long term emerging market bond fund	-8.29	0.44	-0.22	-1.05	1.39	0.56
	(-6.00)	(2.19)	(-1.35)	(-2.50)	(1.75)	(4.50)
General equity fund	-2.71	0.76	0.06	0.45	0.67	0.05
	(-2.40)	(4.14)	(0.39)	(2.28)	(1.64)	(0.68)
Emerging market equity fund	-2.52	0.80	-0.01	0.78	1.03	0.07
	(-2.09)	(3.85)	(-0.06)	(3.20)	(1.98)	(0.85)
Balanced fund	-1.83	0.54	-0.04	0.39	0.68	0.00
	(-1.57)	(2.90)	(-0.23)	(1.84)	(1.60)	(-0.06)
Passively managed fund	-0.08	0.21	0.67	-0.13	-0.08	-0.06
	(-0.10)	(1.16)	(3.42)	(-0.60)	(-0.20)	(-1.04)
Pseudo-R^2	0.215					
Number of observations	480,480					

Table 6

Results for affluent investors

This table runs Table 4's logit regression on investors who belong to the highest 10 percent of the fund wealth distribution. The average (median) wealth of these investors equals 122,256 (70,509) euros. Coefficients and their associated *t*-values, in parentheses, are reported. Standard errors used to compute test statistics are clustered at the fund level and are robust to heteroskedasticity.

Dependent variable	Ownership dummy					
Specification	Logit					
	Main effects of fund attributes	Main effects and interactions				
		IQ	University degree	Business degree	Finance profession	Ln (Wealth)
	1	2	3	4	5	6
Main effects of investor characteristics		0.26	0.03	-0.41	0.10	0.55
		(1.19)	(0.21)	(-1.94)	(0.28)	(3.33)
Management fee	2.79	-0.35	-0.43	-0.51	-0.30	-0.13
	(2.20)	(-2.13)	(-2.36)	(-2.95)	(-1.08)	(-1.30)
Long-term general bond fund	-3.35	0.46	0.41	0.06	-0.40	0.09
	(-1.41)	(2.18)	(1.87)	(0.21)	(-1.07)	(0.50)
Long-term emerging market bond fund	-11.46	0.80	0.14	-0.90	0.39	0.81
	(-4.22)	(2.40)	(0.55)	(-2.29)	(0.60)	(3.69)
General equity fund	-2.26	0.82	0.41	0.72	-0.15	-0.03
	(-0.83)	(2.99)	(1.62)	(2.75)	(-0.31)	(-0.15)
Emerging market equity fund	-2.87	0.81	0.57	0.77	0.44	0.07
	(-0.89)	(2.36)	(1.79)	(2.29)	(0.74)	(0.28)
Balanced fund	0.96	0.61	0.50	0.36	-0.07	-0.30
	(0.34)	(2.03)	(1.80)	(1.07)	(-0.15)	(-1.40)
Retail fund	4.78	-0.75	-0.28	-0.04	-0.23	-0.31
	(6.20)	(-6.65)	(-2.78)	(-0.32)	(-1.42)	(-4.85)
Passively managed fund	2.26	-0.18	0.86	0.07	0.00	-0.21
	(1.10)	(-0.58)	(2.07)	(0.24)	(-0.01)	(-1.23)
Pseudo-R^2			0.095			
Number of observations			48,475			