Portfolio choice and menu exposure

Anders Karlsson
Stockholm University

Massimo Massa[1]
INSEAD

Andrei Simonov
Stockholm School of Economics

Abstract

We study the impact of menu representation on portfolio choice and we show that investors choose assets as a function of the way they are represented in the menu available to them. We use the choices of mutual funds for retirement accounts of the Swedish population. We show that investors prefer the funds that belong to categories that are more represented in the menu. More numerous categories attract more investment than what portfolio theory would suggest. Moreover, an *exogenous* change in the menu changes investor demand. An increase in the representation of a category in the menu increases investment in the funds belonging to the same category, including the already existing ones. By using information on the performance of the funds that investors choose and the degree of concentration of the investor portfolio, we show that there is a consistent positive correlation between the investor's sensitivity to menu exposure and his degree of informativeness. This suggests that menu exposure represents a rational way of coping with limited (private) information that decreases as information improves. Our findings shed light on the home bias puzzle and insight on the determinants of style investing. They also have direct normative implications in terms of Social Security reform.

JEL classification: G11, G14.

Keywords: Portfolio choice, home bias, style investing.

[1] Corresponding author: M. Massa, Finance Department, INSEAD, Boulevard de Constance, 77305 Fontainebleau, Cedex, France. Email: massimo.massa@insead.edu. Tel: (33) 160724481, Fax: (33) 160724045. Andrei Simonov acknowledges financial support from Jan Wallander och Tom Hedelius Stiftelse. All the remaining errors are ours.

Introduction

The goal of this paper is to investigate how investment in a class of assets is affected by the alternatives available in the class. We study whether investors select the categories of assets that are proportionally more represented in the menu of choices available to them. We also study whether an exogenous change in the menu representation changes investor choices. That is, we ask whether investors are more likely to choose a growth fund if financial intermediaries offer proportionally more growth funds. This allows us to say whether investor the categories used by the investors in their choice (Mullainathan, 2002, Barberis and Shleifer, 2003) are supply-induced.

We consider the unique experiment in portfolio choice provided by the new Swedish retirement scheme based on private accounts. Investors must choose how to allocate a fraction of their yearly income ("the capital") among no more than 5 investment vehicles ("the funds") out of more than 464 possibilities. No other choice is available and all the capital has to be invested. All the investors receive a booklet containing a standardized description of all the available funds ("the menu"). Each fund belongs to a different category (e.g., growth funds). All the funds charge uniform and low management fees. No other fees are charged. The choice can be altered every day, no search or switching cost affect the portfolio rebalancing.

We show that investors choose funds according to their representation in the menu. Categories that offer more funds are chosen proportionally more. If for some exogenous reason the number of funds of a specific category (i.e., growth funds) rises, the investors rebalance their portfolios increasing their investment in such a category. This is the case for both the new funds being offered as well as the already existing in the category (i.e., growth category) whose fund number has increased. For example, assume that a new fund – e.g., HSBC growth fund – is offered and investors already hold shares in the UBS growth fund and the Allianz income fund. The mere addition of the HSBC growth fund, by increasing the percentage of growth funds available in the menu, is enough to stimulate investment in the already existing UBS growth fund and to reduce the investment in the Allianz income fund.

We define this phenomenon – i.e., the tendency to invest in the stocks that are more heavily represented in the menu – "menu exposure". It posits that a bigger representation in the menu conveys the idea that the particular category is better, regardless of its intrinsic merit. While similar to partition dependence and to the 1/n

heuristic, menu exposure cannot be explained in terms of standard rational portfolio choice or behavioral heuristics. We propose two alternative explanations of this phenomenon. The first is based on a behavioral form of "representativeness bias", the second relies on a rational "information-induced motivation".

We use information on the fund-picking ability of the investors and their degree of portfolio concentration to distinguish these two hypotheses. Investors who base their choice on the way funds are represented in the menu consistently choose less performing funds and display a lower degree of portfolio concentration. This suggests a positive correlation between the sensitivity of the investor to the menu and their degree of informativeness. That is, less informed investors are more subject to the menu exposure. The reason is that less informed investors use the representation in the menu as a (cheap) source of information to infer the quality of the available choices.

Our findings contribute to two main literatures. The first is the literature on "style investing" and the second is the literature on the "home bias puzzle". We start with the literature on style investing. Mullanaithan (2002) argues that investors have a tendency to think through categories. Barberis and Shleifer (2003) and Barberis, Shleifer and Wurgler (2005) show that investors classify risky assets into different styles. This implies that: "news about one style can affect the prices of other apparently unrelated styles." Stocks returns are affected by the fact of belonging to a particular style (Teo and Woo, 2003).

However, one fundamental question that has been left unanswered is where these styles come from. One possibility is that style classifications are originated by investors who classify stocks according to some characteristics – e.g., book-to-market. Mutual fund families cater to investor demand by offering funds specialized in these categories. This implies that the sprawling of different funds in various categories may be explainable in terms of the desire of the fund families to cater to investor needs. An alternative possibility is that styles are generated by the fund families themselves in order to segment the market. In this case, it is the investors who "adjust" to the funds being offered. That is, the mere fact that funds are established changes the representation of the different styles in the menu from which investors choose and this affects investor demand. Demand is not catered to, but created. In other words, in the first case investors do not rebalance their portfolios as the category representation changes, but funds are offered to cater to investor demand. In the second case, investor preferences are dependent on the way categories are

represented in the menu *and fund families create investor demand by* offering new products and changing the representation of the categories in the supply.

Our findings show that a change in the representation in the menu changes investor demand. This supports the interpretation that style-based demand is created and not just catered to. The positive and normative implications are striking. If demand is induced by the offering of new funds, supply creates its own demand. That is, styles in which more funds are offered will command higher demand, independently of the specific characteristics of the stocks and this will affect the equilibrium conditions of the stocks in those categories. For example, if product market competition between mutual fund families induces these to offer more growth funds as opposed to value funds, this will tilt the demand for growth assets in the market, reduce their price and increase their required rate of return, effectively shaping the value premium.

Let us now consider the implications for the home bias puzzle, i.e., the stylized fact that investors tend to allocate most of their portfolios to domestic assets (Baxter and Jermann, 1997). Most of the previous attempts to explain it are based either on some form of limited information, cost of transaction, search cost and limited awareness story (Cooper and Kaplanis, 1994, Kang and Stultz, 1997, Lewis, 1999, Dahlquist and Robertsson, 2001, Strong and Xu, 2003). For example, the so called "investor recognition hypothesis" suggests that investors have a limited knowledge of the menu of available assets. Home bias can be explained in terms of availability of information only on domestic assets (Merton, 1987 and Shapiro, 2002). Alternatively, limited capacity in processing information induces investors to focus on the few assets on which they have a lower information cost: the domestic ones (Sims, 2000, Peng and Ziong, 2002, Van Nieuwerburgh and Veldkamp, 2004).

Our contribution is to show that, *even in the presence of complete awareness and full information about the menu of all its components, no transaction cost, no search or switching costs,* still the home bias persists. We argue that this happens because *the bias is embedded in the menu*. As the menu representation of domestic and international categories changes, so does investor demand, regardless of any other investor-specific or macro-economic effects. The mere fact that local investment companies offer more investment packages containing domestic stocks induces the investors to over-represent domestic stocks in their portfolios. This would also be consistent with the fact that the reduction in the home bias experienced in most countries during the last two decades has occurred in concomitance with the burgeoning of the offer of international funds.

We also relate to the literature on familiarity (Huberman, 2001, Huberman and Sengmuller, 2002) and proximity bias (Coval and Moskowitz, 1999, 2001, Grinblatt and Keloharju, 2001). However, in our case, proximity is defined not so much in terms of geographical distance, as in terms of the menu representation.

Finally, our results also contribute to the burgeoning literature on how investors choose investment in their retirement saving accounts (Agnew, 2002, Agnew, Balduzzi and Sunden, 2003, Choi, Laibson, Madrian and Metrick, 2001 and 2004, Huberman and Sengmueller, 2004).

Some features make our contribution unique. First, in our set-up, the offering of the funds and their representation in the menu is *exogenous*, being a function of the cost structure of the funds and not related to investor demand. That is, we have an experiment in which we can estimate investor demand in the presence of an exogenous shift in supply.

Second, we know the menu each investor can choose from and the set of standardized information on the funds in the menu that is available to each investor. In most of the previous studies of portfolio choice based on field data the menu available to the investors is not known in its entirety, while data on the information available to the investors on the different choices is severely restricted. For example, investors can actually choose from very different menus. At one extreme, they may be able to invest in all the assets available in the world. At the other extreme, they may be limited to invest in domestic stocks. Limitations may be induced by investment constraints as well as some unwritten rules not easily detectable by the econometrician.

Moreover, even the investor's full awareness of all the options available is doubtful. Indeed, it is not clear whether the investors have information on all the options and how complete such information is. In our case, instead, each investor is provided with a menu of choices in an easily accessible and standardized form. This, by itself, helps to properly control for alternative explanations based on limited awareness of the investors.

The third main feature is the related to the fee structure. In general, information on the effective overall costs faced by the investors is not available. For example, most of the studies on mutual fund demand use the information on the fees that is contained in the prospectus as a proxy for the price charged. However, this does not control for the documented practice of fee-waiving (Christofersen, 2002). Moreover, load fees are not homogenous across investors as their size depends on the

investment horizon of the investors. The standard practice of assuming a 7-year investment horizon hides a big heterogeneity across investors. In our case, not only do we know the overall *effective* fees charged by each fund, but also funds do not differ in terms of fees. That is, transaction, search and switching costs are trivial.

The remainder of the paper is structured as follows. In the next section, we describe the experiment. We provide institutional details and lay out the hypotheses. In Section 3 we describe the data. In Section 4, we provide evidence on the impact of menu exposure on fund picking and study its dynamic implications. In Sections 5 and 6, we test whether there is a relation between sensitivity to menu exposure and investor trading, investment skills and degree of portfolio concentration respectively. A brief conclusion follows.

2. The experiment

2.1. Institutional details

The experiment is based on the new Swedish pension system. The looming demographic crisis has shown the necessity of renewing the Swedish pay-as-you-go pension system. Starting 2000, part of such a pension system is replaced by a partially self-financing system. This newer system is designed in particular for individuals born after 1954, and not yet retired.

The pension system consists of three parts. The first and largest part is the income pension, which is based on 16 percent of the annual pension-based income and is used to finance those who are retired today. The amount paid in also serves as a base in calculating future pension payments. The second part, the premium pension (PPM), is based on 2.5 percent of the annual pension-based income. In the first round in 2000, 2 - 2.5 percent of the previous four years of income was invested. This amount is allocated at each individual's discretion.

Each individual was presented with an investment universe of 464 funds and invited to choose between 1 and 5 funds. These funds are presented to each investor in a prospectus ("the menu") mailed to each individual investor. Fees are capped. Load and switch fees are prohibited and management fees are generally much lower than for the same funds offered outside PPM. Figure 1 reports the information provided for each fund. Apart from the funds identification number, name and fund family, information is provided on fee, past return and risk. Risk is represented by two measures. One is a simplified graph displaying a jagged red line for very risky or a flat green line for very low risk. There are five risk categories of this kind. Beside

the simplified graph there is a number, which is the funds annualized standard deviation using the past 36 monthly returns.

If, for whatever reason, no choice is made, the allotted money is invested in the default alternative, the Seventh Swedish Pension Fund, which is an equity fund run by the government. The accrued amount from the premium pension part will be paid out on a monthly basis to the individual at the time of retirement. The third part of the system is a guaranteed pension level designed to ensure that no retiree will be completely without pension payments at the time of her or his retirement, regardless of her or his previous income.

In total, 18.5 percent of the annual pension based income for each individual is invested to finance this system, and all annual income from the age of 16 is included. However, an individual earning more than 7.5 income base amounts[2] per year will only be accredited an upper limit of 18.5 percent of 7.5 income base amounts, although he or she will still pay 18.5 percent of his or her pension-based income to finance the pension system. For example, for a person with 360,000 SEK[3] as her pension-based income in the year 2006, only 18.5% of 333,750 SEK (7.5 * 44,500) will count towards her pension. In other words, her defined contribution to PPM in 2006 is 8,344 SEK (0.025*333,750), which is the maximum contribution per individual for that year. In the first PPM choice, ones pension-based income from the past four years served as a base for the amount invested. During these four years 2 percent for 1997 and 1998 and 2.5 percent for 1999 and 2000 was paid into the system. In total, the maximum amount invested in 2000 was 26,202 SEK. The average amount invested was 12,651 SEK for the entire population and 13,506 SEK for those who made an active choice. The slightly higher average for active investors is consistent with Engström and Westerberg (2003) who show that active investors tend to have slightly higher income than the "default" investors.

The introduction of the PPM system was preceded by a massive and unprecedented advertising campaign enacted by both the government and the mutual fund industry (Cronqvist and Thaler, 2004, Cronqvist, 2006). While low on information content (level of fees, risks, etc), the ads helped to create a positive image of investing in financial markets. More than 86% of the investors were exposed to TV ads, 75% were exposed to some advertising in print media, 59% saw some kind of outdoor ad, and 36% listened radio ads (Cronqvist, 2006). Thus, virtually all the

[2] For the year 2006, one income base amount equals 44,500 SEK

[3] The typical exchange rate in 2000 was 10 SEK for 1 USD (8.5 SEK/Euro) and for 2006 around 7 SEK/USD (9.3 SEK/Euro)

population of the country was exposed to information about investing in financial markets.

2.2. The spirit of the test

We start with a simple example. Let suppose an investor can choose between two classes of assets: 4 bond funds and 6 equity funds. How will he compose his portfolio? Our working hypothesis is that the investor is affected by the representation in the menu of the different fund categories. He will select more equity funds and less bond funds. In the limit, if the number of equity funds is very high if compared to the other fund categories, the investor will select only equity funds. This suggests a first testable restriction.

H1. There is a positive correlation between investment and representation in the menu.

That is, the higher the representation of a category of funds in the menu, the more the investors will hold the funds that belong to such a category. This is similar to "partition dependence" and to the "1/n heuristic". Partition dependence posits that "if people are biased to allocate investment funds evenly over the options that have been identified, then the particular way in which the investment space is partitioned should influence the resulting distribution of funds" (Fox *et al.* 2004). The *1/n heuristic* posits that investors offered to choose from *n* assets, invest 1/n in each asset (Benartzi and Thaler, 2001, Huberman and Jiang, 2004). In our setting, the *1/n heuristic* would induce investors to put 1/10 in each fund and therefore to have 40% in bond funds and 60% in equity funds if the choice is based on funds. If, instead, investors just choose the category, the *1/n heuristic* would induce investors to put 50% in equity and 50% in bonds.

The intuition behind menu exposure is quite different. Investors do not invest in all the choices equally according to the menu representation, but use the menu representation of the categories to select the funds that belong to the *most represented categories*. In the *1/n heuristic*, the fund category – that is any grouping of the existing choice – does not play any role. In our case, category representation is all that matters. Investors see a higher representation of the equity funds and therefore invest more in equity funds. They do not think of allocating 1/n of their investment to each alternative. They prefer to *allocate most of their money to the "better" alternative* – i.e., the category with the highest representation. That is, they would allocate most of their assets to the equity funds and very little to the bind

funds. They would therefore have less than 40% in bond funds and more than 60% in equity funds if the choice is based on funds. If, instead, investors just choose the category, they would have more than 50% in equity funds.

A test that can distinguish our hypothesis from the *1/n heuristic* is based on the dynamic of the choice in the presence of a change in the menu. Let us continue with the previous example, and let us assume that 4 new equity funds have been added and the investor can now choose between 10 stock equity funds and 4 bond funds. The test would focus on whether a *change in category representation affects investor behavior in such a category.* That is, whether an increase in the number of funds belonging to a category stimulates investment in the *already existing* funds belonging to such a category. This suggests a second testable restriction.

H2. There is a positive correlation between an increase in representation of a category and an increase in investment in the already existing funds belonging to the same category.

Existing theories would have a hard time to explain such an increase. Let us start with the *1/n heuristic*. How would an investor react according to the *1/n heuristic*? He would reallocate his portfolio so as to invest 71% (i.e., 10/14) in equity funds and 29% (i.e., 4/14) in bond funds. However, he would also reduce his holdings of each of the existing equity funds he was already holding in order to be able to invest in as many as possible of the new equity funds. In the case of a constraint limiting the investors to hold no more than 5 funds, he would either hold the same portfolio as before or, if he could, he would invest in a new equity fund he was not investing before. However, he would not increase the investment *in the equity funds in which he was already investing*. Indeed, any further reallocation towards equity funds he was already holding would tilt his portfolio away from the desired 1/n allocation.

Let us now consider rational portfolio theory. If a new fund is added to the menu, the investor may rebalance his portfolio by investing in the new fund. In order to do this he would reduce his holdings of some other existing funds. However, only in very special cases – depending on the correlation of fund returns – would the investor increase his investment in funds in which he was already investing. This would not generate a systematic cross-sectional relation.

The "investor recognition hypothesis" (Merton 1987, Shapiro, 2003) suggests that the choice is affected only by the options of which the investor is actually aware. Given that in our case the entire menu is known, it is unlikely that this theory may

help explain the choice of the funds and the rebalancing after a change in the menu. Indeed, one of the nice features of our experiment is the fact that investors receive the same type of *standardized and easily accessible* information that makes them aware of all the funds in the menu. It may be argued that the ordering in the booklet may play a role. For example, funds reported last in the booklet containing the menu will be overlooked by a cursory reading. We will explicitly control for it in the tests.

These considerations suggest that neither the *1/n heuristic*, nor rational theories nor the investor recognition theory, nor theories based on limited awareness of the available choices would be consistent with an increase in the investment in *existing funds* as their category representation increases as a result of new funds belonging to the same category being added to the menu.

How can we rationalize this in finance? The only theory that can be consistent with it is the one that posits that investors think through categories (Mullainathan, 2002, Barberis and Shleifer, 2003) and the representation of a category plays a major role. A bigger representation in the menu conveys the idea that the particular category is better, regardless of its intrinsic merit. Representation in the menu plays the same role that "space in the shelf" has in marketing of consumer goods. Bigger space suggests better product. A bigger representation in the menu therefore conveys the idea that the category is better, regardless of its intrinsic merit.

Why do investors fall in the "trap" of basing their choice on the representation of a category in the menu? We entertain two alternative explanations. The first is based on a behavioral "representativeness bias". Investors tend to give more importance to and believe more in things that they see repeated more often. In this case, the number of funds in a category reiterates and stresses the importance of the category inducing investors who were already investing there, to increase their holdings. The second explanation relies on a rational "information-induced" motivation. Investors compensate their lack of private information by using as a signal the size of the category the fund belongs to. The bigger the category, the higher the perceived quality of the funds. This would be related to the recent theories explaining portfolio choice in terms of "limited information processing capability" (Sims, 2000, Peng and Ziong, 2002, Van Nieuwerburgh and Veldkamp, 2004). explains investor choice in terms of cost of processing publicly available information. This provides a further testable restriction, based on the correlation between menu exposure and investor informativeness.

H3. An information-induced story posits a negative correlation between menu exposure and investor informativeness, while a behavioral bias posits no correlation.

Before moving on to the tests, we describe the data and the main variables we use in our analysis.

3. The data

For each individual we have semiannual information on the value of his positions as well as the daily value of his transactions. The data on individual retirement accounts come from PPM. They contain all individual choices made from the introduction of the system till October of 2004. Individual data come in form of the percentage choice (made as a percentage of the portfolio) as well as the amount invested. Both the transaction date and clearing date are known. We also know the universe of funds that was available to investors at any point of time. Moreover, for each individual, we have a set of other demographic variables, such as age, gender, place of residence (defined as church parish) and total amount invested in PPM system (highly correlated with income).

Some preliminary descriptive statistics are provided in Table 1. We can see that conditional on making active choice, an individual investor holds on average 3.47 funds. Male hold less funds than females (although, the difference is statistically significant, economic magnitude is only about 0.02) and younger investors (less than 40 years old) more than the older ones (respectively 3.27 and 3.71). It is also interesting to note that, while portfolios of older investors are less exposed to equity and less risky, the difference in exposure is small and not economically significant. Older investors hold 80% of their portfolios in equity. This figure rises to 86% for young investors. If we consider the transactions, we see that on average investors rebalance their portfolios 1.64 times over the time period of our sample (with the median of 1, a 99^{th} percentile of 8 and a maximum of 155). This frequency increases in the case of males (the females rebalance 1.59 every year while the males 1.70 times a year) and does not depend on the age of the investors in any economically significant way.

In Panel B, we report information on the representation in the menu of the different categories and sub-categories in the initial menu. We can immediately see that the funds related to Sweden and Nordic region are grossly overweighed in the menu with respect to what their weight in market portfolio would be, while the other funds are underweighted. In fact, the weights in the menu also deviate quite

significantly from the weights in the universe of mutual funds offered for sale in Sweden (as reported by Morningstar-Sweden). For example, the weight of North America and US in World market portfolio exceeds 50%, while in the universe of the funds offered for sale in Sweden it is only 12.5%, and in PPM menu this weight drops to just 8.4%. On the other hand, the weight of the Swedish Small Cap Funds in the World market portfolio is just 0.17%, in the universe of mutual funds offerings it is 1.9%, and in the PPM menu it rises to 2.3%.

4. Are investors affected by the representation in the menu?

4.1. A definition of menu tilt and the test layout

As the previous discussion indicates, the test will focus on the relation between the investment and the way the choices are laid-out in the menu. The starting point is therefore to quantify the "menu representation". For this purpose, we define the "menu tilt". This quantifies the degree by which the menu representation differs from the world market representation. The tilt captures whether an investor is offered a menu that has a different partition of choices than the one the investor would find in the market. In particular, we define menu tilt as the difference between the market representation of the mutual fund categories and their representation in the menu. For the *jth* category (e.g., growth funds), the menu tilt is:

$$M_j = f_{j,menu} - f_{j,mkt},$$

where $f_{j,menu}$ is the ratio of the number of funds being offered in the menu that belong to the *jth* category of the fund standardized by the overall number of funds being offered in the overall menu. For example, if 3 growth funds are offered and a total of 100 funds are offered in the menu, $f_{j,menu}$ is equal to 3% for the growth category. The term $f_{j,mkt}$ is the ratio of the number of funds belonging to that category in the market (e.g., Morningstar list of funds and categories) standardized by the overall number of funds available in the market (e.g., Morningstar list of funds and categories). The difference between the two ratios (M_{jt}) represents how much the *jth* category is over(under)-represented in the menu with respect to the standard market offering. It is important to notice that we are exclusively focusing on the *number* of funds as opposed to the assets the funds manage. This purges our analysis of potentially endogenous price effects.

As additional robustness checks, we also used an alternative definition of $f_{j,mkt}$ based on the weight of the category in the world market portfolio[4], we denoted this version of the menu tilt variable as M^*_{jt}. We also tried the version normalized on the weight $f_{j,mkt}$ and denote it as $M1j = f_{j,menu} / f_{j,mkt} - 1$

M_j is reasonably exogenous. Indeed, the severe limits imposed on the fund providers on their ability to charge fees make the offer of the funds induced by the cost structure of the provider. For example, it is the case that there are proportionally fewer South East Asian funds in the menu and proportionally more Swedish domestic funds. The reason is cost constraints. While managing a fund invested in South East Asian stocks is more expensive that a fund invested in domestic stocks, fund providers are prevented from passing on to the investors these additional costs. This makes it less lucrative to offer more "expensive" South East Asian funds and more advantageous to propose "cheaper" domestic Swedish funds. The net effect is the creation of an artificial distortion, *not related to the investor demand*, but exogenously induced that sets $M_j \neq 0$. [5]

Is it possible that in increasing the supply of funds the fund management companies were just catering to recent investor demand? To address this issue, we test whether M_j is related to recent fund flows. We collect quarterly data on the flows from Swedish investors to mutual funds (including the ones located abroad) from Money Mate. We then regress M_j on the funds flows. The results show that there is scarcely any correlation between two variables, suggesting that the offering of the new funds was not related to investor demand. As additional robustness check, we will also include these flows among the control variables in the main regressions.

We then define the portfolio choice of the investor. In particular, we define I_{if} (I^*_{if}) the fraction of the retirement money that the *ith* investor allocates to the *fth* fund in excess of its weight in the Morningstar menu (world market portfolio). That is, $I_{if} = f_{if} - f_{f,mkt}$. As a robustness check, we also construct a measure based on the normalized difference: $I_{1if} = f_{if} / f_{f,mkt} - 1$. Also in this case, we consider the difference with respect to both the Morningstar menu (I_{1if}) and the world market portfolio (I^*_{1if}).

[4] We used both definitions based on total market capitalization and free float. The results do not differ, and we report only ones based on market capitalization.

[5] Another reason for exogenous shock to the menu was the reluctance of international fund families to participate in yet unproven system. Many choose to sit on the sideline during the initial introduction of the system.

We will test whether I_{if} correlates with M_j, where j represents the category in which the *jth* fund belongs to. That is, we will study whether the decision of the *ith* investor to invest in the *fth* fund is related to the representation in the menu of the *jth* category to which the *fth* fund belongs. Our hypothesis posits that correlation is positive.

What is the intuition? If the investors choose their portfolio the same way as they allocate they investment in ordinary mutual funds, we expect no correlation . That is, investors would choose according to their preferences and should not be affected by the menu representation. There is no reason why their choice should be systematically related to a different way of representing the funds in the menu that is just induced by the cost-characteristics of the fund providers. This is particularly true given the fact that the difference in not related to demand, but just to the cost structure of the fund families. If however the investors are influenced by the representation in the menu and they replicate in their portfolios the tilt towards some funds contained in the menu, we expect that correlation between I_{ifj} and M_j is positive. We will consider both a static and a dynamic version of the test. We start with the static.

4.2. Fund choice and menu tilt

We start with the first hypothesis, testing whether there is a relation between fund choice and representation in the menu. That is, we study how investors choose their allocation. In what follows, to avoid burdensome notation, we will omit the time subscript, except for the cases in which it is strictly necessary. We regress the investor choice on the menu tilt and a set of fund and investor control variables:

$$I_{if} = \alpha + \beta M_j + \gamma controls_{ifj} + \varepsilon_{ifj} \qquad 1)$$

where, for the *ith* investor, I_{if} is the fraction of the retirement money invested in the *fth* fund belonging to the *jth* category in excess of its weight in the world market portfolio. The control variables are both fund and investor specific. The investor characteristics are the investor's age and gender, the overall amount he has invested in his PPM retirement account (increasing function of his income), number of choices he made in PPM system and the municipality he resides in. This latter variable accounts for potential social effects in investment (Hong, Kubik and Stein, 2004). The fund characteristics are the risk category of the fund, the family affiliation (domesic fund management company or not), a dummy that takes the value 1 if the fund did not exist before and has been created only as an investment vehicle for

PPM and zero otherwise, level of fees, flows into the fund category in the last six month and the printed menu representation of the fund(the position of the fund in the printed booklet).

The results are reported in Table 2. We consider alternative specifications. In Panels A and B, we look at the basic equation (1), controlling for different kind of fixed effects. The results show that the tilt in the menu affects the way investors move their choice away from the Morningstar weights (Panels A and C) or market portfolio (Panels B and D). We consider both the difference with respect to the market (Panels A and B) and the normalized difference (Panels C and D).

We start by considering the (non-normalized) difference (Panels A and B). Our variable of interest is strongly statistically and economically significant. An increase in the over-representation with respect to the Morningstar weights (world market portfolio) in the menu of the category j to which the fth funds belongs of one standard deviation leads to an increase in the overinvestment with respect to the Morningstar weights (world market portfolio) in fund f by 29%. Over-investment is lower for high-income savers (a 1 standard deviation increase in the pension contributions leads to a 0.67% decrease in the deviation from the market portfolio), is stronger for males (by about 0.7%) and older people. Moreover, over-investment is more pronounced for new and more risky funds and is reduced by the level of fees. A one standard deviation increase in the level of fees leads to a 0.1% decrease in the deviation from the market portfolio.

It is interesting to note, that the order by which the funds are reported in the booklet section does play a role. Investors who choose funds reported in the middle of the section are chosen less frequently than the ones who pick funds from the beginning/end of the menu by about 1.5%. Alternative specifications (not reported) shows that the effect is even stronger for the beginning of the menu.

Adding a fund category fixed effects does not change our results. Also, for robustness, we re-estimate (1) removing different sub-categories of funds. Thus, we remove regional funds, leaving Sweden, Industry and Country Funds. We repeat procedure, removing Industry and leaving in Regional, Country and Swedish Funds, and so on. Our results are unchanged, suggesting that they are not driven by any particular category.

Duflo and Saez (2002) explore peer effects in retirement savings decisions, while Hong, Kubik and Stein, (2004) do the same for the case of investment in mutual funds. They find significant own-group peer effects on participation and

fund's choice, but no cross-group peer effects. Can our results be driven by local interaction between investors? To answer this question, we re-estimate (1) adding 290 municipality fixed effects. The results are reported in columns (3) and (4), and are practically the same as reported earlier.

As additional robustness check, we also re-estimate equation (1) removing one-by-one Swedish counties (26 in total). For example, we remove Stockholm County and re-estimate (1) for twenty five counties left. We repeat this procedure 25 times, removing each time one county out of the list. The (unreported) results are not affected by any particular locality. The results are robust to removing groups of explanatory variables (individual investor-based, fund-based or category based). Finally, we did bootstrapping with 1000 resamplings for the full-fledge specifications with both fund subcategory and municipality fixed effects. Our results holds for bootstrapped estimations as well.

If we consider the case in which we use standardized difference (Panels C and D), the results confirm that the menu representation affects portfolio choice. The results are robust both statistically and economically. Increasing the tilt in the menu by one standard deviation leads to changes in the dependent variable of the order of 72% of its standard deviation. These findings suggest that the way funds are presented in the menu affects investor choice.

4.3. A change in the menu representation

We now move on to test the second hypothesis. We see whether there is a positive correlation between an increase in representation of a category and an increase in investment in the already existing funds belonging to the same category. We consider a dynamic specification that exploits the exogenous changes in the menu ensuing the addition of new funds.

Let us define ΔI_{if} as change in the fraction of the retirement money invested in the *fth* fund that belongs to the *jth* category and ΔM_j as change in the representation in the menu of the *jth* category to which fund belongs. Our hypothesis posits a positive correlation between ΔI_{if} and ΔM_j in the case the *jth* fund was already part of the menu before the change in representation. To test it, we estimate:

$$\Delta I_{if} = \alpha + \beta D * \Delta M_j + \gamma(1 - D) * \Delta M_j + \delta controls_{ifj} + \varepsilon_{ifj} \quad 2)$$

where D is a dummy taking the value 1 if the *fth* fund was already part of the menu before the change in the representation of the *jth* category to which it belongs to

(i.e., ΔM_j) took place and zero otherwise. For example, if a new fund – HSBC Growth - is added to the category of growth funds, D would be equal to 1 for the case in which the *fth* fund is a growth fund that was already part of the menu (e.g., ABN AMRO Growth) and zero otherwise (i.e., HSBC Growth). We used as control variables the same variables as in static regression (1), adding momentum (return of the fund in the previous 6 month). Univariate statistics show, that for old funds (D=1) the weight in increasing category is about 0.8% larger than for weight in decreasing categories (differences are significant at 0.05% level for both mean and median test), while for new funds there is no statistically significant differences between weights in increasing or decreasing category[6].

Our hypothesis posits that $\beta > 0$. The results are reported in Table 3. In Panel A, we report the basic specification, while in Panel B, we interact ΔM_{jt} with a *LargeCategory (SmallCategory)* dummy that equal to one if size of sub-category is above (below) the mean. In Panel A, we consider a specification with no interaction between D and ΔM_j (columns 1-3), and a specification with interaction (columns 4-6). We use different level of fixed effects (municipality, year). All the standard errors are clustered on municipality level.

The results show that a change in the way a category is represented in the menu affects portfolio choice and increases the deviation from the market portfolio. An increase in the in the number of funds of a category raises the investment in the funds already existing in the category. In particular, an increase in the category weight in the menu by 1% (1 standard deviation) induces the investors to increase their investment in this category 0.22% (0.18%). Moreover, the effect is driven mostly by existing funds. An increase in the category weight in the menu by 1% (one standard deviation) induces the investors to increase their investment in the already existing funds in this category by 0.80% (0.64%).

In the case of the interaction with the Large Category Dummy (Table 3, Panel B), we see that the effect is driven by old funds in large categories. The coefficients for small categories and for new funds that belongs to large categories are actually negative.

Among the control variables, past returns affect the choice of fund. A 1% increase in return by a fund in the previous six-month raises the investment in the fund by 11%. They also increase their investments into categories in which there were

[6] Actually, the weight of new funds in decreasing category is about 0.15% larger than the one in decreasing category.

recent flows. Participants consistently choose to invest in funds run by non-Swedish fund management companies. At least in part, this is due to the fact that the growth of number of funds in PPM system is mostly due to new foreign fund management companies joining the system.

Also, income positively affects changes in fund holdings. An increase equal to one standard deviation of the menu tilt change raises investments in given fund by 0.78%. It is interesting to note that controlling for income, age have a negative effect (for age below 50 years old). Moreover, investors seem to tilt their portfolios towards riskier and less expensive funds. As in static case, our results are robust to controlling for local effect (municipality fixed effect, see columns (2), (3), (5) and (6)), as well as removing group of funds or county.

Finally, it is worth noting that we include variable ("*Slweight1*") that accounts for the fraction of the portfolio invested prior to rebalancing in all funds that belong to the same category as *fth* fund with the exception of fund $\bar{f}$. The coefficient is negative. This suggests that, all else equal, having already invested in a category decreases the probability of investing in another fund of the same category.

5. Investor bias and trading

We now move look at the relationship between trading and menu exposure and we see whether investors more exposed to menu bias are trading more. We argue that in the case of a bias there should not be any correlation between trading and menu exposure. If menu exposure were associated with some behavioral bias such as overconfidence (e.g., Odean, 1998, Barber and Odean, 2000) we would expect a positive correlations. If, however, menu exposure associated with lack of information, then we would expect a negative relation between menu exposure and trading. Indeed, in the case the exposure were information-induced, we would expect the investors more exposed to it to be the less willing to trade for the standard asymmetric information reasons – i.e., fear of trading in the presence of more informed investors.

In PPM system, there is no limitation with respect of the number of transactions investor can place. Transactions can be placed electronically (via web site) or by filing paper form. In any case, the "transaction" is recorded as selection of new weights (in percents) for as many as five funds. Investor can choose to keep her

[7] We also looked at the full fraction of portfolio invested in the same category. The results do not change.

old allocation and change only one fund or to change all five funds. There are no transaction fee, front and end-load. Normally it takes between one and three days to process the transaction. It is important to note that there is no automatic rebalancing. Thus, if the allocation is creep out of "optimal", it is responsibility of investor to adjust it in due course[8].

For each investor we define trading as either number of trades (rebalancings) investor had within a given half-year, or as portfolio turnover. Then, for each investor, we regress these measures of trading on the exposure of the investor to categories that are over-represented in the menu ("menu exposure", E) and a set of control variables:

$$T_{it} = \alpha + \beta E_{it} + \gamma P_{it-1} + \delta controls_{it} + \varepsilon_{it} \qquad 3)$$

where for the *ith* individual, T_{it} is the aggregate measure of trading of the *ith* investor at time *t*. E_{it} is the *ith* investor's exposure to the menu tilt. It is the weighed average of the overrepresentation (tilt) in the menu of the categories of the funds the investor holds. It is constructed as: $E_{it} = \sum_{j=1}^{J} w_{jt} \left| M_{jt} \right|$. That is, for the *ith* investor, at time t, we calculate the weighed average of the absolute values of the overrepresentation in the menu of the categories in which the *ith* investor hold funds. The weights are given by the fraction of the portfolio invested in each category. For example, if the investor holds two funds: 30% in an growth fund and 70% in a balanced fund, E is given by $0.3*M_g+0.7*M_b$, where M_g and M_b are the degree of overrepresentation of, respectively, the growth and balanced category, defined as before. The absolute value allows us to control for any deviation from the market portfolio. Indeed, categories may be overrepresented (positive deviation) as well as underrepresented (negative deviation). Any deviation may trigger investor's portfolio tilt. The absolute value captures both types of deviations. We consider two measures of menu exposure, one that is based on deviations from world market portfolio weights and another one based on deviations from Morningstar category weights. The control variables includes lagged dependent variable, demographic characteristics (age, age-squared, gender) and amount invested in PPM system.

The results are reported in Table 4. We report the results for alternative specifications. In Panel A, we report the results for tilt measure based on world market portfolio, while in Panel B, we report the results based on Morningstar

[8] Paper statement of the account is mailed to all participants in PPM system once a year (January-February).

category weights. First column reports the results for the first stage of Heckman estimator (the decision to trade). It is interesting that even on that stage, people who are more exposed to menu bias choose to trade less. The findings of the second stage show that there is a strong and significant negative correlation between trading and menu exposure. The more the investors are invested in categories that are over-represented in the menu, the less they trade. In particular, an increase in the exposure to the overrepresented categories by one standard deviation reduces trading by 0.10 trades (reduced turnover by 7.7%). This represents 9.5% (6.8%) of the measure of investor's unconditional trading (turnover).

This is consistent with the intuition that less informed investors are less willing to trade. This would, however, also be consistent with a positive relationship between menu exposure and higher risk aversion. That is, it may be the case that investors that are less risk averse – more conservative, more willing to herd with the pack and therefore more exposed to menu bias – are also those that are more exposed to the menu representation. To distinguish these two interpretations, we focus on the performance of the portfolio.

6. Investor bias or lack of information?

As we mentioned before, the less informed an investor is, the less he will be able to choose over performing funds. In the case of a bias there should not be any (and definitely not a negative) correlation between the ability to select funds and the menu exposure. Indeed, the bias is likely to affect all the investors in a similar way. If the sensitivity of the investment to the menu is just a behavioral heuristic, the ability of the investors to select over-performing funds should not be systematically related to the way their investment is affected by the representation in the menu.

If, instead, more uninformed investors use the representation in the menu as a cheap source of information, there should be a *negative* correlation between the ability of the investors to select over-performing funds and their sensitivity to the menu composition. Indeed, in the case the exposure were information-induced, we would expect the investors more exposed to it to be the less informed investors – i.e., the investors less capable to select over performing funds.

We therefore now move on to the test the third restriction and see whether the fact that investors base their portfolio choice on the representation of a category in the menu is due to a behavioral bias or to an informational need. We consider two

proxies of investor informativeness: their fund-picking skills and the degree of concentration of their portfolio.

6.1 Menu exposure and fund-picking skill

We start with the fund-picking skill, using it as a proxy for information. We consider as a measure of ability the skill to pick over-performing funds – i.e., funds that whose return is higher than that of the other funds *within the same category*. Notice that we are not studying the ability to select funds that provide higher gross returns, as this would depend upon the type of category that is preferred. That is, our analysis does not focus on whether the portfolio of the investor beats the market, as the ability of beating the market is related to the categories investors choose and this choice may be related to his long-term objectives. For example, a young investor may prefer equity funds as he still has many years before retirement. If the equity market were over performing we would erroneously attribute to skill a simple long-term portfolio allocation.

For each fund we calculate the difference between its return and the average return of all the other funds belonging to the same category. This represents the performance of the fund. Then, for each investor, we calculate the weighed average of the performance of all the funds he holds and regress this measure of portfolio performance on the exposure of the investor to categories that are over-represented in the menu ("menu exposure", E) and a set of control variables:

$$P_{it} = \alpha + \beta E_{it} + \gamma P_{it-1} + \delta controls_{it} + \varepsilon_{it} \qquad 4)$$

where for the *ith* individual, P_{it} is the performance of the portfolio of funds of the *ith* investor at time *t.* We consider four alternative measures of performance: the value weighed (according to the investment in each fund) difference between fund return and the average return of all the other funds belonging to the same category, the value weighed (according to the investment in each fund) difference between fund return and the average return of all the other funds belonging to the same category standardized by the volatility of funds, the equally weighed difference between fund return and the average return of all the other funds of the same category and the equally weighed difference between fund return and the average return of all the other funds belonging to the same category standardized by the volatility of funds. We also consider 6 and 12 month performance measures. E_{it} as well as the control variables are defined as in the previous specifications.

The results are reported in Table 5. We report the results for alternative specifications. In Panel A, we consider as a performance measure the difference between performance of chosen mutual fund and the average performance of the funds in the same category. Alternatively, in Panel B, we normalize the performance measure by the standard deviation of the funds in the same category.

The findings support our intuition. The more the investors are invested in categories that are over-represented in the menu, the more they tend to choose worse-performing funds. An increase in the exposure to the overrepresented categories by one standard deviation reduces by 0.54% per annum the performance of the funds the investor has selected. This is between 32 and 37% of the dependent variable' unconditional mean and between 4.5 and 5.5% of its standard deviation. While it seems to be economically small, in the context of the pension system it can result in about 16% changes in expected pension income[9].

It is interesting to note that high-income investors do not perform better. If we focus on Panel A, we see that the coefficient on income is not significant, while if we focus on standardized performance (Panel B) it is negative and significant, but not economically relevant. In terms of age, young are better pickers of funds. These results are robust across specifications as well as definitions of our exposure variables (equally or value-weighted, raw or standardized measures of performance). The results for gender shows that, while performance is roughly the same for males and females, standardized performance is higher for males (i.e., they are mostly choosing funds from categories with high performance dispersion).

In the previous section, we related menu exposure to trading and we showed that there is a negative correlation. May it be that part of the lower performance is not only due to the choice of worse-performing funds, but also to the fact that investors exposed to menu bias trade less. To address this issue, in Panel C, we interact our measures exposure with dummies that proxy for whether the investor is trading a lot.

While we lack good instruments to deal with endogeneity of the turnover measures, we still can try to separate the effects of willingness to trade from the menu exposure. In particular, in columns (1), (2), (5) and (6) we controlled for turnover using residuals of regression of turnover on corresponding menu bias measure. The resulting variable (*res_ turnover*) is purged from direct effect of menu bias on turnover. In columns (3), (4), (7) and (8) we interact menu bias with

[9] We assume 45 years horizon and real risk premia of 4% per annum.

dummies for high and low turnover (dummy for high turnover takes the value 1 if for given investor turnover is higher that the mean and zero otherwise)[10].

The results show that the negative relationship is robust to control for turnover measures. Surprisingly, high turnover is associated with better performance. However, performance of investors that are exposed to menu bias and trade a lot suffers. The results are robust across specifications and suggest that the negative performance is mostly due to the scarce ability to pick well-performing funds.

6.2 Menu exposure and portfolio concentration

Alternatively, we consider the degree of concentration of the investor portfolio. The literature has shown that there is a positive correlation between portfolio concentration and performance and has argued that this implies that more informed investors do hold a more concentrated portfolio (Kacperczyk *et al.*, 2004). We would therefore expect that, if the more informed investors are less subject to menu exposure, there should be a negative relation between menu exposure and the degree of portfolio concentration. Moreover, menu exposure, by inducing investors to spread their investment more evenly as a function of the menu representation, should reduce the degree of portfolio concentration.

We therefore regress the degree of portfolio concentration of the investor (H) on his menu exposure and a set of control variables:

$$H_{it} = \alpha + \beta E_{it} + \gamma controls_{it} + \varepsilon_{it} \qquad 5)$$

where for the *ith* individual, H_{it} is degree of portfolio concentration of the *ith* investor at time *t.* This is the Herfindhal index of concentration of the portfolio, where each fund is represented on the basis of its weight in the portfolio. The menu exposure (E_{it}) as well as the control variables are defined as before.

The results are reported in Table 6. They show that an increase in menu exposure is related to lower portfolio concentration. In particular, an increase in menu exposure equivalent to one standard deviation leads to a reduction of concentration in the portfolio of the investor by 18% of unconditional mean. This explains about 35% of its standard deviation. That is, the more the investors are invested in categories that are over-represented in the menu, the less concentrated their portfolios are. This confirms the previous findings and suggests a negative

[10] The results for number of trades are qualitatively similar. We omit them for the sake of brevity.

correlation between investor informativeness and their choosing funds as a function of their representation in the menu.

All these findings taken together suggest that investors tend to invest more in the funds that are more represented. The investors who are more subject to this behavior are the ones who also select the worse funds and have a less concentrated portfolio. This suggests that the bias is a way of coping with limited information. Given that individuals are fully aware of all the choices available in the menu the lower information does not arise from limited awareness of the options, but it is most likely related to the availability of private information.

This would explain phenomena such as the home bias puzzle in terms of the exposure to the menu investors choose from. This exposure is fully rational and explainable in terms of investors trying to cope with limited information. It is therefore arguable that better information would reduce the role of such exposure. The information disadvantage also affects the degree of portfolio concentration, reducing it.

Conclusion

We study how the choice to invest in a class of assets is affected by the alternatives available in the class. We use the information on the choice of mutual funds that are available to the Swedes to invest their retirement accounts. We show that investors choose the category to invest (e.g., growth funds) according to number of funds of available in the category. More numerous categories attract more investment, regardless of their weight in the optimal or world market portfolio. More importantly, we show that an exogenous increase in the number of funds of a specific category induces investors to rebalance their portfolios so as to increase their investment in the already existing funds belonging to the category whose fund number has increased.

We define this phenomenon as "menu exposure". We argue that it cannot be explained in terms of standard portfolio choice, but requires that investors consider the representation in the menu as a sign of the quality of the fund category. By using information on the performance of the funds that investors choose and on their degree of portfolio concentration, we show that there is a consistent positive correlation between the investor's sensitivity to the menu exposure and his lack of information. This suggests that the menu exposure represents a rational way of coping with limited (private) information that decreases as information improves.

Our findings shed light on both the home bias puzzle and the determinants of style investing. Moreover, they have normative implications in terms of the US debate on the reform of Social Security. They suggest that the impact on the stock market of the reform will crucially depend on the type of menu offered to the investors as this will determine the choice of fund and therefore indirectly the types of stocks (e.g., growth, value, big, small) that will be more affected by the reform.

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Table 1: Descriptive Statistics

This table reports the descriptive statistics of the variables used (Panel A) and the description of the funds' categories (Panel B). Static measures are defined on a subset of the individuals making the first PPM choice. We use two measures of excessive weight of the category in the individual portfolio and in the menu. I_{ijt} (I^*_{ijt}) is defined as difference between fund j in the PPM portfolio of investor *i* and weight of category of the fund in Morningstar menu (world market portfolio), $I_{ijt} = f_{ijt} - f_{j,mkt,t}$. Similarly, I_{1ijt} (I^*_{1ijt}) is defined as normalized difference between fund j in the PPM portfolio of investor *i* and weight of category in Morningstar menu (world market portfolio), $I_{1ijt} = f_{ijt} / f_{j,mkt,t} - 1$. M_{jt} (M^*_{jt}) is defined as difference between equity-category of fund *j* in the PPM menu and weight of category in Morningstar menu (world market portfolio), $M_{jt} = f_{j,menu,t} - f_{j,mkt,t}$. M_{1jt} is defined as $M_{1jt} = f_{j,menu,t} / f_{j,mkt,t} - 1$. We ignore generational funds and bond funds. *Dummy Gender* is defined as 1 if PPM investor is male and 0 otherwise. *Age* is investors' age in years. *Risk category* is a discrete variable between 1 and 5 that is assigned to each fund by PPM administration and given in choice booklet. *New fund dummy* is equal to one if the fund did not exists before PPM system starts (most of those funds were added exclusively for PPM system). *Fee* is funds' annual fee (in percents). *Flows* are defined as sum of all flows to funds that belongs to subcategory s over previous 6 month as a percentage of total money under management at t-1. *Log_amt* is log of amount invested (in SEK) plus 1 SEK. *Alphabet* is the order of fund within the menu category (normalized to be between 0 and 1). *Number of choices* in the number of funds investor choose within PPM system (no more than five). Dynamic variables are defined as semi-annual changes. We are looking at changes in individual portfolio and menu weights.

Panel A: Main Variables

Variable	*Mean*	*StdDev*	*Minimum*	*Maximum*
Excessive Weight in individual portfolio I_{ijt}	0.209	0.159	-0.126	0.999
Excessive Weight in individual portfolio I_{1ijt}	8.838	12.020	-0.999	882.500
Excessive Weight in individual portfolio I^*_{ijt}	0.002	0.351	-1.000	0.999
Excessive Weight in individual portfolio I^*_{1ijt}	9.463	29.923	-1.000	995.000
Gender (male=1)	0.516	0.500	0.000	1.000
Age	40.220	10.630	18.000	62.000
Risk Category	4.222	0.502	3.000	5.000
New fund dummy	0.515	0.500	0.000	1.000
Fee, in pct.	0.906	0.400	0.200	3.970
Flows	0.087	0.106	-0.647	0.444
Log_amt	4.081	0.291	2.224	4.720
Subgroup	0.523	0.346	0.053	1.000
Alphabet	0.513	0.269	0.028	1.000
Excessive Weight in menu M_{jt}	-0.204	0.308	-0.891	0.032
Excessive Weight in menu M_{1jt}	0.272	1.989	-0.972	10.319
Excessive Weight in menu M^*_{jt}	-0.196	0.322	-0.896	0.079
Excessive Weight in menu M^*_{1jt}	1.298	5.342	-0.929	60.688
Number of choices	3.473	1.409	1.000	5.000
Number of times choices were changed	1.645	1.866	1.000	155.000
Changes in Weights, Δf_{ijt}	0.030	0.277	-1.000	1.000
Changes in Category menu weight, ΔM_{jt}	0.001	0.008	-0.016	0.028

Panel B: Description of Mutual Funds

Category 1	Category 2	Category 3	Number of funds	Mean domestic share	Mean percentage fee
Equity	Sweden	Sweden (normal)	28	1	0.92
		Sweden Small Cap	6	1	1.16
		Sweden Index	7	1	0.41
	Regional	Swedish Equity and Foreign Equity	11	0.5455	0.74
		Nordic	12	0.5	1.27
		Europe	36	0	1.11
		Euroland	8	0	0.99
		Europe Small Cap	9	0	1.23
		Europe Index	7	0	0.48
		North America and USA	26	0	1.05
		Asia and Far East	18	0	1.19
		Global	32	0	1.01
		New Markets	21	0	1.56
	Countries	Japan	20	0	1.06
		UK	6	0	1.21
		Other countries	19	0	1.25
	Industry	IT & Telecommunications	19	0	1.15
		Pharmaceutical	7	0	1.36
		Other Industries	16	0.125	1.17
Balanced Funds	Balanced	Swedish Equity and Fixed Income	3	1	1.08
		Swedish Equity, Swedish and Foreign Fixed Income	28	0.6577	0.74
		Swedish and Foreign Equity	22	0	0.93
Generation Funds	Generation	Pension in less than 10 years	5	0.2	0.46
		Pension in less than 20 years	6	0	0.46
		Pension in more than 20 years	21	0.0714	0.46
Fixed Income	Fixed Income	Sweden, short maturity	15	1	0.46
		Sweden, long maturity	15	1	0.45
		Europe and Euroland	18	0	0.70
		Others	15	0.033	0.79

Table 2: Static regression

In this table we report the results of regression of the fraction of the retirement money invested in the j[th] fund at time t in excess of its weight in world market portfolio on set of individual, fund-specific and menu-specific characteristics. Panels A-D reports the results for I_{ij}, I^*_{ij}, I_{1ij}, I^*_{1ij}, correspondingly. Variables are defined in Table 1. All the estimates are done using a White heteroscedastisity-consistent estimator clustered over municipalities. 7734509 observations were used. T-statistics is reported in parentheses. In columns 3, 4, 7, and 8 we use 4 fund category fixed effects, and in columns 3 290 municipality fixed effects. Coefficients for Age and Age**2 in Panels A and B are multiplied by 10000. For specifications (7) and (8), we also report the level of significance obtained via bootstrapped estimates with 1000 replications. Significance on 10%, 5%, 1% and 0.1% is denoted as *, **, *** and ****, correspondingly.

Panel A: Regression for I_{ij}

	(1)		(2)		(3)		(4)		(5)		(6)		(7)		(8)	
Variable	Estimate	t-stat	Estimate	t-stat	Estimate	t-stat	Estimate	t-stat	Estimate	t-stat	Estimate	t-stat	Estimate	t-stat	Estimate	t-stat
M_{1jt}	0.9538	(146.46)			1.1642	(62.62)			0.9589	(160.25)			1.1646	(62.59) ****		
M^*_{1jt}			0.0096	(4.74)			0.0087	(7.84)			0.0096	(4.70)			0.0086	(7.84) ****
Gender	0.0079	(57.56)	0.0070	(46.29)	0.0085	(54.63)	0.0069	(46.56)	0.0081	(63.67)	0.0071	(49.82)	0.0085	(54.35) ****	0.0069	(46.43) ****
Age	-2.3390	(-4.26)	0.3440	(0.62)	-3.3330	(-6.07)	0.2990	(0.54)	-2.0940	(-3.89)	0.3830	(0.69)	-3.3080	(-6.02) ****	0.2980	(0.54)
Age**2	0.0376	(5.42)	0.0132	(1.87)	0.0528	(7.59)	0.0143	(2.04)	0.0358	(5.23)	0.0135	(1.92)	0.0525	(7.54) ****	0.0143	(2.04)
Risk category	0.0003	(0.49)	0.0099	(7.15)	-0.0010	(-1.55)	0.0110	(9.96)	0.0003	(0.47)	0.0099	(7.21)	-0.0010	(-1.56)	0.0110	(9.96) ****
New fund dummy	0.0133	(27.09)	0.0044	(14.56)	0.0126	(28.00)	0.0046	(14.57)	0.0134	(28.06)	0.0044	(14.36)	0.0126	(27.99) ****	0.0046	(14.57) ****
Fee	-0.0231	(-12.11)	-0.0300	(-12.46)	-0.0279	(-14.37)	-0.0296	(-11.80)	-0.0237	(-12.82)	-0.0305	(-12.89)	-0.0279	(-14.38) ****	-0.0296	(-11.80) ****
Log_amt	-0.0230	(-29.31)	-0.0233	(-30.13)	-0.0229	(-27.76)	-0.0231	(-29.64)	-0.0230	(-28.38)	-0.0232	(-29.54)	-0.0229	(-27.67) ****	-0.0231	(-29.60) ****
Number of choices	-0.1016	(-263.60)	-0.1037	(-283.61)	-0.1016	(-232.09)	-0.1038	(-279.00)	-0.1017	(-251.03)	-0.1038	(-273.48)	-0.1016	(-232.22) ****	-0.1038	(-279.12) ****
Alphabet*(1-Alphabet)	-0.0750	(-27.85)	-0.0776	(-19.67)	-0.0689	(-23.80)	-0.0681	(-18.85)	-0.0728	(-27.07)	-0.0761	(-18.58)	-0.0688	(-23.78) ****	-0.0680	(-18.85) ****
Domestic Fund Management	-0.0031	(-6.82)	-0.0082	(-12.31)	-0.0074	(-11.20)	-0.0056	(-8.83)	-0.0022	(-5.26)	-0.0076	(-11.88)	-0.0073	(-11.19) ****	-0.0056	(-8.81) ****
Flows	-0.1950	(-88.99)	-0.2223	(-82.28)	-0.2298	(-61.79)	-0.2385	(-58.44)	-0.1946	(-91.79)	-0.2220	(-84.04)	-0.2298	(-61.81) ****	-0.2385	(-58.48) ****
Fund subcategory fixed effects	N		N		Y		Y		N		N		Y		Y	
Municipality fixed effects	N		N		N		N		Y		Y		Y		Y	
Adj. R^2	0.533		0.513		0.536		0.513		0.533		0.513		0.536		0.513	

Panel B: Regression for I^*_{ij}

	(1)		(2)		(3)		(4)		(5)		(6)		(7)		(8)	
Variable	Estimate	t-stat	Estimate	t-stat	Estimate	t-stat	Estimate	t-stat	Estimate	t-stat	Estimate	t-stat	Estimate	t-stat	Estimate	t-stat
M_{1jt}	3.8055	(162.10)			0.6816	(58.35)			3.8149	(161.30)			0.6812	(58.50) ****		
M^*_{1jt}			0.9787	(582.54)			1.0026	(891.20)			0.9788	(571.91)			1.0026	(892.22)****
Gender	0.0155	(80.64)	0.0080	(57.95)	0.0100	(48.87)	0.0082	(59.50)	0.0158	(78.54)	0.0082	(63.48)	0.0100	(48.76) ****	0.0082	(59.21) ****
Age	-35.3780	(-33.17)	-2.9500	(-5.42)	-14.8090	(-16.14)	-2.8070	(-5.21)	-34.5790	(-31.14)	-2.6880	(-5.02)	-14.8600	(-16.19) ****	-2.7850	(-5.16) ****
Age**2	0.4410	(33.12)	0.0454	(6.57)	0.1660	(14.25)	0.0472	(6.89)	0.4320	(31.03)	0.0434	(6.38)	0.1670	(14.31) ****	0.0469	(6.84) ****
Risk category	0.2648	(167.67)	0.0064	(6.16)	0.2360	(200.53)	0.0004	(0.45)	0.2649	(168.06)	0.0064	(6.27)	0.2360	(200.51) ****	0.0004	(0.45)
New fund dummy	-0.0296	(-15.97)	0.0120	(37.18)	-0.0281	(-23.19)	0.0116	(35.35)	-0.0293	(-15.97)	0.0121	(38.15)	-0.0281	(-23.19) ****	0.0116	(35.35) ****
Fee	-0.0640	(-14.20)	-0.0242	(-12.47)	-0.0295	(-8.25)	-0.0281	(-13.75)	-0.0653	(-14.40)	-0.0249	(-13.21)	-0.0295	(-8.27) ****	-0.0281	(-13.75) ****
Log_amt	-0.0243	(-20.52)	-0.0230	(-28.96)	-0.0258	(-28.82)	-0.0229	(-27.92)	-0.0245	(-19.35)	-0.0231	(-28.07)	-0.0258	(-28.92) ****	-0.0230	(-27.85) ****
Number of choices	-0.0943	(-105.87)	-0.1015	(-264.47)	-0.0979	(-183.42)	-0.1019	(-251.53)	-0.0945	(-102.75)	-0.1017	(-250.66)	-0.0979	(-183.30) ****	-0.1019	(-251.65) ****
Alphabet*(1-Alphabet)	-0.3126	(-18.80)	-0.0802	(-28.74)	-0.4616	(-37.66)	-0.0682	(-24.64)	-0.3069	(-18.44)	-0.0780	(-27.05)	-0.4615	(-37.68) ****	-0.0681	(-24.63) ****
Domestic Fund Management	-0.0852	(-31.09)	-0.0051	(-9.45)	-0.0225	(-6.62)	-0.0071	(-11.13)	-0.0835	(-30.95)	-0.0042	(-7.92)	-0.0225	(-6.63) ****	-0.0071	(-11.12) ****
Flows	0.2027	(24.73)	-0.1874	(-86.78)	0.8286	(61.37)	-0.2325	(-57.18)	0.2033	(24.82)	-0.1872	(-89.81)	0.8288	(61.44) ****	-0.2325	(-57.22) ****
Fund subcategory fixed effects	N		N		Y		Y		N		N		Y		Y	
Municipality fixed effects	N		N		N		N		Y		Y		Y		Y	
Adj. R^2	0.374		0.896		.0565		0.897		0.375		0.897		0.565		0.897	

Panel C: Regression for I_{1ij}

	(1)		(2)		(3)		(4)		(5)		(6)		(7)		(8)	
Variable	Estimate	t-stat	Estimate	t-stat	Estimate	t-stat	Estimate	t-stat	Estimate	t-stat	Estimate	t-stat	Estimate	t-stat	Estimate	t-stat
M_{1jt}	4.2528	(247.29)			4.3625	(255.07)			4.2503	(248.55)			4.3624	(254.96)****		
M^*_{1jt}			0.1421	(20.07)			0.4580	(52.45)			0.1431	(20.65)			0.4579	(52.45) ****
Gender	0.2532	(29.91)	-0.0297	(-2.98)	0.3145	(30.25)	-0.0176	(-1.42)	0.2540	(30.26)	-0.0473	(-4.59)	0.3146	(30.23)****	-0.0183	(-1.49)
Age	-0.0359	(-7.39)	0.0325	(5.28)	-0.0508	(-11.43)	0.0113	(2.00)	-0.0391	(-8.53)	0.0201	(3.61)	-0.0510	(-11.49)****	0.0107	(1.88)
Age**2	0.0004	(7.24)	-0.0002	(-2.76)	0.0007	(12.33)	0.0001	(1.15)	0.0005	(8.30)	-0.0001	(-1.17)	0.0007	(12.39)****	0.0001	(1.26)
Risk category	1.0884	(25.22)	7.4637	(42.06)	0.7557	(11.09)	4.7952	(28.35)	1.0793	(25.51)	7.4280	(41.90)	0.7548	(11.10) ****	4.7937	(28.36) ****
New fund dummy	1.4051	(43.52)	-2.1097	(-22.81)	0.9480	(39.04)	-3.5840	(-28.29)	1.3999	(44.12)	-2.1272	(-23.35)	0.9481	(39.03) ****	-3.5842	(-28.28) ****
Fee	-0.7763	(-11.52)	-2.2074	(-23.14)	-1.9635	(-29.13)	-5.7338	(-33.01)	-0.7904	(-11.71)	-2.1602	(-21.62)	-1.9649	(-29.11) ****	-5.7325	(-33.00) ****
Log_amt	-1.0281	(-19.05)	-1.1977	(-23.36)	-1.0128	(-18.37)	-1.0927	(-25.12)	-1.0180	(-19.29)	-1.1544	(-26.90)	-1.0119	(-18.38) ****	-1.0892	(-25.29) ****
Number of choices	-3.9991	(-121.82)	-4.4443	(-87.54)	-4.0317	(-139.26)	-4.4752	(-92.61)	-3.9958	(-123.07)	-4.4186	(-84.40)	-4.0315	(-139.31) ****	-4.4743	(-92.65) ****
Alphabet*(1-Alphabet)	-4.3823	(-29.75)	-4.2919	(-12.51)	-5.5523	(-24.21)	-4.6300	(-2.28)	-4.3833	(-30.37)	-4.0325	(-13.04)	-5.5502	(-24.22) ****	-4.6238	(-2.27)**
Domestic Fund Management	1.0322	(32.42)	3.2622	(35.63)	-0.3755	(-10.25)	1.0395	(22.61)	1.0269	(33.45)	3.1494	(31.00)	-0.3750	(-10.26) ****	1.0371	(22.62) ****
Flows	-17.2327	(-147.62)	-0.7243	(-2.69)	-21.9505	(-82.04)	-9.1325	(-21.17)	-17.2007	(-147.89)	-0.6581	(-2.43)	-21.9487	(-82.01) ****	-9.1224	(-21.17) ****
Fund subcategory fixed effects	N		N		Y		Y		N		N		Y		Y	
Municipality fixed effects	N		N		N		N		Y		Y		Y		Y	
Adj. R^2	0.582		0.259		0.604		0.296		0.582		0.260		0.605		0.297	

Panel D: Regression for $I_1^*{}_{ijt}$

	(1)		(2)		(3)		(4)		(5)		(6)		(7)		(8)	
Variable	Estimate	t-stat	Estimate	t-stat	Estimate	t-stat	Estimate	t-stat	Estimate	t-stat	Estimate	t-stat	Estimate	t-stat	Estimate	t-stat
M_{1jt}	3.9689	(265.40)			3.6321	(200.34)			3.9684	(265.16)			3.6324	(200.28)****		
M^*_{1jt}			1.6876	(48.09)			0.8607	(37.22)			1.7091	(47.01)			0.8606	(37.29)****
Gender	0.8436	(47.42)	1.7355	(79.28)	0.8291	(38.56)	1.0411	(39.47)	0.8611	(43.19)	1.7606	(76.27)	0.8309	(38.53)****	1.0413	(39.38)****
Age	-0.1242	(-11.94)	-0.1413	(-10.58)	-0.1114	(-10.73)	-0.0652	(-5.46)	-0.1190	(-11.42)	-0.1313	(-9.80)	-0.1110	(-10.67)****	-0.0655	(-5.47)****
Age**2	0.0017	(13.15)	0.0024	(14.44)	0.0015	(11.57)	0.0010	(6.88)	0.0016	(12.66)	0.0023	(13.60)	0.0015	(11.50)****	0.0010	(6.88)****
Risk category	1.9737	(22.95)	0.4679	(5.09)	5.9975	(57.27)	8.4509	(80.15)	1.9942	(22.66)	0.4819	(5.32)	5.9977	(57.24)****	8.4523	(80.21)****
New fund dummy	0.5140	(8.56)	4.4551	(26.99)	2.3553	(34.93)	9.0464	(72.83)	0.5282	(8.75)	4.5240	(27.35)	2.3561	(34.90)****	9.0500	(72.81)****
Fee	1.0084	(5.32)	8.5239	(34.26)	5.4633	(26.03)	21.0058	(95.65)	0.9493	(4.70)	8.4927	(32.83)	5.4556	(25.97)****	21.0118	(95.38)****
Log_amt	-1.4869	(-19.64)	-1.9646	(-21.01)	-1.5946	(-20.66)	-1.9637	(-24.86)	-1.5113	(-19.04)	-2.0189	(-20.24)	-1.5970	(-20.57)****	-1.9637	(-24.82)****
Number of choices	-4.2673	(-48.62)	-4.6555	(-41.94)	-4.2074	(-48.27)	-4.3508	(-52.14)	-4.2910	(-46.77)	-4.6846	(-40.78)	-4.2111	(-48.31)****	-4.3526	(-52.17)****
Alphabet*(1-Alphabet)	-5.1676	(-7.15)	-35.5002	(-14.32)	0.3261	(0.62)	-6.0988	(-5.89)	-4.9490	(-6.44)	-35.1804	(-13.94)	0.3347	(0.64)	-6.1045	(-5.88)****
Domestic Fund Management	-1.0562	(-10.09)	-8.1047	(-34.82)	1.5717	(13.89)	6.8063	(47.54)	-0.9654	(-8.87)	-7.9589	(-34.59)	1.5763	(13.90)****	6.8074	(47.51)****
Flows	-10.7011	(-40.90)	60.7688	(48.84)	-2.1395	(-14.08)	62.8191	(84.75)	-10.7362	(-40.53)	60.5907	(49.57)	-2.1560	(-14.20)****	62.8203	(84.83)****
Fund subcategory fixed effects	N		N		Y		Y		N		N		Y		Y	
Municipality fixed effects	N		N		N		N		Y		Y		Y		Y	
Adj. R^2	0.522		0.181		0.531		0.325		0.522		0.181		0.531		0.325	

Table 3: Dynamic estimates

This table reports the reaction to the change in menu by individuals. We look at the menu in semi-annual increments (June 30, December 31). The dependent variable is the change in holdings of fund j. In Panel A, columns 1-3 we are reporting the result for ΔM_{jt}, and in columns 4-6 we interact it with the dummy *Newfund* that takes the value 1 if the fund j did not exist in the menu when previous choice was made. In Panel B, we interact ΔM_{jt} also with *LargeCategory (SmallCategory)* dummy that equal to one if size of sub-category is above (below) the mean. *Return6* is return of fund j in 6 month prior to the date of the choice. *Slweight1* is the fraction of the portfolio invested in all funds that belongs to the same category as fund j with the exception of fund j. *Flows* is the flows in the preceding six month as percentage of funds under management in subcategory (category 3). All other variables are defined in Table 1. All estimates are done using White heteroscedastisity-consistent estimator with clustering over municipalities. 3237529 observations were used. T-statistics is reported in parentheses. In columns 1, 3, 4 and 6 we used four year fixed effects, and in column 2, 3, 5 and 6 we used also 290 municipalities fixed effects. All coefficients with the exception of Age**2 (multiplied by 10000) and ΔM_{jt}, are multiplied by 100. For specifications 3 and 6 we also report the level of significance obtained via bootstrapped estimates. Significance on 10%, 5%, 1% and 0.1% is denoted as *, **, *** and ****, correspondingly.

Panel A

	(1)		(2)		(3)		(4)		(5)		(6)	
Variable	Estimate	t-stat	Estimate	t-stat	Estimate	t-stat	Estimate	t-stat	Estimate	t-stat	Estimate	t-stat
ΔM_{jt}	0.2231	(4.44)	0.2285	(4.74)	0.2113	(4.28)****						
ΔM_{jt} *Newfund							-0.6069	(-7.02)	-0.6409	(-7.35)	-0.6242	(-7.24)****
ΔM_{jt} *(1-Newfund)							0.8008	(13.94)	0.8340	(15.48)	0.7929	(14.09)****
Gender	-0.0229	(-0.47)	0.0730	(1.45)	-0.0203	(-0.43)	-0.0215	(-0.44)	0.0726	(1.43)	-0.0191	(-0.41)
Age	-0.1071	(-4.30)	-0.0377	(-1.51)	-0.1068	(-4.28)****	-0.1096	(-4.38)	-0.0423	(-1.69)	-0.1093	(-4.36) **
Age**2	0.0947	(3.24)	0.0067	(0.23)	0.0946	(3.23) **	0.0972	(3.32)	0.0116	(0.39)	0.0972	(3.30) **
Log_amt	0.2767	(2.80)	0.5244	(5.58)	0.2868	(2.86) **	0.2572	(2.60)	0.5295	(5.65)	0.2684	(2.68) ***
Number of choices	-1.2896	(-12.91)	-1.2700	(-12.87)	-1.2873	(-13.08)****	-1.2897	(-12.93)	-1.2701	(-12.89)	-1.2873	(-13.10)****
Slweight1	-0.3948	(-52.00)	-0.3981	(-53.98)	-0.3976	(-55.29)****	-0.3946	(-51.65)	-0.3979	(-53.56)	-0.3974	(-54.86)****
Risk category	1.7426	(3.97)	1.5240	(3.45)	1.7650	(4.02)****	1.7615	(4.00)	1.5478	(3.49)	1.7845	(4.05)****
New fund dummy	29.1112	(168.91)	29.2356	(165.18)	29.0860	(169.01)****	29.2959	(161.82)	29.4254	(158.26)	29.2721	(162.25)****
Fee	-0.8345	(-7.22)	-0.7091	(-6.50)	-0.8352	(-7.19)****	-0.8119	(-6.89)	-0.6956	(-6.29)	-0.8119	(-6.85)
Return6	11.8731	(33.23)	10.9884	(35.06)	11.8702	(34.53)****	11.8258	(33.78)	10.9950	(35.64)	11.8223	(35.15)****
Domestic fund management company	-3.1461	(-28.47)	-3.1176	(-28.25)	-3.1322	(-28.72)****	-3.1376	(-28.78)	-3.1103	(-28.57)	-3.1246	(-29.02)****
Flows	6.4623	(11.76)	6.1166	(12.61)	6.5214	(12.20)****	6.4198	(11.55)	6.1248	(12.56)	6.4775	(11.98)****
Alphabet*(1-Alphabet)	-28.3847	(-4.47)	-28.0261	(-4.40)	-28.5657	(-4.54)****	-28.5308	(-4.48)	-28.2142	(-4.42)	-28.7112	(-4.55)****
M^*_{jt}	44.1110	(3.43)	49.1176	(3.90)	46.2066	(3.54) ***	48.6510	(3.71)	53.4096	(4.17)	50.7176	(3.81)****
Year Fixed Effects	Y		Y		Y		N		Y		Y	
Municipality Fixed Effects	N		N		Y		Y		N		Y	
Adj. R^2	0.5849		0.5847		0.5859		0.5852		0.5850		0.5862	

Panel B

	(1)		(2)		(3)	
Variable	Estimate	t-stat	Estimate	t-stat	Estimate	t-stat
ΔM_{it} *Newfund*SmallCategory	-3.7065	(-10.63)	-3.6554	(-10.60)	-3.6514	(-10.58) ****
ΔM_{it} *(1-Newfund) *SmallCategory	-0.8758	(-5.32)	-0.9910	(-5.98)	-0.8822	(-5.37) ****
ΔM_{it} *Newfund*LargeCategory	-0.2283	(-2.66)	-0.2335	(-2.73)	-0.2361	(-2.76) **
ΔM_{it} *(1-Newfund) *LargeCategory	0.7292	(11.80)	0.7475	(12.09)	0.7125	(11.36) ****
Newfund*SmallCategory	9.8925	(12.95)	10.0109	(13.18)	10.1575	(13.15) ****
(1-Newfund) *SmallCategory	38.3450	(49.06)	38.4584	(49.01)	38.5173	(48.75) ****
Newfund*LargeCategory	8.2877	(9.83)	8.4164	(10.12)	8.5735	(10.11) ****
(1-Newfund) *LargeCategory	38.3977	(48.15)	38.6311	(48.14)	38.6989	(47.92) ****
Gender	0.1066	(2.10)	0.1071	(2.21)	0.1094	(2.24) **
Age	-0.0206	(-0.81)	-0.0210	(-0.83)	-0.0215	(-0.84)
Age**2	-0.0144	(-0.48)	-0.0125	(-0.42)	-0.0127	(-0.43)
Log_amt	-0.6764	(-6.83)	-0.6396	(-6.53)	-0.6514	(-6.72) ****
Number of choices	-1.2807	(-12.61)	-1.2730	(-12.80)	-1.2779	(-12.78) ****
Slweight1	-0.3962	(-52.39)	-0.3993	(-54.88)	-0.3988	(-55.34) ****
Risk category	1.2515	(2.80)	1.3017	(2.92)	1.3058	(2.93) **
New fund dummy	-0.3962	(-52.39)	-0.3993	(-54.88)	-0.3988	(-55.34) ****
Fee	-0.5313	(-5.06)	-0.5725	(-5.16)	-0.5401	(-5.06) ****
Return6	11.2601	(35.10)	11.3285	(38.42)	11.2472	(37.71) ****
Domestic fund management company	-3.2906	(-29.67)	-3.2492	(-29.09)	-3.2645	(-29.80) ****
Flows	7.0479	(16.56)	7.1397	(16.29)	7.0314	(16.56) ****
Alphabet*(1-Alphabet)	-28.1734	(-4.38)	-28.4347	(-4.46)	-28.4951	(-4.46) ****
Year Fixed Effects	Y		Y		Y	
Municipality Fixed Effects	N		N		Y	
Adj. R^2	0.5888		0.5898		0.5898	

Table 4: Trade

This table reports measures of trade (number of trades, turnover) over 6 month. We report the results for first stage (the decision to trade, reported in column 1) of Heckman estimator and second stage estimates done with four year fixed effects, 290 municipality fixed effects and combination of those. E_{it} (E^*_{it}) is the *ith* investor's exposure to the menu bias and is defined as the average of the menu (Morningstar menu) exposure of the categories of the funds the investor holds. It is constructed as: $E_{it} = \sum_{j=1}^{J} w_{jt}\left|M_{jt}\right|, E^*_{it} = \sum_{j=1}^{J} w_{jt}\left|M^*_{jt}\right|$, where weights are weights of category in investor portfolio. Panel A (B) reports the results for E_{it} (E^*_{it}). All other variables are defined in Table 1. All estimates are done using heteroscedastisity-consistent estimator with clustering of standard errors over municipalities. t-statistics is reported in parentheses. Estimates for Age**2 is multiplied by 100. For specifications with both year and municipality fixed effects we also report the level of significance obtained via bootstrapped estimates with 1000 resamplings. Significance on 10%, 5%, 1% and 0.1% is denoted as *, **, *** and ****, correspondingly.

Panel A: Results for E_{it}

	1st stage		ntrades		turnover		ntrades		turnover		ntrades		turnover	
	Est	t-stat	Est	t-stat	Est	t-stat	Est	t-stat	Est	t-stat	Est	t-stat	Est	t-stat
E_{it}	-0.403	(-9.18)	-0.486	(-22.63)	-35.959	(-17.94)	-0.286	(-63.65)	-20.740	(-40.83)	-0.485	(-23.95) ****	-35.769	(-19.34) ****
E_{it} **2	-0.022	(-0.39)												
Lagged dep Var			0.400	(27.15)	0.407	(13.49)	0.713	(82.34)	0.704	(86.68)	0.403	(30.97) ****	0.410	(14.87) ****
gender	0.062	(43.87)	0.074	(22.10)	4.572	(14.64)	0.037	(34.44)	2.147	(15.46)	0.074	(22.47) ****	4.603	(13.25) ****
age	0.020	(7.70)	0.030	(40.95)	-0.187	(-2.12)	0.029	(55.86)	-0.138	(-1.20)	0.030	(36.08) ****	-0.132	(-0.89)
age2	-0.022	(-10.11)	-0.032	(-59.94)	0.317	(4.96)	-0.030	(-51.19)	0.330	(2.44)	-0.032	(-53.75) ****	0.250	(1.86)
ltot_amt			0.016	(8.06)	0.952	(6.60)	0.031	(2.62)	-3.704	(-1.89)	0.001	(0.19)	-3.894	(-5.43) ***
Heckman lambda			1.390	(31.31)	97.026	(21.32)	-0.031	(-5.17)	-1.998	(-9.70)	1.387	(34.68) ****	96.696	(22.38) ****
Intercept	-0.074	(-0.62)	1.300	(28.66)	99.653	(25.88)	1.355	(100.30)	101.445	(43.00)	1.301	(28.66) ****	98.685	(19.78) ****
Adj R2	0.124		0.504		0.406		0.492		0.390		0.507		0.407	
Year Fixed Effects			Y		Y		N		N		Y		Y	
Municipality Fixed Effects			N		N		Y		Y		Y		Y	

Panel B: Results for E^*_{it}

	1st stage		ntrades		turnover		ntrades		turnover		ntrades		turnover	
	Est	t-stat	Est	t-stat	Est	t-stat	Est	t-stat	Est	t-stat	Est	t-stat	Est	t-stat
E^*_{it}	-6.926	(-5.20)	-3.118	(-35.90)	-248.133	(-55.45)	-3.268	(-25.46)	-252.304	(-38.07)	-3.116	(-35.05) ****	-246.829	(-44.81) ****
E^*_{it} **2	-82.343	(-6.94)												
Lagged dep Var			0.715	(69.55)	0.697	(78.24)	0.711	(82.17)	0.702	(85.41)	0.715	(72.76) ****	0.697	(84.62) ****
gender	0.004	(3.26)	0.040	(25.16)	2.303	(28.28)	0.037	(30.29)	2.114	(14.10)	0.040	(24.88) ****	2.363	(15.23) ****
age	0.015	(19.03)	0.023	(27.34)	-0.536	(-6.55)	0.030	(59.81)	-0.113	(-1.01)	0.023	(31.36) ****	-0.467	(-19.04) ****
age2	-0.024	(-31.21)	-0.024	(-25.11)	0.740	(8.34)	-0.030	(-54.11)	0.299	(2.27)	-0.024	(-29.70) ****	0.656	(17.98) ****
ltot_amt			0.033	(6.59)	2.179	(6.99)	0.034	(2.88)	-3.517	(-1.80)	0.014	(1.25)	-4.367	(-2.09)
Heckman lambda			-0.009	(-11.58)	-0.294	(-10.14)	-0.054	(-15.27)	-3.531	(-32.67)	-0.009	(-16.80) ****	-0.291	(-20.44) ****
Intercept	1.326	(10.19)	1.683	(236.48)	125.089	(112.03)	1.530	(75.09)	114.818	(40.94)	1.690	(214.16) ****	124.028	(149.81) ****
Adj R2	0.127		0.498		0.396		0.493		0.392		0.500		0.398	
Year Fixed Effects			Y		Y		N		N		Y		Y	
Municipality Fixed Effects			N		N		Y		Y		Y		Y	

Table 5: Investment performance

This table reports performance over 6 month of investors' choice Panel A looks at performance relative to category average, while Panel B looks at the same variable standardized by standard deviation of funds' performance. In columns (2) and (3), 290 municipalities fixed effects were used. In columns (1) and (3), also 4 year fixed effects were employed. E_{it} (E^*_{it})is the *ith* investor's exposure to the menu exposure and is defined as the average of the menu (Morningstar menu) exposure of the categories of the funds the investor holds. It is constructed as: $E_{it} = \sum_{j=1}^{J} w_{jt}\left|M_{jt}\right|, E^*_{it} = \sum_{j=1}^{J} w_{jt}\left|M^*_{jt}\right|$, where weights are weights of category in investor portfolio. Panel C looks at performance and turnover. Columns 1-4 report regression for performance relative to category average, while columns 5-8 report the results for standardized measures of performance. In columns (1), (2), (5) and (6) we used residuals of regression of turnover on menu exposure measures. In columns (3), (4), (7) and (8) we interacted menu bias measure with dummies of High and Low turnover (dummies that takes value 1 if turnover is above or below the mean for given time period, and zero otherwisReported estimates were done with four year fixed effects and 290 municipalities fixed effects. All other variables are defined in Table 1. All estimates are done using HWhite heteroscedastisity-consistent estimator with clustering over municipalities. t-statistics is reported in parentheses. All estimates are multiplied by 100 with the exception of Age**2 that is multiplied by 10000.

Panel A: Performance relative to category average

	(1)				(2)				(3)			
	Estimate	t-stat	Estimate	t-stat	Estimate	t-stat	Estimate	t-stat	Estimate	t-stat	Estimate	t-stat
E_{it}	-1.2943	(-104.41)			-1.1336	(-46.06)			-1.2928	(-112.37)		
E^*_{it}			-1.0878	(-57.51)			-0.9431	(-29.15)			-1.0862	(-61.66)
Gender	-0.0046	(-1.02)	-0.0064	(-1.38)	-0.0243	(-15.10)	-0.0262	(-14.66)	-0.0087	(-6.75)	-0.0105	(-7.62)
Age	0.0115	(5.58)	0.0120	(6.07)	0.0432	(9.92)	0.0437	(9.84)	0.0083	(5.89)	0.0088	(5.99)
Age**2	-0.0200	(-12.25)	-0.0206	(-13.23)	-0.0536	(-9.58)	-0.0542	(-9.51)	-0.0162	(-6.84)	-0.0168	(-6.88)
Log_amt	-0.2309	(-22.87)	-0.2308	(-22.84)	-0.0101	(-0.78)	-0.0106	(-0.82)	0.0166	(1.26)	0.0165	(1.26)
Lagged dependent variable	-20.0828	(-160.06)	-20.1402	(-156.71)	-21.0389	(-187.10)	-21.0968	(-182.76)	-20.1065	(-163.21)	-20.1639	(-160.25)
Year Fixed Effects	Y		Y		N		N		Y		Y	
Municipality Fixed Effects	N		N		Y		Y		Y		Y	
Adj. R^2	0.0863		0.0857		0.0742		0.0737		0.0870		0.0864	

Panel B: Standardized performance relative to category average

	(1)				(2)				(3)			
	Estimate	t-stat	Estimate	t-stat	Estimate	t-stat	Estimate	t-stat	Estimate	t-stat	Estimate	t-stat
E_{it}	-7.3421	(-9.31)			-5.9218	(-2.24)			-7.3069	(-9.70)		
E^*_{it}			-6.1079	(-7.51)			-4.7867	(-2.34)			-6.0730	(-7.80)
Gender	0.3428	(5.07)	0.3316	(4.77)	0.6196	(28.57)	0.6008	(24.82)	0.3630	(4.37)	0.3518	(4.14)
Age	0.3187	(34.08)	0.3225	(32.80)	0.3744	(38.68)	0.3808	(36.42)	0.3366	(27.86)	0.3404	(29.43)
Age**2	-0.3440	(-38.66)	-0.3480	(-38.87)	-0.3170	(-27.60)	-0.3250	(-30.00)	-0.3640	(-18.48)	-0.3680	(-19.31)
Log_amt	-0.9101	(-6.33)	-0.9090	(-6.32)	-0.2403	(-1.42)	-0.2445	(-1.45)	-2.0710	(-9.51)	-2.0707	(-9.52)
Lagged dependent variable	-33.8982	(-86.63)	-33.9484	(-86.24)	-32.2133	(-132.91)	-32.2616	(-131.24)	-33.8632	(-81.66)	-33.9134	(-81.29)
Year Fixed Effects	Y		Y		N		N		Y		Y	
Municipality Fixed Effects	N		N		Y		Y		Y		Y	
Adj. R^2	0.1860		0.1860		0.1681		0.1680		0.1869		0.1867	

Panel C: Performance and Turnover

	Estimate	t-stat	Estimate	t-stat	Estimate	t-stat	Estimate	t-stat	Estimate	t-stat	Estimate	t-stat	Estimate	t-stat	Estimate	t-stat
E_{it}	-1.261	(-95.56)							-6.722	(-8.52)						
E^*_{it}			-1.056	(-52.61)							-5.542	(-6.84)				
E_{it}*Low Turnover*					-0.436	(-3.89)							1.989	(1.35)		
E_{it}*High Turnover*					-1.460	(-21.74)							-10.727	(-7.93)		
E^*_{it}*Low Turnover*							-0.799	(-4.06)							0.757	(0.56)
E^*_{it}*High Turnover*							-1.214	(-15.63)							-9.019	(-6.42)
Lagged dep. variable	-20.607	(-140.03)	-20.666	(-137.16)	-20.679	(-155.82)	-20.733	(-159.54)	-34.535	(-79.55)	-34.585	(-79.36)	-34.611	(-80.59)	-34.680	(-82.64)
Gender	-0.017	(-11.87)	-0.019	(-12.20)	-0.017	(-14.19)	-0.019	(-14.73)	0.197	(2.48)	0.188	(2.32)	0.182	(2.45)	0.175	(2.30)
Age	0.009	(5.33)	0.010	(5.42)	0.011	(11.96)	0.011	(16.51)	0.354	(40.71)	0.357	(42.49)	0.394	(26.67)	0.402	(22.73)
Age**2	-0.017	(-6.35)	-0.018	(-6.39)	-0.020	(-10.97)	-0.020	(-13.75)	-0.391	(-27.05)	-0.394	(-28.27)	-0.437	(-19.13)	-0.446	(-16.96)
Log_amt	0.037	(2.94)	0.037	(2.95)	0.037	(2.99)	0.037	(2.98)	-1.679	(-7.34)	-1.678	(-7.34)	-1.679	(-7.27)	-1.682	(-7.31)
Turnover					0.001	(7.23)	0.001	(6.37)					0.025	(16.28)	0.025	(13.89)
res_turnover	0.143	(11.02)	0.144	(11.16)					2.753	(26.35)	2.762	(26.91)				
Intercept	1.015	(79.16)	0.964	(71.23)	0.801	(42.87)	0.745	(26.19)	-9.014	(-40.09)	-9.273	(-48.72)	-13.179	(-77.67)	-13.678	(-77.09)
Adj R2	0.088		0.087		0.088		0.087		0.189		0.189		0.190		0.189	

Table 6: Portfolio concentration

This table reports portfolio concentration (Herfindahl index) as function of investor' demographic characteristics and menu exposure. All variables are as defined in Tables 1 and 4. In columns (2) and (3), 290 municipalities fixed effects were used. In columns (1) and (3), also 4 year fixed effects were employed. All estimates are done using HWhite heteroscedastisity-consistent estimator and clustered over municipalities. T-statistics is reported in parentheses.

	(1)				(2)				(3)			
	Estimate	t-stat	Estimate	t-stat	Estimate	t-stat	Estimate	t-stat	Estimate	t-stat	Estimate	t-stat
E_{it}	-0.1876	(-12.30)			-0.1267	(-6.98)			-0.1829	(-14.29)		
E^*_{it}			-0.2586	(-11.33)			-0.2141	(-11.68)			-0.2519	(-12.87)
Gender	0.0079	(17.90)	0.0078	(18.34)	0.0069	(25.44)	0.0067	(25.03)	0.0073	(49.41)	0.0072	(51.37)
Age	-0.0135	(-21.10)	-0.0134	(-20.81)	-0.0130	(-72.81)	-0.0129	(-70.17)	-0.0140	(-44.22)	-0.0139	(-43.27)
Age**2	0.0002	(25.81)	0.0002	(25.45)	0.0002	(78.57)	0.0002	(75.82)	0.0002	(54.21)	0.0002	(53.01)
Log_amt	-0.0052	(-5.56)	-0.0052	(-5.65)	0.0041	(4.63)	0.0039	(4.42)	0.0236	(4.44)	0.0235	(4.44)
Lagged dependent variable	0.2021	(3.89)	0.2010	(3.89)	0.1346	(17.33)	0.1330	(17.35)	0.2287	(5.81)	0.2275	(5.81)
Year Fixed Effects	Y		Y		N		N		Y		Y	
Parish Fixed Effects	N		N		Y		Y		Y		Y	
Adj. R^2	0.0826		0.0834		0.0640		0.0648		0.0880		0.0888	

Figure 1: Extract from the information folder, fund example

Fund number	Fund name, Management company	Information regarding the funds	Fund fee (%)	Percentage return 99-12-31 (after fees)						Total risk (last 3 years)
				In the year					Last 5 years	
				95	96	97	98	99		
191080	Baring Global Emerging Markets Baring International Fund Managers (Ireland) Ltd	Emerging markets' equity and equity related assets	1.59	-32	10	25	-25	77	25.3	32 (Red)

The percentage return for the last five years equals the compounded annual growth rate of return for the years 1995 through 1999. The total risk corresponds to an annualised percentage standard deviation of three-year monthly historical fund returns. The total risk is also categorised into five different classes, and colours, with respect to standard deviation; Class 1: very low risk, dark green, percentage standard deviation in the range 0-2; Class 2: low risk, light green, 3-7; Class 3: average risk, yellow, 8-17; Class 4: high risk, orange, 18-24; Class 5: very high risk, red, 25-.