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# Information Costs and Mutual Fund Flows\*

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## Abstract

This paper examines how investor and capital flows into mutual funds in the Swedish pension system are related to fund characteristics. Similarly to U.S. studies, we show that individuals chase past returns and have a strong preference for lower-fee funds. However, our results suggest that past returns are less important than previous studies suggest. A more important determinant of fund inflows is information costs. For instance, foreign-based funds with a track record similar to that of domestic funds attract fewer investors and receive less capital. Moreover, new funds without a track record also receive lower inflows.

**Keywords:** Flows, Information, Pension System, Portfolio Choice

**JEL Classifications:** G11, G23, H55

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# I Introduction

Studies of mutual funds have proliferated since the first evaluations of portfolio performance of U.S. mutual funds in the 1960s. Today, empirical evidence on fund performance can be found for most markets. On the whole, the evidence suggests that active fund managers fail to outperform a passive benchmark. More recent research includes the development of new performance measures and evaluations of the relation between fund characteristics and fund performance. Another important area of research focuses on fund manager behavior, and findings suggest that fund managers are momentum investors, i.e., they buy stocks with high past returns. However, in light of the fast-growing mutual fund industry of the 1990s, increasing attention has been given in the literature to the behavior of mutual fund investors. This paper extends current evidence by a detailed examination of Swedish households' investment decisions in mutual funds and obtains results that differ somewhat from previous U.S. studies.

Today, mutual funds have become a very popular investment vehicle and more than every second household in the U.S. owns a share in a mutual fund. In some countries, such as Sweden, mutual funds have attracted very broad investor groups and about 85% of households own a share in a mutual fund. Studies of mutual fund investors' behavior are very important for several reasons. First, they can enrich the behavioral literature with empirical evidence from less sophisticated investors. Second, policymakers in many countries today are involved in reform plans for current pension systems. A common task is to strengthen the link between individuals' payroll contributions and benefits, which often involves individuals having to invest in mutual funds. Hence, an understanding of investment behavior can have important implications for the design of pension systems. Finally, increased competition in the mutual fund industry is forcing asset managers to become more sophisticated in the battle for fund flows. Thus a crucial success factor for asset managers is a thorough understanding of the factors significantly affecting individuals when they choose to invest in mutual funds

Previous studies that have examined the relation between aggregate flows and fund characteristics have mainly evaluated past returns and fees; see for instance Ippolito (1992), Gruber (1996), Chevalier and Ellison (1997), and Sirri and Tufano (1998). Their findings suggest that, on average, investors chase past returns; in fact, the results even reveal a convex relation between past performance and fund inflows. That is, the best performing funds receive significantly more inflows than other funds. Further, other results indicate that the average investor prefers lower-fee funds. Another interesting study is Khorana and Servaes (2001), who show that both product differentiation and price competition are effective strategies in a fund family's pursuit of market share. Specifically, they show that fund families charging higher fees have a lower market share, adjusted for investment objective.

Sweden has recently launched a new public defined contribution pension system in which pension assets are invested in mutual funds chosen by the individual. The system is mandatory for the entire workforce, and this experimental situation provides a unique opportunity to deepen our knowledge of the determinants of fund flows since individuals' preferences for certain fund characteristics are revealed when inflows to funds are examined. This paper extends current evidence of individuals' preferred fund characteristics by thoroughly examining the fund inflows into the Swedish defined contribution pension system. Compared with previous studies, this study offers five main advantages. First, the Swedish data enrich the literature by providing empirical evidence from an unexplored market. More importantly, the data extends current evidence by an examination of less experienced investors compared with previous studies. Interestingly, Del Guercio and Tkac (2002) document empirical differences in the flow-performance relation across mutual fund and pension fund industry segments that suggest that these managers operate in different environments. One potential explanation is that pension fund sponsors are often trained in the area of investment management and that they rely heavily on the recommendations of professional consultants when deciding managers to retain or hire. Hence, pension fund investors have a more sophisticated investment behavior than mutual fund investors. In the

light of this evidence, the Swedish data offers empirical evidence from less sophisticated investors than traditional mutual fund investors since it includes a significant share of investors that never before have invested in mutual funds. Second, the launch of the pension system was a “pure event” where the flows can only be explained by fund characteristics. Other studies that examine flows using time-series data have problems separating asset allocation decisions from investors’ preferences for certain fund characteristics. Third, we examine both the relation between fund characteristics and capital inflows as well as the relation between fund characteristics and the number of investors the funds attract. This means that our results are not biased towards the biggest investors, which is the case in previous studies. Fourth, the data in this study are homogenous in that it consists of only individual investors who invested a similar amount of capital. Finally, prior to the investment decision, all individuals entitled to participate in the pension system received detailed information from the Premium Pension Authority (PPM) about all available investment opportunities (mutual funds). This information included past returns, fees, risk – measured as the standard deviation of returns – and detailed information on the fund companies. This enables us to extend the literature by examining new variables.

Our results show that, to some extent, high past returns explain mutual fund flows. However, this paper finds that past returns are less important as a decision variable than previous studies suggest. Instead, direct and indirect costs are the most important explanatory variables of mutual fund flows. The results show a clear negative relation between management fees and inflows which highlights the importance of direct costs. To examine the indirect costs we use three proxies which show that individuals tend to invest in funds they are familiar with. For instance, the results show that individuals have a strong preference for domestic fund managers, that is, fund managers about whom they have a cumulative information advantage of. Moreover, funds without a track record (less available information) receive lower inflows than funds with a track record. Finally, individuals are likely to have a cumulative information advantage as regards the funds that belong to the bank they bank

with; the results show that individuals have a strong preference for funds that belong to one of the four main banks in Sweden. Overall, the above evidence suggests that familiarity breeds investments.

The rest of the paper is organized as follows. Section 2 gives an overview of the reformed Swedish pension system and the Swedish mutual fund industry. In Section 3 we present the empirical hypotheses and some previous empirical evidence. Section 4 presents the evidence on the relation between fund characteristics and inflows. Finally, in Section 5, we offer our conclusions.

## II Data

### II.A The New Public Pension System

An aging population forces policymakers in many countries to reform current pension systems. For many, one of the most important tasks is to create a pension system that is less sensitive to demographic changes. In 1999, Sweden introduced a reformed public and mandatory pension system consisting of two parts: a notional defined contribution pay-as-you-go system (NDC PAYG) and an advance-funded defined contribution system (DC). This paper focuses on the latter system, which is also the smaller of the two parts. The pension system is based on a fixed contribution rate of 18.5% on earnings: 16% to the NDC PAYG system and 2.5% to the DC system. In the DC pension system, contributions are paid into an individual account once a year and are invested in the mutual funds of the individual's choice. This implies that pension assets grow at the rate of return of the chosen funds.

The government launched the new advance-funded defined contribution system in the fall of 2000 and consequently more than 4.4 million individuals were required to invest pension assets in mutual funds. At this time, accumulated contributions from 1995 to 1998 amounted to approximately SEK 56 billion (one US dollar was equal to about 10 Swedish kronor), which was then distributed to the mutual funds in accordance with individuals'

investment decisions. The individuals in the system could choose to invest in one to five different mutual funds from 460 available funds. Hence, the Swedish system is substantially larger than the US 401(k) system, which typically only includes a few funds. For individuals that did not make an active investment decision, the government provided a publicly managed mutual fund (the default alternative).

The premium pension system is run on a clearinghouse model, i.e., all investments and other transactions are collected at the Premium Pension Authority, which conducts the actual trading of the funds. This means that the fund managers are unaware of the identity and the number of individuals investing in their fund. Moreover, the system allows individuals to change funds free of charge. Engström and Westerberg (2003) provide a more detailed description of the new pension system.

## II.B Mutual Funds

To help individuals make their investment decisions, a catalog containing detailed information on all available mutual funds was sent to everyone in the premium pension system. The catalog consisted of the 460 participating mutual funds; of these, 312 were classified as equity funds, 63 as fixed-income funds, and 85 as mixed or life-cycle funds. Information on the funds' fees, past five-year returns, standard deviation of returns, and the fund family was included. Table 1 shows that 50% of all mutual funds were based in Sweden. About one third of the funds were new funds without a track record and 15% of the funds belonged to one of the four main banks in Sweden. The average fee was 1.11% for equity funds, 0.70% for mixed and life-cycle funds, and 0.60% for fixed-income funds. The standard deviation of returns was only reported for mutual funds that were at least three years old. For these funds, the average standard deviation was 25% for equity funds, 11% for mixed funds, and 4% for fixed-income funds. Table 1 also shows that the average return in 1999 was 58% for equity funds, 23% for mixed and life-cycle funds, and -3% for fixed-income funds.

The new publicly managed mixed fund, *Premiesparfonden* was set up to supervise contributions for individuals who did not make an active investment decision. The politically set target for this fund is to achieve an average return that will correspond at least to the average return of all other mutual funds in the system over a five-year period. This return must be accomplished at lower risk. Initially, 90% of the portfolio consisted of stocks, 25% of which were Swedish and 65% foreign, and the remaining 10% consisted of Swedish bonds. The fee for this fund is 0.48%, while the average fee for other mixed and life-cycle funds in the system is 0.71%.

The new pension system will have a significant effect on the Swedish mutual fund industry. Before the new system was introduced, every second Swede owned a share in a mutual fund, but by 2001 85% of all Swedes held a share in a mutual fund. This implies that many individuals invested in mutual funds for the first time in association with the launch of the pension system. The system will also ensure high net flows of about SEK 20 billion in the coming years. Table 2 shows that the Swedish mutual fund industry grew and developed very fast during the second half of the 1990s. Total assets managed by this industry grew from SEK 207 billion at the beginning of 1995 to SEK 898 billion at the end of 2000. During this time, individuals also shifted their preferences from fixed-income funds to equity funds. Today, Swedes tend to have a stronger preference for equity funds than individuals in other countries; about 70% of the Swedish fund industry consists of equity funds. However, fixed-income funds experienced high net flows in 1997 and 1998, mainly as a result of individuals shifting their money from direct holdings of bonds to fixed-income funds.

The supply of different types of funds has also increased, but the Swedish industry is lagging behind that of the U.S. Traditionally, individuals in Sweden have mainly invested in funds with a country or a regional investment objective. However, during the late 1990s, passively managed funds, hedge funds and funds with an industry investment objective (e.g., technology and pharmaceuticals) received increasing attention. However, unlike in the U.S.,



passively managed funds in Sweden have not been very successful in attracting new money. Their share of net flows into the market has only been a few percent.

### III Hypotheses

One important goal for individuals investing in mutual funds is to find a fund manager who will provide high future returns. Hence, these investors have to search for information on the available funds and judge whether the manager possesses a superior ability. Individuals have different experiences and backgrounds and therefore judge fund managers differently based on available information. The premium pension authority tried to facilitate the decision-making process and the search for information by providing every individual in the system with a comprehensive catalog that contained information on all fund managers participating in the pension system. This section presents our hypotheses on how fund characteristics might affect individuals' investment decisions. We also discuss previous empirical findings on this issue.

#### III.A Past Returns

When individuals search for fund managers who will outperform in the future an evaluation of past performance might naturally occur. Hence, past return is likely to be an important decision-variable for the investment decision since many individuals may believe that the funds will perform similarly in the future. Interestingly, some previous studies that have examined the relation between past performance and aggregate flow of capital into funds have documented this behavior. For example, Sirri and Tufano (1998) find that past performance is an important factor when individuals choose funds to invest in, and they show that flows in the U.S. fund market go to the best-performing funds. In line with this evidence, Chevalier and Ellison (1997) also find a positive relation between mutual fund inflows and risk-adjusted returns, but they also show that the relation is convex. Some studies have tried

to explain return-chasing behavior and examine whether it is profitable, while other studies attempt to explain the behavior from a psychological perspective. For example, Gilovich, Vallone, and Tversky (1985) show that people systematically underestimate the chance of observing streaks, such as a run of heads in the flip of an unbiased coin, in a random sequence. Thus, they are likely to conclude that the coin is biased if they observe streaks of heads or tails when an unbiased coin is flipped. Hence, individuals are likely to believe that a fund is superior if they observe abnormal high performance. Some supporting evidence exists for this strategy. Zheng (1999) for example, finds that funds that receive more money subsequently perform significantly better. This suggests that return-chasing behavior would be profitable, but the examination also shows that the effect is short-lived and to a large extent due to momentum. However, the strategy of investing in the best-performing funds receives some support in the literature on performance persistence, since the main results suggest that persistence in performance is mainly found in the worst performing funds; see, e.g., Hendriks, Patel, and Zeckhauser (1993), Elton, Gruber, and Blake (1996), and Carhart (1997).

### III.B Risk

To date, only a few studies have examined individuals' risk preferences when they invest in pension funds. One study, by Bernatzi and Thaler (2001), examines individuals' investment behavior in a 401(k) pension plan. They evaluate individuals' risk preferences by examining individuals' investment in equity funds, mixed funds, and bond funds (high risk, medium risk, and low risk, respectively). Their results suggest that individuals divide their contributions evenly across available funds and that the proportion invested in equity funds is therefore related to the number of equity funds in the pension plan. Hence, risk preferences depend on the funds available in the system. This research extends previous evidence by considering a defined contribution system that includes many more funds than the U.S. 401(k) system. We deepen the understanding of individuals' risk preferences by examining the relation between inflows and the funds' past risk, measured as standard deviation.

### III.C Fees

Mutual fund fees received considerable attention in the Swedish media prior to the launch of the new pension system. The funds were often accused of charging unreasonably high fees, which would imply a lower future pension. Several studies support this argument since they have found a negative and statistical significant relation between performance and fees. For instance, Dahlquist, Engström, and Söderlind (2000) show that low-fee funds outperform high-fee funds in the Swedish market. This negative relation between the fee charged and the funds' performance holds for both equity and money market mutual funds. In line with the Swedish evidence, Carhart (1997) finds a negative relation between fees and performance for U.S. mutual funds. This suggests that it is rational for investors to invest in low-fee funds. Moreover, Sirri and Tufano (1998) show that U.S. investors are rational in that they are fee-sensitive; they also show that lower-fee funds and funds that reduce their fees grow faster.

### III.D Information Costs

Numerous academic studies have found that investors have different preferences for financial assets. Many results suggest that investors prefer assets they are familiar with. For instance, domestic investors tend to prefer domestic assets and do not hold as many foreign assets as standard portfolio theory would suggest. This is known as the home-bias puzzle (see Lewis (1999) for an overview). Coval and Moskowitz (1999) extend this evidence by documenting a home bias at home, i.e., investors prefer geographically close investments. Moreover, Kang and Stultz (1997) examine foreigners' preferences in Japan and show that they prefer large firms with large export sales. This evidence is consistent with the conjecture that investors prefer to invest in assets that they are better informed about.

Interestingly, Sirri and Tufano (1998) find that this behavior is present in the mutual fund industry. Among other things, they show that a costly search for information affects mutual fund flows, and that in the U.S., funds receiving greater media attention and belonging to larger families grow more rapidly than other funds. Similarly, several studies of individuals' investment decisions within pension plans highlight the importance of information costs and confirm the common hypothesis that familiarity breeds investments. For instance, Choi et al. (2002) examine the impact on savings behavior of several different 401(k) features and show that individuals often accept the status quo, that is, they follow the path of least resistance. Other studies have found a positive relation between the amount of information that the individuals have to acquire and the likelihood of procrastination. Moreover, Engström and Westerberg (2003) show that individuals who possess more information and experience of financial markets are also more interested in making an active investment decision within the Swedish premium pension system.

In line with the empirical evidence, Swedes have mainly invested in funds belonging to fund families they are familiar with. The supply of mutual funds in Sweden has traditionally consisted of funds managed by four main banks, and hence individuals invested in funds that belonged to the bank they were with. However, during recent years, many have started to be less loyal to "their" bank, and invest in funds offered by other companies. In this paper, we will employ three variables that can be considered as a measure of information costs and examine how they affect individuals' investment decisions. The three variables are:

- i) New fund.* This variable is a dummy for new funds, that is, the fund was established just prior to the launch of the new pension system. New funds have no track record and individuals are therefore less likely to be familiar with these funds.
- ii) Sweden-based fund.* This variable is a dummy for Sweden-based funds. We believe that individuals are more likely to be familiar with mutual funds based in

Sweden since a local presence implies more exposure to the public, and investors believe this provides them with an information advantage.

*iii) Bank.* This variable is a dummy for funds that are owned by the four main banks in Sweden. These banks have traditionally dominated the Swedish mutual fund industry and have controlled about 80% of assets under management. Hence, we believe that individuals are more familiar with the funds provided by these banks than with other available mutual funds.

In contrast to the management fee, indirect or information costs are not found to be related to fund performance. Instead, some evidence suggests that the performance of foreign funds is similar to the performance of domestic Swedish funds. In fact, Engström (2001) shows that the performance of foreign-owned funds investing in Asia and Europe is similar to that of Swedish-owned funds. Hence, the main difference between foreign and Swedish-owned funds is that information costs are lower for the latter, which may explain investor behavior.

## IV Results

### IV.A A First Look

This section presents a first look at the binary relation between fund inflows and various fund characteristics. The characteristics are past returns, risk (standard deviation of returns), fees, location of the fund, a dummy for new funds (i.e. funds without a track record), and a dummy for funds belonging to one of the four main banks in Sweden. We start by sorting funds by size of inflows and grouping mixed and fixed-income funds into quintiles. Equity funds, however, are grouped into deciles, since there are many more equity funds than mixed and fixed-income funds.

Figure 1 shows how average inflow of capital varies between the deciles/quintiles. The average equity fund in the top decile received SEK 595 million whereas the average fund in the bottom decile received SEK 0.4 million. The corresponding figures for mixed and fixed-income funds are SEK 410 million and SEK 51 million for the top quintiles, and SEK 1 million and SEK 0.3 million for the bottom quintiles. Interestingly, we find a herding behavior among investors, that is, they flock into a few very popular funds. About 5% of the funds receive 50% of the total invested capital. Hence, large groups of individuals tend to have similar preferences for certain fund characteristics. An important challenge for fund managers, therefore, is to match these preferences because an ability to do so will be rewarded with a lion share of the inflows in the market.

Figure 2 shows how the inflow of investors varies between the deciles/quintiles. We observe a similar pattern of investor flow and capital flow, which suggests that our evaluation of the relation between inflows and fund characteristics will not be biased towards the preferences of the biggest investors. In the following subsections, we will evaluate the binary relation between inflows and fund characteristics by grouping the funds into deciles/quintiles and calculating the average characteristics for each group.

#### IV.A.1 Past returns

In this evaluation, we use six different horizons of return: each year separately from 1995 to 1999 and total returns for the five-year period. This information is the same return data that PPM provided to all individuals before they made their pension investment decision. Table 3 presents the average return for each decile and quintile for equity, mixed and fixed-income funds separately. By comparing these deciles and quintiles, we will see if a returns-chasing behavior exists among Swedes. In this evaluation, however, it is important to remember that the funds' investment objective is a determinant of past returns, and especially for equity funds. European equity funds have significantly outperformed Asian equity funds, which mean that individuals investing in Asian funds will not be classified as return-chasing

investors even though they invest in the Asian fund associated with the highest past returns. Hence, it creates a very scattered picture of returns for equity funds and might explain why we do not observe a stronger relation between returns and inflow for equity funds. In Section IV.B, however, we evaluate the relation between inflows and fund characteristics in a multiple setting in which we control for a number of other variables such as the fund's investment objective.

In line with previous evidence, our grouping of equity funds into deciles based on inflow shows that individuals to some extent chase past returns. We find a strong relation between returns over the past five years and inflows, both in terms of capital and number of investors. The most recent annual return (year 1999) does influence investment decisions, but mainly in that the worst performing funds are avoided. Like the individuals investing in equity funds, individuals investing in fixed-income and mixed funds chase past returns to some extent. However, contrary to equity fund investors, Table 3 shows that fixed-income and mixed fund investors mainly chase the past one-year return. Interestingly, fixed-income investors avoid funds without a long return history. The bottom quintile for fixed-income funds consists only of funds with less than a three-year return history.

Additional support for return-chasing behavior can be found when we evaluate inflows at a higher level, i.e., inflows into the different fund categories. Average returns for the equity funds are significantly higher than for mixed and life-cycle funds, which show significantly higher returns than fixed-income funds (see Table 3). This clear return pattern, in combination with the fact that equity funds received 72% of inflows, suggests that individuals chase past returns.

#### IV.A.2 Risk

Individuals that made an active investment decision had to take risk into account in two instances. First, the choice of fund category, i.e., equity, fixed-income, or mixed funds, has a significant impact on the risk level of the portfolio. Equity funds are typically associated with

a higher risk level than fixed-income funds and mixed funds, which are associated with a low and intermediate risk level, respectively. The second choice concerned the preferred risk level of the funds in the chosen category. Individuals made this decision based on the standard deviation of returns for funds that was reported in the catalog. This section presents some empirical evidence on both individuals' preferences for risky funds and fund categories by using standard deviation as a risk measure. One drawback of this evaluation is that standard deviation is only available for funds that had existed for more than three years (about 40% of available funds).

About 68% of all available funds were equity funds, and these received 72% of the inflows. Mixed and life-cycle funds received inflows that correspond to the number of available funds: they represented 18% of the number of funds and received 26% of the inflows. Fixed-income funds were not as popular as the other funds; they received only 2% of the inflows even though they account for 14% of available funds. Overall, this is a high-risk profile and even higher than the risky default alternative which includes 10% fixed-income securities. This result suggests a strong preference for risk and especially among those who made an active investment decision.

When we examine individuals' preferences for the funds' past risk level, we find mixed evidence for the separate fund categories. Figure 3 shows the relation between the funds' risk level and capital inflow into the funds. We can see that there is no significant relation between risk (measured as standard deviation of returns) and inflow for equity funds. However, the top decile in terms of inflow for equity funds is associated with the lowest average risk. Hence, individuals appear to prefer less risky equity funds. Similarly, we find a negative, but also statistically significant relation, between inflow and risk for fixed-income funds. In a broader context, this result is somewhat surprising, since individuals who invest in the fixed-income fund category choose a low-risk strategy. Hence, fixed-income fund investors are very risk averse. Unlike investors in equity and fixed-income funds, investors in mixed funds,



especially those with a smaller amount to invest, prefer funds associated with a higher risk level.

#### IV.A.3 Management fee

Similar to Sirri and Tufano's study of U.S. investors, we find a clear negative relation between the fee charged and inflow of capital in the Swedish pension system. Figure 4 shows that the average equity fund in the top decile of inflows charges a fee of 0.83% whereas the average fund amongst those receiving the lowest inflows charges a fee of 1.40%. A similar pattern is observed for mixed funds; funds in the top quintile of inflows charge, on average, a fee of 0.50% and those in the lowest quintile charge 0.97%. A low fee is also a distinguishing characteristic of fixed-income funds that received the highest inflows of capital. The average fee for the top quintile is 0.39% whereas the average fee for the lowest quintile is 0.84%. However, Figure 4 shows that the relation between fees and inflows for fixed-income funds is not as clear as for equity and mixed funds, since the average fund in the third quintile charges a relatively high fee of about 0.73%.

#### IV.A.4 Fund Location

The results show that individuals have a very strong preference for domestic funds. The top quintile, in terms of inflow of capital and investors for both fixed-income and mixed funds, consists entirely of Sweden-based funds. In addition, 100% of the lowest quintile for fixed-income funds is foreign-based funds. Figure 5 also shows a strong preference for domestic equity funds. More than 90% of the top quintile consists of Sweden-based funds. These results suggest that individuals prefer mutual funds that they have more information about. Hence, funds associated with lower information costs attract more investors.

#### IV.A.5 New Fund

Overall, Figure 6 presents weak evidence suggesting that individuals have somewhat stronger preferences for funds with a track record than for new funds. We see that new mixed funds without a track record are less attractive. Only 29% of the funds in the top quintile of inflows are new, whereas in the fourth quintile 78% are new. We find a less clear pattern for equity and fixed-income funds but the figure shows a significant difference between the top and bottom deciles for equity funds: 53% of funds in the bottom decile are new funds, whereas the corresponding figure for the top decile is 31%. Hence, compared with fund location, our dummy for new funds seems to be a less important decision variable. Though the results are weaker, they go in the same direction; less information or higher information costs imply lower inflows.

#### IV.A.6 Bank

Funds that belong to one of the four main banks in Sweden received, on average, higher inflows than other funds; 38% of equity funds in the top decile of inflows belong to one of the banks, whereas only 3% of funds in the lowest decile of inflows belong to these distributors. A similar positive relation is observed for mixed funds (see Figure 7); however, the graph peaks at the fourth quintile, where 72% of funds belong to one of the four banks, whereas this is so only for 24% of funds in the top quintile. In contrast, only 6% of funds in the lowest quintile belong to one of the banks. Figure 7 also shows that funds provided by these banks were more popular than other funds. About 15% of the two top quintiles belong to these distributors. Hence, similar to fund location, our bank dummy seems to be a good proxy for information costs, and the results suggest that individual investors choose funds associated with lower information costs. In other words, they invest in the funds belonging to “their” bank.

## IV.B Regression Analysis

In this section, we evaluate the statistical relation between fund characteristics and fund inflows. The single regressions between a fund characteristic and inflow give results that resemble those in the previous section. Therefore, this analysis will focus on a multiple evaluation of the determinants of fund inflows.

We evaluate the statistical relation between inflows and fund characteristics by running OLS regressions and employing the following model:

$$F_{ij} - \bar{F}_j = \gamma_0 + \gamma_1 \times (x_{ij} - \bar{x}_j) + \varepsilon_i, \quad (1)$$

where  $F_{ij}$  represents inflows of fund  $i$  that belong to funds with the investment objective  $j$  and  $x_{ij}$  is a vector of fund characteristics for the same fund.  $\gamma_0$  and  $\varepsilon_i$  are the intercept and error term in the regression, respectively. Hence, one important feature of this model is that we control for the funds' investment objectives, which is essential for equity funds since this is the most important determinant of past returns. Thus, in contrast to the previous section, our empirical results will not give any information about whether investors are flocking into the funds associated with the highest returns. Instead, our regressions will shed light on whether investors, for instance, prefer funds with high past returns relative to other funds with similar characteristics. Table 4 reports the constant  $\gamma_1$ , which provides information on the relation between inflows and fund characteristics. Furthermore, we evaluate both inflows of capital and number of investors for equity funds, mixed funds, and fixed income funds separately.

Generally, there is a low correlation between all fund characteristics in our data except the correlation between return and risk. Funds that show high past returns are typically associated with a high level of risk. This, of course, has implications for the specification of a multiple regression model. In order to avoid multicollinearity, we have chosen not to include risk in the model, as risk is highly correlated with returns. There were two reasons for this

decision. First, we have evaluated several models that include the risk variable, but our findings are consistent with those in the previous section: no significant relation is found between the risk level of the fund and inflows. Second, we have access to fewer observations for the risk variable (only funds that have existed for a longer period than three years) than for returns. Hence, we include past returns in the multiple regression model instead of risk level. The other explanatory variables in the model are: fees, a dummy for Sweden-based funds, a dummy for new funds without a track record, and a dummy for funds belonging to the four main banks in Sweden. We have access to a high-quality dataset and there are no missing values for the fund characteristics except for past returns. A multiple regression (when  $x_{ij}$  is a vector) typically throws away all lines of data where there is a missing value in one of the regressors. This is a waste of information. To get around this problem, we use the two-step approach in Griliches (1986), which essentially amounts to estimating each regression coefficient using all available data for that particular regressor.<sup>1</sup> Another advantage of this approach is that it allows us to include both past returns and the dummy for new funds in the same regression.

#### IV.B.1 Past returns

Table 4 shows a somewhat mixed result on the relation between fund inflows and past returns. We find a weak but positive relation between inflows and returns when we evaluate all funds in a joint estimation. The coefficient is significant at the 10% level, and a fund associated with 10% higher returns than other funds receives only SEK 4.7 million more in

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<sup>1</sup> The approach in Griliches (1986) allows for missing values (see also Greene (1997) chapter 9). In the regression equation  $y_i = ax_i + bz_i + \varepsilon_i$ , we have data on  $x_i$  for  $i \in N_1$ , but we have data on  $y_i$  and  $z_i$  for  $i \in N_1 \cup N_2$  (the whole sample). First, estimate the regression on  $i \in N_1$  and let  $\hat{a}_{N_1}$  denote the estimate of  $a$ . Second, run the regression  $x_i = \hat{\alpha}_i + u_i$  on  $i \in N_1$ , and let  $\hat{x}_i = \hat{\alpha}_i$  for  $i \in N_2$  and  $x_i = \hat{x}_i$  for  $i \in N_1$ . Third, run the regression  $y_i - \hat{a}_{N_1} \hat{x}_i = bz_i + v_i$   $i \in N_1 \cup N_2$ . The estimate of  $b$  from the third step, and  $\hat{a}_{N_1}$  from the first step, are taken to be the estimates.

capital inflows and attracts only 1,100 more investors. Naturally, the result for equity funds is similar to the result for all funds, since 68% of all funds are equity funds. Hence, we also find a weak positive relation between inflows and returns, but it is the least significant determinant of inflows. It is significant at the 10% level for capital inflows capital but not statistically significant for number of investors. For mixed funds, we find a somewhat stronger relation between inflows and past returns. A mixed fund associated with a 10% higher return than other funds receives SEK 44.5 million more in capital inflows and attracts 5,400 more investors. In contrast, the results show no relation between capital inflows or number of investors and past returns for fixed-income funds.

Overall, these results suggest that past returns is a less important determinant of inflows to funds than previous studies of fund flows in the U.S. mutual fund industry have found. However, it is important to remember that the weak flow-return relation appears when we control for a number of other fund characteristics that seem to have some impact on the individuals' investment decisions. Additionally, we also control for the funds' investment objectives, which are important determinants of past returns.

#### IV.B.2 Management fees

Similar to our binary evaluation of fund flows and management fees, we find a strong relation between fees and inflows when we evaluate all funds jointly in a multiple setting. A one percent lower fee implies significantly higher inflows: about SEK 122 million, and 26 000 more investors. Consistent with the results of all the funds, Table 4 shows a strong negative relation between inflows and fees for equity funds. However, compared with all funds, a lower fee attracts significantly more investors but they invest less per capita. A one percent lower fee implies that the fund attracts 108,000 more investors and SEK 27 million more in capital. The difference between equity funds and the all funds category can be explained by individuals investing in mixed or life-cycle funds. Similarly, the empirical

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evidence shows a clear negative relation between inflows and management fees for mixed funds. However, a lower fee has a very strong impact on capital inflow. A one percent lower fee results in SEK 253 million more in inflows and 36,000 more investors. Finally, we also find a clear negative flow-fee relation for fixed-income funds.

These results confirm previous evidence suggesting that the management fee is an important determinant of fund flows. However, these results not only confirm previous findings but indicate that the disclosed fee is the most important decision variable when individuals invest in mutual funds. One important implication is that high past returns do not easily offset the negative impact of a high fee.

#### IV.B.3 Information costs

The results in Table 4 suggest that a strong relation exists between the location of the fund and inflows when we evaluate equity funds and all funds. Our joint estimation for all the funds indicates that Sweden-based funds receive about SEK 84 million and 23,000 more investors than funds that are based abroad. Corresponding figures for equity funds are inflows of SEK 22 million and 66,000 investors. A somewhat weaker result, that is statistically significant at the 10% level, is found for fixed-income funds. This result also suggests that Sweden-based funds receive higher inflows: about SEK 25 million and 7,000 more investors. In contrast, inflows to mixed funds cannot be explained by the location of the fund. However, there is one important difference between the different fund types: the mixed funds are more homogenous than the equity and fixed-income funds in that they mainly consist of Sweden-based funds (74% of the mixed funds are Sweden-based). This fact can explain the different result.

Similar to the strong results for our location dummy, we find a clear pattern when evaluating the impact that our new dummy has on fund inflows. These results show that individuals tend to avoid investing in funds without a track record. For all the funds, our estimates from the multiple regressions suggest that new funds without a track record receive

SEK 77 million less capital and attract 19,000 fewer investors. The corresponding figures for equity funds are SEK 17 million less capital and 54,000 fewer investors for funds with no track record. It is also important for mixed and life-cycle funds to present a track record in order to attract investors but, in contrast to equity funds, our new dummy has a stronger impact on capital inflows than on number of investors. A mixed fund that does not disclose a track record receives, according to our estimates, SEK 201 million less capital and 32,000 fewer investors. In the fixed-income fund group, we have the lowest share of funds without a track record: only 23%. However, for this group of funds we do not find a statistical significant relation between the new dummy and inflows.

Our bank dummy is the final characteristic that is related to information costs. For this variable we find somewhat weaker results. However, we find a statistically significant relation between the bank dummy and inflows when we evaluate all the funds in a joint estimation, and when we evaluate equity funds separately. The results for all the funds suggest that it is a clear advantage for funds to belong to one of the four main banks. On average they should receive SEK 78 million and 23,000 more in inflows of capital and investors, respectively. However, the results for equity funds suggest, as usual, that our proxy for information costs has a stronger impact on inflows of investors than on inflows of capital. The estimated coefficients for our bank dummy indicate that equity funds belonging to one of the main banks should receive SEK 38 million more in capital and attract 135,000 more investors. In contrast, our results for mixed and life-cycle funds and fixed-income funds show that the coefficient for our bank dummy is not statistically significant.

Overall, the above evidence clearly suggests that information costs have a significant impact on investment decisions. All three proxies for information costs show that funds associated with lower costs receive higher inflows of capital and investors. Hence, familiarity breeds investment, which is in line with the behavioral literature, and the resulting behavior may be rational since no evidence exists to suggest that these funds are associated with lower performance.

## V Conclusions

This paper examines the investors' preferred fund characteristics in the new defined contribution pension system in Sweden. Overall, we show that individual investors appear to have similar preferences and are flocking into just a few funds: about 5% of the funds receive 50% of invested capital. The individuals in the system seem to have an appetite for risk, since the inflows of capital are biased towards equity funds. They receive 72% of invested capital, although the share of equity funds in the system is 68%. However, our results indicate that individuals seem to be reluctant to invest in the riskiest equity funds, in terms of standard deviation of returns.

Previous U.S. studies of determinants of mutual fund flows typically suggest that investors chase past returns, and also that a convex relation exists between past returns and fund inflows. In our evaluation of 4.4 million Swedish individuals' preferences for certain fund characteristics, we find some evidence to support the U.S. findings. For instance, individuals have a strong preference for equity funds, which obviously showed high past return figures (based on the late 1990s). Moreover, our binary evaluation shows a strong and positive relation between past returns and fund inflows. However, we find evidence suggesting something slightly different when we include fund characteristics related to information costs and evaluate the relation between fund characteristics and inflows in a multiple setting where we control for the funds investment objectives. In this analysis, we include dummy variables for funds the individuals are likely to possess more information on and therefore be more familiar with. All variables in the multiple analysis have low correlation. The dummies are i) funds with versus without past track record; ii) Sweden-based funds versus foreign-based funds, and iii) funds belonging to one of the four main banks in Sweden versus other funds. Interestingly, our results suggest that past returns are less important as a determinant of mutual fund flows than suggested by U.S. evidence. Instead,



investors seem to have a strong preference for funds they are familiar with. Funds with a past track record that are based in Sweden and belong to one of the four main banks attract significantly more investors and receive higher inflows of capital. However, in line with previous evidence, we also find a significant relation between management fees and fund inflows. Low-fee funds attract broad investor groups and receive significantly larger capital inflows than high-fee funds.

Our findings on the investment behavior of the individuals in the reformed pension system are very much in line with what the psychology literature on the whole puts forward. We find that individuals behave more rationally than previously suggested. Both indirect and direct costs associated with the funds have a significant impact on investment choice. This behavior has support in the literature. For instance, previous studies have found a negative relation between management fees and fund performance. This suggests that individual investors behave rationally since they prefer low-fee funds. Moreover, another important determinant of fund inflows is information costs. In the Merton (1987) model, rational investors prefer assets they are better informed about. Hence, individuals minimize the indirect transaction costs involved in gathering and evaluating information on the funds by investing in funds that they are already familiar with.

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Table 1. Characteristics of Mutual Funds in the Premium Pension System

Category	No.	Based in Sweden	New	Fee	Bank	Risk	Return
<b>Equity funds</b>	312						
minimum		0.00	0.00	0.20	0.00	15.00	-6.00
25 perc.		0.00	0.00	0.85	0.00	19.00	28.00
median		0.00	0.00	1.20	0.00	22.00	52.00
average		0.45	0.32	1.11	0.13	24.85	57.55
75 perc.		1.00	1.00	1.33	0.00	30.00	75.00
maximum		1.00	1.00	3.97	1.00	53.00	272.00
<b>Mixed and life-cycle funds</b>	85						
minimum		0.00	0.00	0.40	0.00	4.00	-9.00
25 perc.		0.00	0.00	0.48	0.00	7.00	6.00
median		0.00	1.00	0.55	0.00	10.00	21.00
average		0.74	0.58	0.70	0.29	10.53	23.03
75 perc.		1.00	1.00	0.96	1.00	13.00	41.50
maximum		1.00	1.00	1.49	1.00	19.00	61.00
<b>Fixed-income funds</b>	63						
minimum		0.00	0.00	0.15	0.00	0.00	-14.00
25 perc.		0.00	0.00	0.40	0.00	1.00	-8.00
median		0.00	0.00	0.56	0.00	4.00	-2.00
average		0.46	0.24	0.60	0.06	4.42	-2.98
75 perc.		1.00	0.00	0.75	0.00	7.00	2.50
maximum		1.00	1.00	1.34	1.00	19.00	17.00
<b>All</b>	460						
minimum		0.00	0.00	0.15	0.00	0.00	-14.00
25 perc.		0.00	0.00	0.57	0.00	14.50	12.00
median		1.00	0.00	1.04	0.00	19.50	33.00
average		0.50	0.36	0.97	0.15	19.93	43.48
75 perc.		1.00	1.00	1.26	0.00	25.00	65.00
maximum		1.00	1.00	3.97	1.00	53.00	272.00

The table shows mutual fund characteristics in the public defined contributions system in Sweden. No. refers to the total number of funds. Based in Sweden refers to the proportion of mutual funds that are based in Sweden (based in Sweden=1, other=0). New refer to if the fund was new (new=1, old=0). Fee is the management fee in %. Bank refers to if the fund belongs to one of the main banks in Sweden (main bank=1, other=0), and Risk is the funds monthly standard deviation of returns in %. Return refers to past year return (1999). For each characteristic, we first report average value, then median value in parenthesis, and finally, standard deviation of value. The default fund, premiesparfonden, is not included.

Table 2. Size and Flows of the Swedish Mutual Fund Industry

		1994	1995	1996	1997	1998	1999	2000
<b>Equity</b>	No.	294	286	300	330	356	394	453
	TNA	132,415	151,769	202,270	307,143	365,409	591,703	595,461
	Flow	-4,292	1,339	2,115	52,564	14,108	27,143	68,732
<b>Mixed</b>	No.	29	30	37	40	46	62	100
	TNA	22,629	25,686	38,703	66,098	91,222	147,173	179,482
	Flow	10,766	521	5,727	18,001	12,433	4,578	24,637
<b>Fixed- Income</b>	No.	98	113	114	115	124	135	132
	TNA	52,042	64,908	78,059	82,674	104,294	115,746	123,451
	Flow	977	6,600	7,567	370	16,024	-255	5,096
<b>All</b>	No.	421	429	451	485	526	591	685
	TNA	207,086	242,364	319,032	455,915	560,925	854,621	898,394
	Flow	7,452	8,459	15,409	70,935	42,565	31,466	98,465

The table shows the number of funds, size, and flows in the Swedish mutual fund industry for the period 1994 to 2000. No. and TNA refer to the total number of funds and the total net assets in SEK millions (as at December 31 each year). Flow refers to the annual net flows into the fund categories. All refers to all funds (i.e., all funds in the Equity, Mixed, and Fixed-income category). Fixed-income includes both money market funds and bond funds.

Table 3. Aggregate Flows and Past Returns

Fund Decile/ Quintile	Past Returns											
	1995		1996		1997		1998		1999		5 Years	
<b>Equity</b>												
10	15	(16)	30	(29)	35	(36)	37	(39)	57	(56)	326	(325)
9	16	(16)	37	(36)	29	(25)	14	(11)	79	(83)	282	(283)
8	10	(7)	35	(29)	23	(17)	15	(10)	58	(62)	236	(196)
7	-2	(-2)	11	(17)	8	(18)	10	(12)	82	(74)	116	(147)
6	-1	(1)	32	(33)	23	(25)	5	(2)	63	(58)	173	(162)
5	0	(-4)	25	(18)	33	(24)	-1	(-2)	57	(67)	110	(88)
4	-5	(-1)	22	(31)	17	(22)	9	(12)	62	(55)	115	(145)
3	11	(11)	17	(17)	35	(35)	18	(16)	31	(31)	146	(146)
2	-9	(-10)	14	(10)	13	(4)	7	(5)	39	(41)	55	(12)
1	-5	(-5)	21	(21)	27	(27)	19	(19)	40	(40)	163	(163)
<b>Mixed</b>												
5	14	(14)	25	(25)	20	(20)	16	(16)	45	(45)	178	(178)
4	14	(14)	23	(23)	20	(19)	17	(17)	33	(35)	162	(153)
3	8	(8)	19	(19)	14	(14)	15	(15)	18	(18)	123	(123)
2	6	(6)	15	(14)	18	(19)	20	(21)	13	(8)	75	(69)
1	6	(6)	14	(14)	19	(19)	20	(20)	4	(4)	82	(82)
<b>Fixed-Income</b>												
5	14	(14)	13	(13)	5	(5)	9	(9)	0	(0)	49	(49)
4	8	(8)	10	(10)	9	(9)	8	(8)	2	(2)	44	(44)
3	9	(10)	11	(11)	16	(13)	12	(11)	-2	(-1)	56	(56)
2	6	(6)	6	(6)	6	(6)	13	(13)	-6	(-6)	26	(26)
1	N/A	(N/A)	N/A	(N/A)	N/A	(N/A)	18	(18)	-11	(-11)	N/A	(N/A)

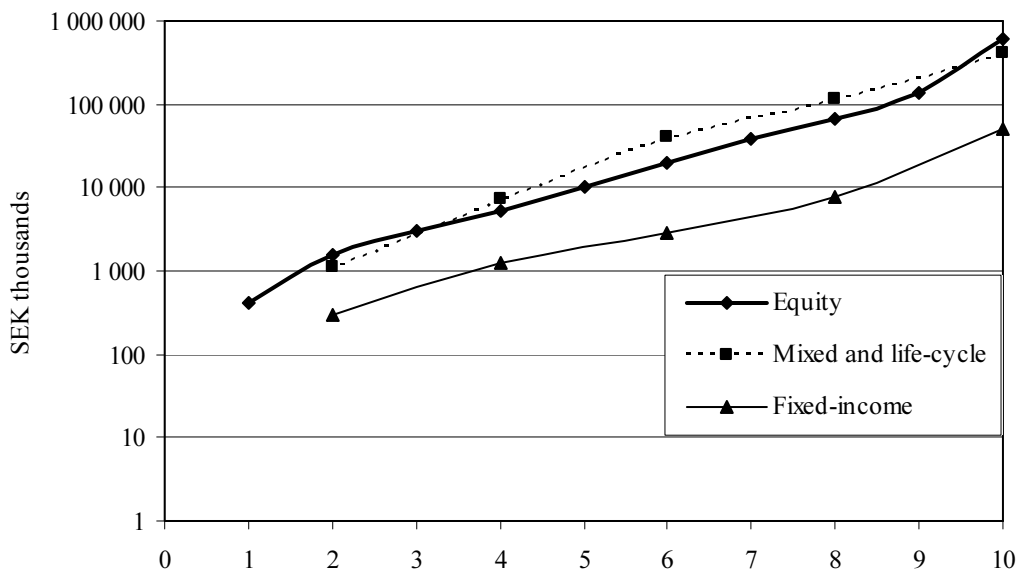
The table shows the relation between net inflows and past returns for equity funds, fixed-income funds, and mixed funds. Equity funds are divided into deciles, based on net inflows, and average past return for the single years of 1995 to 1999 and for the whole period of 1995 to 1999 are calculated for each decile. Average past return is calculated based on both net inflows of capital and number of investors (in parentheses). The results are presented in descending order, where the top decile refers to the funds that received the largest inflows. Corresponding averages are calculated for fixed-income and mixed funds, while, the averages are calculated for quintiles.

Table 4. Regression Analysis of Aggregate Flows

Category			Return	Fee	Based	New	Bank
<b>All</b>	<b>Capital</b>	Coeff.	0.47	-121.95	83.91	-77.23	77.92
		Std	0.25	29.35	25.56	20.20	28.31
	<b>Investors</b>	Coeff.	0.11	-25.72	23.08	-18.86	22.66
		Std	0.06	7.17	6.25	4.94	6.92
<b>Equity</b>	<b>Capital</b>	Coeff.	0.15	-26.74	21.69	-17.10	37.99
		Std	0.09	9.47	8.64	7.01	10.49
	<b>Investors</b>	Coeff.	0.52	-108.16	65.56	-54.19	135.34
		Std	0.34	37.03	34.03	28.11	42.06
<b>Mixed</b>	<b>Capital</b>	Coeff.	4.45	-253.05	-16.94	-200.71	42.47
		Std	1.92	62.42	74.13	39.56	43.15
	<b>Investors</b>	Coeff.	0.54	-35.79	5.25	-31.66	7.16
		Std	0.29	9.42	11.20	5.98	6.52
<b>Fixed- Income</b>	<b>Capital</b>	Coeff.	0.03	-25.76	24.51	6.43	0.80
		Std	0.45	13.57	14.63	7.10	13.24
	<b>Investors</b>	Coeff.	0.01	-7.32	7.11	1.75	0.77
		Std	0.12	3.88	4.18	2.02	3.78

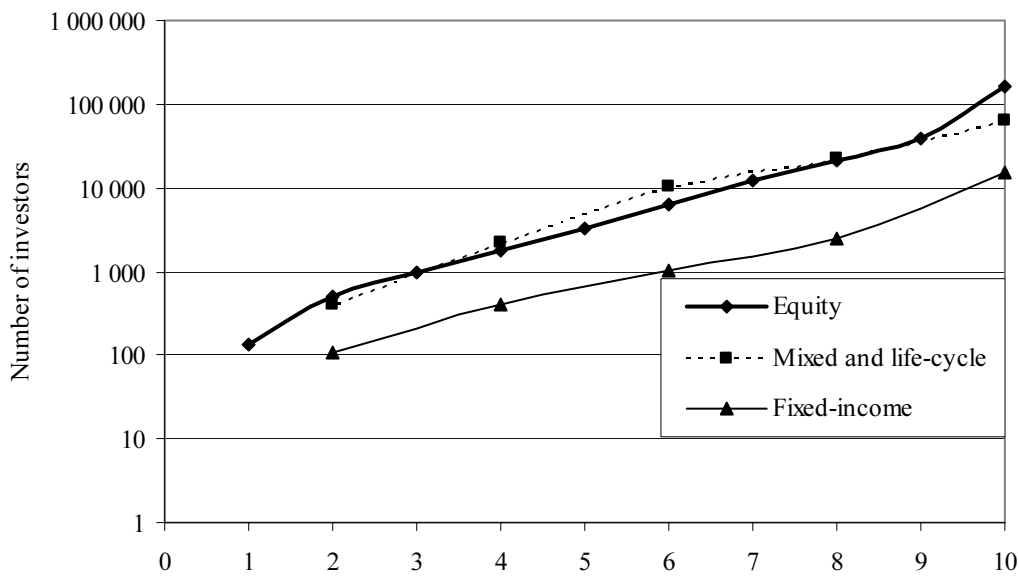
The table shows the results from the multiple regressions of inflows of capital and investors on fund attributes. Coefficients statistically significant at the 5% level are *emphasized* and associated standard errors are reported. Capital refers to SEK million and Investors to thousands of individuals. Return refers to the one-year past return. Fee refers to management fee. Based is a dummy, where 1 refers to Swedish based funds and 0 refers to foreign based funds. New is a dummy, where 1 refers to funds that has recently been established and lack historical data. Bank is a dummy, where 1 refers to funds that belong to one of the four main banks.

Figure 1. Average inflow of capital to funds



The figure shows the average inflow of capital to funds. Averages are computed for each decile, based on inflow of capital, for equity funds and each quintile for mixed and fixed-income funds.

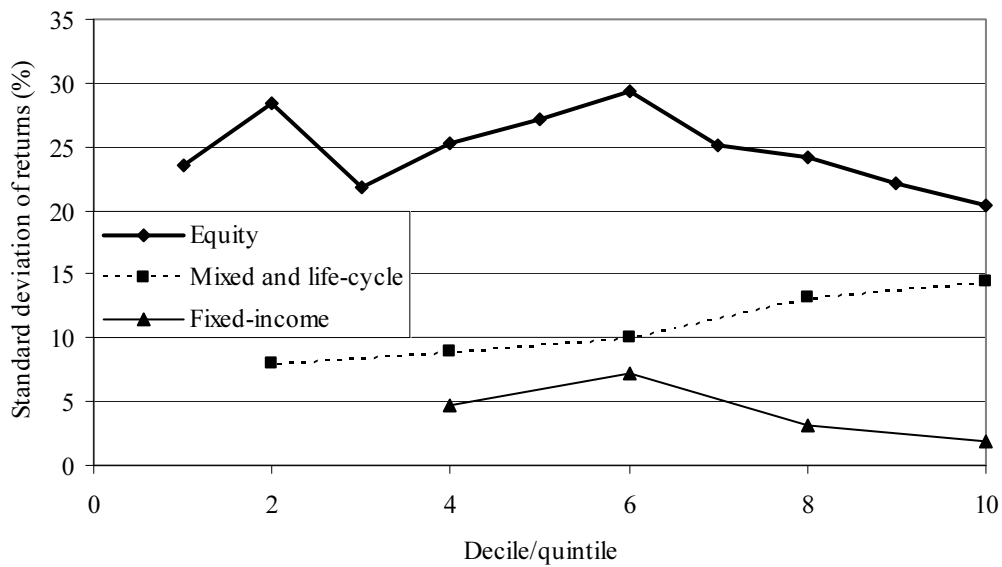
Figure 2. Average inflow of investors to funds



The figure shows the average inflow of individuals to funds. Averages are computed for each decile, based on inflow of individuals, for equity funds and each quintile for mixed and fixed-income funds.

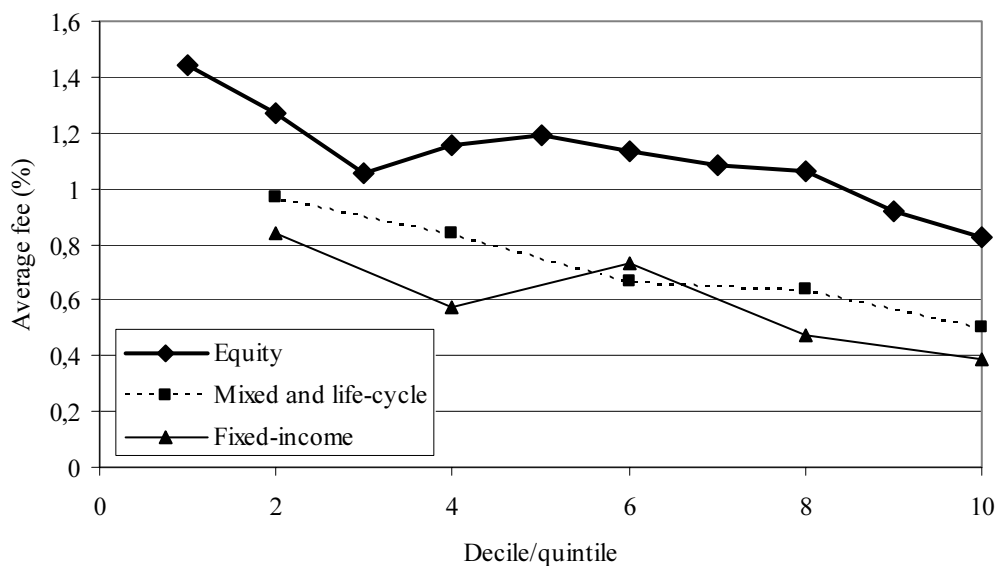


Figure 3. Flow into funds and average risk



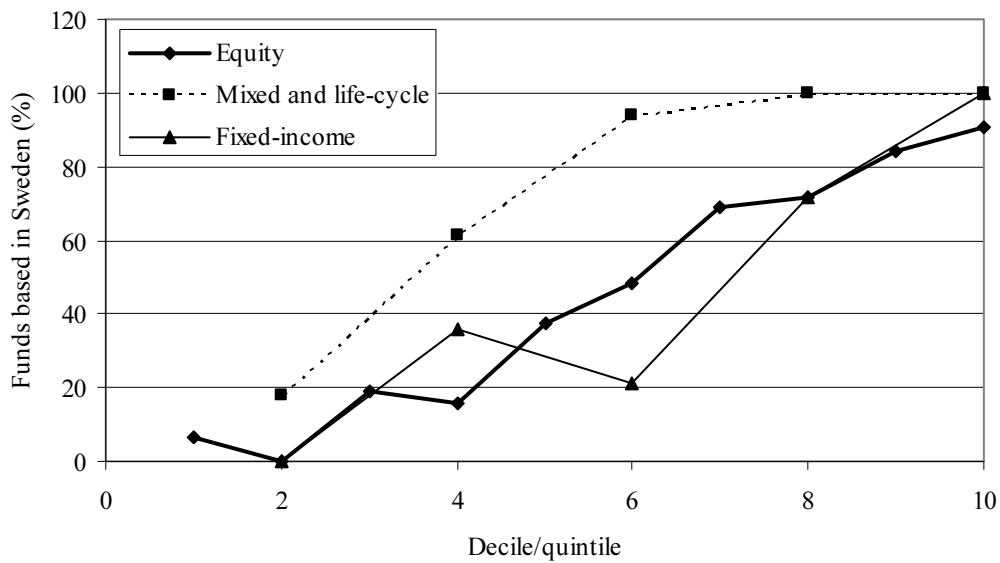
The figure shows the average standard deviation of returns for the sample of funds. Averages are computed for each decile, based on inflow of capital, for equity funds and each quintile for mixed and fixed-income funds.

Figure 4. Flow into funds and average fee



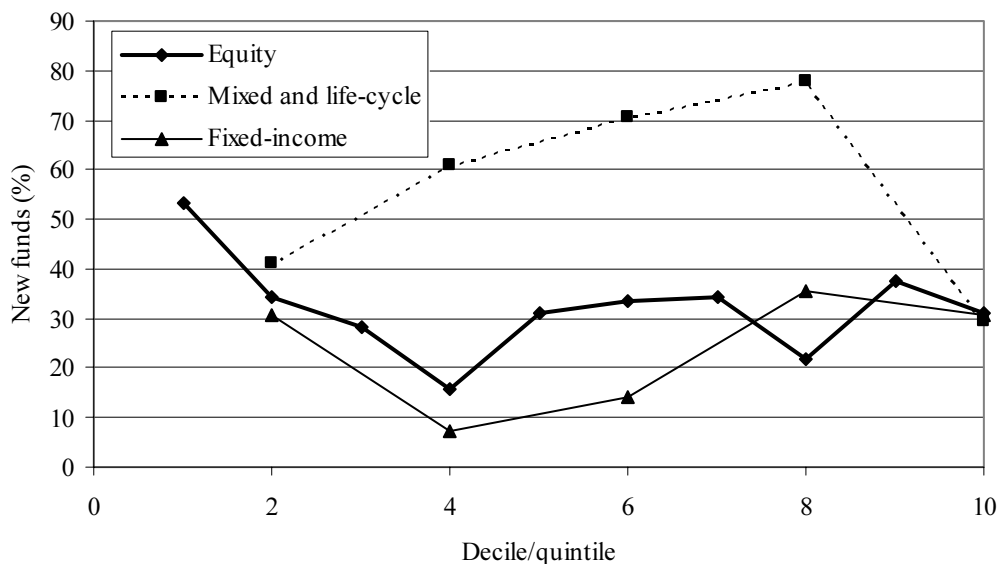
The figure shows the average management fee for the sample of funds. Averages are computed for each decile, based on inflow of capital, for equity funds and each quintile for mixed and fixed-income funds.

Figure 5. Flow into funds and location of the funds



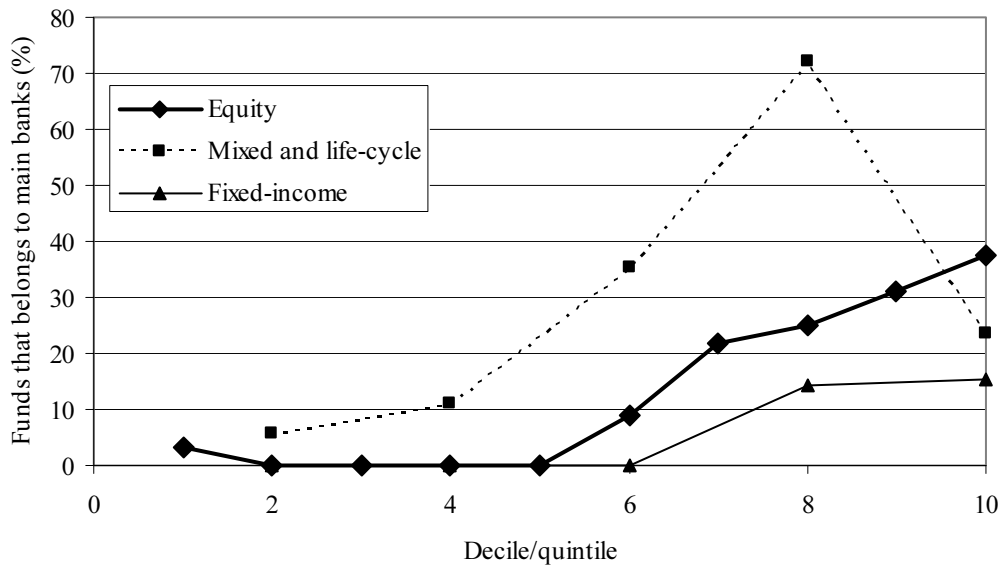
The figure shows the relation between inflows of capital and the location of the fund. The fraction of funds that are based in Sweden are computed for each decile, based on inflow of capital, for equity funds and each quintile for mixed and fixed-income funds.

Figure 6. Flow into funds and new funds



The figure shows the impact that an available track record has on inflows of capital to funds. The fraction of funds that have a historical track record are computed for each decile, based on inflow of capital, for equity funds and each quintile for mixed and fixed-income funds.

Figure 7. Flow into funds and fund company



The figure shows how inflow of capital varies for funds that belong to well known fund companies. The fraction of funds that belong to a well known fund company (four banks) are computed for each decile, based on inflow of capital, for equity funds and each quintile for mixed and fixed-income funds.