

Can Financial Innovation Solve Household Reluctance to Take Risk?

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ABSTRACT

Using a large administrative panel of Swedish households, we document the fast and broad adoption of retail structured products, an innovative class of contracts offering non-linear exposures to equity markets. We first estimate the expected returns and markup of such products, and find them to be comparable to equity mutual funds. Households investing in retail structured products significantly increase the risky share of their financial wealth over the sample period, especially for households with an initially low risky share, lower wealth and IQ, and of older age. The relationships between household characteristics and the share of financial wealth invested is similar for structured products and cash, but differs strongly for equity mutual funds and stocks. A simple portfolio choice model shows that risk aversion cannot explain the demand for structured products and the empirical facts we observe, while loss aversion or misperception over their design can. Our results illustrate how security design can mitigate household reluctance to take financial risk.

JEL classification: I22, G1, D18, D12.

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I. Introduction

The low share of household wealth invested in stocks and mutual funds is a major challenge of household finance in developed economies (Campbell, 2006). This phenomenon illustrates the reluctance of households to participate in risky asset markets, which has large economic and welfare effects. Households with low exposures to compensated risk forfeit an important source of income over their lives (Mankiw and Zeldes, 1991; Haliassos and Bertaut, 1995), which reinforces wealth inequality (Bach, Calvet, and Sodini, 2017). Furthermore, as household savings are mainly directed toward safe assets, raising external capital might be costlier for firms. Traditional explanations for the low household exposure to risky assets rely on a high risk aversion combined with fixed participation costs, risky human capital, beliefs and behavioral biases such as loss aversion (Gomes, 2005). The issue of low stock market participation is more pronounced for certain sub-groups of the population: households with low-to-median financial wealth (Calvet, Campbell, and Sodini, 2007), low-to-median IQ (Grinblatt, Keloharju, and Linnainmaa, 2011), or loss-averse preferences.

This paper investigates whether financial innovation, in the form of products offering non-linear exposure to risk assets, can increase household portfolio allocation to risky asset markets. If so, through which economic mechanism? And are households better off as a result? To address these questions, we study the introduction of retail structured products in Sweden and its impact on household portfolio allocation. While C  lerier and Vall  e (2017) describe how banks use the design of these products to cater to yield-seeking investors, this study takes a different view and explores the potential benefits of retail structured products.

By offering a pre-packaged risk profile compatible with household preferences, retail structured products may increase household willingness to participate in risky asset markets. Retail structured products marketed in Sweden typically offer downside protection, and hence allow households to gain exposure to a risky asset market while capping the maximum loss.¹ Buying downside protection, for instance by buying put options or implementing portfolio insurance, is often difficult or costly to do for households, especially for long investment horizons.

We exploit Swedish micro data with granular information on both household characteristics and

¹A typical product offers the following cash flows: investor pays 110 initially, and gets 100 times (1 + 80% of the positive performance of an equity index over the period) four years later. See Section II for more details on structured product design.

financial holdings (see Calvet et al. (2007)) that we merge with a dataset with detailed information on all structured products sold in Europe since market inception (see Célérier and Vallée (2017)). The combined panel dataset is unique on many dimensions. First, the dataset offers a comprehensive coverage of the first five years of the development of the retail market for structured products for the whole population of Sweden.² Second, the dataset allows us to investigate how a rich set of household characteristics, such as wealth, IQ or age, relate to participation in this new asset class. Third, we can observe the whole portfolio composition of households and how the introduction of these innovative products impact household holdings in both safe and risky assets. Last, the data allow us to explore the link between household characteristics and the design of these products. More broadly, our research setting offers a unique opportunity to study how the introduction and the development of a financial innovation can impact retail investors portfolio decisions, while also shedding light on what drives the success of an innovation in household finance.

Our main results are the following. First, we develop an asset pricing methodology and establish several facts about structured product design and the implied exposure they offer. We find that their expected returns of structured products sold in Sweden between 2002 and 2007 are significantly higher than the risk free rate, and that their markups are around 1.4% per year on average, which makes their cost comparable to the one of mutual funds marketed to Swedish households at that time. These results are consistent with structured products allowing households to share in the risk premium.

Second, we document that the adoption of these products is fast and broad, with 13% of all Swedish households buying at least one of these products within five years of the introduction. For the participating households, retail structured products represent more than 15% of their financial wealth. The speed of development contrasts with the slow adoption of other innovative financial products offering equity exposure, such as exchange traded funds (ETFs).

Third, participation in retail structured products is associated with an increase in household risk-taking. We focus on the allocation of household portfolio to the four asset classes that compose financial wealth: cash, equity mutual funds, stocks, and structured products, and consider the latter

²The market developed from 2002 in Sweden. Since the end of the 1990s, European financial institutions have sold more than 2 trillion euros of structured products. More recently in the US, equity-linked certificates of deposit, one category of retail structured products, are becoming increasingly popular.

three classes as risky assets.³ We weight the holdings in these assets by their exposure to the risk premium, i.e. the ratio of excess expected return of the investment over the market risk premium, when calculating their risky share. Over the five years following the introduction of structured products, we find that the risky share increases twice as much for households that participate in these products than for households that do not. The effect is larger for households in the lowest quartile of risky share in 2002: participating in structured products lead to an additional 10 percentage point increase in their risky share, which amounts to less than 4% in 2002. Guaranteed products, therefore, mostly complement rather than substitute for other risky assets.

We implement an instrumental variable analysis to mitigate potential sources of endogeneity when studying the effect of investing in structured products. Investment in structured products over our sample period might be correlated with a higher demand for risky assets over that period that our large set of controls does not capture. We therefore use household proximity to banks offering structured products to instrument the supply of structured products. This instrumental variable analysis confirms the positive impact of structured product supply on the risky share of households.

The increase in the risky share is especially pronounced for households with low financial wealth, and of older age. Households use cash to fund 63% of investments in structured products: when a household invests 1% percent of their financial wealth in retail structured products, it therefore increases its risky share by 0.63%. When adjusting for the exposure of structured products to equity markets, the gain in household exposure to risky assets remains substantial. When investing 1% of their financial wealth in structured products while selling 0.37% of a traditional risky asset, a household increases its exposure to risky assets by 0.3%.

Fourth, households participating in structured products differ from owners of traditional risky assets along the IQ and age dimensions. The probability of participating in retail structured products is a hump-shaped function of IQ, while the probability of owning stocks and equity funds monotonically increases with IQ. The probability of participating in retail structured products increases with age, while age reduces the probability of owning equity funds and stocks. These relationships suggest that structured products attract specific groups of households that are less likely to invest in traditional risky assets. Among participants, the share of financial wealth invested

³We do not study corporate bonds as they represent a negligible fraction of household portfolios.

in structured products is decreasing with wealth and increasing with age. Poor and old households traditionally have a low risky share, as the share of stocks and funds in financial wealth exhibit the reverse relationships: they are both increasing in wealth and decreasing in age. On the other hand, the share of wealth held in cash relates to wealth and age similarly than for structured products. The relationship between household characteristics and product design suggests that less sophisticated households predominantly look for protection, while sophisticated households look for design associated with higher expected returns. This mapping between household characteristics and product design suggests an heterogeneity in preferences across households.

Finally, we develop a portfolio-choice model to investigate the theoretical mechanisms possibly explaining our empirical results on the impact of structured product introduction on household portfolio allocation. In this model, the investor can invest in three distinct assets: a risk-free bond, a stock market index and a structured product offering a guaranteed return and a participation in the performance of a stock market index. We find that loss aversion or misperception about the design of structured products are the most likely mechanism to explain the data. By contrast, the strong demand for structured products cannot be explained by a constant relative risk aversion (CRRA) utility alone, while habit formation can only generate a moderate appetite for guaranteed products.

This study contributes to the strand of the household finance literature documenting the limited stock market participation and low risky shares of households (Campbell, 2006; Calvet et al., 2007). While several papers explore possible explanations for low risk-taking (Attanasio and Vissing-Jørgensen, 2003; Guiso and Jappelli, 2005; Guiso, Sapienza, and Zingales, 2008; Haliassos and Bertaut, 1995; Hong, Kubik, and Stein, 2004; Barberis, Huang, and Thaler, 2006; Kuhnen and Miu, 2015), our work focuses on possible solutions that can alleviate it. In this respect, our study relates to papers that explore solutions to the frictions households face in their financial decisions, such as financial advisors (Gennaioli, Shleifer, and Vishny, 2015), default options (Madrian and Shea, 2001), or innovative banking products (Cole, Iverson, and Tufano, 2016).

Our work also contributes to the literature on the cost and benefits of financial innovation. Several studies have underlined potential adverse effects of financial innovation, such as speculation (Simsek, 2013) or rent extraction (Biais, Rochet, and Woolley, 2015; Biais and Landier, 2015), particularly from unsophisticated agents (Carlin, 2009). The present paper illustrates how innovative

financial products may also benefit unsophisticated market players. Our paper suggests that innovative security design can mitigate investor behavioral biases, and not merely exploit them (C  l  rier and Vall  e, 2017), thereby having a positive impact on investor welfare. This mechanism differs from and complements the more traditional role of financial innovation to improve risk-sharing and complete markets (Calvet, Gonzalez-Eiras, and Sodini, 2004). While recent work has focused on the dark side of retail structured products (Arnold, Schuette, and Wagner, 2016; Henderson and Pearson, 2011; Hens and Rieger, 2014), the present study offers a more nuanced view of these markets.

The paper is organized as follows. Section II provides background on retail structured products and presents the asset pricing results. Section III documents the adoption of retail structured products in Sweden and studies the impact of these products on household risky shares. In Section IV, we explore the relationship between household characteristics and both the likelihood and extent of structured product investments. In Section V, we develop a theoretical framework of portfolio allocation for an investor that can access products paying a risk premium while offering a capital protection, and interpret our empirical results in light of the model predictions. Section VI concludes. An Internet Appendix provides additional empirical results.

II. The Swedish Market for Structured Products

A. *The Development of Retail Structured Products*

Retail structured products include any investment products marketed to retail investors and possessing a payoff function that varies automatically and non-linearly with the performance of an underlying financial asset.⁴ Typically designed with embedded options, these products leave no room for discretionary investment decisions during the life of the investment. These products are based mainly on equity indices and individual stocks but may also offer exposure to commodities, fixed income, or alternative indices.

For illustration purposes, we provide below an example of a Swedish best-seller named *Spax Pension 284d* sold by Swedbank in 2004 (ISIN: SE0001242983):

⁴Exchange traded funds, which have payoffs that are a linear function of a given underlying financial index, are not retail structured products.

The product has a maturity of 8 years and a fee of 1.5% is charged at issuance. The product return is linked to the performance of the OMX 30 index, as follows: at maturity the product offers a minimum capital return of 100% plus 105% of the positive performance of the index over the investment period. The performance of the index is calculated as the average of the index return since inception over the last 13 months, and does not include dividends.

The retail market for structured products emerged in Europe at the beginning of the 2000s and has subsequently experienced steady growth. In 2012, with 770 billion euros of assets under management, the retail market for structured products stood at 3% of all European financial savings, one-eighth of the assets under management of European mutual funds, and twice the assets under management of the hedge fund industry. The European market is the largest market in the world, with more than half of the global volume. The US and Asian markets, however, have been growing fast: retail structured product assets under management exceeded 400 billion US dollars in 2015 in the US.

In Europe, retail structured products are available to any household and are under the same regulatory framework as stocks or mutual funds during our sample period. Specific rules to regulate the distribution of these products are rare. While the conditions under which certain categories of structured products could be sold to retail investors were tightened by Italy in 2009, France in 2010, and Belgium in 2011, Norway was the only country that placed a ban on selling structured products to retail investors and did so in 2008.

The Swedish market for structured products is an ideal laboratory for our research question because most of the products offer a capital protection (98%), and the overall level of product complexity is moderate. Potentially exploitative behaviors by banks, such as catering to reaching-for-yield investors by shrouding risk, are therefore less of a concern in Sweden than in markets such as France, Germany, or Italy (Célérier and Vallée, 2017).

B. Characteristics and Design of Structured Products

The dataset compiled by Célérier and Vallée (2017) contains detailed information on all retail structured products sold in Europe since 2002. Comprehensive information on the pay-off structure,

distributors, and volume are available at the issuance level. The database also includes all the features embedded in each product, obtained through a text analysis of the pay-off description.⁵

INSERT TABLE I

Our sample includes 1,510 equity-linked structured products issued in Sweden over the 2002 to 2007 period, for a total volume of 8 billion dollars.⁶ Table I reports summary statistics on the main characteristics of these products.

In terms of design, products offering a capital guarantee, and therefore presenting a limited downside, are overwhelmingly dominant. Hence, 98% of the products issued over the period offer a minimum payoff of at least 100% of face value at maturity. The majority of these products, however, are issued at a price that is higher than face value, as an initial fee is added to calculate the issuance price. This feature leads to an actual level of capital protection below 100%, or 91.3% on average in the sample.

In more than half of the issuances, representing 60% of the volume, the capital protection is associated with a participation in the rise of the underlying asset coupled with an Asian option. We label such a payoff structure as the representative design in the market.

More formally, the representative contract is defined by:

1. an initial fee *init* charged when the product is originated at date 0,
2. a maturity date T ,
3. an underlying asset or index, S_t ,
4. a benchmark return R_T^* based on the underlying,
5. a participation rate p ,
6. a guaranteed rate of return g .

The benchmark return is the average performance of the underlying measured at prespecified dates $t_1 < \dots < t_n$:

$$1 + R_T^* = \frac{S_{t_1} + S_{t_2} + \dots + S_{t_n}}{nS_{t_0}}, \quad (1)$$

⁵See C  lerier and Vall  e (2017) for the precise methodology.

⁶In Sweden, the large majority of products offer equity exposure (87% of the products)

where S_{t_0} is the initial reference level of an index or asset at t_0 , typically a few days after issuance.

In the empirical section, we refer to $t_n - t_1$ as the length of the Asian option.⁷

The gross return on the structured product between issuance and maturity is

$$1 + R_{g,T} = \frac{1 + \max(p R_T^*; g)}{1 + \text{init}}. \quad (2)$$

The initial fee is deducted from the initial investment at the initial date. For example if $\text{init} = 0.1$, a \$110 investment in the guaranteed product is worth $\$100[1 + \max(p R_T^*; g)]$ at maturity.⁸

C. Pricing of Structured Products

In order to investigate the risk and return properties of the representative contract, we develop a pricing model based on the absence of arbitrage. We assume that under the risk-adjusted measure \mathbb{Q} , the underlying follows a geometric Brownian motion:

$$\frac{dS_t}{S_t} = (r_f - q)dt + \sigma dZ_t, \quad (3)$$

where r_f is the continuous-time interest rate, q is the continuous-time dividend yield, and σ denotes volatility.

Let $\mathbb{E}_0^{\mathbb{Q}}$ denotes the expectation operator conditional on the information available at date 0. Under the risk-adjusted measure \mathbb{Q} , the mean return on the structured product is equal to the risk-free rate, $\mathbb{E}_0^{\mathbb{Q}}(1 + R_{g,T}) = e^{r_f T}$, which by equation (2) implies the following pricing result.

Proposition 1 (Fair pricing of structured product). *The fair initial fee is given by:*

$$\text{init} = e^{-r_f T} \left[1 + g + p M_1^{\mathbb{Q}} N(d_1) - (p + g) N(d_2) \right] - 1, \quad (4)$$

⁷This format can be pensionable through Individual Pension Savings (IPS) status eligibility, and the average term is 3.5 years.

⁸Almost all products have a structured bond format (98% of issuances), and therefore bear credit risk. Credit spread are close to zero in the period we study, and no Swedish banks defaulted during the financial crisis, so this issue plays no role in the analysis.

where $M_1^{\mathbb{Q}}$ and $M_2^{\mathbb{Q}}$ denote the first two moments under \mathbb{Q} of the benchmark return:

$$M_1^{\mathbb{Q}} = \mathbb{E}_0^{\mathbb{Q}}(1 + R_T^*) = \frac{1}{n} \sum_{i=1}^n e^{(r_f - q)(t_i - t_0)}, \quad (5)$$

$$M_2^{\mathbb{Q}} = \mathbb{E}_0^{\mathbb{Q}}[(1 + R_T^*)^2] = \frac{1}{n^2} \sum_{i=1}^n \sum_{j=1}^n e^{[2(r_f - q) + \sigma^2][\min(t_i, t_j) - t_0] + (r_f - q)|t_j - t_i|}, \quad (6)$$

$(w^{\mathbb{Q}})^2$ denotes the variance of the log benchmark return:

$$(w^{\mathbb{Q}})^2 = \text{Var}_0^{\mathbb{Q}}[\ln(1 + R_T^*)] = \ln \left[M_2^{\mathbb{Q}} (M_1^{\mathbb{Q}})^{-2} \right], \quad (7)$$

and d_1 and d_2 are Black-Scholes normalized ratios:

$$d_1 = \frac{1}{w^{\mathbb{Q}}} \left[\ln \left(\frac{p}{p + g} \right) + \ln(M_1^{\mathbb{Q}}) + \frac{(w^{\mathbb{Q}})^2}{2} \right] \quad (8)$$

and $d_2 = d_1 - w^{\mathbb{Q}}$. Furthermore, the fair initial fee (4) increases with the participation rate p and the guaranteed return g .

The expected return of the representative contract under the physical measure \mathbb{P} is easily derived when the underlying follows

$$\frac{dS_t}{S_t} = (\mu - q)dt + \sigma dZ_t$$

under \mathbb{P} .

Proposition 2 (Expected return of the guaranteed product under \mathbb{P}). *The expected return on the guaranteed product under the physical measure is*

$$\mathbb{E}^{\mathbb{P}}(1 + R_{g,T}) = \frac{1 + g + pM_1^{\mathbb{P}}N(d_1^{\mathbb{P}}) - (p + g)N(d_2^{\mathbb{P}})}{1 + \text{init}},$$

where $M_1^{\mathbb{P}}$ and $M_2^{\mathbb{P}}$ denote the first two moments under \mathbb{P} of the benchmark return:

$$M_1^{\mathbb{P}} = \mathbb{E}_0^{\mathbb{P}}(1 + R_T^*) = \frac{1}{n} \sum_{i=1}^n e^{(\mu - q)(t_i - t_0)}, \quad (9)$$

$$M_2^{\mathbb{P}} = \mathbb{E}_0^{\mathbb{P}}[(1 + R_T^*)^2] = \frac{1}{n^2} \sum_{i=1}^n \sum_{j=1}^n e^{[2(\mu - q) + \sigma^2][\min(t_i, t_j) - t_0] + (\mu - q)|t_j - t_i|}, \quad (10)$$

$(w^{\mathbb{P}})^2$ denotes the variance of the log benchmark return:

$$(w^{\mathbb{P}})^2 = \text{Var}_0^{\mathbb{P}}[\ln(1 + R_T^*)] = \ln \left[M_2^{\mathbb{P}} / (M_1^{\mathbb{P}})^2 \right], \quad (11)$$

and

$$d_1^{\mathbb{P}} = \frac{1}{w^{\mathbb{P}}} \left[\ln \left(\frac{p}{p+g} \right) + \ln(M_1^{\mathbb{P}}) + \frac{(w^{\mathbb{P}})^2}{2} \right], \quad (12)$$

and $d_2^{\mathbb{P}} = d_1^{\mathbb{P}} - w^{\mathbb{P}}$.

A subset of contracts include a cap to the return that can be earned on the initial investment net of fee. In the Appendix, we provide the fair initial fee and expected return in the presence of a cap.

D. Summary Statistics on Structured Products

D.1. Issuance and Design

Panel A of Table I provides summary statistics on the issuance of all structured products in Sweden during the 2002-2007 period, as well as on the sub-sample of products defined by the representative contract. The representative contract represents 55% of the retail structured products issued during our sample period in Sweden, and 60% of the corresponding volumes. Table I also shows summary statistics of the six parameters that define the contract for this sub-sample of products: the maturity T , the capital guarantee g , the initial fee $init$, the participation rate p , the market premium μ and volatility σ of the underlying asset, and the length of the Asian option $t_n - t_1$.

D.2. Pricing

The sub-sample of products described by the representative contract rely on 155 different underlying assets, which are either a stock index, a basket of stock indices, or a basket of stocks. We rely on the following assumptions for each underlying asset.

- We estimate the risk premium of a given underlying asset at the monthly frequency, $\mathbb{E}(R_{m,t})$, by applying the World CAPM over the longest time-series available and a risk premium on

the world market of 4%. We then convert it into our model input $\mu = \ln[1 + \mathbb{E}(R_{m,t})]/t$, where $t = 1/12$ if μ is expressed in yearly units.

- We use historical volatility as measured over the 1990 - 2007 period for σ .
- We use the latest dividend yield before the structured product issuance for q .
- We use the SEK Swap Rate for the product maturity as the risk free rate r_f in the pricing model.

We compute the product markup as the difference between the fair initial fee that we derive from Proposition 1 and the actual initial fee we observe in our data. To obtain a yearly markup that can be easily compared to mutual fund yearly fees, we scale this markup by the product maturity in year. We then derive the excess expected return the investor earns. A product expected return is calculated as per Proposition 2. The excess expected return is obtained by annualizing this expected return and subtracting the risk-free rate (T-bill rate).

Table I reports the product markup and excess expected returns implied by the asset pricing method. There are several important take-aways. First, the cost to households/ the profitability to the banks of retail structured products represents 1.4% of the invested amount per year on average, which is comparable to the fees of mutual funds available to the same population.⁹ This finding suggests that banks have comparable financial incentives to market equity mutual funds and retail structured products.

Second, yearly excess expected returns for these products are significantly positive with an average of 4.9%. This confirms that retail structured products allow households to earn part of the risk premium.

INSERT FIGURE 1

In Figure 1, we report the distribution of the expected excess return in the population of structured products. We observe that about 90% of products earn a positive risk premium, which confirms that these products can benefit retail investors. In Table IA.2 of the Internet Appendix, we conduct a sensitivity analysis that shows that our results are not driven by a particular choice of parameters. Furthermore, Table IA.3 shows that the monotonic relationships between the initial

⁹The average equity mutual fund fee in Sweden over the period 2000-2007 is 1.80%.

fee, participation rate and guaranteed return implied by Proposition 1 hold in the cross-section of contracts.

Having empirically established that the retail structured products marketed to Swedish households allow them to share in a large fraction of the risk premium, we turn to their portfolio data to study who buys such products and to which extent.

III. Do Structured Products Increase Household Risk-Taking?

A. Measuring Household Risky Share

Household risk-taking is a function of the share of their financial wealth invested in equity products and the share of the risk premium they obtain through each equity products.

For guaranteed products, the fraction of the equity premium earned by the household in expectation is the fraction of the excess expected return over the market risk premium:

$$\eta_g = \frac{\mathbb{E}(R_{g,T} - e^{r_f T})}{\mathbb{E}(R_{m,T} - e^{r_f T})}.$$

This definition coincides with the risky share in the case of a portfolio of the stock and the riskless asset. It can also be applied to mutual funds, where the expected fund return is net of fees.

We compute η for each equity product, i.e. both funds and structured products, and assume $\eta = 1$ for stocks. For funds, the excess expected return is the difference between the market premium and the fund fees. We collect fund fees for each fund in our database. For structured product, we compute the excess expected return as described in Proposition 2. We find that η amounts to 60% for structured products versus 70% for equity funds on average. We measure an household risky share as follows:

$$w_h = \sum_{i=1}^3 \eta_i \times \frac{EquityProduct_{h,i}}{FinancialWealth_h},$$

where i describes the three equity asset classes: structured products, equity mutual funds, and stocks.

B. Household Risk-Taking: Data and Summary Statistics

We investigate household holdings by merging the structured product database with the Swedish Income and Wealth Registry. This second dataset, described in Calvet et al. (2007), is a panel of financial wealth and income covering all Swedish households over the period 2000 to 2007. It provides us with the detailed breakdown of financial wealth between cash, equity mutual funds, stocks and structured products.¹⁰ This panel has been used to study household portfolio diversification (Calvet et al., 2007), rebalancing (Calvet, Campbell, and Sodini, 2009a), investor sophistication (Calvet, Campbell, and Sodini, 2009b), financial risk-taking (Calvet and Sodini, 2014) and value and growth investing (Betermier, Calvet, and Sodini, 2017). The data are available because the Swedish government levied a wealth tax over the 2000 to 2007 period. To collect this tax, the government assembles records of financial assets. The records are available at the individual security level and are based on statements from financial institutions that are verified by taxpayers. In addition, the data contains a high diversity of individual socio-demographic and financial characteristics, in addition to a number of proxies for sophistication, such as IQ and educational attainment.

The merge of the two datasets is done using the unique ISIN identifiers of financial assets. Household portfolio data are disaggregated at the security level, with the corresponding ISIN of each security, including retail structured products. The dataset resulting from merging the two previous sources represents an ideal setting to investigate how the development of structured products affected household investment decisions, as the overlap of the datasets occurs during the launch and subsequent high growth period of the retail market for structured products.

INSERT TABLE II

Table II presents demographic and financial characteristics for the different sample used in our empirical analysis. The IQ data, resulting from military tests, is only available for men born after 1945.¹¹

Despite the usual reluctance of households to invest in equity funds and stocks, the retail market for structured products developed within a few years in Sweden. At the end of 2007, 11% of Swedish

¹⁰Bonds and bond mutual funds, which we can also observe, are infrequent.

¹¹Our analysis being conducted at the household level, we use the man's IQ as a proxy of the average IQ in the household.

households participated in this new asset class and invested a significant fraction of their financial wealth in these products.

Figure 3 illustrates the massive adoption of structured products in Sweden over the 2002-2007 period. The market is still dynamic in the recent period: 3.2 billion euros of retail structured products have been issued in 2015 in Sweden, which makes it comparable to 2007.¹² Panel A of Figure 3 shows the evolution of the share of households participating in structured products and in other stock market products over the 2002 to 2007 period.¹³ Household participation in traditional stock market products, while high in Sweden compared to other countries, is slightly declining over the sample period. Conversely, the share of household investing in structured products significantly increases from 2000 to 2007, reaching 11% in 2007. Retail structured products, therefore, play an increasing role in households' access to stock markets over the period.

INSERT FIGURE 3

C. Impact of Structured Products on Financial Risk-Taking

We now explore whether investing in structured products is associated with an increase in the risky share of household financial wealth. This analysis requires one important adjustment when comparing the risky share of households before and after the introduction of retail structured products. While we include structured products in the risky share - as they allow earning a fraction of the risk premium - we adjust the portfolio weight of structured products, as previously described.

We focus on the subsample of households participating in equity funds or stocks in 2002 and compare the change in the risky share between 2002 and 2007 for households that have invested in structured products during that period versus households that have not. The risky share is expressed in percentage points of financial wealth. The exact specification is:

$$w_{h,2007} - w_{h,2002} = \alpha + \beta \mathbb{1}_{SP,h} + \eta' x_h + \varepsilon_h,$$

where $w_{h,t}$ denotes the risky share of household h in year t , x_h is a vector of household characteristics, and ε_h is the measurement error. The vector x_h includes the number of children, household

¹²SRP 2015 annual report

¹³A household is viewed as a participant in a given financial product if it possesses a strictly positive amount of investment in that type of financial products in a given year.

size, an urban dummy, a gender dummy, the change in income over the period, the change in financial wealth, as well as wealth and income decile and IQ or years of education fixed effects.

Column (1) of Table III displays the regression coefficients for the total sample. The coefficient of the variable $\mathbb{1}_{SP,h}$ suggests that structured product participants increase their risky share by an additional 3.5 pp over the 2002-2007 period compared to nonparticipants. This increase represents more than 15% of their initial risky share, and doubles the average increase for the whole population.

Figure 4 shows that the effect of participating in structured products is higher on households with ex-ante low risky share. We split the sample into 8 categories based on the level of risky share in 2002 and interact indicators for each of these categories with the indicator variable for participating in structured products.

INSERT FIGURE 4

Table III confirms this result: participating in structured products is associated with an additional active increase in risky share of 10 percentage points for household in the lowest quartile of risky share who initially have less than 4% of risky share. To obtain this result, we split the sample in quartiles of risky share in 2002. Households with a risky share of 3.8% ex ante experienced a growth in their risky share 9.99 pp higher when they participated in structured products. The coefficient of the dummy variable $\mathbb{1}_{SP,h}$ is decreasing as household ex-ante risky share increases.

INSERT TABLE III

Finally, we interact the indicator variable for participating in structured products with financial wealth decile, IQ levels, and age categories to identify heterogeneity in this change along our key characteristics. Figure 5 displays the OLS regression coefficients. This figure illustrates how structured product participants have increased significantly more their risky share, and how this increase is more pronounced for households with lower financial wealth, and for older households.

INSERT FIGURE 5

Columns (6) to (9) in Table III displays the regression coefficients with linear specifications for the explanatory variables.

D. Controlling for Endogenous Selection: Instrumental Variable Analysis

Because investment in structured products is an endogenous decision which might correlate with a willingness to increase household risky share independently of the introduction of structured products, our analysis requires an exogenous variation in the supply of retail structured products. For this purpose, we exploit the fact some Swedish banks did not market structured products to their client base during our sample period, and that these banks are unevenly distributed geographically, which generates geographic variation in the supply intensity of retail structured products.

We collect the list of bank branches in each parish and build a proxy for the household exposure to retail structured product supply by calculating the ratio of branches in their parish that market retail structured product during our study period.

This strategy alleviates concerns that households might have several banking relationships, or could shop around. It relies on the assumption that shopping banking services is a local market, which is supported by the existing literature (Beck, Demircuc-Kunt, and Peria, 2007).

A natural concern is that household from parishes with few or no banks distributing retail structured products differ fundamentally from the other parishes, which could result in a different trend in the evolution of their portfolio allocation. This concern is mitigated by the richness and the size of our dataset, which allows us to control for a comprehensive set of household characteristics, as well as their evolution, in non-parametric specifications.

Figure 7 illustrates the geographic distribution of supply intensity.

INSERT FIGURE 7

Table V shows the result of this analysis. Column 1 displays the coefficients of the first stage, and shows that a higher share of branches offering structured products in a given parish significantly increases the probability to invest in structured products for the households of this parish, even when controlling for household characteristics. Column 2 presents the coefficients from the second stage, which regresses change in the risky share on participation in retail structured products, where participation in retail structured product is instrumented. The positive and significant coefficient on the indicator variable for participating in retail structured products confirms our initial result. The larger magnitude of the coefficient suggests that the endogeneity issue is biasing

our results downwards, which suggests that households participating in structured products would have actually reduced their risky share in the absence of these products.

INSERT TABLE V

E. How Does Innovation Change Household Portfolio Allocations?

We now study how households that invest in structured products fund these purchases, and more specifically whether they do so with cash or by selling stock market instruments they own. We can measure this substitution between financial assets thanks to the panel structure of our data.

In Table IV, we report the rate of substitution between structured products and cash at a yearly frequency. We estimate the panel regression:

$$CashShare_{h,t} = \alpha_h + \delta_t + \beta SPshare_{h,t} x_h + \varepsilon_{h,t},$$

where $CashShare_{h,t}$ is the share of financial wealth held as cash by household h in year t , $SPshare_{h,t}$ is the share of financial wealth invested in equity-linked **structured products**, x_h denotes characteristics, α_h is a household fixed effect and δ_t is a year fixed effect. x_h is either the decile of financial wealth, the level of IQ, or the age category. The coefficient on the interacted term $SPshare_{h,t} \times x_h$ shows how structured products purchase are predominantly funded with cash, with an average substitution rate of 62%. Substitution with cash appears to be even higher for household with lower financial wealth, lower IQ, and younger households, which is consistent with the larger increase in stock market exposure for these sub-groups of the population.

INSERT TABLE IV

When we adjust for the return elasticity to the underlying asset performance, the average increase in exposure to risky assets resulting from household investing 1% of their financial wealth in structured products is therefore around 0.3%. As structured product participants invest on average 15% of their financial wealth into these products, this translates into an increase in the exposure to risky assets of around 5% of their financial wealth.

F. Does Financial Innovation Drive Risky Asset Market Participation?

We define new participants to risky asset markets as households that were not participating in equity funds or stocks during the four years before 2002 and that start investing in equity funds, stocks or structured products during the 2003-2007 period.

Figure 6 shows the evolution of new participants, and their breakdown between new participants who start investing in equity funds or stocks, and new participants who start investing in structured products. We observe that the share of new participants through structured products substantially increases over time. While new participants through structured products only represent 3.6% of new participants through traditional products in 2002, this proportion reaches more than 22% in 2007.

INSERT FIGURE 6

Finally, column (3) in Table V indicates that households are more likely to start participating in stock markets when they live in parishes where the supply of retail structured products is high.

IV. Who Buys Structured Products and To Which Extent?

We now zoom in on the characteristics of investors in structured products. We investigate the drivers of participation in guaranteed products (extensive margin) as well as the share of wealth invested in these products (intensive margin). We run similar analysis for equity mutual funds and stocks, as well as for cash for in the intensive margin. Overall, the relationships between household characteristics and the likelihood and extent of participation to guaranteed products appear to be significantly different than for equity mutual funds and stocks, and similar than for cash.

A. Characteristics of Structured Product Participants

We study the characteristics of households that invest in retail structured products. In Table VI, we compare financial and demographic characteristics of households investing in structured products with the characteristics of the whole Swedish population, and of households investing in equity funds and stocks.

These unconditional summary statistics points at structured products participants being wealthier than the overall population and fund and stock participants, but also significantly older, and less invested in risky assets than equity fund and stock participants.

INSERT TABLE VI

To further explore the determinants of structured product participation, we implement logit regressions to estimate the probability that a household invests in structured products at least once during the 2002 to 2007 period. We focus on the three main characteristics that identify households with lower participation in risky asset markets: financial wealth, IQ and age.

We run the following specification for participating in retail structured products, equity funds, or stocks:

$$\text{logit}(p_h) = \log\left(\frac{p_h}{1 - p_h}\right) = \alpha + \beta x_h,$$

where p_h is the probability that the household participate at least once in a given type of investment over the 2002-2007 period, and x_h is a vector of household characteristics in 2007. Figure 8 displays the predicted probability of participation for each financial wealth decile, IQ level, and age category. Each regression includes financial wealth, IQ, and age fixed effects in this non-parametric specification as explanatory variables as well as controls for the number of children in the household, household size, a urban dummy and a household head gender dummy.

INSERT FIGURE 8

The likelihood to participate increases with financial wealth for all three asset classes. However, there are notable differences between retail structured products, and equity fund and stocks, on the two other dimensions. The likelihood of participating in retail structured products is a hump-shaped function of IQ, while it is a monotonically increasing function for equity funds and stock markets. The different pattern is even more pronounced for age: while likelihood of participating in retail structured products increases with age (except at the end of life), the opposite is true for equity funds and stocks. We also implement the same analysis on years of education, and find results consistent with the ones for IQ that we include in the Internet Appendix.

These differences point to retail structured products appealing differently than equity funds and stocks to specific sub-groups of the population: these products appear in relative higher demand from mature households, but in lower demand from households with the highest IQs.

B. Who Invests the Most in Structured Products?

The bottom half of Figure 3 displays the evolution of the composition of the financial wealth of households that participate in retail structured products as of end 2007. The figure shows how these households build up a significant share of their wealth invested in retail structured product in a matter of five years: from 0% in 2002 to more than 15% in 2007. This increases contrasts with how they reduce over the same period their share of wealth held in cash, as well as the share invested in stocks and equity fund.

We then explore whether household characteristics relate to the extent to which households invest in structured products, as well as in other financial assets: cash, equity funds, and stocks. For this purpose, we run cross-sectional OLS regressions on the share of financial wealth invested in a given financial asset as of end of 2007. We use the following specification on the sample restricted to structured product participants:

$$\omega_{j,h} = \alpha_j + \beta_j x_h + \varepsilon_{h,j},$$

where $\omega_{j,h}$ is the share of financial wealth invested in asset class j . As previously, the vector of characteristics, x_h , consists of financial wealth, IQ and age, as well as the number of children, household size, a urban dummy and a household head gender dummy. Figure 9 plots regression coefficients on fixed effects for each financial wealth decile, IQ level, and age category. We also report the regression coefficient in Table VI for assessing the economic magnitudes.

There are three key take-aways from this analysis. First, household with lower financial wealth invest a larger share of their wealth in retail structured products. Second, older households invest a larger share of their wealth in retail structured products than younger households. Last, these relationships are the opposite for traditional equity products, but are similar for cash. These results suggest a complementarity between structured products, and equity funds and stocks. The relationship between IQ and the share invested in structured product appear unclear, while it is

strongly positive for equity funds and stocks.

INSERT FIGURE 9

C. Product Design and Household Characteristics

We finally investigate whether and how the design of retail structured products varies with household characteristics. We explore the four main parameters of the representative design: (i) participation rate p , (ii) initial fee $init$, (iii) length of the Asian option $t_n - t_1$, and (iv) capital guarantee g .

We run OLS regressions using each of these four parameters as the dependent variable, and financial wealth deciles, IQ levels, and age categories as explanatory variables. Figure 10 plots the coefficients of these regressions. We observe that while the participation rate and the initial fee vary with household characteristics, the length of the Asian option and the guarantee are largely insensitive to them. Household with lower financial wealth, lower IQ and older are more likely to invest in products offering lower participation rate and a lower initial fee, which corresponds to a higher level of guarantee. The magnitude are however modest. The length of the Asian option decreases with IQ, but again the magnitude is small.

INSERT FIGURE 10

This mapping between household characteristics and product design suggests some heterogeneity in preferences among the population. In addition, this result does not support a predatory view of the market, where one design parameter, such as the initial fee, is shrouded for the low sophistication households.

V. Theoretical Framework for Portfolio Choice

This section investigates the theoretical mechanisms that can explain the impact on household portfolios of the introduction of structured products we observe in our data. We develop a portfolio-choice model with three assets: a risk-free bond, a stock-market index, and a structured product based on the index. Structured product distribution of returns is derived from the methodology in Section II. We compute the portfolio choice of an investor with CRRA, habit formation, or loss

aversion preferences.¹⁴ We finally calculate the increase in utility brought by the access to the structured product, and determine the increase in the risk-free rate that would provide the same utility gain for the agent.

A. *Portfolio Choice and Corresponding Utility*

The agent is endowed with initial wealth W_t that she can invest in the riskless asset, the stock, and the guaranteed product. Let α_t denote the portfolio weight of the stock and β_t the portfolio weight of the structured product. The agent chooses the values of α_t and β_t that maximize the expected value of its utility. We compute the portfolio choice α_t and β_t of an investor with CRRA, habit formation, and loss aversion preferences, as well as the increase in interest rate that would correspond to the same gain in utility.

A.1. CRRA Investor

We consider an agent with CRRA utility $\mathbb{E}_t[u(C_{t+1})]$, where

$$u(C) = \frac{C^{1-\gamma}}{1-\gamma}.$$

The agent chooses the values of α_t and β_t that maximize

$$\mathbb{E} \left\{ u \left[W_t (1 + R_f + \alpha_t R_{m,t+1}^e + \beta_t R_{g,t+1}^e) \right] \right\} = W_t^{1-\gamma} v(\alpha_t, \beta_t),$$

where

$$v(\alpha_t, \beta_t) = \frac{1}{1-\gamma} \mathbb{E} \left[(1 + R_f + \alpha_t R_{m,t+1}^e + \beta_t R_{g,t+1}^e)^{1-\gamma} \right]$$

denotes the expected utility from one unit of initial wealth.

When the investor can only invest in the bond and the stock, the optimal share invested in the stock is given by Merton's formula:

$$\alpha_t = \frac{\mu + \sigma^2/2}{\gamma\sigma^2},$$

as we verify in the Appendix.

¹⁴We also interact these utility functions with the presence of human capital in the appendix.

When the investor can invest in all three assets, the optimal solution can be computed numerically. For a given $z = \ln(1 + R_{m,t})$, the net arithmetic return on the portfolio is

$$R_p(z; \alpha, \beta) = (1 - \alpha - \beta)R_f + \alpha(e^z - 1) + \beta \max[p(e^z - 1); g].$$

The objective function is

$$v(\alpha_t, \beta_t) = \frac{1}{1 - \gamma} \int_{-\infty}^{+\infty} [1 + R_p(z; \alpha, \beta)]^{1-\gamma} \phi(z; \mu + r_f, \sigma^2) dz,$$

where $\phi(\cdot; m, \sigma^2)$ denotes the p.d.f. of a Gaussian with mean m and variance σ^2 .

In a second step, we compute the increase in interest rate that would correspond to the same gain in utility.

A pure bond portfolio achieves the utility level $W_t^{1-\gamma} v(\alpha_t, \beta_t)$ if and only if

$$1 + R_f^* = [(1 - \gamma) v(\alpha_t, \beta_t)]^{1/(1-\gamma)}.$$

If the investment period contains n years, the gross yearly interest rate is

$$(1 + R_f^*)^{1/n} - (1 + R_f)^{1/n}$$

in annual units.

A.2. Habit Formation

We now consider an agent with habit formation with utility

$$u(C) = \frac{(C - X)^{1-\gamma}}{1 - \gamma}.$$

Let $\xi = X/W$ denote the habit to wealth ratio. The objective function is

$$v(\alpha, \beta) = \frac{1}{1 - \gamma} \int_{-\infty}^{+\infty} [1 + R_p(z; \alpha, \beta) - \xi]^{1-\gamma} \phi(z; \mu + r_f, \sigma^2) dz.$$

A strategy is admissible if $C - X \geq 0$ for all realizations of the stock return. That is

$$[1 + (1 - \alpha_t - \beta_t)R_f + \alpha_t(e^z - 1) + \beta_t \max[p(e^z - 1); g]] \geq \xi$$

for all $z \in \mathbb{R}$, which holds if and only if $1 + (1 - \alpha_t - \beta_t)R_f - \alpha_t + \beta_t \max(-p; g) \geq \xi$. Therefore, a portfolio is admissible if and only if

$$(1 + R_f)\alpha_t + [R_f - \max(-p; g)]\beta_t \leq 1 + R_f - \xi.$$

We compute the increase in interest rate that would lead to the same utility gain as follows. A pure bond portfolio achieves the utility level $W_t^{1-\gamma}v(\alpha_t, \beta_t)$ if and only if $(1 + R_f^* - \xi)^{1-\gamma}/(1 - \gamma) = v(\alpha_t, \beta_t)$, or equivalently

$$1 + R_f^* = [(1 - \gamma)v(\alpha_t, \beta_t)]^{1/(1-\gamma)} + \xi.$$

If the investment period contains n years, the welfare gain is quantified by the difference $(1 + R_f^*)^{1/n} - (1 + R_f)^{1/n}$.

A.3. Loss Aversion

We now consider an agent with loss aversion. The expected utility becomes

$$u(W; W_R) = \begin{cases} (W - W_R)^{1-\gamma}/(1 - \gamma) & \text{if } W \geq W_R, \\ -\lambda(W_R - W)^{1-\gamma}/(1 - \gamma) & \text{if } W < W_R. \end{cases}$$

Let $\omega_R = W_R/W_t$ denote the ratio of the reference point to initial wealth.

The objective function is $W_t^{1-\gamma}v(\alpha_t, \beta_t)$, where

$$v(\alpha_t, \beta_t) = \frac{1}{1 - \gamma} \int_{-\infty}^{+\infty} u[1 + R_p(z; \alpha, \beta); \omega_R] \phi(z; \mu + r_f, \sigma^2) dz.$$

A pure bond portfolio achieves the utility level $W_t^{1-\gamma}v(\alpha_t, \beta_t)$ if and only if $(1 + R_f^* - \omega_R)^{1-\gamma}/(1 - \gamma) = v(\alpha_t, \beta_t)$, or equivalently

$$1 + R_f^* = [(1 - \gamma)v(\alpha_t, \beta_t)]^{1/(1-\gamma)} + \omega_R.$$

If the investment period contains n years, the welfare gain is quantified by the difference $(1 + R_f^*)^{1/n} - (1 + R_f)^{1/n}$.

A.4. Misperception on the Fraction of Risk Premium the Investor Receives

We finally consider the misperception of the product design as a potential mechanism for our empirical results. We assume that investors do not understand the asian option, and therefore believe that their return conditional on the guarantee not being exercised is p times the underlying asset positive return of the product maturity. We study the demand for such a misperceived product. Alternatively, we study the demand for a product that do not We study the portfolio allocation impact of such a belief. The rationale for considering such a variation is that retail structured products design frequently relies on payoff designs that translate into a higher percentage of the index performance the investor receives than a vanilla call option would provide. Asian options, for instance, mechanically reduce the index performance during bullish periods. If household do not distinguish between vanilla call options and Asian options, they misperceive p .

B. *Model Estimation*

B.1. Assumptions

We take the median parameters of the representative design:

- a maturity of 4 years,
- a capital guarantee of 100%,
- an initial fee of 11%,
- a market premium of 4% and a volatility of 20%,
- a Asian option of a length of 4 years

These inputs translate into a p , the percentage of index performance the investor receives through the structured product, of 51.27%.

We use the investment universe with only the risk-free asset as our initial benchmark. For each of the framework specification, we then sequentially introduce the stock index and the structured product, and study the change in portfolio allocation, in utility levels, and the interest rate increase

that would lead to the same increase in utility. We also include quantiles of net portfolio returns.

B.2. Results

Portfolio Allocation

We present a summary of the model allocation outputs and welfare gains in Table VII.

INSERT TABLE VII

They are several key take-aways. First, we observe that CRRA and habit formation utilities are unlikely to explain our data, as they generate negligible appetite for the guaranteed product.

Second, loss aversion, and misperception on the fraction of the index performance the investor will receive, generate significant appetite for the guaranteed product. Third, the risky share expands significantly under both these specifications, which is consistent with the data.

Under the loss-aversion mechanism, structured product would mitigate this behavioral bias and thereby foster households to participate more often and in a larger extent to risky asset markets. On the other hand, the misperception mechanism suggests a possible interaction between behavioral and rational motivation. To generate appetite for risk, banks may need to partly obfuscate its cost.

VI. Conclusion

This study provides empirical evidence suggesting that innovative financial products can help alleviate the low participation of households in risky asset markets. We use a large administrative dataset to characterize the demand for structured products, an innovative class of retail financial products with option-like features.

The micro-evidence in this paper suggests that the introduction of retail structured products increases significantly stock market participation and the risky share of specific subgroups of the population, in particular households with lower financial wealth, with low to median IQ, and older. Both empirical and theoretical evidence is most consistent with these innovative products being successful at alleviating loss aversion among households.

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Figures and Tables

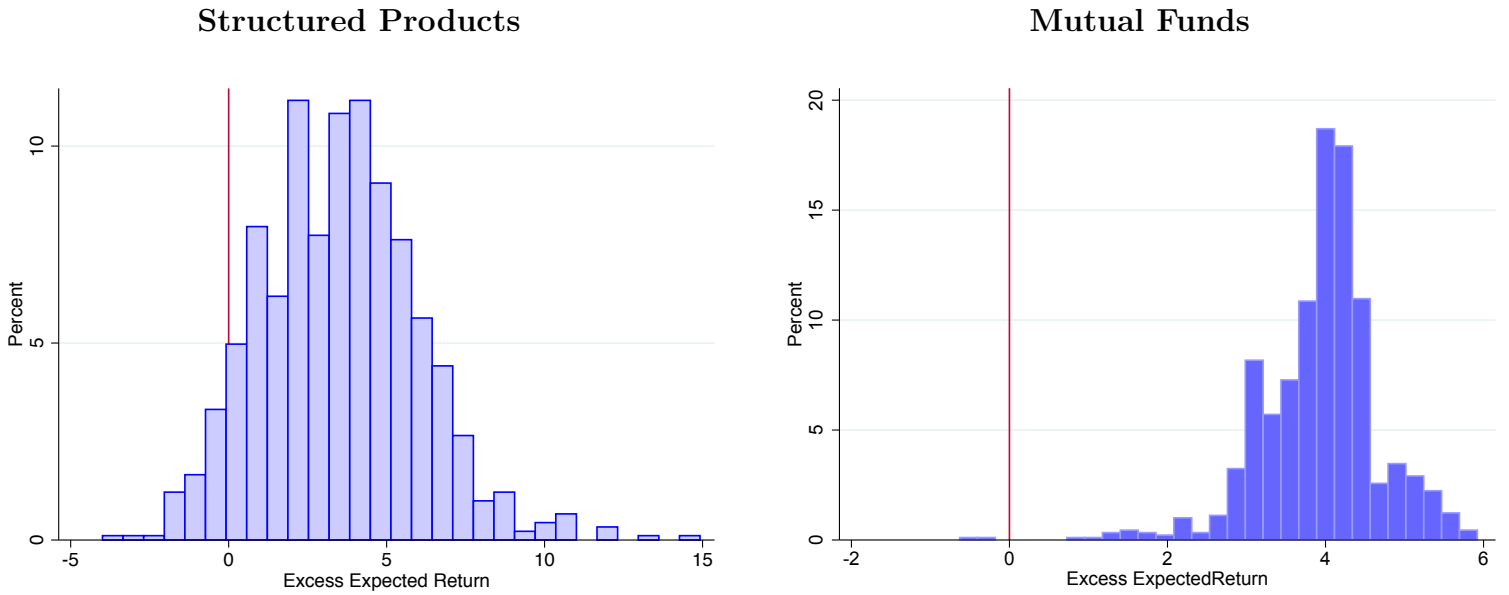


Figure 1. Histogram of the Excess Expected Return Offered by Structured Products and Mutual Funds. This figure shows the histogram of the excess expected returns offered by the representative structured products in our sample (908 products issued from 2002 to 2007). Representative products are products with a guarantee, a participation rate, an initial fee, a cap and an asian option.

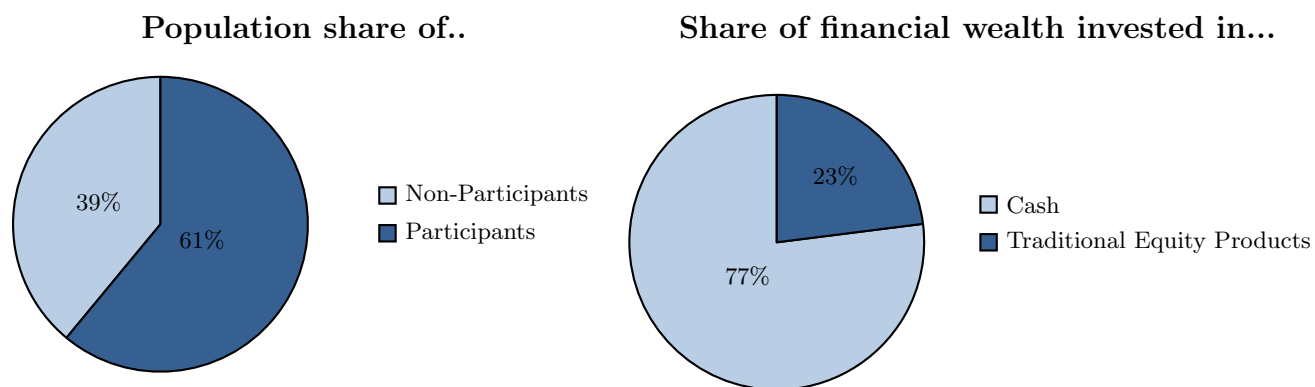
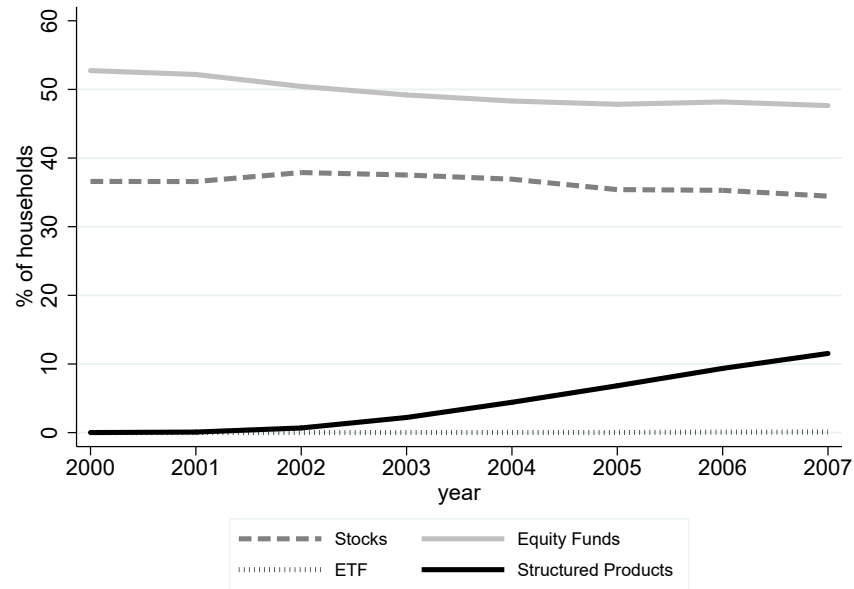


Figure 2. Household Risk Taking in Sweden, 2002. This graph shows the share of Swedish households that participates to stock market in 2002, as well as the level of participation for households that do participation. The risky share is measured as described in section III.A

Panel A. Fraction of Households Participating in Structured Products, Stocks, and Equity Funds



Panel B. Share of Financial Wealth Invested in Structured Products, Stocks, and Equity Funds

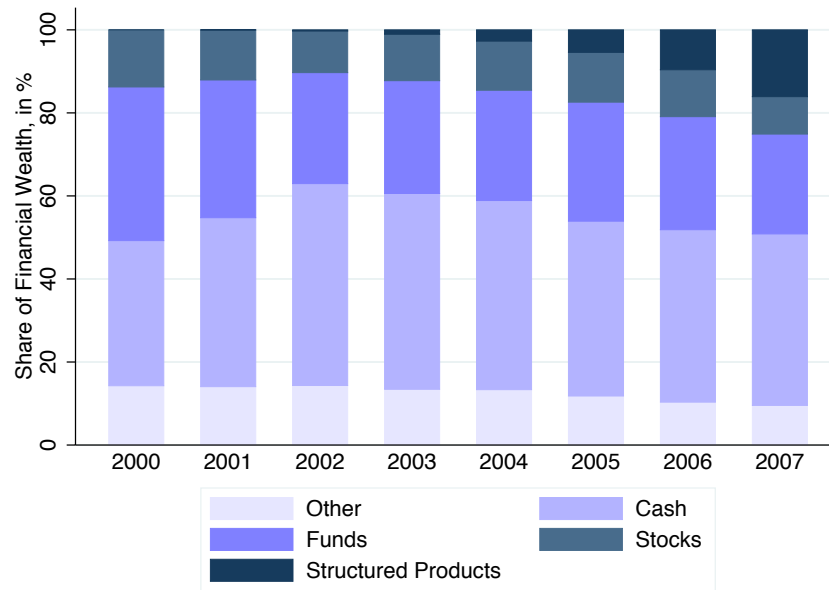


Figure 3. Adoption of Structured Products in Sweden (2000-2007). Panel A shows the evolution of the share of Swedish households investing in equity markets through either stocks, funds or structured products (blue line), in equity funds (dot line), in stocks (grey line), in structured products (red line) and in ETFs (dashed line). Swedish banks started distributing retail structured products in 2000, the beginning of our sample period. Panel B displays the evolution of the composition of the financial wealth of households that participate in retail structured products as of end 2007.

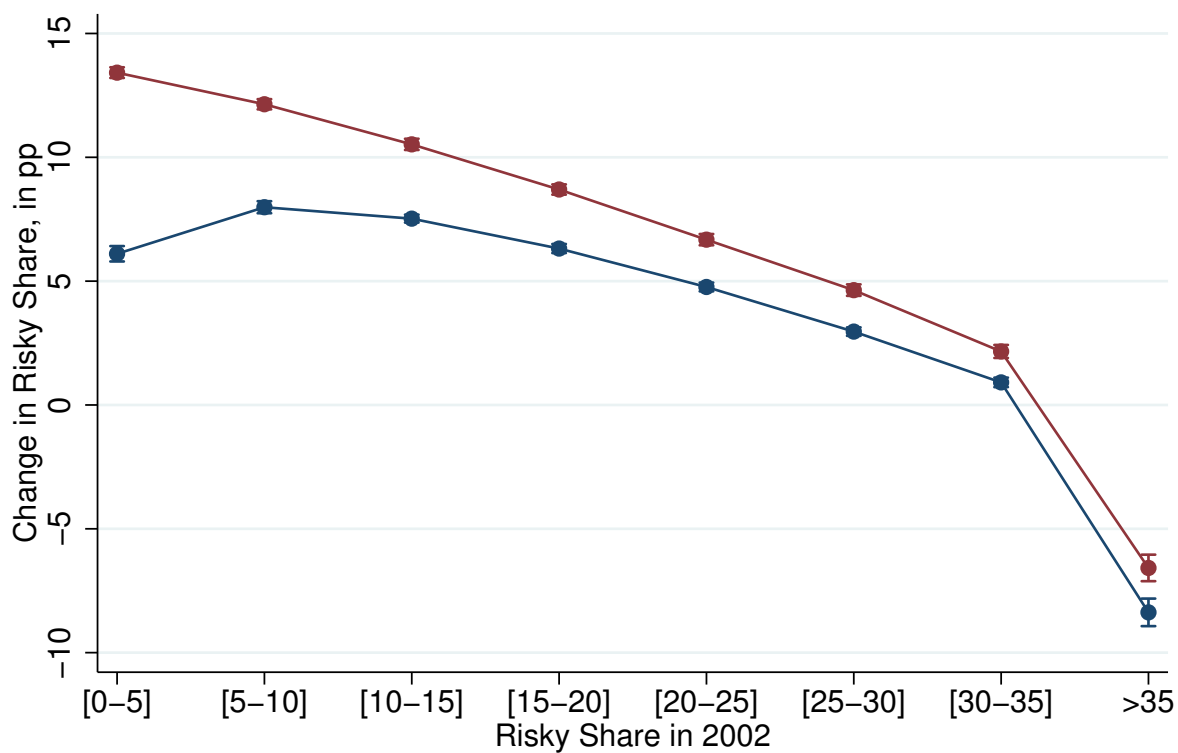


Figure 4. Change in the risky share over the 2002-2007 period for participants in equity funds, stocks or structured products across risky share in 2002. This figure shows the change in the risky share, in p.p. of financial wealth, over the 2002-2007 period for 2007 structured product participants versus equity fund or stock participants (that do not participate in structured products), broken down by risky share in 2002. The risky share includes equity funds, stocks and retail structured products. The sample includes all households that participate in equity funds or stocks in 2002.

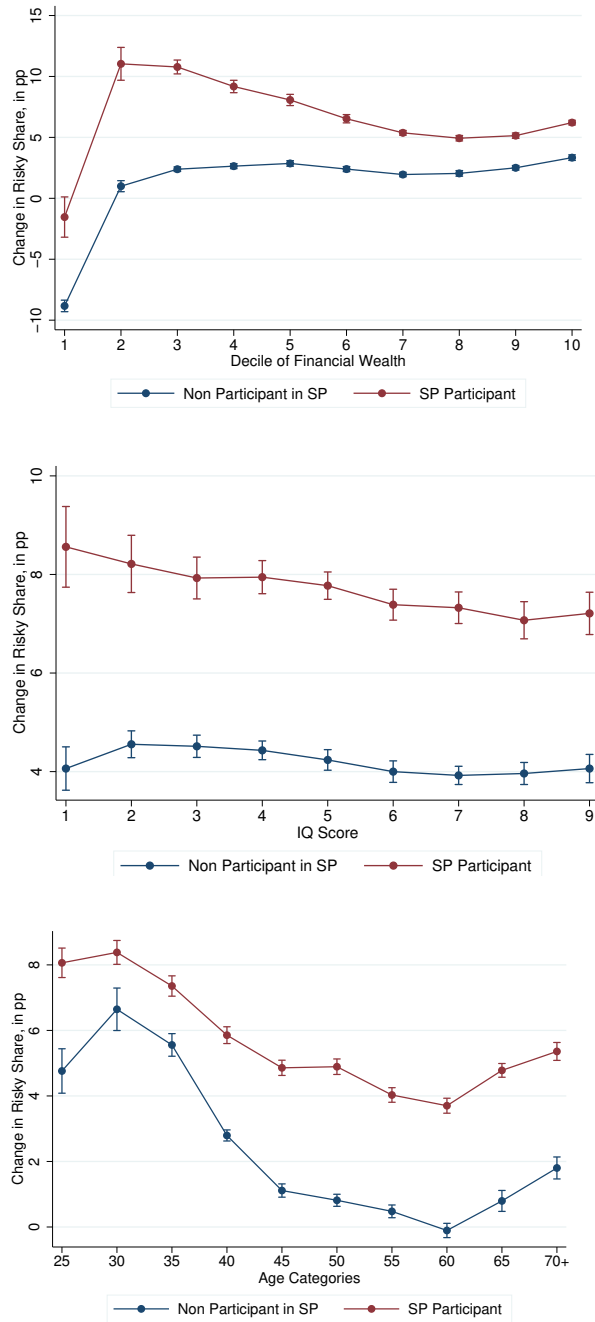


Figure 5. Change in the risky share over the 2002-2007 period for participants in equity funds, stocks or structured products. This figure shows the change in the risky share, in p.p. of financial wealth, over the 2002-2007 period for 2007 structured product participants versus equity fund or stock participants (that do not participate in structured products), broken down by wealth decile, IQ levels and age categories. The risky share includes equity funds, stocks and retail structured products. The sample includes all households that participate in equity funds or stocks in 2002.

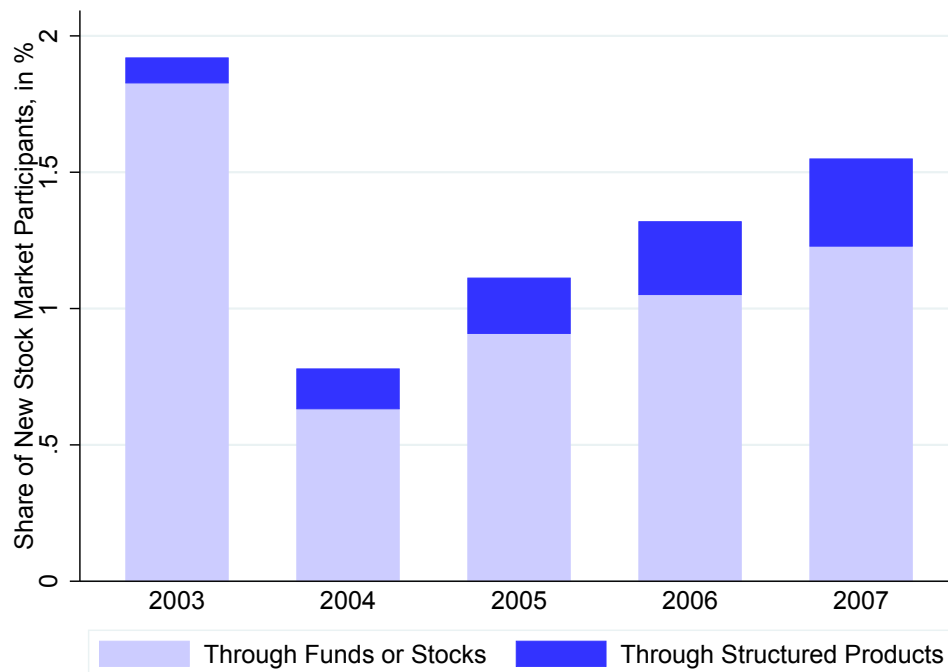


Figure 6. Evolution of the share of new participants through equity funds and stocks, and through structured products. This figure shows the evolution of the share of households that start participating in risky asset markets. These new participants are broken down between the one that start participating through equity funds and stocks, and the ones that do so through structured products. New participants are defined as households that were not participating in equity funds, stocks or structured products during in the four precedent years.

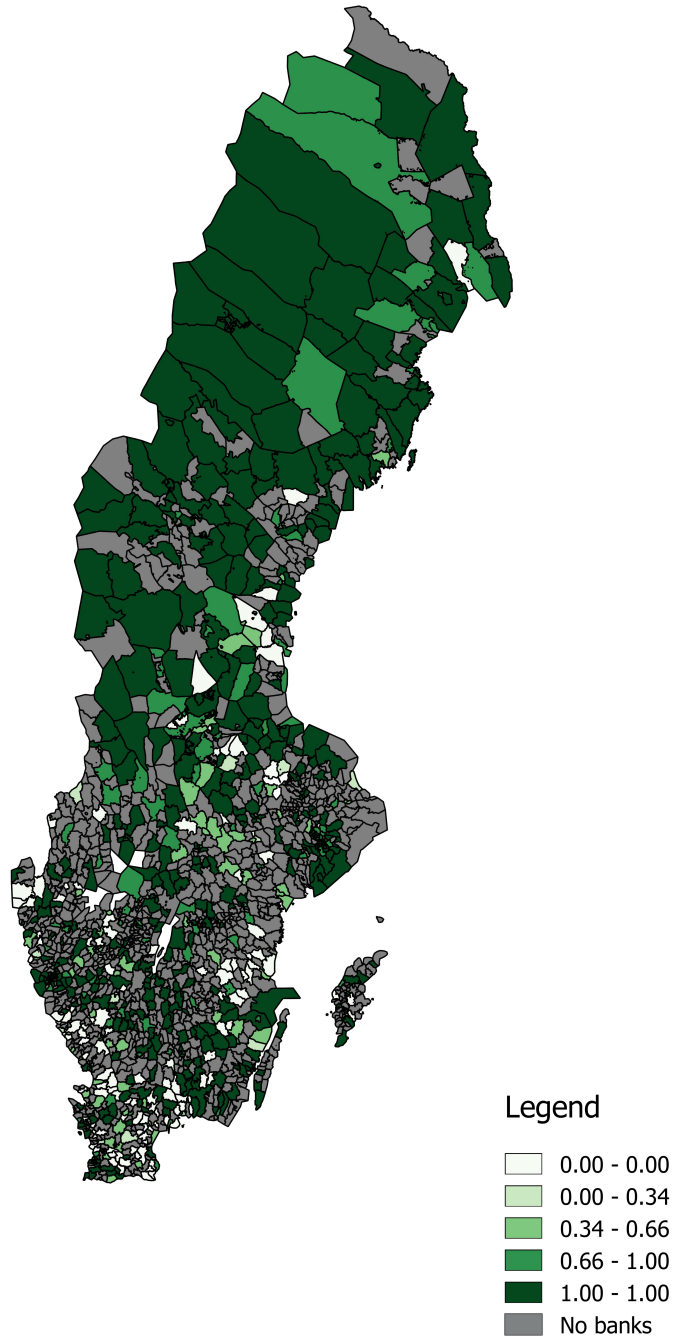
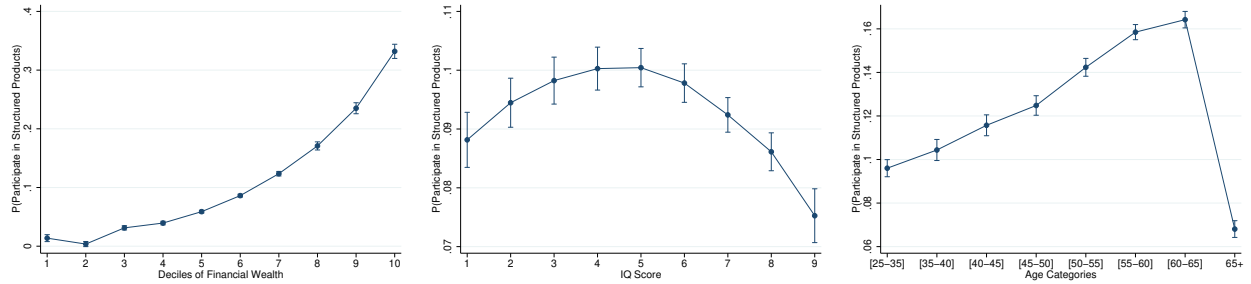
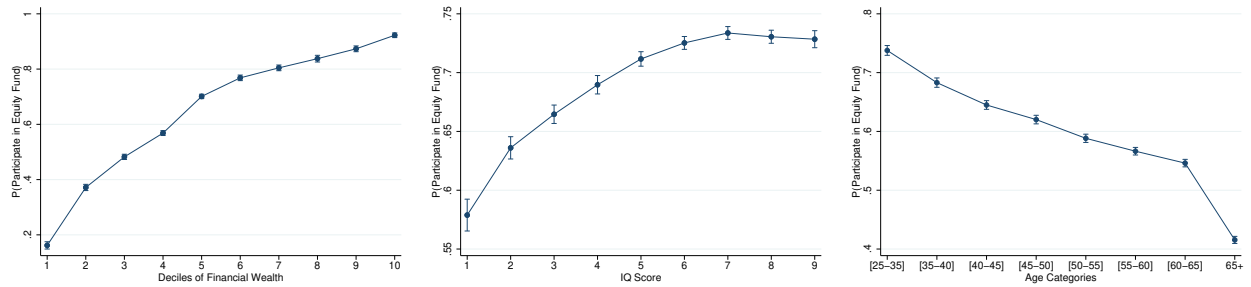


Figure 7. Within Parish Share of Bank Branches Offering Structured Products over the 2002-2007 Period. This figure displays within in Swedish parish the share of branches offering structured products over the 2002-2007 period. We use this measure to instrument household likelihood to participate in structured products.

Panel A. Structured Products



Panel B. Equity Funds



Panel C. Stocks

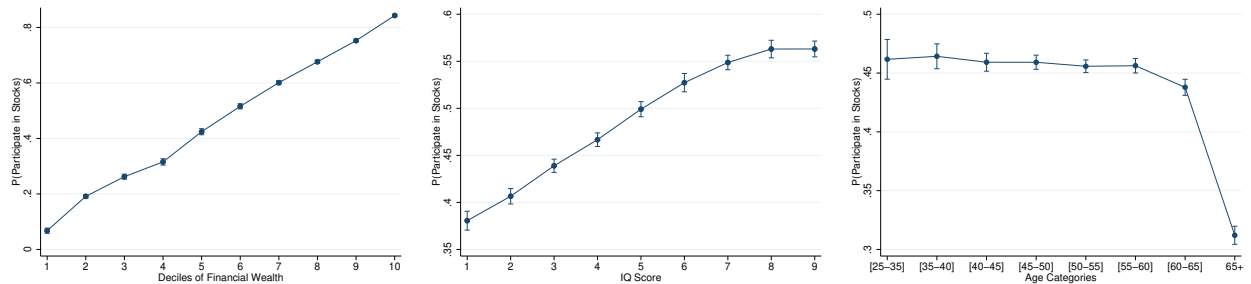
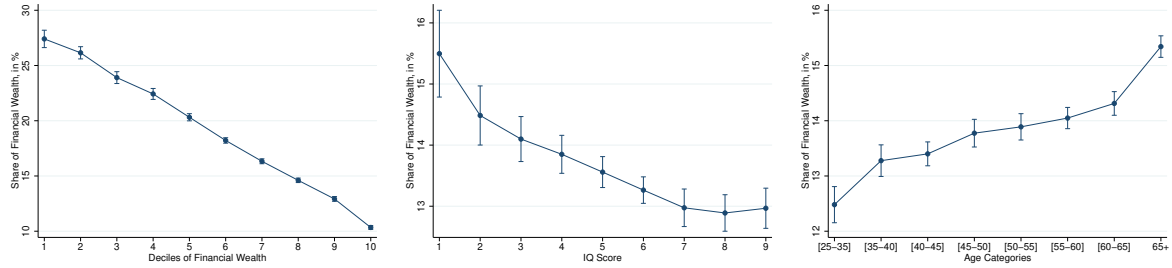


Figure 8. Likelihood of Participation in Structured Products, Equity Funds and Stocks. This figure shows predicted probabilities estimated from logit regressions, where the dependent variable is an indicator variable for investing in a given investment products at least one year during the 2002-2007 period. All regressions include the same explanatory variables: financial wealth deciles, IQ score levels (from 0 to 9), age categories, the number of adults in the household, the number of children in the households, and indicator variable for living in a urban area, and the gender of the household. All explanatory variables are defined in 2002.

Panel A. Structured Products



Panel B. Cash

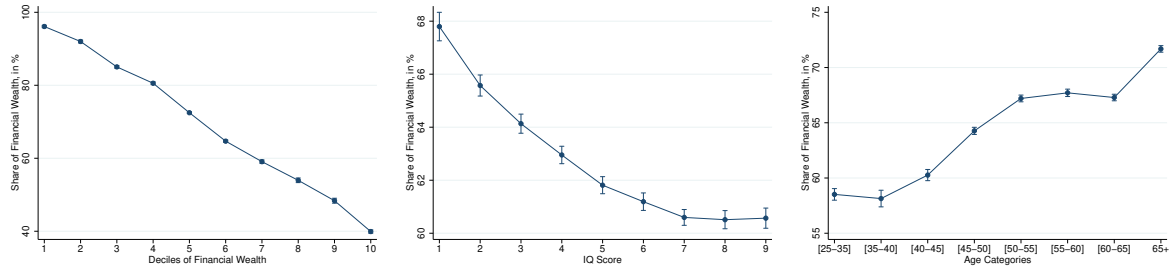
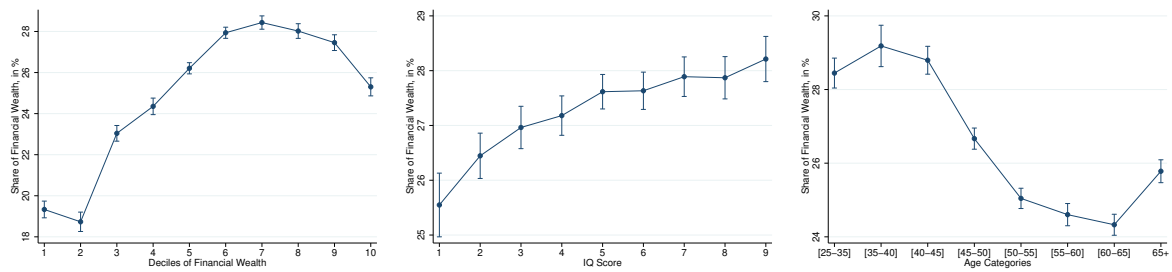


Figure 9. Portfolio Composition: Share of Financial Wealth Invested in Structured Products, Equity Funds, Stocks and Cash. This figure displays regression coefficients from OLS regressions, where the dependent variable is the share of financial wealth invested in a given investment products as of end of 2007. All regressions include the same explanatory variables: financial wealth deciles, IQ score levels (from 0 to 9), age categories, the number of adults in the household, the number of children in the households, and indicator variable for living in a urban area, and the gender of the household head. The sample is restricted to participants in each asset category

Panel C. Mutual Funds



Panel D. Stocks

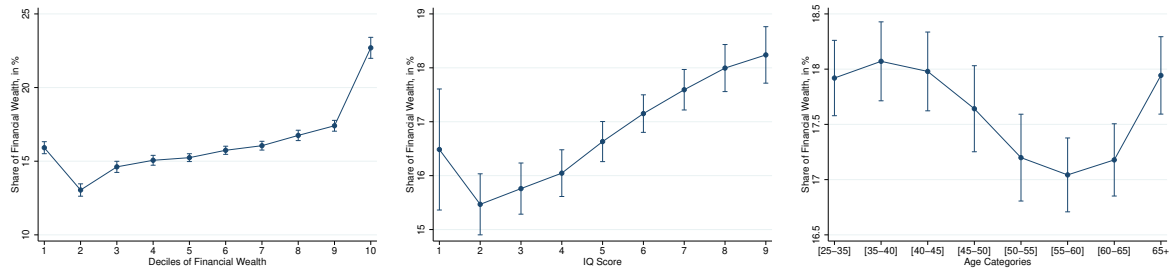
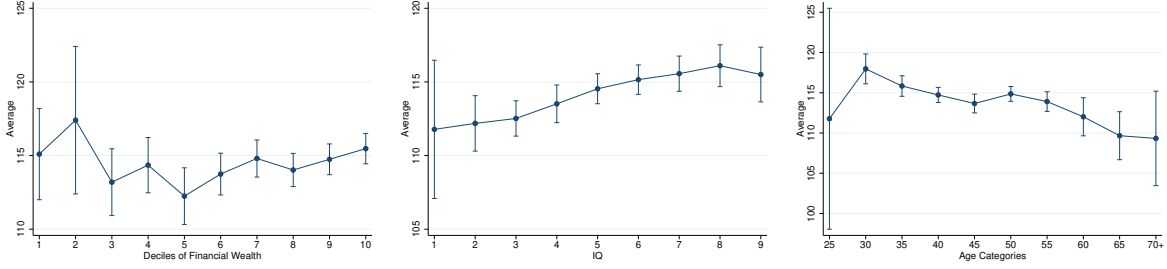


Figure 9. (cont.) Portfolio Composition: Share of Financial Wealth Invested in Structured Products, Equity Funds, Stocks and Cash.

Panel A. Participation Rate



Panel B. Initial Fee

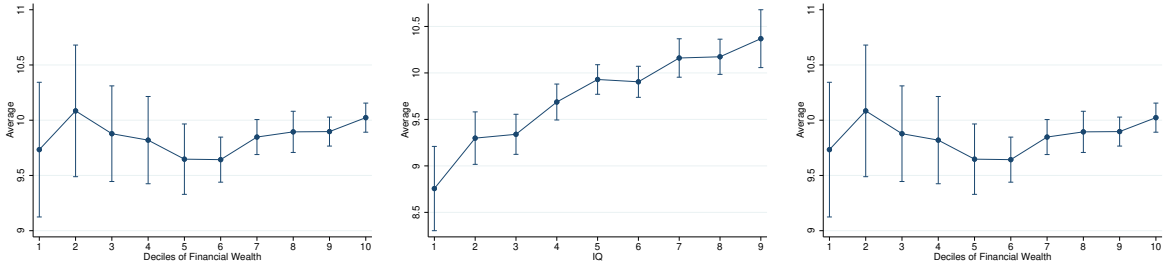
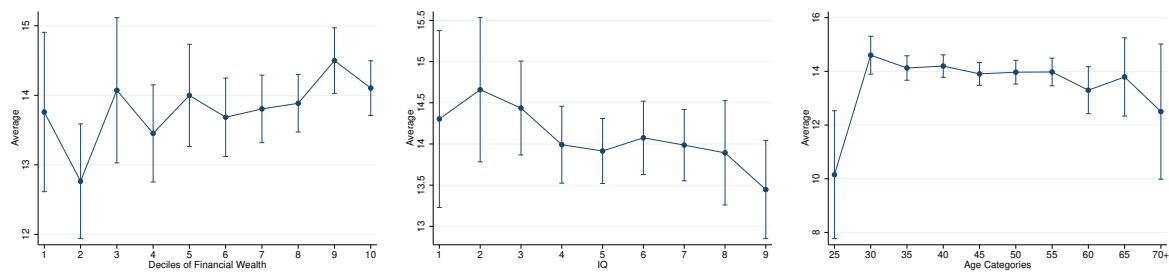


Figure 10. Product Design and Investor Characteristics. This figure displays coefficients from OLS regressions where the dependent variables are the participation rate p , the initial fee $init$, the asian option length $t_n - t_1$, and the guarantee g , as defined in section III. All regressions include the same explanatory variables: financial wealth deciles, IQ score levels (from 0 to 9), age categories, the number of adults in the household, the number of children in the households, and indicator variable for living in a urban area, and the gender of the household head. The sample is restricted to structured product participants.

Panel C. Asian Option Length



Panel D. Guarantee

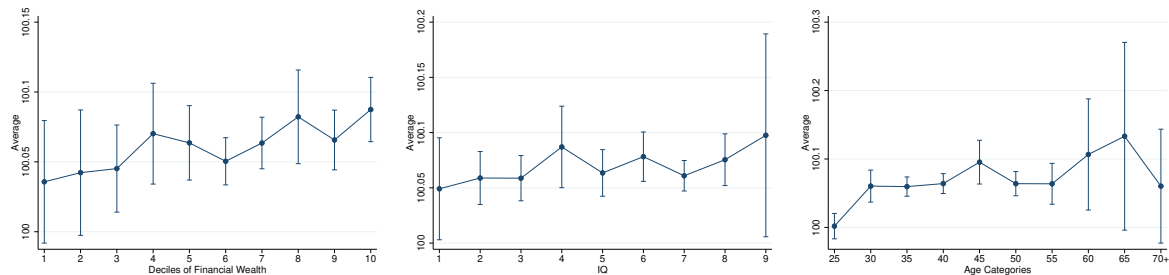


Figure 10. (cont.) Product Design and Investor Characteristics.

Table I. Structured Product Summary Statistics and Pricing Outputs

Panel A: Total Sample (1,505 contracts)						
	Mean	p1	p10	p50	p90	p99
Issuance year	2006	2002	2004	2006	2007	2007
Volume (\$ million)	5.2	0.1	0.5	2.6	13.0	29.1
Design Parameters:						
- Term (months)	40.1	12.0	17.9	37.6	60.5	72.5
- Capital guarantee (%)	100.2	100.0	100.0	100.0	100.0	108.0
- Initial fee (%)	7.0	0.0	1.0	6.0	12.0	22.0
Panel B: Representative Products (906 contracts)						
Issuance year	2006	2002	2004	2006	2007	2007
Volume (\$ million)	4.9	0.0	0.4	2.9	12.1	27.5
Design Parameters:						
- Term (months)	44.2	12.5	24.5	48.0	60.5	72.5
- Capital guarantee (%)	100.2	100.0	100.0	100.0	100.0	108.0
- Initial fee (%)	8.5	0.0	1.0	11.0	13.0	22.0
- Participation rate (%)	114.6	30.0	64.0	110.0	160.0	220.0
- Asian option length (months)	14.5	0.0	4.0	13.0	36.0	60.0
Underlying Asset Parameters:						
- Beta to world index	1.1	0.5	0.9	1.1	1.3	1.4
- Historical volatility	0.2	0.1	0.1	0.2	0.3	0.4
Return Properties:						
- Yearly excess expected return (%)	3.5	-1.6	0.4	3.5	6.6	10.9
- Exposure to risk premium (%)	58.4	-26.1	5.9	59.0	110.7	182.0
- Yearly markup (%)	1.3	-4.5	-0.3	1.5	2.8	5.8

Panel A of this table reports summary statistics of the issuances of retail structured products in Sweden between 2002 and 2007. *Capitalguarantee* represents the minimum fraction of the initial investment nominal amount that the household is guaranteed to receive at maturity. *InitialFee* represents the additional amount that the household pay above the principal at issuance, in % of principal, i.e. Issuance price - nominal amount). This fee affects the other design parameters of the product and should not be interpreted as a markup. *ParticipationRate* represent the coefficient applied to the positive performance of the benchmark asset. *AsianOptionLength* represents the period over which the underlying asset performance is averaged to define the benchmark asset. These parameters are described in more details in Section 2. Panel B displays the output from the expected returns and markup calculation from Section 2. *YearlyExcessExpectedReturn* represents the annualized expected return of the structured product over the maturity of the product, minus the riskfree rate for the same period (Swedish treasury rate). *ExposuretotheRiskPremium* corresponds to the *YearlyExcessExpectedReturn* divided by the World index market premium assumed for the calculation of the expected return. *YearlyMarkup* corresponds to the difference between the issuance price of product (nominal amount + initial fee) minus the fair replication value under the Black and Scholes framework described in Section 2 of a product, divided by the product maturity in years.

Table II. Structured Product Participants: Summary Statistics

Sample	All N= 3,994,605				Structured Participants N= 437,529				Fund Participants N= 1,976,083				Stock Participants N= 1,420,638			
	Mean	Median	10 th %	90 th %	Mean	Median	10 th %	90 th %	Mean	Median	10 th %	90 th %	Mean	Median	10 th %	90 th %
Financial characteristics (in 2000 \$):																
Yearly Income	25,934	22,037	11,593	38,227	34,055	25,681	14,150	50,836	28,338	24,338	13,484	40,775	31,459	25,378	13,077	45,795
Total Wealth	197,406	110,988	3,360	432,605	346,187	230,402	47,060	667,465	237,692	149,645	9,758	480,133	311,789	196,238	22,072	591,023
Financial Wealth	55,408	15,961	2,123	114,733	133,490	71,221	17,198	262,902	64,636	22,015	3,898	121,055	95,704	34,015	6,184	167,691
Total Liability	56,602	23,152	0	150,737	52,440	18,225	0	139,576	72,869	40,042	0	180,713	76,895	37,509	0	192,445
Traditional Equity Products	23,534	1,492	0	36,957	49,983	13,847	47	102,411	34,035	6,124	428	50,311	53,106	9,132	592	75,388
Equity Products Incl. Structured Products	24,500	1,773	0	39,914	58,578	21,244	3,251	116,837	34,035	6,124	428	50,311	53,106	9,132	592	75,388
Stocks	14,628	0	0	10,371	25,902	1,184	0	41,243	20,358	0	0	14,707	38,646	2,374	159	37,247
Funds	11,119	909	0	28,156	31,452	12,548	0	76,641	15,999	5,361	341	37,899	17,205	4,289	0	42,861
Equity Funds	8,170	134	0	20,418	21,760	6,923	0	55,832	12,855	4,112	229	30,381	13,527	2,661	0	34,405
Allocation Funds	712	0	0	1,400	2,279	0	0	6,088	792	0	0	1,869	882	0	0	2,065
ETFs	23	0	0	0	41	0	0	0	31	0	0	0	52	0	0	0
Structured Products	1,486	0	0	979	13,223	5,873	979	29,364	0	0	0	0	0	0	0	0
Residential Real Estate	118,573	73,129	0	303,687	168,655	119,613	0	384,111	144,924	102,415	0	340,818	172,737	123,618	0	393,422
Non Residential Real Estate	23,426	0	0	6,955	44,043	0	0	54,547	28,133	0	0	18,171	43,349	0	0	51,425
Demographics																
Household Head Age	52.5	52.0	31.0	76.0	56.3	58.0	36.0	73.0	48.8	46.0	30.0	70.0	52.2	51.0	32.0	73.0
Family Size	2.1	2.0	1.0	4.0	2.2	2.0	1.0	4.0	2.5	2.0	1.0	4.0	2.3	2.0	1.0	4.0
Number of Dep.Children	0.6	0.0	0.0	2.0	0.6	0.0	0.0	2.0	0.9	0.0	0.0	2.0	0.7	0.0	0.0	2.0
Stockholm Area in (in %)	0.2	0.0	0.0	1.0	0.2	0.0	0.0	1.0	0.2	0.0	0.0	1.0	0.2	0.0	0.0	1.0
Years of Schooling	12.1	12.0	9.0	16.0	12.3	12.0	8.0	16.0	12.5	12.0	9.0	16.0	12.6	12.0	9.0	16.0
IQ Score	5.1	5.0	2.0	8.0	5.4	5.0	3.0	8.0	5.3	5.0	3.0	8.0	5.5	6.0	3.0	8.0
Household Head Male (in %)	0.6	1.0	0.0	1.0	0.6	1.0	0.0	1.0	0.7	1.0	0.0	1.0	0.7	1.0	0.0	1.0
Number of Structure Products	0.3	0.0	0.0	1.0	2.6	2.0	1.0	5.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Table II. Structured Product Participants: Summary Statistics - Continued

Sample	All N= 3,994,605				Structured Participants N= 437,529				Fund Participants N= 1,976,083				Stock Participants N= 1,420,638			
	Mean	Median	10 th %	90 th %	Mean	Median	10 th %	90 th %	Mean	Median	10 th %	90 th %	Mean	Median	10 th %	90 th %
Share of financial wealth in (%):																
Traditional Equity Products	22.0	10.5	0.0	64.0	27.7	23.3	0.1	61.8	36.7	33.0	4.8	75.0	37.4	33.6	3.6	78.3
Equity Products Incl. Structured Products	23.1	12.5	0.0	65.1	37.3	34.9	10.2	68.1	36.7	33.0	4.8	75.0	37.4	33.6	3.6	78.3
Stocks	6.6	0.0	0.0	22.6	8.9	1.6	0.0	29.2	8.0	0.0	0.0	27.8	18.4	8.9	0.8	53.2
Equity Funds	13.9	1.1	0.0	46.6	16.7	11.2	0.0	43.1	26.9	21.1	2.1	61.7	17.6	8.9	0.0	50.4
Allocation Funds	1.5	0.0	0.0	4.7	2.1	0.0	0.0	7.0	1.8	0.0	0.0	6.1	1.4	0.0	0.0	4.7
ETFs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Structured Products	1.7	0.0	0.0	2.3	14.8	10.0	2.1	34.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cash	66.6	72.8	19.3	100.0	41.4	38.7	11.5	76.2	53.1	52.9	15.2	91.9	52.3	51.5	13.2	93.4
Participate in (%):																
Traditional Equity Products	67.8	100.0	0.0	100.0	90.8	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Equity Products Incl. Structured Products	68.9	100.0	0.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Stocks	37.3	0.0	0.0	100.0	62.1	100.0	0.0	100.0	47.0	0.0	0.0	100.0	100.0	100.0	100.0	100.0
Equity Funds	53.3	100.0	0.0	100.0	77.8	100.0	0.0	100.0	100.0	100.0	100.0	100.0	69.1	100.0	0.0	100.0
Allocation Funds	25.0	0.0	0.0	100.0	44.3	0.0	0.0	100.0	33.1	0.0	0.0	100.0	30.3	0.0	0.0	100.0
ETFs	0.1	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.2	0.0	0.0	0.0
Structured Products	11.2	0.0	0.0	100.0	100.0	100.0	100.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Participated at least once in (%):																
Stocks	45.3	0.0	0.0	100.0	70.9	100.0	0.0	100.0	55.1	100.0	0.0	100.0	100.0	100.0	100.0	100.0
Equity Funds	64.3	100.0	0.0	100.0	88.3	100.0	0.0	100.0	100.0	100.0	100.0	100.0	78.9	100.0	0.0	100.0
ETFs	0.2	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.3	0.0	0.0	0.0
Allocation Funds	31.3	0.0	0.0	100.0	54.8	100.0	0.0	100.0	39.5	0.0	0.0	100.0	37.5	0.0	0.0	100.0
Structured Products	13.3	0.0	0.0	100.0	100.0	100.0	100.0	100.0	3.2	0.0	0.0	0.0	3.9	0.0	0.0	0.0
Equity Products Including Structured Products	77.1	100.0	0.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Traditional Equity Products	76.5	100.0	0.0	100.0	95.7	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Cash	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
2002-2007 pp change in share of financial wealth invested in (%):																
Traditional Equity Products	2.6	0.0	-17.7	26.5	-1.9	0.0	-27.1	20.7	8.3	6.6	-17.6	37.2	5.3	3.9	-21.1	33.5
Equity Products Including Structured Products	3.7	0.0	-16.3	28.3	7.3	7.8	-18.4	32.3	8.3	6.6	-17.6	37.1	5.3	3.8	-21.1	33.5
Equity Funds	1.6	0.0	-13.0	19.3	-2.3	0.0	-22.0	14.6	6.8	4.1	-14.3	32.3	1.8	0.0	-14.6	20.5
Stock	0.0	0.0	-5.4	5.5	-0.9	0.0	-10.1	7.2	0.3	0.0	-6.7	8.0	2.7	0.7	-11.8	20.8
Income (Log)	0.1	0.1	-0.3	0.4	0.1	0.1	-0.3	0.6	0.1	0.1	-0.2	0.4	0.1	0.1	-0.3	0.5
Financial Wealth (Log)	0.3	0.3	-0.7	1.3	0.7	0.6	0.0	1.6	0.4	0.4	-0.5	1.3	0.5	0.5	-0.4	1.4

This table reports summary statistics of the main financial and demographic characteristics of Swedish households at the end of 2007. The first sample is the total population of Swedish households, the second sample is structured product participants, the third sample is fund participants and the last sample is stock participants.

Table III. Change in Risky Share and Participation in Structured Products

Sample	Change in Risky Share (p.p.)							
	Quartiles of 2002 Risky Share					All		
	All	Q1	Q2	Q3	Q4	All	IQ Restricted	All
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
SP participation dummy	3.49*** (0.07)	9.99*** (0.12)	5.65*** (0.12)	1.66*** (0.09)	-1.77*** (0.09)	8.46*** (0.58)	3.51*** (0.24)	-1.67*** (0.46)
SP participation dummy interacted with:								
- financial wealth						-0.51*** (0.05)		
- IQ Score							-0.08* (0.04)	
- Age								0.09*** (0.01)
Province fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,033,646	508,092	508,555	508,604	508,395	2,033,646	735,278	2,033,646
R^2	0.057	0.092	0.082	0.055	0.092	0.045	0.061	0.045
<i>Summary Statistics</i>	All	Q1	Q2	Q3	Q4			
2002 Risky Share (%)								
- Range	[0;96]	[0;9]	[9;23]	[23;44]	[44;96]			
- Mean	24.06	3.8	15.3	32.4	63.8			
- Median	22.7	3.7	15.1	32.0	60.8			
Change in Risky Share (p.p.)								
- Mean	3.92	9.3	11.0	5.9	-9.9			
- Median	2.6	2.2	7.2	5.9	-4.5			

This table displays OLS regression coefficients. The dependent variable is the absolute change in the risky share from 2002 to 2007, in p.p. of financial wealth. The risky share includes equity funds, stocks and retail structured products. *Structured Product Participant* is a dummy variable equal to one if the household invested at least once in structured products over the 2002-2007 period. The sample is restricted to household participating in stock markets in 2002. The coefficient in column 1 means that the increase in stock market exposure over the 2002-2007 period was 3.6 percentage points higher for households who participated in structured products than for the ones that did not. Standard errors are clustered at the kommun level. T-statistics are displayed below their coefficient of interest. *, **, and *** represent statistical significance at the 10%, 5%, and 1% confidence levels, respectively.

Table IV. Substitution Effects and Household Characteristics

	Share of Financial Wealth Invested in Cash, in %			
	(1)	(2)	(3)	(4)
SP Share of Financial Wealth	-0.620*** (0.002)	-2.115*** (0.022)	-0.738*** (0.012)	-1.147*** (0.010)
SP Share of Financial Wealth × Financial Wealth (log)		0.117*** (0.002)		
SP Share of Financial Wealth × IQ Score			0.012*** (0.002)	
SP Share of Financial Wealth × Age				0.010*** (0.000)
<i>Controls</i>				
Household FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
<i>Observations</i>	16,547,797	16,547,797	5,252,612	16,547,797
<i>R</i> ²	0.0470	0.0489	0.0470	0.0471

This table displays OLS panel regression coefficients with household and year fixed effects. The dependent variable is the share of financial wealth invested in cash. Sample period is 2002-2007. Standard errors are clustered at the household level. T-statistics are displayed below their coefficient of interest. *, **, and *** represent statistical significance at the 10%, 5%, and 1% confidence levels, respectively.

Table V. Instrumental Variable Analysis

	First Stage	IV	Extensive Margin
	Structured Product Participant (1)	Change in Risky Share (in p.p.) (2)	New Stock Market Participant (3)
SP Supply Intensity	0.023*** (0.004)		0.014*** (0.002)
Structured Product Participant		24.18*** (5.11)	
Individual Controls	Yes	Yes	Yes
Observations	1,532,508	1,532,508	922,552
F-statistics	23.08	-	-

This table displays the results of our IV analysis. In the first stage, the dependent variable, *Structured Product Participant*, is a dummy variable equal to one if the household invested at least once in structured products over the 2002-2007 period. The independent variable is a measure of structured product supply at the parish level, i.e. the share of branches in a given parish that offers structured product. In the second stage, the dependent variable is the absolute change in the risky share from 2002 to 2007, in p.p. of financial wealth. The risky share includes equity funds, stocks and retail structured products. The sample is restricted to household participating in stock markets in 2002. Control variables include years of schooling, wealth decile and age category fixed effects, as well as a urban dummy, number of children, household size and household head gender dummy. The coefficient in column 2 means that the increase in stock market exposure over the 2002-2007 period was 18 percentage points higher for households who participated in structured products than for the ones that did not. Standard errors are clustered at the parish level. T-statistics are displayed below their coefficient of interest. *, **, and *** represent statistical significance at the 10%, 5%, and 1% confidence levels, respectively.

Table VI. Portfolio Allocation across Household Characteristics

	Share of Financial Wealth Invested in:			
	Structured Products (1)	Stocks (2)	Funds (3)	Cash (4)
Financial Wealth (Log)	-0.036*** (0.001)	0.044*** (0.001)	0.014*** (0.001)	-0.041*** (0.001)
IQ score	-0.001 (0.000)	0.004*** (0.000)	0.005*** (0.001)	-0.007*** (0.001)
Age (years)	0.000 (0.000)	-0.001*** (0.000)	-0.001*** (0.000)	0.002*** (0.000)
<i>Controls</i>				
Province FE	Yes	Yes	Yes	Yes
Individual Controls	Yes	Yes	Yes	Yes
<i>Observations</i>	80,315	80,315	80,315	80,315
<i>R²</i>				

This table displays OLS regression coefficients. The dependent variable is the share of financial wealth invested in structured products (column 1), stocks (column 2), equity mutual funds (column 3), and cash (column 4) as of 2007. The sample is restricted to structured product participants as of 2007. Standard errors are clustered at the kommun level. Individual controls include a urban area dummy, a household head gender dummy, the size of the household and the number of children. T-statistics are displayed below their coefficient of interest. *, **, and *** represent statistical significance at the 10%, 5%, and 1% confidence levels, respectively.

Table VII. Model Outputs

	CRRRA RRA $g = 5$	Habit formation Curvature $g = 2$ Habit = 0.7 x initial wealth	Loss aversion Curvature $g = 0.5$ Kink coefficient $l = 2$ Ref point = initial wealth
Riskless asset			
- Portfolio return (annualized)	4.00%	4.00%	4.00%
Riskless asset and stock			
- Share of stock	0.1933	0.2008	0.2248
- Gain in utility: Corresponding interest rate increase (annualized)	0.40%	0.42%	0.59%
Riskless asset, stock, and guaranteed product			
- Share of stock	0.1933	0.2008	0.1418
- Share of guaranteed product	0.0000	0.0000	0.1785
- Gain in utility: Corresponding interest rate increase (annualized)	0.40%	0.42%	0.62%
Riskless asset, stock, and guaranteed product	Misperception: p perceived as 10% higher		
- Share of stock	0.1933	0.0611	0.0109
- Share of guaranteed product	0.0000	0.1982	0.4059

Appendix A. Proofs

We use the following result throughout the Appendix. If V is lognormally distributed and the standard deviation of V is s , then

$$\mathbb{E}[\max(V - K, 0)] = \mathbb{E}(V) N(d_1) - K N(d_2) \quad (\text{A1})$$

for every $K > 0$, where

$$d_1 = \frac{\ln[\mathbb{E}(V)/K] + s^2/2}{s}$$

and $d_2 = d_1 - s$.

A.1. Moments of the Benchmark Return

Since $\mathbb{E}_0^{\mathbb{Q}}(S_{t_i}/S_{t_0}) = e^{(r_f - q)(t_i - t_0)}$ for every i , the first moment of the benchmark return is

$$M_1^{\mathbb{Q}} = \frac{1}{n} \sum_{i=1}^n \mathbb{E}_0^{\mathbb{Q}} \left(\frac{S_{t_i}}{S_{t_0}} \right) = \frac{1}{n} \sum_{i=1}^n e^{(r_f - q)(t_i - t_0)}.$$

The second moment satisfies

$$M_2^{\mathbb{Q}} = \frac{1}{n^2} \sum_{i=1}^n \sum_{j=1}^n \mathbb{E}_0^{\mathbb{Q}} \left(\frac{S_{t_i}}{S_{t_0}} \frac{S_{t_j}}{S_{t_0}} \right).$$

If $i \leq j$, then

$$\begin{aligned} \mathbb{E}_0^{\mathbb{Q}} \left(\frac{S_{t_i}}{S_{t_0}} \frac{S_{t_j}}{S_{t_0}} \right) &= \mathbb{E}_0^{\mathbb{Q}} \left[\left(\frac{S_{t_i}}{S_{t_0}} \right)^2 \frac{S_{t_j}}{S_{t_i}} \right] \\ &= e^{(r_f - q)(t_j - t_i)} \mathbb{E}_0^{\mathbb{Q}} \left[\left(\frac{S_{t_i}}{S_{t_0}} \right)^2 \right]. \end{aligned}$$

Since $\ln(S_{t_i}/S_{t_0})$ is normal with mean $(r_f - q - \sigma^2/2)(t_i - t_0)$ and variance $\sigma^2(t_i - t_0)$, we infer that

$$\begin{aligned} \mathbb{E}_0^{\mathbb{Q}} \left[\left(\frac{S_{t_i}}{S_{t_0}} \right)^2 \right] &= e^{2(r_f - q - \sigma^2/2)(t_i - t_0) + 2\sigma^2(t_i - t_0)} \\ &= e^{[2(r_f - q) + \sigma^2](t_i - t_0)}. \end{aligned}$$

Hence

$$\mathbb{E}_0^{\mathbb{Q}} \left(\frac{S_{t_i}}{S_{t_0}} \frac{S_{t_j}}{S_{t_0}} \right) = e^{[2(r_f - q) + \sigma^2](t_i - t_0) + (r_f - q)(t_j - t_i)}.$$

Thus

$$\mathbb{E}_0^{\mathbb{Q}} \left(\frac{S_{t_i} S_{t_j}}{S_{t_0} S_{t_0}} \right) = e^{[2(r_f - q) + \sigma^2][\min(t_i, t_j) - t_0] + (r_f - q)|t_j - t_i|}.$$

for all i and j , and equation (6) holds.

By a similar derivation, the first and second moments of the benchmark return under the physical measure \mathbb{P} satisfy (9) and (10).

Specialized Example. Assume that the benchmark is computed f times a month over the last Y months of the product. The frequency is 1 when the index is recorded every month, 2 if this is every two weeks, or 0.5 if this is every two months, etc. In our notation, the number of observations is $n = Yf$ and the time interval between two consecutive observations is $t_i - t_{i-1} = 1/(12f)$ in annual units. The instants at which the index is recorded are therefore

$$t_i = T - \frac{n - i}{12f},$$

where $i = 1, \dots, Yf$. We also assume that $t_0 = 0$.

Let

$$\begin{aligned} a &= e^{\frac{r_f - q}{12f}}, & b &= e^{\frac{2(r_f - q) + \sigma^2}{12f}}, \\ a^{\mathbb{P}} &= e^{\frac{\mu - q}{12f}}, & b^{\mathbb{P}} &= e^{\frac{2(\mu - q) + \sigma^2}{12f}}. \end{aligned}$$

We easily infer from equations (5), (6), (9), and (10) the following results

$$M_1 = \frac{a^{12fT}}{n} \frac{1 - a^{-n}}{1 - a^{-1}} \tag{A2}$$

$$M_2 = \frac{b^{12fT}}{n^2(a-1)} \left[2a \frac{1 - (b/a)^{-n}}{1 - (b/a)^{-1}} - (a+1) \frac{1 - b^{-n}}{1 - b^{-1}} \right] \tag{A3}$$

$$M_1^{\mathbb{P}} = \frac{(a^{\mathbb{P}})^{12fT}}{n} \frac{1 - (a^{\mathbb{P}})^{-n}}{1 - (a^{\mathbb{P}})^{-1}}$$

$$M_2^{\mathbb{P}} = \frac{(b^{\mathbb{P}})^{12fT}}{n^2(a^{\mathbb{P}}-1)} \left[2a^{\mathbb{P}} \frac{1 - (b^{\mathbb{P}}/a^{\mathbb{P}})^{-n}}{1 - (b^{\mathbb{P}}/a^{\mathbb{P}})^{-1}} - (a^{\mathbb{P}}+1) \frac{1 - (b^{\mathbb{P}})^{-n}}{1 - (b^{\mathbb{P}})^{-1}} \right]$$

where $n = Yf$.

A.2. Proof of Proposition 1

The gross return on the guaranteed product, defined by (2), satisfies

$$1 + R_{g,T} = \frac{1 + g + \max[p(1 + R_T^*) - p - g; 0]}{1 + \text{init}}.$$

The mean return on the structured product, $\mathbb{E}_0^{\mathbb{Q}}(1 + R_{g,T})$, is therefore given by a Black-Scholes type formula.

Lemma A1 (Expected return on the structured product under \mathbb{Q}). The mean return on the structured product under the risk-adjusted measure is given by

$$\mathbb{E}_0^{\mathbb{Q}}(1 + R_{g,T}) = \frac{1 + g + pM_1^{\mathbb{Q}}N(d_1) - (p + g)N(d_2)}{1 + \text{init}}. \quad (\text{A4})$$

Furthermore, the mean return $\mathbb{E}_0^{\mathbb{Q}}(1 + R_{g,T})$ strictly increases with the participation rate p and the guaranteed return g .

Proof of Lemma A1. In order to price the structured product, we approximate the distribution of the benchmark return $1 + R_T^*$ as of date $t = 0$ under the risk-adjusted measure \mathbb{Q} by a lognormal with mean $M_1^{\mathbb{Q}}$ and second moment $M_2^{\mathbb{Q}}$, as the Edgeworth expansion implies (Turnbull and Wakeman 1991). The variance of the log benchmark return is then given by equation (7), which follows from the properties of the lognormal distribution.

The average return on the structured product can be written as

$$\mathbb{E}_0^{\mathbb{Q}}(1 + R_{g,T}) = \frac{1 + g + p\mathbb{E}_0^{\mathbb{Q}}[\max(1 + R_T^* - 1 - g/p; 0)]}{1 + \text{init}}.$$

We infer from (A1) that

$$\mathbb{E}_0^{\mathbb{Q}}[\max(1 + R_T^* - 1 - g/p; 0)] = M_1^{\mathbb{Q}}N(d_1) - (1 + g/p)N(d_2),$$

where d_1 is defined by equation (8) and $d_2 = d_1 - w^{\mathbb{Q}}$. . The expected return on the guaranteed product therefore satisfies (A4).

The monotonicity of the expected return, $\mathbb{E}_0^{\mathbb{Q}}(1 + R_{g,T})$, with respect to g results directly from the definition of the return on the guaranteed product, $R_{g,T}$, in equation (2).

We now derive the monotonicity of the expected return with respect to the participation rate p . The argument used for g does not apply in general because if g and R_T^* are both negative, a contract with a higher participation rate would incur a larger loss. The proof relies instead on the partial derivative of the function

$$\varphi(g, p) = 1 + g + pM_1^{\mathbb{Q}}N(d_1) - (p + g)N(d_2)$$

with respect to p .

It is useful to show a few preliminary facts. We note that

$$\frac{\partial d_1}{\partial p} = \frac{\partial d_2}{\partial p} = \frac{g}{p(p + g)w^{\mathbb{Q}}},$$

We also note that

$$N'(d_2) = \frac{1}{\sqrt{2\pi}} \exp\left(-\frac{d_2^2}{2}\right) = \frac{1}{\sqrt{2\pi}} \exp\left[-\frac{(d_1 - w^{\mathbb{Q}})^2}{2}\right]$$

and therefore

$$N'(d_2) = N'(d_1) \exp \left[d_1 w^{\mathbb{Q}} - \frac{(w^{\mathbb{Q}})^2}{2} \right].$$

Since

$$d_1 w^{\mathbb{Q}} - \frac{(w^{\mathbb{Q}})^2}{2} = \ln \left(\frac{p}{p+g} \right) + \ln(M_1^{\mathbb{Q}}),$$

we obtain that

$$(p+g)N'(d_2) = p M_1^{\mathbb{Q}} N'(d_1).$$

Hence

$$\begin{aligned} \frac{\partial \varphi}{\partial p}(g, p) &= M_1^{\mathbb{Q}} N(d_1) - N(d_2) + p M_1^{\mathbb{Q}} N'(d_1) \frac{\partial d_1}{\partial p} - (p+g)N'(d_2) \frac{\partial d_2}{\partial p} \\ &= M_1^{\mathbb{Q}} N(d_1) - N(d_2) + \frac{\partial d_1}{\partial p} \left[p M_1^{\mathbb{Q}} N'(d_1) - (p+g)N'(d_2) \right] \end{aligned}$$

and therefore

$$\frac{\partial \varphi}{\partial p}(g, p) = M_1^{\mathbb{Q}} N(d_1) - N(d_2).$$

Since $d_1 > d_2$ and $M_1^{\mathbb{Q}} > 1$, we conclude that

$$\frac{\partial \varphi}{\partial p}(g, p) > 0.$$

The function $\varphi(g, p)$ strictly increases with the participation rate p .¹⁵ We conclude that Lemma A1 holds. ■

Under the risk-adjusted measure \mathbb{Q} , the mean return on the structured product is equal to the risk-free rate, $\mathbb{E}_0^{\mathbb{Q}}(1 + R_{g,T}) = e^{r_f T}$, which implies that Proposition 1 holds.

A.3. Pricing of Contracts with a Cap

A subset of contracts include a cap to the return that can be earned on the initial investment net of fee. The return on the structured product is then given by:

$$1 + R_{g,T} = \min \left[\frac{1 + \max(p R_T^*; g)}{1 + \text{init}}; \frac{1 + \text{cap}}{1 + \text{init}} \right]$$

where cap denotes the cap rate. The cap rate is generally higher than the guaranteed rate.

¹⁵ A similar derivation implies that

$$\frac{\partial \varphi}{\partial g}(g, p) = N(-d_2) > 0.$$

Lemma A2 (Fair price of structured product with a cap). The fair initial fee is given by

$$init = e^{-r_f T} \left[1 + g + pM_1^{\mathbb{Q}}N(d_1) - (p + g)N(d_2) - pM_1^{\mathbb{Q}}N(e_1) + (p + cap)N(e_2) \right] - 1,$$

where

$$e_1 = \frac{1}{w^{\mathbb{Q}}} \left[\ln \left(\frac{p}{p + cap} \right) + \ln(M_1^{\mathbb{Q}}) + \frac{(w^{\mathbb{Q}})^2}{2} \right] \quad (\text{A5})$$

and $e_2 = e_1 - w^{\mathbb{Q}}$.

The fair initial fee is reduced by the presence of a cap.

Proof of Lemma A2. The return on the guaranteed product with a cap satisfies

$$1 + R_{g,T} = \frac{1 + g + \max(p R_T^* - g, 0) - \max(p R_T^* - cap; 0)}{1 + init}.$$

for all realizations of R_T^* . We infer from (A1) that the proposition holds. ■

Lemma A3 (Expected return of the guaranteed product under \mathbb{P}). The expected return on the guaranteed product under the physical measure is

$$\mathbb{E}^{\mathbb{P}}(1 + R_{g,T}) = \frac{1 + g + pM_1^{\mathbb{P}}N(d_1^{\mathbb{P}}) - (p + g)N(d_2^{\mathbb{P}}) - pM_1^{\mathbb{P}}N(e_1^{\mathbb{P}}) + (p + cap)N(e_2^{\mathbb{P}})}{1 + init},$$

where

$$\begin{aligned} d_1^{\mathbb{P}} &= \frac{1}{w^{\mathbb{P}}} \left[\ln \left(\frac{p}{p + g} \right) + \ln(M_1^{\mathbb{P}}) + \frac{(w^{\mathbb{P}})^2}{2} \right], \\ e_1^{\mathbb{P}} &= \frac{1}{w^{\mathbb{P}}} \left[\ln \left(\frac{p}{p + cap} \right) + \ln(M_1^{\mathbb{P}}) + \frac{(w^{\mathbb{P}})^2}{2} \right], \end{aligned}$$

$$d_2^{\mathbb{P}} = d_1^{\mathbb{P}} - w^{\mathbb{P}}, \text{ and } e_2^{\mathbb{P}} = e_1^{\mathbb{P}} - w^{\mathbb{P}}.$$

A.4. Joint Distribution of the Underlying and the Benchmark

We derive the joint distribution of the market and the benchmark. Let $r_{m,T} = \ln(1 + R_{m,T})$ and $r_T^* = \ln(1 + R_T^*)$.

Lemma A4 (Joint distribution of the underlying and the benchmark). The vector $(r_T^, r_{m,T})'$ is Gaussian with mean $[(\mu - \sigma^2/2)T; \mu^{\mathbb{P}}]'$ and variance-covariance matrix*

$$\begin{bmatrix} \sigma^2 T & \sigma_{m,b} \\ \sigma_{m,b} & (w^{\mathbb{P}})^2 \end{bmatrix}, \quad (\text{A6})$$

where

$$\sigma_{m,b} = \ln \left[\frac{\sum_{i=1}^n e^{(\mu-q+\sigma^2)(t_i-t_0)}}{\sum_{i=1}^n e^{(\mu-q)(t_i-t_0)}} \right]. \quad (\text{A7})$$

and $w^\mathbb{P}$ is defined by (11).

Proof of Lemma A4. The total return on the stockmarket index (with reinvested dividends) has a lognormal distribution:

$$r_{m,T} = \ln(1 + R_{m,T}) \sim \mathcal{N}[(\mu - \sigma^2/2)T; \sigma^2 T].$$

The log benchmark return is approximately normal $r_T^* = \ln(1 + R_T^*) \sim \mathcal{N}[\mu^\mathbb{P}; (w^\mathbb{P})^2]$. The covariance of the log market return and the log benchmark return can be computed as follows. We know that

$$\begin{aligned} \mathbb{E}^\mathbb{P}[(1 + R_{m,T})(1 + R_T^*)] &= \mathbb{E}^\mathbb{P} \left[\frac{S_T e^{qT}}{S_0} \frac{S_{t_1} + S_{t_2} + \dots + S_{t_n}}{n S_{t_0}} \right] \\ &= \frac{e^{qT}}{n} \sum_{i=1}^n \mathbb{E}^\mathbb{P} \left[\frac{S_{t_0}}{S_0} \left(\frac{S_{t_i}}{S_{t_0}} \right)^2 \frac{S_T}{S_{t_i}} \right], \\ &= \frac{e^{qT}}{n} \sum_{i=1}^n e^{(\mu-q)t_0} e^{[2(\mu-q)+\sigma^2](t_i-t_0)} e^{(\mu-q)(T-t_i)}, \end{aligned}$$

and therefore

$$\mathbb{E}^\mathbb{P}[(1 + R_{m,T})(1 + R_T^*)] = \frac{e^{\mu T}}{n} \sum_{i=1}^n e^{(\mu-q+\sigma^2)(t_i-t_0)}.$$

Recall that if $X = (X_1, X_2)$ is bivariate normal with mean $(\mu_1, \mu_2)'$ and variance-covariance matrix $\Sigma = (\sigma_{i,j})_{1 \leq i,j \leq 2}$, then

$$\mathbb{E}^\mathbb{P}(e^{X_1+X_2}) = \exp \left(\mu_1 + \mu_2 + \frac{\sigma_{1,1} + \sigma_{2,2} + 2\sigma_{1,2}}{2} \right) = \mathbb{E}(e^{X_1}) \mathbb{E}(e^{X_2}) \exp(\sigma_{1,2}),$$

or equivalently

$$\sigma_{1,2} = \ln \left[\frac{\mathbb{E}(e^{X_1+X_2})}{\mathbb{E}(e^{X_1}) \mathbb{E}(e^{X_2})} \right].$$

The covariance of $r_{m,T}$ and r_T^* is therefore

$$\text{Cov}(r_{m,T}; r_T^*) = \ln \left\{ \frac{\mathbb{E}^\mathbb{P}[(1 + R_{m,T})(1 + R_T^*)]}{\mathbb{E}^\mathbb{P}(1 + R_{m,T}) \mathbb{E}^\mathbb{P}(1 + R_T^*)} \right\},$$

which implies (A7).

Appendix B. Additional Figures and Tables

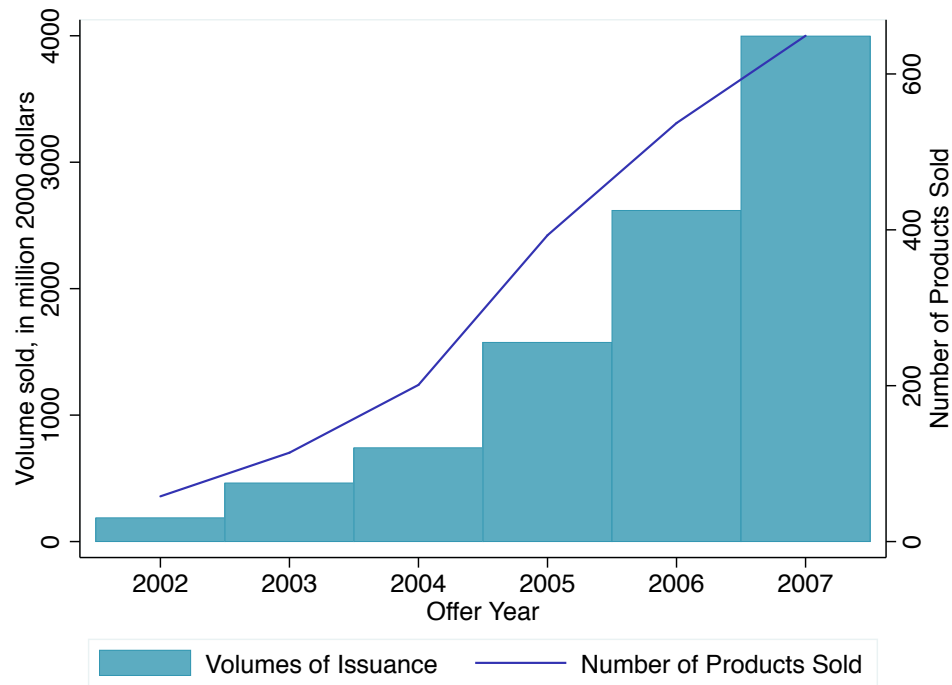


Figure IA.1. Volume and Number of Products Sold per Year. This figure shows volume issuance in millions of 2000 USD of retail structured products over the 2002-2007 period in the Swedish market.

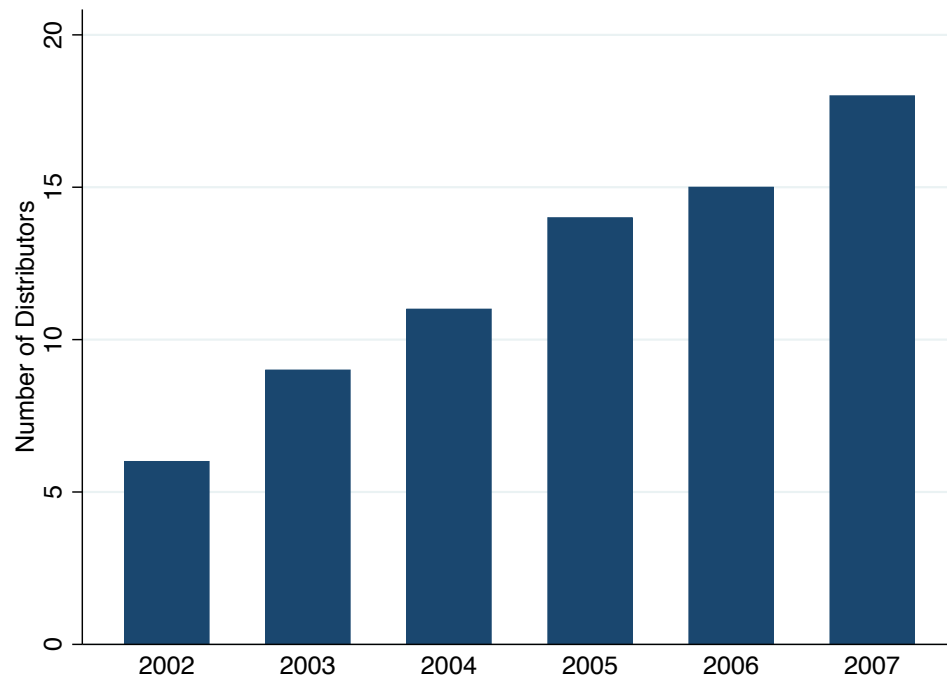
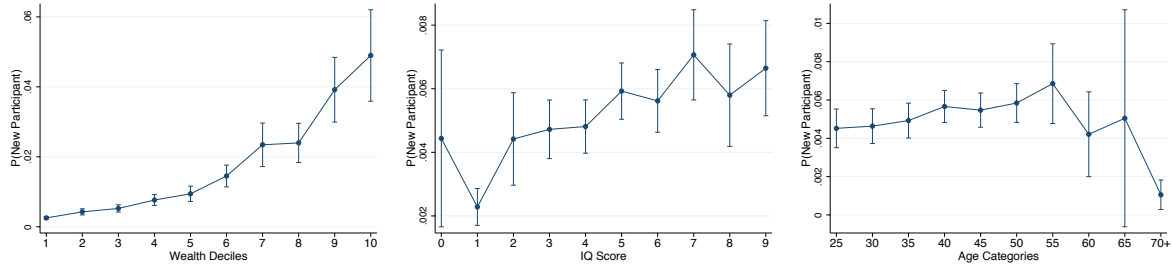
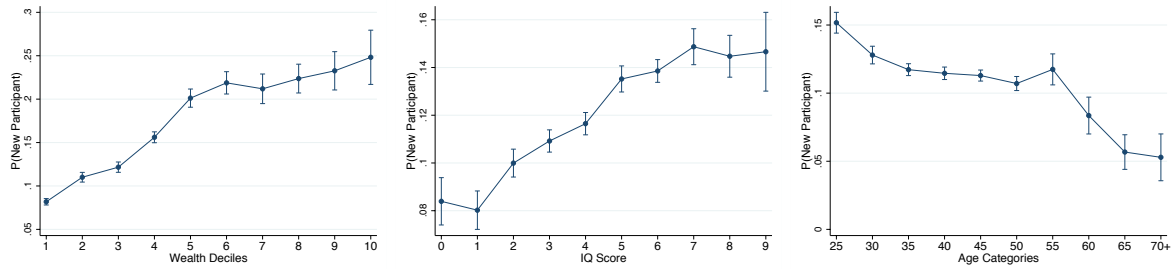


Figure IA.2. Number of Distributors per Year. This figure shows the evolution of the number of structured product distributors over the 2002-2007 period.

Panel A. Structured Products



Panel B. Mutual Funds



Panel C. Stocks

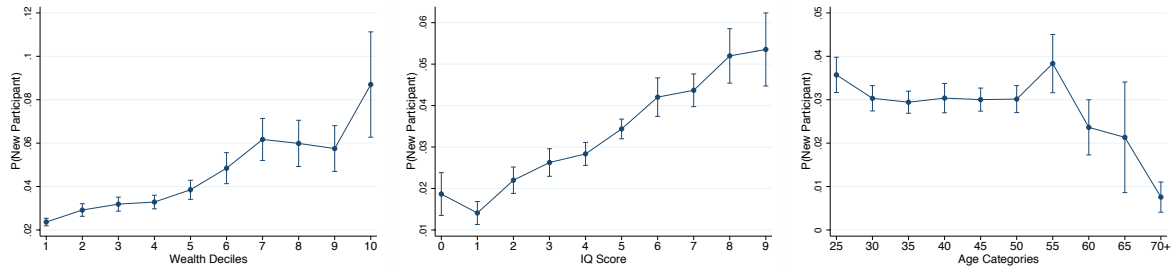


Figure IA.3. Likelihood of Participation in Structured Products, Equity Funds and Stocks for Households Not Participating to Risky Asset Markets as of 2000-2001. This figure shows predicted probabilities estimated from logit regressions, where the dependent variable is an indicator variable for investing in a given investment products at least one year during the 2002-2007 period, and the sample is restricted to households that were not invested in risky assets in 2000 and 2001. All regressions include the same explanatory variables: financial wealth deciles, IQ score levels (from 0 to 9), age categories, the number of adults in the household, the number of children in the households, and indicator variable for living in a urban area, and the gender of the household. All explanatory variables are defined in 2002.

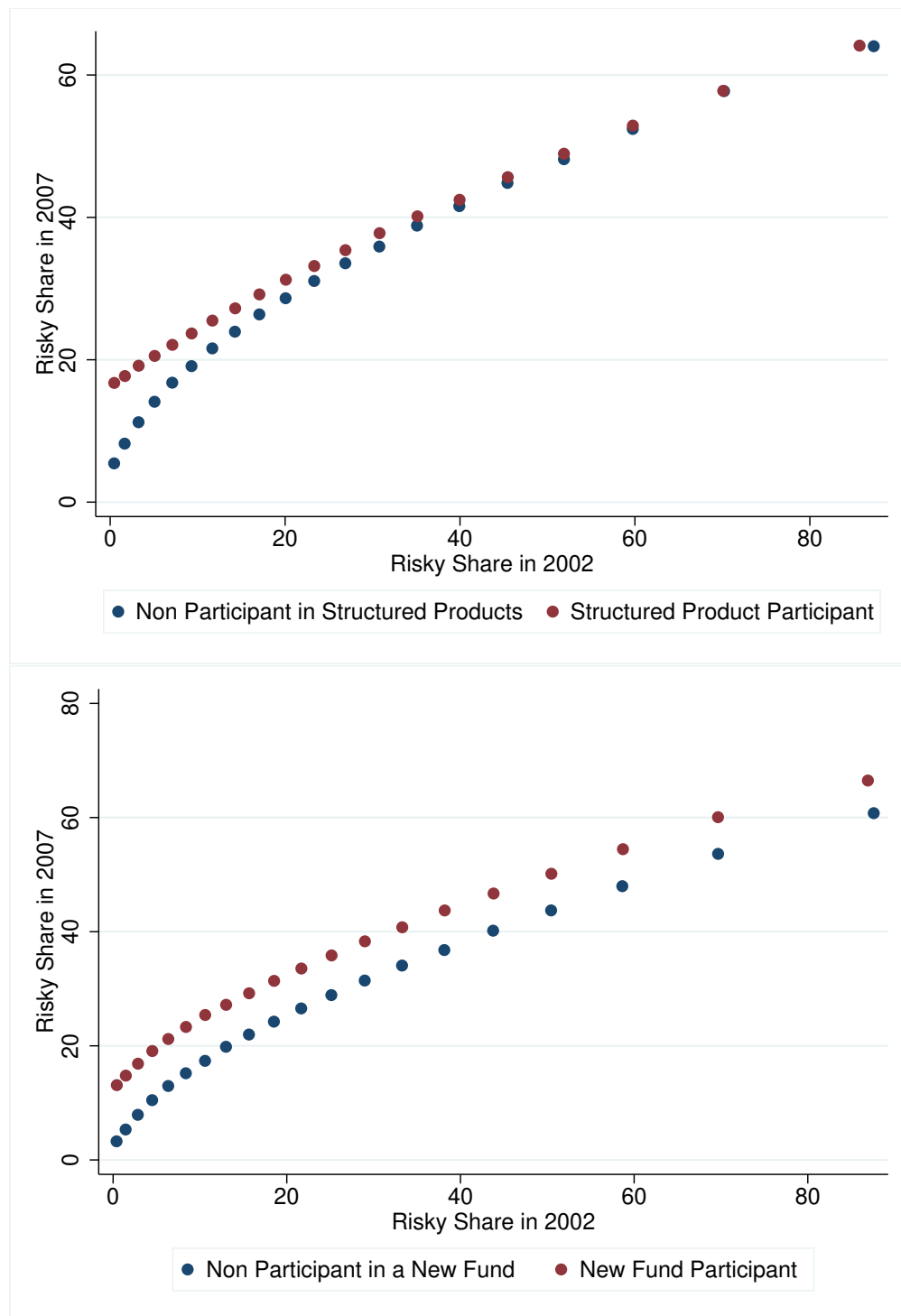


Figure IA.4. The Effect of Participating in Structured Products or Any New Fund on the Risky Share (2002 - 2007). This figure shows the evolution of the number of structured product and new fund distributors over the 2002-2007 period.

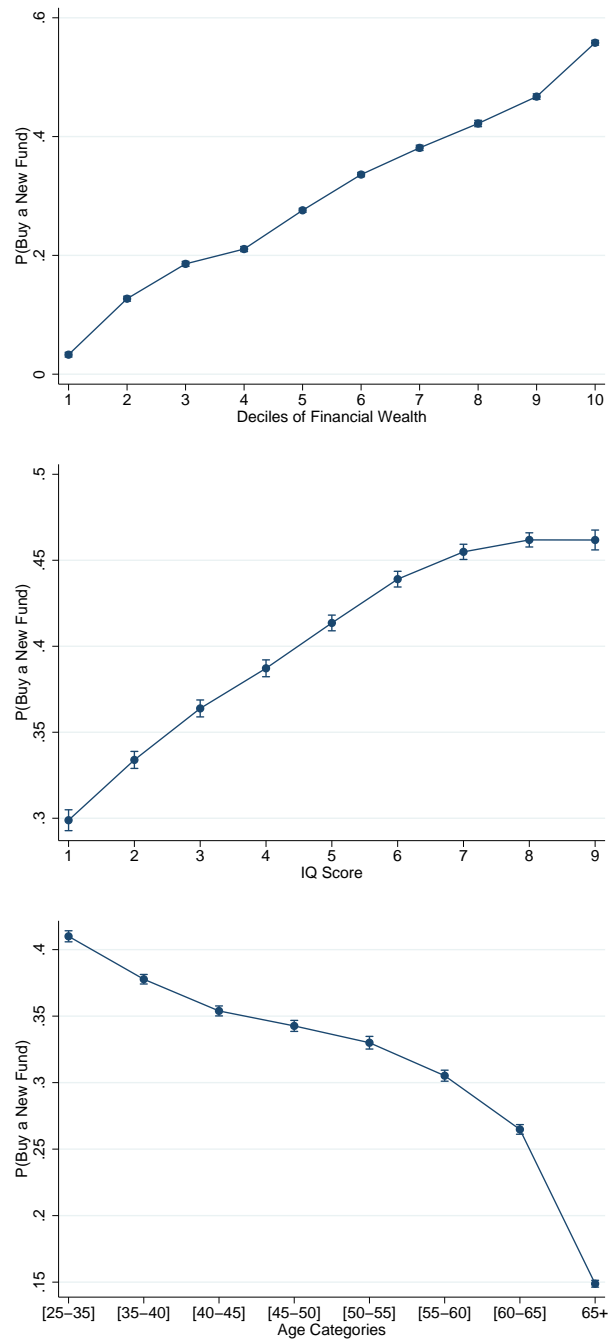


Figure IA.5. Likelihood of Buying a New Fund. This figure shows predicted probabilities estimated from logit regressions, where the dependent variable is an indicator variable for buying a new fund at least one year during the 2002-2007 period. The sample is restricted to stock market participants in 2002. All regressions include the same explanatory variables: financial wealth deciles, IQ score levels (from 0 to 9), age categories, the number of adults in the household, the number of children in the households, and indicator variable for living in a urban area, and the gender of the household. All explanatory variables are defined in 2002.

Table IA.1. Market Share (in Volume) of Structured Product Distributors

	Market Share	Cumulated Market Share	Entry Date
	(1)	(2)	(3)
Swedbank	30.5%	30.5%	April 2002
Handelsbanken	20.7%	51.1%	May 2002
Nordea	14.7%	65.9%	September 2002
SEB	14.6%	80.5%	April 2003
Hq bank	5.4%	85.9%	March 2003
Acta	4.4%	90.4%	January 2002
Erik Penser	2.7%	93%	January 2004
Danske Bank	2.6%	95.7%	March 2002
Avanza	1.6%	97.3%	October 2004
Kaupthing Bank	1.1%	98.3%	November 2005
Garantum	0.7%	99%	
E-trade	0.4	99.5%	
Ohman	0.2	99.7%	
Others	0.3%	100%	

This table reports the market share of each distributor, in volumes of product sold, over our sample period.

Table IA.2. Sensitivity Analysis

Upward Adjustment to Underlying Asset Volatility	+1%	+ 2%	+3%	+4%	+5%
Resulting Average Underlying Asset Volatility	0.19	0.20	0.21	0.22	0.23
Yearly Mark-up (in %)	1.32	1.14	0.96	0.77	0.59
Yearly Excess Expected Return					
with Risk Premium=4%	1.85	2.01	2.16	2.32	2.48
with Risk Premium=5%	2.66	2.80	2.95	3.10	3.25
with Risk Premium=6%	3.50	3.64	3.77	3.91	4.05
with Risk Premium=7%	4.38	4.50	4.63	4.76	4.89
with Risk Premium=8%	5.29	5.40	5.52	5.64	5.76
Exposure to the Risk Premium					
with Risk Premium=4%	46.4	50.2	54.1	58.0	61.9
with Risk Premium=5%	53.2	56.1	59.0	61.9	64.9
with Risk Premium=6%	58.4	60.6	62.9	65.2	67.5
with Risk Premium=7%	62.6	64.3	66.1	68.0	69.9
with Risk Premium=8%	66.1	67.5	69.0	70.5	72.0

Table IA.3

	Participation Rate in % (1)	Yearly Markup in % (2)	Excess Expected Return in % (3)	Exposure to the Risk Premium in % (4)
Participation rate, in %		-0.02*** (0.00)	0.05*** (0.00)	0.75*** (0.05)
Guarantee , in %	-4.31*** (0.49)	-0.03* (0.02)	-0.10*** (0.03)	-1.71*** (0.47)
Initial Fee, in %	5.03*** (0.18)	0.16*** (0.02)	-0.09*** (0.02)	-1.58*** (0.39)
Length of the Asian Options (in months)	0.31*** (0.09)	0.03*** (0.00)	-0.08*** (0.00)	-1.25*** (0.08)
Term, in months	0.32*** (0.08)	-0.00 (0.00)	0.03*** (0.01)	0.46*** (0.10)
Year FE	Yes	Yes	Yes	Yes
<i>Observations</i>	906	906	906	906
R^2	0.552	0.281	0.528	0.528

Note: This table displays coefficients from OLS regressions. *, **, and *** represent statistical significance at the 10%, 5%, and 1% confidence levels, respectively.

Table IA.4. Who are the New Participants through Structured Products?

	=1 if the new participant joins with...					=1 if structured product has...		
	Structured	Stock	Single	Equity	ETF	Capital	Developed	Simple
	Products	Markets	Stocks	Funds		Protection	Economy	Payoff
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Age	-0.003 (0.005)	-0.014*** (0.001)	-0.003 (0.004)	-0.020*** (0.002)	0.185*** (0.067)	-0.005 (0.008)	-0.001 (0.005)	-0.002 (0.006)
Log(years of schooling)	0.784*** (0.223)	0.741*** (0.069)	1.071*** (0.137)	0.622*** (0.094)	-2.171 (4.635)	0.403 (0.367)	0.675*** (0.228)	0.590** (0.288)
Gender Income Weight	-0.475*** (0.141)	-0.196*** (0.031)	0.359*** (0.088)	-0.187*** (0.052)	-1.305*** (0.349)	-0.710*** (0.182)	-0.526*** (0.155)	-0.682*** (0.189)
Urban Area Dummy	-0.146 (0.105)	-0.019 (0.039)	0.023 (0.069)	-0.063 (0.050)	17.541*** (1.569)	-0.160 (0.276)	-0.126 (0.114)	-0.331* (0.189)
Log(Disposable Income)	0.572*** (0.124)	0.620*** (0.060)	0.565*** (0.111)	0.778*** (0.078)	-0.191 (0.253)	0.444** (0.186)	0.479*** (0.138)	0.487*** (0.136)
Log(Financial Wealth)	0.357*** (0.055)	0.225*** (0.018)	0.145*** (0.035)	-0.037* (0.022)	0.305 (0.245)	0.444*** (0.084)	0.404*** (0.059)	0.382*** (0.074)
Log(RealEstate)	0.028*** (0.009)	0.029*** (0.002)	0.033*** (0.005)	0.030*** (0.003)	0.113 (0.085)	0.025** (0.012)	0.030*** (0.010)	0.021** (0.010)
Log(Leverage)	-0.453*** (0.095)	-0.002 (0.018)	-0.011 (0.035)	0.065*** (0.023)	1.579*** (0.071)	-0.280* (0.168)	-0.423*** (0.117)	-0.412*** (0.120)
<i>Controls</i>								
Province FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	50,355	50,355	50,355	50,355	12,733	50,024	50,355	50,024
R ²	0.058	0.052	0.038	0.051	0.373	0.059	0.060	0.058

This table reports logit regression coefficients where the dependent variable is a dummy equal to one if the household gains exposure through stock markets during the 2003-2007 period through a specific instrument (structured product, basic structured product: with domestic underlying assets and simple payoff formulas, stocks and equity mutual funds). Explanatory variables are as per 2002. The analysis is restricted to household that are not participating in stock markets in 2002 and the 4 year before. Standard errors are clustered at the parish level.

Table IA.5. Change in Risky Share and Participation in Structured Products

Panel A: IQ Sample					
Sample	Quartiles of 2002 Risky Share				
	All (1)	Q1 (2)	Q2 (3)	Q3 (4)	Q4 (5)
SP participation dummy	3.254*** (0.147)	9.681*** (0.276)	5.054*** (0.266)	1.311*** (0.253)	-1.212*** (0.267)
Province fixed effect	Yes	Yes	Yes	Yes	Yes
Observations	467,718	113,372	121,997	122,076	110,273
Panel B: Controlling for IQ					
Sample	Quartiles of 2002 Risky Share				
	All (6)	Q1 (7)	Q2 (8)	Q3	Q4
SP participation dummy	3.254*** (0.147)	9.707*** (0.276)	5.076*** (0.266)	1.329*** (0.255)	-1.220*** (0.267)
Province fixed effect	Yes	Yes	Yes	Yes	Yes
Observations	467,718	113,372	121,997	122,076	110,273

This table displays OLS regression coefficients. The dependent variable is the absolute change in the risky share from 2002 to 2007, in p.p. of financial wealth. The risky share includes equity funds, stocks and retail structured products. *Structured Product Participant* is a dummy variable equal to one if the household invested at least once in structured products over the 2002-2007 period. The sample is restricted to household participating in stock markets in 2002. The coefficient in column 1 means that the increase in stock market exposure over the 2002-2007 period was 4.2 percentage points higher for households who participated in structured products than for the ones that did not. Standard errors are clustered at the kommun level. T-statistics are displayed below their coefficient of interest. *, **, and *** represent statistical significance at the 10%, 5%, and 1% confidence levels, respectively.

Table IA.6. Active Change in Risky Share and Participation in Structured Products

Sample	Change in Risky Share, in p.p.							
	Quartiles of 2002 Risky Share					All		
	All	Q1	Q2	Q3	Q4	All	IQ Re- stricted	All
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$\mathbb{1}_{Participation(SP)}$	2.94*** (0.10)	9.73*** (0.15)	5.67*** (0.17)	1.83*** (0.15)	-2.33*** (0.16)	5.79*** (1.01)	2.81*** (0.44)	-2.50*** (0.53)
$\mathbb{1}_{Participation(SP)} \times \text{Financial Wealth}$						-0.28*** (0.10)		
$\mathbb{1}_{Participation(SP)} \times \text{IQ Score}$							-0.02 (0.07)	
$\mathbb{1}_{Participation(SP)} \times \text{Age}$								0.11*** (0.01)
<i>Controls</i>								
Province FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1106010	273,919	279,289	278,373	274,429	1106010	562,324	1106010
R^2	0.074	0.080	0.085	0.058	0.077	0.065	0.071	0.065
<i>Corresponding Summary Statistics</i>								
2002 Risky Share, in %	All	Q1	Q2	Q3	Q4			
Range	[0 ; 96]	[0 ; 9]	[9 ; 23]	[23 ; 44]	[44 ; 96]			
Mean	28.8	3.8	15.3	32.4	63.8			
Median	22.7	3.7	15.1	32.0	60.8			
Change in Risky Share, in pp								
Mean	4.1	9.3	11.0	5.9	-9.9			
Median	2.6	2.2	7.2	5.9	-4.5			

This table displays OLS regression coefficients. The dependent variable is the active change in the risky share from 2002 to 2007, in p.p. of financial wealth. The risky share includes equity funds, stocks and retail structured products. *Structured Product Participant* is a dummy variable equal to one if the household invested at least once in structured products over the 2002-2007 period. The sample is restricted to household participating in stock markets in 2002. The coefficient in column 1 means that the increase in stock market exposure over the 2002-2007 period was 2.9 percentage points higher for households who participated in structured products than for the ones that did not. Standard errors are clustered at the kommun level. T-statistics are displayed below their coefficient of interest. *, **, and *** represent statistical significance at the 10%, 5%, and 1% confidence levels, respectively.

Table IA.7. Sample Restricted to Mutual Fund Buyers

Panel A					
Sample	Change in Risky Share (p.p.)				
	Quartiles of 2002 Risky Share				
	All (1)	Q1 (2)	Q2 (3)	Q3 (4)	Q4 (5)
SP participation dummy	2.07*** (0.08)	5.13*** (0.12)	2.58*** (0.12)	-0.25*** (0.09)	-2.73*** (0.10)
Province fixed effect	Yes	Yes	Yes	Yes	Yes
Observations	1,133,058	195,683	269,162	319,639	348,574
R^2	0.055	0.046	0.061	0.047	0.070
Summary Statistics	All	Q1	Q2	Q3	Q4
2002 risky share (%):					
- Range	[0 ; 96]	[0 ; 9]	[9 ; 23]	[23 ; 44]	[44 ; 96]
- Mean	28.8	3.8	15.3	32.4	63.8
- Median	22.7	3.7	15.1	32.0	60.8
Change in risky share (pp):					
- Mean	4.1	9.3	11.0	5.9	-9.9
- Median	2.6	2.2	7.2	5.9	-4.5

Panel B			
	Change in Risky Share (p.p.)		
	All (6)	IQ Restricted (7)	All (8)
SP participation dummy	-7.15*** (0.90)	1.67*** (0.25)	-4.50*** (0.46)
SP participation dummy interacted with:			
- Financial wealth	0.86*** (0.09)		
- IQ Score		0.01 (0.04)	
- Age			0.12*** (0.01)
Province fixed effects	Yes	Yes	Yes
Observations	1133058	449,905	1133058
R^2	0.045	0.058	0.045

This table displays OLS regression coefficients. The dependent variable is the change in the risky share from 2002 to 2007, in p.p. of financial wealth. The risky share includes equity funds, stocks and retail structured products. *Structured Product Participant* is a dummy variable equal to one if the household invested at least once in structured products over the 2002-2007 period. The sample is restricted to household participating in stock markets in 2002. The coefficient in column 1 means that the increase in stock market exposure over the 2002-2007 period was 2.9 percentage points higher for households who participated in structured products than for the ones that did not. Standard errors are clustered at the kommun level. T-statistics are displayed below their coefficient of interest. *, **, and *** represent statistical significance at the 10%, 5%, and 1% confidence levels, respectively.