

Financial Innovation and Stock Market Participation

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Innovation in Household Finance

- Innovative products targeted at retail investors, such as retail structured products, have been shown to **cater to behavioral biases** from households (Célérier and Vallée, QJE2017)
- However, such products might also help **mitigate frictions** households face, similar to what advisors (Gennaioli, Shleifer and Vishny, JF2015) or default options (Madrian and Shea, QJE2001) can do

Household Stockmarket Participation

- By offering a tailored design, structured products might **foster households to participate in stock markets**, thereby improving their financial standing by sharing in the equity premium
- Stock market participation is typically low for:
 - non-wealthy households (Calvet, Campbell and Sodini, JPE2007)
 - low IQ individuals (Grinblatt, Keloharju, Linnainmaa, JF2011)
 - loss averse individuals (Gomes, JB2005)
- Scarce literature on financial innovation as a remedy to low household stock market participation

Drivers of Success for a Financial Innovation

- Financial innovations targeted to households **rarely gain traction**
- ETFs took **several decades** to develop, despite their superior performance to mutual funds
- Retail structured products developed **in matter of years**:
10% of Swedish households started participating within 5 years

Research Question

- Can financial innovation improve the **likelihood** and the **extent** of household stock market participation? If so, for which sub-groups of the population?
- ⇒ Are household better off when innovative products are offered?

Empirical setup: The Swedish Retail Market for Structured Products

- The retail market for structured products (Célérier and Vallée, QJE2017)
- Sweden: unique data (Calvet, Campbell and Sodini, JPE2007) and widespread capital protection for structured products

Preview of Results

- We find supportive evidence of retail structured product having a **positive impact** on both the likelihood and the extent of household stock market participation
- This impact is more pronounced for household with **lower financial wealth**, **older** households, and households with **median or low IQ**
- Households mainly fund their purchase of structured products **with cash**
- Poorer, older and lower IQ households are more likely to buy **simple products**, and products with a **full capital guarantee**

Background and Data

Product Example

- This is a growth product linked to the performance of the DJ Eurostoxx50
- The performance of the index is observed over every month. At the end of the investment period the negative monthly returns are deducted from the maximum final payoff of 140%. At maturity the product offers a **minimum capital return of 111.25%**
- The product is issued at par, and a fee of 1.5% is added to the issue price

Data for this Study

- Detailed information on all the retail structured products that have been sold in Sweden, including detailed information on their payoff design (Célérier and Vallée, QJE2017)
- Structured products are defined by: 1) an underlying financial asset(s) 2) a non-linear pay-off formula 3) a maturity
- Merged to disaggregated data on Swedish household (Calvet, Campbell and Sodini, JPE2007), which includes:
 - Demographics
 - Education
 - Income and wealth

The Swedish Retail Market for Structured Products

- Largest Scandinavian retail market for retail structured products, and the 9th largest European market (EUR16bn out of EUR700bn in Europe in 2010)
- As the other European markets, retail structured products provide mainly **stock market exposure**, either domestic or foreign
- Swedish investors exhibit a strong preference for **capital-protected products**

Product Characteristics - Summary Statistics

	2002-2003 (1)	2004-2005 (2)	2006-2007 (3)	Full Sample (4)
Number of Products Sold	172	594	1,173	1,939
Stock Market Exposure (in %)	92	90	84	87 (88%)
Single Index or Share	36	41	46	44
<i>Europe</i>	<i>17.4</i>	<i>31.1</i>	<i>27.2</i>	<i>27.5</i>
<i>Non Europe</i>	<i>18.2</i>	<i>10.3</i>	<i>19.4</i>	<i>16.5</i>
Index Basket	44	37	28	32
Share Basket	9	11	8	9
Other Exposure (in %)	8	10	16	13 (12%)
Capital Protected (in %)	99	99	97	98
Issue Price (in %)	103.8	104.7	105.5	105.11
Minimum Return (in %)	96.5	94.7	93.7	94.3
Average Maturity (in years)	4.1	3.8	3.3	3.5
Mean Volume (in million 2000 dollars)	3.8	3.9	5.6	4.9

Likelihood of Participation: Extensive Margin

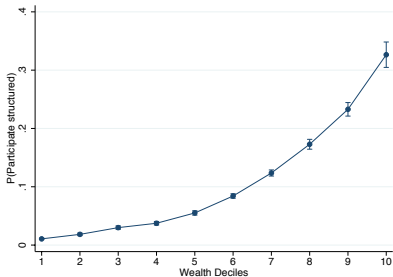
Structured Product Participants

- How do household characteristics predict participation in structured products? How does it differ for traditional products?
- We run cross-sectional logit regressions on participating in a given type of financial instrument at some point during the 2002-2007 period

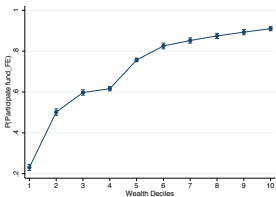
$$\text{Ind}(\text{participation})_i = \alpha + \beta \times \text{HouseholdCharacteristics}_i + \epsilon_i$$

Likelihood of Participation by Financial Wealth

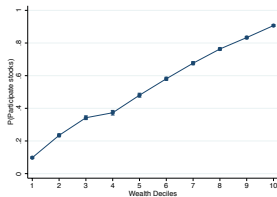
Structured Products



Equity Funds

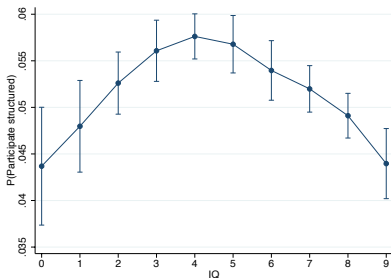


Stocks

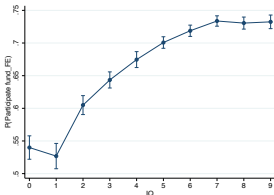


Likelihood of Participation by IQ

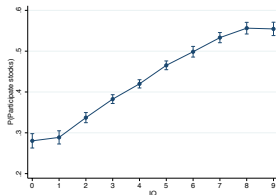
Structured Products



Equity Funds

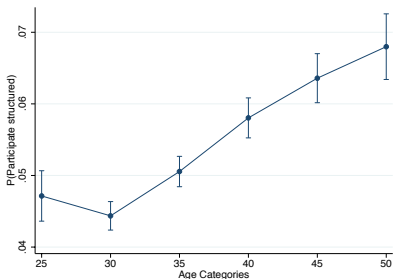


Stocks

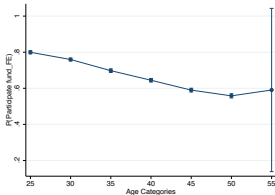


Likelihood of Participation by Age

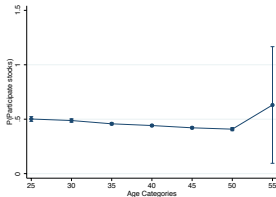
Structured Products



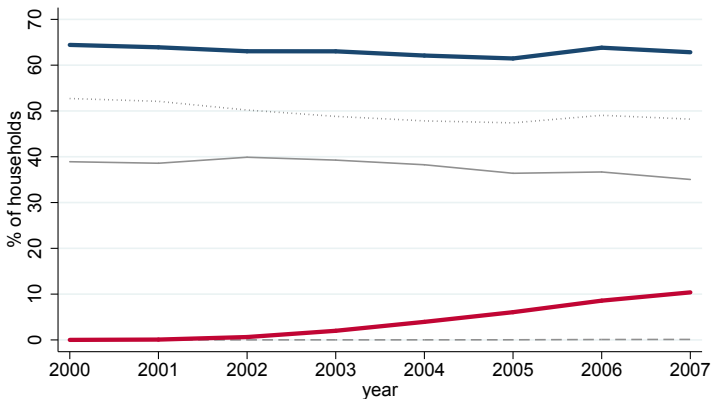
Equity Funds



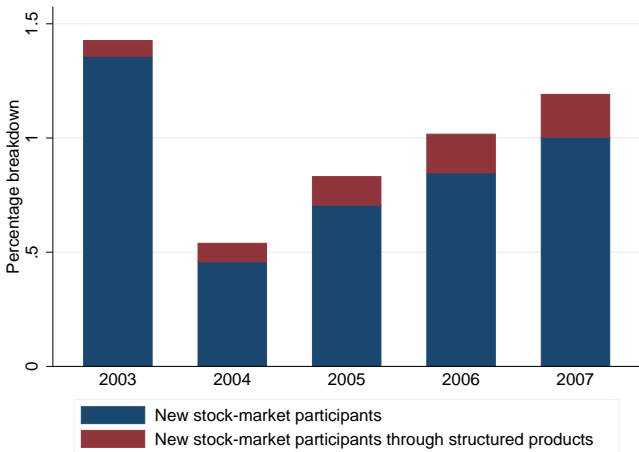
Stocks



Share of Population Holding Structured Products



New Stock Market Participants: Evolution



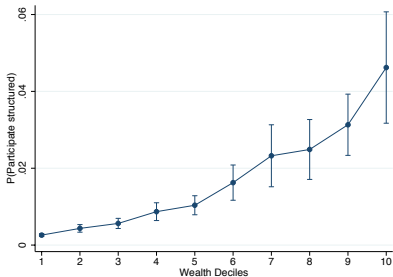
New Stock Market Participants

- What are the characteristics of households who **start** participating through structured products? (versus through other asset classes?)
- We restrict our analysis to households that were not participating to stock markets before the development of the retail market for structured products and run the same logit regression

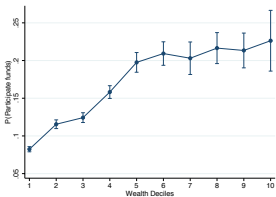
$$\text{Ind}(\text{participation})_i = \alpha + \beta \times \text{HouseholdCharacteristics}_i + \epsilon_i$$

New Stock Market Participants across Wealth

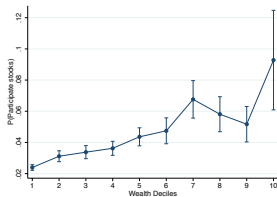
Structured Products



Equity Funds

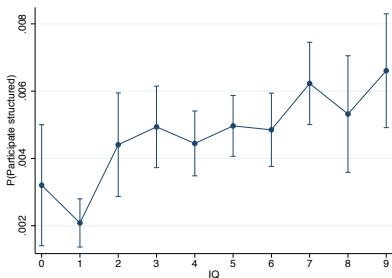


Stocks

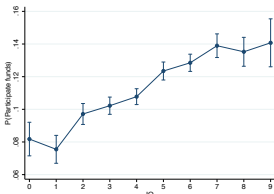


New Stock Market Participants across IQ

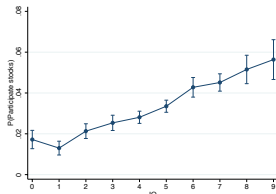
Structured Products



Equity Funds

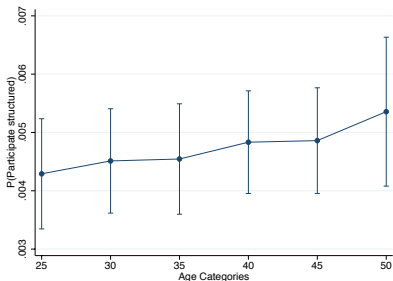


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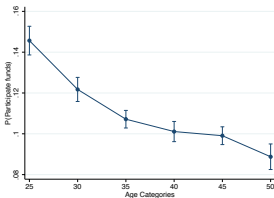


New Stock Market Participants across Age

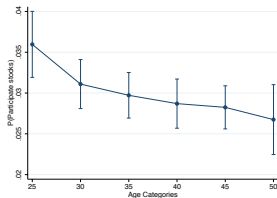
Structured Products



Equity Funds



Stocks



Extent of Participation: Intensive Margin

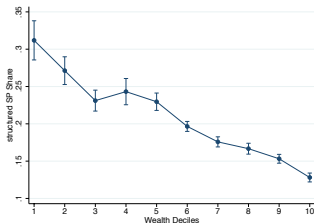
Share of Financial Wealth Invested in Structured Products

- We explore whether household characteristics explain the extent to which household invest in structured products
- We compare these patterns with the extent of participation in other financial assets
- We run cross-sectional OLS regression on amount invested in a given product at the end of our sample period (2007)

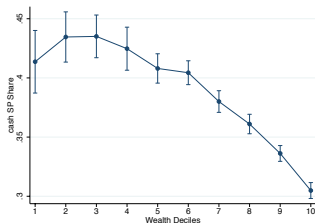
$$\text{ShareFinancialWealth}_i = \alpha + \beta \times \text{HouseholdCharacteristics}_i + \epsilon_i$$

Intensive Margin - Financial Wealth

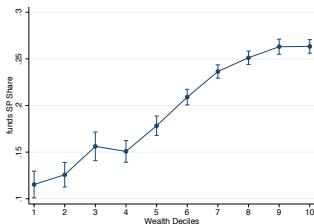
Structured Products



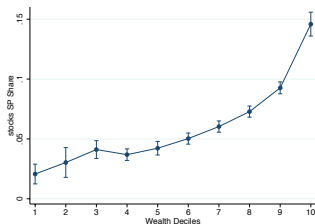
Cash



Equity Funds

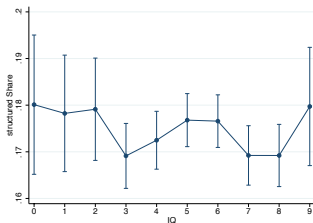


Stocks

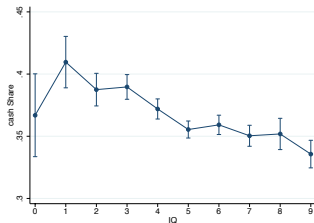


Intensive Margin - IQ

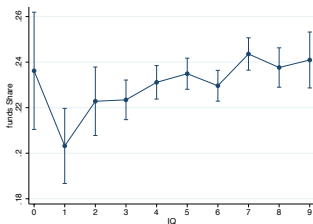
Structured Products



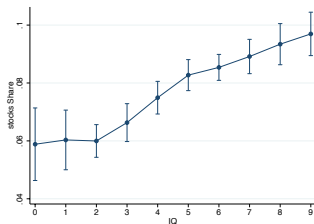
Cash



Equity Funds

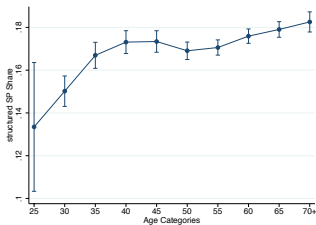


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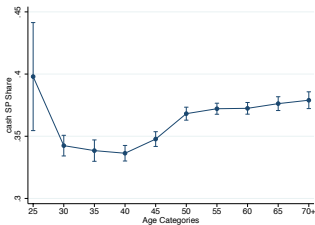


Intensive Margin - Age

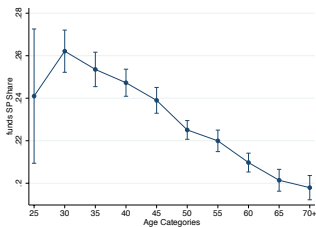
Structured Products



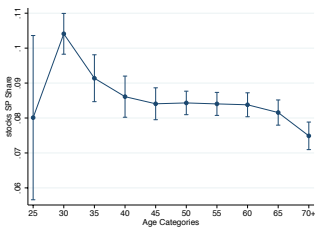
Cash



Equity Funds



Stocks

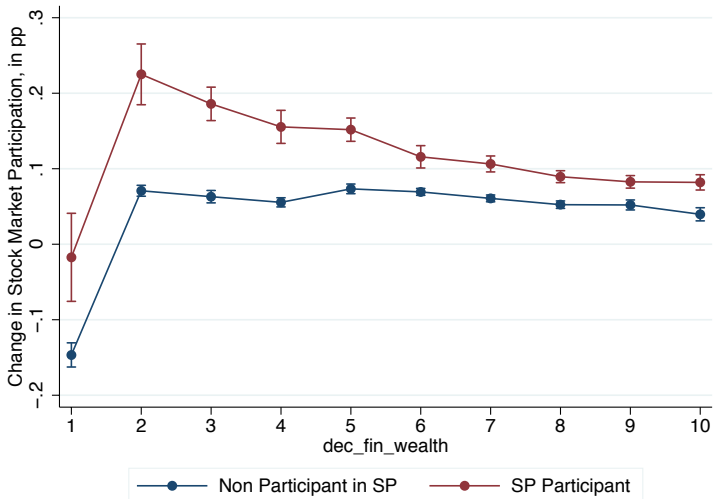


Change in Stock Market Exposure over the 2002-2007 Period

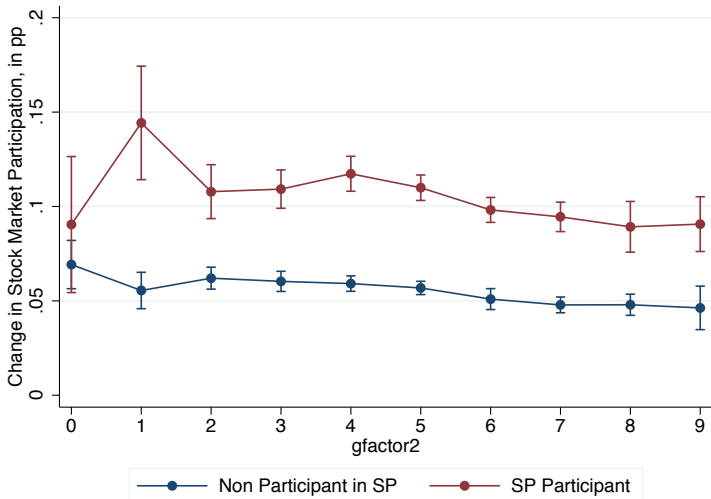
- We then explore whether investing in retail structured products translates into an increase of the share of financial wealth invested in stock markets over the 2002-2007 period
- Stock market products include stocks, equity mutual funds, and equity retail structured products
- We run cross-sectional OLS regression on the change in the share of financial wealth invested in stock markets on household characteristics, and interact household characteristics with an indicator variable for participating in structured products:

$$\begin{aligned}
 \text{EvolutionShare}_{02-07} = & \alpha + \beta \times \text{HouseholdCharacteristics}_i \\
 & + \beta' \times \text{Ind}(\text{Participant}) \times \text{HouseholdCharacteristics}_i + \epsilon_i
 \end{aligned}$$

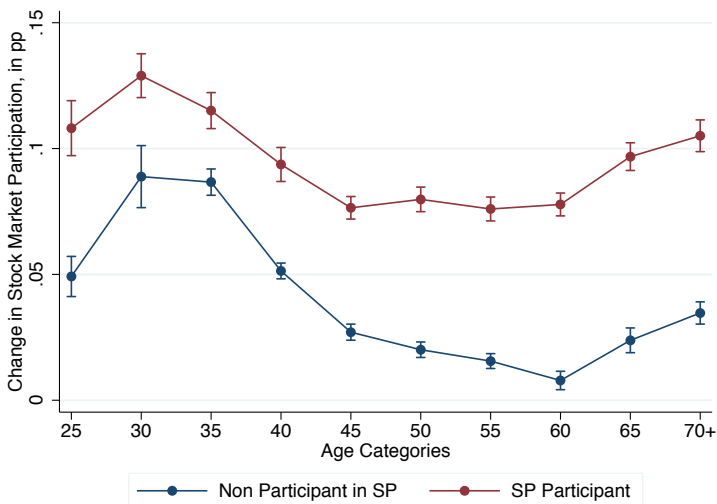
Change in Stock Market Exposure over the 2002-2007 Period - Financial Wealth



Change in Stock Market Exposure over the 2002-2007 Period - IQ



Change in Stock Market Exposure over the 2002-2007 Period - Age



Motivation
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Background and Data
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Extensive Margin
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Intensive Margin
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Portfolio Rebalancing
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Product Design
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Model
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Conclusion
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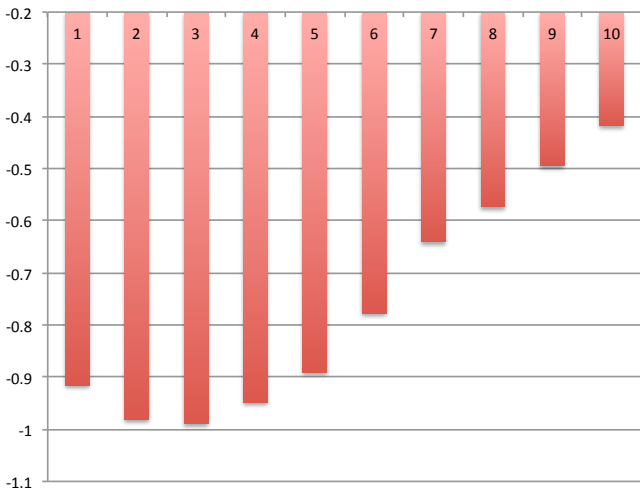
Portfolio Rebalancing

Substitution from Cash

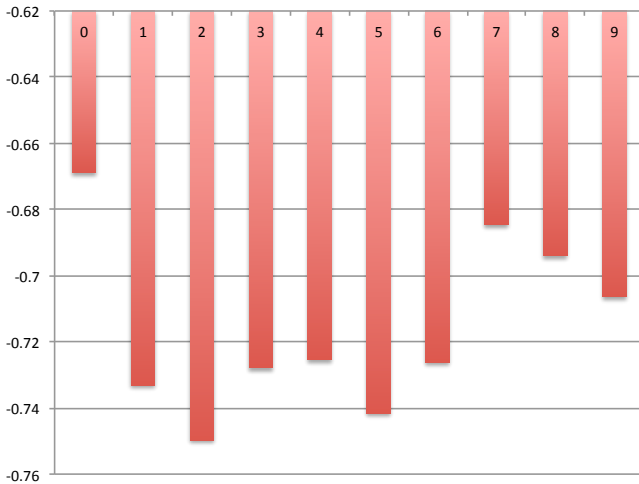
- We test whether households fund their investment in structured products with cash, and whether this cash-elasticity varies with household characteristics
- We conduct a panel analysis on the sample of structured product participants. Variables expressed in % of Financial Wealth

$$\begin{aligned} \text{Cashshare}_{i,t} = & \alpha + \beta \times \text{SPshare}_{i,t} \\ & + \beta' \times \text{SPshare}_{i,t} \times \text{HouseholdCharacteristics}_i \\ & + \gamma \times I_i + \eta \times Y_t + \epsilon_{i,t} \end{aligned}$$

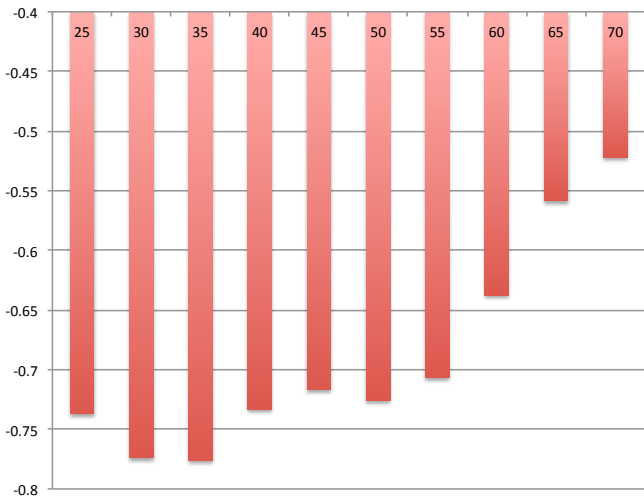
Substitution from Cash - Financial Wealth



Substitution from Cash - IQ



Substitution from Cash - Age



Motivation
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Background and Data
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Extensive Margin
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Intensive Margin
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Portfolio Rebalancing
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Product Design
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Model
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Conclusion
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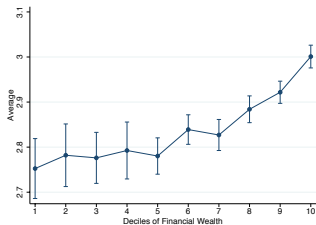
Product Design

Structured Product Design

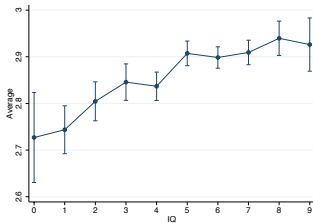
- We investigate whether structured product design varies with household characteristics
- We study product complexity, as measured by the number of payoff feature, as in Celerier and Vallee (QJE2007), and the level of guarantee

Complexity

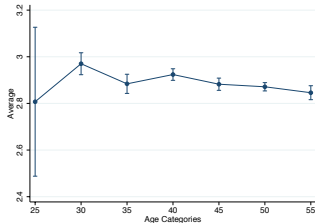
Financial Wealth



IQ

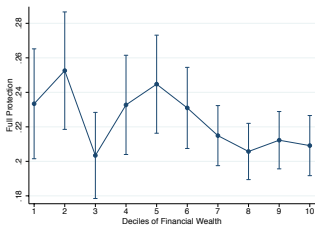


Age

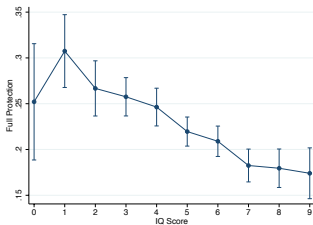


Share of Products with Full Guarantee

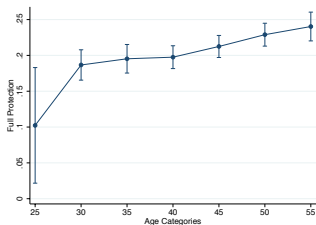
Financial Wealth



IQ



Age



Theoretical Framework

Theoretical Framework (1/2)

- We develop a theoretical framework to investigate the mechanism behind participation in structured product
- In the model, the investor can invest in three distinct assets: a risk-free bond, a stock market index and a structured product offering a guarantee and a participation in the performance of the stock market (verifying a Black and Scholes no-arbitrage condition)
- We test several utility functions:
 - CRRA utility
 - Habit formation
 - Loss aversion

Theoretical Framework (2/2)

- The data cannot be explained by a CRRA utility, while habit formation can generate a moderate appetite for guaranteed products
- Loss aversion is the most likely mechanism to explain the data

Motivation
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Background and Data
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Extensive Margin
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Intensive Margin
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Portfolio Rebalancing
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Product Design
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Model
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Conclusion
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Conclusion

Conclusion and Next Steps

- We provide evidence consistent with innovative financial products fostering stock market participation of households, by having an impact on both the extensive and the intensive margin
- Our results suggests that non-linear payoff design can mitigate household reluctance to participate in stock markets
- Next steps:
 - Instrument investment in retail structured products with geographic coverage of banks
 - Assess the cost to households of these products, to put in prospect with the benefits