



EUROPEAN CENTRAL BANK

EUROSYSTEM

# Wealth Shocks and Portfolio Choice

20.027: Housing and Wealth  
European Economic Association  
Universitat Pompeu Fabra  
Barcelona, 28 Aug – 1 Sep 2023

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## Disclaimer

*The views expressed are my own and do not necessarily reflect the views of the European Central Bank or those of the euro system.*

# Motivation

Relation between **wealth** and **portfolio choice** is at the **heart of empirical investigations** in the **Household Finance** literature.

How does stockholding react to wealth shocks of different size?

- Useful to signal importance of *transaction* and *information* costs

- How does the share of risky assets vary with wealth shocks?

- Useful to understand the nature of households' *attitudes towards risk*

Yet, it is **challenging to estimate** the effect of wealth on stockholding and risky portfolio shares using **observational data** and for **the general population**.

# Empirical challenges

Even with panel data, hard **to estimate the causal effect of wealth on portfolios**:

- a) **Reverse causality** (stock market participants may secure high returns).
- b) **Correlation with unobservable characteristics** that affect the decision to invest in risky assets (time-varying risk aversion).
- c) Need to **distinguish exogenous from endogenous changes in wealth** (some investors are successful, avoiding market crashes or exploiting market booms).

Two studies exploit random wealth shocks and focus on stock market participation:

**Unexpected inheritances** (Andersen and Nielsen 2010);

**Lottery winners** (Brigs et al. 2021)

# What we do

- 1) We implement a **survey experiment** asking households how they would allocate **randomly assigned lottery gains** of different size between spending, debt repayment, saving and investment in various financial assets.
- 2) The experiment expands studies using hypothetical transitory income shocks to estimate MPC: Shapiro (2003), Jappelli and Pistaferri (2014, 2020), Christelis et al. (2019).
- 3) We estimate the **causal effect of wealth on both stock market participation** and **asset share** invested in stocks and mutual funds.

-**Randomization** ensures that estimates are not confounded by unobservable variables of the selected sample that is subject to a shock.

-Our study combines an experimental survey with a representative sample of the euro area and estimates propensity to invest in risky assets (samples with lottery winners or inheritances analyze **restricted / selected** households).

# Findings

On **participation: positive gradient** between wealth and stock ownership

- For every 10k euro increase in wealth: +1.5 pp in participation
- Going from the lowest (5k) to the highest lottery (50k): +6 pp in participation
- +2 pp in participation for relatively more financially literate
- Even for large wealth shocks (50k) the majority does not invest in stocks

On **asset shares**: flat for small shocks, slightly increasing for larger shocks

- Holds for both stocks held directly and stocks plus mutual funds

Increase in asset share of 1.5 pp for prizes >30k

**Heterogeneity of response:**

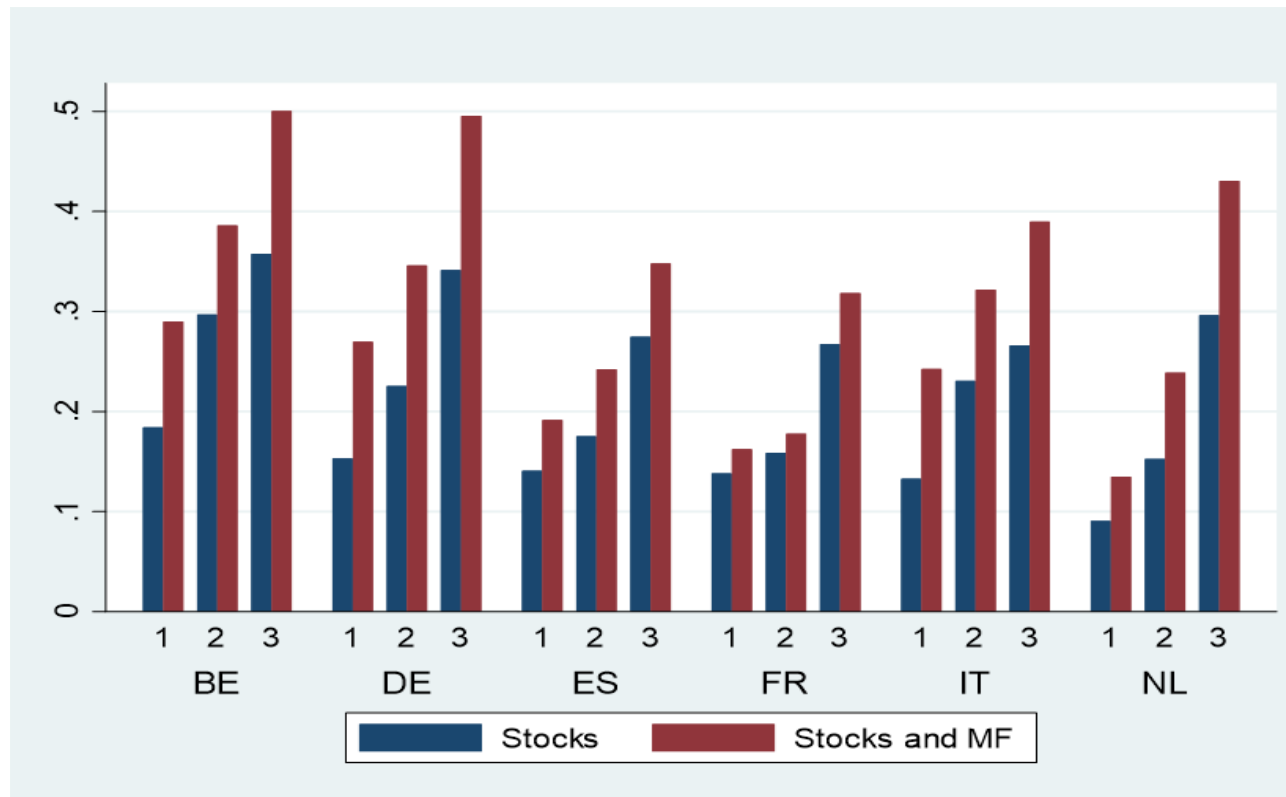
Financial literacy, liquidity, previous stockholding

# CES - Consumer Expectations Survey

- **Internet panel** administered by the ECB;
- 6 countries: DE, FR, ES, IT, BE, NL; ~ 10,000 households;
- Pilot started January 2020;
- Nationally representative with sample weights (Georgarakos and Kenny, 2022, *JME*)
- Household **expectations** (*e.g., inflation, income, house prices, interest rates, GDP growth, labor markets*) and **behavior** (*e.g., spending, portfolio allocation*)
- **Mixed-frequency modular approach** (background; monthly, quarterly, annual topical modules; special-purpose ad hoc surveys)

**Two definitions of stockholding:** narrow (only stocks); broad (stocks or MF)

## Background CES data (August 2020 – November 2021) Reported stock market participation, by education



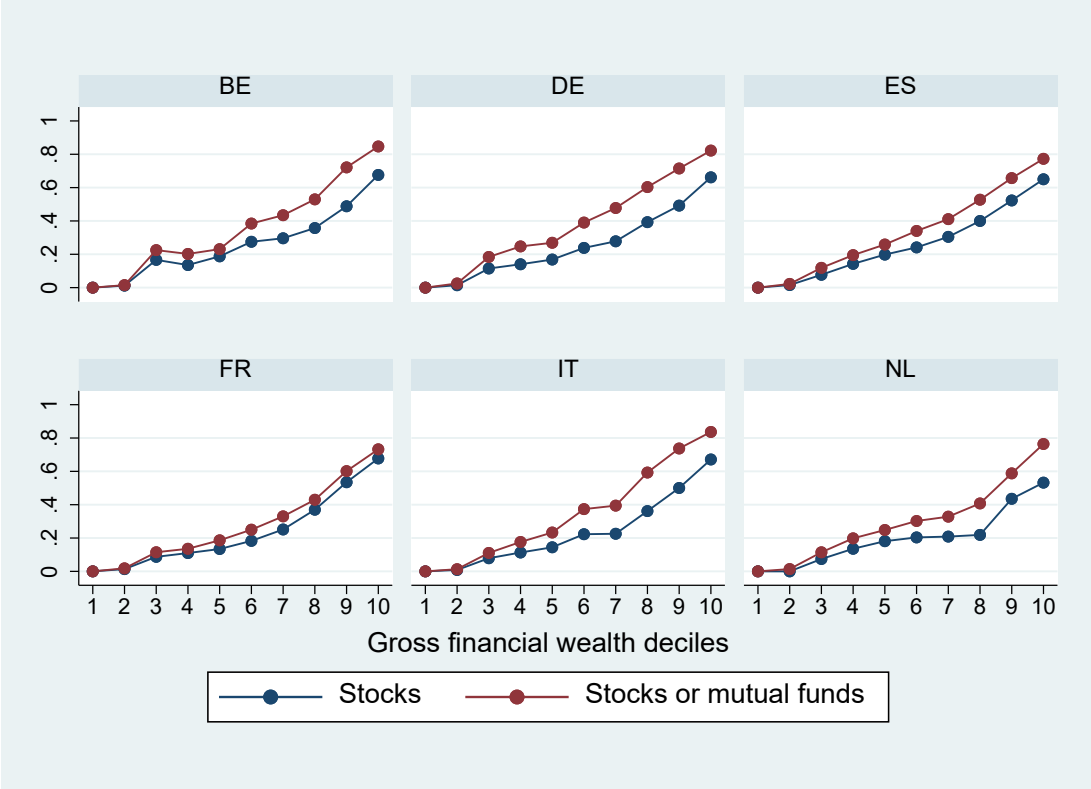
Narrow  
and broad  
definitions of  
stockholding.

CES shows strong  
correlation  
between  
participation  
and education  
in each country.

Data are drawn from pooled **August 2020 – November 2021 Consumer Expectations Survey (CES)**.  
Statistics are computed using sample weights.



# Background CES data (August 2020 – November 2021): Stock market participation by wealth deciles



Stockholding profiles by age, income, wealth, and correlations with other relevant variables agree with previous country-level studies.

Important to validate quality of CES data.

Data are drawn from pooled **August 2020 – November 2021 Consumer Expectations Survey (CES)**. Statistics are computed using sample weights.

## The June 2021 survey experiment

- **June 2021:** special-purpose survey following the regular CES
- Background information on financial assets and demographic variables
- Subsequently implement the survey experiment

Identification of the effect of wealth shocks is achieved by assigning randomly lottery prizes of different size **to 5 sub-samples**.

Experiment is implemented in two successive screens.

## Survey experiment – Screen 1

Imagine you win a lottery of **€Amount** today. How would you use this unexpected windfall over the next 12 months? Please allocate the **<Amount>** over the following three categories.

**<Amount>**: 5k, 10k, 20k, 30k and 50k euro

- (1) Buy goods and services (including food, housing costs and rent, utility bills, clothing, and long-lasting goods such as home improvements, furniture and electronics, etc.)
- (2) **Save and invest in financial assets**
- (3) Repay debts

Median financial wealth in the CES is 15k euro. A 50k prize is equivalent to the 75<sup>th</sup> pct of the financial wealth distribution.

## Survey experiment – Screen 2

You said that you would save or invest in financial assets **€Amount**. Please indicate in which of the following asset categories you would save/invest this amount.

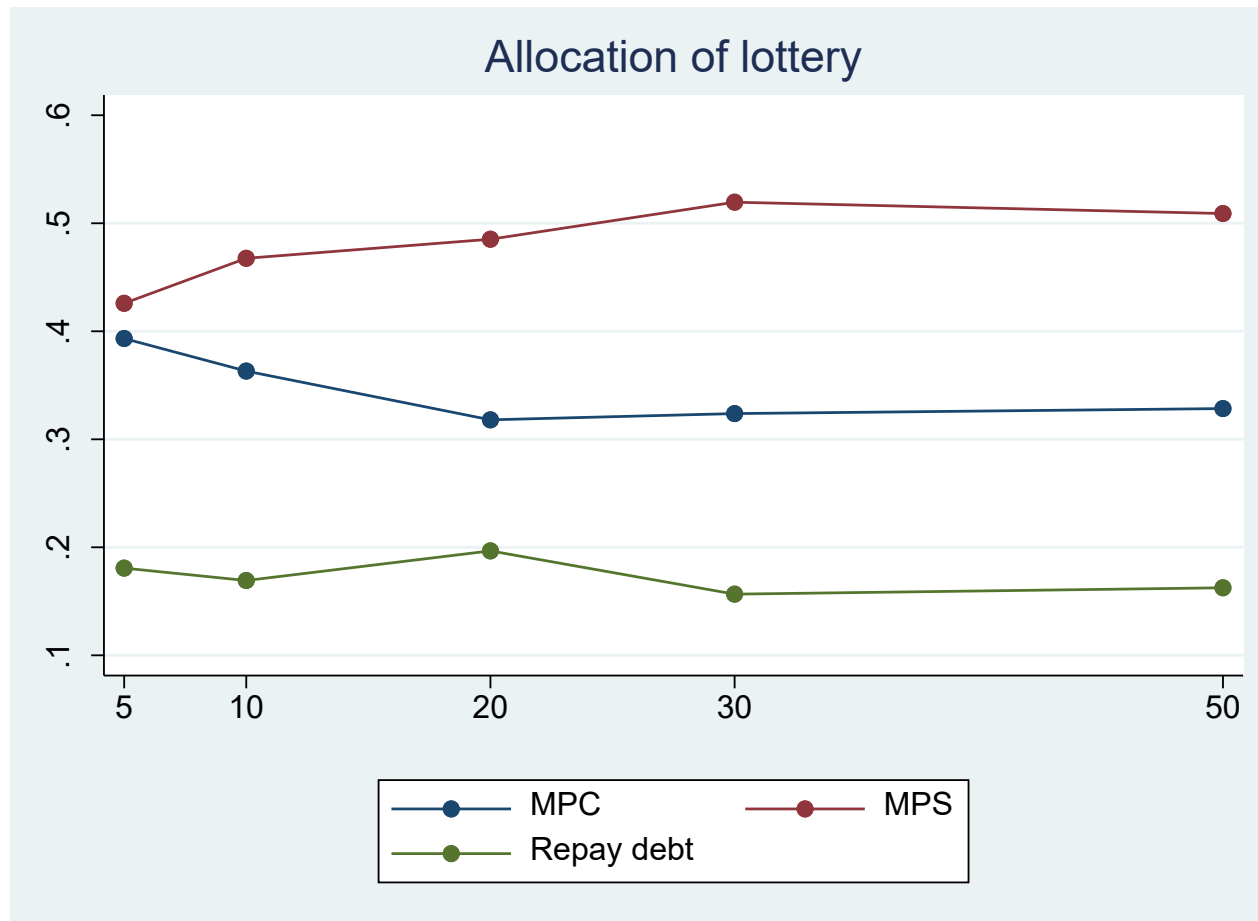
- (i) current accounts and saving accounts
- (ii) **stocks and shares**
- (iii) **mutual funds**
- (iv) retirement and pension products (including life insurances)
- (v) bonds

## Randomization works well in the survey experiment: 5 sub-samples share similar characteristics

	Prize =5k	Prize=10 k	Prize=20 k	Prize=30 k	Prize=50 k	Total sample
Male	.478	.491	.504	.490	.498	.493
Age	46.0	46.5	46.6	47.0	46.5	46.5
Family size	2.76	2.72	2.75	2.66	2.67	2.71
High school	.324	.324	.311	.325	.309	.319
College	.543	.521	.539	.535	.570	.542
Employed	.601	.593	.587	.572	.583	.587
Self-employed	.096	.086	.106	.105	.091	.097
High literacy	.521	.523	.530	.535	.507	.523
High trust	.511	.540	.518	.533	.546	.530
High STM expectations	.427	.430	.420	.424	.422	.425
High STM uncertainty	.203	.192	.183	.185	.171	.187
Log cash-on-hand	9.75	9.79	9.76	9.75	9.84	9.78
N. of observations	1,953	1,935	1,932	1,933	1,925	9677

Data are drawn from the **June 2021 wave of the Consumer Expectations Survey (CES)**.  
Statistics are computed using sample weights.

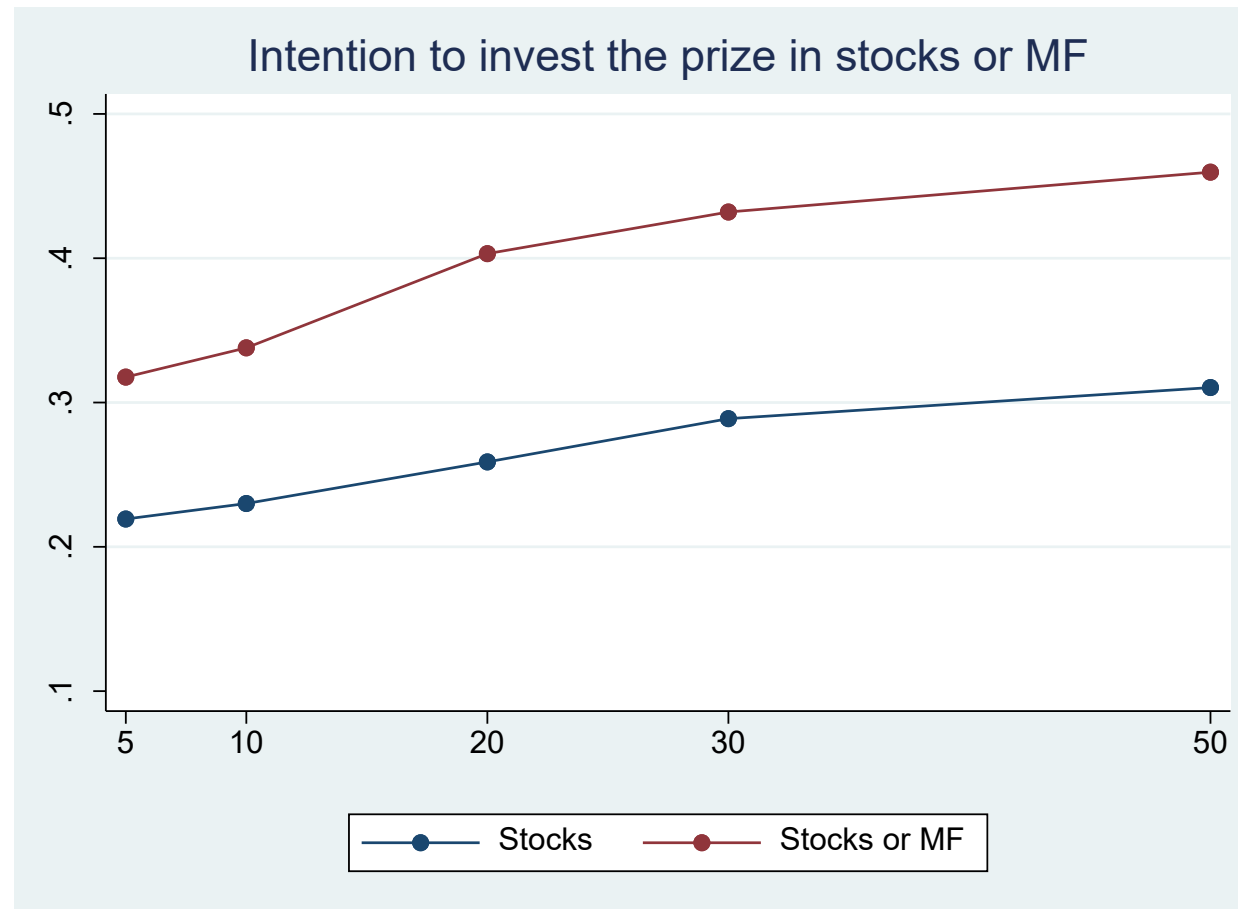
# Allocation of lottery prize between spending, saving and repaying debt



Negative association between MPC and shock size, replicating earlier findings:

Easier to overcome constraints for relatively large shocks.

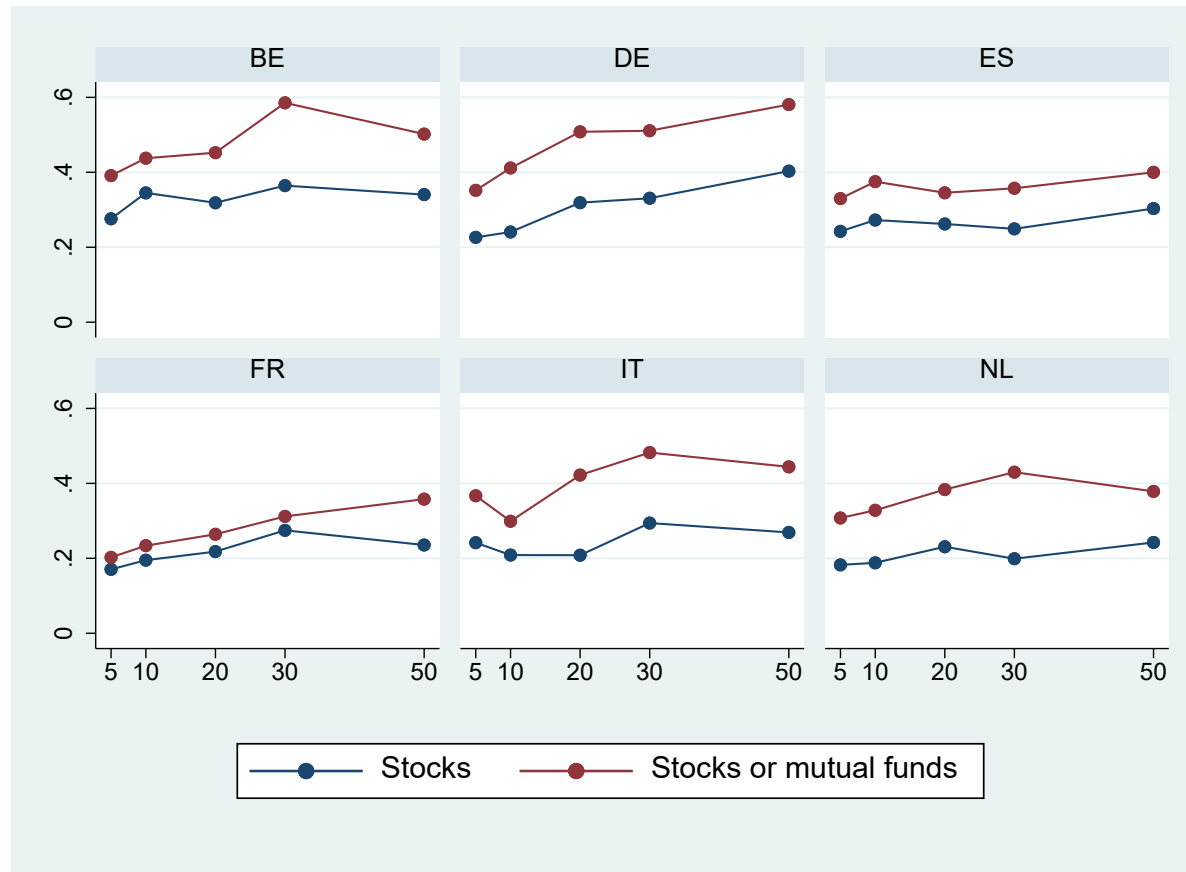
## Intention to invest amount saved in stocks or MF



Positive association between shock size and stockholding.

Majority would not invest in stocks or MF even if wins a 50k prize.

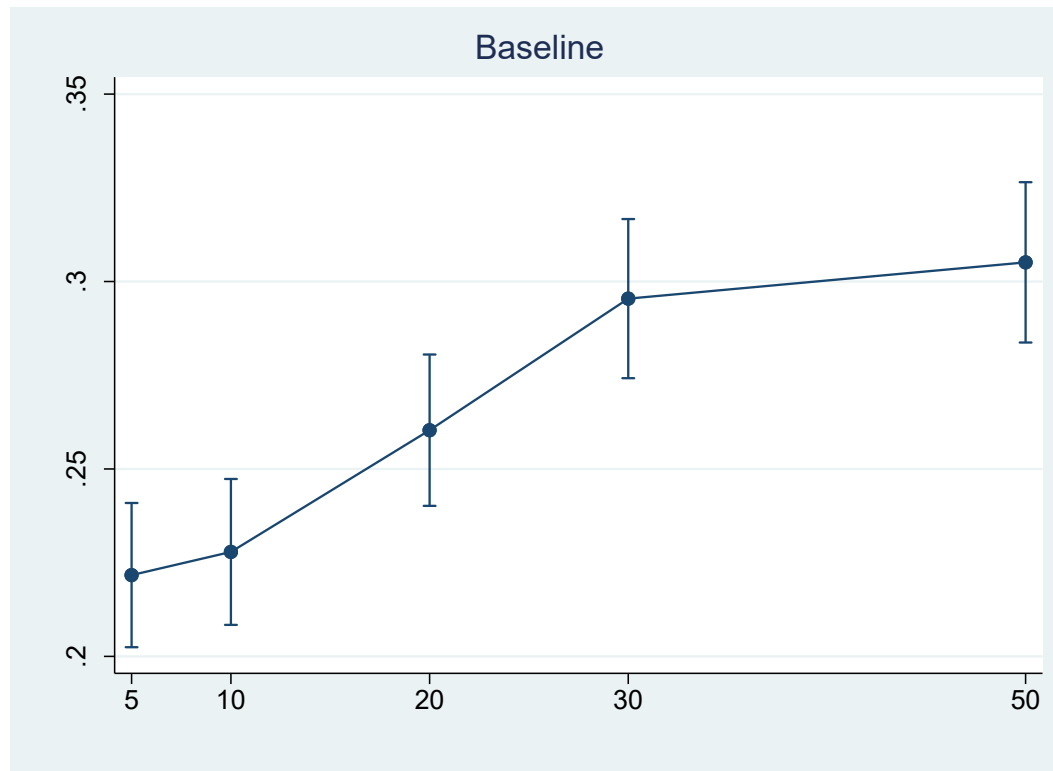
# Intention to invest in stocks or MF across countries



Positive association  
between shock size  
and stockholding in all  
countries



## Probit for intention to invest in stocks

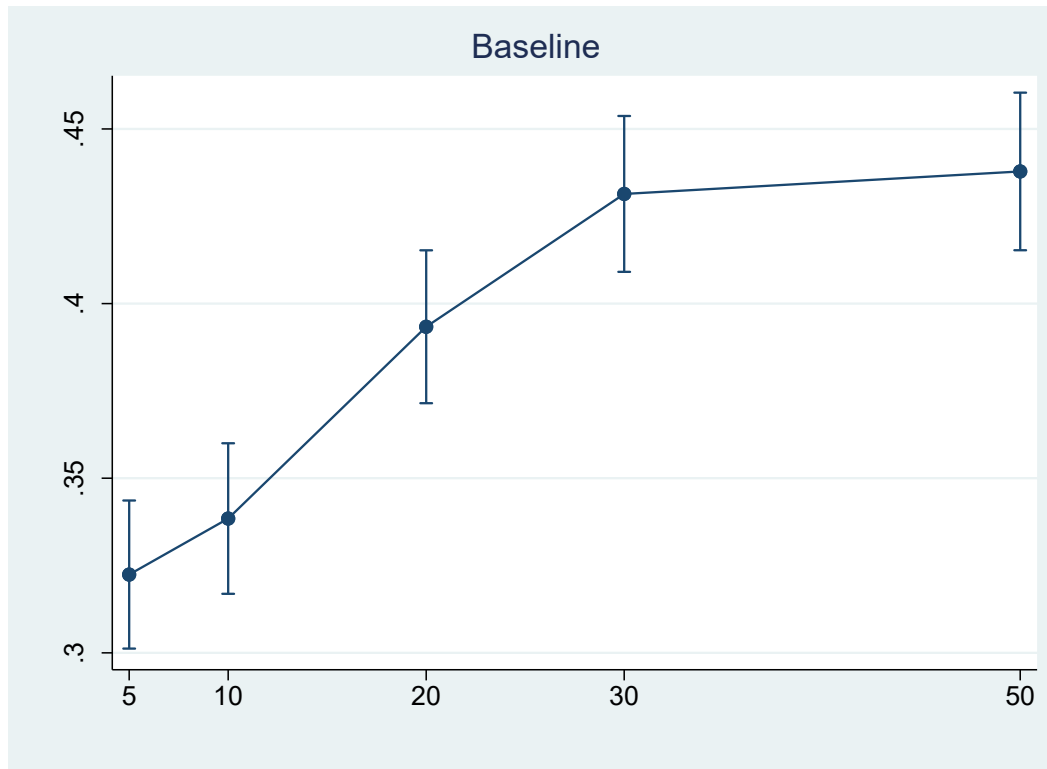


	LHS: Stocks
Prize 10k	0.025 (0.014)*
Prize 20k	0.045 (0.014)***
Prize 30k	0.083 (0.014)***
Prize 50k	0.086 (0.014)***

Increase in participation  
of 6 pp for largest prize.

Given randomization, the  
relation can be  
interpreted as causal

## Probit for intention to invest in stocks or MF



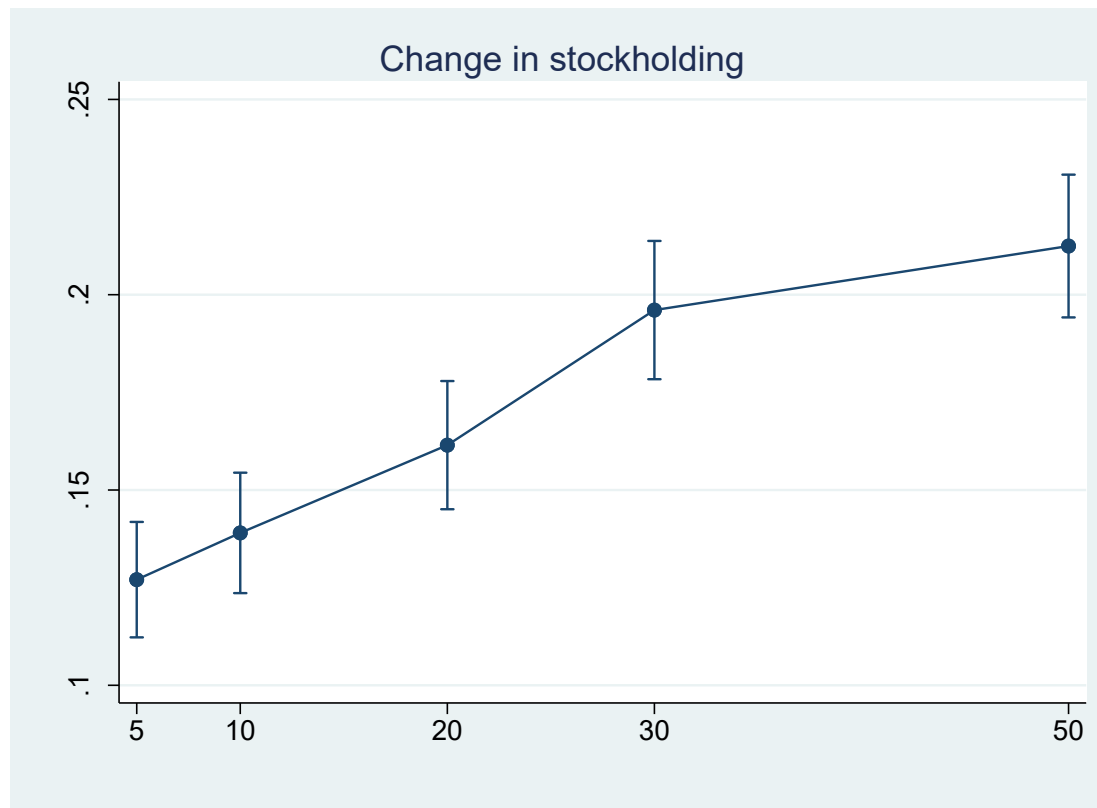
	Stocks or MF
Prize 10k	0.029 (0.016)*
Prize 20k	0.072 (0.015)***
Prize 30k	0.120 (0.015)***
Prize 50k	0.128 (0.015)***

Increase in participation of 10 pp for largest prize

Given randomization, the relation can be interpreted as causal.

$$Prob(P_{it}) = Prob(\beta_0 + \beta_1 L_{it} + \beta_2 X_{it} + \varepsilon_{it} > 0)$$

# Probit for change in stockownership



Scale is different, but the effect is similar

Increase in participation of 10 pp with respect to stockholding before the experiment

$$Prob(\Delta P_{it}) = Prob(\beta_0 + \beta_1 L_{it} + \varepsilon_{it} > 0)$$

## External validity

Size of the wealth effect is broadly consistent with previous studies:

- Andersen and Nielsen (2011)
  - Denmark; unexpected inheritances due to sudden death
  - Receiving an unexpected inheritance of 50k euro: +12.9 pp in stock ownership
- Briggs et al. (2021)
  - Sweden; lottery winners
  - Winning a prize in the 15-150k USD range: +8.2 pp in stock ownership

# Heterogenous wealth effects

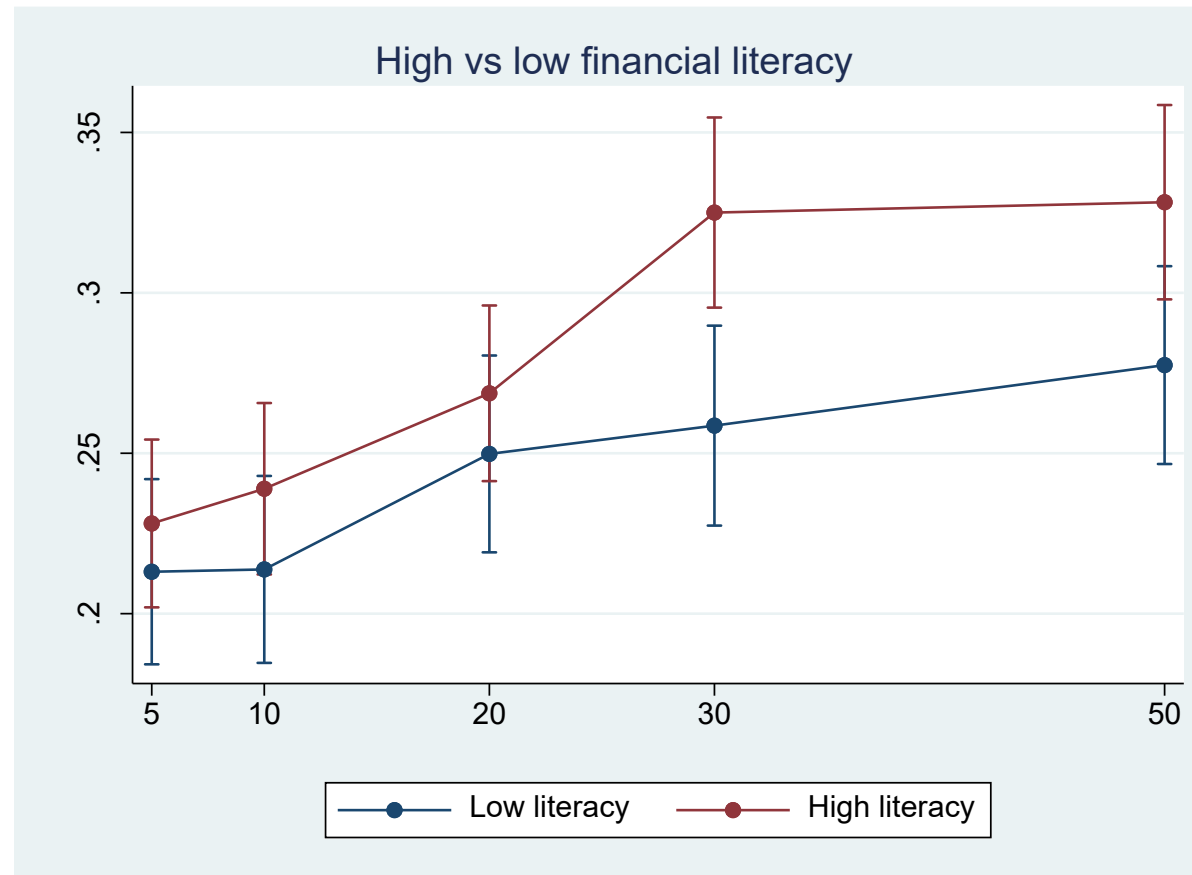
Propensity to invest in stocks stronger for:

- High wealth households
- Liquid households
- High financial literacy
- Previous ownership of stocks
- Indicator of over-confidence
- Optimistic stock market expectations
- Long investment horizon
- Trust others

In addition, the wealth-participation gradient is heterogenous:

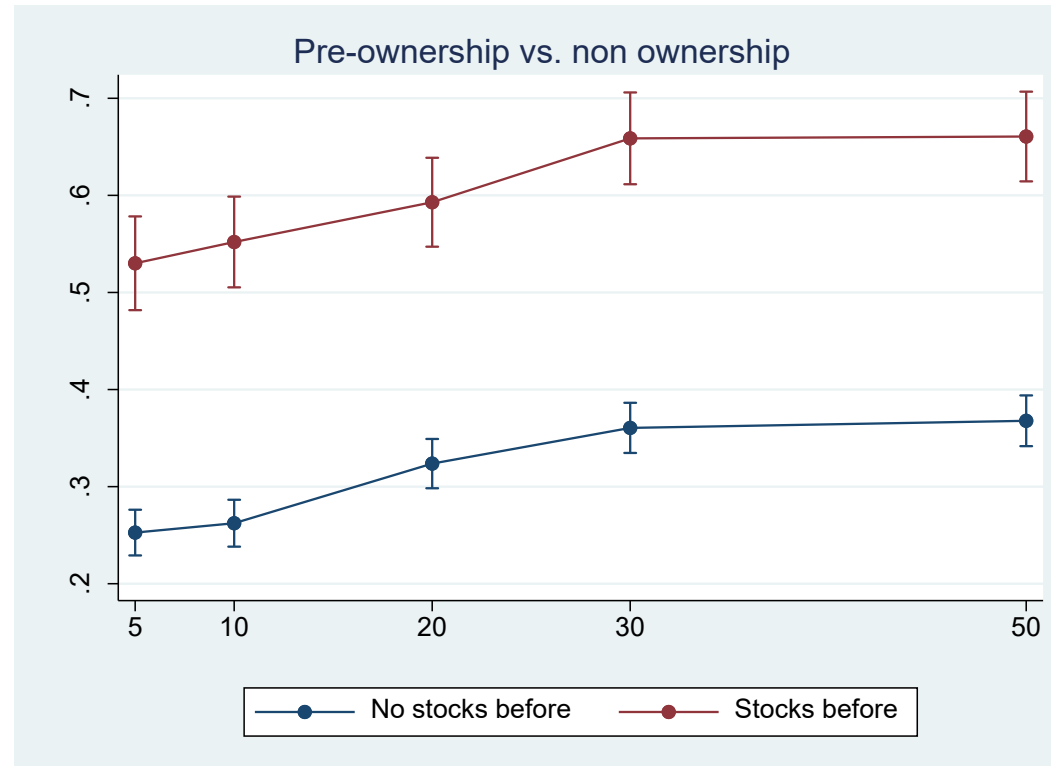
- Financial literacy
- Pre-ownership of stocks
- Liquidity

## Probit regression: Marginal effects of lottery size, interacted with financial literacy



Effect of lottery is 6 pp for “low literacy” and 10 pp for “high literacy”.  
Relatively high literacy makes it easier to invest in stocks, at each level of wealth.

## Probit regression: Marginal effects of lottery size, interacted with ownership of stocks before the lottery



Effect of 50k lottery is 6 pp for “no stocks before” and 10 pp for “stocks before”. Lower information costs for pre-owners make it easier to invest in stocks, at any given level of wealth.

## The wealth effect on risky asset shares

$$\alpha_{it} = \frac{A_{it}}{W_{it}} = f(W_{it}, Er_{it}^e, \sigma_{it}^2, \rho_i, f_{it})$$

Using actual data and experimental data, we define the asset share before and after the experiment:

$$\Delta\alpha_{it} = \frac{A_{it}}{W_{it}} - \frac{A_{it-1}}{W_{it-1}}$$

The change in asset share is positive for 38%, negative for 12%, zero for 51%

We then estimate the equation in first difference:

$$\Delta\alpha_{it} = \eta_0 + \sum_{j=1}^M \eta_j L_{jt} + \varepsilon_{it}$$

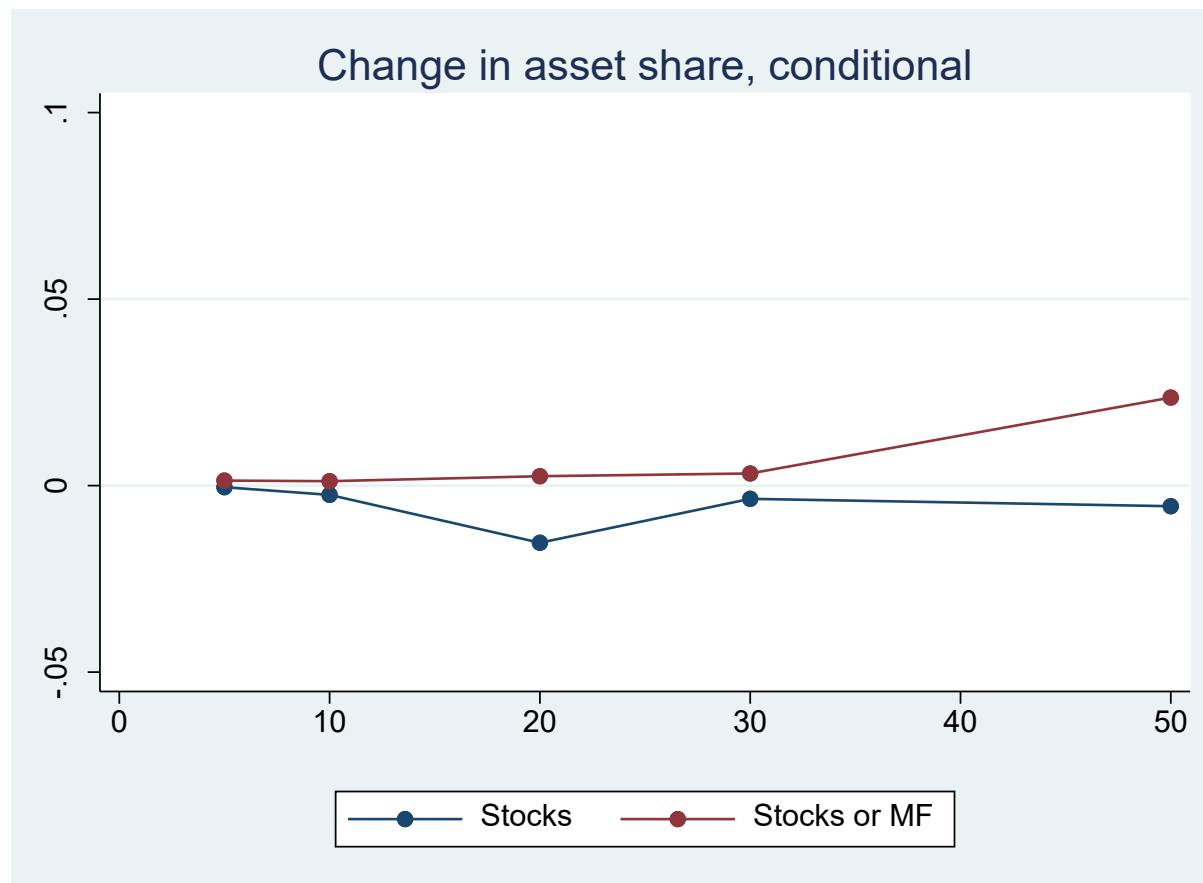
We can safely assume that **no variable changes except the prize**

The shock is **exogenous**:  $cov(L_i, \varepsilon_i) = 0$ ; **no reverse causality**; **no measurement error**

- Under specific hypothesis, estimates of  $\eta$  informative about risk aversion



## Descriptive analysis: change in asset share, conditional on participation

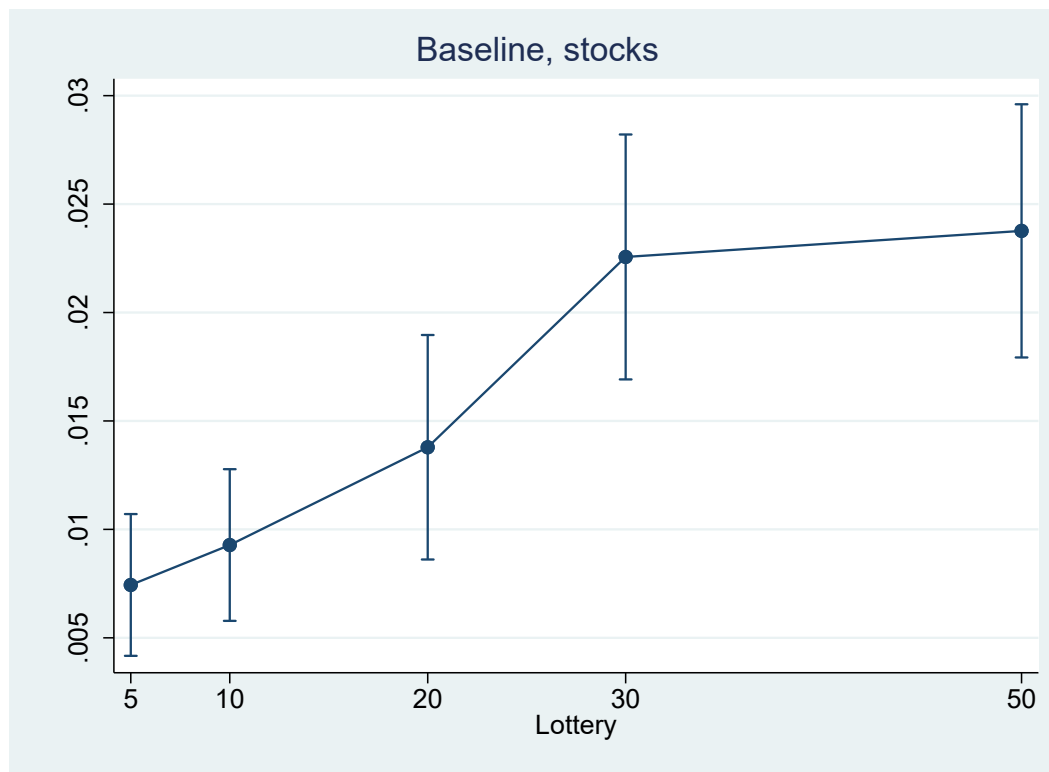


Change in asset share invested in risky assets, in sub-sample investing in risky assets.

Narrow definition: flat

Broad definition: slightly increasing for 30k+ prize

## Change in asset share (stocks or MF): total sample



	First difference
Prize 10k	0.002 (0.002)
Prize 20k	0.006 (0.003)**
Prize 30k	0.015 (0.003)***
Prize 50k	0.016 (0.003)***

Increase in asset share of 1.5 pp for prizes >30k

$$\Delta\alpha_{it} = \eta_0 + \sum_{j=1}^M \eta_j L_{jt} + \varepsilon_{it}$$

# Summary

Previous literature has used lotteries and inheritances to identify effect of wealth shocks on stockholding. We implement a **novel survey experiment**:

wealth shock is **exogenous**;

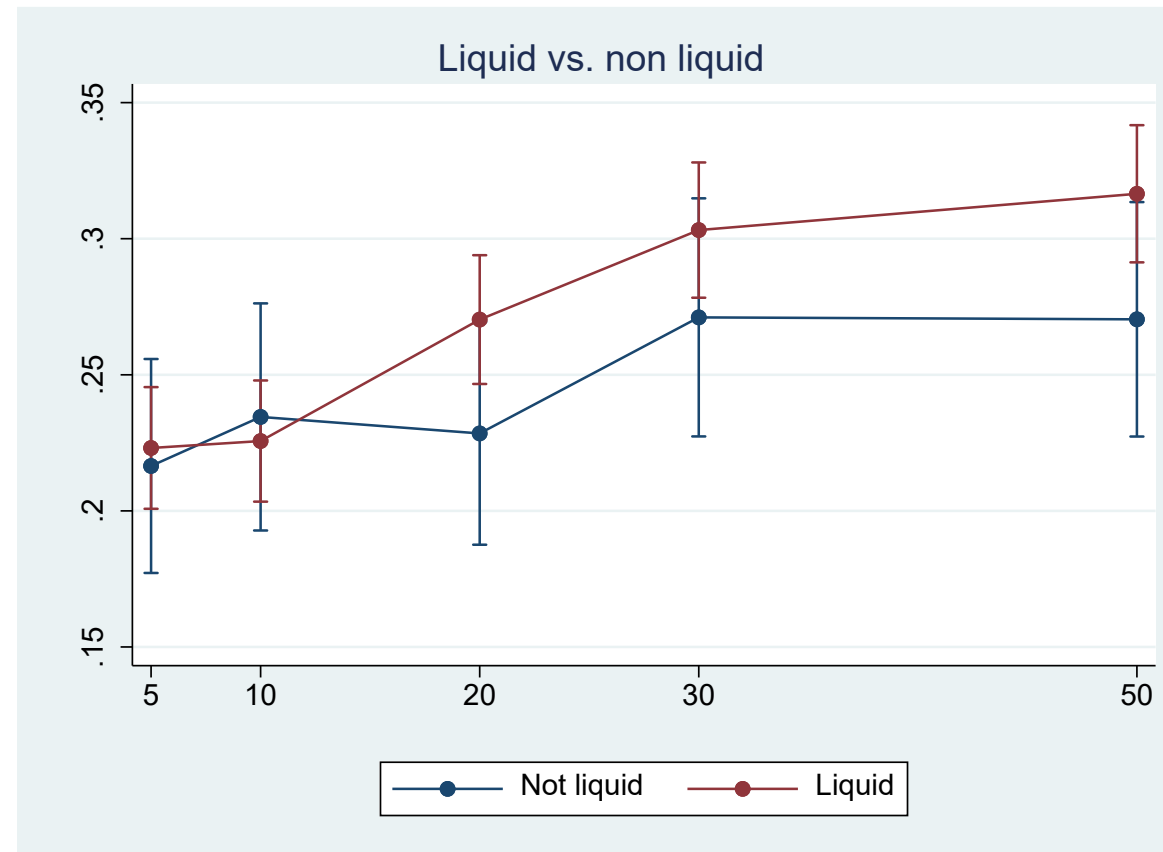
**realistic menu** of choices: spending, saving and **portfolio allocation**.

We derive **causal estimates** of the effect of wealth on stock market participation and risky asset shares, and four findings:

1. participation costs limit stockholding, especially for less sophisticated investors;
2. even for 50k prize majority would not invest in stocks (suggestive of explanations based on *stock price beliefs, lack of trust, inertia, behavioral biases*)
3. conditional asset shares do not depend on wealth shocks for relatively small wealth shocks (up to 30k);
4. propensity to take financial risk slightly increasing for 30k+ wealth shocks.

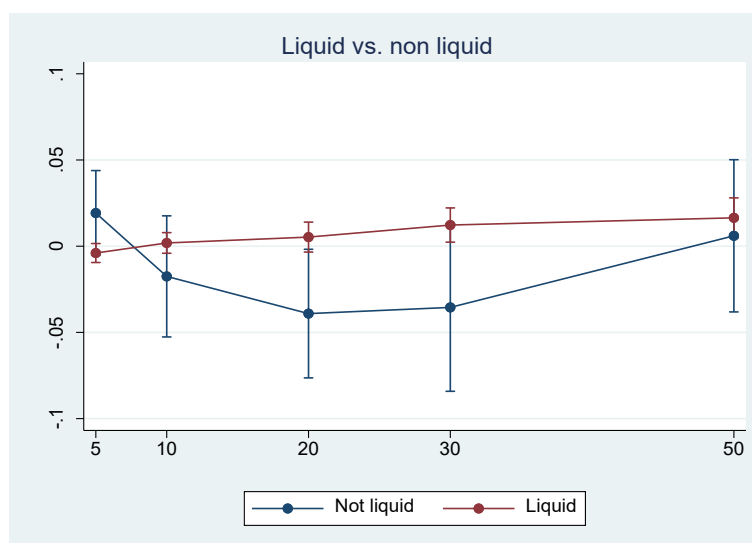
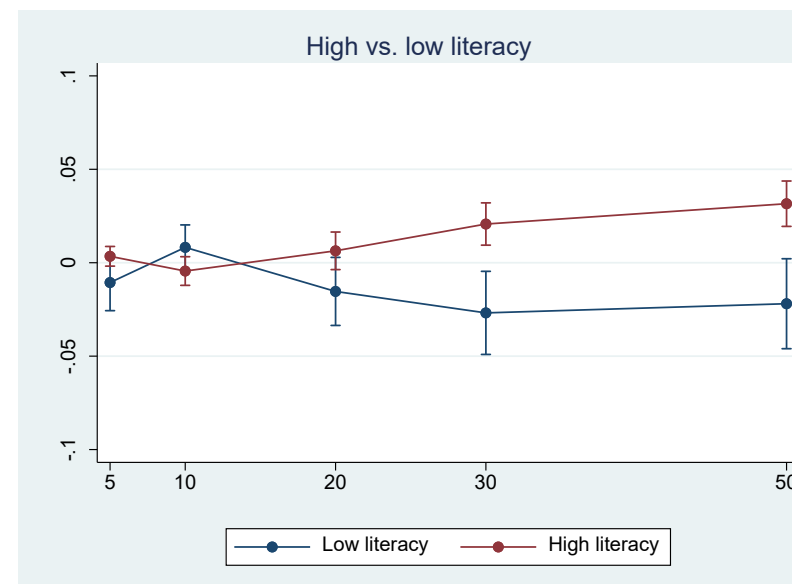
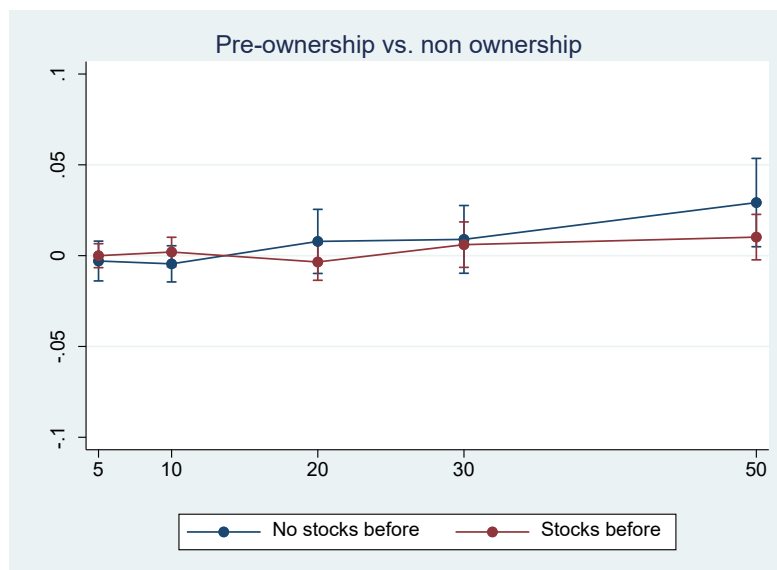
## Reserve Slides

## Probit regression: Marginal effects of lottery size, interacted with dummy for liquidity



Effect of largest prize is 5 pp for “not liquid” and 9 pp for “liquid”.  
Liquid households participate more, when the prize is large.

## Heterogeneity of change in asset share (broad definition)



The gradient is slightly steeper for the high financial literacy group, but similar for many potentially relevant subgroups: low vs high education, income risk, liquidity, ecc.