Wealth Shocks and Portfolio Choice

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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.


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

\textcolor{red}{\textit{<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) \textcolor{red}{\textit{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\textsuperscript{th} pct of the financial wealth distribution.
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

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

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

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

Increased participation of 10 pp for largest prize.

Given randomization, the relation can be interpreted as causal.

Probit for intention to invest in stocks or MF

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

\[ \alpha_{it} = \frac{A_{it}}{W_{it}} = f(W_{it}, E\tau_{it}, \sigma_{it}^2, \rho_i, f_{it}) \]

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

Baseline, stocks

<table>
<thead>
<tr>
<th>Lottery</th>
<th>First difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prize 10k</td>
<td>0.002 (0.002)</td>
</tr>
<tr>
<td>Prize 20k</td>
<td>0.006 (0.003)**</td>
</tr>
<tr>
<td>Prize 30k</td>
<td>0.015 (0.003)**</td>
</tr>
<tr>
<td>Prize 50k</td>
<td>0.016 (0.003)**</td>
</tr>
</tbody>
</table>

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
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.