Determinants of Households’ Savings in Central, Eastern and Southeastern Europe

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Opinions expressed do not necessarily reflect the official viewpoint of the OeNB or the Eurosystem
Outline

• Motivation, policy relevance and contribution

• Literature overview
  → Life-cycle hypothesis

• Stylized facts, data and empirical strategy
  → OeNB Euro Survey

• Results

• Robustness checks

• Conclusions
CESEE Household Savings: Motivation and Policy Relevance

- Financial stability and (long-term) fiscal sustainability:
  
  Financial markets in Central, Eastern and Southeastern Europe (CESEE)
  - mostly dominated by foreign-owned banks
  - with high loan-to-deposit ratios at the onset of the financial crisis
    → need to rebalance funding of the financial sector via local savings

Ageing will put strain on public finances (health & pension systems)

  → individual saving will become more important
    (irrespective of policy solutions, e.g. private or defined-contribution schemes)

- Some specific features of CESEE:
  
  e.g.: euroization, remittances, local capital markets

  → possibly different saving behavior than in other countries

  → Which CESEE households save and how?
CESEE Household Savings: Our contribution

We explore household saving in 10 CESEE countries:

- based on OeNB Euro Survey data (frequencies only; no amounts)
- by testing *and finding evidence* of the Life-Cycle Hypothesis (LCH):
  - providing evidence on which households hold savings
  - testing whether the standard LCH determinants of saving are relevant for CESEE
  - providing evidence on savings instruments and portfolio choice of households
  - analyzing which factors determine the choice of saving instruments
- focusing on micro-level determinants only
Literature: Saving

Theory:

• Life-Cycle Theory (LCH) (*Modigliani and Brumberg, 1954; Modigliani, 1986*)

• Permanent Income Hypothesis (PIH) (*Friedman, 1957*)

→ **hump-shaped age-savings profile**

Empirical evidence:

• mixed

• advanced countries:


**CESEE:**

*Denizer, Wolf and Ying (2002)* – BG, HU, PL: evidence against LCH

*Hanousek and Tuma (2002)* – CZ:

*Leszkiewicz-Kedzior and Welfe (2012)* – PL: LCH evidence for a fraction of households
Literature: LCH in Portfolio Choice

- Modern portfolio theory: risk and return; **life cycle plays no direct role**
  - frictions: e.g. risky labor income and borrowing constraints
    - (Cocco, Gomes and Maenhout, 2005), housing (Flavin and Yamashita, 2002)
  → optimal **individual portfolios can vary over one’s life cycle**

- Empirical evidence puzzles:
  - stock market participation puzzle (e.g. Mankiw and Zeldes, 1991)
  - underdiversification problem (e.g. Roche, Tompaidis and Yang, 2013)

- hump-shape found for **ownership probabilities** rather than for value shares
  - (e.g. Ameriks and Zeldes, 2004; preliminary HFCS results in HFCN, 2013)

- **CESEE portfolio choice:** Revoltella and Mucci (2004) – aggregate data,
CESEE Household Savings: Some Stylized Facts

Selected Financial Indicators in CESEE and in High-Income Countries in 2011

% of GDP

Albania  Bosnia and Herzegovina  Bulgaria  Czech Republic  Croatia  Hungary  Macedonia, FYR  Poland  Romania  Serbia  High-income countries

Stock market capitalization  Mutual funds  Life insurance  Pension funds  Remittances  Bank deposits

Note: Data as of 2011 or 2010, if 2011 data are not available. High-income countries are those in which 2011 gross national income per capita was USD 12,476 or more. This aggregate covers 70 countries, including the Czech Republic, Croatia, Hungary and Poland. The values depicted for the high-income aggregate are medians.
Data: OeNB Euro Survey

OeNB Euro Survey

• representative sample of 1000 persons aged 14+ per country; we use only 18+
• information on individuals’ saving and loan decisions, economic sentiments and expectations

Coverage:

• 6 EU member states: BG, CZ, HR, HU, PL*, RO
• 4 (potential) candidate countries: AL, BiH, FYROM and RS
• semi-annual, since fall 2007;
  we use 4 waves: spring 2010 – fall 2011 → approx. 40,000 observations

*10 largest cities sampled only
There are several ways in which you can hold savings. For example, one can hold cash, use bank accounts, have life insurances, hold mutual funds, etc. Please take a look at this card that lists various savings instruments – could you please select the ones you are using and rank them according to the amounts you have saved on the respective instrument. Please refer to savings you hold personally or together with your partner.

<table>
<thead>
<tr>
<th>“all savings”</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash</td>
<td>1</td>
</tr>
<tr>
<td>Savings deposits (in foreign or in [LOCAL CURRENCY])</td>
<td>2</td>
</tr>
<tr>
<td>Life insurance</td>
<td>3</td>
</tr>
<tr>
<td>Mutual funds</td>
<td>4</td>
</tr>
<tr>
<td>Stocks</td>
<td>5</td>
</tr>
<tr>
<td>Pension funds (voluntary contributions)</td>
<td>6</td>
</tr>
<tr>
<td>Bonds</td>
<td>7</td>
</tr>
<tr>
<td>Current account/transaction account/wage card</td>
<td>8</td>
</tr>
<tr>
<td>Other</td>
<td>9</td>
</tr>
</tbody>
</table>

- cash (and possibly current account) is different in CESEE: Stix (2012)
Data: Descriptive Evidence I

Fraction of Respondents Holding Savings, Interest-Bearing and Other Savings

in % of respondents with interest bearing savings

Note: Excluding respondents answering "Don't know" and "No answer".
Data: Descriptive Evidence II

Saving Instruments

in % of respondents

Note: Excluding respondents answering "Don't know" and "No answer". Source: OeNB Euro Survey, 2010-2011.
**Data: Descriptive Evidence III**

**Number of Interest-Bearing Saving Instruments**

*in % of respondents with interest bearing savings*

- **Czech Republic**: 1 saving instrument (80%), 2 saving instruments (15%), 3+ saving instruments (5%)
- **Hungary**: 1 saving instrument (70%), 2 saving instruments (20%), 3+ saving instruments (10%)
- **Poland**: 1 saving instrument (60%), 2 saving instruments (30%), 3+ saving instruments (10%)
- **Bulgaria**: 1 saving instrument (50%), 2 saving instruments (40%), 3+ saving instruments (10%)
- **Romania**: 1 saving instrument (40%), 2 saving instruments (50%), 3+ saving instruments (10%)
- **Albania**: 1 saving instrument (30%), 2 saving instruments (60%), 3+ saving instruments (10%)
- **Bosnia**: 1 saving instrument (20%), 2 saving instruments (80%)
- **Croatia**: 1 saving instrument (60%), 2 saving instruments (30%), 3+ saving instruments (10%)
- **FYR Macedonia**: 1 saving instrument (70%), 2 saving instruments (20%), 3+ saving instruments (10%)
- **Serbia**: 1 saving instrument (50%), 2 saving instruments (40%), 3+ saving instruments (10%)

*Source: OeNB Euro Survey, 2010-2011.*

*Note: Excluding respondents answering "Don't know" and "No answer".*
Estimation Strategy

1) probit model to estimate probability that a respondent has **IR savings** and to analyze LCH determinants of IR savings (S):

\[ P(S = 1) = \Phi_S(X_S \beta_S + u_S) \]

2) Heckman (1979) selection probit model to jointly estimate the probability of having savings and the probability of holding a **specific saving instrument** (F):

\[ P(F = 1|S = 1) = \Phi_F(X_F \beta_F + u_F) \]
\[ u_S \sim N(0,1), \quad u_F \sim N(0,1), \quad \text{corr}(u_S, u_F) = \rho \]

- selection instruments:
  - distance to bank (Stix, 2012)
  - plan a loan
  - remittances
  - positive expectations regarding the economy

assumption: correlated with the decision **whether** to save but **not** with the decision **how** to save

- country- and time-fixed effects
Results:
Determinants of Saving

<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>(1) Interest savings</th>
<th>(2) Interest savings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>0.060***</td>
<td>0.057***</td>
</tr>
<tr>
<td>Age squared</td>
<td>-0.005***</td>
<td>-0.004**</td>
</tr>
<tr>
<td>Female</td>
<td>0.006</td>
<td>0.006</td>
</tr>
<tr>
<td>1-person household</td>
<td>0.011</td>
<td>0.012</td>
</tr>
<tr>
<td>2-person household</td>
<td>0.014**</td>
<td>0.011</td>
</tr>
<tr>
<td>Children ≤6 years</td>
<td>0.010</td>
<td>0.012</td>
</tr>
<tr>
<td>Children ≤15 years</td>
<td>-0.001</td>
<td>0.004</td>
</tr>
<tr>
<td>Household head</td>
<td>0.003</td>
<td>0.003</td>
</tr>
<tr>
<td>High income</td>
<td>0.137***</td>
<td>0.130***</td>
</tr>
<tr>
<td>Medium income</td>
<td>0.060***</td>
<td>0.059***</td>
</tr>
<tr>
<td>Don’t know /NA income</td>
<td>0.036*</td>
<td>0.065**</td>
</tr>
<tr>
<td>Medium education</td>
<td>0.072***</td>
<td>0.075***</td>
</tr>
<tr>
<td>High education</td>
<td>0.193***</td>
<td>0.199***</td>
</tr>
<tr>
<td>Employed</td>
<td>0.068***</td>
<td>0.065***</td>
</tr>
<tr>
<td>Self-employed</td>
<td>0.097***</td>
<td>0.105***</td>
</tr>
<tr>
<td>Remembers high inflation</td>
<td>0.038***</td>
<td></td>
</tr>
<tr>
<td>Income in euro</td>
<td>0.245***</td>
<td></td>
</tr>
<tr>
<td>Risk averse</td>
<td>0.042**</td>
<td></td>
</tr>
<tr>
<td>Bank perceived as far</td>
<td>-0.013***</td>
<td></td>
</tr>
<tr>
<td>Expected economic situation better</td>
<td>0.050**</td>
<td></td>
</tr>
<tr>
<td>Plan a loan</td>
<td>0.055***</td>
<td></td>
</tr>
<tr>
<td>Remittances</td>
<td>0.111***</td>
<td></td>
</tr>
<tr>
<td>Log-L</td>
<td>-20272.8</td>
<td>-9856.6</td>
</tr>
<tr>
<td>N</td>
<td>38519</td>
<td>18497</td>
</tr>
<tr>
<td>P(dependent variable=1)</td>
<td>0.28</td>
<td>0.3</td>
</tr>
</tbody>
</table>

Note: Marginal effects from probit model, standard errors (adjusted for clustering at the country level) in parentheses. *: significant at the 10% level, **: significant at the 5% level, ***: significant at the 1% level. For a definition of the variables, see annex. All estimations include time-fixed and country-fixed effects. P(dependent variable=1) denotes the unconditional sample probability that a respondent has savings.

Source: Authors' calculations.
## Results: Determinants of Saving Instruments

### Source: Authors' calculations.

<table>
<thead>
<tr>
<th>Dependent Variable:</th>
<th>No of instr. (1/7)</th>
<th>&gt;=2 instr.</th>
<th>deposits</th>
<th>life insurance</th>
<th>pension funds</th>
<th>stocks</th>
<th>mutual funds</th>
<th>bonds</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td>0.133</td>
<td>0.100***</td>
<td>-0.070**</td>
<td>0.124***</td>
<td>0.082</td>
<td>0.039</td>
<td>0.001</td>
<td>-0.019*</td>
</tr>
<tr>
<td><strong>Age squared</strong></td>
<td>-0.015</td>
<td>-0.012***</td>
<td>0.010**</td>
<td>-0.015***</td>
<td>-0.010</td>
<td>-0.005</td>
<td>0.000</td>
<td>0.002**</td>
</tr>
<tr>
<td><strong>Female</strong></td>
<td>-0.037</td>
<td>-0.005</td>
<td>-0.021</td>
<td>0.01</td>
<td>-0.002</td>
<td>-0.003</td>
<td>-0.005</td>
<td>-0.006</td>
</tr>
<tr>
<td><strong>1-person HH</strong></td>
<td>-0.039</td>
<td>0.000</td>
<td>0.020</td>
<td>-0.012</td>
<td>-0.048**</td>
<td>-0.044*</td>
<td>0.014</td>
<td>-0.002</td>
</tr>
<tr>
<td><strong>2-person HH</strong></td>
<td>-0.062</td>
<td>-0.019</td>
<td>-0.008</td>
<td>0.014</td>
<td>-0.023</td>
<td>-0.030***</td>
<td>0.007</td>
<td>-0.025***</td>
</tr>
<tr>
<td><strong>Children ≤6 years</strong></td>
<td>-0.034</td>
<td>-0.017*</td>
<td>-0.030***</td>
<td>0.015</td>
<td>0.000</td>
<td>-0.016</td>
<td>-0.002</td>
<td>0.002</td>
</tr>
<tr>
<td><strong>Children ≤15 years</strong></td>
<td>0.024</td>
<td>-0.002</td>
<td>0.016</td>
<td>0.015</td>
<td>0.011</td>
<td>-0.009</td>
<td>0.004***</td>
<td>-0.003</td>
</tr>
<tr>
<td><strong>Household head</strong></td>
<td>0.021</td>
<td>0.014</td>
<td>0.003</td>
<td>-0.012</td>
<td>0.002</td>
<td>0.018</td>
<td>0.006</td>
<td>0.005</td>
</tr>
<tr>
<td><strong>High income</strong></td>
<td>0.106</td>
<td>0.058</td>
<td>0.045**</td>
<td>0.042</td>
<td>-0.029</td>
<td>0.017</td>
<td>0.012</td>
<td>0.006</td>
</tr>
<tr>
<td><strong>Medium income</strong></td>
<td>-0.012</td>
<td>0.002</td>
<td>0.024</td>
<td>0.012</td>
<td>-0.037***</td>
<td>-0.018</td>
<td>0.001</td>
<td>-0.014</td>
</tr>
<tr>
<td><strong>DN /NA income</strong></td>
<td>0.143</td>
<td>0.042</td>
<td>0.049**</td>
<td>0.005</td>
<td>-0.006</td>
<td>0.041</td>
<td>0.018*</td>
<td>0.007</td>
</tr>
<tr>
<td><strong>Medium education</strong></td>
<td>0.074</td>
<td>0.066*</td>
<td>0.008</td>
<td>0.032</td>
<td>0.021</td>
<td>0.019</td>
<td>-0.001</td>
<td>0.014</td>
</tr>
<tr>
<td><strong>High education</strong></td>
<td>0.196</td>
<td>0.115*</td>
<td>0.061***</td>
<td>0.059*</td>
<td>0.000</td>
<td>0.038</td>
<td>0.010</td>
<td>0.020</td>
</tr>
<tr>
<td><strong>Employed</strong></td>
<td>0.014</td>
<td>0.028</td>
<td>-0.034**</td>
<td>0.027</td>
<td>0.053**</td>
<td>-0.016</td>
<td>0.001</td>
<td>-0.014</td>
</tr>
<tr>
<td><strong>Self-employed</strong></td>
<td>0.217</td>
<td>0.070*</td>
<td>0.011</td>
<td>0.080***</td>
<td>-0.002</td>
<td>-0.009</td>
<td>0.015</td>
<td>0.033**</td>
</tr>
<tr>
<td><strong>Remembers high inflation</strong></td>
<td>0.038</td>
<td>0.035**</td>
<td>-0.021</td>
<td>0.026*</td>
<td>0.022**</td>
<td>-0.003</td>
<td>0.006</td>
<td>-0.003</td>
</tr>
<tr>
<td><strong>Income in euro</strong></td>
<td>0.147</td>
<td>0.045</td>
<td>0.064</td>
<td>0.076*</td>
<td>-0.037</td>
<td>-0.021</td>
<td>0.028</td>
<td>0.019</td>
</tr>
<tr>
<td><strong>Risk averse</strong></td>
<td>-0.101</td>
<td>-0.034***</td>
<td>-0.014</td>
<td>0.010</td>
<td>-0.012</td>
<td>-0.035*</td>
<td>-0.013</td>
<td>-0.010</td>
</tr>
</tbody>
</table>

Rho: -0.14*** -0.29 -0.43*** -0.13 -0.03 -0.26 0.23 -0.1
Log-L: -17058.84 -13044.52 -13241.16 -13108.83 -12453.1 -13588.31 -11150.37 -10766.09
N (selection equation): 18497 18497 18497 18497 18497 18497 18497 18497
N (outcome equation): 5531 5531 5531 5531 5531 5531 5531 5531
P (dependent variable=1): 0.19 0.12 0.07 0.03 0.02 0.01
Robustness Checks

- **age**: continuous vs. brackets
  \[\to linear \text{ vs. hump-shape (HFCN, 2013)}\]

- adding **marital status** (available for 6 countries only):
  \[\to positive \text{ but insignificant correlation with saving propensity}\]

- controlling for **wealth** (via proxies: car, house or secondary residence; 1 wave only):
  \[\to age \text{ remains hump-shaped, but insignificant} \]
  BUT: potential endogeneity problem with wealth

- **cash and current account**: 
  \[\to age \text{ remains hump-shaped, but insignificant for C/A} \]
  \[\to U\text{-shape relationship for cash; supports findings of Stix (2012)} \]
  \[\to justifies our use of IR savings \]

- distinguishing between local currency and FX savings, including FX and inflation expectations, trust in institutions, country-specific age coefficient
  \[\to results \text{ qualitatively unchanged} \]
Conclusions

• Saving behavior and portfolio choice analysis in 10 CESEEs based on micro data

• We find that the relationship between age and the propensity to save has a flattening-out hump-shape
  → The young and the elderly are less likely to save than the middle-aged
  → However, the elderly dissave less than what would be predicted by the LCH: possibly due to bequest motives or memories of past economic turbulences

• This finding combined with population ageing may lower savings in the future, unless the saving pattern and/or policies change

• Education is an important factor for saving decisions, beyond predicting future income: role for educational policies and financial literacy improvement

• There is room for more diversification of financial instruments used in CESEE

• Open questions for further research: Demand or supply? Country-specific differences? Macro-determinants of savings?
Thank you!