



OESTERREICHISCHE NATIONALBANK  
EUROSYSTEM

# Determinants of Households' Savings in Central, Eastern and Southeastern Europe

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# 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:

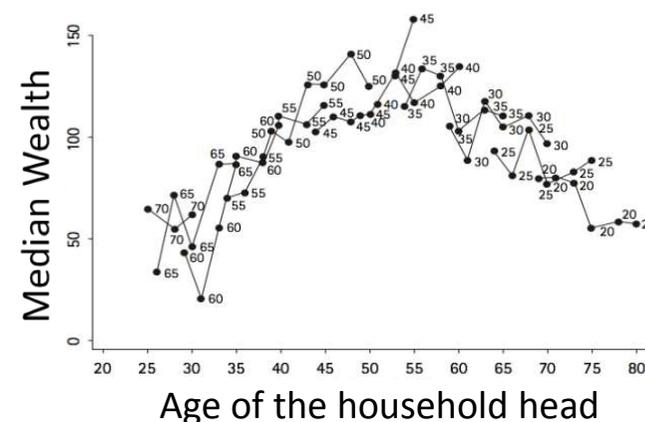
- Life-Cycle Theory (LCH) (*Modigliani and Brumberg, 1954; Modigliani, 1986*)
- Permanent Income Hypothesis (PIH) (*Friedman, 1957*)

→ **hump-shaped age-savings profile**

## Empirical evidence:

- mixed
- advanced countries:

e.g. *Attanasio and Weber (1995)* vs. *Zeldes (1989)* (borrowing constraints)



(Source: *Jappelli and Modigliani, 2003*)

## CESEE:

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

*Hanousek and Tuma (2002)* – CZ:

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

} evidence against LCH

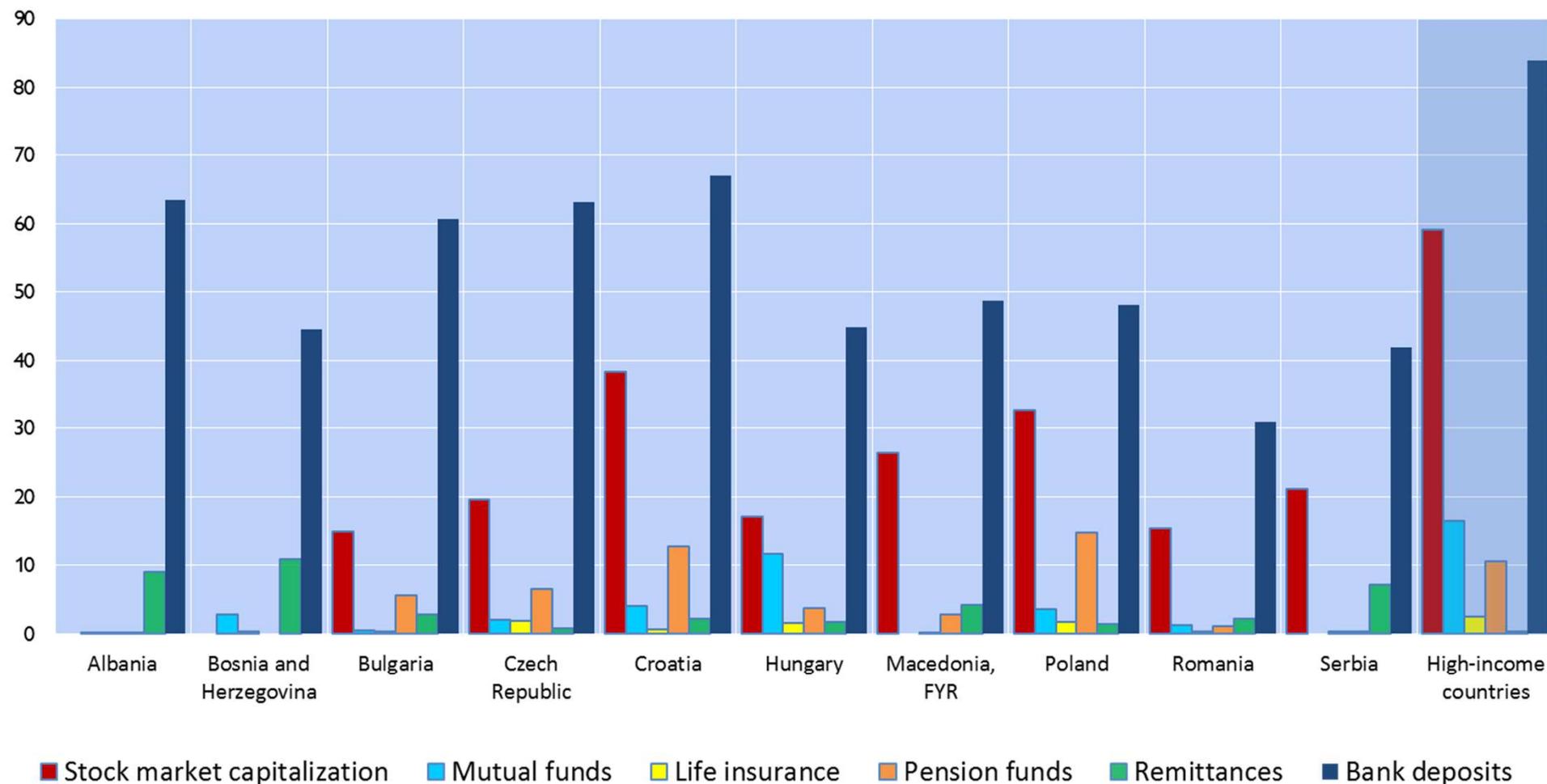
## Literature: LCH in Portfolio Choice

- 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,*  
*Stix (2011, 2012) – cash savings, FX savings*

# CESEE Household Savings: Some Stylized Facts

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

% of GDP



Source: World Bank Global Financial Development Database.

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.

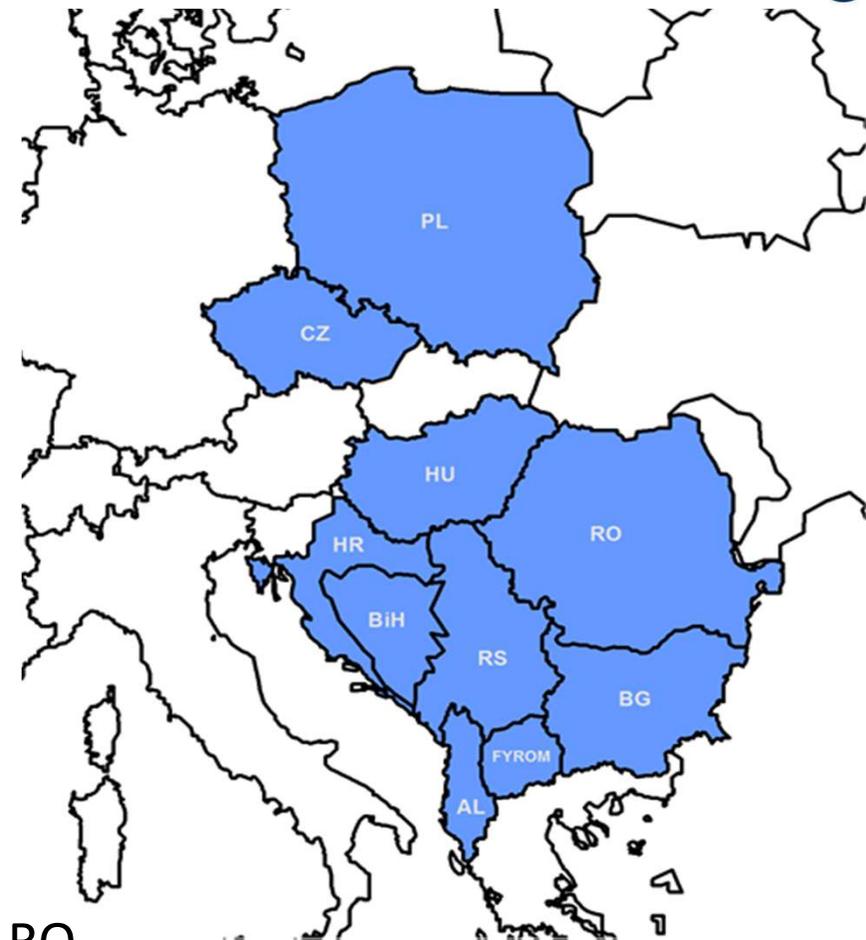
## Data: OeNB Euro Survey

### 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*




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\*10 largest cities sampled only

## Data: Central Survey Question

*“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.”*

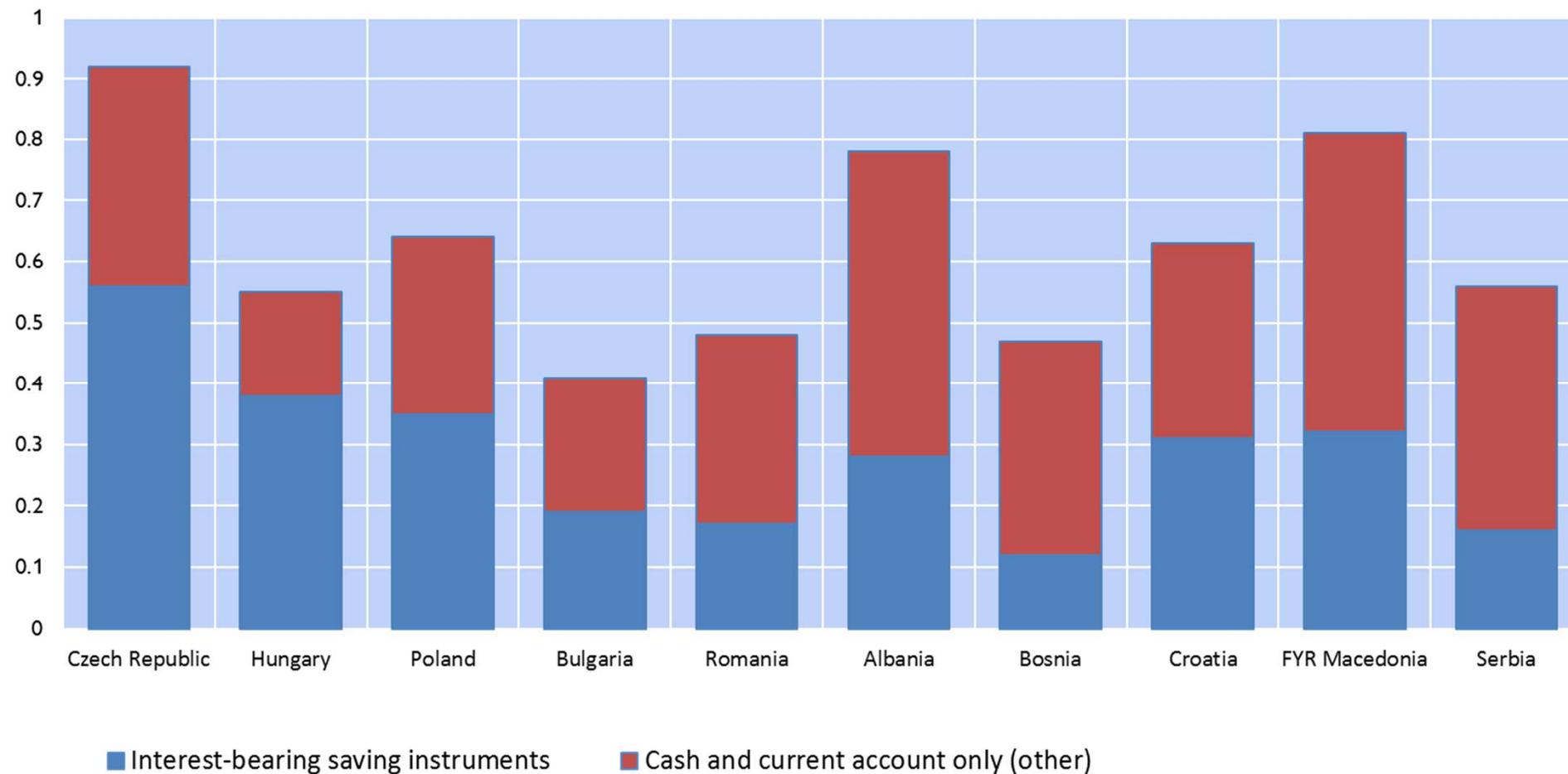
“all savings”	Cash	1	“IR savings” → interest rate bearing savings
	Savings deposits (in foreign or in [LOCAL CURRENCY])	2	
	Life insurance	3	
	Mutual funds	4	
	Stocks	5	
	Pension funds (voluntary contributions)	6	
	Bonds	7	
	Current account/transaction account/wage card	8	
	Other	9	

- 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*



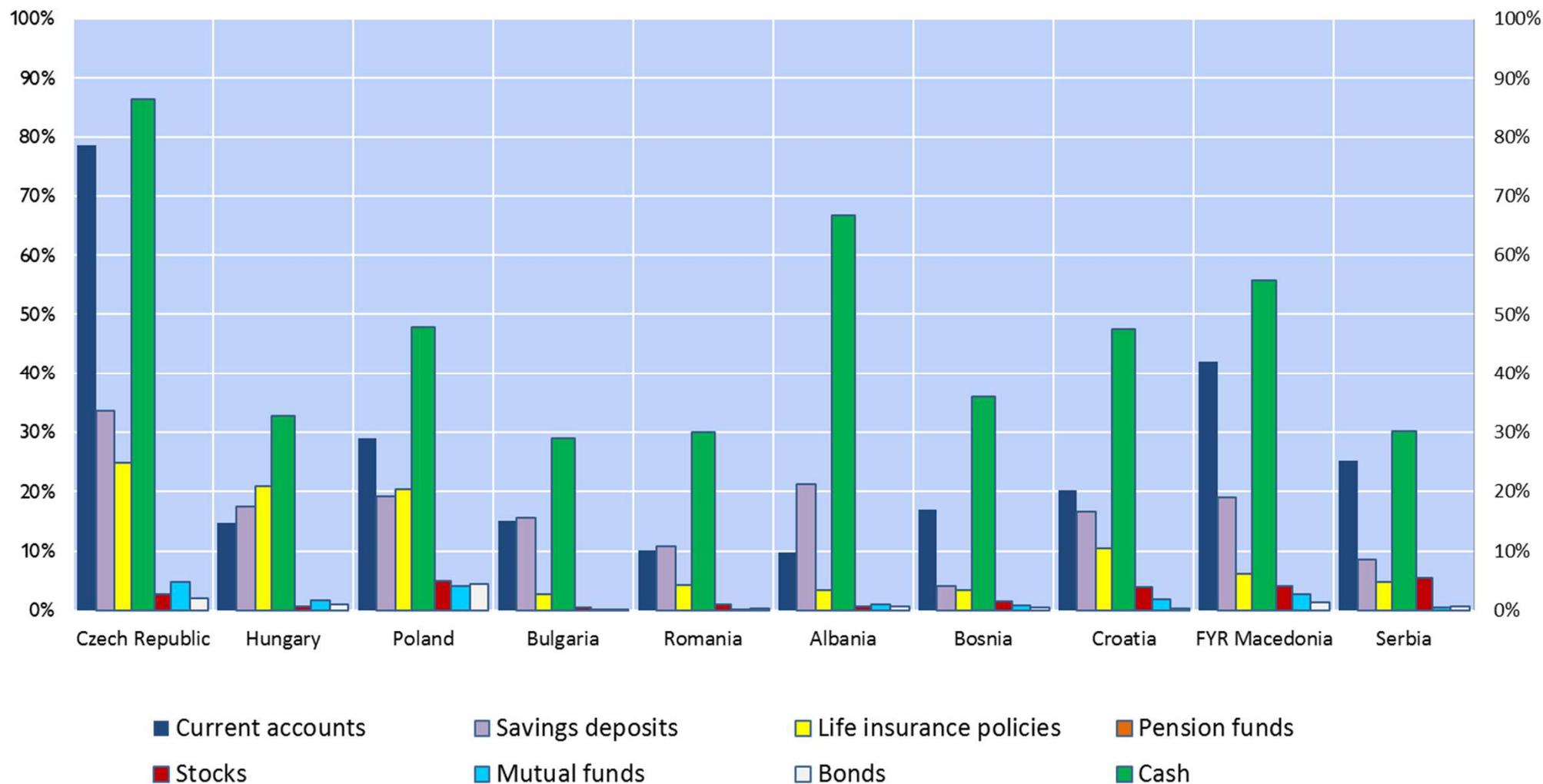
Source: OeNB Euro Survey, 2010-2011.

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

# Data: Descriptive Evidence II

## Saving Instruments

in % of respondents

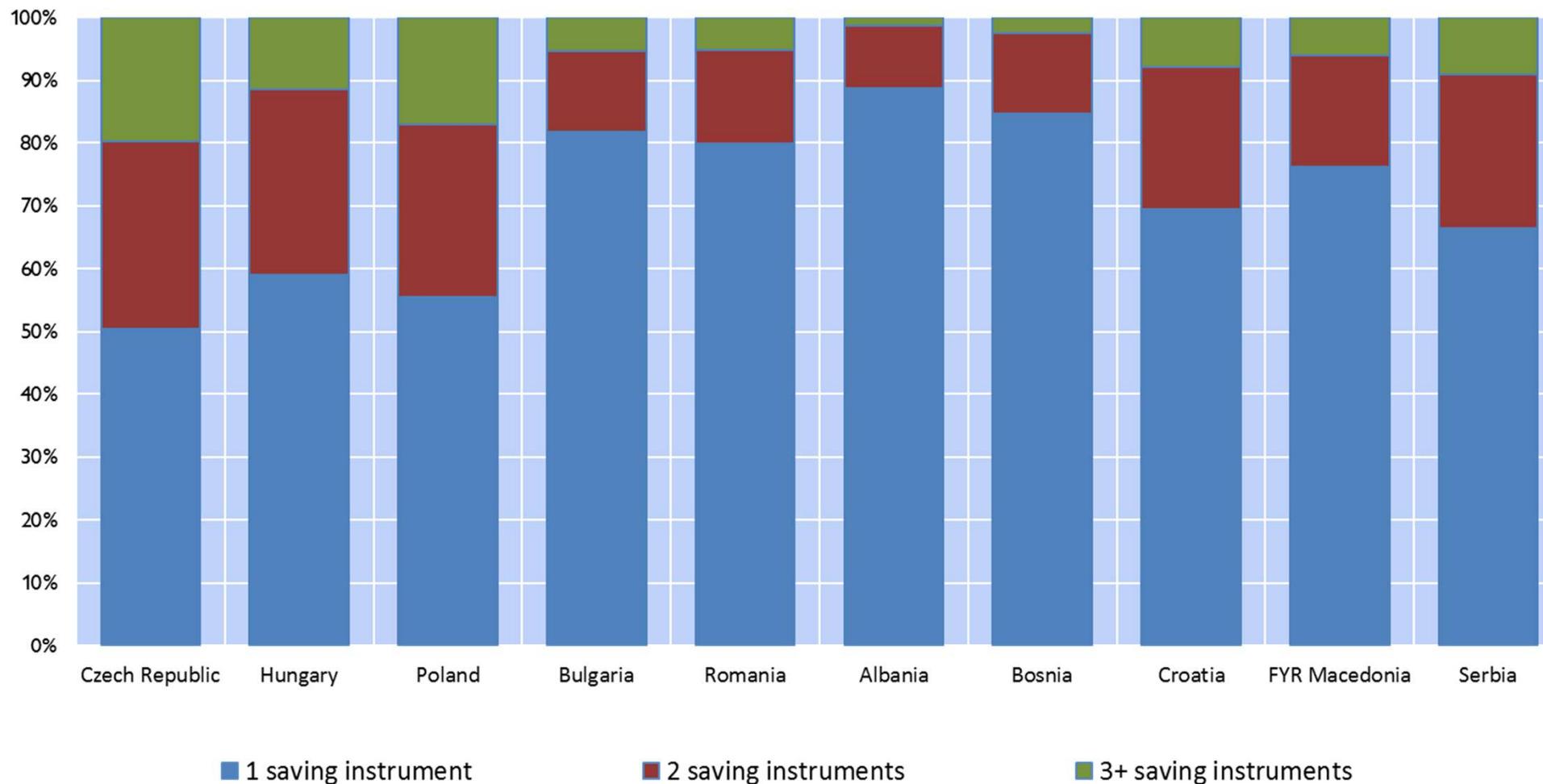


Note: Excluding respondents answering "Don't know" and "No answer". Source: OeNB Euro Survey, 2010-2011.

# Data: Descriptive Evidence III

## Number of Interest-Bearing Saving Instruments

*in % of respondents with interest bearing savings*



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

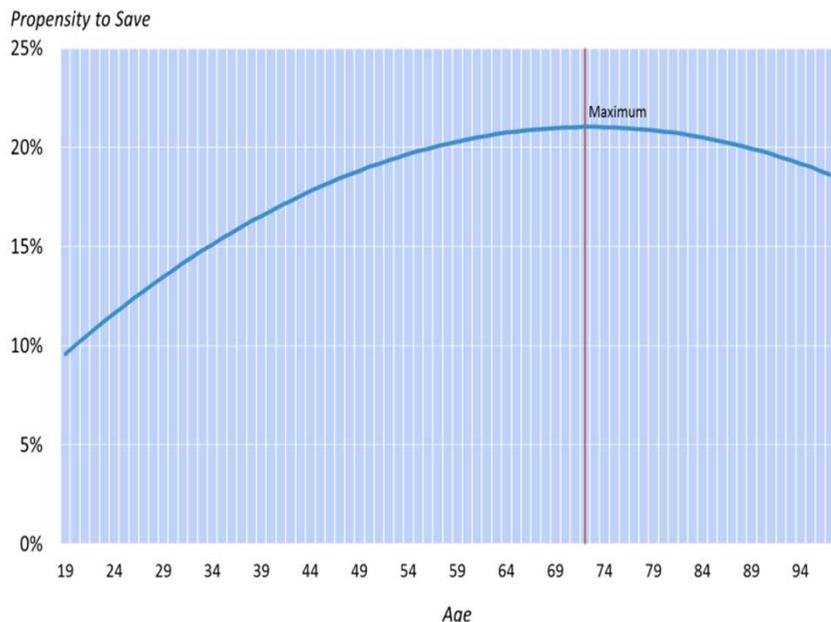
assumption:  
 correlated with the decision **whether** to save  
 but **not** with the decision **how** to save

- country- and time-fixed effects

# Results:

## Determinants of Saving

The Estimated Relationship Between Age and Propensity to Save



Source: Authors' calculations.

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.

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

# Results: Determinants of Saving Instruments

Dependent Variable:	No of instr. (1/7)	>=2 instr.	deposits	life insurance	pension funds	stocks	mutual funds	bonds
Age	0.133	0.100***	-0.070**	0.124***	0.082	0.039	0.001	-0.019*
Age squared	-0.015	-0.012***	0.010**	-0.015***	-0.010	-0.005	0.000	0.002**
Female	-0.037	-0.005	-0.021	0.01	-0.002	-0.003	-0.005	-0.006
1-person HH	-0.039	0.000	0.020	-0.012	-0.048**	-0.044*	0.014	-0.002
2-person HH	-0.062	-0.019	-0.008	0.014	-0.023	-0.030***	0.007	-0.025***
Children ≤6 years	-0.034	-0.017*	-0.030***	0.015	0.000	-0.016	-0.002	0.002
Children ≤15 years	0.024	-0.002	-0.016	0.015	0.011	-0.009	0.004***	-0.003
Household head	0.021	0.014	0.003	-0.012	0.002	0.018	0.006	0.005
High income	0.106	0.058	0.045**	0.042	-0.029	0.017	0.012	0.006
Medium income	-0.012	0.002	0.024	0.012	-0.037***	-0.018	0.001	-0.014
DN /NA income	0.143	0.042	0.049**	0.005	-0.006	0.041	0.018*	0.007
Medium education	0.074	0.066*	0.008	0.032	0.021	0.019	-0.001	0.014
High education	0.196	0.115*	0.061***	0.059*	0.000	0.038	0.010	0.020
Employed	0.014	0.028	-0.034**	0.027	0.053**	-0.016	0.001	-0.014
Self-employed	0.217	0.070*	0.011	0.080***	-0.002	-0.009	0.015	0.033**
Remembers high inflation	0.038	0.035**	-0.021	0.026*	0.022**	-0.003	0.006	-0.003
Income in euro	0.147	0.045	0.064	0.076*	-0.037	-0.021	0.028	0.019
Risk averse	-0.101	-0.034***	-0.014	0.010	-0.012	-0.035*	-0.013	-0.010
Rho	-0.14***	-0.29	-0.43***	0.3	-0.13	-0.26	0.23	-0.1
Log-L	-17058.84	-13044.52	-13214.16	-13108.83	-12453.1	-11358.83	-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)		0.33	0.19	0.12	0.07	0.03	0.02	0.01

Source: Authors' calculations.

## Robustness Checks

- **age:** continuous vs. brackets  
→ *linear vs. hump-shape (HFCN, 2013)*
- adding **marital status** (available for 6 countries only):  
→ *positive but insignificant correlation with saving propensity*
- controlling for **wealth** (via proxies: car, house or secondary residence; 1 wave only):  
→ *age remains hump-shaped, but insignificant*  
BUT: potential endogeneity problem with wealth
- **cash and current account:**  
→ *age remains hump-shaped, but insignificant for C/A*  
→ *U-shape relationship for cash; supports findings of Stix (2012)*  
→ *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  
→ *results 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!**