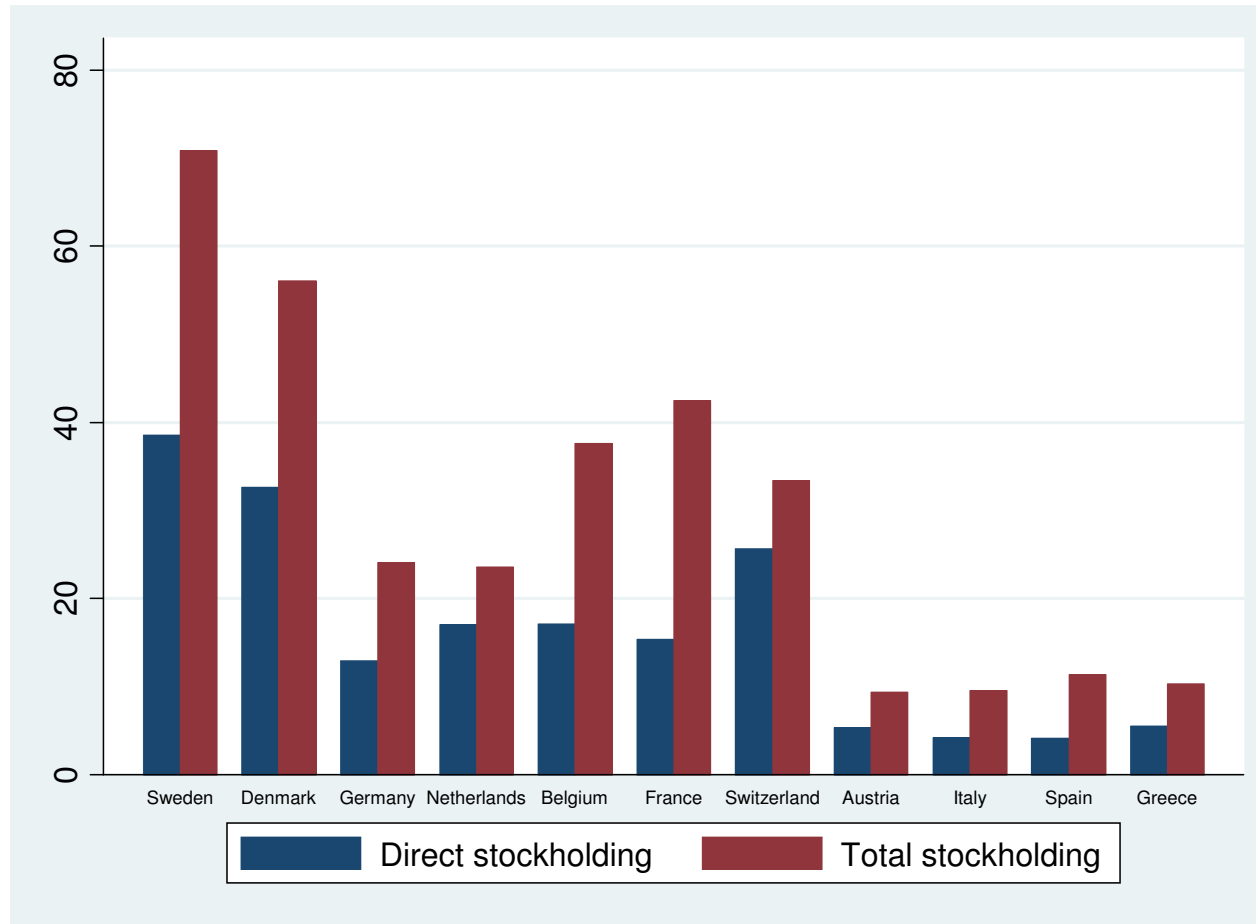# Cognitive Abilities and Portfolio Choice

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STOCKHOLDING PUZZLE

- Leading explanation: costs, pecuniary and information (Guiso, Haliassos, Jappelli (2002)

A SIMPLE MODEL

$$\max_{\alpha} Eu\left[(\alpha\tilde{R} + R)w\right]$$

α: share invested in risky assets

$\tilde{R}$: excess return over that of safe asset R

w: wealth

Result 1: optimal α* is given by

$$\alpha* \approx \frac{RE(\tilde{R})}{\rho(Rw)E(\tilde{R}^2)}$$

Result 2: stock market participation takes place if

$$\left[\alpha^* wE(\tilde{R})\right] - \phi > 0 \Leftrightarrow w > \frac{\phi\rho(Rw)(E\tilde{R}^2)}{R\left[E(\tilde{R})\right]^2} = \frac{\phi\rho(Rw)}{R}\left(\frac{1}{S^2}+1\right)$$

Cognition can affect participation by:

a. Reducing information costs (Campbell (2006), Corniotis and Kumar (2006))

b. Reducing risk aversion (Frederick (2005), Benjamin et al. (2006), Dohmen et al (2007))

c. Leading misperception of risk, overconfidence (Barber and Odean (2001))

Cognition related to financial literacy (Bernheim and Garrett (2003), Lusardi and Mitchell (2006), Graham et al (2006), Van Rooij et al (2007)), but less affected by endogeneity problems.

SHARE (Survey of Health, Ageing and Retirement in Europe)

- New household survey of people above 50 in 11 European countries (Sweden, Denmark, Germany, the Netherlands, Belgium, France, Switzerland, Austria, Italy, Spain, Greece) and Israel. Modeled after the HRS (US) and ELSA (UK).

- Conducted in 2004 and 2005

- 19,000 households and 32,000 individuals

- Second wave in 2007 (Ireland, Czech Republic and Poland added)

SHARE MODULES

- Demographics

- Physical and mental health

- Cognitive abilities

- Health care

- Activities

- Financial transfers and inheritances

- Employment and Income

- Consumption

- Housing and Assets

- Expectations

COGNITION QUESTIONS

- Numeracy (min. score 1, max. score 5):

  1. *If the chance of getting a disease is 10 per cent, how many people out of one thousand would be expected to get the disease?* The possible answers are 100, 10, 90, 900 and another answer.
  2. *In a sale, a shop is selling all items at half price. Before the sale a sofa costs 300 euro. How much will it cost in the sale?* The possible answers are 150, 600 and another answer.
  3. *A second hand car dealer is selling a car for 6,000 euro. This is two-thirds of what it costs new. How much did the car cost new?* The possible answers are 9,000, 4,000, 8,000, 12,000, 18,000 and another answer.
  4. *Let's say you have 2,000 euro in a saving account. The account earns ten per cent interest each year. How much would you have in the account at the end two years?* The possible answers are 2,420, 2,020, 2,040, 2,100, 2,200, 2,400 and another answer.

- Fluency: name as many animals as you can in one minute (score: number mentioned)

- Recall: repeat 10 words that were just read to you (score: number recalled)

COGNITION BY EDUCATION
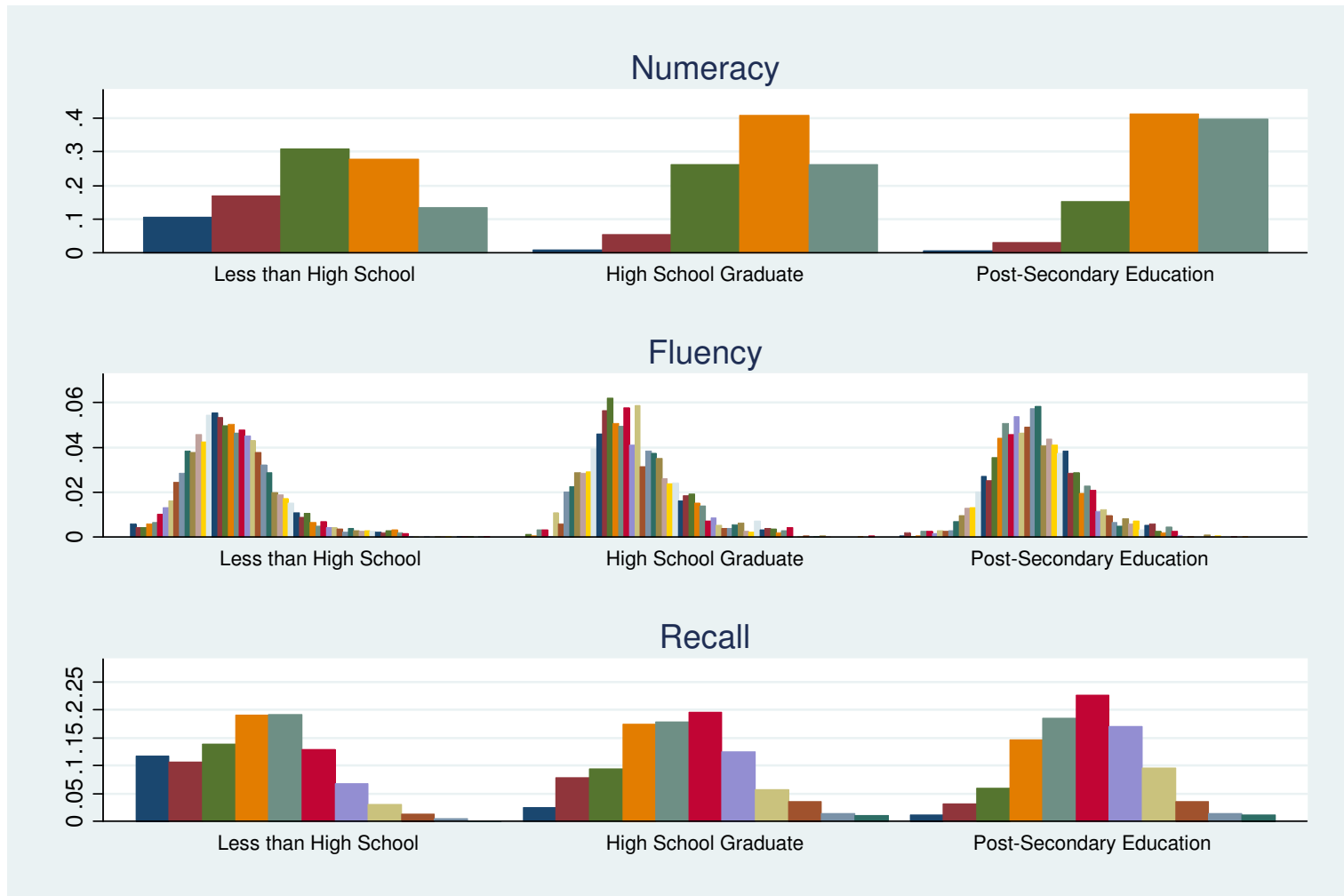
MODEL SPECIFICATION

a. Probits of direct and total stockholding

b. Regressors:

- Cognitive variables (numeracy, fluency, recall)

- Education

- Social interactions (Hong, Kubik and Stein (2003))

- Self-reported health (Rosen and Wu (2004))

- Financial and real assets

- Probability of leaving a bequest greater than 50,000 euro

- Working status

c. Regressions split by family kind, sociability

d. Initially fully country interacted, in the end interactions only for financial assets and post-secondary education

e. Estimation accounts for multiple imputation

RESULTS

a. Main regression

	Direct participation		Total participation	
	Couples	**Singles**	**Couples**	**Singles**
	(1)	(2)	(3)	(4)
Numeracy	0.019	0.010	0.024	0.010
	(0.004)**	(0.003)**	(0.004)**	(0.004)*
Fluency	0.001	0.001	0.002	0.002
	(0.000)*	(0.000)**	(0.001)*	(0.001)**
Recall	0.008	0.001	0.007	0.003
	(0.002)**	(0.001)	(0.003)*	(0.002)
Social activities	0.011	0.014	0.006	0.027
	(0.006)	(0.005)*	(0.007)	(0.007)**
Pseudo-R^2	0.24	0.16	0.46	0.34
Observations	12,567	7,047	12,567	7,047

- Results for remaining regressors sensible

- Cognitive abilities have a significant effect with or without education

b. By social activities

	No Social Activities (1)	Social Activities (2)	No Social Activities (3)	Social Activities (4)
Numeracy	0.010	0.020	0.014	0.019
	(0.003)**	(0.004)**	(0.004)**	(0.005)**
Fluency	0.001	0.001	0.002	0.002
	(0.000)**	(0.001)	(0.001)*	(0.001)
Recall	0.004	0.006	0.004	0.007
	(0.002)*	(0.002)**	(0.003)	(0.002)**
Pseudo-R^2	0.20	0.23	0.42	0.43
Observations	9,124	10,490	9,124	10,490

- Complementarities between social learning and cognitive skills

ADDITIONAL RESULTS

- In probits for bank accounts cognitive variables are not significant

- In probits for bonds numeracy and recall are significant for couples but with weaker effect than the one for stocks

- Regressions split by gender produce no differences across genders, no support for overconfidence

- Effects evaluated within countries show strong North-South gradient

CONCLUSIONS

- Cognition influences stockholding, after controlling for education

- No effect for bank accounts, weak effects for bonds: indication of information and pecuniary costs of stockholding

- Policy implications: need to focus on detection and treatment of cognitive loss, give incentives for participation in financial literacy programs