

The Acquisition of Financial Literacy over the Life Course

Preliminary Results

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Motivation

Traditional questions in the literature on Financial Literacy:

- **(1) How much do people know?**
 - ▶ Benchmark of Lusardi and Mitchell (2011)
 - ▶ Assessment in several countries: US, Germany, France, Italy etc.
 - ▶ Low performances and heterogeneity (age, sex, education, employment)

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- **(2) What are the consequences?**

- ▶ Low saving rates especially for retirement
- ▶ Underdiversified portfolios
- ▶ Higher propensity for debt

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- **(3) What are the remedies?**

- ▶ Financial education programs
- ▶ Financial advisors/experts

Motivation

The question we address in this paper:

How is financial literacy acquired over the life course?

Objectives:

- Explain observed heterogeneity in financial literacy levels (Positive)
- Identify long-term levers to boost financial literacy (Normative)

Focus on:

- Financial fragility/Exposure to financial risks during life
- Early-life schooling and cognition in the context of PISA 2012

Contribution

- Simple two-period model to capture the determinants of late-life FL:
 - ▶ Early-life financial literacy
 - ▶ Financial fragility over the life course
- Empirical analysis using the Wisconsin Longitudinal Study
 - ▶ Assess the predictions of the theoretical model
 - ▶ Document determinants of financial literacy heterogeneity

Findings:

- The model predicts:
 - ▶ Early-life FL and investment in FL are positively related to late-life FL
 - ▶ Financial fragility over the life-course boosts investment in FL
- Empirical analysis highlights the importance of:
 - ▶ Early-life schooling and cognition, and financial fragility for late-life FL
 - ▶ Heterogenous determinants of late-life FL for men/women and educational attainment

Outline

- 1 Two-Period Model
- 2 Data
- 3 Descriptive Statistics
- 4 Econometric Analysis

Settings

We consider a simple two-period model:

- **Period 1:** the agent receives a *certain* income
 - ▶ Consumption
 - ▶ Saving/Borrowing
 - ▶ Investment in financial literacy
- **Period 2:** the agent receives an *uncertain* income
 - ▶ Consumption
 - ▶ Return on investment/Reimbursement with interests

The agent maximizes her intertemporal utility with respect to her **investment in financial literacy** and the **amount saved/borrowed**.

References

The model borrows from:

- **Jappelli and Padula (2013):**

- ▶ Investment/Borrowing opportunities increase with financial literacy
- ▶ Late-life FL increases with early-life FL and investment in FL

- **Lawrence (1995):**

- ▶ The income in period 2 is uncertain and a borrowing agent can default
- ▶ When the agent defaults, the bank has a limited legal claim on income

Results in the borrowing case

- Optimal investment in financial literacy in period 1 increases with the probability of making default in period 2.



- 1 The bank restricts borrowing opportunities when the probability of default increases
- 2 The agent reacts by increasing her financial literacy so as to access better financial opportunities

⇒ Positive relationship between **Financial Fragility** and **investment in Financial Literacy**

⇒ Positive relationship between **Late-life Financial Literacy, Early-life Financial Literacy** and **investment in Financial Literacy**

The Wisconsin Longitudinal Study

- Random cohort of 10,317 Wisconsin highschool graduates from the class of 1957
- Data collected several times between 1957 and 2011
- Representative of white, non-Hispanic highschool graduates in the US
- Focus on social background, schooling, labor market experience, retirement and psychological factors.
- Since 2011, the WLS includes a questionnaire on financial literacy
- Sample loss due to death, attrition and non-response.

Measuring Financial Literacy

Financial literacy questions in the WLS 2011:

- **Interest compounding:**

“If you start out with \$1,000 and earn an average return of 10% per year for 30 years, after compounding, the initial \$1,000 will have grown to more than \$6,000 - true or false?”

- **Risk diversification:**

“When an investor spreads money between 20 stocks, rather than 2, the risk of losing a lot of money decreases - true or false?”

- **Taxes:**

“Taxes do not affect how you should invest your money - true or false?”

Measuring Financial Literacy

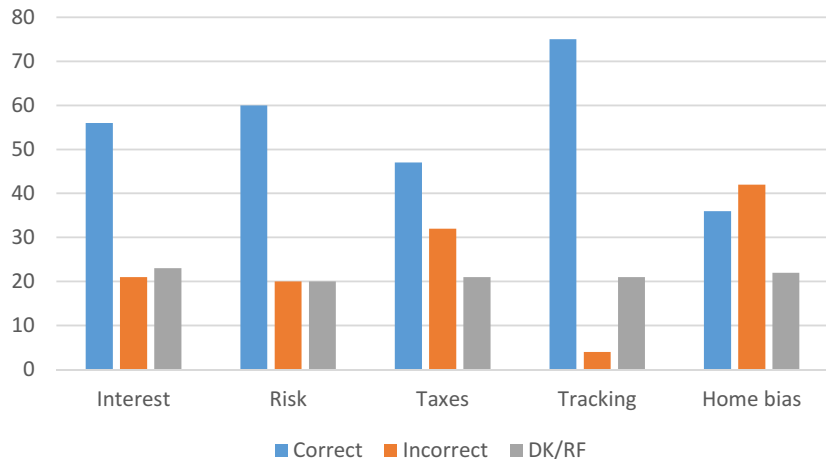
- **Tracking investments:**

“It is important to take a look at your investments periodically to see if you need to make changes - true or false?”

- **Home bias:**

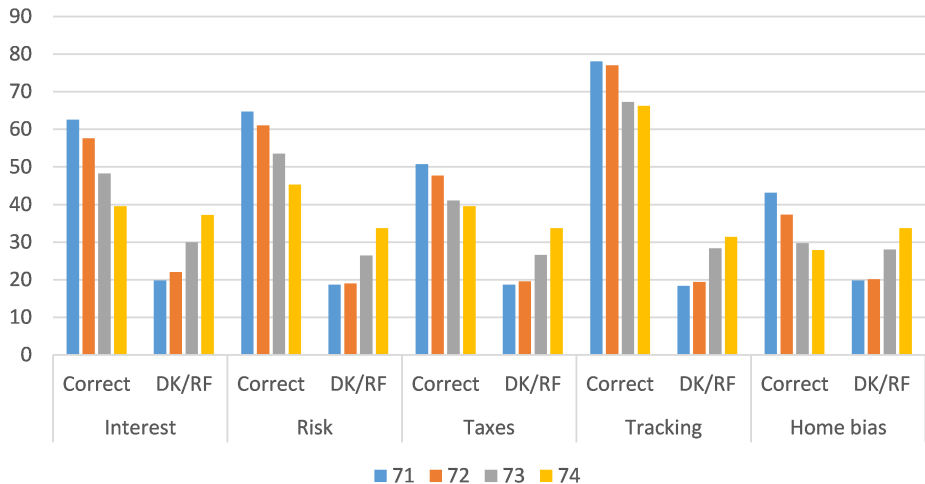
“It is best to avoid owning stocks of foreign companies - true or false?”

Financial Literacy in the WLS



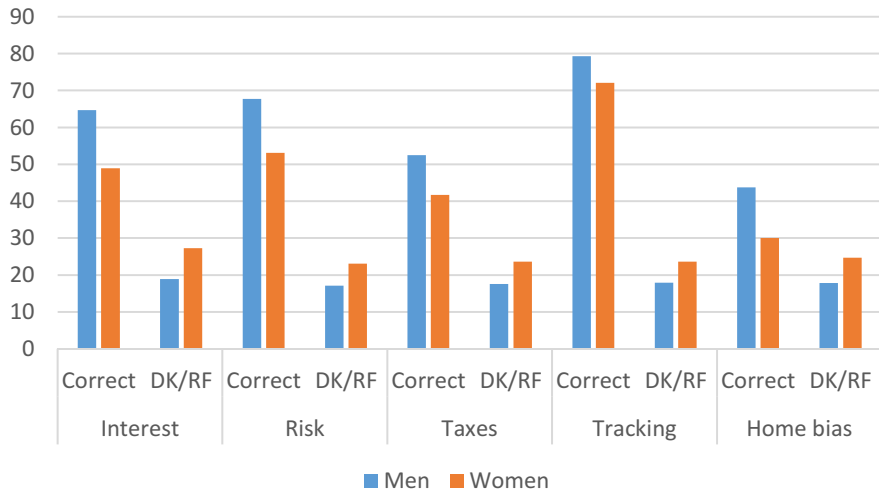
Source: WLS 2011. Percentages of correct, incorrect and do not know/refuse.

Financial Literacy by Age



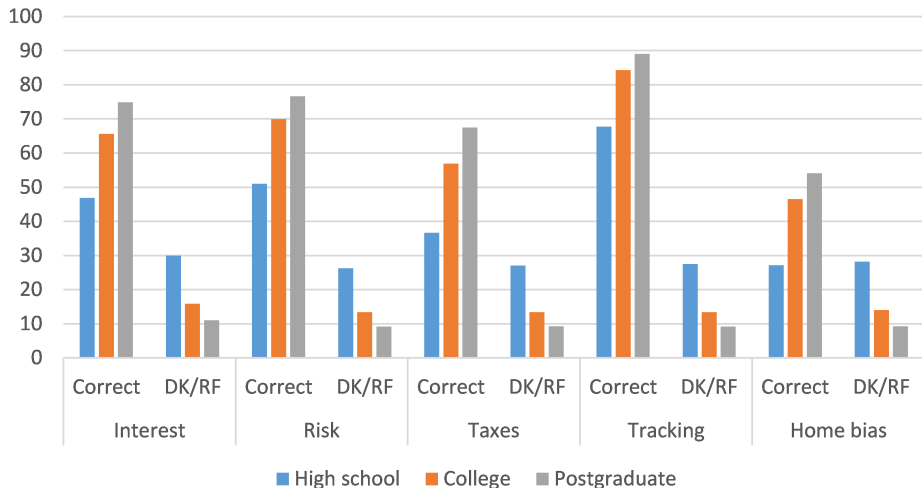
Source: WLS 2011. Percentages of correct, incorrect and do not know/refuse.

Financial Literacy by Gender



Source: WLS 2011. Percentages of correct, incorrect and do not know/refuse.

Financial Literacy by Education



Source: WLS 2011. Percentages of correct, incorrect and do not know/refuse.

Econometric Strategy

We estimate the following model using OLS regressions:

$$\text{LateLife FL} = \alpha + \beta \cdot \text{Financial Fragility} + \eta \cdot \text{EarlyLife FL} + \gamma \cdot X_i + \varepsilon_i$$

- Late-life FL \Rightarrow Score of correct answers to FL questions
- Financial fragility \Rightarrow Dummy indicating whether the respondent has ever suffered financial problems
- Early-life FL \Rightarrow Early-life schooling and cognition: IQ, High school rank, Algebra (WLS 1957)
- Other explanatory variables \Rightarrow age, sex, education, income, net worth, health, retirement and marital status.
- Due to death, attrition and non-response, the sample is restricted to 3,410 obs. among which 723 incurred fin. problems and 2,687 did not.

Results

Determinants of Late-life Financial Literacy

	OLS (1)		OLS (2)		OLS (3)	
Fin. Fragility	0.179***	(0.051)			0.150***	(0.050)
IQ < 90 (Ref.)						
[90 ; 100[			0.129*	(0.074)	0.122*	(0.074)
[100 ; 110[			0.236***	(0.077)	0.226***	(0.078)
≥ 110			0.415***	(0.081)	0.398***	(0.081)
High School Rank Q1 (Ref.)						
Q2			0.123*	(0.074)	0.124*	(0.074)
Q3			0.194**	(0.075)	0.195***	(0.075)
Q4			0.311***	(0.081)	0.313***	(0.081)
Algebra			0.177***	(0.064)	0.182***	(0.064)
Age	-0.156***	(0.045)	-0.094**	(0.045)	-0.093**	(0.045)
Male	0.324***	(0.045)	0.441***	(0.047)	0.422***	(0.047)
Married	0.155***	(0.052)	0.146***	(0.051)	0.155***	(0.051)
High School (Ref.)						
College	0.428***	(0.048)	0.235***	(0.053)	0.230***	(0.053)
Postgraduate	0.588***	(0.059)	0.304***	(0.066)	0.303***	(0.066)
Net Worth < 108,000 (Ref.)						
[108,000 ; 303,250[	0.246***	(0.073)	0.227***	(0.071)	0.244***	(0.072)
[303,250 ; 679,000[	0.621***	(0.071)	0.560***	(0.070)	0.588***	(0.070)
≥ 679,000	0.790***	(0.076)	0.705***	(0.074)	0.740***	(0.075)
Constant	13.408***	(3.232)	8.569***	(3.240)	8.427***	(3.228)
Other controls	Yes		Yes		Yes	
R ²	0.185		0.209		0.211	

Source: WLS 2011 and 1957. N=3,410. Robust std. errors in parentheses. Significant at: * 10%, ** 5%, *** 1%.

Results by Gender

Determinants of Late-life Financial Literacy by Gender

	Men		Women	
Fin. Fragility	0.122*	(0.064)	0.186**	(0.080)
IQ < 90 (Ref.)				
[90 ; 100[	0.248**	(0.106)	0.024	(0.104)
[100 ; 110[	0.338***	(0.114)	0.139	(0.108)
≥ 110	0.513***	(0.116)	0.311***	(0.114)
High School Rank Q1 (Ref.)				
Q2	0.106	(0.092)	0.124	(0.126)
Q3	0.223**	(0.097)	0.165	(0.124)
Q4	0.350***	(0.103)	0.285**	(0.130)
Algebra	0.218**	(0.097)	0.161*	(0.085)
Age	-0.102*	(0.056)	-0.086	(0.072)
Married	0.107	(0.082)	0.181***	(0.065)
High School (Ref.)				
College	0.185**	(0.077)	0.252***	(0.073)
Postgraduate	0.243***	(0.090)	0.340***	(0.102)
Net Worth < 108,000 (Ref.)				
[108,000 ; 303,250[	0.250**	(0.118)	0.249***	(0.090)
[303,250 ; 679,000[	0.558***	(0.111)	0.614***	(0.092)
≥ 679,000	0.714***	(0.116)	0.762***	(0.103)
Constant	9.413**	(4.053)	7.960	(5.215)
Other controls	Yes		Yes	
R ²	0.203		0.152	
N	1,555		1,855	

Source: WLS 2011 and 1957. OLS regressions.

Results by Education

Determinants of Late-life Financial Literacy by Educational Attainment

	High School		College		Postgraduate	
Fin. Fragility	0.142*	(0.078)	0.133	(0.082)	0.218**	(0.108)
IQ < 90 (Ref.)						
[90 ; 100[	0.085	(0.084)	0.416**	(0.184)	-0.128	(0.380)
[100 ; 110[	0.200**	(0.093)	0.451**	(0.183)	0.068	(0.359)
≥ 110	0.413***	(0.104)	0.621***	(0.183)	0.151	(0.364)
High School Rank Q1 (Ref.)						
Q2	0.114	(0.086)	0.240	(0.169)	-0.101	(0.335)
Q3	0.171*	(0.094)	0.342**	(0.156)	0.001	(0.325)
Q4	0.245**	(0.108)	0.415**	(0.163)	0.280	(0.320)
Algebra	0.207***	(0.069)	-0.200	(0.172)	0.630	(0.387)
Age	-0.112*	(0.063)	-0.049	(0.080)	-0.111	(0.097)
Male	0.417***	(0.070)	0.416***	(0.081)	0.432***	(0.099)
Married	0.144*	(0.074)	0.155*	(0.086)	0.284**	(0.119)
Net Worth < 108,000 (Ref.)						
[108,000 ; 303,250[	0.195**	(0.089)	0.395***	(0.142)	0.149	(0.247)
[303,250 ; 679,000[	0.569***	(0.092)	0.692***	(0.136)	0.421**	(0.212)
≥ 679,000	0.710***	(0.104)	0.847***	(0.139)	0.613***	(0.223)
Constant	9.823**	(4.563)	5.401	(5.797)	9.969	(6.943)
Other controls	Yes		Yes		Yes	
R ²	0.185		0.209		0.211	
N	1,752		1,119		539	

Source: WLS 2011 and 1957. OLS regressions.

Conclusion

- Theoretical model predicts:
 - ▶ Financial fragility should boost investment in financial literacy.
 - ▶ Late-life FL depends on early-life FL and investment in FL over the life course.
- Empirically, WLS data show:
 - ▶ Positive and significant relationship between late-life FL and, early-life schooling and cognition.
 - ▶ To a lower extent, positive and significant relationship between late-life FL and financial fragility.
 - ▶ Heterogeneity across population subgroups:
 - ★ women are slightly more reactive to financial fragility
 - ★ the less educated are more reactive to early-life schooling and cognition
- Implications:
 - ▶ Need for early-life training, in particular for populations with low IQ or social background
 - ▶ Importance of well-targeted financial education programs across the life course in particular for fragile populations which seek to increase FL