

Financial Literacy and Stock Market Participation

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Relevance

- **Financial literacy has become increasingly important:**
 - Increasing participation in risky assets
 - Prevalence of more financial products of increasing complexity
 - More individual responsibility: trend toward privatization of social security and pensions
- **Are individuals well-equipped to take up responsibility for their financial well-being after retirement?**

Research Project on Financial Literacy

- **Lusardi and Mitchell devised a module on financial literacy and planning for the US Health and Retirement Study.**
- **An extended module on financial literacy for the Dutch DNB household Survey (DHS).**
- **This extended module will also be inserted in the US RAND Internet Panel (currently in the field) .**

Results from DHS

- **Financial illiteracy is widespread.**
- **Measurement of financial literacy is difficult; wording of questions is extremely important.**
- **Causal effect of financial literacy on stock market participation: Those with low literacy do not invest in stocks.**

The Survey and the Financial Literacy Module

- **We have contacted 2028 households from the DHS (the respondent is the person who is mostly responsible for household financial administration).**
→ 1508 households responded, for a response rate of 74%.
- **Internet survey**
- **We have asked questions about current and past economic knowledge and education.**
- **We use weights to correct for an overrepresentation of rich households.**
- **Results can be combined with the DHS core data, a rich set of background information on demographics, employment, wealth and portfolio choice.**

Five Simple Financial Literacy Questions

1) Numeracy

Suppose you had €100 in a savings account and the interest rate was 2% per year. After 5 years, how much do you think you would have in the account if you left the money to grow: more than €102, exactly €102, less than €102?

2) Interest compounding

Suppose you had €100 in a savings account and the interest rate is 20% per year and you never withdraw money or interest payments. After 5 years, how much would you have on this account in total: more than €200, exactly €200, less than €200?

Five Financial Literacy Questions (cont.)

3) Inflation

Imagine that the interest rate on your savings account was 1% per year and inflation was 2% per year. After 1 year, would you be able to buy more than, exactly the same as, or less than today with the money in this account?

4) Time value of money

Assume a friend inherits €10,000 today and his sibling inherits €10,000 3 years from now. Who is richer because of the inheritance: my friend, his sibling or are they equally rich?

5) Money illusion

Suppose that in the year 2010, your income has doubled and prices of all goods have doubled too. In 2010, will you be able to buy more, the same or less than today with your income?

Financial Literacy Questions: Results

Weighted percentages of total number of respondents (N=1508)

	Numeracy	Interest compounding	Inflation	Time value of money	Money illusion
Correct	90.8	76.2	82.6	72.3	71.8
Incorrect	5.2	19.6	8.6	23.0	24.3
Do not know	3.7	3.8	8.5	4.3	3.5
Refusal	0.3	0.3	0.4	0.4	0.4

Note: Due to rounding columns may not sum up to 100

Financial Literacy: Correct answers

Number of correct financial literacy questions
Weighted percentages of total number of respondents (N=1508)

Number of correct responses	Percentage of respondents
None	2.3
1	2.8
2	6.7
3	15.1
4	32.8
All	40.2

Note: Due to rounding columns may not sum up to 100

Advanced Financial Literacy Questions

1) Stock Risk

Stocks are normally riskier than bonds. True or False?

2) Return

Considering a long time period (for example 10 or 20 years), which asset normally gives the highest return: Savings accounts, Bonds or Stocks?

3) Volatility

Normally, which asset displays the highest fluctuations over time: Savings accounts, Bonds or Stocks?

4) Company Stock

Buying a company stock usually provides a safer return than a stock mutual fund. True or False?

Advanced Financial Literacy Questions (cont.)

5) Diversification

When an investor spreads his money among different assets, does the risk of losing money increase, decrease or stay the same?

6) Bond prices

If the interest rates fall, what should happen to bond prices: rise, fall, or stay the same?

7) Bond maturity

If you buy a 10-year bond, it means you cannot sell it after 5 years without incurring a major penalty. True or false?

8) Definition of Bond

Which of the following statements is correct? If someone buys a bond of Firm B: (i) He owns part of Firm B; (ii) He has lent money to Firm B; (iii) He is liable for Firm B's debt; (iv) None of the above.

Advanced Financial Literacy Questions (cont.)

9) Definition of stock

Which of the following statements is correct? If someone buys the stock of firm B in the stock market:

(i) He owns a part of firm B; (ii) He has lent money to firm B; (iii) He is liable for firm's B debt; (iv) None of the above.

10) Functions of the stock market

(i) It helps to predict stock earnings; (ii) It results in an increase in the price of stocks; (iii) It brings people who want to buy stocks together with people who want to sell stocks; (iv) None of the above.

11) Mutual funds

(i) Once one invests in a mutual fund, one cannot withdraw money in the first year; (ii) Mutual funds can invest in several assets, for example invest in both bonds and stocks, (iii) Mutual funds pay a guaranteed rate of return that depends on their past performance; (iv) None of the above.

Advanced Literacy Questions: Results

Weighted percentages of total number of respondents (N=1508)

	Stock Risk	Company Stock	Bond prices
Correct	60.2	48.2	24.6
Incorrect	15.1	24.8	37.1
Do not know	24.3	26.6	37.5
Refusal	0.4	0.4	0.9

Randomization: Stock Risk

True or false?	Correct	Incorrect	DK
Stocks are normally riskier than bonds (N=751)	60.8%	17.1%	21.7%
Bonds are normally riskier than stocks (N=757)	59.7%	13.1%	26.9%

Pearson $\chi^2(3) = 6.47$ ($p = 0.091$)

Randomization: Company Stock

True or false?	Correct	Incorrect	DK
Buying a company stock usually provides a safer return than a stock mutual fund (N=763)	63.4%	12.1%	24.1%
Buying a stock mutual fund usually provides a safer return than a company stock (N=745)	32.3%	38.1%	29.2%

Pearson $\chi^2(3) = 184.67$ ($p = 0.000$)

Randomization: Bond Prices

	Correct	Incorrect	DK
If the interest rates fall, what should happen to bond prices: rise/fall/stay the same/none of the above? (N=755)	30.5%	33.8%	34.8%
If the interest rates rise, what should happen to bond prices: rise/fall/stay the same/none of the above? (N=753)	18.9%	40.3%	40.3%

Pearson $\chi^2(5) = 23.22$ ($p = 0.000$)

Financial Literacy Indexes

- **We summarize the information on the basic and advanced literacy questions using factor analysis.**
- **We find that literacy is low among**
 - low education
 - women
- **Literacy indexes are highly correlated with self-assessed literacy**

Advanced Literacy Across Demographics

N = 1508

Education	Advanced literacy quartiles				Mean	N
	1	2	3	4		
Primary	48.3	24.7	17.5	9.5	1.88	67
Preparatory intermediate voc.	35.1	29.4	23.5	12.0	2.12	345
Intermediate vocational	32.8	23.9	26.3	17.0	2.28	294
Secondary pre-university	19.0	21.8	28.4	30.9	2.71	207
Higher vocational	14.6	23.7	25.1	36.7	2.84	397
University	6.0	24.7	26.0	43.4	3.07	197
				Pearson chi2(15) = 149.32	(p=0.000)	
Gender	1	2	3	4	Mean	N
Male	15.9	20.2	26.7	37.2	2.85	834
Female	34.5	30.2	23.3	12.1	2.13	674
				Pearson chi2(3) = 161.53	(p= 0.000)	

Note: percentages may not sum up to 100 due to rounding.

Does Financial Literacy Matter?

- **We find that financial literacy is correlated with the sources of financial advice**
 - Those with low literacy are more likely to consult family and friends.
 - Those with high literacy are more likely to read newspapers, magazines, books and rely on financial advisors.
- We investigate whether financial literacy prevents people from investing in stocks.

Financial Literacy and Stock Market Participation

- We investigate whether there is a causal relationship between financial literacy and stock market participation.
- We insert basic literacy as a control for cognitive ability.
- **Estimation:**
 - Reverse causality
 - Measurement error
- We use an Instrumental Variables approach.

Instrument

Instrument:

How much of your education was devoted to economics?

(i) A lot; (ii) Some; (iii) Little; (iv) Hardly at all

First stage regression

- **High predictive power**

Stock market participation: OLS and IV estimates

N = 1,115

	OLS	OLS	GMM	GMM
Adv. Literacy	0.089*** (0.012)	0.083*** (0.012)	0.155*** (0.057)	0.163*** (0.069)
Basic Literacy		0.011 (0.010)		-0.0138 (0.023)
Demographics	yes	yes	yes	yes
F value 1 st st			22.15	19.71
Hansen J test (p value)			0.672	0.673
Exogeneity test (p value)			0.227	0.236

Extensions

- **Use self-assessed literacy in lieu of measured literacy**

Self-assessed versus objective literacy

Advanced literacy quartiles

Self-assessed literacy	1	2	3	4	Mean	N
1 (very low)	55.3	9.4	27.1	8.2	1.88	9
2.	24.9	34.9	22.2	18.0	2.33	56
3	29.2	31.8	28.1	10.9	2.21	137
4	31.3	27.5	23.2	18.0	2.28	366
5	21.7	28.1	25.8	24.4	2.53	499
6	15.9	15.6	26.1	42.4	2.95	355
7	3.9	10.2	34.8	51.1	3.33	45
Do not know	66.1	18.3	8.6	7.0	1.56	31
Refusal	67.5	24.9	7.6	0.0	1.40	10

Pearson chi2(24) = 189.19

(p= 0.000)

Stock market participation: Self-assessed literacy

N = 1,083

	OLS	GMM
Self-assess. literacy	0.063*** (0.012)	0.091** (0.038)
Basic literacy	0.033*** (0.011)	0.0288** (0.012)
Demographics	yes	yes
F value 1 st stage		37.99
Hansen J test		0.624
Exogeneity test		0.424

Extensions

- ✓ **Self-assessed literacy**
- **Exclude randomized questions**

Stock market participation: Different literacy index

N = 1,115

	OLS	OLS	GMM	GMM
Adv. Literacy	0.082*** (0.012)	0.077*** (0.012)	0.166*** (0.062)	0.182*** (0.078)
Basic Literacy		0.011 (0.010)		-0.024 (0.028)
Demographics	yes	yes	yes	yes
F value 1 st st			19.07	16.15
Hansen J test			0.682	0.684
Exogeneity test			0.156	0.163

Extensions

- ✓ **Self-assessed literacy**
- ✓ **Exclude randomized questions**
- **Literacy or cognition?**

Stock market participation: Literacy or cognition?

N = 1,053

	OLS	GMM
Advanced literacy	0.085*** (0.012)	0.141** (0.061)
Difficulty converting to Euro	yes	yes
Demographics	yes	yes
F value 1 st stage		18.37
Hansen J test		0.960
Exogeneity test		0.343

Stock market participation: Literacy or cognition?

N = 1,053

	OLS	GMM
Advanced literacy	0.088*** (0.012)	0.156** (0.065)
Difficulty with new health system	yes	yes
Demographics	yes	yes
F value 1 st stage		17.27
Hansen J test		0.970
Exogeneity test		0.280

Extensions

- ✓ **Self-assessed literacy**
- ✓ **Exclude randomized questions**
- ✓ **Literacy or cognition?**
- **Estimates across different age groups**

Stock market participation: Age Groups

N = 320 (age <40), 566 (age <50)

	Age < 40 OLS	Age <40 GMM	Age<50 OLS	Age <50 GMM
Adv. Literacy	0.079*** (0.019)	0.135* (0.076)	0.077*** (0.016)	0.211*** (0.081)
Basic Literacy	-0.002 (0.019)	-0.022 (0.031)	0.008 (0.015)	-0.039 (0.031)
Demographics	yes	yes	yes	yes
F value 1 st st		10.34		13.46
Hansen J test		0.462		0.703
Exogeneity test		0.431		0.075

Contributions and conclusions

- **Widespread lack of financial literacy**
→ Financial literacy should not be taken for granted.
- **Measurement of financial literacy**
→ Large differences warrant a careful survey design.
- **Financial literacy matters**
→ Under the assumption of instrument validity, our estimates indicate that literacy does have an effect on stock market participation.

Future work

- Correlation between financial literacy and retirement planning

“Have you ever tried to figure out how much your household would need to save yourself for retirement?, before you retired?”

preliminary evidence: strong positive correlation

Future work (contnd)

- Effects of financial literacy (pension knowledge) and retirement planning on savings