



Know more, spend more?

The impact of financial literacy on household consumption

Milena Dinkova (UU, Netspar), Adriaan Kalwij (UU, Netspar), Rob Alessie (RUG, Netspar)



Introduction

- What is financial literacy (FL)?
- The role of self-assessing financial knowledge
- And why relate FL to consumption?
- RQ: What is the impact of financial literacy on household consumption levels?



Model

- Life-cycle setting
- Financial literacy enters through intertemporal budget constraint
- Deriving closed-form equation for consumption using logarithmic preferences



Some math

- Closed-form solution

$$c_t = \frac{(1+r)}{L-t+1} A_{t-1} + \frac{y}{L-t+1} \sum_{\tau=t}^L \left(\frac{1}{1+r} \right)^{\tau-t}$$

- Derivative wrt r

$$\begin{aligned} \frac{dc_t}{dr} &= \frac{1}{L-t+1} A_{t-1} - \frac{y(1+r - (1+r)^{t-L})}{r^2(L-t+1)} \\ &\quad + \frac{y(1 - (t-L)(1+r)^{t-L-1})}{r(L-t+1)} \end{aligned}$$



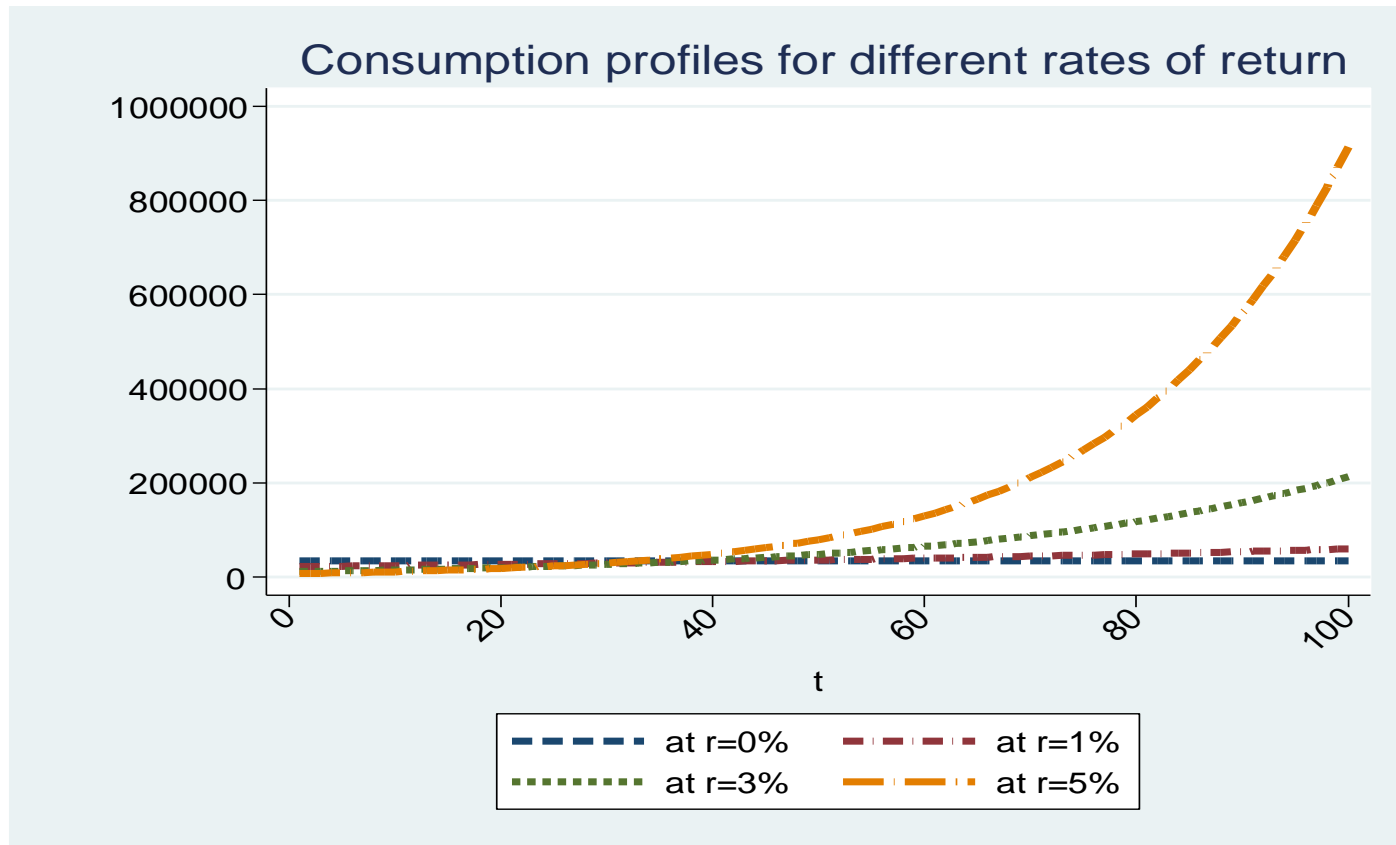
Model

Theoretical prediction:

Highly literate have a steeper consumption profile than low literacy individuals, keeping age constant.



Consumption and financial literacy





Data

- Data – LISS panel (CentERdata)
 - Financial literacy: 1 wave (2009), 3298 households
 - Consumption: 4 waves (2009-2015), more than 4000 households per wave
- Data on individual level of financial literacy, individual responses to household consumption



Testing financial literacy

- Interest compounding
- Inflation
- Risk diversification
- Bond prices and interest rates



How much people know

Share of respondents by number of Correct,
Incorrect and DK answers (n=3060)

| | None | 1 | 2 | 3 | All four | Total |
|-----------|-------------|----------|----------|----------|-----------------|--------------|
| Correct | 5,98 | 13,56 | 37,68 | 30,31 | 12,48 | 2,30 |
| Incorrect | 49,85 | 36,84 | 11,8 | 1,48 | 0,03 | 0,65 |
| DK | 42,06 | 27,13 | 23,11 | 5,04 | 2,66 | 0,99 |
| Refuse | 96,98 | 0,99 | 0,81 | 0,17 | 1,05 | 0,07 |



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Gender and FL

Percentage share of correct answers by gender (n=3062)

| | Interest | Inflation | Risk | Bonds |
|------------------------|----------|-----------|-------|-------|
| Female (n=1624) | | | | |
| Correct | 87,78 | 73,40 | 32,01 | 12,86 |
| Incorrect | 5,59 | 11,47 | 16,47 | 30,38 |
| DK | 5,01 | 13,21 | 49,59 | 54,89 |
| Refuse | 1,63 | 1,92 | 1,92 | 1,86 |
| Male (n=1438) | | | | |
| Correct | 91,27 | 84,72 | 54,70 | 25,99 |
| Incorrect | 4,76 | 8,33 | 14,88 | 38,29 |
| DK | 2,84 | 5,56 | 28,70 | 34,79 |
| Refuse | 1,12 | 1,39 | 1,72 | 0,93 |



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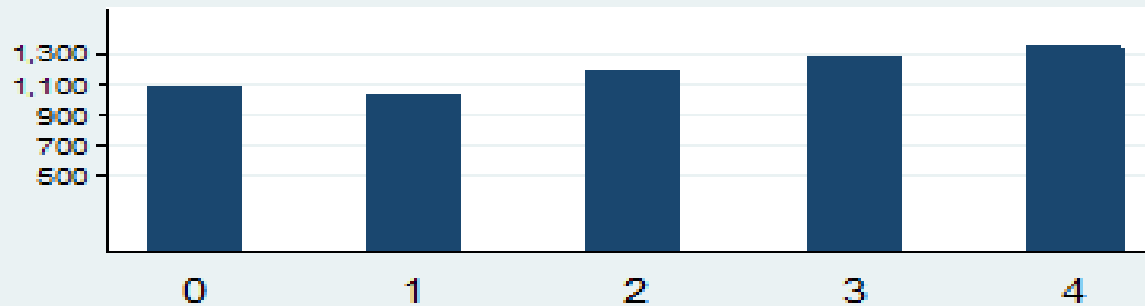
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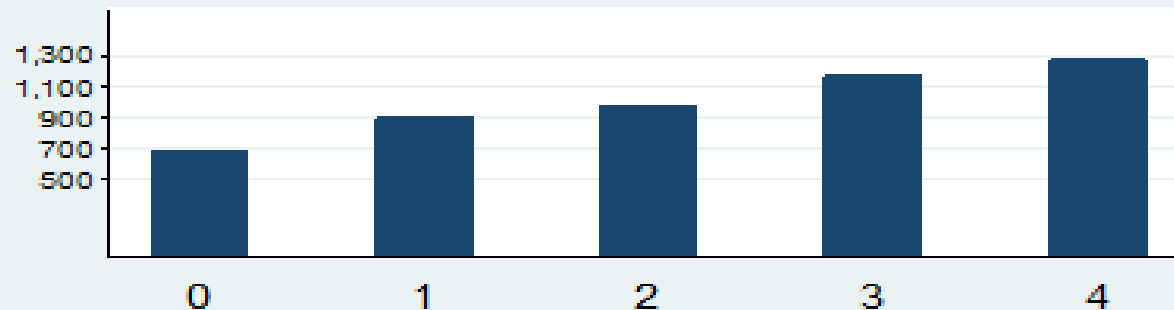


Household consumption and FL

Median household consumption by number of correct answers to FL questions singles



Median household consumption by number of correct answers to FL questions couples





Estimation procedure (1)

Stage 1:

- Estimating the financial literacy index using ordered probit
- And predicting the probability to assess own FL above median, $\Pr(SAFL_i > 4)$



Estimation procedure (2)

Stage 2: Estimating the impact of financial literacy on...

- the probability to invest in stocks and bonds
- household consumption levels



Creating index

Estimating the FL index - first stage

| VARIABLES | (1) single F | (2) single M | (3) couples F | (4) couples M |
|----------------------------|-----------------------|----------------------|----------------------|-----------------------|
| Women's Score on Q1 | 0.283*** (0.0830) | | 0.112 (0.0794) | |
| Women's Score on Q2 | 0.151** (0.0646) | | 0.0621 (0.0570) | |
| Women's Score on Q3 | 0.120* (0.0660) | | 0.252*** (0.0535) | |
| Women's Score on Q4 | 0.163** (0.0831) | | 0.204*** (0.0622) | |
| Low education dummy women | -0.0238 (0.0770) | | -0.110** (0.0558) | |
| High education dummy women | -0.297*** (0.0718) | | -0.151** (0.0616) | |
| Men's Score on Q1 | | 0.345** (0.141) | | 0.286*** (0.0945) |
| Men's Score on Q2 | | -0.0162 (0.113) | | 0.0347 (0.0754) |
| Men's Score on Q3 | | 0.208*** (0.0791) | | 0.314*** (0.0498) |
| Men's Score on Q4 | | 0.436*** (0.0806) | | 0.427*** (0.0536) |
| Low education dummy men | | 0.0914 (0.0873) | | -0.179*** (0.0555) |
| High education dummy men | | 0.0971 (0.0843) | | 0.0275 (0.0573) |
| Observations | 1,440 | 986 | 2,176 | 2,176 |

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Note that we controlled for age
household size and HH position



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FL and investing

Marginal effects on P(Invest)

| VARIABLES | (1) singles F | (2) singles M | (3) couples | (4) singles F | (5) singles M | (6) couples |
|----------------------------|----------------------|---------------------------|-----------------------|----------------------|----------------------|-----------------------|
| Pr(SAFL>4) women | 1.301*** (0.301) | Without income | 0.383** (0.171) | 1.231*** (0.295) | With income | 0.386** (0.172) |
| log(age woman) | 0.0920* (0.0521) | | 0.238 (0.147) | 0.0820 (0.0521) | | 0.253* (0.145) |
| Low education dummy women | 0.0149 (0.0419) | | -0.0468 (0.0288) | 0.0253 (0.0419) | | -0.0425 (0.0287) |
| High education dummy women | 0.181*** (0.0438) | | -0.00103 (0.0281) | 0.162*** (0.0423) | | -0.000894 (0.0278) |
| Pr(SAFL>4) men | | 1.297*** (0.256) | 0.230* (0.132) | | 1.327*** (0.260) | 0.222* (0.131) |
| log(age man) | | 0.0837 (0.0711) | -0.0281 (0.141) | | 0.0780 (0.0718) | -0.0459 (0.138) |
| Low education dummy men | | -0.0701 (0.0576) | 0.0662** (0.0324) | | -0.0645 (0.0573) | 0.0648** (0.0324) |
| High education dummy men | | 0.0206 (0.0512) | 0.0790*** (0.0269) | | 0.000857 (0.0532) | 0.0757*** (0.0262) |
| Observations | 910 | 674 | 877 | 910 | 674 | 877 |

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Note that we controlled for position in the asset distribution household size and HH position.



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Consumption

Pooled OLS Estimations of closed form solution for consumption

| VARIABLES | (1) singles F | (2) singles M | (3) couples | (4) singles F | (5) singles M | (6) couples |
|----------------------------|----------------------|----------------------|----------------------|---------------------|----------------------|----------------------|
| Pr(SAFL>4) women | 0.865** (0.424) | | 0.222 (0.318) | 0.599* (0.339) | | -0.0378 (0.300) |
| log(age woman) | 0.181* (0.0983) | | -0.751*** (0.290) | 0.0557 (0.0795) | | -0.794*** (0.258) |
| Low education dummy women | -0.0827 (0.0552) | | 0.0229 (0.0605) | 0.00449 (0.0492) | | 0.0587 (0.0529) |
| High education dummy women | 0.188*** (0.0720) | | 0.122** (0.0583) | 0.0674 (0.0604) | | 0.117** (0.0537) |
| Pr(SAFL>4) men | | 0.433 (0.311) | 0.905*** (0.218) | | 0.256 (0.247) | 0.751*** (0.200) |
| log(age man) | | 0.102 (0.0742) | 0.367 (0.297) | | -0.0488 (0.0550) | 0.443* (0.264) |
| Low education dummy men | | -0.135** (0.0593) | 0.0702 (0.0571) | | -0.0759* (0.0437) | 0.0926* (0.0521) |
| High education dummy men | | 0.0480 (0.0606) | 0.219*** (0.0540) | | -0.0449 (0.0455) | 0.159*** (0.0487) |
| Constant | 5.812*** (0.498) | 6.498*** (0.348) | 7.893*** (0.528) | 6.571*** (0.405) | 7.230*** (0.265) | 8.098*** (0.473) |
| Observations | 910 | 674 | 877 | 910 | 674 | 877 |
| R-squared | 0.187 | 0.098 | 0.155 | 0.379 | 0.314 | 0.258 |

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Note that we controlled for position in the asset distribution household size and HH position.



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So far

- Created a financial literacy index by combining objective and subjective measures of financial literacy
- Confirmed findings of previous literature:
 - higher financial literacy ~ higher probability to invest in stocks and bonds
- Empirically tested the theoretical prediction that household consumption is positively related with financial literacy



So far

- First results suggest that financial literacy is positively related with household consumption, notably for single women and men that are part of a couple



References

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Thank you



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Interest compounding

Suppose you have 100 euros on a savings account and the interest is 2% per year. How much do you think you will have on the savings account after five years, assuming that you leave all your money on this savings account: more than 102 euros, exactly 102 euros, less than 102 euros?

- 1 more than 102 euros
- 2 exactly 102 euros
- 3 less than 102 euros
- 4 I don't know
- 5 I would rather not say



Inflation

Suppose that the interest on your savings account is 1% per year and that inflation amounts to 2% per year. After 1 year, would you be able to buy more, exactly the same, or less than you could today with the money on that account?

- 1 more than today
- 2 exactly the same as today
- 3 less than today
- 4 I don't know
- 5 I would rather not say



Understanding risk

A share in a company usually offers a more certain return than an investment fund that only invests in shares.

- 1 true
- 2 not true
- 3 I don't know
- 4 I would rather not say



Bonds and interest rates

If the interest rate goes up, what should happen to bond prices?

- 1 they should increase
- 2 they should decrease
- 3 they should stay the same
- 4 none of the above
- 5 I don't know
- 6 I would rather not say



Closed-form solution for consumption

$$c_t = \frac{(1+r)}{\sum_{\tau=t}^L \left(\frac{1}{1+\rho}\right)^{\tau-t}} A_{t-1} + y \frac{\sum_{\tau=t}^L \left(\frac{1}{1+r}\right)^{\tau-t}}{\sum_{\tau=t}^L \left(\frac{1}{1+\rho}\right)^{\tau-t}}$$

- setting $\rho = 0$:

$$c_t = \frac{(1+r)}{L-t+1} A_{t-1} + \frac{y}{L-t+1} \sum_{\tau=t}^L \left(\frac{1}{1+r}\right)^{\tau-t}$$



Derivative wrt r

$$\frac{dc_t}{dr} = \frac{1}{L-t+1} A_{t-1} - \frac{y(1+r - (1+r)^{t-L})}{r^2(L-t+1)} + \frac{y(1 - (t-L)(1+r)^{t-L-1})}{r(L-t+1)}$$



Simulation is based on..

$$c_t = \frac{(1+r)}{L-t+1} A_{t-1} + \frac{y}{L-t+1} \frac{1+r - (1+r)^{t-L}}{r}$$



Effect of change in r on consumption

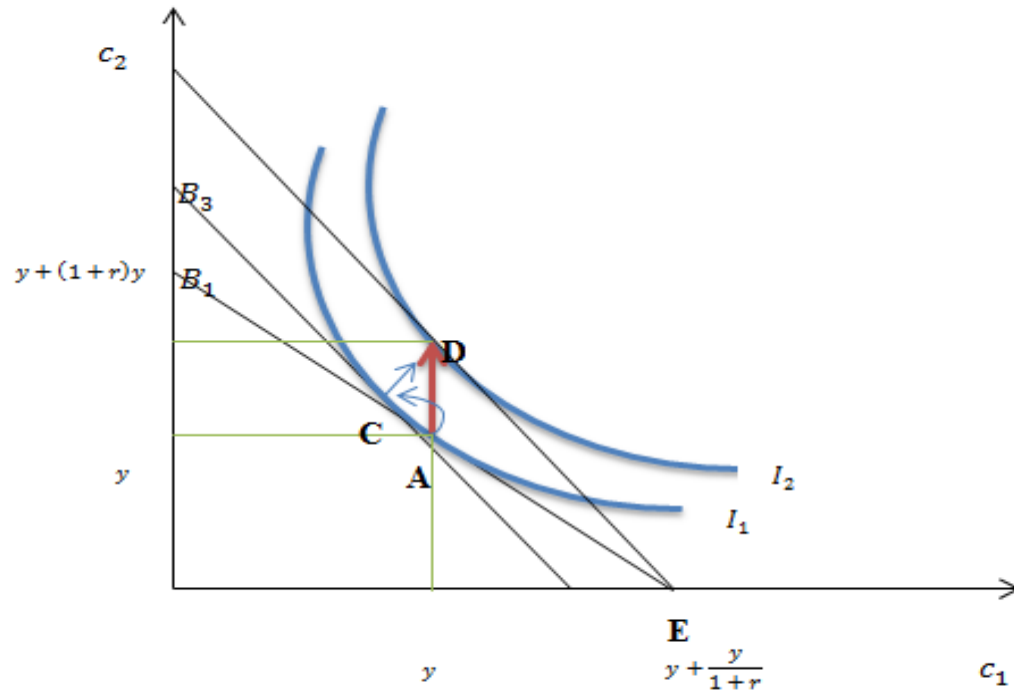


Figure 2: Effect of change in interest rate r on consumption for two periods



Euler equation with logarithmic preferences

$$u'(c_t) = \left(\frac{1 + r(\varphi)}{1 + \rho} \right)^{\tau-t} u'(c_\tau)$$

- And for two subsequent periods using logarithmic preferences:

$$\Delta \log(c_t) = \log \left(\frac{1 + r}{1 + \rho} \right)$$