

Financial Literacy and Self-Employment

Aida Ćumurović and Walter Hyll

Halle Institute for Economic Research (IWH)

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Does financial literacy play a role for entrepreneurial activity?

Table 1: Global Entrepreneurship Monitor: Entrepreneurial Behavior and Attitudes

	Germany		USA	
	Value (%)	GEM 2016 Rank/65	Value (%)	GEM 2016 Rank/65
Self-Perceptions				
Perceived Opportunities Rate	37.6	41	57.3	9
Perceived Capabilities Rate	37.4	17	55	41
Fear of Failure Rate	41	17	33.3	41
Entrepreneurial Intentions Rate	6.2	62	11.7	47
Activity				
Total early-stage Entrepreneurial Activity Rate	4.6	64	12.6	24
Established Business Ownership Rate	7	35	9.2	16
Entrepreneurial Employee Activity Rate	5.1	21	7	7
Motivations				
Motivational Index	2.7	27	6.4	3
Impact				
High Job Creation Expectation Rate	21.5	32	34.2	8
Innovation Rate	24.7	34	37.1	9
Business Services Sector Rate	25	21	33.6	6

Note: Most recent data: 2016. Source: Global Entrepreneurship Monitor, Global Entrepreneurship Research Association.

Does financial literacy play a role for entrepreneurial activity?

- Self-employed individuals are more financially literate than regularly employed. (e.g. Bucher-Koenen and Lusardi (2011), Klapper, Lusardi, Panos (2012), Bucher-Koenen and Lamla (2014), Deuilhard, Georgarakos, Inderst (2014))

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- Reasons why small business fail are also of financial type (Under-capitalization, poor financial management, misjudgment of risks, record keeping and financial control, planning, marketing, ...)
- Individuals who are considering taking the step into self-employment, are aware of existence of special challenges & risks. → Abilities affect choice of employment.
- Considering individuals eligible for self-employment (business idea, willingness to take risks, other decisive conditions): More financially literate are more likely to take the step into self-employment and/or to survive in self-employment and/or to perform better.

Mechanisms

1 Financial literacy → Self-employment

People with a higher level of financial literacy

- ▷ are more aware of sources of capital
- ▷ are more likely to find (efficient) access to credit and financial support
- ▷ have a better understanding of products, terms, conditions (e.g. of financing options)
- ▷ develop skills and confidence to become more aware of financial risks & opportunities
- ▷ are more able to draw up a business plan
- ▷ have a better understanding of the profitability of the business

⇒ have better opportunities to realize business ideas and to finance their venture.

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2 Self-employment → Financial literacy

Self-employed persons are likely to form financial knowledge e.g. by the experience of running a business

- ▷ are more likely to be confronted with activities that require financial literacy → engagement in these activities, in turn, might affect the level of financial literacy

This paper

- studies the relationship between financial literacy and the probability of self-employment,
- using German survey panel data,
 - established financial knowledge-based questions (basic and advanced) to measure financial literacy
 - decisive factors in occupational choice (characteristics and preferences)
 - family background to control for socialization
- shows that financial literacy levels and self-employment highly correlate;
- applies an IV strategy to address endogeneity issues using information on level of education of the mother;
- and discusses potential concerns and additional extensions.

SAVE (Sparen und AltersVersorgE in Deutschland)

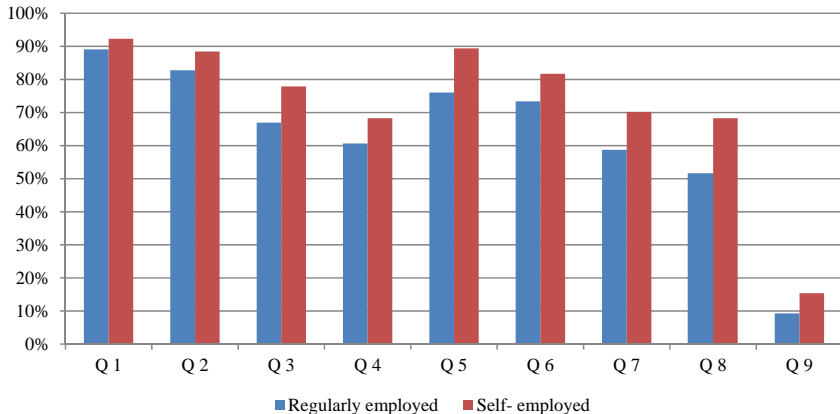
- SAVE 2009, survey panel (2001-2013)
 - 18- 65 year old respondents
 - employed (excluding not employed respondents, unpaid family worker, pensioners)
 - 1,039 observations
 - Dependent variable (binary): **Self-employment**
- 1 (a) **self-employed** (traders and other self-employed, farmers, self-employed and member at the respective chamber, other freelancers)
(b) **self-employed** - narrow definition (traders and other self-employed)
 - 0 (a) not self-employed (blue collar & white collar worker, civil servants in regular employment)
(b) not self-employed (blue collar & white collar worker)

SAVE (Sparen und AltersVersorgE in Deutschland)

- **Financial literacy index** 9 financial knowledge-based questions
 - 4 basic questions (compound interest, inflation, money illusion) Basic
 - 5 advanced questions
(volatility/ fluctuations of assets, risk diversification (single company stocks vs. mutual funds) function of a stock market, balanced funds, bonds prices) Advanced
- Controls:
 - age, gender, education, education in former GDR, federal states,
 - marital status, number of children,
 - periods of unemployment, earnings from wage and salary, household income, home ownership,
 - cognitive abilities (3 mental exercises),
 - self-assessed health status, risk attitude, and time preferences: forward planning (living for the day vs. exact future plans), neuroticism (impulsive vs. weighing),
 - creature of habit, open to changes, optimistic, self-assured,
 - voluntarily active

Descriptive Statistics: Financial literacy

Figure 1: Financial knowledge-based questions by Employment Status



Endogeneity problems with OLS / Probit

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- IVs in the literature:
Financial literacy instrumented using parental education / literacy
 - *Alessie et al. (2011), Bucher-Koenen & Lusardi (2011), and Agnew et al. (2013)* estimating the effect on retirement preparation, and van Rooij et al. (2011) estimating the effect on stock market participation,
 - *Behrman et al. (2012)* instrument financial literacy using parental schooling attainment to isolate the causal effect of financial literacy on wealth accumulation.
- Our IV: Schooling attainment of the mother (years of education)

Table 2: Financial literacy and self-employment

	(1)	(2)	(3)
Financial literacy (first stage)			
Mother's schooling attainment	0.282*** (0.067)	0.274*** (0.061)	0.273*** (0.066)
Basic socio-demographic controls	Yes	Yes	Yes
Advanced controls		Yes	Yes
Personality traits			Yes
Observations	591	583	530
F-statistic first-stage regression	17.38	18.64	15.80
Self-employment			
Financial Literacy	0.352*** (0.109)	0.416*** (0.097)	0.402*** (0.127)
Financial Literacy: Marginal Effects	[0.016]	[0.014]	[0.014]

Note: The dependent variable is a financial literacy index counting the number of correct answers on financial knowledge-based questions. Robust standard errors in brackets; ***, **, * indicate significance at the 1%, 5%, and 10% level, respectively. In model (4), the very narrow definition of self-employed is applied; in model (5) additionally, civil servants are excluded from the initial sample.

Table 2: Financial literacy and self-employment

	(1)	(2)	(3)	(4)	(5)
Financial literacy (first stage)					
Mother's schooling attainment	0.282*** (0.067)	0.274*** (0.061)	0.273*** (0.066)	0.236*** (0.073)	0.291*** (0.076)
Basic socio-demographic controls	Yes	Yes	Yes	Yes	Yes
Advanced controls		Yes	Yes	Yes	Yes
Personality traits			Yes	Yes	Yes
Observations	591	583	530	461	410
F-statistic first-stage regression	17.38	18.64	15.80	9.61	13.16
Self-employment					
Financial Literacy	0.352*** (0.109)	0.416*** (0.097)	0.402*** (0.127)	0.534*** (0.042)	0.553*** (0.049)
Financial Literacy: Marginal Effects	[0.016]	[0.014]	[0.014]	[0.016]	[0.020]

Note: The dependent variable is a financial literacy index counting the number of correct answers on financial knowledge-based questions. Robust standard errors in brackets; ***, **, * indicate significance at the 1%, 5%, and 10% level, respectively. In model (4), the very narrow definition of self-employed is applied; in model (5) additionally, civil servants are excluded from the initial sample.

Issues with IV

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- IV relies on the interaction with parents and IV is based on the assumption that the educational level of the mother affects the children's financial literacy levels.

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- IV relies on the interaction with parents and IV is based on the assumption that the educational level of the mother affects the children's financial literacy levels.
- Other potential channels for the influence on children: Inter-generational transfer of entrepreneurship or “entrepreneurial spirit”
 - 1 entrepreneurship of parents and characteristics of parents (Djankov et al., 2006; Lindquist et al., 2015)
 - 2 the role of wealth (Hurst & Lusardi, 2004; Fairly & Krashinsky, 2012; Monticone, 2010)
 - 3 financial socialization by parents (Grohmann et al., 2014)

(A) GDR / East Germany:

firms owned by the state, self-employment rate: 2%; strongly controlled by the state (e.g. profits and size of company (up to 10 employees) limited); self-employment regarded as *unwanted remnant of the capitalist society* (Fritsch *et al.* 2010)

Discussion and Extension: Results

Table 3: Financial Literacy: Probability of being self-employed and the role of social background

Self-Employment	(A) East-Germany
Financial Literacy	0.418***
	(0.119)
	[0.008]
Full set of control variables	Yes
Controls for federal states	Yes
Observations	210
F-statistic first-stage regression	13.69

Note: The dependent variable is a financial literacy index counting the number of correct answers on financial knowledge-based questions. Robust standard errors in brackets; ***, **, * indicate significance at the 1%, 5%, and 10% level, respectively. In model (4), the very narrow definition of self-employed is applied; in model (5) additionally, civil servants are excluded from the initial sample.

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- (B) Characteristics of parents:
mother & father adventurous persons; mother & father plan for future; mother & father keep private accounts; single parent families or did not live together with parents

Discussion and Extension: Results

Table 3: Financial Literacy: Probability of being self-employed and the role of social background

Self-Employment	(A) East-Germany	(B) Parental Character.
Financial Literacy	0.418***	0.4243***
	(0.119)	(0.096)
	[0.008]	[0.011]
Full set of control variables	Yes	Yes
Controls for federal states	Yes	Yes
Observations	210	525
F-statistic first-stage regression	13.69	16.38

Note: The dependent variable is a financial literacy index counting the number of correct answers on financial knowledge-based questions. Robust standard errors in brackets; ***, **, * indicate significance at the 1%, 5%, and 10% level, respectively. In model (4), the very narrow definition of self-employed is applied; in model (5) additionally, civil servants are excluded from the initial sample.

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mother & father adventurous persons; mother & father plan for future; mother & father keep private accounts; single parent families or did not live together with parents
- (C) Wealth & Support:
Monetary support by parents/children in the previous year, regular support payments, occasional support payments, inheritance receipts of financial assets & of real estates, likelihood of an inheritance receipt in the future, understanding of parents concerning financial matters

Discussion and Extension: Results

Table 3: Financial Literacy: Probability of being self-employed and the role of social background

Self-Employment	(A) East-Germany	(B) Parental Character.	(C) Monetary Support
Financial Literacy	0.418***	0.4243***	0.440***
	(0.119)	(0.096)	(0.094)
	[0.008]	[0.011]	[0.012]
Full set of control variables	Yes	Yes	Yes
Controls for federal states	Yes	Yes	Yes
Observations	210	525	514
F-statistic first-stage regression	13.69	16.38	13.33

Note: The dependent variable is a financial literacy index counting the number of correct answers on financial knowledge-based questions. Robust standard errors in brackets; ***, **, * indicate significance at the 1%, 5%, and 10% level, respectively. In model (4), the very narrow definition of self-employed is applied; in model (5) additionally, civil servants are excluded from the initial sample.

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Monetary support by parents/children in the previous year, regular support payments, occasional support payments, inheritance receipts of financial assets & of real estates, likelihood of an inheritance receipt in the future, understanding of parents concerning financial matters
- (D) Financial socialization:
receiving pocket money regularly in childhood, spent this money immediately

Discussion and Extension: Results

Table 3: Financial Literacy: Probability of being self-employed and the role of social background

Self-Employment	(A) East-Germany	(B) Parental Character.	(C) Monetary Support	(D) Pocket Money
Financial Literacy	0.418***	0.4243***	0.440***	0.394***
	(0.119)	(0.096)	(0.094)	(0.134)
	[0.008]	[0.011]	[0.012]	[0.012]
Full set of control variables	Yes	Yes	Yes	Yes
Controls for federal states	Yes	Yes	Yes	Yes
Observations	210	525	514	525
F-statistic first-stage regression	13.69	16.38	13.33	13.70

Note: The dependent variable is a financial literacy index counting the number of correct answers on financial knowledge-based questions. Robust standard errors in brackets; ***, **, * indicate significance at the 1%, 5%, and 10% level, respectively. In model (4), the very narrow definition of self-employed is applied; in model (5) additionally, civil servants are excluded from the initial sample.

Discussion and Extension: Results

Table 3: Financial Literacy: Probability of being self-employed and the role of social background

Self-Employment	(A) East-Germany	(B) Parental Character.	(C) Monetary Support	(D) Pocket Money	(E) All
Financial Literacy	0.418***	0.4243***	0.440***	0.394***	0.444***
	(0.119)	(0.096)	(0.094)	(0.134)	(0.091)
	[0.008]	[0.011]	[0.012]	[0.012]	[0.011]
Full set of control variables	Yes	Yes	Yes	Yes	Yes
Controls for federal states	Yes	Yes	Yes	Yes	Yes
Observations	210	525	514	525	497
F-statistic first-stage regression	13.69	16.38	13.33	13.70	12.47

Note: The dependent variable is a financial literacy index counting the number of correct answers on financial knowledge-based questions. Robust standard errors in brackets; ***, **, * indicate significance at the 1%, 5%, and 10% level, respectively. In model (4), the very narrow definition of self-employed is applied; in model (5) additionally, civil servants are excluded from the initial sample.

Conclusion

- Level of financial sophistication is relatively low.
- Self-employed persons are more financially literate.
- The effect of financial literacy on the rate of self-employment is positive, statistically and economically significant,
- ... and robust across different specifications
- Further research should provide further support for the link observed. It is worthwhile analyzing whether financial literacy has an impact on self-employment entry and performance/survival rates.

Thank you!

Financial literacy affects financial decision making on the household level

▷ Retirement preparation

*Lusardi & Mitchell (2005, 2008, 2011): US; Klapper & Panos (2011): Russia
Bucher-Koenen & Lusardi (2011): Germany*

Alessie et al. (2011) and Van Rooij et al.(2011): Netherlands

▷ Saving & Wealth accumulation

*Lusardi (2008): Household saving behavior; Jappelli & Padula (2013): S. decisions
Behrman et al. (2012): Wealth accumulation; Lusardi et al. (2015): Wealth inequality*

▷ Borrowing, Financing, Indebtedness & Credit Card Behavior

*Disney & Gathergood (2012): Levels of consumer credit relative to income (high cost credit share);
Klapper et al. (2012): Level of spending capacities, formal credits
De Bassa Scheresberg (2013): High-cost borrowing methods
Dick & Jaroszek (2013): Overdraft credit on current accounts*

Lusardi & Tufano (2015): Debt levels, high-cost borrowing

▷ Stock market participation & Portfolio diversification

*Christiansen et a. (2008): Stock & bond holdings, private pension funds
Guiso & Jappelli (2009): Degree of portfolio diversification*

Van Rooij et al. (2011): Stock ownership

Demographics and personality traits affect self-employment decisions

▷ Demographics

age, gender, education, family background, employment history, wealth, ...

▷ Risk aversion

- *Cramer et al. (2002)*: Negative correlation
- *Ekelund et al. (2005)* and *Caliendo et al. (2009)*: Negative impact on entry decision

▷ Big Five: conscientiousness, openness, neuroticism, agreeableness, extraversion

- *Zhao & Seibert (2006)*; *Ciavarella et al. (2004)*; *Caliendo et al. (2013)*

▷ Other personality traits:

Need for achievement, need for autonomy, need for power, locus of control, impulsivity

- *Hansemark (2003)*; *Oosterbeck et al. (2010)*; *Caliendo et al. (2012; 2013)*

Financial knowledge-based questions

Basic

- (1) *Compound interest I.* 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?
- [1] More than €102 [2] Exactly €102 [3] Less than €102 [4] Do not know / Refuse
- (2) *Inflation.* Imagine that the interest rate on your savings account was 1% per year and inflation was 2% per year. After 1 year, how much would you be able to buy with the money in this account?
- [1] More than today [2] Exactly the same [3] Less than today [4] Do not know / Refuse
- (3) *Compound interest II.* Assume that you have €100 in a savings account and the interest rate you earn on this money is 20% a year. If you keep this money in the account for 5 years, how much would you have after 5 years?
- [1] More than €200 [2] Exactly €200 [3] Less than €200 [4] Do not know / Refuse
- (4) *Money illusion.* Suppose that in the year 2012, your income has doubled and prices of all goods have doubled too. In 2012, how much will you be able to buy with your income?
- [1] More than today [2] Exactly the same [3] Less than today [4] Do not know / Refuse

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Examples-advanced

Summary Statistics

Financial knowledge-based questions

Advanced

- (5) *Volatility.* Normally, which of the following assets displays the highest fluctuations over time?
[1] Savings accounts [2] Fixed-interest securities [3] Stocks [4] Do not know / Refuse
- (6) *Risk diversification.* Buying a company stock usually provides a safer return than a stock mutual fund.
[1] True [2] False [3] Do not know / Refuse
- (7) *Stock market.* Which of the following statements describes the main function of the stock market?
[1] The stock market helps to predict stock earnings
[2] The stock market results in an increase in the price of stocks
[3] The stock market brings people who want to buy stocks together with those who want to sell stocks
[4] None of the above [5] Do not know / Refuse
- (8) *Balanced funds.* Which of the following statements is correct?
[1] Once one invests in a mutual fund, one cannot withdraw the money in the first year
[2] Mutual funds can invest in several assets, for example invest in both stocks and bonds
[3] Mutual funds pay a guaranteed rate of return which depends on their past performance
[4] None of the above [5] Do not know / Refuse
- (9) *Bond prices.* If the if market interest rates fall, what should happen to bond prices?
[1] Rise [2] Fall [3] Stay the same [4] None of the above; Do not know / Refuse

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Examples-basic

Summary Statistics