Gender differences and stereotypes in financial literacy: Off to an early start[*]

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December 22, 2015

Abstract

The determinants of the gender gap in financial literacy, an important correlate of financial wealth, are largely unknown. We confirm the existence of the gap already among teenagers and report an association with gender stereotypes related to household finance.

JEL Classification: J16, D14, J24

Keywords: Stereotypes; Financial Literacy; Gender; Adolescence

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1 Introduction

Financial literacy is a reliable predictor of individual wealth, savings, stock market participation, and retirement planning (Lusardi and Mitchell 2008, van Rooij et al. 2011). Yet, financial literacy is low on average, particularly among women. The gender gap in financial literacy is large and persists throughout the life cycle, but the underlying mechanisms are poorly understood. Explanations of gender gaps in other domains, such as differences in risk attitudes, self-confidence, or division of labour, can only partially account for the gap in financial literacy (Lusardi and Mitchell 2014).

Most studies of the gender gap in financial literacy focus on adults. An exception is Lührmann et al. (2015) who document that the gender gap in financial literacy already exists at younger ages – among 13 to 15 year old teenagers. In this paper, we report results from a field study in the same age group that elicited domain-specific measures of gender stereotypes jointly with measures of financial literacy.

Our interest in gender stereotypes is motivated by recent findings showing that stereotypes can explain gender gaps in various domains (Bordalo et al. 2015, Coffman 2015, Lavy and Sand 2015). In the present context, stereotypes represent beliefs about the levels of, and the future returns to, the financial knowledge of women and men. Bordalo et al. (2015) present a social cognition model of stereotypical thinking that implies overreaction to information that confirms stereotypes. Stereotypical beliefs may thus lead to under-investment in financial knowledge among girls.[1]

Our data show gender differences in the relationship between the strength of gender stereotypes and the level of financial literacy among teenagers. This relationship is robust to controlling for several other factors that may explain the gender gap, such as numeracy, risk preferences (Niederle and Vesterlund 2010) and self-confidence (Bucher-Koenen et al. 2014). Beliefs are biased towards higher competency of males: Teenagers of both genders believe that boys have higher interest and ability regarding financial matters; that the returns to financial knowledge are higher for males; and that males are more likely to deal with financial matters at work. Further, there is no gender difference in financial knowledge among those teenagers who do not share male-favouring stereotypical views. The more strongly teenagers agree with such stereotypes, the wider the gender gap.

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[1] Jappelli and Padula (2013) and Lusardi et al. (2015) present investment models of financial human capital.

2 Data and survey instruments

We study the association between gender stereotypes and teenagers' financial knowledge in a sample of 418 high-school students recruited from 30 classes across 13 schools in three German cities.[2] Participating schools pertain to the two lower tracks of the German high school system. Students in those tracks typically continue with vocational training after graduation and come from lower socio-economic status backgrounds.

We assess financial knowledge through standard financial literacy questions on discounting, interest compounding, the time value of money, risk diversification, and the definition of stocks (Lusardi and Mitchell 2014, Lusardi et al. 2010, van Rooij et al. 2011). They are similar to those used in the PISA module on financial knowledge. We ask seven additional questions to cover concepts like return, liquidity and risk of different assets, running versus one-off costs, budgeting skills, and cash versus payment in installments. We construct an index of financial knowledge as the number of correct answers to the twelve questions.

Gender stereotypes are measured in five sub-domains (Table 1): financial interest (or motivation), the ability to deal with financial matters, the relevance of financial knowledge at work and at home, and future returns to financial literacy. Questions are answered on a five-point Likert scale. We construct an index of belief bias towards males by summing up the responses and re-scaling to the unit interval.[3]

All questionnaires were filled out in the presence of the research team during regular school hours. We asked students for their gender, age, and social background: household composition, the language they speak at home, and the number of books at home. The latter is a standard question in PISA, capturing important family inputs into a student's education (Hanuschek and Woessmann, 2011). The survey also included math grades, self-reported risk attitude (see Dohmen et al. 2011 for empirical validation), self-confidence (using the scale proposed in Robins et al. 2001), and four of Raven's progressive matrices to measure cognitive skills, based on Heller et al. (1998).

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[2]Classes were randomly drawn from a list of classes interested in a financial education course offered by a non-profit organisation. 97% of students provided participation consent signed by their parents. Data were collected in 2013. For more details, see Lührmann et al. (2014) who analyze an experiment on time preference measurement conducted as part of the same study.

[3]Psychologists often rely on implicit association tests to determine biases in beliefs and stereotypes. As no such test existed specifically for the financial domain, we developed our 5-item scale, leaning on the "Beliefs about Women Scale" by Belk et al. (2001).

3 Results

Female teenagers have lower financial knowledge than their male counterparts (the difference amounts to 0.3 of a standard deviation, $p = 0.0028$, Mann-Whitney-Wilcoxon (MWW) test[4]); this result is similar to Lührmann et al. (2015). Gender differences in financial literacy may be related to gender-specific risk attitudes, numeracy, and self-confidence. In columns 1 and 2 of Table 2, we present summary statistics for these variables and for socio-economic characteristics. Adolescent females neither have lower levels of numeracy than males (as evidenced by their last math grade)[5], nor different risk attitudes, self-confidence, or cognitive ability (column 3 in Table 2). Male and female teenagers in our sample are also similar in terms of their socio-demographic characteristics, such as household size, number of siblings, migrant background, and number of books in the household.

According to our stereotype index, males' beliefs tend to be more biased towards the own gender in all five sub-domains, especially regarding the ability to deal with financial matters and future returns to financial literacy (Table 1). Females, in contrast, do not exhibit such self-affirmative beliefs. While they are significantly less biased towards male competency in finance (tests in column 3), both genders believe in a higher male competency in finance.

Following initial data inspection, we allow for a non-linear relationship between the stereotype and financial knowledge measures by using Robinson's semiparametric estimator (Robinson 1988). Separately by gender, Figure 1 shows the nonparametric estimates of the association between stereotype strength and knowledge, controlling for several covariates in the parametric part. Females' financial knowledge tends to deteriorate as the bias in their beliefs increases, while male performance increases with self-affirming belief bias.[6]

The last two columns of Table 2 report the estimates for the regressors in the parametric part. In contrast to Bucher-Koenen et al. (2014) for adults, we do not find evidence of a link between self-confidence and financial literacy. However, there is a (weakly) positive association of the willingness to take risks and financial knowledge for female teenagers, and, as expected, a strongly negative correlation between a low math score and financial knowledge. Students with a low math grade answer, on average, between 0.6 and 1 fewer questions correctly.

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[4]Throughout, we test for gender differences using the MWW test for ordinal and continuous variables and the χ^2 test for dummy variables.

[5]We define a dummy for low numeracy which is 1 if a students' grade is below the class average (since math exams are not standardised in Germany), and 0 otherwise.

[6]The difference between the nonparametric regression lines for female and male students is more pronounced if we trim the stereotype score at the bottom and top 5% to account for outliers (results available on request).

4   Conclusion

This paper reported data from a field study in German schools among 13 to 15 year old teenagers, confirming the existence of a sizeable gender gap in financial literacy. Differences in numeracy, risk attitudes, and self-confidence have been discussed as potential determinants of such differences in prior literature. We do not find systematic differences in these variables by gender. Our data suggest, however, that stereotypical beliefs play a role in the formation of the gender gap in financial literacy. We found no statistically significant knowledge differences between males and females that do *not* display biased beliefs related to financial literacy. For females, financial knowledge deteriorates with stereotype intensity whereas it increases for males.

While we cannot establish a causal relationship between gender stereotypes and financial knowledge, our results show that the gender gap in financial literacy and stereotypes are both present at young ages – consistent with the notion that stereotypes influence investment into financial literacy among teenagers. Further research is needed to establish such causal links, and more generally on the formation of gender stereotypes in this and other domains.

Our findings suggest possible ways to improve financial education programs for younger individuals. Such interventions are known to increase self-assessed competence and motivation to engage with finance topics, but not differently so by gender (Lührmann et al. 2015). Their effectiveness for females might be increased by addressing stereotypes directly. Further, integrating financial education into mandatory school curricula might limit under-investment by groups holding biased beliefs.

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Table 1: Survey instrument to measure stereotypes

		Females' attitudes	Males'	$H_0 : x_f = x_m$ (p-value)
Interest	*"Men are usually more interested in finances than women."*	2.85	3.15	0.0081***
Ability	*"Men are usually better in dealing with finances than women."*	2.64	3.09	0.0000***
Work	*"Men are more likely to be concerned with finance in their job than women."*	2.73	2.96	0.0523*
Home	*"Men are more likely to be concerned with the family finances than women."*	3.00	3.17	0.1132
Expected return	*"For a successful future it is more important for men to be good at dealing with finance than for women."*	2.72	3.07	0.0013**
Overall index	aggregating all answers and rescaling to $S \in (0,1)$	0.44	0.52	0.0002***

Note: Stereotypes are measured on a 1-5 Likert scale, 1 = "not at all" and 5= "absolutely true". Higher values indicate bias towards males. p-values refer to gender differences in financial stereotypes, using MWW tests.

Table 2: Summary statistics and estimation results

		Summary Statistics		Test	Estimation Results	
		Females	Males	$H_0 : x_f = x_m$ (p-value)	Females'	Males'
					Financial Knowledge	
Age (months)		171.3 [9.991]	170.6[9.509]	0.562	0.012 [0.014]	0.015 [0.014]
>26 books at home	D	0.105 [0.307]	0.159 [0.366]	0.114	0.918 [0.575]	0.395 [0.321]
Household size (log)		1.057 [0.574]	1.049 [0.511]	0.605	-0.017 [0.257]	-0.184 [0.264]
Siblings	D	0.808 [0.395]	0.780 [0.415]	0.493	-0.099 [0.460]	0.019 [0.225]
Migrant Background	D	0.448 [0.499]	0.524 [0.500]	0.123	0.120 [0.294]	0.319 [0.246]
Grade 8	D	0.477 [0.501]	0.516 [0.501]	0.427	-0.181 [0.309]	1.162 [0.307]***
Low math score	D	0.436 [0.497]	0.435 [0.497]	0.982	-0.601 [0.225]**	-1.018 [0.245]***
High cognition	D	0.209 [0.408]	0.236 [0.425]	0.524	-0.046 [0.340]	0.331 [0.328]
High risk	D	0.203 [0.404]	0.260 [0.440]	0.180	0.674 [0.302]**	-0.162 [0.328]
Low confidence	D	0.192 [0.395]	0.146 [0.354]	0.217	-0.024 [0.331]	-0.277 [0.453]
City Fixed Effects					Yes	Yes
Observations		172	246	418	172	246
R-squared					0.091	0.233

Note: The dependent variable is the average no. of questions answered correctly. D indicates dummy variables. Robust standard errors clustered at the class level are reported in parentheses. *** p<0.01, ** p<0.05, * p<0.1
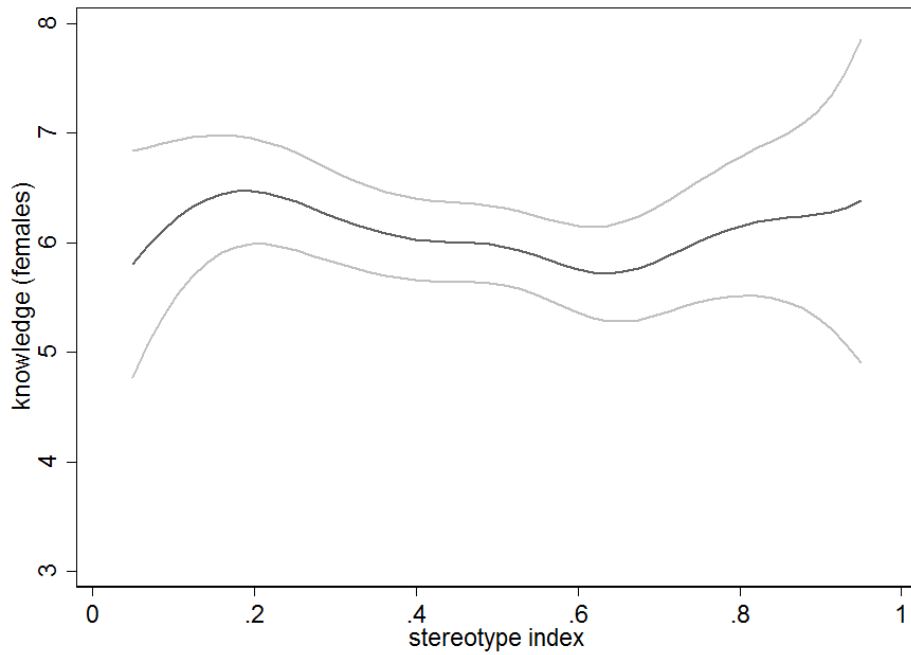
Figure 1: Nonparametric estimates of the relationship between stereotype index and financial knowledge

(a) Males
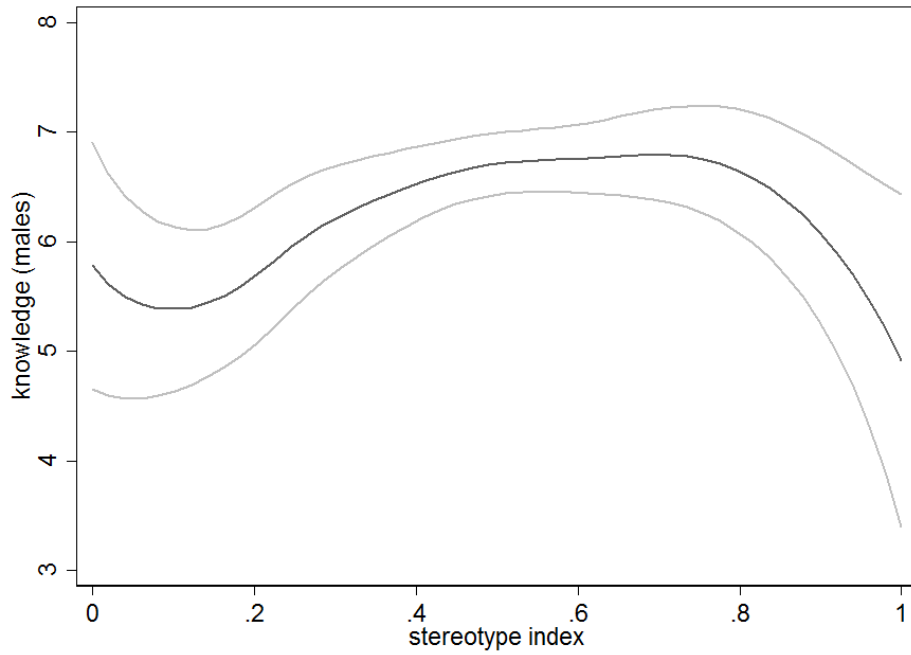
(b) Females

Note: 95% confidence intervals shown in dotted lines