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How Financially Literate Are Women? An Overview and New Insights

We document strikingly similar gender differences in financial literacy across countries. When asked to answer questions that measure knowledge of basic financial concepts, women are less likely than men to answer correctly and more likely to indicate that they do not know the answer. Both young and old women show low levels of financial literacy. Moreover, women for whom financial knowledge is likely to be very important—for example widows or single women—also know little about concepts relevant for day-to-day financial decisions. The gender differences are present for very basic as well as more advanced measures of financial literacy. This is important because financial literacy has been linked to economic behavior, including retirement planning and wealth accumulation. Women live longer than men and are likely to spend time in widowhood. Thus, improving women's financial literacy is key to helping them prepare for retirement and promoting their financial security.

INTRODUCTION

With rapidly changing financial markets and increasing individual responsibility—in particular for retirement income—being able to make informed financial decisions has become of paramount importance. Yet,

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empirical research from various countries shows that many people know little about the concepts underlying saving and investment decisions. This may have substantial consequences for financial well-being, especially as it relates to the accumulation of retirement wealth (Lusardi and Mitchell 2014).

Not only is financial illiteracy widespread, but it is particularly severe among women. This is important because women tend to live longer than men; thus their savings needs are different. Women are likely to spend at least part of their retirement in widowhood. Evidence from the United States suggests that the death of a spouse is an important determinant of female old-age poverty (see Sevak, Weir, and Willis 2003/2004). Moreover, women tend to have less attachment to the labor market, with interrupted careers because of childbearing and potentially fewer financial resources over the life cycle. With fewer available resources and higher life expectancies, women's financial security after retirement is potentially at risk. For example, Lusardi and Mitchell (2008) show that women are much less likely to plan and thus less likely to be prepared for their retirement than men.

In this paper we present evidence from financial literacy surveys in many countries, with a special focus on women so as to provide insights into the financial literacy gender gap. We build on the work of Lusardi and Mitchell (2011b, 2014) that compares financial literacy in twelve countries, but we perform additional analyses on a subset of those countries. Specifically, we use data from American, Dutch, and German surveys to evaluate levels of financial literacy via both objective and subjective measures. Moreover, comparing these three countries, we document new evidence on the gender gap and possible explanations. The measure of financial literacy is based on responses to a set of three questions, which have become known as the *Big Three* (Hastings, Madrian, and Skimmyhorn 2013). These questions have been used extensively not only across countries but also in surveys that cover different population subgroups. In addition to the evidence resulting from surveys with these three questions, we discuss findings from surveys containing a broader set of financial literacy questions.

This paper contributes to the literature by reviewing existing evidence for the gender gap and providing possible explanations. Studying the similarities and differences in the gender gap in three countries deepens our understanding of the gender gap. Moreover, whenever possible, we explore potential explanations for the gender gap that can move the discussion forward.

Until recently the factors that might drive the gender gap in financial literacy have not been well understood. Few theoretical models exist that

explain the accumulation of financial literacy. These models suggest that differences in financial literacy are driven by differences in the benefits and costs of acquiring financial knowledge (see Lusardi, Michaud, and Mitchell 2016). Such models are able to explain a gender gap insofar as the benefits and costs are different for women and men. Consistent with this theoretical framework, other models suggest that gender differences in knowledge are related to decision making within the household; e.g., if husband and wife divide household tasks and the husband specializes in the accumulation of financial knowledge (Hsu 2011).

We find a persistent gender gap in financial literacy that is independent of socioeconomic background and cultural and institutional context. Specifically, we confirm large gender differences in financial literacy in the United States, Germany, and the Netherlands. Not only are female respondents less likely to answer financial literacy questions correctly but they are also more likely to state that they do not know the answers to the questions. Moreover, we find a gender gap in financial literacy even among the young—this in spite of younger women having higher education levels and labor force participation.

Gender differences occur not only in objective measures of financial literacy but also in self-reported financial literacy measures. In addition to that we report evidence that women have difficulties obtaining high quality financial advice. Thus, if women, on average, have lower levels of financial literacy and do not obtain high-quality financial advice, they may be at risk of failing to plan for retirement and making other financial mistakes. All in all, the evidence suggest that there is a substantial gender gap in financial literacy which matters for a wide set of economic decisions. This has important policy implications.

The structure of our paper is as follows. First, we provide our empirical findings on the gender gap in financial literacy in the United States, the Netherlands, and Germany. Then we examine financial literacy gender gaps across age, household decision-making role, and geographic regions. Next, we examine self-assessed literacy and study the relationship between financial advice and financial literacy. Finally, we discuss the links between financial literacy and financial behavior and we conclude with some directions for future research.

UNCOVERING THE GENDER GAP IN FINANCIAL LITERACY

While it is challenging to provide a measure of financial literacy, Lusardi and Mitchell (2011a) have designed a financial literacy module that has proven effective in measuring knowledge of fundamental financial

decision-making concepts and enabling comparisons of that knowledge across countries. The questions they developed—explained in more detail below—were initially designed for the US Health and Retirement Study and were subsequently incorporated into several other surveys.¹

The use of the same financial literacy questions across countries allows researchers to identify similarities in financial knowledge in distinct institutional, cultural, social, and economic environments. Moreover, it enables identification of demographic groups that display low levels of knowledge. The disadvantage of the measure we use is that it is limited to three questions only. The measure captures knowledge of financial concepts and not financial behaviors. While this is a rather narrow measure of financial literacy, the advantage is that it covers concepts most relevant to savings and investment decisions. Whenever possible, we will cite evidence from surveys that cover more comprehensive measures of financial literacy.

Data Sources and Financial Literacy

We combine information taken from three nationally representative household surveys for which we were able to coordinate the data collection efforts so as to result in information that is strictly comparable across countries. For the United States, we use the 2009 National Financial Capability Study (NFCS). This survey was commissioned by the Financial Industry Regulatory Authority (FINRA) Investor Education Foundation in consultation with the Department of the Treasury and the President's Advisory Council on Financial Literacy. About 1,500 American adults were surveyed by telephone.² For the Netherlands, we use De Nederlandsche Bank Household Panel (DHS). The DHS is an online panel of around 2,000 households run by CentERdata at Tilburg University. Data were collected in June 2010.³ For Germany we use data from SAVE—a representative panel of German households. The panel has been run by the Munich Center for the Economics of Aging (MEA) since 2001. In 2009 about 2,200 households participated by filling in a paper-and-pencil questionnaire.⁴

Respondents were asked three questions covering fundamental concepts of economics and finance, expressed in everyday terms: the questions

1. For an overview of the international comparison of financial literacy across 12 countries, see Lusardi and Mitchell (2011b, 2014).

2. For more detail about these data, see Lusardi and Mitchell (2011c). While more recent data have become available, these data are most comparable with the Dutch and German data.

3. For details about the data set and findings about financial literacy, see Alessie, Van Rooij, and Lusardi (2011) and Van Rooij, Lusardi, and Alessie (2011).

4. For more details see Bucher-Koenen and Lusardi (2011).

require simple interest rate calculations and an understanding of the workings of inflation and risk diversification. The exact wording of the questions is as follows (with country-specific variation in currency):

1. *Interest Rate Question: "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; Do not know; Refuse to answer."*
2. *Inflation Question: "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? More than today; Exactly the same; Less than today; Do not know; Refuse to answer."*
3. *Risk Diversification Question: "Please tell me whether this statement is true or false. "Buying a single company's stock usually provides a safer return than a stock mutual fund." True; False; Do not know; Refuse to answer"*

The first two questions measure whether respondents have a basic understanding of interest rates and inflation. The third question evaluates knowledge of risk diversification, a more sophisticated concept that allows researchers to differentiate respondents across levels of financial literacy.

The Gender Gap in Financial Literacy

In Table 1a, we use data from the 2009 NFCS to describe financial literacy in the population and the differences between women and men in the United States. Overall, financial literacy is rather low. A large fraction of Americans lack knowledge of simple financial concepts. For example, less than half of respondents correctly answer the interest rate and inflation questions and only one-third are able to correctly answer all three questions.⁵ Most important, women are much less likely than men to correctly answer the financial literacy questions; for each question, the proportion of correct answers is lower among women than men. For example, while 55% of men correctly answer the interest rate and inflation questions, only 38% of women do so. Moreover, while 38% of men correctly answer all three questions, only 22% of women do so. There is another important and notable gender difference in the responses to these

5. For brevity, we will sometimes refer to these questions as the interest, inflation, and risk diversification questions.

TABLE 1a
Summary Statistics from the US 2009 National Financial Capability Study

A: Interest Rate Question	Full Sample (%)	Female (%)	Male (%)	
>\$102*	64.9	58.8	71.3	
= \$102	11.3	13.1	9.5	
<\$102	9.2	10.0	8.4	
Do not know	13.5	16.6	10.3	
Refuse to answer	1.0	1.5	0.5	
Chi ² Test: chi ² = 29.05, p-value = 0.000, df = 4				
B: Inflation Question				
More	11.2	12.3	10.0	
Exactly the same	9.0	9.8	8.1	
Less*	64.3	58.0	71.0	
Do not know	14.2	18.4	9.8	
Refuse to answer	1.4	1.6	1.1	
Chi ² Test: chi ² = 33.54, p-value = 0.000, df = 4				
C: Risk Diversification Question				
Correct (false)	13.3	10.6	16.2	
Incorrect (true)*	51.8	46.8	57.1	
Do not know	33.7	41.4	25.6	
Refuse to answer	1.2	1.2	1.2	
Chi ² Test: chi ² = 45.09, p-value = 0.000, df = 3				
D: Cross-question Consistency				t-test p-value
Interest & Inflation	46.2	37.7	55.2	0.000
All correct	30.2	22.5	38.3	0.000
None correct	12.3	15.1	9.3	0.000
At least 1 “do not know”	42.4	50.0	34.3	0.000
All “do not know”	4.7	6.3	3.0	0.000
# Observations	1,488	768	720	

Notes: Distribution of responses to financial literacy questions in the full sample and for female and male respondents. The correct answer is marked by an asterisk. χ^2 test statistics are used for testing differences in the distribution of answers between men and women. T-tests are used for testing differences in the cross-question consistency between men and women. All figures are weighted and tests are performed on the weighted data.

questions. Women are much more likely than men to indicate that they do not know the answer to the questions.⁶ The proportion of "do not know" responses is particularly high on the risk diversification question: as many as 41% of women indicate that they do not know whether a single company stock is riskier than a stock mutual fund. Moreover, half of women give at least one "do not know" response to the three financial literacy questions. The χ^2 -test statistics show that the answers to the financial literacy questions are significantly different between men and women for all three

6. The percentage of respondents who refused to answer the financial literacy questions is very small: about 1% for any one of the three questions.

TABLE 1b
Summary Statistics from the Dutch 2010 DNB Household Panel

A: Interest Rate Question	Full Sample (%)	Female (%)	Male (%)	
>€102*	84.8	83.1	86.6	
=€102	3.4	4.3	2.5	
<€102	1.7	1.9	1.6	
Do not know	8.9	9.5	8.3	
Refuse to answer	1.1	1.1	1.1	
<i>Chi² Test: chi² = 5.79, p-value = 0.2135, df = 4</i>				
B: Inflation Question				
More	2.7	2.8	2.7	
Exactly the same	5.7	6.9	4.3	
Less*	76.9	72.0	81.9	
Do not know	13.5	16.9	10.1	
Refuse to answer	1.2	1.4	1.0	
<i>Chi² Test: chi² = 25.45, p-value = 0.000, df = 4</i>				
C: Risk Diversification Question				
Correct (false)	51.9	42.1	62.0	
Incorrect (true)*	13.3	16.1	10.5	
Do not know	33.2	39.9	26.2	
Refuse to answer	1.6	1.9	1.3	
<i>Chi² Test: chi² = 68.46, p-value = 0.000, df = 3</i>				
D: Cross-question Consistency				t-test p-value
Interest & Inflation	73.4	68.3	78.6	0.000
All correct	44.8	35.0	55.1	0.000
None correct	10.5	11.5	9.4	0.165
At least 1 "do not know"	37.6	45.9	29.0	0.000
All "do not know"	8.1	8.2	8.0	0.874
# Observations	1,665	847	818	

Notes: Distribution of responses to financial literacy questions in the full sample and for female and male respondents. The correct answer is marked by an asterisk. Chi² test statistics are used for testing differences in the distribution of answers between men and women. T-tests are used for testing differences in the cross-question consistency between men and women. All figures are weighted and tests are performed on the weighted data.

questions. The t-test statistics for the summary measures also show a significant gender difference in financial literacy.

Results for the Netherlands are reported in Table 1b. The findings are rather similar to those from the United States. While the proportion of correct answers is a little higher in the Netherlands than in the United States, financial literacy is not widespread among the Dutch population either. About 73% of respondents correctly answer the interest rate and inflation questions, but less than half of respondents in the sample (45%) are able to correctly answer all three questions. Most important, the Dutch data as well show a gender gap in financial literacy. Women are less likely to correctly answer the financial literacy questions. Moreover, as in the

TABLE 1c
Summary Statistics from the 2009 German SAVE Survey (%)

A: Interest Rate Question	Full Sample (%)	Female (%)	Male (%)	
>€102*	82.4	81.1	83.8	
=€102	3.0	3.2	2.8	
<€102	3.7	3.4	4.0	
Do not know/ refuse to answer	11.0	12.4	9.4	
Chi ² Test: chi ² = 2.94, p-value = 0.4017, df= 3				
B: Inflation Question				
More	0.9	0.5	1.3	
Exactly the same	3.8	4.3	3.1	
Less*	78.4	74.1	83.2	
Do not know/ refuse to answer	17.0	21.0	12.4	
Chi ² Test: chi ² = 17.1, p-value = 0.001, df= 3				
C: Risk Diversification Question				
Correct (false)	61.8	56.8	67.6	
Incorrect (true)*	5.9	5.2	6.6	
Do not know/ refuse to answer	32.3	38.0	25.8	
Chi ² Test: chi ² = 18.25, p-value = 0.000, df= 2				
D: Cross-question Consistency			t-test p-value	
Interest & Inflation	71.9	68.1	76.3	0.004
All correct	53.2	47.5	59.6	0.000
None correct	10.3	11.5	8.9	0.184
At least 1 “do not know”/ refuse	37.0	43.3	29.9	0.000
All “do not know”/ refuse	8.4	9.7	6.9	0.110
# Observations	1,059	553	506	

Notes: Distribution of responses to financial literacy questions in the full sample and for female and male respondents. The correct answer is marked by an asterisk. Chi² test statistics are used for testing differences in the distribution of answers between men and women. T-tests are used for testing differences in the cross-question consistency between men and women. All figures are weighted and tests are performed on the weighted data.

United States, women in the Netherlands are much more likely to indicate that they do not know the answer to the questions. While 38% of men give at least one "do not know" response to the three questions, 46% of women answer with at least one "do not know." In the Netherlands the chi² and t-test show that the differences in financial literacy between men and women are statistically significant, with the exception of the answers to the interest rate question.

German respondents' answers to the three questions are displayed in Table 1c.⁷ Findings are very similar to those reported above. While

7. In the German case, it is not possible to differentiate between "do not know" and "refuse to answer" responses, but in comparable surveys where it is possible to differentiate, the proportion refusing to answer is very low.

about 70% of respondents correctly answer the interest rate and inflation questions, only about half of the sample answers all three questions correctly. Moreover, women perform significantly worse than men. Compared to male respondents, women are equally likely to give correct answers to the interest rate question but are significantly less likely to correctly answer the inflation and risk diversification questions (see χ^2 -tests in Table 1c). About 60% of male respondents correctly answer all questions, compared to 48% of female respondents. Again, we find that women are disproportionately more likely to indicate that they do not know the answer. About 30% of male respondents and more than 43% of female respondents have at least one “do not know” response.

Comparing the gender gap in financial literacy among the United States, the Netherlands, and Germany reveals a striking similarity across the three countries despite the different survey formats.⁸ In all three countries, women are disproportionately more likely than men to state that they do not know the answer to a financial literacy question, in particular when considering the risk diversification question.

Very similar differences in financial literacy between men and women have been found in the other countries that use the same three questions or a slight variation of these three questions (see Lusardi and Mitchell 2011b, 2014). In all of the countries considered, women are not only less likely to correctly answer the three financial literacy questions but they are also more likely to indicate that they do not know the answer to the financial literacy questions. Thus, we see a consistent and robust pattern of responses across countries.

The gender gap in financial literacy is also evident when using a larger set of questions (up to 16) that assess understanding of both simple and complex financial concepts among Dutch, American, and German respondents (see Van Rooij, Lusardi, and Alessie 2011; Lusardi and Mitchell 2009; and Bucher-Koenen 2011, respectively). Concepts covered include the understanding of compound interest, mortgage pricing, the link between interest rates and bond pricing, the functioning of the stock

8. When comparing results across countries, one has to keep in mind that the design of the surveys in the three countries was different: in the United States, a telephone interview was conducted; in the Netherlands, respondents completed an online questionnaire; and in Germany, the questionnaire was in paper-and-pencil format. Thus, the gender gap holds across survey formats. Note that the gender gap could be affected by the interview mode, if men and women respond differently to the way the interview is conducted. However, when comparing responses in face-to-face and web surveys, Revilla (2012) does not find any evidence of an interaction between gender and interview mode on the survey quality.

market, and mutual funds.⁹ Responses to this broader set of questions confirm the general prevalence of and the gender-specific differences in correct answers and “do not know” answers. For almost every question in this additional set, women are significantly more likely than men to indicate that they do not know the answer to the questions. Moreover, the proportion of “do not know” answers is quite high, in particular for complex questions. For example, in Germany (the Netherlands) more than 40% (27%) of women state that they do not know the answer to questions about the function of the stock market and 56% (30%) do not know the answer to questions about the workings of mutual funds. Thus, the pattern of responses we find for the three basic financial literacy questions mentioned above is replicated when considering a wider and more sophisticated set of questions.

Gender disparities in financial literacy are also found in studies that use different measures of financial literacy (see, e.g., Hogarth and Hilgert 2002). In addition, the gender gap in financial literacy does not seem to be domain specific. Lusardi and Tufano (2015) and Van Ooijen and Van Rooij (2016) investigate debt literacy and find large differences between men and women. Hung, Parker, and Yoong (2009) find that the gender disparity is persistent over time and across measurement methodologies.

Gender differences also appear in surveys that cover not only different measures of financial literacy but also specific subgroups of the population (e.g., Mandell (2004), and Agnew et al. (2008)). Mahdavi and Horton (2012) analyze the financial knowledge of alumnae from an elite female college in the United States and report that their financial literacy is low. In other words, even very well-educated women do not seem to be financially literate.

Interestingly, the gender difference at high levels of education holds true even among the young. For example, female respondents with a college degree are 13 percentage points less likely to give correct responses to the financial literacy questions than young males with a college degree (Lusardi, Mitchell, and Curto 2010). Similarly, large differences in financial literacy have been found between male and female high school and college students (see Goldsmith and Goldsmith 1997; Chen and Volpe 2002; Ford and Kent 2010).

Overall there is compelling and robust evidence of a gender gap in financial literacy across countries with different financial market development and institutional setup as well as different social and cultural contexts. The difference between women and men is strikingly similar across countries.

9. See Online Appendix, Annex 1.

Is the Gender Gap Real?

So far, we have considered differences in financial literacy between women and men. But do these differences hold up when we account for differences in demographic and economic characteristics between women and men? In Tables 2 and 3, we report a set of multivariate regressions using data from the United States, the Netherlands, and Germany.¹⁰ The variables included in the regressions are motivated by the theoretical models mentioned earlier. In Table 2 the dependent variable is a dummy variable equal to 1 for respondents who answered all three financial literacy questions correctly. In Table 3 the dependent variable is a dummy equal to 1 if a respondent has at least one “do not know” response. These regressions are meant as an additional set of descriptive statistics to check whether the gender differences in financial literacy are driven by other differences between men and women, such as income or education. Therefore, we add controls in blocks of variables and observe what happens to the gender effect.¹¹

In each regression, we add a female dummy and, additionally, a set of controls that could account for the gender gap in financial literacy.¹² We first note that the largest gender gap is in the Netherlands: Dutch women are 20 percentage points less likely than Dutch men to answer all three financial literacy questions correctly. American women are about 16 percentage points less likely than American men to give three correct answers, while German women are 12 percentage points less likely than German men to give correct answers to all three questions. In specification 2, we add information on marital status, and in specification 3, we also add information on age. The gender gap decreases only slightly when controlling for these variables. In specification 4, we add education dummies. Finally, we add income dummies. Controlling for these demographic characteristics hardly changes the estimates for the gender gap. American women are still about 14 percentage points less likely to give three correct answers. In the

10. We are not using an Oaxaca-Blinder decomposition because, when running separate regressions for men and women, we did not reject equality of the coefficient estimates. Therefore no decomposition is called for.

11. The tables show the results from linear regressions. In addition, we perform probit regressions and calculate average marginal effects, but we do not find substantial differences. These estimates are available in the Online Appendix, Annex 2. Alternatively, we used the number of correct answers (from 0 to 3) as dependent variable and estimated ordinary least squares and ordered probit models. Results are also presented in the Online Appendix, Annex 3 and 4. Qualitatively our results do not change in these specifications.

12. We only report the gender effect in the tables. The full set of coefficients is reported in the Online Appendix, Annex 5 and 6.

TABLE 2

Linear Probability Model: Dependent Variable "All Correct"

	(1)	(2)	(3)	(4)	(5)
Panel A: US National Financial Capability Study					
Female	-0.158*** (0.0247)	-0.146*** (0.0242)	-0.145*** (0.0240)	-0.152*** (0.0228)	-0.138*** (0.0228)
Marital Status		×	×	×	×
Age			×	×	×
Education				×	×
Income					×
N	1,488	1,488	1,488	1,488	1,488
R ²	0.03	0.065	0.086	0.166	0.187
Panel B: Dutch DNB Panel					
Female	-0.201*** (0.0294)	-0.199*** (0.0294)	-0.204*** (0.0298)	-0.197*** (0.0290)	-0.116*** (0.0342)
Marital Status		×	×	×	×
Age			×	×	×
Education				×	×
Income					×
N	1,665	1,665	1,665	1,665	1,665
R ²	0.041	0.042	0.051	0.098	0.126
Panel C: German SAVE Survey					
Female	-0.115*** (0.031)	-0.096*** (0.031)	-0.116*** (0.032)	-0.059* (0.032)	-0.066** (0.031)
Marital Status		×	×	×	×
Age			×	×	×
Education				×	×
Income					×
N	1,059	1,059	1,059	1,059	1,059
R ²	0.013	0.027	0.037	0.11	0.141

Notes: This table shows the results from different linear regressions performed on the different data sets. Panel A displays results from the US National Financial Capability Study, panel B from the Dutch DNB Panel, and panel C from the German SAVE survey. The dependent variable in all regressions is the proportion of respondent answering the three financial literacy questions correctly. The coefficient, standard error, and significance level are shown only for the control variable female—our main variable of interest. Other control variables are added consecutively—× indicates that the respective controls are included. These control variables are marital status, age group dummies, education dummies, and dummies for income levels. *N* refers to the number of observations. Significance levels: * significant at 10%; ** significant at 5%; *** significant at 1%.

Netherlands the gender gap reduces by about 9 percentage points. Income differences between men and women seem responsible for about half of the gender gap among Dutch respondents. In Germany the gender gap reduces to half of the original difference mainly as a result of accounting for differences in education levels between men and women. All in all, while marital status, age, education, and income can explain part of the gender gap in financial literacy, they do not explain it fully. Even after controlling

TABLE 3
Linear Probability Model: Dependent Variable “At Least One ‘Do Not Know’ Response”

	(1)	(2)	(3)	(4)	(5)
Panel A: US National Financial Capability Study					
Female	0.156*** (0.0272)	0.140*** (0.0271)	0.139*** (0.0268)	0.146*** (0.0259)	0.131*** (0.0261)
Marital Status		×	×	×	×
Age			×	×	×
Education				×	×
Income					×
N	1,488	1,488	1,488	1,488	1,488
R ²	0.025	0.054	0.073	0.137	0.154
Panel B: Dutch DNB Panel					
Female	0.168*** (0.0296)	0.162*** (0.0297)	0.168*** (0.0301)	0.163*** (0.0297)	0.0975*** (0.0342)
Marital Status		×	×	×	×
Age			×	×	×
Education				×	×
Income					×
N	1,665	1,665	1,665	1,665	1,665
R ²	0.03	0.033	0.038	0.065	0.089
Panel C: German SAVE Survey					
Female	0.128*** (0.029)	0.106*** (0.030)	0.121*** (0.030)	0.074** (0.030)	0.081*** (0.030)
Marital Status		×	×	×	×
Age			×	×	×
Education				×	×
Income					×
N	1,059	1,059	1,059	1,059	1,059
R ²	0.018	0.039	0.047	0.099	0.131

Notes: This table shows the results from different linear regressions performed on the different data sets. Panel A displays results from the US National Financial Capability Study, panel B from the Dutch DNB Panel, and panel C from the German SAVE survey. The dependent variable in all regressions is the proportion of respondent answering with “do not know” at least once. The coefficient, standard error, and significance level are shown only for the control variable female—our main variable of interest. Other control variables are added consecutively—× indicates that the respective controls are included. These control variables are marital status, age group dummies, education dummies, and dummies for income levels. *N* refers to the number of observations. Significance levels: * significant at 10%; ** significant at 5%; *** significant at 1%.

for demographic and economic characteristics, women are less likely to answer all three financial literacy questions correctly in all three countries. We report similar findings when turning to the probability of respondents answering at least one question with “do not know” (Table 3). Without taking account of covariates, women in all three countries are between 13 and 17 percentage points more likely to reply with at least one “do not know.” After considering the same covariates as before, the gender gap

diminishes but remains statistically significant. Across countries and even after accounting for economic and demographic characteristics, women are much more likely to state that they do not know the answer to the financial literacy questions.

These results are in line with the findings of Fonseca et al. (2012). Thus, even though the gender gap can be partly explained by differences in socioeconomic characteristics between men and women and potential differences in the costs and benefits of acquiring financial knowledge, a large difference remains unexplained.

ZOOMING IN ON FINANCIAL LITERACY

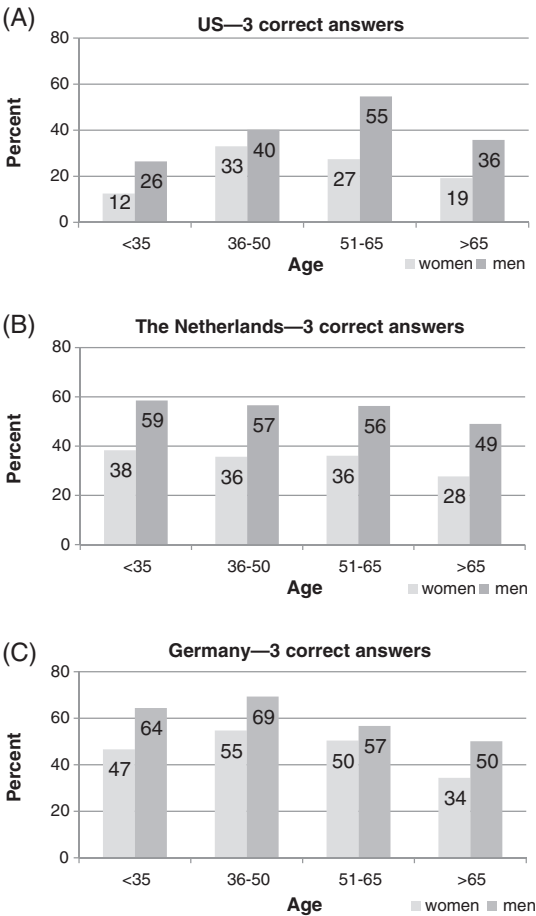
The Gender Gap Across Age

Having established that the gender gap in financial literacy is large across countries and does not go away even after we account for many demographic and economic characteristics, we turn next to examining the gap more closely and studying specific subgroups of the population to gain additional insight.

We first investigate financial literacy across different age groups. Women, especially older women, may be less financially literate than men because of traditional societal roles. Older generations of women are more likely to have stayed home to care for children and less likely to have engaged in the workforce where they might have dealt with financial decisions or to have discussed finances with colleagues, family, and friends. Today's younger generations of women are more likely to participate in the labor market, to be educated (e.g., to have a college degree), and to move away from traditional societal roles. By examining data from three countries, we can determine whether similarities in financial literacy hold true across countries with different institutional frameworks and different economic, sociological, and cultural backgrounds.

In Figure 1A–C, we compare performance on the financial literacy questions of female and male respondents in different age groups. In general the age pattern of responses to the financial literacy questions for both men and women is in line with other studies that have argued that financial expertise shows a reverse U-shaped pattern over age (see Agarwal et al. 2009). In the United States, the Netherlands, and Germany, financial literacy is rather low among the young but is lower among young women than young men. Thus, gender differences in financial literacy are present from the start of the life cycle in all three countries. While we cannot infer cohort patterns from a single cross-section, a look across the surveyed age groups suggests that gender differences in financial literacy continue to be

FIGURE 1
Financial Literacy by Age for Men and Women in the US National Financial Capability Study (Panel A), in the Dutch DHS (Panel B), and in the German SAVE (Panel C)



Notes: In this graph we display the proportion of respondents who answer all three financial literacy questions correctly by age and gender for the United States, the Netherlands, and Germany. The number of observations for the US is 768 women, 720 men; for the Netherlands is 847 women, 818 men; and for Germany is 553 women, 506 men. All figures are weighted.

pervasive among today’s young people. This is worrisome because young people have to make many important financial decisions—from whether and how much to invest in education to dealing with credit cards and other debt to contributing to retirement accounts—and women seem less equipped than men to effectively do so.

Other surveys find similar results. For example, Lusardi, Mitchell, and Curto (2010) document a gender difference in financial literacy among

young adults (age 23–28) in the United States. Similarly, Lusardi, Mitchell, and Curto (2014) find that among American respondents over age 50, women know substantially less than men about complex aspects of investment and finance, and they perform less well on complex calculations. Because older women are more inclined to reply that they do not know the answer to the financial literacy questions, they are more likely to be classified among those with low literacy. Moreover, Woodyard and Robb (2012) find large gender differences in objective financial knowledge based on responses to five financial literacy questions in the 2009 NFCS, in particular for younger and older respondents.

Financial Decision Making within the Household

Several papers make a compelling case that differences in financial literacy emerge due to specialization within the household, where men traditionally make the majority of household financial decisions (Hsu 2011; Fonseca et al. 2012). Thus, women in a (heterosexual) partnership (married or living with a partner) may accumulate less financial knowledge than men. Yet, because women tend to outlive men, there is an incentive for women to acquire financial knowledge when they become widowed. In Table 4 we present level of financial literacy by marital status. Because of the rich data in the three countries under consideration, we can also consider respondents' decision-making role within the household.

What we find is that married women exhibit lower levels of financial literacy than married men, a result that holds true across countries. However, gender differences are large even for respondents who have experienced a marital breakup (those who are divorced or widowed).¹³ Moreover, widows show very low levels of financial literacy across all countries. There is a gender gap in financial literacy even between single men and single women. In the United States, in particular, single women display very low levels of financial literacy. The regression results presented in the previous section point in a similar direction; the financial literacy gender gap remains almost unchanged in all three countries when taking marital status into account (see column 2 in Table 2). In other words, this variable alone is not able to explain the size of the gender gap we see in the data.

Marital status may, however, be an imperfect proxy for identifying the decision maker in the household. In all our data sets we are able to identify who the financial decision maker in the household is. Moreover, we can analyze the relationship between gender and financial decision-making

13. We note that the number of observations in these subgroups is small.

TABLE 4
Distribution of Responses to Financial Literacy Questions by Marital Status Among Women and Men

Women			Men		
Marital status (relative frequency)	All correct (%)	At least 1 “do not know” (%)	Marital status (relative frequency)	All correct (%)	At least 1 “do not know” (%)
Panel A: US National Financial Capability Study					
Married (51.1%)	27.7	41.6	Married (58.9%)	47.7	27.8
Single (25.7%)	13.4	57.4	Single (25.6%)	23.5	43.1
Divorced (12.2%)	24.4	58.0	Divorced (11.0%)	29.6	40.7
Widowed (11.0%)	17.1	62.3	Widowed (4.6%)	21.4	54.1
<i>N</i>	768			720	
Panel B: Dutch DNB Panel					
Married (67.9%)	35.2	43.5	Married (77.9%)	56.7	28.5
Single (14.0%)	43.8	48.2	Single (15.6%)	53.7	33.9
Divorced (10.7%)	21.6	57.3	Divorced (3.7%)	56.1	36.1
Widowed (7.3%)	25.6	48.0	Widowed (2.8%)	61.5	32.5
<i>N</i>	656			685	
Panel C: German SAVE Survey					
Married (55.5%)	51.6	40.0	Married (59.3%)	60.6	28.0
Single (14.9%)	47.4	40.7	Single (26.1%)	62.2	28.1
Divorced (15.4%)	49.9	38.0	Divorced (9.2%)	52.6	38.8
Widowed (14.2%)	28.7	64.5	Widowed (5.4%)	48.8	44.4
<i>N</i>	553			506	

Notes: In this table we display the answers to the financial literacy questions—specifically whether a respondent answered three questions correctly or responded “do not know” at least once—conditional on marital status by gender. *N* refers to the number of observations. All figures are weighted.

roles. We identify four groups of decision makers: (i) “Sole decision maker with partner,” i.e., decision makers who live with a partner but individually decide about financial issues; (ii) “sole decision maker without partner,” i.e., singles and widows; (iii) respondents who claim that their “partner makes most financial decisions”; and (iv) “joint decision makers.”¹⁴ Our results indicate that female sole decision makers without a partner have lower levels of financial literacy than do male sole decision makers without a partner (Table 5). Female respondents who decide jointly with their partner also know significantly less than respective male respondents.¹⁵

14. In the German case this can be jointly with a person outside the household.
15. There are no significant gender disparities for individuals who are sole decision makers and live with a partner or between men and women claiming that their partner makes the decisions. We must note, however, that these groups are small, so inferences are tentative.

TABLE 5

Distribution of Responses to Financial Literacy Questions by Financial Decision Maker Among Women and Men

Women			Men		
Financial decision maker (relative frequency)	All correct (%)	At least 1 "do not know" (%)	Financial decision maker (relative frequency)	All correct (%)	At least 1 "do not know" (%)
Panel A: US National Financial Capability Study					
Sole with partner (32.5%)	20.8	47.0	Sole with partner (49.0%)	52.3	23.1
Sole w/o partner (1.6%)	34.7	45.4	Sole w/o partner (2.3%)	47.0	11.1
Partner decides (20.7%)	19.6	44.9	Partner decides (13.1%)	34.4	44.0
Joint decisions (44.4%)	32.9	38.9	Joint decisions (34.9%)	43.6	28.5
<i>N</i>	436		<i>N</i>	464	
Panel B: Dutch DNB Panel					
Sole with partner (8.4%)	21.5	63.9	Sole with partner (16.5%)	65.0	23.3
Sole w/o partner (34.1%)	37.3	47.7	Sole w/o partner (22.6%)	55.5	33.7
Partner decides (10.2%)	40.8	38.3	Partner decides (8.0%)	26.0	48.4
Joint decisions (47.3%)	35.4	44.8	Joint decisions (52.9%)	54.9	28.6
<i>N</i>	662		<i>N</i>	656	
Panel C: German SAVE Survey					
Sole with partner (5.9%)	53.8	29.4	Sole with partner (6.5%)	67.8	25.2
Sole w/o partner (39.1%)	40.4	50.4	Sole w/o partner (36.1%)	54.5	35.3
Partner decides (2.6%)	57.1	30.1	Partner decides (2.8%)	54.2	25.5
Joint decisions (52.4%)	51.6	40.2	Joint decisions (54.6%)	62.4	27.2
<i>N</i>	553		<i>N</i>	506	

Notes: In this table we display the answers to the financial literacy questions—specifically whether a respondent answered three questions correctly or responded “do not know” at least once—conditional on who is the financial decision maker by gender. *N* refers to the number of observations. All figures are weighted.

Thus, even when they are the decision maker, women display lower financial knowledge than male decision makers. Overall, we find it worrisome that women who have to decide by themselves, i.e., single women and widows, show such low levels of financial literacy.

Gender Differences in Financial Literacy between East and West Germany

The results in the previous section do not provide support to the specialization within the household hypothesis to fully explain the gender difference in financial literacy. An alternative reason for the gender differences might be that women and men acquire knowledge in very different ways. The German SAVE allows us to shed more light on gender differences and the channels through which financial literacy may be

acquired by investigating gender differences in financial literacy between East (former German Democratic Republic) and West Germany. Individuals in these two regions were exposed to different financial markets and institutions before German unification. Thus, we can study the size of the gender gap in financial knowledge in East and West Germany 25 years after unification and assess how well respondents living in the East perform on financial literacy questions compared to those living in the West. This comparison may provide insight into the roots of the gender differences we have documented so far.¹⁶

Women (men) in the West are significantly more likely to answer all three financial literacy questions correctly compared to women (men) in the East (Bucher-Koenen and Lusardi 2011). Thus, many years after German unification, there is still a significant gap in financial knowledge between respondents from East and West Germany. Interestingly, there is a strong gender difference among respondents in the West but no significant gender difference among respondents living in East Germany. This tells us that history and experience can be at the root of learning, a fact confirmed in other studies. Lusardi and Mitchell (2011a) find, e.g., that American respondents who have been exposed to inflationary episodes are more likely to know about inflation.

One reason that has been put forward to explain the lack of gender differences in the East is that women's labor market participation is higher in East Germany than in West Germany. However, the gender disparity in the West remains significant even after controlling for income, education, and labor market status in a multivariate regression, whereas the gender difference in the East remains insignificant.

Klapper and Panos (2011) and Beckmann (2013) report no pronounced gender difference in the proportion of correct responses to the financial literacy questions in Russia and Romania, two other former socialist countries, respectively. The lack of gender difference in financial literacy may be related to the fact that former socialist societies were much more egalitarian with respect to gender roles. On the other hand, the findings in East Germany, Romania, and Russia could be interpreted as *prima facie* evidence that as financial markets develop, women are left behind in terms of financial knowledge. If this is the case, the financial market development of recent years may lead to the emergence of a gender gap in these societies

16. See Bucher-Koenen and Lamla (2014) for further discussions of how the exposure to the socialist system in East Germany has shaped the differences in financial literacy between East and West Germans.

as well. However, more research is necessary to understand how and under what circumstances men and women acquire financial knowledge.

ARE WOMEN AWARE OF THEIR LACK OF KNOWLEDGE?

In addition to providing information about actual levels of financial literacy, all three surveys offer information about self-assessed financial literacy. It is thus possible to evaluate not just how much people actually know but also how much they *think* they know. Most important for this paper, it is possible to evaluate whether there is a mismatch between actual and perceived knowledge and if it is different for women and men.

In all three surveys, respondents were asked the following question: “*On a scale from 1 to 7, where 1 means very low and 7 means very high, how would you assess your overall financial knowledge?*”

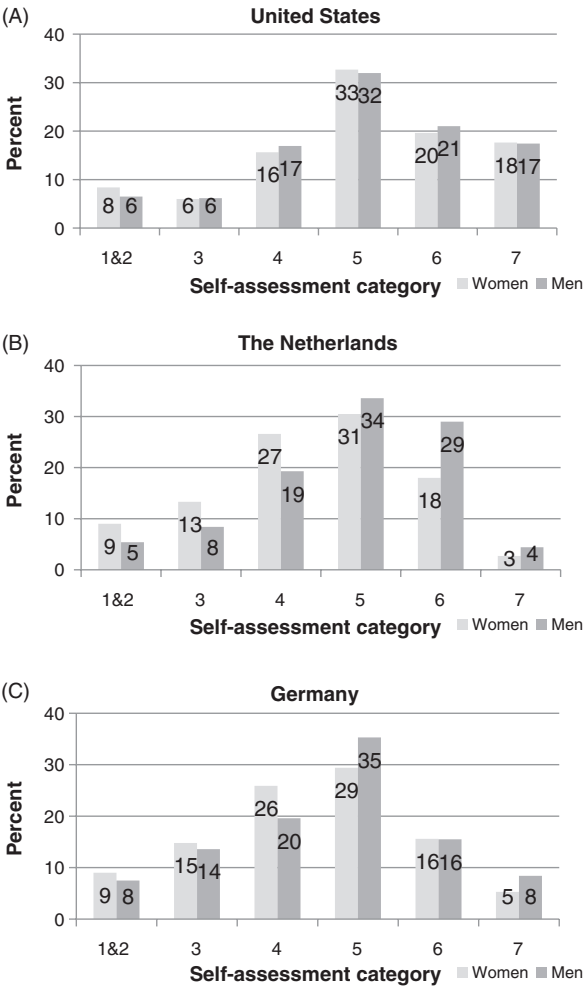
Figure 2A–C shows the self-assessed literacy for men and women in the American, Dutch, and German samples, respectively.

While many American respondents fare rather poorly on the three financial literacy questions, results shown in Figure 2A indicate that a high proportion of American respondents gave themselves high self-assessment scores. Around two-fifths (38%) of respondents award themselves top scores (6 and 7), and only 13% give themselves very low scores (1, 2, or 3). Overall, about 70% of respondents indicate that their knowledge exceeds the median score (4), a figure that is surprising given the actual number of correct responses to the financial literacy questions. We have seen that women—based on the three knowledge questions—are less financially literate than men. The differences in self-assessed financial literacy between women and men are relatively small and not significant.

Dutch respondents are somewhat less confident about their financial knowledge than American respondents (see Figure 2B). On average, about 27% of the Dutch assess themselves as knowledgeable about financial issues (6 or 7), and 18% evaluate themselves as being at the bottom of the scale (1, 2, or 3). But even in the Netherlands, about 60% of respondents consider their knowledge to be above median (a score of 4). But, relevant to our analysis, female respondents give themselves lower scores than men. Thus, many Dutch women seem to be aware of their lack of knowledge.

German respondents rate themselves even more conservatively than respondents from the Netherlands and the United States (See Figure 2C). Only a little more than 22% assess themselves as being very knowledgeable (6 or 7); roughly the same percentage (23%) rate themselves as not knowledgeable (1, 2, or 3). Overall, only slightly more than half of the respondents (54%) evaluate themselves as having an above-median

FIGURE 2
Self-reported Financial Literacy for Men and Women in the US National Financial Capability Study (Panel A), in the Dutch DHS (Panel B), and in the German SAVE (Panel C)



Notes: Distribution of answers to the self-assessment question: “On a scale from 1 to 7, where 1 means very low and 7 means very high, how would you assess your overall financial knowledge?” The number of observations for the US is 1,481 (763 women, 718 men); for the Netherlands is 1,614 (826 women, 788 men); and for Germany is 1,059 (553 women, 506 men). All figures are weighted.

score (4). Similar to Dutch women, German women rate themselves more conservatively than men.

We also compare actual and subjective financial literacy between men and women. Specifically, we evaluate the percentage of individuals among

each self-rated category who are able to correctly answer the three financial literacy questions and the percentage of those with at least one “do not know” response.¹⁷ We find a rather strong correlation between actual and self-assessed financial knowledge for both men and women in all three countries. Interestingly, the percentage of women who correctly answer all three questions and give themselves high scores (6 or 7) is not very high, while a relatively high proportion of women who answer with at least one “do not know” give themselves high scores. This may indicate that “do not know” responses reflect not lack of knowledge but difficulty in articulating the answer to a specific question and/or lack of confidence in the answer.

Overall we have a consistent set of findings on gender differences in financial literacy in the three countries. Female respondents are less likely to respond correctly and more likely to state that they do not know the answer to a financial literacy question. Additionally, when asked to assess their financial knowledge, women assign themselves lower scores than men.

SEEKING FINANCIAL ADVICE

Having established that a gender gap exists in financial literacy, and in more than one country, the important question is whether this gap matters for financial decision making. One way to overcome lack of financial knowledge is to seek financial advice. If women recognize their lack of knowledge, as discussed in the previous section, one way to potentially compensate for lack of knowledge would be to rely on professional financial advisers when making financial decisions. However, several studies show that women are much less likely to ask for advice (see Loibl and Hira 2006) and are less likely to use online resources as a source of information (Loibl and Hira 2011).

We present evidence on sources of financial advice among Dutch and German respondents in Table 6.¹⁸ First, we note that only a small proportion of the population rely on professional advice. Professional financial advisers are the main source of financial information for about 25% of Dutch respondents. More than half of respondents get their information mainly from the Internet, newspapers, magazines, and other written sources, and about 23% consult family and friends. However, women are

17. See Online Appendix, Annex 7.

18. Questions on professional advice are asked differently in the United States and are not directly comparable.

TABLE 6
Financial Advice by Gender and Financial Literacy

	No Personal Advice (%)	Formal Advice from Professionals (%)	Informal Advice from Family and Friends (%)
Panel A: Dutch DNB Panel			
All (<i>N</i> = 1,392)	52.2	23.1	24.7
By Gender			
Women (<i>N</i> = 694)	46.6	23.4	29.9
Men (<i>N</i> = 698)	57.8	22.8	19.4
By Financial Literacy			
All correct (<i>N</i> = 631)	55.3	25.9	18.9
At least one “do not know” (<i>N</i> = 526)	47.1	21.1	31.8
Panel B: German SAVE survey			
All (<i>N</i> = 1,059)	33.5	33.1	48.8
By Gender			
Women (<i>N</i> = 553)	30.3	31.4	53.0
Men (<i>N</i> = 506)	37.2	35.0	44.0
By Financial Literacy			
All correct (<i>N</i> = 560)	26.5	40.1	55.1
At least one “do not know” (<i>N</i> = 391)	43.2	23.4	41.1

Notes: In this table we display the probability of seeking formal or informal advice by gender and financial literacy level. The numbers do not add to 100% because individuals can get both formal and informal advice at the same time. *N* refers to the number of observations. All figures are weighted.

much more likely than men to report family and friends as their main source of information (30% vs. 19%). Men and women are almost equally likely to rely on a financial professional. If we look at sources of financial information across levels of financial literacy among Dutch respondents, we find that those with high financial literacy, i.e., those able to correctly answer the three financial literacy questions, are more likely to consult professional financial advisers (26%) than are respondents with low financial literacy (21%). Those with low levels of literacy are much more likely to rely on family and friends as their main source of financial information (32% vs. 20%). This finding supports work that shows that financial literacy and financial advice are complements rather than substitutes (Tennyson 2011; Hackethal, Haliassos, and Jappelli 2012; Collins 2012; Bucher-Koenen and Koenen 2015).

Among German respondents, about one-third state that they do not consult anyone when making financial decisions, another third consult professional advisers, and around 50% talk to family, friends, or colleagues

about their finances (Table 6; Panel B).¹⁹ Looking at sources of financial advice by gender, we find that women are much more likely than men to consult informal sources of advice (53% vs. 44%), while men are slightly more likely to consult professional advisers (31% vs. 35%). If we split the sample by financial literacy level instead of gender, the difference becomes more pronounced. About 43% of respondents with low levels of financial literacy do not talk to anyone about their finances. This fraction is much lower among those with high levels of financial literacy (26%). In turn, those with high levels of financial literacy are much more likely to consult professional advisers (40%), whereas only 23% of those with low literacy rely on the services of professionals.

One of the reasons why women, who have lower financial literacy than men, are less likely to consult professional advisers is because they may have difficulty judging the quality of the advice they receive. In an audit study of financial advice, Mullainathan, Nöth, and Schoar (2012) found that young female investors received lower quality advice than young male investors. This is in line with the theoretical and empirical work by Bucher-Koenen and Koenen (2015).

Overall, there is little evidence that women with low financial literacy are more likely to consult professionals when making financial decisions in order to compensate for their lack of knowledge. On the contrary, women and those with low financial literacy are less likely to turn to financial advisers. This strategy may be rational because women seem to be more likely to receive low-quality advice. Unfortunately, if low financial literacy and lack of financial advice feed into each other, women may not acquire the skills or receive the support necessary to make sound financial decisions.

CONCLUDING REMARKS AND DIRECTIONS FOR FUTURE RESEARCH

In this paper, we considered evidence from both new and existing studies to compare the levels of financial literacy between women and men. Our analysis of financial literacy in different countries and in different population subgroups has shown that financial illiteracy is severe among women.

Particularly worrisome is that financial illiteracy is so widespread among single women and widows. Moreover, the gender gap in financial

19. Note that the findings from Germany may not be strictly comparable to those from the Dutch DHS because the question was asked in a rather different way. Results do not add up to 100% because respondents can consult both formal and informal sources of advice at the same time.

literacy is still present among the young despite their high education level and labor force participation.

This has far-reaching consequences, because financial literacy can be linked to important financial decisions. Those who are more financially literate are more likely to invest in the stock market and pay attention to fees, and to borrow at low costs.²⁰ They are also much more likely to plan for retirement and accumulate retirement wealth (see, e.g., Bucher-Koenen and Lusardi 2011; Lusardi and Mitchell 2008, 2011c; Van Rooij, Lusardi, and Alessie 2012). The shift from defined benefit to defined contribution systems may have major consequences for women because of their lower levels of financial knowledge in addition to lower incomes during their working lives, interrupted employment histories, and longer life expectancies (Jefferson 2009). With pension reforms shifting responsibility to save from state pensions to occupational and private pensions, the link between labor market status and retirement income will become even stronger, potentially widening the gender gap in retirement income. Moreover, women are very likely to spend at least part of their retirement as widows. Sevak, Weir, and Willis (2003/2004) report evidence that elderly women in the United States have a high likelihood of becoming poor. Biro (2011) confirms the pattern for Europe.

In addition, the evidence suggests that it is particularly difficult for women to obtain independent, high-quality advice. Therefore, enhancing the financial knowledge of women and equipping them with the tools to make sound financial decisions should be a top priority for policymakers.

While more research is needed to understand the sources of gender differences in financial literacy, the good news is that many women recognize their lack of knowledge, as indicated by their tendency to rate themselves low on a personal financial knowledge scale. This awareness makes them an ideal target for financial education programs. Previous research has shown that financial education programs seem to be particularly successful for women. For example, Clark et al. (2006) provide evidence that women are more likely than men to change their behavior after attending a seminar on retirement goals and saving behavior. Specifically, they are more likely to increase their retirement age and adjust their saving behavior. Lusardi, Keller, and Keller (2008) show that financial education programs can be rather effective for women. Focus groups and in-depth interviews with women reveal that women would like such programs to be offered. In view of the gender differences found in the research, an effective way

20. See Bucher-Koenen et al. (2014) for an extensive discussion of the relation between gender, financial literacy, and financial decision making.

forward for financial education programs is to target women and men separately and to offer programs that recognize the differences between women and men in terms of both financial knowledge and financial behavior.

An important avenue for future research is understanding to what extent gender differences in financial literacy are already present at an early stage in life or at what point they develop and what type of policy interventions are successful at increasing financial literacy of girls. While there are not many studies paying attention to gender differences in financial education among the young, the experiment by Lührmann, Serra-Garcia, and Winter (2015) is an exception. They document marked gender differences in financial knowledge and behavior among German teenagers. Most important, these young students (13–15 years old) were exposed to a program to improve financial literacy. This intervention was successful in raising interest, financial knowledge, and changing behavior. Interestingly, no differential impact was found among boys and girls on financial interest and knowledge. Moreover, the positive impact on self-assessed financial knowledge was found to be smaller for girls than for boys, a finding that the authors relate to self-confidence.

A gender effect of financial education among the young is found by Becchetti, Caiazza, and Coviello (2013). They run a randomized 16-hour financial education treatment in 36 Italian secondary schools. Financial literacy improved both in the control and in the treatment group, perhaps due to a learning effect by participating in the ex-ante survey. While there is no evidence of the effect of course treatment among the whole group of students, a positive effect is found among students with ex-ante lower levels of financial literacy, among them female students and students with lower grades in math and Italian. While it is encouraging to see evidence indicating that financial education programs may achieve convergence in financial literacy levels among men and women, more research is needed to understand the effectiveness of financial education programs in school.

Future research agendas may explore alternative and novel explanations for the existence of gender gaps in financial knowledge. For instance, Boggio et al. (2014) suggest that language can be a barrier to the acquisition of financial knowledge. They argue that communication in finance uses words and metaphors from more typically masculine domains (war, physical activity, gaming, and farming). This type of research could lead to the development of financial education programs that use language that is more familiar to women. Future research could investigate the effectiveness of financial education programs that use more feminine versus masculine communication. While this is just one example of how to go

forward, we believe that the development of gender-specific approaches to financial education is still in its infancy but offers much promise.

SUPPORTING INFORMATION

Additional supporting information may be found in the online version of this article:

Appendix S1. Online Appendix

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