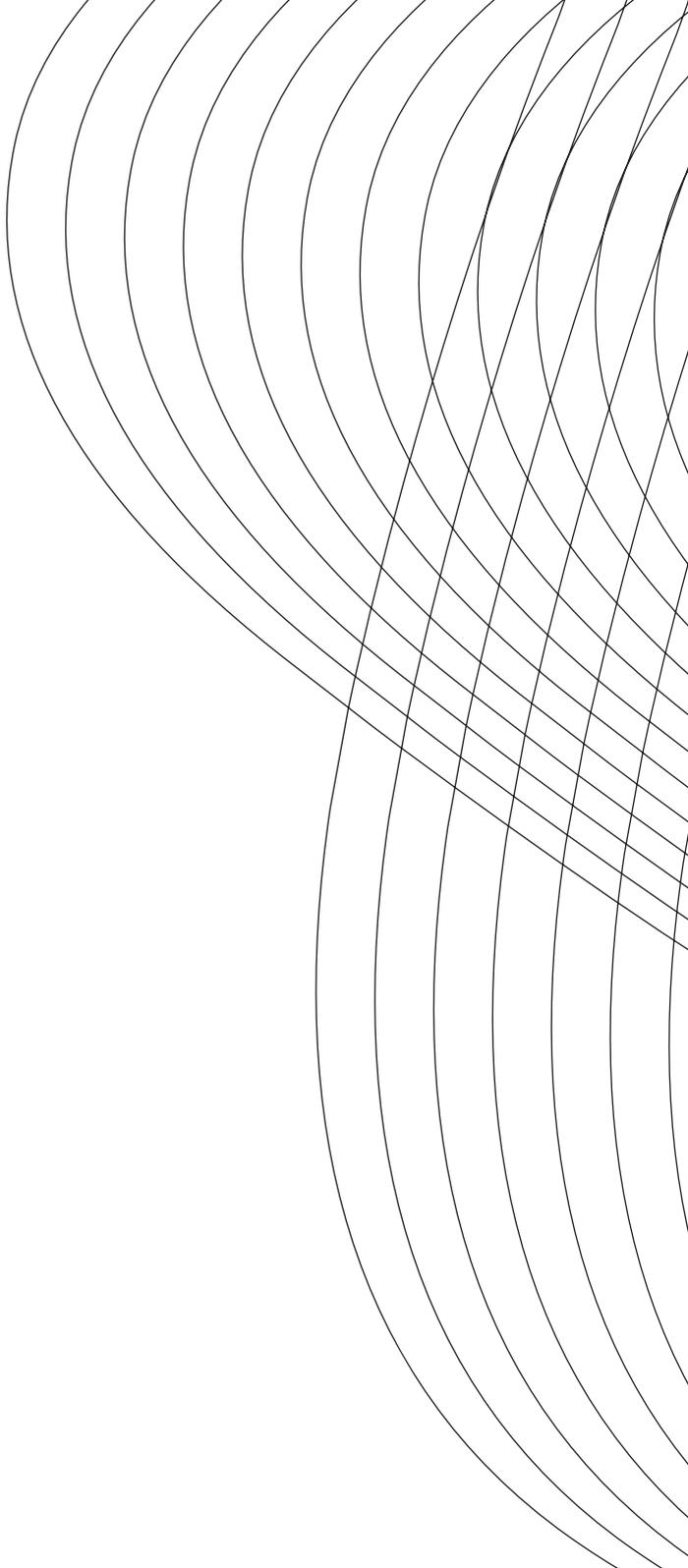
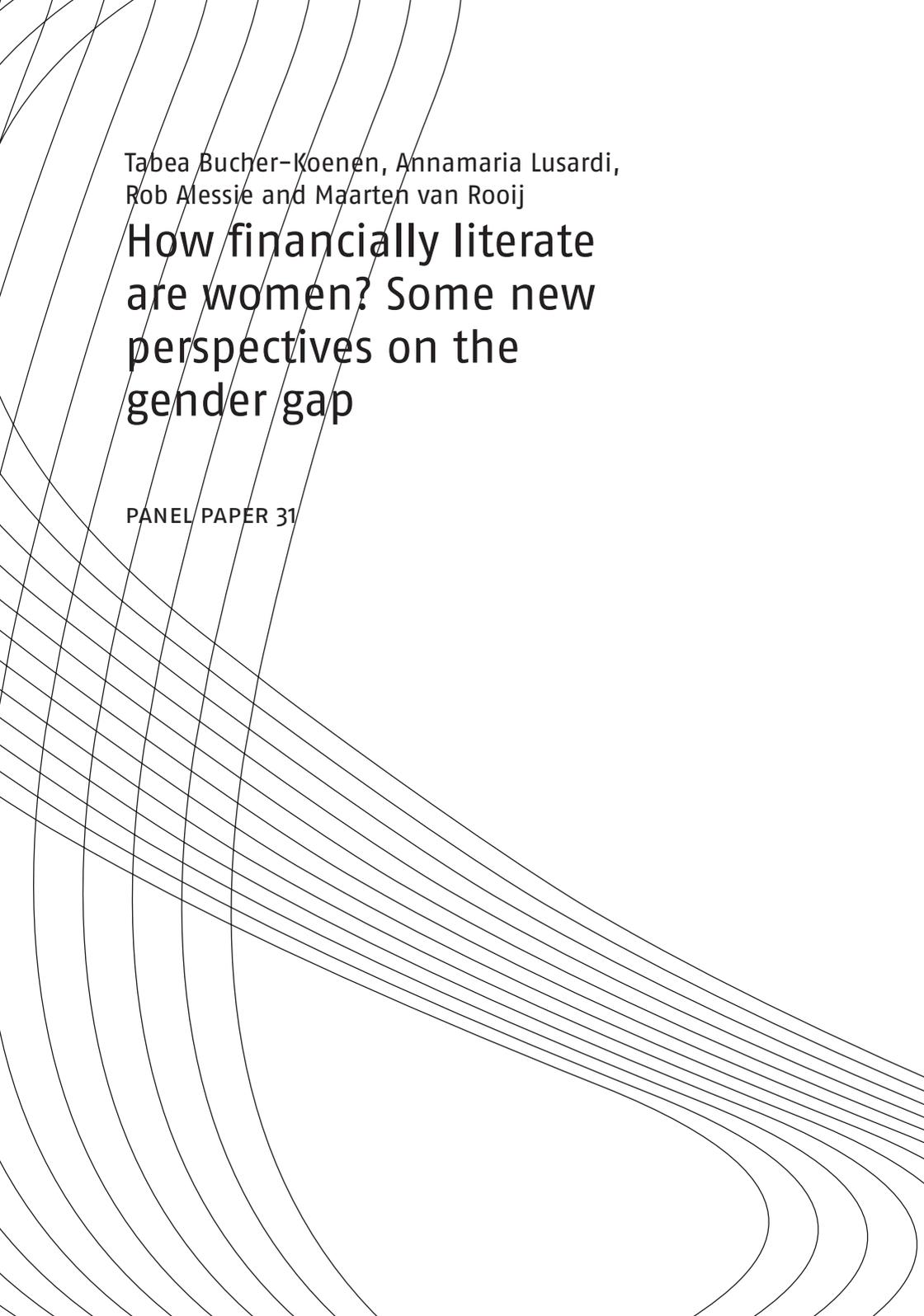


Netspar PANEL PAPERS

*Tabea Bucher-Koenen, Annamaria Lusardi,
Rob Alessie, and Maarten van Rooij*

How financially literate
are women? Some new
perspectives on the
gender gap



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Tabea Bucher-Koenen, Annamaria Lusardi,
Rob Alessie and Maarten van Rooij

How financially literate are women? Some new perspectives on the gender gap

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PREFACE

Netspar stimulates debate and fundamental research in the field of pensions, aging and retirement. The aging of the population is front-page news, as many baby boomers are now moving into retirement. More generally, people live longer and in better health while at the same time families choose to have fewer children. Although the aging of the population often gets negative attention, with bleak pictures painted of the doubling of the ratio of the number of people aged 65 and older to the number of the working population during the next decades, it must, at the same time, be a boon to society that so many people are living longer and healthier lives. Can the falling number of working young afford to pay the pensions for a growing number of pensioners? Do people have to work a longer working week and postpone retirement? Or should the pensions be cut or the premiums paid by the working population be raised to afford social security for a growing group of pensioners? Should people be encouraged to take more responsibility for their own pension? What is the changing role of employers associations and trade unions in the organization of pensions? Can and are people prepared to undertake investment for their own pension, or are they happy to leave this to the pension funds? Who takes responsibility for the pension funds? How can a transparent and level playing field for pension funds and insurance companies be ensured? How should an acceptable trade-off be struck between social goals such as solidarity between young and old, or rich and poor, and

individual freedom? But most important of all: how can the benefits of living longer and healthier be harnessed for a happier and more prosperous society?

The Netspar Panel Papers aim to meet the demand for understanding the ever-expanding academic literature on the consequences of aging populations. They also aim to help give a better scientific underpinning of policy advice. They attempt to provide a survey of the latest and most relevant research, try to explain this in a non-technical manner and outline the implications for policy questions faced by Netspar's partners. Let there be no mistake. In many ways, formulating such a position paper is a tougher task than writing an academic paper or an op-ed piece. The authors have benefitted from the comments of the Editorial Board on various drafts and also from the discussions during the presentation of their paper at a Netspar Panel Meeting.

I hope the result helps reaching Netspar's aim to stimulate social innovation in addressing the challenges and opportunities raised by aging in an efficient and equitable manner and in an international setting.

Roel Beetsma

Chairman of the Netspar Editorial Board

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HOW FINANCIALLY LITERATE ARE WOMEN? SOME NEW PERSPECTIVES ON THE GENDER GAP

Policy Recommendations

Levels of financial literacy are modest in many developed countries. One group that shows consistently low levels of financial literacy across countries is women. Because of lower income earned during their working lives, interrupted employment histories, and longer life expectancies, women are at risk of having inadequate retirement resources. Moreover, women are very likely to spend at least part of their retirement years as widows. Financial literacy has been linked to better retirement planning, higher wealth accumulation, and savvier financial decision-making. Because individuals are increasingly personally responsible for their financial well-being before and after retirement, it is critically important that women's financial knowledge is enhanced and that they become equipped with the tools that are needed to make informed saving decisions.

To do so, it is necessary to:

- 1) Target financial education to women. Due to their lower financial literacy and their awareness of their lower knowledge, women can profit substantially from targeted financial education programs.
- 2) Consider alternative ways of tailoring pension and financial communication to women. Because of their lower financial

literacy, the way questions are framed may play a more important role for women than men.

- 3) Rethink the role of professional financial advice and consider how advisors can help women improve their financial decisions. Financial advisors are mostly used by individuals with high financial literacy, and it can be hard to judge the quality of their advice. Independent and easily understandable advice may thus be crucial to the financial decision-making of women, especially because women and men may benefit from different modes of advice.

Abstract

In this paper we document gender differences in financial literacy in the United States, the Netherlands, and Germany. When asked to answer questions that measure knowledge of basic financial concepts, women are less likely to answer correctly and more likely to indicate that they "do not know" the answer to these questions. This is an important finding since financial literacy has been linked to economic behavior, including retirement planning and wealth accumulation. In addition to providing information about the demonstrated financial knowledge of respondents, we offer data on their self-assessed knowledge. We find significant gender differences in self-assessed knowledge: women give themselves lower scores than men. We investigate several reasons for gender differences in financial literacy. We explore the role of specialization within the family, the traditional roles of women in society, and the effect of framing and confidence on financial knowledge. Moreover, we discuss the relationship between financial literacy and financial advice and the potential effects of low financial literacy on women's financial decisions. We conclude with a discussion of the implications of our findings for financial education policy and programs.

1. Introduction

Financial knowledge is a key tool for making financial decisions. 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, 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 decision making, especially as it relates to the accumulation of retirement wealth (Lusardi and Mitchell, 2011b).

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 saving needs are different. Women are likely to spend at least part of their retirement in widowhood. Evidence from the US suggests that the death of a spouse is an important determinant of female old-age poverty (see Sevak et al., 2003/2004; Weir and Willis, 2000). Moreover, women tend to have less attachment to the labor market, with interrupted careers because of childbearing and potentially fewer financial resources over the lifecycle.¹ Thus, it is important to discuss gender-specific aspects of recent shifts from defined benefit (DB) to defined contribution (DC) pension plans. With fewer available resources and higher life expectancies, women are potentially more affected by these changes in pension schemes than men. For example, Lusardi and Mitchell (2008) show that women are much less likely to be prepared for their retirement and that retirement planning can be linked to financial literacy.

1 See, for example, Jefferson (2009) for a review of the literature on the care-providing role and pension policies of women.

The objective of this panel paper is to review the findings from surveys on financial literacy around the world, with a special focus on women so as to provide additional insights into the gender gap in financial literacy. We build on the work of Lusardi and Mitchell (2011b) that compares financial literacy in eight countries, but we perform additional analysis on a sub-set of those countries. Specifically, we use data from surveys in the United States, the Netherlands, and Germany to evaluate levels of financial literacy based on objective and subjective measures. Moreover, we analyze potential reasons for financial literacy differences between men and women. We consider the roles of spouses in financial decision-making within the household, and we compare gender gaps among young respondents to investigate whether the traditional roles of women are driving results. We also look at gender differences in financial literacy between East and West Germany to examine how financial knowledge is shaped by different economic histories. Furthermore, we consider the effect of framing and the importance of measurement issues. Finally, we discuss potential consequences of the gender disparity in financial literacy for women's financial well-being and the implications for public policy and financial education programs.

To summarize our main results, we consistently find gender differences in financial literacy in many countries. Not only are female respondents less likely to respond correctly to financial literacy questions but they are also more likely to state that they do not know the answer to such questions. The gender gap is persistent across different sets of financial literacy questions and other domains such as economic knowledge and pension knowledge. It is present in many countries: the Netherlands, the United States, and Germany as well as Sweden, Italy, New Zealand, and Japan. We also find gender differences in various subgroups

of the population, for example among the young and the old. Moreover, gender differences occur not only in actual financial literacy but also in self-reported financial literacy: when asked to assess their financial knowledge, women tend to give themselves lower scores than men. The mismatch between actual and self-assessed literacy also differs between women and men. Not many women who answer the financial literacy questions correctly give themselves high scores. Conversely, some of those who give at least one “do not know” answer rate their knowledge as high.

The gender gap in financial literacy continues to persist even after taking into account marital status, education, income, and other socioeconomic characteristics. Moreover, we find a gender gap in financial literacy among the young despite higher education levels and labor force participation of younger women. Low levels of financial literacy among women may have important consequences for their financial decisions. For example, women are not likely to consult financial advisors to compensate for their lack of knowledge. They may thus end up with low levels of retirement wealth or make substantial investment mistakes or suffer from financial scams.

The structure of our paper is as follows. In section 2 we provide a summary of existing empirical results on the gender gap in financial literacy around the world. We focus on results from the United States, the Netherlands, and Germany and analyze differences in objective and subjective measures of financial literacy. In section 3 we examine potential explanations for the financial literacy gender gap, such as decision-making within households and traditional gender roles. In section 4 we provide evidence on the effects of the gender gap in financial literacy on financial decision-making. We conclude with policy implications in section 5.

2. Financial literacy around the world – existing empirical findings

Lusardi and Mitchell (2011a) designed a financial literacy module for the 2004 Health and Retirement Study (HRS), a longitudinal panel study that surveyed a representative sample of Americans age 50 and older. They developed three questions, explained in more detail below, that were designed to measure knowledge of simple but fundamental concepts for financial decision-making. These three questions have subsequently been incorporated into several other US national surveys. These questions have also been fielded in many other countries, including Germany, the Netherlands, Italy, Sweden, Russia, Japan, and New Zealand, making it possible to perform an international comparison of financial literacy.²

The use of the same financial literacy measure across different countries allows researchers to identify similarities in financial knowledge in distinct economic environments. Moreover, it enables identification of demographic groups that display low levels of knowledge. As will be discussed below, women have emerged as a group that consistently shows low financial literacy.

2.1 Measuring financial literacy

To evaluate financial knowledge, respondents were asked three questions covering fundamental concepts of economics and finance, expressed in everyday transactional terms, and requiring simple calculations about interest rates and inflation and an

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

understanding of the workings of risk diversification.³ The exact wording of the questions is as follows:

- 1) *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?*⁴

More than \$102

Exactly \$102

Less than \$102

Do not know

Refuse to answer

- 2) *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) *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

3 See Lusardi and Mitchell 2011(a, b) for more details on the measurement of financial literacy.

4 Values in the US survey are expressed in dollars; values in the Dutch and German surveys are expressed in euros.

The first two questions indicate whether respondents have a basic understanding of interest and inflation, economic concepts that are related to saving decisions. The third question evaluates knowledge of risk diversification, crucial to making informed investment decisions. Below we discuss the findings for three countries, with a focus on the gender differences in financial literacy.

2.1.1 Evidence from the United States

In Table 1a, we use data from the 2009 US National Financial Capability Study to report the differences in financial literacy in the population and between women and men.⁵ Overall, financial literacy is rather low in the United States. A large fraction of Americans do not correctly answer simple questions that measure basic financial knowledge. For example, only about half of the sample correctly answered the risk diversification question and only one-third was correct on all three questions. Most importantly, women are much less likely to correctly answer the financial literacy questions than men; for each question, the proportion of correct answers was lower among women than men. For example, while 55% of men correctly answered the questions about interest rates and inflation, only 38% of women were able to do so. Moreover, while 38% of men correctly answered all three questions, only 22% of women did so. There is another important and notable gender difference in the responses to these questions. Women are much more likely than men to indicate

5 The 2009 US National Financial Capability Study was commissioned by the Financial Industry Regulatory Authority (FINRA) Investor Education Foundation in consultation with the US Department of the Treasury and the President's Advisory Council on Financial Literacy. About 1,500 American adults were contacted by telephone. For more details, see Lusardi and Mitchell (2011c).

they “do not know” the answer to a question.⁶ The proportion of “do not know” responses was particularly high on the risk diversification question; as many as 41% of women stated that they did not know whether a single company stock is riskier than a stock mutual fund. Moreover, half of women gave at least one “do not know” response to the three financial literacy questions. This is a striking finding as the three questions measure relatively simple concepts.

2.1.2 Evidence from the Netherlands

The questions reported above were also asked to a representative panel of the Dutch population. The data come from the DNB Household Survey (DHS).⁷ Results are reported in Table 1b. The findings are rather similar to those from the US. 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. Only about half of the sample was able to correctly answer the question about risk diversification. To put this result into perspective, Van Rooij, Lusardi, and Alessie (2011a) report that around three-quarters of the Dutch population do not invest in stocks or stock mutual funds and that concepts related to investing are not covered in school. Moreover, less than half of the sample population was able to correctly answer all three questions. Most importantly, the Dutch data as well show a gender gap in financial literacy. While 77% of men correctly answered the inflation question, 72%

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

7 The DHS is an online panel of around 2,000 households run by CentERdata at Tilburg University. For details about the data set and findings about financial literacy, see Alessie, Van Rooij, and Lusardi (2011a and b) and Van Rooij, Lusardi, and Alessie (2011a).

of women did so, and while 52% of men correctly answered the risk diversification question, only 42% of women did so. As in the United States, women are much more likely to indicate that they do not know the answer to a question. While 38% of men gave at least one “do not know” answer to the three questions, 46% of women answer with at least one “do not know.” As in the United States, close to half of the women in the Dutch sample experienced difficulty with at least one of the financial literacy concepts.

2.1.3 Evidence from Germany

The answers to the three questions by German respondents are displayed in Table 1c, in which we use data from SAVE.⁸ Financial literacy is not widespread among the German population. While about 70% correctly answered the questions about interest rates and inflation, only about half of the sample answered all three questions correctly. In Germany, as in the US and the Netherlands, we find that women performed significantly worse than men. Compared to male respondents, women were equally likely to give correct answers to the interest question but were significantly less likely to correctly answer the inflation and risk diversification questions. About 60% of male respondents correctly answered all questions, compared to 48% of female respondents (the difference is significant at the 1% level). German women, however, did not provide more incorrect answers than men, rather they stated “do not know” much more often (as was

8 SAVE is a representative panel of German households. The panel has been run by the Munich Center for the Economics of Aging (MEA) since 2001. Respondents fill in a paper-and-pencil questionnaire. For more details, see Bucher-Koenen and Lusardi (2011). In the German case, it is not possible to differentiate between “do not know” and “refuse to answer” responses, but based on the responses in other countries, the proportion refusing to answer is normally very low.

also the case for female respondents in the United States and the Netherlands). Less than 30% of male respondents and more than 43% of female respondents had at least one “do not know” response (the difference is significant at the 1% level).⁹

Comparing the gender gap in financial literacy among the three countries reveals a very similar gender gap in the Netherlands, Germany, and the US. According to a Chi-square test, the cross-country differences in the gender gap are not significant. However, 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 US, 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 a direct interpretation of the results across countries is difficult as the cross-gender differences could be influenced by different survey modes. More research will be necessary to shed light on cross-country differences in financial literacy and to link these to the differences in institutional design.

2.2 Looking at broader sets of financial literacy questions

The gender gap in financial literacy is also evident when using a wider set of questions (up to 18) that assess understanding of both simple and complex financial concepts among Dutch, American, and German respondents (see Van Rooij et al., 2011a; Lusardi and Mitchell, 2009; Bucher-Koenen, 2011, for details). Table 1d displays the frequency of correct, incorrect, and do-not-know answers to a set of financial literacy questions among German

9 One concern about the gender effect in financial literacy is that if the household head is required to fill out the questionnaire, the selection of women who are household heads may be biased toward single women and widows. However, men and women are selected with equal probability for the SAVE survey. Thus, there should not be a gender selection bias.

SAVE respondents. Most of these questions mimic those asked in the broader sets of Dutch and US survey questions. Responses to these broader sets of questions confirm the general prevalence of and the gender-specific differences in do-not-know answers. For every question in this additional set, women were significantly more likely than men to state they “do not know” the answer. Moreover, the proportion of do-not-know answers is quite high, in particular for complex questions. For example, more than 40% of women stated that they did not know the answer to questions about the functions of the stock market and 56% did not know the answer to questions about the workings of mutual funds. Thus, the pattern of responses we reported for the three basic financial literacy questions mentioned above is replicated when considering a wider and more sophisticated set of questions.

2.3 Evidence from other countries and other surveys

Similar patterns of financial literacy differences between men and women have been found in Sweden (Almenberg and Säve-Söderbergh, 2011), New Zealand (Crossan, Feslier, and Hurnard, 2011), Italy (Fornero and Monticone, 2011), and Japan (Sekita 2011). In all of these countries, women are not only less likely to correctly answer the three financial literacy questions but they are more likely to indicate they “do not know” the answer to a financial literacy question. Thus, we see a consistent pattern of responses across countries. In most of them, a high proportion of women tend to state they “do not know” the answer to financial literacy questions.

One interesting exception to the pattern of gender differences is seen in Russia. Klapper and Panos (2011) report no pronounced gender difference in the correctness of responses to financial literacy questions. In general, the level of financial literacy is very

low in Russia, with Russian men and women appearing to know equally little. However, as in the countries previously mentioned, there is a significant difference in the number of do-not-know responses to all questions. In Russia as well, women are much more likely than men to indicate that they do not know the answer to financial literacy questions.

Gender disparities in financial literacy are also detected in studies that use alternative measures of financial literacy. Earlier papers, mainly based on surveys in the United States, find a large gap in financial literacy levels of men and women (Hogarth and Hilgert, 2002; Hilgert, Hogarth, and Beverly, 2003). Gender differences also occur in other samples that cover specific subgroups of the population, such as those by Moore (2003), Mandell (2004), Agnew and Szykman (2005), and Agnew et al. (2008).

Gender differences in financial literacy are found both among the younger and the older population. Lusardi, Mitchell, and Curto (2010) found that young (23–28) female respondents with a college degree are 13 percentage points less likely to give correct responses to inflation and risk questions than young males with a college degree. Similarly, Goldsmith and Goldsmith (1997), Chen and Volpe (1998 and 2002), and Ford and Kent (2010) found substantial differences in financial literacy between male and female college students. According to Chen and Volpe (2002), female college students are less enthusiastic about financial topics, less confident, and less willing to acquire financial skills. By contrast, in the final report from the APLUS Project (2009) no gender-specific differences in objective financial literacy were found. However, female college students do rate themselves significantly lower on subjective financial literacy.

Lusardi, Mitchell, and Curto (2012) examined financial literacy among an older cohort of respondents in the American Health and Retirement Study (HRS). They found that among US 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” an answer, they are more likely to be classified among those with low literacy. These results are in line with results from an earlier examination of financial literacy among baby boomers (Lusardi and Mitchell, 2007) using data from the 2004 HRS.

The gender gap in financial literacy does not seem to be domain-specific. Gender differences are also apparent when measuring pension, economic, or debt literacy. Van Els et al. (2004) report that, among Dutch employees, men more often know their retirement plan characteristics (such as the type of pension scheme and the value of their pension rights) than women. These gender differences do not go away when other traits (including age, income, and education) are taken into account. The same conclusions are reported in a study on knowledge of macroeconomics (Christensen et al., 2006). Dutch men are found to have higher knowledge of inflation rates and economic growth than women. Lusardi and Tufano (2009a,b) investigate debt literacy and find large differences between men and women: in some cases the share of women who gave correct answers was about 20 percentage points below the share of men. They also found that the gender gap in debt literacy applied for all age groups. Hung et al. (2009) compare various financial literacy measures on the basis of data from the American Life Panel. They found that the gender disparity is persistent over time and with different methodologies for measuring financial knowledge.

Evidence from countries other than those mentioned above is, so far, limited. A study by the ANZ Banking group (2005) provides evidence of a financial literacy gender gap among respondents in Australia and New Zealand, and women in the United Kingdom score substantially lower on knowledge related to financial decision-making compared to men (Atkinson et al., 2006).

2.4 Self-assessed financial literacy

In addition to providing information about demonstrated levels of financial literacy, the surveys in the United States, the Netherlands, and Germany 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. Moreover, differences in self-assessed literacy are important because subjective knowledge has an independent effect on financial decision-making (Hadar et al., 2010). Most importantly for this paper, it is possible to evaluate whether there are gender differences not only in financial literacy but also in self-reported literacy and, moreover, whether the mismatch between actual and perceived knowledge 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?”

Table 2 reports the self-assessed literacy in the full sample and the differences between female and male respondents in the American, Dutch, and German samples, respectively.

United States. While many respondents in the United States fared rather poorly on the three financial literacy questions, results

in Table 2a indicate that a high proportion of respondents gave themselves high financial knowledge scores. Around two-fifths (38%) of respondents awarded themselves top knowledge scores (6 and 7), and only 13% gave themselves very low marks (1, 2, or 3). Overall, almost 70% of respondents indicated that their knowledge exceeds the median score (4), a figure that exceeds what is shown from our assessment of actual knowledge. Table 2a shows self-assessed financial knowledge separately for men and women. We have seen previously, based on the three knowledge questions, that women are less financially literate than men. Although US women do assign themselves slightly lower scores, the differences in self-assessed financial literacy between women and men are relatively small.

At the bottom of Table 2a we compare actual and subjective financial literacy between men and women. We evaluate the percentage of individuals among each self-rated category who were able to correctly answer the three financial literacy questions and the percentage of those with at least one “do not know” response. We find a rather strong correlation between actual and self-assessed financial knowledge for both men and women. The percentage of respondents who answered all questions correctly increases as self-assessed knowledge increases; the share of those with at least one “do not know” answer declines as self-assessed knowledge declines. Interestingly, the percentage of women who correctly answered all three questions and gave themselves high ratings (6 or 7) is not very high, while a relatively high proportion of women who answered with at least one “do not know” gave themselves high scores. This may indicate that “do not know” responses reflect not simply lack of knowledge but difficulty in articulating the answer to a specific question and/or lack of confidence in the answer.

The Netherlands. Dutch respondents are somewhat less confident about their financial knowledge than US respondents. On average, about 27% of the Dutch assessed themselves as knowledgeable about financial issues (6 or 7), and 18% evaluated themselves as being at the bottom of the scale (1, 2, or 3). About 60% of the respondents considered their knowledge to be above median (a score of 4). But relevant to our analysis, female respondents gave themselves lower assessments compared to men. Twenty-one percent assigned themselves a 6 or 7, and 22% ranked themselves as having low financial literacy. Thus, on average, Dutch women seem to be aware of their lack of knowledge.

At the bottom of Table 2b we again compare actual and subjective financial literacy among men and women. Similar to data for the United States, we find a positive correlation between actual and self-assessed financial knowledge for both men and women. But women in the Dutch sample who were able to answer all questions correctly often gave themselves low scores, and the proportion of those who answered correctly and gave themselves a 6 or 7 is not very high. Conversely, some of those who answered with at least one "do not know" gave themselves high assessment scores.

Germany. Table 2c shows self-assessed financial knowledge among German SAVE respondents. Overall, German respondents seem to rate themselves even more conservatively than respondents from the Netherlands and the United States. Only a little more than 22% assessed themselves as being very knowledgeable (6 or 7); roughly the same percentage (22.6%) rated themselves as not knowledgeable (1, 2, or 3). About half of the respondents rated themselves in the middle of the scale (4 or 5). Overall, only slightly more than half of the respondents

(54%) evaluated themselves as having an above–median score (a 4). Similar to the Netherlands, German women rated themselves more conservatively than men. Twenty–one percent of women evaluated themselves as having high financial literacy, and 24% assigned themselves to the lower literacy ranks. On average, women gave themselves significantly lower scores than men did (average score of 4.4 vs. 4.6, significant at the 5% level).

Among both male and female German respondents there is a strong correlation between actual and perceived financial knowledge. The share of respondents who were able to correctly answer all questions increases monotonically with self–perceived knowledge; the share of those with at least one “do not know” declines monotonically. Irrespective of this monotonic relationship, a sizeable proportion of German women gave themselves high scores, even when they answered with at least one “do not know.”

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.

3. Potential explanations of gender differences in financial literacy

Having documented pervasive gender differences in financial literacy and the systematic pattern of responses by women to financial literacy questions, we now turn to a discussion of some of the potential causes of these differences.

3.1 Is the gender gap real?

Financial literacy is closely linked to demographic characteristics, such as marital status, age, education, and income (see Lusardi and Mitchell, 2011b). So far, we have considered differences between women and men. But do these differences hold up when we account for demographic and economic characteristics? In Table 3a, we report a set of multivariate regressions using data from the Dutch DHS, in which the dependent variable is a dummy variable equal to 1 for respondents who answered all three financial literacy questions correctly. In each regression, we add a set of controls that can account for the gender gap. In the first specification, we only consider a female dummy. In the Netherlands, women are 20 percentage points less likely than men to answer all financial literacy questions correctly. In specifications 2 and 3 we add information on marital status and age. We find that individuals who are older are significantly less likely to give three correct answers. However, the gender effect decreases only slightly when controlling for these variables. In specification 4 we also add education dummies. Finally, we add income dummies. Adding these variables reduces the gender gap by about 9 percentage points. However, the female dummy is still sizable and statistically significant; even after controlling for demographic and economic characteristics, women are almost 12 percentage points

less likely to answer all three financial literacy questions correctly. Thus, even though marital status, age, education, and income can explain part of the gender gap in financial literacy, they do not explain it fully. Alternatively, we examine the probability of responding to at least one question with “do not know” (see Table 3b). Without taking account of covariates, women are 17 percentage points more likely to state “do not know” at least once. After adding the same covariates as before, the gender gap is reduced but remains highly significant. We also examine the probability of giving at least one incorrect answer.¹⁰ We find that women are around 10 percentage points more likely to give an incorrect answer. This result is hardly affected by including covariates in the regression.¹¹

We find very similar results in the German SAVE data. In that data set we were able to account for a very large set of controls, including variables that can proxy for risk preferences and for region of residence (East versus West Germany). After controlling for this larger set of variables, the gender effect decreases by half; yet women are 7 percentage points more likely to respond to at least one question with “do not know.” These results are in line with findings from the United States using the Financial Capability Study. They are also in line with the findings reported by Fonseca et al. (2010), who find that covariates such as education, income, and marital status explain about 25% of the observed gender gap in financial literacy. Thus, even though the gender gap can be partly explained by differences in socioeconomic characteristics between men and women, a large difference remains unexplained.

10 The results are omitted for brevity but are available upon request.

11 Similar results are obtained when we use the number of correct answers and the number of “do not know” answers as dependent variables.

We examine below a set of explanations that have been offered to account for the differences in financial literacy between women and men.

3.2 The role of financial decision-making within the household

One of the proposed explanations for the financial literacy gender gap, for example by Hsu (2011) and Fonseca et al. (2010), is that gender disparities emerge due to specialization within the household; specifically, men are more involved in financial decision-making. As long as they live in a partnership, women will accumulate less financial knowledge than men. On the other hand, because women tend to outlive men, there is an incentive for women to acquire financial knowledge when they become widowed. The German and the Dutch data can shed light on these issues. Married women have lower financial literacy than married men, but the difference in the share of correct answers by gender is particularly high for divorced and widowed respondents. The difference for widows versus widowers is rather striking (but do note that the number of observations in these subgroups is small). Widows show the lowest levels of financial literacy (see Tables 5a and 5b). Similarly, the results by Fonseca et al. (2010) suggest that specialization within the family does not explain the gender gap. The Dutch regression results presented in the previous section point in a similar direction. The financial literacy gender gap remains almost unchanged when taking marital status into account (see column 2 in Table 3).

Marital status may, however, be an imperfect proxy to identify the decision-maker in the household. In the German SAVE data and the Dutch DHS data we have the capacity to analyze the relationship between gender and individual roles in financial decision-making, since respondents were asked who

is primarily responsible for those decisions. We differentiate between 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" (in the German case this can be jointly with a person outside the household). 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 (see Table 6a and 6b). Female respondents who decide jointly with their partner also know significantly less than respective male respondents.¹² Moreover, among German women, sole decision-makers without a partner have a significantly lower probability of correctly answering the three financial literacy questions compared to women who decide with a partner. These results are very similar to results reported in a Swedish population study (Almenberg and Säve-Söderbergh, 2011). Thus, at first glance the fact that sole female decision-makers have equally low or even lower levels of financial literacy compared to those in partnerships speaks against the hypothesis that specialization within the household drives women to know less. More research is necessary to shed light into financial decision-making patterns within households. Overall, we consider it to be particularly worrisome that women who have to decide by themselves, i.e., single women and widows, show such low levels of financial literacy.

¹² 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 very small, so inferences are tentative.

3.3 Traditional roles of women

Another way to evaluate the effect of traditional role allocations is to compare financial literacy among young respondents only. It could be that women are less financially literate because of their traditional roles in society; in the past, they were more likely to stay home and take care of children and less likely to deal with financial topics or discuss them with colleagues, family, and friends. But today's younger generations of women are more likely to participate in the labor market, to be educated (for example, to have a college degree), and to move away from traditional societal roles.

In Tables 4a–c, we compare the performance on the financial literacy quiz of female respondents in different age groups and in the three countries under consideration.

United States. Data from the United States show that young women perform worse than young men on all financial literacy questions. Overall, financial literacy is rather low among the young, but more so among young women than young men. Thus, women from the start know less than men. Using a different data set, Lusardi, Mitchell, and Curto (2010) also documented a sharp gender difference in financial literacy among young adults (aged 23 to 28). Other studies, e.g., Goldsmith and Goldsmith (1997), Chen and Volpe (2002), Mandell (2008), and Ford and Kent (2010), found substantial gender differences in the financial knowledge of high school students. While we cannot infer cohort patterns from a single cross-section, a look across the surveyed age groups does not seem to suggest that gender differences with regard to financial literacy are much different or less pervasive among the young.

The Netherlands. We find similar results relating to gender difference among the young in the Netherlands: young women have less financial knowledge than young men. And again there is a large gender gap across age groups. Interestingly the gender gap does not seem to decline with age. If we compare the performance of young women to young men, we find that the gender gap for the young is almost as large as for the old. Women of all ages in the Netherlands are about 20 percentage points less likely than men to correctly answer the financial literacy questions.

Germany. Overall, we find that young women (those below age 35) perform significantly worse than young men. While more than 64% of young male respondents gave three correct responses to the financial literacy questions, only around 47% of young female respondents were able to do so (difference is significant at the 1% level). The age pattern of correct answers 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). This pattern is mirrored in the U-shape of the frequency of "do not know" responses over age. Looking at the gender gap in financial literacy over age, we found that it is greatest among the young. Young women are 18 percentage points less likely to have given three correct answers to the financial literacy questions compared to men (significant at the 1% level). This is particularly worrisome because, for younger cohorts, individual responsibility for old-age income is increasing.

To summarize: the empirical evidence shows that gender differences are present at the start of the working career and that young women in all three countries know significantly less

than young men. Thus, difference in knowledge is present from the start of the life cycle. While we cannot infer from our data how differences will change as people age, the evidence from our cross-sections indicate a gender gap across all age groups. Thus, women knew less in the past, and they know less now. Therefore, despite the changes in the roles of women in society in many areas, there is still a substantial gender gap with respect to financial literacy and, in particular, among the young.

3.4 Gender differences in financial literacy between East and West Germany

The German SAVE allows us to investigate gender differences between East and West Germany. Individuals in these two regions were exposed to different financial markets before the German unification. This provides us with an interesting comparison. Specifically, we can study the size of the gender gap in financial knowledge in East and West Germany twenty years after the unification and how well households living in the East perform on financial literacy questions compared to those living in the West. This comparison can shed some light on the channels of learning and offer an explanation for the gender differences we have documented so far.

Women (men) in the West are significantly more likely to answer all financial literacy questions correctly compared to women (men) in the East (Bucher-Koenen and Lusardi, 2011). Thus, even twenty 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.

One reason that has been put forward to explain the lack of gender differences in the East is that labor market involvement of women 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.

Previously we reported that there are no gender differences in financial literacy in Russia, another former Communist country where financial markets were not well developed. The lack of gender difference may be related to the fact that the former Communist societies were much more equal with respect to the roles of men and women. On the other hand, the different results between East Germany and Russia versus the other countries could also be interpreted as *prima facie* evidence that as financial markets develop, women are left behind with respect to men in terms of financial knowledge. In that sense, the development in financial markets of recent years may lead to the emergence of a gender gap in financial literacy in the future. However, more research is necessary to understand how and under what circumstances men and women acquire financial knowledge. In future work, we plan to investigate this topic in more detail.

3.5 Confidence in knowledge

Another reason for the persistent gender gap in financial literacy may be that women are less confident in their financial knowledge and thus are more inclined to answer "do not know." There is ample evidence from psychologists and economists that women are less confident than men in many situations (see Beyer, 1990; Barber and Odean, 2001). Some studies indicate that while men appear to be over-confident, women seem under-confident

(see Dahlbom et al., 2011). In the context of financial knowledge, Chen and Volpe (2002) find that female college students are less confident and enthusiastic about financial topics. Webster and Ellis (1996) provide evidence that, even among financial experts, women show lower self-confidence in financial analysis compared to men.

In a similar manner, responses to the financial literacy questions may reflect confidence in the level of knowledge. The fact that women tend to frequently answer "do not know" may indicate less confidence in their financial knowledge rather than ignorance. This is consistent with the evidence provided by the self-assessed knowledge responses, which show that women who respond with at least one "do not know" tend to give themselves high assessments. Thus, irrespective of the fact that they are unable to answer a specific question, women still consider themselves financially competent. This is confirmed by some suggestive evidence from the German SAVE study. In the 2007 wave, respondents did not have a "do not know" option for the interest and inflation questions; that option was added in the 2009 survey. In other words, in 2007, respondents were forced to give an answer. Because of the panel dimension of SAVE, we are able to look at responses within these two different question frames. Of those who responded "do not know" in 2009, more than 70% had answered the question correctly two years earlier. We take this as an indication that many of those answering "do not know" actually do know the answer but do not feel confident about their knowledge. Unfortunately, because the sample sizes are very small, we cannot investigate gender differences. Nevertheless, these are important issues that we plan to investigate in future work, as confidence in financial skills is an important determinant of financial decision-making.

As an example, individuals who have a lot of confidence in their skills relative to objectively measured knowledge are more likely to make retirement calculations and set up a financial plan for retirement saving (Van Rooij et al., 2012).

3.6 Gender differences and framing

Another possibility for the persistent gender gap in financial literacy results is simply the framing of the questions. Previous research by Van Rooij et al. (2011a) and Lusardi and Mitchell (2009) has shown that framing matters when it comes to measuring financial literacy, in particular for questions measuring complex financial concepts. For example, using data from the DHS in 2005, Van Rooij et al. (2011a) reversed the wording of the risk diversification question and assigned respondents randomly to either version a or b, as indicated below:

- a) "Buying a stock mutual fund usually provides a safer return than a company stock."
- b) "Buying a company stock usually provides a safer return than a stock mutual fund."

They found that the number of correct responses changed substantially when the words were reversed. The percentage of correct responses was twice as high when respondents were presented with the second option. Thus, there seems to be considerable measurement error in the financial literacy questions, and the relevance of framing may differ between women and men.

Lusardi, Mitchell, and Curto (2012) found that respondents are sensitive to the wording of the financial literacy questions and suggest that this is linked to the fact that many of the questions require knowledge about specific financial terms. The authors

found that women are particularly sensitive to changes in the wording of the financial literacy questions.

Thus, gender differences may result from the fact that very specific concepts are covered and questions are formulated in a way that may induce women to respond with "do not know." The use of economic jargon, such as the term "stock mutual fund," may prevent women from attempting to answer the questions. Similarly women may shy away from questions that are mathematical and that require them to perform very specific and sometimes complex calculations. For example, women may have a general understanding of interest compounding but may be unable to provide an answer that requires a very specific calculation. In other words, the gender difference, or at least part of it, may be artificial and result from the way the questions are asked.

Much research has been conducted on gender differences with respect to risk preferences that can be related to gender differences in financial literacy. Many studies show that women are more risk averse than men.¹³ As decisions in the financial domain are very often related to risk, it may well be that there is a relation between financial knowledge, risk perception, and risk preferences. More research is necessary to understand the interaction between risk and financial literacy and what exactly drives the gender difference in financial literacy.

13 See Croson and Gneezy (2009) for a review of the literature on gender differences in preferences.

4. Does the gender gap in financial literacy matter?

4.1 The role of 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 decisions. One way to overcome lack of financial knowledge is to ask for financial advice. If women recognize their lack of knowledge, they may rely on professional financial advisors when making financial decisions. However, evidence from surveys across countries shows that women not only display lower levels of financial literacy but also are much less likely to ask for advice (see Loibl and Hira, 2006) and are less likely to use online resources or mass media as a source of information (Loibl and Hira, 2011). Moreover, women more often rely on informal sources of financial advice, such as family and friends (see Alcon, 1999).

We present evidence on gender, financial advice, and financial literacy among Dutch and German respondents in tables 7a and 7b. Professional financial advisors are the main source of financial information for about 25% of the Dutch DHS respondents, while about 23% consult family and friends. More than half of respondents get their information mainly from the internet, newspapers, magazines, and other written sources. In general, women are more likely to communicate about financial issues. However, they are much more likely to report family and friends as their main source of information compared to men (30% vs. 19%). They are almost equally likely as men to rely on a financial professional. If we look at sources of 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 advisors (26%) compared to 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%).

Among German SAVE respondents, about one-third state that they do not consult anyone when making financial decisions, another third consult professional advisors, and around 50% talk to family, friends, or colleagues about their finances (see Table 7b).¹⁴ 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%); however, men are slightly more likely to consult professional advisors (31% vs. 35%). If we split the sample by financial literacy instead of gender, the difference becomes even 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 advisors (40%), whereas among those with low literacy only 23% rely on the services of professionals.

Apart from being less likely to consult professional advisors, women may have difficulty judging the quality of financial advice. Women may be unable to find a good financial advisor or not know what to do when they have a conflict with an advisor (Alcon, 1999). In an audit study of financial advice, Mullainathan et al. (2012) found that young female investors tend to get lower quality advice. Advisors are less likely to ask women for personal information to be able to tailor the advice to their needs, and

¹⁴ 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.

women are less frequently advised to invest in stocks or bonds. Most importantly, advisors are much more inclined to ask women to transfer their funds before they give any useful advice. So, female investors have to choose an advisor before knowing anything about the quality of the advice that they will receive. This is in line with the theoretical model by Bucher-Koenen and Koenen (2011): they set up a model of financial advice and financial literacy in which advisors have an incentive to offer clients with low financial literacy lower quality advice.

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 advisors. This strategy may even be rational because women seem to be more likely to receive low quality advice.

4.2 Is there a gender gap in financial well-being?

Having provided ample evidence for the difference in financial literacy between men and women, we now turn to whether this has an effect on the quality of financial decisions and financial well-being. At this time there are two separate strands of literature, one that investigates the link between financial literacy and financial decision-making, and another that examines gender and financial well-being. To the best of our knowledge, to date only a few attempts have been made to link this evidence.

An increasing number of studies investigate the effect of financial literacy on financial decision-making. Individuals with low financial knowledge are found to be less likely to plan for retirement (Lusardi and Mitchell, 2007, 2008, 2009, 2011a,c; Bucher-Koenen and Lusardi, 2011; Van Rooij et al., 2011b, 2012).

Alessie et al. (2011a), for example, report that among non-retired Dutch respondents younger than 65, almost one-third has thought “little” or “hardly at all” about retirement and that financial literacy is linked to retirement planning: those who are more literate are more likely to save for retirement. Moreover, households with low financial literacy are less likely to invest in risky assets such as stocks or bonds (Van Rooij et al., 2011a; Yoong, 2011) and are more likely to make financial mistakes such as borrowing at high rates (Lusardi and Tufano, 2009a; Agarwal et al., 2009) or failing to minimize fees (Hastings et al., 2010; Bucher-Koenen and Koenen, 2010). Mottola (2012) found that women with low levels of financial literacy were more likely to engage in costly credit card behavior than men. Households with more financial knowledge hold much higher levels of wealth (Van Rooij et al., 2012). Thus, if women, on average, have lower levels of financial literacy and do not obtain high-quality financial advice, they are at risk of failing to plan for retirement or of making financial mistakes. Alcon (1999) found that women perceive their lack of financial knowledge as an obstacle to financial planning.

The second strand of literature deals with gender and financial well-being. Jefferson (2009) provides a review of the literature on gender and pensions. Because in most countries pension benefits are related to contributions made during one’s working life, gender gaps in income and labor force participation translate into lower pension income for women. With pension reforms shifting responsibility from state pensions to occupational and private pensions, the link between labor market status and retirement income will become even stronger, potentially enhancing the gender gap in retirement income. On the other hand, the shift from DB to DC pension plans enhances freedom of choice and increases opportunities to manage risk related to human capital

and social security wealth (see Baxter, 2002). However, this requires women to be aware of the risks associated with the different forms of capital and to efficiently manage those risks.

Currently, the data show a prevalence of poverty among older women. Siegenthaler (1996) provides an overview of studies examining old-age poverty. He states that poverty rates among single female households in the US and Germany are high compared to other countries. Sevak et al. (2003/2004) as well as Weir and Willis (2000) report evidence that elderly women in the US have a high likelihood of becoming poor. The threat of old-age poverty is particularly high for women with low socioeconomic status prior to widowhood, because they tend to become widowed earlier due to the correlation between socioeconomic status and mortality. The authors consider this worrisome because elderly widows have few alternatives for enhancing their financial situation. They argue that this is related to insufficient insurance and financial preparation, especially among women who become widowed between age 50 and 65 (see also Weir and Willis, 2003). Biro (2011) examined the economic and health situation of elderly people in Europe and found that female widows above the age of 50 are ten percentage points more likely to report financial difficulties compared to single and married women of the same age. No such differences are found for men.

There is also a large number of studies that point to the difficulties that women face with financial decision-making. Women are less likely to plan for retirement and accumulate lower amounts of financial wealth (Lusardi and Mitchell, 2008). Additionally, they are more inclined to state "do not know" to questions about their expected retirement age and expected retirement income (Alessie et al., 2011b). Hurd and McGarry (1995), for instance, report evidence that women tend to underestimate

their own life expectancy. Therefore they may be insufficiently prepared for retirement. On the other hand, Agnew et al. (2008) found that women are more likely to choose annuities compared to men, even after adjusting for differences in risk aversion and financial literacy. But women are subject to framing, i.e., they are less likely to choose an annuity when it is framed as an investment decision.

Women are also less likely to have defined contribution pension plans (Sundén and Surette, 1998), and they invest more conservatively, i.e., they are less likely to own stocks and more likely to invest in fixed-income securities (see Almenberg and Dreber, 2011; Bajtelsmit and VanDerhei, 1997; Hinz et al., 1997; and Sundén and Surette, 1998). Additionally, there are gender differences not only with respect to long-term saving and investment behavior, but also with respect to short-term objectives and behavior. Hira and Mugenda (2000), for instance, find that women are more likely to shop compulsively or without need and are less satisfied with their ability to handle financial emergencies. Bucher-Koenen and Koenen (2010) found evidence that men compare more alternatives when shopping for private pension plans. Alesina et al. (2008) examined credit conditions of self-employed and small business owners in Italy and found evidence that female borrowers systematically get worse credit conditions, even after controlling for risk characteristics and bank fixed effects.

Overall the existing evidence suggests that women and those with low financial literacy have difficulties making financial decisions and that this can have severe consequences for their financial well-being.

5. Discussion and concluding remarks

The analysis of financial literacy in different countries and in different population subgroups has shown that financial illiteracy is particularly severe among women. This can have far-reaching consequences, because financial literacy has been shown to be an important tool for making informed financial decisions, such as planning for retirement and accumulating retirement wealth.

Particularly worrisome is that financial illiteracy is more widespread among single women and widows, who cannot consult with a partner or spouse when deciding about financial issues. Moreover, the gender gap in financial literacy is still present among the young, whereas the responsibility for financial security after retirement is increasing for younger generations due to cuts in public pensions.

Thus, a low level of financial knowledge may have serious consequences because of the increasing individual responsibility for old-age income. The recent shift from DB to DC 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. Moreover, women are very likely to spend at least part of their retirement as widows. Finally, the evidence suggests that it is particularly difficult for women to obtain independent and 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.

In an environment where people are individually responsible for handling their retirement finances rather than employers and governments doing this on their behalf, it is essential that they

become financially literate in order to be able to successfully prepare for retirement and manage their retirement finances. This is of particular importance for women, who have specific savings needs and are a potentially vulnerable group. Moreover, due to longer life expectancies, the majority of pensioners will be women. Thus, enhancing their capacity to manage their finances before and during retirement should be an important policy objective.

As described earlier, women are very likely to indicate that they “do not know” an answer to financial literacy questions, and they tend to rate themselves low when assessing their personal financial knowledge. Thus, they are 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 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) also show that financial education programs can be rather effective for women. Focus groups and in-depth interviews with women have also indicated that women would like such programs to be offered. Hanemaaijer (2011) discusses suggestions by Dutch pension experts on how to improve financial advice for female clients. She argues that financial advice should be personal and independent, that women prefer female advisors, and that financial advice needs to address “caring for the family” rather than “investing.” Pictures and images are found to be better than texts and numbers to communicate content. Different communication channels may be necessary if women and men acquire financial knowledge in different ways In view of the gender differences found in

the research, an effective way 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 both financial knowledge and financial behavior.

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Tables

Table 1a: Summary Statistics in the US 2009 Financial Capability Study (%)

A: Interest Question	Full Sample	Female	Male
>\$102	64.89	58.83	71.28
= \$102	11.34	13.07	9.52
<\$102	9.23	10.01	8.41
Do not know	13.50	16.56	10.26
Refuse to answer	1.04	1.53	0.52
B: Inflation Question			
More	11.16	12.28	9.97
Exactly the same	8.95	9.75	8.10
Less	64.31	57.95	71.03
Do not know	14.21	18.40	9.77
Refuse to answer	1.38	1.62	1.13
C: Risk Question			
Correct (false)	13.32	10.64	16.15
Incorrect (true)	51.81	46.77	57.12
Do not know	33.72	41.43	25.58
Refuse to answer	1.15	1.16	1.15
D: Cross-question Consistency			
Interest & Inflation	46.20	37.65	55.23
All correct	30.18	22.48	38.30
None correct	12.27	15.13	9.26
At least 1 do-not-know	42.36	49.96	34.33
All do-not-know	4.73	6.33	3.03
# Observations	1488	768	720

Note: Distribution of responses to financial literacy questions in the full sample and for female and male respondents. All figures are weighted.

Table 1b: Summary Statistics in the 2010 DNB Household Survey (%)

A: Interest 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%
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%
C: Risk 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%
D: Cross-question Consistency			
Interest & Inflation	73.4%	68.3%	78.6%
All correct	44.8%	35.0%	55.1%
None correct	10.5%	11.5%	9.4%
At least 1 do-not-know	37.6%	45.9%	29.0%
All do-not-know	8.1%	8.2%	8.0%
# Observations	1665	847	818

Note: Distribution of responses to financial literacy questions in full sample and for female and male respondents. All figures are weighted. DK indicates respondent does not know. RF stands for "refuse to answer".

Table 1c: Summary Statistics in the 2009 German SAVE (%)

A: Interest 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%
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%
C: Risk 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%
D: Cross-question Consistency			
Interest & Inflation	71.9%	68.1%	76.3%
All correct	53.2%	47.5%	59.6%
None correct	10.3%	11.5%	8.9%
At least 1 DK/RA	37.0%	43.3%	29.9%
All DK/RA	8.4%	9.7%	6.9%
# Observations	1,059	553	506

Note: Distributions of responses to financial literacy questions in full sample and for female and male respondents. All figures are weighted. DK/RF indicates respondent does not know or refuses to answer.

Table 1d: Alternative financial literacy measures, responses among German SAVE respondents (in %)

	Full sample	Female	Male
Compound interest: "Suppose you had €100 in a savings account and the interest rate is 20% per year and you never withdraw money or interest payments. After 5 years, how much would you have on this account in total?" More than €200 / Exactly €200 / Less than €200 / Do not know. / Refuse to answer.			
Incorrect	25.4%	27.4%	23.1%
Correct	62.0%	58.2%	66.3%
DK/RF	12.1%	13.2%	10.1%
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?" More than today. / The same. / Less than today. / Do not know. / Refuse to answer.			
Incorrect	31.3%	30.6%	32.1%
Correct	55.3%	53.3%	57.6%
DK/RF	12.8%	15.3%	9.9%
Return volatility: "Normally, which asset displays the highest fluctuations over time?" Savings accounts. / Bonds. / Stocks. / Do not know. / Refuse to answer.			
Incorrect	10.3%	13.0%	7.1%
Correct	68.1%	60.8%	76.3%
DK/RF	20.7%	25.2%	15.7%
Stock Market: "Which of the following statements describes the main function of the stock market?" The stock market helps to predict stock earnings. / The stock market results in an increase in the price of stocks. / The stock market brings people who want to buy stocks together with those who want to sell stocks. / None of the above. / Do not know. / Refuse to answer.			
Incorrect	17.9%	18.6%	17.2%
Correct	47.9%	40.3%	56.6%
DK/RF	33.2%	40.0%	25.4%
Mutual Funds: "Which of the following statements is correct?" Once one invests in a mutual fund, one cannot withdraw the money in the first year. / Mutual funds can invest in several assets, for example invest in both stocks and bonds. / Mutual funds pay a guaranteed rate of return which depends on their past performance. / None of the above. / Do not know. / Refuse to answer.			
Incorrect	7.2%	7.4%	7.0%
Correct	40.7%	34.4%	48.0%
DK/RF	49.8%	56.1%	42.6%
Bonds: "If the interest rate falls, what should happen to bond prices?" Rise. / Fall. / Stay the same. / None of the above. / Do not know. / Refuse to answer.			
Incorrect	52.4%	50.8%	54.2%
Correct	8.6%	5.5%	12.2%
DK/RF	36.5%	41.5%	30.7%

N= 1059. The responses do not add to 100% due to a small number of missing answers on these questions. DK/RF means "do not know / refuse to answer".

Table 2a: Distribution of responses to self-reported financial literacy in the full sample and by sex (Panel A), and the share of respondents with 3 correct responses and at least 1 “do not know” response per self-rating category (Panel B) in the US National Financial Capability Study (%).

Panel A. Self-rated financial literacy							
	1-2	3	4	5	6	7	Average score
Full sample	7.47	6.08	16.28	32.33	20.30	17.54	5.00
Women	8.40	6.00	15.65	32.68	19.63	17.65	4.96
Men	6.49	6.16	16.94	31.97	21.02	17.43	5.03
Panel B. Self-rated financial literacy and financial literacy quiz							
Share of respondents with ...							
<i>Women</i>							
3 correct responses	8.65	16.75	14.62	27.65	32.22	18.32	
at least 1 “do not know”	70.14	64.09	59.79	48.22	41.12	38.93	
<i>Men</i>							
3 correct responses	14.36	12.51	33.48	40.82	52.58	39.85	
at least 1 “do not know”	49.65	56.33	46.24	34.92	20.39	23.85	

All figures are weighted. Respondents who answered the question on self-assessed financial literacy with “do not know” or who refused to answer were removed from the sample.

Table 2b: Distribution of responses to self-reported financial literacy questions in the full sample and by sex (Panel A), and the share percentage of respondents with 3 correct responses and at least 1 “do not know” response per self-rating category (Panel B) in the Dutch DNB Household Survey (%).

Panel A. Self-rated financial literacy								
	1-2	3	4	5	6	7	Do not know	Average score
Full sample	7.3	10.9	23.0	32.0	23.4	3.5	3.6	4.6
Women	9.0	13.3	26.6	30.5	18.0	2.7	3.1	4.4
Men	5.4	8.4	19.3	33.6	29.0	4.4	4.1	4.8
Panel B. Self-rated financial literacy and financial literacy quiz								
Share of respondents with ...								
<i>Women</i>								
3 correct responses	8.9	34.8	36.4	39.8	43.1	33.8	6.2	
at least 1 “do not know”	67.4	47.4	49.3	37.0	35.4	55.4	85.7	
<i>Men</i>								
3 correct responses	40.0	30.0	43.1	63.0	67.5	74.9	11.5	
at least 1 “do not know”	54.4	52.1	31.7	24.5	14.8	15.4	85.8	

All figures are weighted. Respondents who answered the question on self-assessed financial literacy with “do not know” or who refused to answer were removed from the sample.

Table 2c: Distribution of responses to self-reported financial literacy questions in the full sample and by sex (Panel A) and the share of respondents with 3 correct responses and at least 1 do not know response per self-rating category (Panel B) in the German SAVE (%).

Panel A. Self-rated financial literacy							
	1-2	3	4	5	6	7	Average score
Full sample	8.3	14.2	23.0	32.2	15.6	6.8	4.5
Women	9.0	14.8	25.9	29.4	15.6	5.3	4.4
Men	7.5	13.6	19.6	35.3	15.5	8.4	4.6
Panel B. Self-rated financial literacy and financial literacy quiz							
Share of respondents with ...							
<i>Women</i>							
3 correct responses	30.0	42.1	48.3	49.5	53.7	58.9	
at least 1 "do not know"	64.5	49.9	44.5	40.2	34.1	26.5	
<i>Men</i>							
3 correct responses	30.1	57.6	59.7	59.2	67.7	76.0	
at least 1 "do not know"	61.5	33.8	26.9	30.3	23.0	13.8	

All figures are weighted. Respondents who answered the question on self-assessed financial literacy with "do not know" or who refused to answer were removed from the sample.

Table 3a: Multivariate linear regressions of gender and other socio-demographic variables on a dummy equal to one if responding with " all correct" to at least one financial literacy question (DHS data)

VARIABLES	all_correct	all_correct	all_correct	all_correct	all_correct
Female	-0.201***	-0.199***	-0.204***	-0.197***	-0.116***
	(0.0294)	(0.0294)	(0.0298)	(0.0290)	(0.0342)
<i>Marital status: reference category is single</i>					
Married without children		0.0156	0.0379	0.0274	0.0340
		(0.0398)	(0.0392)	(0.0380)	(0.0385)
Married with children		-0.0216	-0.0593	-0.0495	-0.0292
		(0.0418)	(0.0455)	(0.0437)	(0.0446)
Single parent, other		0.00314	-0.0231	-0.0125	-0.00119
		(0.0882)	(0.0875)	(0.0886)	(0.0875)
<i>Age: reference category is age 35 or younger</i>					
Age: 36-50			-0.0131	0.0133	0.0104
			(0.0525)	(0.0510)	(0.0506)
Age: 51-65			-0.0471	0.0101	0.00744
			(0.0513)	(0.0512)	(0.0505)
Age: 66 and older			-0.148***	-0.0815	-0.0798
			(0.0552)	(0.0555)	(0.0548)
<i>Education level: reference category is primary education</i>					
Lower secondary (VMBO)				0.0604	0.0703
				(0.0606)	(0.0563)
Upper secondary (vocational, MB0)				0.115*	0.108*
				(0.0659)	(0.0603)
Upper secondary (HAVO, VWO)				0.265***	0.233***
				(0.0701)	(0.0664)
Tertiary (vocational, HBO)				0.260***	0.179***
				(0.0630)	(0.0590)
Tertiary: University				0.381***	0.271***
				(0.0686)	(0.0657)

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VARIABLES	all_correct	all_correct	all_correct	all_correct	all_correct
<i>Monthly net income: reference category is "income <1,000 euros"</i>					
1,000<income <=1,500					0.0186 (0.0425)
1,500<income <=2,000					0.130*** (0.0439)
Income>2,000					0.266*** (0.0480)
Income unknown					0.126 (0.128)
Constant	0.551*** (0.0210)	0.551*** (0.0382)	0.609*** (0.0617)	0.413*** (0.0863)	0.298*** (0.0872)
Observations	1,665	1,665	1,665	1,665	1,665
R-squared	0.041	0.042	0.051	0.098	0.126
p value test marital status		0.736	0.097	0.247	0.387
p value test age			0.006	0.061	0.075
p value test education				0.000	0.000
p value test income					0.000
p self-assess. Lit					

Results are weighted, robust standard errors in parentheses;

*** p<0.01, ** p<0.05, * p<0.

Table 3b: Multivariate linear regressions of gender and other socio-demographic variables on a dummy equal to one if responding with "do not know" to at least one financial literacy question (DHS data)

VARIABLES	atleast one_dk	atleast one_dk	atleast one_dk	atleast one_dk	atleast one_dk
Female	0.168*** (0.0296)	0.162*** (0.0297)	0.168*** (0.0301)	0.163*** (0.0297)	0.0975*** (0.0342)
<i>Marital status: reference category is single</i>					
Married without children		-0.0718* (0.0403)	-0.0862** (0.0404)	-0.0798** (0.0388)	-0.0828** (0.0386)
Married with children		-0.0347 (0.0432)	-0.0141 (0.0467)	-0.0167 (0.0448)	-0.0312 (0.0448)
Single parent, other		-0.0207 (0.0856)	-0.00790 (0.0851)	-0.0144 (0.0851)	-0.0285 (0.0840)
<i>Age: reference category is age 35 or younger</i>					
Age: 36-50			0.0523 (0.0523)	0.0383 (0.0510)	0.0348 (0.0514)
Age: 51-65			0.0816 (0.0513)	0.0399 (0.0512)	0.0371 (0.0510)
Age: 66 and older			0.110* (0.0562)	0.0594 (0.0567)	0.0534 (0.0563)
<i>Education level: reference category is primary education</i>					
Lower secondary (VMB0)				-0.0934 (0.0673)	-0.0987 (0.0635)
Upper secondary (vocational, MB0)				-0.152** (0.0727)	-0.146** (0.0682)
Upper secondary (HAV0, VW0)				-0.283*** (0.0726)	-0.252*** (0.0685)
Tertiary (vocational, HB0)				-0.226*** (0.0688)	-0.159** (0.0643)
Tertiary: University				-0.273*** (0.0737)	-0.183*** (0.0697)

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VARIABLES	atleast one_dk	atleast one_dk	atleast one_dk	atleast one_dk	atleast one_dk
<i>Monthly net Income: reference category is "income<1000 euro"</i>					
1000 < income ≤ 1500					0.0205 (0.0458)
1500 < income ≤ 2000					-0.125*** (0.0444)
Income>2000					-0.203*** (0.0460)
Income unknown					-0.0569 (0.114)
Constant	0.290*** (0.0199)	0.333*** (0.0386)	0.265*** (0.0628)	0.454*** (0.0946)	0.541*** (0.0958)
Observations	1,665	1,665	1,665	1,665	1,665
R-squared	0.030	0.033	0.038	0.065	0.089
p value test mar status		0.307	0.093	0.138	0.153
p value test age			0.248	0.774	0.824
p value test education				0.000	0.003
p value test income					0.000
p self-assess. lit					

Results are weighted, robust standard errors in parentheses*** p<0.01, ** p<0.05,
* p<0.1

Table 4a: Distribution of responses to financial literacy questions by age among women and men in the US Financial Capability Survey (%).

	Age			
	<35	36-50	51-65	>65
<i>Women</i>				
correct answer to...				
interest question	57.21	64.58	58.14	54.66
inflation question	36.64	67.26	69.60	67.44
risk question	37.13	57.18	51.36	43.52
overall performance				
3 correct	12.49	33.01	27.43	19.19
at least one DK	59.51	37.09	44.03	58.35
<i>Men</i>				
correct answer to...				
interest question	71.33	68.12	80.77	63.12
inflation question	55.23	75.05	86.43	74.60
risk question	49.01	58.99	70.04	51.64
overall performance				
3 correct	26.48	40.21	54.69	35.79
at least one DK	41.40	33.92	20.05	41.24

Note: All figures are weighted. DK means "do not know."

Table 4b: Distribution of responses to financial literacy questions by age among women and men in the Dutch DNB Household Survey (%).

	Age			
	<35	36-50	51-65	>65
<i>Women</i>				
correct answer to...				
interest question	85.6	83.3	85.6	75.5
inflation question	71.2	67.2	74.5	77.7
risk question	44.1	42.7	45.0	34.3
overall performance				
3 correct	38.3	35.7	36.1	27.7
at least one DK	39.6	48.1	47.1	48.3
<i>Men</i>				
correct answer to...				
interest question	83.2	87.0	87.4	87.4
inflation question	84.3	81.7	80.2	82.9
risk question	66.3	63.3	62.9	56.3
overall performance				
3 correct	58.5	56.6	56.3	49.0
at least one DK	25.7	28.0	29.9	31.4

Note: All figures are weighted. DK means "do not know."

Table 4c: Distribution of responses to financial literacy questions by age among women and men in the German SAVE (%).

	Age			
	<35	36-50	51-65	>65
<i>Women</i>				
correct answer to...				
interest question	81.4	83.0	83.0	76.0
inflation question	60.4	78.1	79.2	74.0
risk question	59.6	63.7	61.3	39.6
overall performance				
3 correct	46.6	54.7	50.4	34.4
at least one DK	46.2	36.3	38.5	56.2
<i>Men</i>				
correct answer to...				
interest question	87.9	85.8	83.3	79.9
inflation question	79.2	86.0	79.6	86.0
risk question	72.0	77.6	67.5	56.0
overall performance				
3 correct	64.4	69.3	56.7	50.1
at least one DK	26.8	20.5	33.2	37.9

Note: All figures are weighted. DK means "do not know."

Table 5a: Distribution of responses to financial literacy questions by marital status among women and men in the Dutch DNB household survey (%).

Marital status	Number of responses	Percentage	Percentage 3 correct	Percentage at least 1 do not know
<i>Women</i>				
Married	445	67.92%	35.17%	43.52%
Single	92	14.02%	43.81%	48.18%
Divorced	70	10.73%	21.57%	57.31%
Widowed	48	7.34%	25.56%	47.99%
Total	656			
<i>Men</i>				
Married	533	77.85%	56.72%	28.48%
Single	107	15.64%	53.73%	33.88%
Divorced	25	3.68%	56.14%	36.13%
Widowed	19	2.83%	61.51%	32.53%
Total	685			

Note: All figures are weighted.

Table 5b: Distribution of responses to financial literacy questions by marital status among women and men in the German SAVE (%).

Marital status	Number of responses	Percentage	Percentage 3 correct	Percentage at least 1 do not know
<i>Women</i>				
Married	307	55.46	51.6%	40.0%
Single	82	14.9	47.4%	40.7%
Divorced	85	15.41	49.9%	38.0%
Widowed	79	14.23	28.7%	64.5%
Total	553	100		
<i>Men</i>				
Married	300	59.27	60.6%	28.0%
Single	132	26.06	62.2%	28.1%
Divorced	47	9.23	52.6%	38.8%
Widowed	28	5.44	48.8%	44.4%
Total	506	100		

Note: All figures are weighted.

Table 6a: Distribution of responses to financial literacy questions by financial decision maker among women and men in the Dutch DNB household survey (%).

Financial decision-maker	Number of responses	Percentage	Percentage 3 correct	Percentage at least 1 do not know
<i>Women</i>				
Sole with partner	56	8.43%	21.48%	63.92%
Sole without partner	226	34.14%	37.34%	47.66%
Partner decides	67	10.17%	40.76%	38.34%
Joint decision	313	47.26%	35.35%	44.76%
Total	662			
<i>Men</i>				
Sole with partner	108	16.52%	65.00%	23.28%
Sole without partner	148	22.55%	55.47%	33.72%
Partner decides	53	8.02%	26.00%	48.37%
Joint decision	347	52.92%	54.92%	28.56%
Total	656			

Note: All figures are weighted.

Table 6b: Distribution of responses to financial literacy questions by financial decision maker among women and men in the German SAVE (%).

Financial decision-maker	Number of responses	Percentage	Percentage 3 correct	Percentage at least 1 do not know
<i>Women</i>				
Sole with partner	33	5.9%	53.8%	29.4%
Sole without partner	216	39.1%	40.4%	50.4%
Partner decides	14	2.6%	57.1%	30.1%
Joint decisions	290	52.4%	51.6%	40.2%
Total	553	100		
<i>Men</i>				
Sole with partner	33	6.5%	67.8%	25.2%
Sole without partner	183	36.1%	54.5%	35.3%
Partner decides	14	2.8%	54.2%	25.5%
Joint decisions	276	54.6%	62.4%	27.2%
Total	506	100		

Note: All figures are weighted.

Table 7a: Financial advice by gender and financial literacy in the Dutch DHS (%)

	No advice	Formal advice by professionals	Informal advice by family and friends
All (N=1392)	52.2	23.1	24.7
By gender			
Women	46.6	23.4	29.9
Men	57.8	22.8	19.4
By financial literacy			
3 correct	55.3	25.9	18.9
At least one DK	47.1	21.1	31.8

Note: All figures are weighted.

Table 7b: Financial advice by gender and financial literacy in the German SAVE (%)

	No advice	Formal advice by professionals	Informal advice by family and friends
All (N=1059)	33.5	33.1	48.9
By gender			
Women	30.3	31.4	53.0
Men	37.2	35.0	44.0
By financial literacy			
3 correct	26.5	40.1	55.1
At least one DK	43.2	23.4	41.1

Note: All figures are weighted. Rows do not add to 100% because multiple answers were possible, i.e. formal and informal advice was possible at the same time. Thus, the results are not directly comparable to results in Table 6a.

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How financially literate are women?

Levels of financial literacy are modest in many developed countries. One group that shows consistently low levels of financial literacy across countries is women. It is critically important that women's financial knowledge is enhanced and that they become equipped with the tools that are needed to make informed saving decisions. In this paper, Tabea Bucher-Koenen (University of Mannheim), Annamaria Lusardi (George Washington School of Business), Rob Alessie (RUG), and Maarten van Rooij (DNB) document gender differences in financial literacy in the United States, the Netherlands, and Germany, and conclude with a discussion of the implications of their findings for financial education policy and programs.