DISCUSSION PAPER

// MARIUS CZIRIAK, TABEA BUCHER-KOENEN, AND ROB ALESSIE

Beyond Knowledge: Confidence and the Gender Gap in Financial Literacy

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Beyond Knowledge:

Confidence and the Gender Gap in Financial Literacy

Marius Cziriak[1,2], Tabea Bucher-Koenen[1,2], and Rob Alessie[3,4]

[1]*ZEW – Leibniz Centre for European Economic Research, Mannheim* — [2]*University of Mannheim* — [3]*Netspar* — [4]*University of Groningen*

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Abstract

Women are less likely to correctly answer the "Big-3" financial literacy questions, and a substantial share of the gap reflects women's lower confidence. In our experiment, women are more likely to choose "do not know" or refuse to answer financial literacy questions. If these options are not available, the gender gap decreases substantially. We build on the method proposed by Bucher-Koenen et al. (2021) and provide an easy-to-implement survey design applicable in cross-sectional studies that allows us to disentangle financial knowledge and confidence. We find that both financial knowledge and confidence are related to participation in the stock market.

Keywords: financial knowledge, gender gap, financial decision making, measurement error, survey methodology

JEL Classification: G53, C81, D14, D91

1 Introduction

Financial literacy is an important determinant of individual financial decision-making and financial well-being (Jappelli, 2010; Lusardi & Mitchell, 2011, 2014, 2023), retirement planning, and household wealth (Banks et al., 2010; Banks & Oldfield, 2007; van Rooij et al., 2012). The pronounced gender gap in financial literacy has been the subject of an increasing number of studies (Aristei & Gallo, 2022; Bucher-Koenen et al., 2017; Z. Chen & Garand, 2018; Davoli, 2023; Hospido et al., 2024; Klapper & Lusardi, 2019; Tinghög et al., 2021), and financial literacy programs tailored to women are emerging widely.[1] Based on earlier evidence on women's lower confidence in financial topics (H. Chen & Volpe, 2002; Webster & Ellis, 1996) and evidence that female survey respondents are more likely to skip questions in multiple choice settings (Coffman, 2014a; Riener & Wagner, 2017), Bucher-Koenen et al. (2021) show that the gender gap in financial literacy reflects both lower knowledge regarding financial matters, but also lack confidence. More specifically, lower confidence, particularly among women, affects the measurement of financial knowledge and thus causes an underestimation of financial literacy among less confident groups.

We build on this work and propose a new experimental setup to analyse whether and to what extent confidence contributes to the gender gap in financial literacy and financial behaviour. Bucher-Koenen et al. (2021) implement a within-individual approach to identify the contribution of confidence to the gender gap in financial literacy and financial behaviour. Our experiment uses a between-subjects design. We also extend the set of financial literacy questions and use five questions, which measure knowledge about several basic but fundamental financial concepts, including compound interest, inflation, risk diversification, credit interest, and loan repayment.Respondents in the control group receive the standard mode of the financial literacy questions, including the options to refuse to answer and to indicate that they "do not know." Respondents in the treatment group do not have the option to select "do not know" as an answer and cannot refuse to answer. Furthermore, treated respondents receive a follow-up question on how confident they are in their answer. This follow-up question allows respondents to "admit to guessing" – that is, we allow respondents to indicate that they did not know the answer but guessed. With this design we can measure financial literacy while taking care of systematic differences in the response behaviour caused by differences in confidence. Allowing respondents to admit to guessing is an important methodological innovation vis-à-vis the approach of Bucher-

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[1] Many programs specifically target women and girls to deliver financial education. The interventions are coordinated governmental strategies (see, for instance, Hung et al., 2012; Monticone, 2023) or privately funded programs targeted at specific subgroups of the female population (examples include Park et al., 2021 for students and DeVaney et al., 1996 for working women in the US, or Frisancho et al., 2008 for Peruvian micro-entrepreneurs).

Koenen et al. (2021) with implications for measuring financial knowledge. More generally, it is also important for other multiple choice survey questions which include an option to select "do not know" and which could be influenced by confidence of respondents. We use admitted guesses to adjust the responses to the financial literacy questions and treat them as incorrect responses. This method provides us with a measure of true financial knowledge without econometrically modelling each respondent's probability of genuinely knowing the answer to the respective financial literacy question. Hence, the treatment group's financial literacy measure is neither plagued by the measurement error introduced by low confidence nor by measurement error caused by respondents guessing the correct answer. Overall, our empirical strategy allows for estimating the association between financial literacy and financial behaviour while separately controlling for the respondents' confidence level.

First, we find a pronounced gender gap in financial literacy. Men provide the correct answers to the financial literacy questions significantly more often than women, both in the treatment and the control group. Moreover, women are more likely to indicate that they do not know the answer than men. If the "do not know" option is unavailable, both men and women answer correctly more often, but the increase in correct answers is significantly larger for women. That is, compared to women in the control group, women in our treatment group answered 0.7 additional questions correctly (of the five financial literacy questions included in our survey). In contrast, treated men answered 0.4 additional questions correctly compared to men in the control group. When we account for the number of admitted guesses, these results are qualitatively unaffected: Compared to women (men) in the control group, treated women (men) provide 0.4 (0.2) additional correct answers. Hence, we confirm the finding of Bucher-Koenen et al. (2021) that removing the "do not know" response option reduces the gender gap in financial literacy – this is notable since we use a different experimental design.

Second, we find that about two-thirds of the gender gap in financial literacy can be explained by lower financial knowledge, and the remaining third is associated with lower confidence of women in their financial knowledge. This finding supports the notion that though women, on average, have less financial knowledge, they often know more than they think. Interestingly, the order of magnitude of the effect is almost identical to earlier results reported by Bucher-Koenen et al. (2021) based on Dutch data collected almost a decade earlier and using a different experimental approach.

Third, our results underline that confidence in financial knowledge is an important determinant of stock market participation. One standard deviation above average level of confidence is associated with an about seven to nine percentage points higher level of stock market participa-

tion. We show that the association between financial literacy and stock market participation is substantially lower when we account for differences in confidence in financial knowledge. Hence, our results underline that *how* we measure financial literacy is important, and it is crucial to collect data on confidence to understand gender differences in financial literacy and behaviour.

We contribute to several strands of the literature. We add to the vast literature on gender differences in financial literacy. We not only confirm earlier findings of significant gender gaps in financial literacy related to "do not know" responses (Bannier & Schwarz, 2018; Bertola & Lo Prete, 2024; Bucher-Koenen et al., 2017; Z. Chen & Garand, 2018; Conte et al., 2024; Driva et al., 2016; Kim & Mountain, 2019) but also further the understanding of the determinants of this gap. On a more general level, our findings relate to the literature on gender stereotypes (Bordalo et al., 2019; Carlana, 2019) and (self-)stereotyping (Coffman, 2014b).

We also add to the emerging methodological discussion on financial literacy measurement (Hospido et al., 2024; Tranfaglia et al., 2024). We follow the design of Bucher-Koenen et al. (2021) and show that asking about the respondent's confidence in the provided answers to the financial literacy questions allows to disentangle the confidence and knowledge dimensions that may impede sound measurement of financial knowledge. In contrast to their within-subjects design, our between-subjects implementation eliminates concerns regarding learning and attrition between surveys. Furthermore, allowing respondents to report whether they guessed their answer in the follow-up question enables us to remove the noise introduced by forced responses without relying on a latent class model. Our approach thus offers a simple and cost-effective way to improve the measurement of financial capability that can be applied in other cross-sectional studies.

More generally, our findings contribute to our understanding of measuring competencies using survey techniques that are relevant to and discussed in various disciplines. Our findings relate to insights in neuroscience and psychology on metacognition which describes individuals' ability to recognize their successful cognitive processing (Fleming & Lau, 2014). We focus on three concepts: metacognitive bias, sensitivity, and efficiency. Metacognitive bias corresponds to over- and underconfidence, more commonly used in economics and finance. Metacognitive sensitivity is the ability of individuals to distinguish between their own correct and incorrect responses, and metacognitive efficiency describes how sensitivity differs by task difficulty. Our proposed financial literacy measure allows insights into respondents' metacognitive bias, sensitivity, and efficiency. We find evidence for substantial gender differences in metacognitive bias. Men are significantly more confident in their responses to financial literacy questions than women, both when they provide the correct answer and when they do not. Confidence is pos-

itively correlated with answering correctly, which provides evidence of sensitivity. However, we do not find systematic gender differences in sensitivity, as the association between confidence and correct responses is insignificantly different between men and women. Moreover, we find that the correlation between confidence and correct answers is significantly lower for difficult questions, indicating metacognitive efficiency, similarly for both men and women.

Finally, our findings relate to studies from various disciplines on response behaviour in multiple-choice tests more broadly. These contributions have shown that the measurement of knowledge may be impeded by including the option to state "do not know" (Lizotte & Sidman, 2009; Mondak & Davis, 2001; Mondak, 2001), as women are more likely to refuse to answer or report that they do not know the answer (Espinosa & Gardeazabal, 2020; Karle et al., 2022; Montolio & Taberner, 2021; Saygin & Atwater, 2021) and are less willing to guess (Ben-Shakhar & Sinai, 1991; Coffman & Klinowski, 2020; Coffman, 2014a) even without penalties for incorrect answers (Pekkarinen, 2015). We contribute to this literature and show that the observed gender differences in financial literacy are related to differences in confidence in knowledge and how it this influences response behaviour.

How we measure financial literacy matters for the relationship between financial literacy and financial behaviour.[2] We confirm earlier studies, which find a positive relationship between financial literacy and stock market participation (see, for example Bucher-Koenen et al., 2021; van Rooij et al., 2011). We show that financial behaviour is significantly associated with confidence in one's financial knowledge. This finding is related to the literature that highlights the positive association of financial behaviour with "perceived" financial literacy (Allgood & Walstad, 2015; Anderson et al., 2017; Lusardi & Mitchell, 2017), which is especially relevant for women (Bannier & Neubert, 2016). Moreover, confidence and financial literacy are essential when interacting with financial advisors (Bucher-Koenen et al., 2023).

Our findings have implications for financial education policies. Closing the gender gap in financial inclusion requires educational programs to improve women's financial knowledge. However, our results underline the need to combine these programs with initiatives to foster women's confidence and confront gender stereotypes around the financial domain.

In the next section, we provide an overview of the experimental setup and describe our data. Section 3 shows the results of our experiment and the implications for the gender gap in financial literacy. We highlight the implications for financial behaviour, focusing on stock market participation in section 4. Finally, we discuss implications of our findings in section 5.

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[2]For an overview of the literature, see Lusardi and Mitchell (2011, 2014).

2 Sample and experimental design

2.1 Sample

The experiment was part of a larger survey on the social security system in Germany and conducted by a German survey agency on behalf of the Leibniz-Centre for European Economic Research (ZEW) between October 8 and December 9, 2020. The majority of the surveys are delivered as Computer Assisted Web Interviews (CAWI, $N_{CAWI} = 4,993$).[3] Our sample is representative for the German-speaking resident population in the Federal Republic of Germany aged 30 and above living in private households.[4]

2.2 Experiment

We conducted a between-subjects survey experiment in order to disentangle financial knowledge and confidence, and at the same time correct for guessing behaviour. Survey participants were informed that the data were used for scientific purposes only and collected within a research project on "securing the living standard and social security" by a public research institute. Following questions on demographic characteristics in a screening interview, respondents of our target population were invited to participate in the full survey. The survey included a module on expectations, home ownership, preferences and attitudes, saving for retirement and financial wealth.

At the beginning of our experiment, we randomly allocated respondents to the control or treatment group by drawing a random number, assigning one out of four participants to the treatment. All respondents were asked to answer five financial literacy questions with multiple-choice answer options. Respondents in the control group received the standard question mode including a "do not know" response option. Respondents could also "refuse" to answer by providing "no response." Respondents in the treatment group did not receive the "do not know" and "no response" options.

Both experimental groups received five questions on financial literacy. The first three questions are closely related to the "Big-3" financial literacy questions proposed by Lusardi and Mitchell (2011). While questions on the basic understanding of inflation and risk diversification are German translations of the "Big-3 financial literacy questions", the interest rate question is more complex than the standard interest question, as the possible answer options target the

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[3]179 surveys were collected as pen and paper surveys. We exclude those respondents because they received the standard financial literacy questionnaire by default. Including these individuals does not change the results, which are available upon request.

[4]The descriptive statistics presented here are weighted to achieve the representativeness of our target population but are qualitatively the same without weights. See Appendix A for details about the weighting procedure.

understanding of compound interest. The fourth and fifth questions relate to the debt literacy module proposed by Lusardi and Tufano (2015) and cover credit interest rates and loan repayment, respectively.

Following an introductory screen informing respondents about a "short quiz on financial knowledge," respondents received the following questions (with correct answers in bold):

1. **Compound interest question:** Suppose you had EUR 100 in a savings account, and the interest rate was 2% per year. After five years, how much do you think you would have in the account if you left the money to grow? **More than EUR 110** / Exactly EUR 110 / Less than EUR 110 / *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 one year, would you be able to buy the exactly same as, more than, or less than today with the money in this account? More / Exactly the same / **Less than today** / *Do not know / Refuse to answer*

3. **Risk diversification question:** Do you agree with the following statement: "Buying a single company stock is less risky than investing in a mutual fund with stocks of similar companies"? I agree / **I disagree** / *Do not know / Refuse to answer*

4. **Credit interest question:** Suppose you take out a loan of EUR 1,000 from the bank at an interest rate of 20% per year. If you do not pay anything off at this interest rate, how long will it take to double the amount you owe the bank? Less than 2 years / **2 to less than 5 years** / 5 to less than 10 years / 10 years or more / *Do not know / Refuse to answer*

5. **Loan repayment question:** Suppose you have taken out a loan of EUR 3,000 with the bank. You pay the minimum payment of EUR 30 per month to the bank. The annual interest is 12% (or 1% per month). How many years will it take to pay off this loan? Less than 5 years / Between 5 and 10 years / Between 10 and 15 years / **Never, the debt will remain** / *Do not know / Refuse to answer*

Following each of these questions, treated respondents received a follow-up question about how confident they are regarding their response ("How confident are you about your response?"). We measured the respondents' confidence on a scale ranging from "0 (not confident)" to "10 (very confident)." This follow-up question also included the option to report that the respondent did not know the answer but guessed ("I did not know the answer, I guessed"). In the following, we refer to these responses as *admitted guesses.*

2.3 Composition of Experimental Groups

Our data include 3,715 respondents in the control group and 1,212 treated participants. Overall, our sample displayed in Table 1 includes 51.4% of respondents who self-identified as female and 48.6% who self-identified as male. The treatment and control groups are not significantly different regarding the number of children, marital status, age, monthly household net income, home ownership status, region of living within Germany (East/West), retirement status, stock market participation, and a proxy for general risk aversion. However, despite randomization, there is a significant imbalance regarding educational attainment. A significantly larger share of respondents in the treatment group has an upper education level compared to the control group. Moreover, a significantly larger share of the treatment group holds a university or college degree. Since earlier studies show a positive relationship between educational attainment and financial literacy (Bucher-Koenen et al., 2024; Bucher-Koenen & Lusardi, 2011), we control for socioeconomic and demographic characteristics in all our analyses. This is necessary to ensure that the differences in educational attainment do not drive our results.

[Table 1 about here]

3 Experimental Results

3.1 Responses to Financial Literacy Questions

In Table 2, we present the answers to the five financial literacy questions for the treatment and control group separately for men and women. Moreover, the last three columns of the Table present the answers among the treatment group after we adjust for the number of "admitted guesses" of respondents who do not know the answer to the respective financial literacy question.

The first question measures the understanding of compound interest. Our control group received questions including the "do not know" option. In our control group 49.5% of respondents answered the interest question correctly. This fraction of correct answers is lower compared to results using the question format without compounding [5]. The share of correct answers is significantly lower in the control group compared to the raw answers in the treatment group: 54.6% of respondents in the treatment group answered the interest question correctly (difference of 5.1 percentage points, $p = 0.008$).[6] We force answers in the treatment, but in return, allow respondents in the follow-up question to answer that they do not know the answer but guessed ("admitted guessing"). In the last three columns of Table 2, we tabulate the answers in the

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[5]SeeBucher-Koenen et al. (2024) for recent evidence based on a large-scale sample of German respondents of Deutsche Bundesbank's Panel on Household Finances (PHF).

[6]We test differences using weighted t-tests. We did not include the results in Table 2 for brevity.

treatment group but set responses of individuals who admitted to having guessed a response to zero. While the treatment increases the share of correct answers to the compound interest question, 9.5% of treated respondents admit to guessing. Adjusting for these admitted guesses reduces the share of correct answers to 50.9%. As a result there is an insignificant difference in the share of correct answers between the treatment and control group of 1.4 percentage points ($p = 0.475$).

[Table 2 about here]

Table 2 also provides insights into the gender gap in the share of correct answers. Among the control group, we find that 56.7% of men answered the interest question correctly, compared to 42.6% of women. The gender gap of 14.1 percentage points is significant ($p = 0.000$). Furthermore, women tend to report significantly more often that they do not know the answer or refuse to answer than men. Whereas 15.0% of women pick "do not know" or refuse to answer, only 7.1% of men do. For ease of exposition we summarize the responses "do not know" or refuse to answer and refer to them using the abbreviation DNK. This sizeable gender gap in the tendency to pick DNK of 6.9 percentage points is significantly different from zero ($p = 0.000$). In the treatment group, when the DNK option is not available, 60.8% of men and 49.3% of women pick the correct answer. The gender difference in the share of correct answers decreases to 11.5 percentage points, which is still sizeable and significant ($p = 0.000$). Men and women also differ in their share of admitted guessing. We find that 7.3% of male respondents admit guessing, compared to 11.3% of women. This gender gap in guessing of 4.0 percentage points is significant ($p = 0.017$) and has implications for the "adjusted" gender gap regarding the number of correct answers. Accounting for guessing decreases the gender gap in the share of correct answers to the compound interest question to 12.2 percentage points, as 57.5% of men and 45.3% of women answer the question correctly (after adjusting for admitted guesses).

Notably, the gender gaps in the share of correct answers do not differ significantly between the treatment and control group, irrespective of whether we adjust for admitted guesses. The difference between the control group's gender gap and the adjusted gender gap in the treatment group is 1.9 percentage points ($p = 0.570$), and the difference between the gender gap in our control group and our treatment group's "raw" gender gap is 2.6 percentage points ($p = 0.427$).

The second question measures the understanding of inflation. Similarly to earlier contributions (for example Bucher-Koenen et al., 2024) we find that the majority of respondents answers this question correctly. Our results show that 75.0% of respondents in the control group provided the correct answer, and only 13.4% reported DNK. In contrast, 82.5% of treated respondents answered correctly. The difference in correct answers between both experimental conditions of

7.5 percentage points is significant ($p = 0.000$). However, 10.6% of treated respondents admitted guessing in the follow-up question. Adjusting for guesses reduces the share of correct answers to the inflation question among treated respondents to 75.2%, implying an insignificant difference between the share of correct answers between the control and adjusted treatment group of 0.2 percentage points ($p = 0.904$).

Similar to the first question, more men and women in the treatment group answered the inflation question correctly, compared to the control group. 84.9% of treated men and 80.4% of treated women provide the correct answer. In contrast, 81.0% of men and 69.3% of women in the control group answered correctly. The gender gap of 11.7 percentage points in the control group is significant ($p = 0.000$) and considerably larger than the "raw", unadjusted gender gap among treated respondents of 4.5 percentage points (significantly different from zero, $p = 0.038$). Furthermore, these gender gaps are significantly different from each other (difference of 7.2 percentage points, $p = 0.011$). A much higher percentage of women in the control group indicates that they do not know an answer compared to men (17.9% vs. 8.9%). The difference of 9.0 percentage points is significant ($p = 0.000$). Similarly, 14.9% of treated women and only 5.6% of treated men admit guessing. The differences between men and women in admitted guessing are comparable to the gender difference in the DNK in the control group (difference of 9.3 percentage points, $p = 0.000$). In contrast to the first question, adjusting for admitted guesses widens the gender gap substantially to 11.7 percentage points. Hence, the difference between the gender gap in the control group (11.8 percentage points) and the gender gap in the adjusted treatment measure (11.7 percentage points) is small and not significantly different from zero ($p = 0.971$).

The third question assesses the respondents' knowledge of risk diversification. 56.5% of respondents in the control condition answered this question correctly. This question differs from other financial literacy questions of our questionnaire due to the very high share of 35.2% of respondents answering with DNK in the control group. 25.6% of men and 44.5% of women choose this option. In contrast, most respondents in the treatment group provided the correct answer (82.8%), and only a small share of respondents admitted guessing in the follow-up question (9.3%). The large difference between the share of correct answers in the control condition and the share of correct "raw" answers (26.3 percentage points) is significant ($p = 0.000$). When we adjust for admitted guesses, the share of correct answers is still large (75.6%) and significantly larger than the share of correct answers in our control group (difference of 19.1 percentage points, $p = 0.000$).

Most male respondents in the control group provided the correct answer to the risk diversification question (65.4%), but only 47.9% of women in the control group did. The gender gap

of 17.5 percentage points is significant ($p = 0.000$). However, the gender gap is considerably smaller in the treatment group. With forced responses, 84.1% of men and 81.6% of women pick the correct answer, which reduces the gender difference to 2.5 percentage points and renders it insignificant ($p = 0.259$). When correcting for admitted guesses, we find that 79.3% of men and 72.3% of women did not guess and answered correctly, resulting in a larger gender gap of 7.0 percentage points, which is significantly different from zero ($p = 0.005$). Similar to the previous questions, the share of women who admit guessing is significantly larger (12.3%) than among men (5.9%). Interestingly, the gender gap in DNK responses is much larger than the gender gap in admitted guesses: 25.6% of men and 44.5% of women in the control group selected DNK, resulting in a significant gender gap of 18.8 percentage points that is substantially larger than the gender gap in admitted guessing (6.5 percentage points).

We now turn to the credit interest question, the first of the two debt literacy questions. Less than half of the respondents in the control group correctly respond that it will take "2 to less than 5 years" for a credit of EUR 1000 to double at an interest rate of 20 percent (43.4%), which is significantly lower than the 55.1% of treated respondents who answer correctly (difference of 11.7 percentage points, $p = 0.000$). In the control group, about one in five respondents selected the DNK response (22.4%). Among all financial literacy questions in our survey, the credit interest question has the largest share of admitted guesses (14.2%). Note that the share of admitted guesses is still lower than the share of DNK in the control group. Accounting for admitted guessing reduces the share of correct answers among treated respondents to 48.8%, which is significantly higher ($p = 0.001$) than the share of correct answers in the control group (by 5.4 percentage points).

We find a pronounced gender gap in the share of correct answers in both treatment conditions. In the control group, 52.8% of men and 34.2% of women answered the question correctly, resulting in a significant gender gap of 18.6 percentage points. When we consider the "raw" share of correct answers in the treatment group, we find that 63.3% of men and 48.1% of women answer the question correctly, which implies a slightly smaller gender gap of 15.2 percentage points. This difference is significant ($p = 0.000$) but insignificantly different from the gender gap in the control group ($p = 0.301$). 18.6% of women and 9.1% of men admit guessing the answer to this question. Adjusting the answers in the treatment group leaves 58.3% of men and 40.6% of women with correct answers. The gender gap in the adjusted shares of correct answers is still significant ($p = 0.000$), with 17.7 percentage points even closer to the gender gap in our control group. Similar to the risk diversification question, we also find a sizeable gender gap in the share of DNK, with a significantly higher share of women (30.3%) choosing these options

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compared to men (14.2%).

The second debt literacy question is on loan repayment and appears to be the most difficult among the five financial literacy question. Only a minority in both treatment and control group provided the correct answer. Among the control group, 24.4% answered this question correctly, significantly fewer than the 31.0% correct "raw" answers among treated respondents ($p = 0.000$). While 21.7% in our control group responded with DNK, just 13.8% of treated respondents admitted that they did not know the answer but guessed. Adjusting the treatment group's responses using admitted guesses shows that 28.0% answered correctly, which is significantly higher than among our control group ($p = 0.015$).

The gender gap in the share of correct answers is sizeable in both groups. 32.3% of men and 16.8% of women in the control group answered correctly, which is lower than the share of raw correct answers among men (40.5%) and women (22.8%) in our treatment group. The gender gap is lower but still significant if we control for admitted guesses. Accounting for this leaves us with 37.5% correct answers among men and 19.8% correct answers among women. These gender differences are significantly different from zero ($p = 0.000$), although they are not significantly different from each other. Women pick DNK significantly more often than men (28.4% of women vs. 14.9% of men, $p = 0.000$), and women also admit guessing significantly more often than men in our treatment group (17.5% of women vs. 9.4% of men).

The last two panels of Table 2 show the number of correct answers across the "Big-3" financial literacy questions and to all financial literacy questions included in our survey (which we call "FL-5" for brevity). Among respondents in the control group, 30.7% answered all three of the "Big-3" questions correctly. In the treatment group, a significantly larger share of 42.8% answered all of these questions correctly. This also holds when we adjust for the admitted guesses in the follow-up question, leaving us with 38.0% of the respondents who answer all three questions correctly. The share of male respondents correctly answering all "Big-3" questions is considerably larger than the share of female respondents, which is true for both the control group (39.6% of men vs. 22.1% of women) and the treatment group (51.7% of men vs. 35.2% of women). Similarly, adjusting for admitted guesses leaves us with 47.6% of men and 29.7% of women who provided all correct answers.

The results are comparable when we turn to the second financial literacy measure of interest, the "FL-5"-count-measure. When we account for all financial literacy questions, the gender difference in the percentage of respondents correctly answering all questions increases considerably. The share of respondents that answered all questions correctly is lower, with 11.3% in the control group and 15.1% "raw" correct answers to all questions in the treatment group. While

adjusting for admitted guesses reduces the share of correct scores to 13.3%, it is still significantly higher than in the control group ($p = 0.000$).

In the control group, a larger share of men than women answered all financial literacy questions correctly (17.4% vs. 5.4%, $p = 0.000$), and a larger share of men answered four of these questions correctly (21.9%), compared to women (12.2%). Similarly, the treatment group's share of respondents answering all questions correctly is higher among men (23.8%) than among women (7.7%). The gender gap decreases by about 0.8 percentage points when adjusting for admitted guesses, with 21.6% of men having all answers correct versus 6.3% of treated women.

3.2 Financial Literacy Measures

We present regression analyses of the financial literacy count measures in Table 4. We focus on two measures based on the "Big-3" financial literacy questions and on all five financial literacy questions included in the survey (which we refer to as "FL-5"). We run OLS regressions on both count measures and use gender, the treatment status, and their interaction term as explanatory variables. In all regressions, we control for a wide range of socioeconomic and demographic characteristics, including marital status, number of children, age, education, home ownership, net income and a dummy for living in East Germany. In columns 1 and 3, we compare the number of correct answers in our control group with the answers of our treatment group, in columns 2 and 4, we adjust the treated respondents' answers for admitted guesses.

[Table 4 about here!]

Our findings indicate that it is crucial to consider gender differences when analysing the effect of the treatment. The results in Table 4 point towards a significant difference in the number of correct answers between the treatment and control groups for women but not necessarily for men. Comparing the "raw" number of correct answers to the "Big-3" financial literacy questions in column 1, we find that treated men (mean= 2.26 correct answers) give 0.190 additional correct answers compared to men in the control group (mean= 2.07). Similarly, treated women (mean= 2.10) answered 0.437 more questions correctly, compared to women in the control group (mean= 1.67). Therefore, before adjusting for admitted guesses, the difference between treated women and women in the control group is significantly larger than between treated men and men in the control group (by about 0.247 additional correct answers to the "Big-3").

When we compare the adjusted number of correct answers to the "Big-3" financial literacy questions of treated men (mean= 2.14) and men in our control group, we find an insignificant difference of 0.0729 additional correct answers ($p = 0.090$). In contrast, treated women answered

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significantly more questions correctly after adjusting for admitted guesses (mean= 1.89) than women in the control group. The difference between women in the treatment and control group is significantly larger than between men in the treatment and control group (by about 0.145 additional correct answers). Our results are virtually unchanged if we consider the responses to all financial literacy questions instead. This is shown in columns 3 and 4 of Table 4.

In summary, our results show that the standard way of asking about financial literacy potentially leads to large gender gap in financial literacy which is related to they way in which the questions are asked. Women reported more often that they do not know the answer or skip the questions, which makes their financial literacy appear lower than men's. When these options are unavailable, the gender gap in financial literacy diminishes considerably. Our results show that as much as 35.7% of the gender difference in the share of correct answers is associated with differences in response behaviour and confidence.[7] The results are also similar if we include the two debt literacy questions. We find that about one-fourth (24.3%) of the gender gap conditional on socioeconomic and demographic characteristics can be attributed to differences in response behaviour and confidence.[8]

In summary, our results closely resemble the findings of Bucher-Koenen et al. (2021), albeit using a different experimental design and a sample from a different country. Based on a within-subjects design with a sample of Dutch individuals, they report an financial literacy gender gap of 0.361 using the standard financial literacy questionnaire with DNKs and controlling for similar demographic and socioeconomic characteristics as we do. This is comparable to the gender gap in our control group of 0.410. Furthermore, when Bucher-Koenen et al. (2021) use their 'true knowledge' measure estimated with a latent class model, they find a gender gap of 0.225, which is comparable to the financial literacy gender gap of 0.253 we find in our treatment group after adjusting for guesses.

3.3 Test for Randomly Guessing the Correct Answer

To ensure that our results are not driven by respondents guessing the correct answer, we provide a formal test using the "financial numeracy" measure proposed by Von Gaudecker (2015). If the DNK or refusals in our control group's standard financial literacy questionnaire reflect only missing knowledge, we would expect them to pick an answer at random under forced responses. Von Gaudecker (2015) proposes to assign a value of zero for incorrect responses, a value of one for

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[7]That is, using our results on the gender gap in financial literacy across treatment status (conditional on demographic and socioeconomic controls, see in column 2 of Table 4), the gender gap in our treatment relative to our control group is about $0.145/0.406 = 35.7\%$.

[8]Using our results on the gender gap in financial literacy across treatment status (conditional on demographic and socioeconomic controls, see column 4 of Table 4) the gender gap in our treatment relative to our control group is about $0.177/0.729 = 24.3\%$

correct responses, and a value of $1/(n)$ for DNK/Refusals, with n being the number of available options (that is $1/3$ for the question on compound interest and inflation questions, $1/2$ for the risk diversification question, $1/4$ for the credit interest and loan repayment questions). As we randomly assigned our treatment among survey participants, we should find an insignificant difference between the "financial numeracy" measure and our treatment if our finding can be explained only by random guessing.

[Table 5 about here!]

Panel A of Table 5 displays the results for the "financial numeracy" measure by gender for all financial literacy questions and both count measures. Panel B includes the unadjusted responses to the financial literacy questions in our treatment for reference.

The "financial numeracy" measure reveals a significant gender gap in financial literacy. A gender gap remains even when assuming that all respondents who indicated they did not know the answer or refused to answer would randomly pick an answer. The share of correct answers is consistently lower for women than for men across all questions, with the gap ranging from 7.8 to 13.6 percentage points. This disparity is further underscored by the sizeable difference in both count measures, with men consistently outperforming women.

In Table 6, we compare the "financial numeracy" measure with our treatment, separately for men and women. Our treatment consistently finds higher shares of correct answers than the "financial numeracy" approach. The difference between both approaches is significant for the risk diversification and credit interest questions for both genders. We also find a significantly higher share of correct answers to the inflation question in our treatment than in the financial numeracy methodology for women. The gaps between both approaches are sizeable, reaching up to 10.2 percentage points for the risk diversification question for women. Across all financial literacy questions, women (men) answered 0.245 (0.193) additional questions correctly.

[Table 6 about here!]

Hence, these results suggest that our treatment uncovers a higher share of correct answers than expected if all respondents that would choose DNK/Refusal in the standard pick an answer randomly due to forced responses and subsequently do not admit guessing. Hence, we confirm the notion of Bucher-Koenen et al. (2021) that the DNK/Refusals contain more information than missing knowledge. In the next section, we relate our findings to the treatment group's stated confidence in their responses measured in the follow-up question.

3.4 Confidence in Knowledge

Treated respondents receive a follow-up after every financial literacy question, in which we ask about the confidence they put in their answers to the preceding questions. Respondents can report their confidence on a scale from "0 (not confident)" to "10 (very confident)." This question also included the option to indicate that the respondents did not know the answer but guessed. We present an overview of the average level of confidence men and women of our treatment put into their answers in Table 7.

[Table 7 about here!]

Our results show that respondents are relatively confident in their answers to the financial literacy questions. The average confidence level among respondents who did not admit guessing ranges from 6.8 for both debt literacy questions (the credit interest and loan repayment questions) to 7.6 for the inflation question. Across all financial literacy questions included in our survey, being "completely confident" is the modal response.[9]

Across all questions, respondents who answered correctly were significantly more confident in their responses than those who answered incorrectly. The difference in the average confidence level is significant and ranges between 0.97 points for the credit interest question and 3.28 points for the inflation question. [10]

Comparing the results for men (columns 5-7) and women (columns 8-10) highlights a persistent gender gap in confidence. Men are significantly more confident in their answers than women across all financial literacy questions. The gender gap ranges between 1.26 points for the loan repayment question and 1.58 points for the credit interest question.[11]

Combining differences in confidence across genders and the responses to the financial literacy questions reveals three remarkable patterns. First, both men and women who answered correctly were significantly more confident in their responses than those who did not. Men who answered correctly are between 0.86 points (credit interest question) and 3.14 points (inflation question) more confident than men who did not give the correct answer (both differences are significant, $p = 0.000$). Similarly, women who answered correctly were significantly more confident than women who answered incorrectly, with differences ranging from 0.66 points (credit interest question) to 3.20 (inflation question). Second, while men who answered correctly are significantly

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[9]Note that this also holds when we treat respondents who do not know the answer to the respective financial literacy question and admit guessing as being "not confident at all."

[10]The t-tests on the equality of means, the Wilcoxon rank-sum (Mann-Whitney) tests, and the non-parametric equality-of-medians test all reject the Null that the confidence levels between correct and incorrect respondents are the same ($p = 0.000$). These results are available upon request.

[11]The t-tests on the equality of means all reject the notion that the gender gap regarding the confidence level equals zero ($p = 0.000$). Results are available upon request.

more confident in their responses than any other group, women who answered incorrectly are the least confident across all financial literacy questions. Third, the confidence levels are similar for women answering correctly and men answering incorrectly for the compound interest (difference -0.20 points, $p = 0.441$) and risk diversification question (difference 0.49 points, $p = 0.110$). Women are also significantly less confident in their correct answers to the credit interest question than men answering incorrectly (difference -0.70 points, $p = 0.006$).

[Table 8 about here!]

We further analyse the association between confidence in and correctness of the response to question q_i in a regression framework. We include a gender dummy and an interaction between gender and correct answers to question q_i. For this question-level analysis, we cluster standard errors at the respondent level. Table 8 presents our results without (column 1) and with socioeconomic and demographic controls (column 2).[12]

Our findings confirm the insights outlined above, which also hold when controlling for socioeconomic and demographic characteristics. Men providing the correct answer are significantly more confident than men providing an incorrect answer (+1.53 points on the confidence scale, $p = 0.000$), and women are less confident than men if they provide an incorrect answer (-1.11, $p = 0.000$). Notably, our results also highlight that women who provided the correct answer are similarly confident as incorrect men (+0.19, $p = 0.188$).[13]

Thus, there are substantial gender differences in the levels of confidence. On average, women are significantly less confident in their knowledge than men across all financial literacy questions and conditional on providing correct or incorrect responses.

3.5   Relating our findings to metacognition

Our results shed light on financial knowledge and confidence and offer insights into the respondent's "thinking about their thinking" (Flavell, 1979), their metacognitive processes. Metacognition, a concept studied intensively in neuroscience and psychology, describes an individual's ability to assess or monitor their own knowledge. In this section, we interpret our findings in light of the concepts described by Fleming and Lau (2014). Specifically, we consider three aspects of metacognition: metacognitive bias, sensitivity, and efficiency.

Metacognitive bias refers to the general tendency to over- or underestimate one's performance, which relates to the notions of under- and overconfidence more commonly used in the

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[12]To include the full set of responses to the follow-up question on confidence, we treat respondents that admitted guessing as reporting no confidence in their response, though the results are qualitatively similar when excluding them.

[13]See Table B.1 in appendix B for analyses of the level of confidence respondents put into each financial literacy questions included.

literature on economics and finance. We provided evidence on metacognitive bias in Table 7. Our results highlight substantial differences in the average level of confidence across genders, with men reporting higher confidence levels for correct and incorrect responses, which suggests a potential miscalibration of women relative to men.

Metacognitive sensitivity describes how confidence discriminates between correct and incorrect answers. Hence, higher sensitivity describes a more positive association between confidence and answering correctly. We provide insights in Table 7, which highlights that respondents provide, on average, higher levels of confidence if they provide the correct answer, compared to their confidence for an incorrect answer. Moreover, appendix D provides additional evidence using the commonly employed Goodman-Kruskal γ coefficient proposed to measure metacognitive sensitivity by Nelson (1984). We find significantly positive γ for all questions included in our experiment, indicating high confidence associated with correct answers and low confidence with incorrect answers.

One drawback of this measure is that γ is sensitive to metacognitive bias, which makes group differences difficult to interpret (Masson & Rotello, 2009). To disentangle gender differences in metacognitive bias and sensitivity, we consider the regression results in Table 8. As described in section 3.4 in greater detail, women are less confident when providing correct and incorrect answers, indicating a metacognitive bias relative to men. However, the insignificant interaction terms highlight that the association between correctness and confidence does not differ significantly across genders, which implies similar metacognitive sensitivity for both men and women.

[Table 9 about here!]

Finally, we provide insights into the degree of metacognitive efficiency in results presented in Table 9. Following Fleming and Lau (2014), we consider how our measure of metacognitive sensitivity varies across question difficulty, which we define as the share of correct answers to each question. Similar to the analyses presented in Table 8 and described above, we analyse the association between confidence in provided answers, the correctness of the responses, and question difficulty in a regression framework. We analyse the associations on the question level, with standard errors clustered at the respondent level. The significantly negative interaction term of question difficulty and correctness of responses across all specifications in Table 9 highlights that the association between correctness and respondent's confidence is less pronounced for more difficult questions compared to easier ones. We find this considering all respondents in our treatment (column 1) and when we control for a wide range of socioeconomic and demographic characteristics (column 2). We also find evidence for metacognitive efficiency among treated

men (column 3) and women (column 4). However, the difference in metacognitive efficiency across genders is not significantly different from zero.[14]

Overall, our findings provide insights into gender differences in metacognitive bias, and overall metacognitive sensitivity and -efficiency, though both of these dimensions are similarly distributed across men and women.

4 Financial Literacy and Stock Market Participation

In this section, we show that how financial literacy is measured matters for the association between financial literacy and financial behaviour. We focus on stock market participation - a financial outcome, which has been studied frequently in the context of financial literacy. Earlier studies consistently find significant associations between traditional measures of financial literacy and stock market participation.[15] Lower levels of financial literacy among women might therefore have severe long-run consequences. In the following, we study whether and to what extent the associations uncovered in earlier contributions reflect a mix of financial knowledge and confidence.

Similar to earlier studies, we capture stock market participation using a dummy that equals one if the respondent holds investments in shares, equity funds, or real estate funds, and 0 otherwise.[16] Overall, 29.9 % of the respondents in the sample participate in the stock market, with significantly higher participation rates among men (36.4 %) than women (23.8 %).

The results of our regression analysis of the association between stock market participation, gender and financial literacy are presented in Table 10. In columns 1 and 3, we consider the association between gender and stock market participation in the control and treatment group, respectively. In both cases, we do not control for socioeconomic and demographic characteristics and find women to be significantly less likely to participate in the stock market, compared to men. The gender gap in stock market participation amounts to 11.2 percentage points in the control group, and 17.0 percentage points in our treatment group. [17]

In all other columns of Table 10, we account for a wide range of socioeconomic and demographic characteristics, including marital status, the number of children living in the respondent's

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[14]The p-value of the Hausman-test of the difference in the coefficients of the interaction terms of men (column 3) and women (column 4) is 0.9024. Note that this also holds when we do not control for socioeconomic and demographic characteristics.

[15]See Lusardi and Mitchell (2014) for a review, and Bucher-Koenen and Ziegelmeyer (2013) and Bucher-Koenen et al. (2024) for evidence on German data.

[16]We follow the convention of the literature and use OLS regressions to readily interpret coefficients as percentage-point differences, but probit regressions yield quantitatively and qualitatively similar results that are available upon request.

[17]Note that the gender gaps in stock market participation are insignificantly different across our treatment and control groups, as Table B.6 in Appendix B shows.

household, age, education, home ownership, monthly net income, living in East Germany, and retirement status. We also account for the participant's level of general risk aversion,[18] following previous research that highlights the significant role of the gender gap in risk aversion in explaining gender disparities in stock market participation (Almenberg & Dreber, 2015; Halko et al., 2012).[19]

[Table 10 about here!]

Furthermore, we consider the association between stock market participation and financial literacy, measured by the number of correct answers to the "Big-3" financial literacy questions. For ease of interpretation, we standardize the financial literacy measure by subtracting the mean and dividing the result by the standard deviation, both relative to the respondent's treatment status.[20] In column 2, we analyse the association of stock market participation with gender and financial literacy in our control group, accounting for the socioeconomic and demographic characteristics. When accounting for financial knowledge using the standardized measure of financial literacy, the estimated gender gap in stock market participation is substantially lower but remains significant. Women have a 4.9 percentage point lower chance of owning stocks than men. Moreover, a one standard deviation higher level of financial literacy results in a 7.9 percentage points higher chance of owning stocks. The size of these associations is comparable to those found in earlier contributions to the literature.

In the following columns, we consider the treatment group. Column 4 shows the association of the standardized "raw" measure, which does not adjust for admitted guesses. While this measure may contain noise due to guesses, it is unconfounded by low confidence. Our results indicate that a one standard deviation higher level of financial literacy is associated with a 5.8 percentage points higher chance of stock ownership. In column 5, we present the results based on the "adjusted" financial literacy measure. Beyond being unconfounded by low confidence, this measure should be unaffected by the noise introduced by guessing due to the forced responses as we adjust for admitted guessing. We find that one standard deviation higher level of financial literacy is associated with about 7.2 percentage points higher chance of stock market participation. In both regressions, controlling for financial literacy reduces the size of the gender gap in stock market participation substantially by about 12 percentage points, rendering it

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[18]We asked respondents about their willingness to take risks by asking: "How do you rate yourself personally: How willing are you to take risks in general?" Respondents could answer on an 11-point scale, ranging from "0 – Not at all willing to take risks" to "10 – Very willing to take risks." We use the inverted scale in as a control variable to allow for an interpretation as risk aversion.

[19]While our results are qualitatively similar without controlling for risk-aversion, the gender gap in stock market participation is bigger.

[20]That is, we use the mean and standard deviation of the financial literacy score of the control (treatment) group to standardize the score of respondents in the control (treatment) group.

insignificant for our analysis using adjusted financial literacy.[21]

The findings described in subsections 3.4 underline that women are substantially less confident in their financial knowledge, irrespective of whether they provide the correct answer. To directly capture this in our regression framework, we add confidence measures to our models, which allows us to further investigate the role of confidence conditional on financial knowledge. Table 11 presents the results of these specifications.[22]

[Table 11 about here!]

First, we focus on the results for our control group in column 1. We follow the strategy of Bucher-Koenen et al. (2021) and include the number of "do not know" responses and refusals to the "Big-3" questions of financial literacy as an imperfect proxy for low confidence in financial knowledge. Notably, we find a significantly negative association between the standardized number of "do not know" responses and refusals with stock market participation. A one standard deviation above average level of "do not know" responses or refusals is associated with an about 2.5 percentage points lower chance of participating in the stock market. Moreover, adding this measure to the regression reduces the point estimate of the financial literacy measure. A one standard deviation higher level of financial literacy is associated with a 6.1 percentage points higher chance of owning stocks in this specification (compared to 7.9 percentage points without the confidence proxy). Hence, by comparing the coefficient of our financial literacy measures in column 2 of Table 10 and column 1 of Table 11, we find that including this measure reduces the coefficient of our financial literacy indicator by about 22.3 % (that is, (0.0789 - 0.0613)/0.0789)).[23] The inclusion of the count measure of DNKs in our control group also moves the coefficient of financial literacy among respondents in the control group closer to the point estimate based on the treatment group (as presented in columns 4 and 5 of Table 10). This indicates that the standard estimate of financial literacy is affected by the respondent's confidence in financial knowledge and could be improved by including an (imperfect) proxy for this dimension. Nevertheless, this measure is likely very noisy because the number of DNKs captures both the inability to answer the question correctly and the respondents' low confidence in financial knowledge.

Giving respondents the option to admit to guessing when they do not know the answer

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[21]Our results are qualitatively similar when we include the debt literacy questions, see Table B.2 in appendix B.

[22]As the results are qualitatively similar when we include both debt literacy questions, we do not describe these results in detail, but include them in Table B.3 in appendix B.

[23]The association between the number of "do not know" responses and refusals with stock market participation and the reduction of the financial literacy coefficient after controlling for "do not know" responses and refusals is comparable to the result reported by Bucher-Koenen et al. (2021), that is a reduction of 26 % and an association of the number of "do not know" responses and stock market participation of -0.0279.

allows us to better disentangle the lack of knowledge and confidence. The results in column 2 of Table 11 include the standardized number of admitted guesses across the "Big-3" financial literacy questions in addition to the standardized count measure of financial literacy. We use this measure to capture the missing knowledge in analogy to the estimation strategy employed for the control group in column 1. Among treated respondents, a one standard deviation higher number of admitted guesses is associated with a 3.3 percentage points lower chance of owning stocks. Notably, the association between stock market participation and the financial literacy measure for our control group does not change substantially: a one standard deviation higher level of financial literacy is associated with a 5.5 percentage points higher chance of owning stocks, compared to 5.8 percentage points without accounting for admitted guesses (in column 4 of Table 10).

In contrast to the control group, respondents in the treatment group also report the confidence they put into their answers, allowing us to further disentangle the lack of knowledge and confidence. In column 3 of Table 11, we add the standardized average level of confidence the respondents have in their answers to the "Big-3" financial literacy questions. Our results show a significantly positive association with stock market participation. A one standard deviation above average confidence level is associated with a 7.6 percentage points higher chance of owning stocks. At the same time, the financial literacy coefficient is still significant but reduced substantially by 39.5 % to 0.0351 ((0.0580 - 0.0351)/0.0580), see column 4 of Table 10), which suggests that the confidence measure captures information relevant to explaining stock market participation and shows that some of the association between financial literacy and stock market participation works through the confidence channel.

Adding the number of admitted guesses to the model in column 4 of Table 11 does not change the results qualitatively. Both measures of financial literacy and confidence are significantly positively associated with stock market participation, and their associations with stock market participation are in the same order of magnitude as the results in column 3 of Table 11. In contrast, the coefficient of the number of admitted guesses is insignificantly different from zero in this specification. When controlling for financial knowledge and confidence explicitly using the number of correct answers and average confidence level, the admitted guesses only capture noise introduced by random guessing, which is unrelated to stock market participation.

Lastly, we turn to the adjusted measure of financial literacy in column 5 of Table 11. Instead of adding a count measure of admitted guesses as in columns 2 and 4, we directly adjust the responses to the financial literacy questions and treat guessing as incorrect answers. These results highlight a significantly positive association of both financial knowledge and confidence.

A one standard deviation higher confidence level is associated with a 6.7 percentage points higher chance of owning stocks. Notably, the adjusted measure of financial literacy is about 50.9 % smaller than in the specification without our confidence measure ((0.0717-0.0352)/0.0717, see column 5 of Table 10).[24] Our results are qualitatively the same when we include both debt literacy questions, as Table B.3 in appendix B shows.

Overall, our results confirm the findings of Bucher-Koenen et al. (2021). Both financial knowledge and confidence in financial knowledge are significantly positively associated with stock market participation. We find that accounting for confidence reduces the association between financial literacy and financial behaviour.

5   Discussion and Conclusions

In our treatment with forced responses, we find a substantially higher share of correct answers to the financial literacy questions than the standard financial literacy questionnaire, with the option to indicate "do not know" or to refuse to answer. Our method to account for admitted guessing highlights that some respondents who say they "do not know" the answer were able to provide the correct answer with some confidence. We further show that the share of correct answers in our treatment is significantly higher than expected if respondents randomly picked an answer. Our findings also have implications for the reported gender gap in financial literacy. Our methodology shows that as much as one-third of the gender gap in financial literacy could be related to women's lower confidence levels.

Our proposed methodology offers a practical and cost-effective way to disentangle knowledge and confidence, making it particularly relevant for cross-sectional studies. This approach is not only of interest to researchers aiming to estimate the connections between financial knowledge, confidence, and financial behaviour, but also to policymakers striving to bridge the gender gaps in financial knowledge and financial inclusion. Our analyses of financial behaviour reveal that both financial literacy and confidence are linked to stock market participation. Neglecting the role of confidence in financial behaviour could lead to financial education programs falling short of their objectives. Therefore, our methodology has the potential to significantly contribute to closing the gender gap in financial knowledge.

Recent experimental evidence shows that financial education programs (especially active learning environments) can foster financial knowledge (Kaiser & Menkhoff, 2022) and financial attitudes (Bruhn et al., 2016) and have substantial (intergenerational) spill-over effects (Fri-

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[24]Differentiating between very low confidence and random guessing could be challenging for respondents. The results are qualitatively similar when we treat very low confidence as random guessing, as Table 11 in appendix B shows.

sancho, 2022, 2023). In a recent meta-analysis of financial education programs, Kaiser et al. (2022) show that the positive treatment effects are not limited to financial knowledge but improve downstream financial behaviours. Our findings indicate that tailoring financial education programs to the needs of women is an integral component in closing the gender gap in financial literacy and financial inclusion.

Nevertheless, our findings suggest that standard financial education programs may not entirely close the gender gap in financial literacy. Our findings support policies and private initiatives to foster women's confidence. While our results cannot speak to the design of these interventions, earlier research shows that confronting substantial gender stereotypes around the financial domain (Bottazzi & Lusardi, 2021; Driva et al., 2016; Tinghög et al., 2021) and around quantitative tasks (Grosse et al., 2017) and strengthening the attitude and affinity of women with numbers (Skagerlund et al., 2018) are promising complementary strategies to close the financial literacy gender gap. Another potential pathway to spark interest in the topic, promote the acquisition of financial knowledge, and instil confidence is to enable and incentivize stock market participation directly. Experimental evidence of Jha and Shayo (2024) shows that trading stocks for only a few weeks improves financial knowledge, confidence, and risk tolerance, with particularly strong effects for women. Nonetheless, more research is needed to design and evaluate further effective policies that boost women's confidence and foster their knowledge regarding financial matters.

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7 Tables

Table 1: Socioeconomic and demographic characteristics across experimental conditions

	Experimental condition		Total %	p-value
	Control %	Treatment %		
Gender				0.1008
Male	49.3	46.2	48.6	
Female	50.7	53.8	51.4	
No. of children in HH				0.4391
0	67.4	65.9	67.1	
1	16.1	18.9	16.8	
2	12.9	11.4	12.5	
3	2.8	3.1	2.9	
4	0.6	0.4	0.5	
5+	0.3	0.3	0.3	
Marital status				0.2525
Single	16.4	15.4	16.2	
Unmarried, living together	11.1	12.4	11.4	
Married, living together	55.0	52.0	54.3	
Divorced/ separated/ widowed	14.4	16.5	14.9	
Divorced/ separated/ widowed, partner in HH	3.1	3.7	3.2	
Age				0.0295
30 to 39	19.3	18.9	19.2	
40 to 49	17.8	18.8	18.1	
50 to 59	23.4	25.2	23.8	
60 to 69	17.1	19.5	17.7	
70 and older	22.3	17.6	21.2	
Education				0.0000
Lower secondary	21.0	18.5	20.4	
Upper secondary	50.7	44.8	49.3	
Advanced upper secondary/ Post-secondary non-teriary	28.3	36.7	30.3	
Vocational education				0.0297
No vocational training	7.2	6.7	7.1	
Completed vocational training	73.9	70.4	73.1	
Bachelor/Master degree	18.9	22.9	19.8	
Homeownership status				0.2070
Owner	43.9	46.3	44.5	
Tenant	56.1	53.7	55.5	
Region in Germany				0.5014
West	83.2	82.2	83.0	
East	16.8	17.8	17.0	

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Table 1: Socioeconomic and demographic characteristics across experimental conditions *(continued)*

	Experimental condition			
	Control %	Treatment %	Total %	p-value
Monthly household net income				0.2630
[0, 1000)	10.7	10.8	10.7	
[1000, 1500)	11.8	11.6	11.7	
[1500, 2000)	11.8	10.8	11.6	
[2000, 2500)	11.1	12.6	11.4	
[2500, 3000)	10.4	12.4	10.9	
[3000, 3500)	9.1	8.2	8.9	
[3500, 4500)	11.3	12.0	11.4	
[4500, inf)	9.5	10.1	9.6	
Refusal	14.4	11.5	13.7	
Retirement status				0.0628
Not retired	62.9	66.3	63.7	
Retired	37.1	33.7	36.3	
Risk aversion				0.8861
low (0-3)	20.6	20.2	20.5	
medium (4-6)	37.4	38.3	37.6	
high (7-10)	42.1	41.6	41.9	
Stock market participation				0.2746
No	70.5	68.6	70.1	
Yes	29.5	31.4	29.9	

Note: The treatment group did not have the option to respond "do not know" and could not refuse to answer the questions. We report the shares of respondents of our control- and treatment conditions, and the total share of respondents. The p-values are the result of Pearson χ^2 test statistics corrected for survey weights (using the second-order correction of Rao and Scott, 1984) and converted into a F statistics.

Our categorization of educational attainment broadly follows the International Standard Classification of Education (ISCED 2011) categories, with *lower secondary education* corresponding to ISCED 24 (*Haupt-/Mittel-/Volksschulabschluss* in German), *upper secondary* to ISCED 24 and 34 (*Mittlere Reife, Realschulabschluss* or *Abschluss der Polytechnischen Oberschule*), *advanced upper secondary/post-secondary non-tertiary* to ISCED 34 and 44 (*Allgemeine Hochschulreife (Abitur), fachgebundene Hochschulreife, and Fachhochschulreife*), *completed vocational training* to ISCED 35 and 45 (*abgeschlossene Berufsausbildung*), and *Bachelor/Master degree* correspond to ISCED levels 64 and 74 (*Hochschulabschluss (Fachhochschule oder Universität)*).

We captured risk aversion using the following survey item: "How do you rate yourself personally: How willing are you to take risks in general?", an 11-point Likert item with "0 – Not at all willing to take risks" to "10 – Very willing to take risks." We reversed the scales for ease of interpretation, with higher values corresponding to higher levels of risk aversion. Shares weighted, see appendix A for details.

Table 2: Responses to the financial literacy questionnaire in treatment and control group, by gender

	Control			Treatment (raw)			Treatment (adj.)		
	Men %	Women %	All %	Men %	Women %	All %	Men %	Women %	All %
Compound Interest									
More than € 110	56.7	42.6	49.5	60.8	49.3	54.6	57.5	45.3	50.9
Exactly € 110	24.3	28.8	26.6	27.0	36.1	31.9	24.6	31.7	28.4
Less than € 110	11.9	13.6	12.8	12.2	14.6	13.5	10.6	11.7	11.2
Do not know	4.6	11.5	8.1						
Refuse	2.5	3.5	3.0						
Admitted guess							7.3	11.3	9.5
Inflation									
More	2.8	2.7	2.7	3.6	4.2	3.9	2.3	3.1	2.7
Just as much	7.4	10.1	8.8	11.5	15.4	13.6	10.6	12.3	11.5
Less than today	81.0	69.3	75	84.9	80.4	82.5	81.5	69.8	75.2
Do not know	6.3	13.5	9.9						
Refuse	2.6	4.4	3.5						
Admitted guess							5.6	14.9	10.6
Risk Diversification									
I agree	9.0	7.7	8.3	15.9	18.4	17.2	14.8	15.3	15.1
I disagree	65.4	47.9	56.5	84.1	81.6	82.8	79.3	72.3	75.6
Do not know	21.7	37.7	29.8						
Refuse	3.9	6.8	5.4						
Admitted guess							5.9	12.3	9.3
Credit Interest									
Less than 2	7.7	10.2	9.0	6.7	13.5	10.4	6.1	10	8.2
2 to less than 5	52.8	34.2	43.4	63.3	48.1	55.1	58.3	40.6	48.8
5 to less than 10	20.5	20.1	20.3	25.1	30.2	27.9	23.0	24.3	23.7
10 or more	4.8	5.1	5.0	4.9	8.1	6.6	3.5	6.5	5.1
Do not know	10.7	24.1	17.5						
Refuse	3.5	6.2	4.9						
Admitted guess							9.1	18.6	14.2
Loan Repayment									
Less than 5	4.3	5.2	4.8	2.7	8.2	5.7	2.2	6.9	4.7
Between 5–10	20.0	23.0	21.5	27.3	34.1	31.0	24.0	28.0	26.1
Between 10–15	28.5	26.7	27.6	29.5	34.9	32.4	26.9	27.8	27.4
Never, debt remains	32.3	16.8	24.4	40.5	22.8	31.0	37.5	19.8	28.0
Do not know	11.0	21.5	16.3						
Refuse	3.9	6.9	5.4						
Admitted guess							9.4	17.5	13.8

Table continued on next page!

Table 2: Answers to the financial literacy questionnaire across treatment conditions *(continued)*

	Control			Treatment (raw)			Treatment (adj.)		
	Men %	Women %	All %	Men %	Women %	All %	Men %	Women %	All %
No. correct in 'Big-3'									
None correct	9	15.9	12.5	4.9	4.3	4.5	8.3	11.7	10.2
One correct	18.6	30.6	24.7	12.1	15.4	13.8	12.6	18.9	16
Two correct	32.8	31.4	32.1	31.4	45.2	38.8	31.5	39.7	35.9
All correct	39.6	22.1	30.7	51.7	35.2	42.8	47.6	29.7	38
No. correct in FL-5									
None correct	7.4	13.4	10.4	2.9	1.9	2.4	6.3	8.9	7.7
One correct	13.7	23.9	18.8	6.9	9.2	8.1	8	14.2	11.3
Two correct	19	24.6	21.8	16.7	29.6	23.6	17.5	27.5	22.9
Three correct	20.6	20.5	20.5	24.6	30.9	28	23.5	24.9	24.3
Four correct	21.9	12.2	17	25.2	20.7	22.8	23.2	18.1	20.5
All correct	17.4	5.4	11.3	23.8	7.7	15.1	21.6	6.3	13.3

Note: Respondents in the treatment group were forced to answer and could not report DNK/Refusal, but received a follow-up question on how confident they were in their answer, which also included the option to admit guesses. Shares weighted, see appendix A for details.

Table 3: Responses to the financial literacy questionnaire in treatment and control group, by gender

	Men	Women	Difference (M-W)	P-Value
Panel A: Control group				
Mean correct in 'Big-3'	2.030	1.597	0.432***	(0.000)
Mean correct in FL-5	2.881	2.107	0.773***	(0.000)
Observations	1825	1890	3715	
Panel B: Treatment (raw)				
Mean correct in 'Big-3'	2.298	2.114	0.185***	(0.000)
Mean correct in FL-5	3.336	2.823	0.513***	(0.000)
Observations	551	661	1212	
Panel C: Treatment (adjusted)				
Mean correct in 'Big-3'	2.209	1.908	0.310***	(0.000)
Mean correct in FL-5	3.180	2.551	0.662***	(0.000)
Observations	551	661	1212	

Note: Panel A shows the mean number of correct answers among the Big-3 and all financial literacy questions for respondents in the control group, panel B and C refer to mean number of correct answers before and after adjusting for admitted guesses, respectively. Columns 3 and 4 show the difference across gender and p-value of the t-tests, respectively.

Table 4: Gender gap in financial literacy across treatment status

	(1) Big-3 (raw)	(2) Big-3 (adj.)	(3) FL-5 (raw)	(4) FL-5 (adj.)
Female	-0.404***	-0.406***	-0.729***	-0.729***
	(0.0302)	(0.0302)	(0.0445)	(0.0445)
Treatment	0.190***	0.0729	0.327***	0.133*
	(0.0401)	(0.0430)	(0.0613)	(0.0657)
Female × Treatment	0.247***	0.145*	0.301***	0.177*
	(0.0548)	(0.0597)	(0.0807)	(0.0873)
Constant	1.638***	1.635***	2.303***	2.337***
	(0.0696)	(0.0713)	(0.0993)	(0.102)
Socioecon. controls.	YES	YES	YES	YES
N	4927	4927	4927	4927
R2	0.181	0.168	0.220	0.207
Adj. R2	0.177	0.164	0.216	0.203

Note: Results from OLS regressions with robust standard errors, using the number of correct answers to the "Big-3" financial literacy questions or all financial literacy questions as dependent variable. Socioeconomic controls include marital status, number of children living in the household, age groups, educational attainment, home ownership status, household's monthly net income, and a dummy for East Germany. Robust standard errors in parentheses, $^*\ p < 0.05$, $^{**}\ p < 0.01$, $^{***}\ p < 0.001$

Table 5: Financial numeracy Von Gaudecker ([2015]) and financial literacy in treatment, by gender

	Men	Women	Difference (M-W)	P-Value
Panel A: "Financial numeracy" (adjustment of von Gaudecker, 2015)				
Compound Interest	0.595	0.482	0.113***	(0.000)
Inflation	0.853	0.759	0.094***	(0.000)
Risk Diversification	0.791	0.713	0.078***	(0.000)
Credit Interest	0.567	0.431	0.136***	(0.000)
Loan Repayment	0.369	0.233	0.136***	(0.000)
Correct in 'Big-3'	2.239	1.955	0.284***	(0.000)
Correct in FL-5	3.175	2.618	0.557***	(0.000)
Observations	1825	1890	3715	
Panel B: Financial literacy responses in treatment				
Compound Interest	0.623	0.489	0.134***	(0.000)
Inflation	0.858	0.818	0.040	(0.061)
Risk Diversification	0.840	0.815	0.025	(0.255)
Credit Interest	0.646	0.495	0.151***	(0.000)
Loan Repayment	0.401	0.247	0.154***	(0.000)
Correct in 'Big-3'	2.321	2.123	0.199***	(0.000)
Correct in FL-5	3.368	2.864	0.505***	(0.000)
Observations	551	661	1212	

Note: Panel A reports the financial numeracy measure proposed by Von Gaudecker, assigning the probability of answering correctly at random for DNK/refusals and a count measure summing all the financial numeracy values across the "Big-3" and all financial literacy questions. Panel B reports the share of correct answers in our treatment and count measures of correct answers for the "Big-3" and all financial literacy questions. Columns 3 and 4 of both panels show the difference across gender and p-value of t-tests.

Table 6: Comparing the financial numeracy measure of Von Gaudecker (2015) and financial literacy in treatment, by gender

	Men	Women
Compound Interest	0.0276	0.00647
	(1.19)	(0.30)
Inflation	0.00547	0.0590***
	(0.34)	(3.42)
Risk Diversification	0.0491**	0.102***
	(3.03)	(6.74)
Credit Interest	0.0794***	0.0639**
	(3.46)	(3.10)
Loan Repayment	0.0319	0.0138
	(1.42)	(0.80)
Correct in 'Big-3'	0.0821*	0.168***
	(2.17)	(4.87)
Correct in FL-5	0.193**	0.245***
	(3.15)	(4.96)

Note: differences of the financial numeracy measure of Von Gaudecker (2015) and our treatment outcome, calculated separately for men and women. T-statistics of the test of the difference between both measures being zero reported in parentheses, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table 7: Gender gap in confidence in answer to financial literacy questions across correctness of response and gender

	All			Men			Women		
	N	mean	sd	N	mean	sd	N	mean	sd
Confidence: Compound Interest									
Overall confidence	1104	7.17	3.02	513	7.97	2.57	591	6.46	3.21
Cond. on incorrect	484	6.43	3.15	188	7.18	2.89	296	5.91	3.22
Cond. on correct	620	7.75	2.79	325	8.46	2.23	295	6.97	3.12
Confidence: Inflation									
Overall confidence	1102	7.62	2.74	524	8.33	2.31	578	6.95	2.93
Cond. on incorrect	164	4.87	2.73	70	5.62	2.48	94	4.33	2.78
Cond. on correct	938	8.15	2.41	454	8.76	1.97	484	7.53	2.64
Confidence: Risk Diversification									
Overall confidence	1105	7.55	2.70	519	8.21	2.27	586	6.94	2.91
Cond. on incorrect	185	6.21	2.77	81	6.69	2.68	104	5.82	2.80
Cond. on correct	920	7.82	2.60	438	8.50	2.07	482	7.17	2.87
Confidence: Credit Interest									
Overall confidence	1048	6.81	2.78	501	7.62	2.34	547	6.03	2.94
Cond. on incorrect	438	6.26	2.87	172	7.07	2.35	266	5.70	3.06
Cond. on correct	610	7.23	2.64	329	7.93	2.28	281	6.37	2.80
Confidence: Loan Repayment									
Overall confidence	1055	6.79	2.73	500	7.44	2.41	555	6.18	2.88
Cond. on incorrect	705	6.11	2.65	294	6.67	2.37	411	5.70	2.77
Cond. on correct	350	8.21	2.33	206	8.54	2.02	144	7.69	2.69

Note: Average level of confidence in answer to the respective financial literacy question, based on the follow-up question in the treatment ("How confident are you about your response?"). The follow-up question also included the option to admit guessing, which is not displayed here (see Table 2). Shares weighted, see appendix A for details.

Table 8: Gender gap in confidence to financial literacy questions

	(1) Confidence in answer to q_i	(2) Confidence in answer to q_i
Correct	1.999***	1.712***
	(0.140)	(0.140)
Female	-1.361***	-1.355***
	(0.193)	(0.196)
Correct × Female	-0.293	-0.169
	(0.186)	(0.182)
Constant	5.997***	5.626***
	(0.146)	(0.400)
Socioecon. controls	NO	YES
N (clusters)	1212	1212
R2	0.125	0.171
Adj. R2	0.125	0.167

Note: Regressions on the association of answering the financial literacy questions correctly and confidence put into each response. We include all responses to the follow-up question on confidence by treating admitted guesses as zero level of confidence. Socioeconomic controls include marital status, number of children living in the household, age groups, educational attainment, home ownership status, household's monthly net income, and a dummy for East Germany. Standard errors clustered at the respondent level and reported in parentheses, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table 9: Association of confidence to financial literacy questions and correctness across level of question difficulty

	(1) Conf. in q_i	(2) Conf. in q_i	(3) Men: Conf. in q_i	(4) Women: Conf. in q_i
Correct	2.522***	2.271***	2.308***	2.200***
	(0.261)	(0.258)	(0.371)	(0.349)
Question difficulty	0.592	0.335	0.101	0.511
	(0.363)	(0.362)	(0.550)	(0.467)
Correct × Question difficulty	-1.167*	-1.289**	-1.464*	-1.583*
	(0.501)	(0.495)	(0.673)	(0.710)
Constant	4.854***	4.878***	6.038***	3.699***
	(0.227)	(0.454)	(0.582)	(0.625)
Socioecon. controls	No	Yes	Yes	Yes
N (clusters)	1212	1212	551	661
R2	0.0777	0.133	0.164	0.110
Adj. R2	0.0773	0.130	0.156	0.102

Note: Regressions on the association of answering the financial literacy questions correctly and confidence put into each response. Question difficulty is defined as the share of correct answers in the treatment group (adjusted for admitted guesses). We include all responses to the follow-up question on confidence by treating admitted guesses as zero level of confidence. Socioeconomic controls include marital status, number of children living in the household, age groups, educational attainment, home ownership status, household's monthly net income, and a dummy for East Germany. Standard errors clustered at the respondent level and reported in parentheses, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table 10: Stock market participation and correct answers to 'Big-3' financial literacy questions

	(1) Control	(2) Control	(3) Treatment	(4) Treatment raw	(5) Treatment adj.
Female	-0.112*** (0.0170)	-0.0491*** (0.0147)	-0.170*** (0.0305)	-0.0532* (0.0261)	-0.0454 (0.0262)
Correct in 'Big-3' (std.)		0.0789*** (0.00734)		0.0580*** (0.0117)	0.0717*** (0.0118)
Constant	0.352*** (0.0130)	0.241*** (0.0323)	0.405*** (0.0244)	0.154** (0.0584)	0.154** (0.0583)
Socioecon. controls	NO	YES	NO	YES	YES
N	3715	3715	1212	1212	1212
R2	0.0151	0.203	0.0333	0.233	0.240
Adj. R2	0.0148	0.197	0.0325	0.216	0.223

Note: OLS regressions using a dummy for stock market participation as dependent variable. Socioeconomic controls include a measure of risk aversion, marital status, number of children living in the household, age groups, educational attainment, home ownership status, household's monthly net income, a dummy for East Germany and retirement status. We standardize the financial literacy measure by demeaning relative to the treatment status and dividing by the respective standard deviation. Robust standard errors reported in parentheses, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table 11: Stock market participation, financial literacy and measures of confidence based on the "Big-3" financial literacy questions

	(1) Control	(2) Treatment raw	(3) Treatment raw	(4) Treatment raw	(5) Treatment adj.
Correct in 'Big-3' (std.)	0.0613*** (0.0107)	0.0551*** (0.0117)	0.0351** (0.0120)	0.0334** (0.0121)	0.0352* (0.0139)
DNK/Refusals in 'Big-3' (std.)	-0.0245* (0.00952)				
Guesses in 'Big-3' (std.)		-0.0328** (0.0102)		0.0135 (0.0129)	
Av. confidence in 'Big-3' (std.)			0.0760*** (0.0131)	0.0855*** (0.0166)	0.0669*** (0.0150)
Female	-0.0477** (0.0147)	-0.0464 (0.0264)	-0.0194 (0.0270)	-0.0180 (0.0270)	-0.0213 (0.0271)
Socioecon. controls	YES	YES	YES	YES	YES
N	3715	1212	1212	1212	1212
R2	0.204	0.238	0.252	0.253	0.251
Adj. R2	0.198	0.220	0.235	0.234	0.233

Note: OLS regressions using a dummy for stock market participation as dependent variable. Socioeconomic controls include a measure of risk aversion, marital status, number of children living in the household, age groups, educational attainment, home ownership status, household's monthly net income, a dummy for East Germany and retirement status. We standardize the financial literacy measure, number of DNK/Refusals, guesses and average confidence by demeaning relative to the treatment status and dividing by the respective standard deviation. Robust standard errors reported in parentheses, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

A Sample Recruitment and Survey Weights

We recruited participants for our survey using a German survey agency. The agency recruited participants by phone or invited active participants of a standing online panel. Phone recruitment was conducted via Computer Assisted Telephone Interviews (CATI) in a dual-frame procedure, including landline and mobile phone numbers. The *next birthday method* ensured random draws within multi-person households of participants reached by landline phone numbers. The sample for the survey via landline was randomly drawn from the current ADM master sample, stratified by German federal state and municipality types ("BIK-Gemeindetypen"). Individuals reached by mobile phones are immediate targets for the survey. 11.9% of the phone recruitments were successful (N_{phone}=1,361).

After agreeing to participate in the study, CATI-recruited respondents received screening questions on their gender, age, federal state of residence, school-leaving qualification, household size, retirement status, employment and home ownership status via phone and had the option to participate in the main study by pen and paper (P&P) or in a computer-assisted web interview (CAWI). Most respondents agreed to participate online (84%). As it was not possible to ensure our treatment's forced response format in the P&P surveys, they received the standard format including the refusal and DNK options ($N_{P\&P}$=179). Due to the inability to randomize treatment for this group, we did not include them in our main analyses, though their inclusion yields quantitatively and qualitatively similar results.

We supplemented our sample with members of an online access panel, with controlled invitations proportional to our target population with respect to age, gender, federal state of residence and school-leaving qualification (N_{online}=4,162).

We compensated survey participants recruited by phone for successful completion of the questionnaire with universal shopping vouchers (EUR 5.00). The compensation of online panel participants for survey completion was at the discretion of the panel operator.

The survey weights used for our descriptive statistics are based on data from the Federal Statistical Office (from December 31, 2019) and are calculated in a two-stage procedure. In the first stage, respondents recruited by telephone are re-weighted by household size to ensure similar selection probabilities. In the second stage, the weights are adjusted along a wide range of socioeconomic and demographic characteristics, including household size, age, gender, highest educational attainment, and German federal state of residence. In some cases, several variables are combined to account for deviations between specific subgroups using nested data (such as gender, household size, and age). Furthermore, we instructed the survey agency to include a representative share of homeowners. To ensure a share of 48 % home owning respondents

(share reported by the Federal Statistical Office in 2019), we include one screening question on whether the respondent rents or owns their current accommodation. Of the respondents included in our main results (without pen and paper respondents), the minimum weight is 0.13, and the maximum weight is 5.30, with a median weight of 0.86 and a standard deviation of 0.59.

B   Robustness Checks

In the following section, we present robustness checks of the main results. First, we provide additional insights into the gender gap in confidence across all financial literacy questions included in Table B.1.

Table B.2 presents the associations of stock market participation and our measures based on all financial literacy questions included in the survey (that is the "Big-3" and both debt-literacy questions). Table B.3 presents the regressions on stock market participation and our measures of knowledge and confidence based on all financial literacy questions. Overall, these results show that our findings presented in Table 10 and 11 are robust to including additional information based on the debt literacy questions.

Table B.4 presents a robustness check for the analysis of financial behaviour presented in Tables 10 and 11. We treat respondents who report a level of zero confidence ("0 – not confident at all") as if they admitted to guessing. Specifically, columns 1 and 2 use our non-adjusted standardized count measure of financial literacy but control for the number of admitted guesses including 0 confidence. In columns 3 and 4, we make use of our adjusted count measure but adjust answers for both admitted guesses *and reported levels of zero confidence.* Similar to results in our main Table, we treat their responses as incorrect, independent of their actual answer. The results presented in the Table are qualitatively similar to the findings discussed in section 4.

Lastly, Table B.6 shows that stock market participation differs across gender, but the gender gap is insignificantly different across our treatment and control groups.

Table B.1: Confidence in answers to financial literacy questions, all questions included

	(1) Compound interest	(2) Inflation	(3) Risk diver- dification	(4) Credit Interest	(5) Loan re- payment
Correct answer	1.031***	2.886***	1.541***	0.675**	1.950***
	(0.262)	(0.310)	(0.306)	(0.223)	(0.204)
Female	-1.504***	-1.297**	-0.729	-1.281***	-0.858***
	(0.294)	(0.415)	(0.396)	(0.267)	(0.198)
Female × Correct answer	0.329	-0.000205	-0.552	-0.152	-0.187
	(0.365)	(0.440)	(0.425)	(0.335)	(0.334)
Socioecon. controls	YES	YES	YES	YES	YES
N	1104	1102	1105	1048	1055
R2	0.157	0.248	0.208	0.161	0.187
Adj. R2	0.136	0.230	0.189	0.140	0.167

Note: OLS regressions on confidence in answers to financial literacy questions in treatment, excluding respondents that indicated they did not know the answer but guessed. Socioeconomic controls include marital status, number of children living in the household, age groups, educational attainment, home ownership status, household's monthly net income, and a dummy for East Germany. Robust standard errors reported in parentheses, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table B.2: Stock market participation and correct answers to all financial literacy questions

	(1) Control	(2) Control	(3) Treatment	(4) Treatment raw	(5) Treatment adj.
Female	-0.112***	-0.0410**	-0.170***	-0.0415	-0.0346
	(0.0170)	(0.0149)	(0.0305)	(0.0264)	(0.0264)
Correct in FL-5 (std.)		0.0829***		0.0668***	0.0801***
		(0.00782)		(0.0128)	(0.0127)
Constant	0.352***	0.236***	0.405***	0.157**	0.148*
	(0.0130)	(0.0321)	(0.0244)	(0.0587)	(0.0586)
Socioecon. controls	NO	YES	NO	YES	YES
N	3715	3715	1212	1212	1212
R2	0.0151	0.204	0.0333	0.236	0.244
Adj. R2	0.0148	0.198	0.0325	0.219	0.226

Note: OLS regressions using a dummy for stock market participation as dependent variable. Socioeconomic controls include a measure of risk aversion, marital status, number of children living in the household, age groups, educational attainment, home ownership status, household's monthly net income, a dummy for East Germany and retirement status. We standardize the financial literacy measure by demeaning relative to the treatment status and dividing by the respective standard deviation. Robust standard errors reported in parentheses, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table B.3: Stock market participation, financial literacy and measures of confidence based on all financial literacy questions

	(1) Control	(2) Treatment raw	(3) Treatment raw	(4) Treatment raw	(5) Treatment adj.
Correct in FL-5 (std.)	0.0770***	0.0634***	0.0456***	0.0446***	0.0517***
	(0.0104)	(0.0128)	(0.0133)	(0.0134)	(0.0152)
DNK/Refusals in FL-5 (std.)	-0.00897				
	(0.00867)				
Guesses in FL-5 (std.)		-0.0296**		0.00926	
		(0.0104)		(0.0134)	
Av. confidence in FL-5 (std.)			0.0654***	0.0720***	0.0512***
			(0.0133)	(0.0171)	(0.0153)
Female	-0.0406**	-0.0357	-0.0153	-0.0145	-0.0188
	(0.0149)	(0.0266)	(0.0271)	(0.0271)	(0.0270)
Socioecon. controls	YES	YES	YES	YES	YES
N	3715	1212	1212	1212	1212
R2	0.204	0.240	0.250	0.251	0.250
Adj. R2	0.198	0.222	0.233	0.232	0.232

Note: OLS regressions using a dummy for stock market participation as dependent variable. Socioeconomic controls include a measure of risk aversion, marital status, number of children living in the household, age groups, educational attainment, home ownership status, household's monthly net income, a dummy for East Germany and retirement status. We standardize the financial literacy measure by demeaning relative to the treatment status and dividing by the respective standard deviation. Robust standard errors reported in parentheses, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table B.4: Stock market participation and measures based on "Big-3" financial literacy questions, treating 0 confidence as guess

	(1) Treat.	(2) Treat.	(3) Treat.	(4) Treat.
Correct in 'Big-3' (std.)	0.0536*** (0.0117)	0.0380** (0.0127)		
Correct in 'Big-3' (std., low conf.=guess)			0.0762*** (0.0120)	0.0529*** (0.0145)
Guesses in 'Big-3' (std., low conf.=guess)	-0.0316** (0.0108)	-0.00282 (0.0153)		
Av. confidence in 'Big-3' (std.)		0.0640*** (0.0145)		0.0539*** (0.0143)
Female	-0.0440 (0.0266)	-0.0200 (0.0275)	-0.0407 (0.0263)	-0.0176 (0.0273)
Socioecon. controls	YES	YES	YES	YES
N	1212	1169	1212	1169
R2	0.237	0.246	0.242	0.249
Adj. R2	0.219	0.227	0.225	0.230

Note: Results from OLS regressions with robust standard errors, using a dummy for stock market participation as dependent variable. Socioeconomic controls include a measure of risk aversion, marital status, number of children living in the household, age groups, educational attainment, home ownership status, household's monthly net income, a dummy for East Germany and retirement status. We standardize the financial literacy measure by demeaning relative to the treatment status and dividing by the respective standard deviation. Standard errors clustered at the respondent level and reported in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table B.5: Stock market participation and measures based on all financial literacy questions, treating 0 confidence as guess

	(1) Treat.	(2) Treat.	(3) Treat.	(4) Treat.
Correct in FL-5 (std.)	0.0620*** (0.0128)	0.0480*** (0.0136)		
Correct in FL-5 (std., low conf.=guess)			0.0848*** (0.0128)	0.0675*** (0.0152)
Guesses in FL-5 (std., low conf.=guess)	-0.0295** (0.0110)	-0.00882 (0.0143)		
Av. confidence in FL-5 (std.)		0.0524*** (0.0144)		0.0431** (0.0142)
Female	-0.0332 (0.0267)	-0.0160 (0.0274)	-0.0297 (0.0264)	-0.0131 (0.0272)
Socioecon. controls	YES	YES	YES	YES
N	1212	1176	1212	1176
R2	0.240	0.245	0.246	0.250
Adj. R2	0.222	0.226	0.229	0.231

Note: Results from OLS regressions with robust standard errors, using a dummy for stock market participation as dependent variable. Socioeconomic controls include a measure of risk aversion, marital status, number of children living in the household, age groups, educational attainment, home ownership status, household's monthly net income, a dummy for East Germany and retirement status. We standardize the financial literacy measure by demeaning relative to the treatment status and dividing by the respective standard deviation. Standard errors clustered at the respondent level and reported in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table B.6: Stock market participation and correct answers to "Big-3" financial literacy questions, full specification

	(1) Stock market participation	(2) Stock market participation	(3) Stock market participation
Female	-0.112***	-0.0981***	-0.0762***
	(-6.58)	(-6.86)	(-5.30)
Treatment	0.0535	0.00161	-0.000727
	(1.94)	(0.07)	(-0.03)
Female × Treatment	-0.0577	-0.00443	-0.00174
	(-1.65)	(-0.16)	(-0.06)
Constant	0.352***	0.216***	0.330***
	(27.04)	(7.33)	(10.28)
Socioecon. controls.	NO	YES	YES
Control for risk aversion	NO	NO	YES
N	4927	4927	4927
R2	0.0199	0.171	0.184
Adj. R2	0.0193	0.166	0.180

Note: Results from OLS regressions with robust standard errors, using a dummy for stock market participation as dependent variable. Socioeconomic controls include marital status, number of children living in the household, age groups, educational attainment, home ownership status, household's monthly net income, a dummy for East Germany and retirement status. Column 3 also controls for our measure of risk aversion, which we standardized by subtracting the mean and dividing by the standard deviation. Standard errors clustered at the respondent level and reported in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

C Full Model Specifications and Coefficient Estimates

We present the full specifications of the models used in section 3 and 4, including detailed estimates of the coefficients of all control variables. Specifically, we provide the detailed results of our analysis of the gender gap in financial literacy across treatment groups in Table C.1. Similarly we provide the full set of coefficients for our analysis of stock market participation and financial literacy (Table C.2, including relevant columns with control variables of Table 10) and considering financial literacy and confidence (Table C.3).

Table C.1: Gender gap in financial literacy across treatment status, full specification

	(1)	(2)	(3)	(4)
	Big-3 (raw)	Big-3 (adj.)	FL-5 (raw)	FL-5 (adj.)
Female	-0.404***	-0.406***	-0.729***	-0.729***
	(0.0302)	(0.0302)	(0.0445)	(0.0445)
Treatment	0.190***	0.0729	0.327***	0.133*
	(0.0401)	(0.0430)	(0.0613)	(0.0657)
Female × Treatment	0.247***	0.145*	0.301***	0.177*
	(0.0548)	(0.0597)	(0.0807)	(0.0873)
No. of children in HH	-0.0147	-0.0132	-0.0144	-0.0113
	(0.0177)	(0.0186)	(0.0253)	(0.0266)
Marital Status (Ref. = Single)	ref.	ref.	ref.	ref.
Unmarried, living together	-0.0651	-0.0560	-0.223**	-0.220**
	(0.0508)	(0.0518)	(0.0725)	(0.0740)
Married, living together	-0.122**	-0.114**	-0.198**	-0.201**
	(0.0414)	(0.0429)	(0.0603)	(0.0621)
Divorced/separated/widowed	0.0331	0.0372	0.0382	0.0340
	(0.0455)	(0.0476)	(0.0668)	(0.0694)
Divorced/separated/widowed,	-0.0172	-0.00597	-0.201	-0.206
with partner in household	(0.0721)	(0.0736)	(0.112)	(0.114)
Age (Ref. = 30-39)	ref.	ref.	ref.	ref.
40 to 49	0.0852*	0.0763	0.0504	0.0357
	(0.0433)	(0.0439)	(0.0624)	(0.0630)
50 to 59	0.168***	0.166***	0.188**	0.168**
	(0.0422)	(0.0431)	(0.0609)	(0.0620)
60 to 69	0.245***	0.242***	0.291***	0.278***
	(0.0461)	(0.0472)	(0.0670)	(0.0684)
70 and older	0.194***	0.177***	0.196**	0.164*
	(0.0476)	(0.0490)	(0.0694)	(0.0713)

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Table C.1 – *continued from previous page*

	(1) Big-3 (raw)	(2) Big-3 (adj.)	(3) FL-5 (raw)	(4) FL-5 (adj.)
Education (Ref. = Lower secondary)	ref.	ref.	ref.	ref.
Upper secondary	0.213***	0.226***	0.326***	0.340***
	(0.0365)	(0.0376)	(0.0519)	(0.0535)
Advanced upper secondary or	0.528***	0.572***	0.816***	0.859***
post-secondary, non-teriary	(0.0448)	(0.0460)	(0.0667)	(0.0682)
Vocational training (Ref. = Yes)	ref.	ref.	ref.	ref.
No vocational training	-0.109*	-0.119*	-0.0808	-0.113
	(0.0552)	(0.0568)	(0.0800)	(0.0826)
Bachelor/Master degree	0.0522	0.0369	0.135*	0.120
	(0.0403)	(0.0414)	(0.0621)	(0.0634)
Income (Ref. = $[0, 1000)$)	ref.	ref.	ref.	ref.
$[1000, 1500)$	0.0535	0.0461	0.126	0.107
	(0.0545)	(0.0559)	(0.0771)	(0.0788)
$[1500, 2000)$	0.0960	0.106	0.153*	0.169*
	(0.0546)	(0.0558)	(0.0777)	(0.0793)
$[2000, 2500)$	0.197***	0.201***	0.369***	0.366***
	(0.0561)	(0.0573)	(0.0809)	(0.0826)
$[2500, 3000)$	0.291***	0.271***	0.496***	0.468***
	(0.0580)	(0.0591)	(0.0841)	(0.0857)
$[3000, 3500)$	0.364***	0.368***	0.594***	0.593***
	(0.0603)	(0.0612)	(0.0873)	(0.0882)
$[3500, 4500)$	0.343***	0.347***	0.578***	0.573***
	(0.0577)	(0.0588)	(0.0845)	(0.0859)
$[4500, inf)$	0.480***	0.463***	0.897***	0.870***
	(0.0613)	(0.0629)	(0.0911)	(0.0932)

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Table C.1 – *continued from previous page*

	(1)	(2)	(3)	(4)
	Big-3 (raw)	Big-3 (adj.)	FL-5 (raw)	FL-5 (adj.)
Refusal	-0.0270	-0.0569	-0.00130	-0.0583
	(0.0552)	(0.0565)	(0.0774)	(0.0791)
Tenant (Ref. = Owner)	ref.	ref.	ref.	ref.
Tenant	-0.187***	-0.194***	-0.273***	-0.294***
	(0.0277)	(0.0284)	(0.0407)	(0.0416)
Region in DE (Ref. = West)	ref.	ref.	ref.	ref.
East Germany/East Berlin	-0.0115	-0.0280	-0.0874	-0.118*
	(0.0339)	(0.0348)	(0.0492)	(0.0503)
Constant	1.638***	1.635***	2.303***	2.337***
	(0.0696)	(0.0713)	(0.0993)	(0.102)
N	4927	4927	4927	4927
R2	0.181	0.168	0.220	0.207
Adj. R2	0.177	0.164	0.216	0.203

Note: Results from OLS regressions with robust standard errors, using the number of correct answers to the "Big-3" financial literacy questions or all financial literacy questions as dependent variable. Robust standard errors in parentheses, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table C.2: Stock market participation and correct answers to 'Big-3' financial literacy questions, full specification

	(1) Control	(2) Treatment raw	(3) Treatment adj.
Female	-0.0491***	-0.0532*	-0.0454
	(0.0147)	(0.0261)	(0.0262)
Correct in 'Big-3' (std.)	0.0789***	0.0580***	0.0717***
	(0.00734)	(0.0117)	(0.0118)
Risk aversion (std.)	-0.0469***	-0.0810***	-0.0790***
	(0.00662)	(0.0124)	(0.0124)
Retirement status (Ref. = Not retired)	ref.	ref.	ref.
Retired	-0.0258	-0.0324	-0.0315
	(0.0215)	(0.0349)	(0.0344)
No. of children in HH	-0.0171	-0.0381*	-0.0385*
	(0.00962)	(0.0152)	(0.0150)
Marital Status (Ref. = Single)	ref.	ref.	ref.
Unmarried, living together	-0.0341	-0.0628	-0.0649
	(0.0262)	(0.0477)	(0.0473)
Married, living together	-0.0230	-0.0693	-0.0713
	(0.0210)	(0.0387)	(0.0380)
Divorced/ separated/ widowed	0.00183	-0.0468	-0.0475
	(0.0230)	(0.0419)	(0.0418)
Divorced/ separated/ widowed	-0.0217	-0.117	-0.120
with partner in household	(0.0449)	(0.0626)	(0.0621)
Age (Ref. = 30-39)	ref.	ref.	ref.
40 to 49	-0.00337	0.0687	0.0712
	(0.0226)	(0.0406)	(0.0404)
50 to 59	0.00704	0.0372	0.0371
	(0.0221)	(0.0380)	(0.0378)

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Table C.2 – *continued from previous page*

	(1) Control	(2) Treatment raw	(3) Treatment adj.
60 to 69	-0.0291	0.118*	0.117*
	(0.0272)	(0.0467)	(0.0459)
70 and older	0.0119	0.0502	0.0527
	(0.0314)	(0.0551)	(0.0544)
Education (Ref. = Lower secondary)	ref.	ref.	ref.
Upper secondary	0.0569**	0.0716*	0.0661*
	(0.0174)	(0.0318)	(0.0316)
Advanced upper secondary or	0.0729**	0.0857*	0.0709
post-secondary, non-tertiary	(0.0254)	(0.0424)	(0.0423)
Vocational training (Ref. = Yes)	ref.	ref.	ref.
No vocational training	-0.0305	0.0123	0.0158
	(0.0225)	(0.0433)	(0.0426)
Bachelor/Master degree	0.108***	0.150***	0.154***
	(0.0263)	(0.0427)	(0.0427)
Income (Ref. = 0, 1000))	ref.	ref.	ref.
[1000, 1500)	0.0425	0.0499	0.0512
	(0.0225)	(0.0388)	(0.0392)
[1500, 2000)	0.0810***	0.150**	0.147**
	(0.0244)	(0.0461)	(0.0463)
[2000, 2500)	0.109***	0.149***	0.149***
	(0.0267)	(0.0447)	(0.0447)
[2500, 3000)	0.147***	0.224***	0.228***
	(0.0284)	(0.0505)	(0.0499)
[3000, 3500)	0.212***	0.287***	0.283***
	(0.0324)	(0.0569)	(0.0564)

Table C.2 – *continued from previous page*

	(1) Control	(2) Treatment raw	(3) Treatment adj.
[3500, 4500)	0.225***	0.273***	0.271***
	(0.0308)	(0.0512)	(0.0510)
[4500, inf)	0.325***	0.402***	0.405***
	(0.0347)	(0.0588)	(0.0587)
Refusal	0.126***	0.105*	0.115**
	(0.0244)	(0.0439)	(0.0441)
Tenant (Ref. = Owner)	ref.	ref.	ref.
Tenant	-0.118***	-0.0960***	-0.0928***
	(0.0157)	(0.0266)	(0.0265)
Region in DE (Ref. = West)	ref.	ref.	ref.
East Germany/East Berlin	-0.0783***	-0.0313	-0.0269
	(0.0176)	(0.0316)	(0.0314)
Constant	0.241***	0.154**	0.154**
	(0.0323)	(0.0584)	(0.0583)
N	3715	1212	1212
R2	0.203	0.233	0.240
Adj. R2	0.197	0.216	0.223

Note: OLS regressions using a dummy for stock market participation as dependent variable. We standardize the risk aversion and financial literacy measures by demeaning relative to the treatment status and dividing by the respective standard deviation. Robust standard errors reported in parentheses, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table C.3: Stock market participation and correct answers to 'Big-3' financial literacy questions, full specification

	(1) Control	(2) Treatment raw	(3) Treatment raw	(4) Treatment raw	(5) Treatment adj.
Correct in 'Big-3' (std.)	0.0613***	0.0551***	0.0351**	0.0334**	0.0352*
	(0.0107)	(0.0117)	(0.0120)	(0.0121)	(0.0139)
DNK/Refusals in 'Big-3' (std.)	-0.0245*				
	(0.00952)				
Guesses in 'Big-3' (std.)		-0.0328**		0.0135	
		(0.0102)		(0.0129)	
Av. confidence in 'Big-3' (std.)			0.0760***	0.0855***	0.0669***
			(0.0131)	(0.0166)	(0.0150)
Female	-0.0477**	-0.0464	-0.0194	-0.0180	-0.0213
	(0.0147)	(0.0264)	(0.0270)	(0.0270)	(0.0271)
Risk aversion (std.)	-0.0457***	-0.0803***	-0.0723***	-0.0715***	-0.0725***
	(0.00663)	(0.0124)	(0.0124)	(0.0124)	(0.0124)
Retirement status (Ref. = Not ret.)	ref.	ref.	ref.	ref.	ref.
Retired	-0.0259	-0.0329	-0.0307	-0.0303	-0.0298
	(0.0215)	(0.0345)	(0.0337)	(0.0338)	(0.0337)
No. of children in HH	-0.0166	-0.0385*	-0.0378*	-0.0376*	-0.0383*
	(0.00962)	(0.0150)	(0.0149)	(0.0150)	(0.0149)
Marital Status (Ref. = Single)	ref.	ref.	ref.	ref.	ref.
Unmarried, living together	-0.0341	-0.0645	-0.0737	-0.0744	-0.0765
	(0.0262)	(0.0475)	(0.0475)	(0.0476)	(0.0474)
Married, living together	-0.0231	-0.0698	-0.0730	-0.0733	-0.0765*
	(0.0210)	(0.0384)	(0.0377)	(0.0378)	(0.0375)
Divorced/ separated/ widowed	0.00249	-0.0482	-0.0551	-0.0555	-0.0561
	(0.0230)	(0.0419)	(0.0414)	(0.0413)	(0.0414)
Divorced/ separated/ widowed	-0.0197	-0.119	-0.127*	-0.127*	-0.128*

continued on next page!

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Table C.3 – *continued from previous page*

	(1) Control	(2) Treatment raw	(3) Treatment raw	(4) Treatment raw	(5) Treatment adj.
with partner in household	(0.0448)	(0.0621)	(0.0629)	(0.0632)	(0.0629)
Age (Ref. = 30-39)	ref.	ref.	ref.	ref.	ref.
40 to 49	-0.00205	0.0702	0.0716	0.0713	0.0732
	(0.0227)	(0.0405)	(0.0401)	(0.0401)	(0.0402)
50 to 59	0.00847	0.0395	0.0340	0.0327	0.0362
	(0.0221)	(0.0380)	(0.0379)	(0.0378)	(0.0379)
60 to 69	-0.0277	0.119*	0.108*	0.107*	0.111*
	(0.0272)	(0.0461)	(0.0456)	(0.0457)	(0.0454)
70 and older	0.0135	0.0556	0.0483	0.0458	0.0524
	(0.0314)	(0.0548)	(0.0544)	(0.0546)	(0.0543)
Education (Ref. = Lower secondary)	ref.	ref.	ref.	ref.	ref.
Upper secondary	0.0561**	0.0691*	0.0589	0.0583	0.0593
	(0.0173)	(0.0316)	(0.0314)	(0.0315)	(0.0314)
Advanced upper secondary or	0.0705**	0.0762	0.0579	0.0584	0.0582
post-secondary, non-tertiary	(0.0255)	(0.0423)	(0.0417)	(0.0417)	(0.0417)
Vocational training (Ref. = Yes)	ref.	ref.	ref.	ref.	ref.
No vocational training	-0.0286	0.0187	0.0218	0.0203	0.0228
	(0.0225)	(0.0428)	(0.0419)	(0.0420)	(0.0418)
Bachelor/Master degree	0.108***	0.153***	0.151***	0.150***	0.153***
	(0.0263)	(0.0428)	(0.0424)	(0.0423)	(0.0425)
Income (Ref. = $[0, 1000)$)	ref.	ref.	ref.	ref.	ref.
$[1000, 1500)$	0.0417	0.0512	0.0441	0.0428	0.0440
	(0.0225)	(0.0391)	(0.0391)	(0.0392)	(0.0395)
$[1500, 2000)$	0.0779**	0.150**	0.140**	0.139**	0.138**
	(0.0244)	(0.0463)	(0.0459)	(0.0459)	(0.0461)

Table C.3 – *continued from previous page*

	(1) Control	(2) Treatment raw	(3) Treatment raw	(4) Treatment raw	(5) Treatment adj.
[2000, 2500)	0.108***	0.150***	0.145**	0.144**	0.144**
	(0.0267)	(0.0448)	(0.0441)	(0.0441)	(0.0442)
[2500, 3000)	0.143***	0.229***	0.210***	0.206***	0.216***
	(0.0284)	(0.0504)	(0.0499)	(0.0505)	(0.0497)
[3000, 3500)	0.208***	0.285***	0.260***	0.258***	0.265***
	(0.0324)	(0.0567)	(0.0565)	(0.0568)	(0.0564)
[3500, 4500)	0.221***	0.272***	0.257***	0.256***	0.261***
	(0.0308)	(0.0512)	(0.0508)	(0.0508)	(0.0507)
[4500, inf)	0.323***	0.406***	0.387***	0.383***	0.394***
	(0.0347)	(0.0590)	(0.0585)	(0.0587)	(0.0583)
Refusal	0.127***	0.116**	0.112*	0.108*	0.115**
	(0.0245)	(0.0445)	(0.0437)	(0.0441)	(0.0439)
Tenant (Ref. = Owner)	ref.	ref.	ref.	ref.	ref.
Tenant	-0.118***	-0.0928***	-0.0871***	-0.0873***	-0.0881***
	(0.0157)	(0.0266)	(0.0263)	(0.0263)	(0.0264)
Region in DE (Ref. = West)	ref.	ref.	ref.	ref.	ref.
East Germany and East Berlin	-0.0784***	-0.0276	-0.0167	-0.0164	-0.0157
	(0.0176)	(0.0316)	(0.0312)	(0.0311)	(0.0312)
Constant	0.241***	0.149*	0.160**	0.163**	0.158**
	(0.0322)	(0.0585)	(0.0581)	(0.0583)	(0.0582)
N	3715	1212	1212	1212	1212
R2	0.204	0.238	0.252	0.253	0.251
Adj. R2	0.198	0.220	0.235	0.234	0.233

Note: OLS regressions using a dummy for stock market participation as dependent variable. We standardize risk aversion, financial literacy, number of DNK/Refusals, number of guesses and average confidence by demeaning relative to the treatment status and dividing by the respective standard deviation. Robust standard errors reported in parentheses, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

D   Supplementary evidence on metacognition

Table D.1: Goodman-Kruskal γ as measure of metacognitive sensitivity

	(1) Compound interest	(2) Inflation	(3) Risk diver- dification	(4) Credit Interest	(5) Loan re- payment
Goodman-Kruskal γ	0.363***	0.661***	0.400***	0.244***	0.552***
	(0.0373)	(0.0330)	(0.0463)	(0.0378)	(0.0377)
Observations	1212	1212	1212	1212	1212

Note: Goodman-Kruskal gamma statistic with bootstrapped standard errors (10.000 repetitions). * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

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