GENDER GAPS IN FINANCIAL LITERACY:
A MULTI-ARM RCT TO BREAK
THE RESPONSE BIAS IN SURVEYS

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GENDER GAPS IN FINANCIAL LITERACY: A MULTI-ARM RCT TO BREAK THE RESPONSE BIAS IN SURVEYS [(*)]

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Abstract

Gender gaps in financial literacy are pervasive and persistent. While most studies explore why women know less, these gaps might also reflect differential behavior in providing responses in surveys. Women might be more likely to be uncertain, or men might be more likely to choose an answer when uncertain, while women might tend to opt for "I do not know", leading to imprecise measures of the gender gap in financial literacy. We test for the effectiveness of three interventions to reduce the frequency of "I do not know", in a randomized control trial online survey administered to 6,000 participants. The standard survey, our control group, includes the possibility of answering "I do not know". The three treatment arms exclude the "I do not know" answer, offer incentives for correct answers or inform survey takers of the existing gender gap in choosing "I do not know". All interventions are very effective in reducing the frequency of "I do not know". The information is most effective for women, while the incentives are most effective for men. As regards gender gaps, only the provision of information significantly reduces the gender gap in choosing "I do not know", as well as the gender gap in financial literacy.

Resumen

La evidencia internacional ha documentado brechas de género en conocimientos financieros en múltiples países y grupos demográficos. Aunque la mayoría de los estudios analizan por qué las mujeres saben menos, estas brechas también podrían reflejar un comportamiento diferencial por género a la hora de proporcionar respuestas en encuestas. En aquellos casos en los que no existe certeza acerca de la respuesta correcta, los hombres podrían ser más propensos a elegir una respuesta mientras que las mujeres podrían optar por responder «No lo sé», lo que llevaría a mediciones imprecisas de la brecha de género en educación financiera. En este estudio evaluamos la efectividad de tres intervenciones aleatorias para reducir la frecuencia de respuestas «No lo sé» en una encuesta en línea administrada a 6.000 participantes. La encuesta estándar, nuestro grupo de control, incluye la posibilidad de responder «No lo sé». El primer tratamiento excluye esa opción de respuesta, el segundo ofrece incentivos por respuesta correcta y el tercero informa a los encuestados sobre la brecha de género existente en la elección de la respuesta «No lo sé». Todas las intervenciones son muy efectivas para reducir la probabilidad de responder «No lo sé». La información es más efectiva para las mujeres, mientras que los incentivos lo son para los hombres. En cuanto a las brechas de género, solo la provisión de información reduce significativamente la diferencia entre hombres y mujeres en la elección de la respuesta «No lo sé», así como la brecha de género en respuestas correctas.

Palabras clave: conocimientos financieros, brechas de género, métodos en encuestas.

Códigos JEL: C8, C9, D14, D91, G53, I22, J16.

1 Introduction

Financial literacy, the understanding of basic financial concepts such as inflation and interest rates, impacts important economic decisions, for example, retirement and saving plans, stock market participation and, ultimately, households' wealth levels and well-being (IOSCO, 2018; Lusardi and Mitchell, 2014). In fact, improving the general population's financial literacy has become a major policy goal in many countries (OECD, 2013). For example, a large number of U.S. states now require students to take a personal finance course before graduating from high school. Importantly, an appropriate policy response should take into account that financial knowledge is not evenly distributed in the population. In particular, women perform more poorly in survey measures of financial literacy, a fact that is persistent across countries and over time (OECD, 2016; Klapper and Lusardi, 2020). This gender gap is partly explained by differences in observable characteristics such as education, experience in financial decisions, and interest in financial topics.[1] However, a considerable part of this gap remains unexplained.

Financial literacy is typically measured by the percentage of correct answers in surveys on basic financial concepts that allow for no response or "I do not know" answers. Therefore, observed gender gaps may reflect not only differences in knowledge but also response bias in choosing "I do not know". For instance, if women are more likely to be unsure about the correct answer than men (gender differences in confidence), or when equally unsure if women are more likely than men to choose "I do not know" (gender differences in risk preferences), then typical measures will overstate the gender gap in financial knowledge resulting in imprecise measures of the gender gap in financial literacy.

In this paper, we study gender gaps in financial literacy, switching the focus to *how* they are measured, and evaluate interventions to potentially reduce response bias in the propensity to choose "I do not know" answers. We circumvent measurement challenges with a multi-arm randomized control trial (RCT) where 6,000 participants from Spain complete an online survey that only varies the financial literacy section design. This section builds on the OECD

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[1]See, among others, Chen and Volpe (2002); Fonseca, Mullen, Zamarro, and Zissimopoulos (2012); Driva, Lührmann, and Winter (2016); Hsu (2016); Bucher-Koenen, Lusardi, Alessie, and Rooij (2017); Zaccaria and Guiso (2020); Bottazzi and Lusardi (2021).

International Network of Financial Education questionnaire and includes our key outcome, the *Big Five* foundational survey questions used to measure financial literacy (Hastings, Madrian, and Skimmyhorn, 2013). The *Big Five* questions, developed by Anamaria Lusardi and Olivia Mitchell, measure basic understanding of inflation, compound interest rate, risk diversification, mortgages and bond pricing. These questions are either multiple choice or true or false questions that allow for "I do not know" among the answer options. Importantly, we randomize alternative design features while presenting participants with the same questions.

First, participants in the control group complete this section where the "I do not know" (IDK in short) answer option is allowed, as is standard in these surveys. The remaining participants are assigned to one of the three treatment groups. The first treatment, "without IDK", presents the same financial literacy questions without the "I do not know" answer option. This forces participants to choose an answer, allowing us to measure the extent in which choosing "I do not know" reflects effective knowledge gaps or different response biases. The second treatment, "incentives", provides explicit and immediate monetary incentives for each correct answer and no credit for incorrect and "I do not know" answers. This should induce profit-maximizing participants to strictly prefer selecting an option over "I do not know", and provides a quantifiable measure to which extent participants prefer to forego a chance of receiving credit. Finally, the "information" treatment presents a sentence with statistics based on women's propensity to choose "I do not know" relative to men's. This treatment aims to raise awareness of potential deterrents from women's success, as measured by performance, prompting them to provide educated guesses when uncertain.[2]

In addition to measuring financial literacy, percent correct, incorrect and "I do not know" answers, the survey gathers standard information such as households' and their parents' sociodemographics, interest in financial topics and experience with financial products. It also gathers new observable characteristics on personal traits and experiences, such as risk preferences, confidence and competitiveness, which have been found relevant in explaining other relevant economic decisions (see, for example, Buser, Niederle, and Oosterbeek 2014).

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[2]Other studies have shown that information treatments can be effective in reducing existing biases. For example, in an experimental context in which participants perform a real effort task and then rate the task performance of other participants, Mengel (2021) documents that committee deliberation contributes to gender biases. She also finds that an information intervention where raters are informed of existing gender bias in prior sessions reduces the gender bias.

These data allow us to control for new and standard characteristics that help explain gender differences in financial literacy. In addition, the data keep track of whether and where participants abandon the survey, offering a unique possibility to study attrition in surveys. Finally, it also records other outcomes of interest, such as perceived survey difficulty and completion time, which are of special relevance to survey data.

Overall, we confirm the two key patterns observed in the literature in our control survey. First, women are less financially literate than men, as measured by the percent of correct answers. This gap almost reaches a 9 percentage point difference as women have an average of 49 percent of correct answers, while men have 58 percent. Second, women are more likely to choose "I do not know" answer than men. This gap is of over 6 percentage points as women choose "I do not know" 18 percent of the time while men 12 percent of the time. These gaps are reduced to 6 percentage and 4 percentage points, respectively, when adding control variables but remain significantly different from zero. Either way, the response bias accounts for about two-thirds of the gender gap in financial literacy.

Interestingly and the main innovation of this paper, we find that all three interventions effectively reduce the percent of "I do not know" answers. In the control group, 15 percent of survey takers choose this answer. By design, the treatment without IDK reduces this percent to zero. The incentives reduce this answer choice to 9 percent, and the provision of information to 7 percent. These reductions translate into significant increases in both percent correct (from 53 percent in the control group to 60, 56 and 57 percent in the without IDK, incentives and information, respectively), but also in percent incorrect (from the 30 percent in the control group to 38, 33 and 34 percent in the without IDK, incentives and information, respectively). What about gender gaps in responding "I do not know" and in financial literacy? Introducing incentives does not significantly reduce the gap in "I do not know" answers. On the other hand, the information shows very effective in reducing the gap in response bias, reducing it to half, 3 percentage points, in the specification without controls and even eliminating it in the specification with controls. In turn, this has implications for the gender gap in the standard financial literacy measure: the percentage of correct answers. Eliminating "I do not know" answer seems to go in the direction of reducing the gender gap in financial literacy but the effect is not significant. The introduction of incentives, if anything,

can only increase the gender gap in financial knowledge but the effect is not significant. Most importantly, and consistent with the results on the provision of information in reducing the response bias, this treatment is the only one that reduces significantly (at the 10% significance level) the gender gap in financial literacy. The financial literacy gender gap is reduced in half, from 6 percentage points to 3 percentage points. In addition, if financial literacy studies were to take into account the percent incorrect as well, the provision of information is the only treatment that does not affect the gender gap in the percent incorrect, contrary to without IDK and incentives treatments, which increase that gap. Finally, reassuringly, the three interventions do not impact the probability of exiting the survey differently and they do not impact the perceived difficulty of completing the survey, suggesting no differential attrition nor disutility from each treatment arm.

We therefore conclude that an important part of the observed gender gap in standard financial literacy questions is due to response bias in choosing "I do not know" and therefore, standard financial literacy surveys measure the gender gap in financial knowledge imprecisely, overstating it. According to our estimates, the actual gender gap in financial literacy can be reduced to even half when reducing the response bias. Furthermore, we provide sound evidence on the effectiveness of a simple design tool, the provision of information on the existing response bias in choosing "I do not know", that can potentially even eliminate it.

This paper contributes to the literature exploring gender differences in financial literacy. While most of the literature has focused on which observable contributing factors are associated with gender gaps in financial literacy (see, for example Bucher-Koenen, Lusardi, Alessie, and Rooij 2017 for an overview of the literature exploring gender gaps in financial literacy), this paper contributes to the scarce literature that explores a relatively new channel, shifting the focus to *how* financial literacy is measured. Bucher-Koenen, Lusardi, Alessie, and Rooij 2021 provide a first and significant step in this direction. Their study shows that the gender gaps in financial literacy considerably shrink in a panel, where participants first answer financial literacy questions with the "I do not know" option, and then, six weeks later, they answer the same questions without this option and with follow-up questions about confidence after each answer. We contribute by implementing the first RCT assessing response bias, and exploring which intervention can potentially help eliminate it. Our extreme treatment, without IDK, is

comparable to Bucher-Koenen et al. (2021). The main difference is that there is no concern over potential learning in our design, as it is a between-participant design, and we keep the sections identical in everything but their randomized components. We further complement the literature by providing relatively more precise estimates on how gender gaps vary with contributing factors, as well as by observing whether differential attrition and disutility in surveys exist, factors not typically available in public data.

Another strand of the literature we contribute to is the study of gender differences in educational tests. In particular, to a large literature that has studied how gaps vary in multiple-choice tests with and without differential grading for omitting questions and providing wrong answers. Women are found to omit more questions than men (Ben-Shakhar and Sinai, 1991; Pekkarinen, 2015; Baldiga, 2014; Coffman and Klinowski, 2020; Espinosa and Gardeazabal, 2020; Iriberri and Rey-Biel, 2021), which can be related to choosing "I do not know" answers. These studies often find that deleting differential grading of incorrect and omitted answers reduces gender gaps in performance measures. Our study, which studies a very different setting with survey responses on financial literacy, shows how interventions can potentially help reduce gaps and equalize men's and women's response choices.

The rest of the paper is organized as follows. In Section 2 we describe the survey design and the treatments. Section 3 presents all results. Finally, Section 4 concludes.

2   Survey Design and Treatments

We designed an online survey experiment to measure response bias and financial literacy, test for the effectiveness of three interventions to reduce this response bias and evaluate how this impacts standard measures of financial literacy. The survey design was exempt from the evaluation of the Ethics Committee as determined by the Institutional Review Board. The survey design and pre-analysis plan were pre-registered.[3]

The survey consisted of about 40 questions, lasted 15 minutes on average and was administered by the survey company 40dB in Spain between October 24 and November 18 of

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[3]The University of the Basque Country UPV/EHU Ethics Committee certified the exemption (https://www.ehu.eus/en/web/ceid/) because the researchers received anonymized data and the survey company, 40dB, has configured and implemented a personal data protection program in accordance with the reforms of the European Data Protection Regulation 2016/679 and the Organic Law on Protection of Personal Data 3/2018. The experiment and the pre-analysis plan are pre-registered in the AEA RCT Registry (The American Economic Association's Registry for Randomized Controlled Trials) under the RCT ID AEARCTR-0009896.

2022. Survey takers received a small fixed payment of 1.20€ for completing the questionnaire. This amount was determined based on the expected time required to complete the survey and is a standard compensation in the survey company. The survey was divided into three main parts, starting with individual demographic questions, continuing with a financial literacy section, and ending with additional questions on perceptions, experiences and managing finances. For a diagram of the experimental design, see Figure A1 in the Appendix A. All the questions included in the survey can be found in Appendix C.

The survey started with questions about individual demographic information, family and household background and the elicitation of behavioral traits and perceptions such as interest and perceived knowledge of financial topics and risk preferences. The inclusion of these questions was motivated by the research that shows that these are important variables in explaining gender gaps in financial literacy (e.g., Chen and Volpe 2002; Fonseca et al. 2012; Driva et al. 2016; Hsu 2016; Bucher-Koenen et al. 2017; Zaccaria and Guiso 2020; Bottazzi and Lusardi 2021).[4] Unlike previous studies, we also included questions on intergenerational background, such as parental education, to have a richer set of control variables. This section was the same for all survey takers and had no time limit.

Then, the survey included a financial literacy section that builds on the OECD International Network of Financial Education questionnaire. The introductory section text is standard and encourages participants to try to avoid choosing the "I do not know" answer option. Specifically, it follows INFE/OECD toolkit for measuring financial literacy suggestion (OECD, 2022) and uses the verbatim spanish text from the ECF (Bover et al., 2018). It reads: "If you do not know the answer, just say so. If you think you have the right answer, it is likely that you do." Of course, this text was excluded in the treatment arm without IDK. This section included 10 questions with a total time limit of 7 minutes to complete. These included the Big Five financial literacy questions (inflation, interest rate compounding, risk diversification, mortgages and bond pricing) we will focus on for the main results.[5] The goal of providing a time limit to complete was to minimize the probability of section interruptions

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[4]Some of these questions are always included by the company, a standard practice in all their surveys.

[5]In addition to the Big Five, we included a simple division question, an interest rate question without compounding, a probability question, a question included in the cognitive reflection test, and a simple subtraction exercise that we used to identify those survey takers who did not pay any attention.

and searching for answers. We also kept track of the time spent answering the financial literacy section. This measure is an additional outcome that can be interpreted as provided effort.

Finally, after the financial literacy section, the survey ended with 7 additional questions about participants' experiences, perceptions, and holdings of financial products. Based on their experiences, we construct a lean-in index as a standardized measure combining experiences such as asking for a job promotion or wage increase. The perceptions refer to behavioral traits such as having confidence to deal with unexpected events. The financial products questions referred to ownership and means of interacting with banks (e.g., online). Then, the questionnaire ended with a question on perceived survey difficulty. This last part was the same for all survey takers and had no time limit.

Importantly, we randomly varied the financial literacy section design while keeping the same questions. The survey design included a control version and three treatments to evaluate as interventions to potentially reduce "I do not know" answers. Following standard survey practices, the control group included the 10 questions with the option "I do not know" among the answer options. The first treatment arm, without IDK, omitted this option from the possible answers and the standard introductory section text omitted the mention of "I do not know" answers. The second treatment arm, incentives, kept the "I do not know" option in the answers but offered additional monetary incentives for correct answers. Specifically, before the start of the financial literacy questions, we presented a text explaining that survey takers could earn an additional 60 percent of their fixed payment. The incentive consisted on paying 7 additional cents for each correct answer, up to 70 cents if all 10 questions were answered correctly. Although the overall incentives are low, they are substantial in relative terms and can be gained during a task that takes 7 minutes at most. Finally, the third treatment, referred to as information, also kept "I do not know" among the answers but included an introductory text before starting the financial literacy section. This information aimed to increase awareness of gender differences in propensities to choose "I do not know" and repeated the instruction to try to avoid choosing "I do not know" answers so as to nudge them away from choosing this answer. Specifically, survey takers assigned to this treatment received the following information:

Men typically answer 7 out of 10 financial questions correctly. Women 6 out of 10. This difference is mostly explained (65%) because women choose the answer "I do not know" more often than men. Therefore, we ask you to - please - avoid answering "I do not know".

Any intervention using informational nudges might be susceptible of potential experimenter demand effects. However, it is reassuring that De Quidt, Haushofer, and Roth 2018 show that experimenter demand effects tend to be small in online experiments.

The survey code randomly assigned each treatment by gender immediately before entering the financial literacy section. The survey was pre-tested in a pilot implemented in September 2022. For the final sample, we received 6,000 completed surveys in total (3,000 men and 3,000 women): 2,400 in the control group (40 percent of the sample: 1,200 men and 1,200 women) and 1,200 (20 percent of the sample: 600 men and 600 women) in each of the three treatment arms. To obtain 6,000 completed surveys, the survey company collected 6,879 surveys, of which 879 survey takers abandoned the survey before completing it. In Subsection 3.3, we test whether there are gender differences in the probability of exiting the survey, and, in particular, we analyze if different treatment arms impact the probability of exiting the survey differently.

3   Results

3.1   Descriptive Statistics and Randomization

Table 1 presents summary statistics for the control and the three treated groups. It includes all characteristics and outcome variables used in the main analysis and shows the p-value for the F-test on differences across groups.

First, regarding respondents' main demographics, they are equally represented by gender by design, are, on average, 46 years old, about 92% were born in Spain, and more than 50% live in big cities. More than half of them have completed at most secondary education, and over 68% are currently working.

Second, regarding respondents' household characteristics, over 70% live with a partner, have an average of about 3 household members, and are most likely the primary income earners. Survey takers' parents have low education, as more than half of mothers and fathers

have completed at most primary education. In line with this, close to 75% recall having fewer than a bookshelf of books when they were 10 years old.

Third, regarding their self-assessments on financial knowledge and risk-taking behavior, we find that most participants perceive they have either neutral (over 40%) or good (close to 40%) knowledge of financial topics. In line with this, they believe they would get close to 6 correct answers in a 10-question financial questionnaire and their interest in finance is about 6 on a scale between 0 and 10. Both risk aversion measures, one qualitative and one lottery choice using the elicitation method by Eckel and Grossman (2002), show that the survey takers are, on average, slightly risk averse.

Finally, they place themselves close to 4 in their self-efficacy, confidence and lean-in measures, which come from statements with an agreement scale between 0 and 5. Regarding their management of finances, they have, on average, 2.5 out of 6 saving or investing products, such as saving accounts or pension plans, and about 1.4 out of 3 debt products, among loans, mortgages, and credit cards. Most have performed online bank operations over the last 12 months, while about 3% had no bank operations.

The last column reports the p-values for the F-test when comparing all control variables across the four treatment groups. Overall, all these values show that the randomization was implemented successfully. The two exceptions are the education level, the proportion of those who have primary education and university studies, and the choice of having a high knowledge of financial knowledge. Reassuringly, the results are not sensitive to the inclusion of these characteristics as controls.

These descriptive statistics are also presented, separately by gender, in Tables A1 and A2. As expected, men and women differ, in some characteristics, mostly in behavioral traits and perceptions. They also differ on managing finance variable characteristics. For example, women tend to be more risk-averse (Croson and Gneezy, 2009), less interested in finance (Brown and Graf, 2013) and less confident in their self-perceived financial knowledge than men (Bordalo et al., 2019). They also hold a lower number of financial products, are less likely to do online bank operations, and are more likely to have no bank operations (Almenberg and Dreber, 2015; Bottazzi and Lusardi, 2021). Most importantly, the p-values in the final columns show that, when split by gender, both, men and women have comparable

socio-demographics, family background, behavioral traits and experience managing finances across the four treatment groups.

3.2 Main Results: Evaluation of the Three Interventions

The *main outcomes* panel in Table 1 show the mean values for the percent of "I do not know" answers, and the percent of correct and incorrect answers for the Big Five financial literacy questions. In the control group, the survey takers choose the "I do not know" answer on average in about 15 percent of the questions (in 0.75 out of 5 questions), while the three treatment arms reduce this percentage significantly. Mechanically, the biggest decrease is when this option is eliminated, followed by the information treatment, chosen in 7 percent of the questions (in 0.35 questions out of 5), and finally, by the introduction of monetary incentives, chosen in 9 percent of the questions (in 0.45 questions). The results in the percent correct are also aligned with the previous results. On average, in the control group, survey takers answer 53 percent of the questions correctly, and the three treatment arms are effective in increasing this percentage. When deleting the "I do not know" option, survey takers answer correctly 60 percent of the questions, followed by the provision of information and the monetary incentives, with about 57 and 56 percent correct each, respectively. However, the percent of incorrect answers also increases as survey takers answer more questions. In the control group, on average survey takers answer about 30 percent of the questions incorrectly. When we exclude the "I do not know" option, the survey takers answer incorrectly on average 38 percent of the questions. This percent is reduced to 34 percent with the information and to 33 percent with the monetary incentives. As expected by these differences, the p-values in the final column show that the different interventions impacted these three outcome variables significantly.

For the control group, we confirm two main findings on gender gaps in financial literacy as shown in Figure 1. First, we observe a gender gap of about 9 percentage points in financial literacy as measured by the percent of correct answers, in line with the literature (see, for example, Bucher-Koenen, Lusardi, Alessie, and Rooij 2017) for an overview. Specifically, men answer close to 58 percent of the questions correctly, on average. By contrast, women do so

close to 49 percent of the time. Adjusting for differences in characteristics reduces this gap by only 2 percentage point, as shown in Tables 3. Second, the unadjusted 8.5 percentage point difference is explained by a 6.5 percentage point gap in "I do not know" answers, while the gap in incorrect answers is of 2 percentage points. Consistent with Bucher-Koenen, Lusardi, Alessie, and Rooij 2021 and Hospido, Izquierdo, and Machelett 2021, over 75 percent of the gap in financial literacy corresponds to different propensities to choose "I do not know" answers. Specifically, men choose the "I do not know" in close to 12 percent of the questions, while women choose it at a higher rate (18 percent). Lastly, men choose incorrect answers 29 percent of the time, while women's incorrect answers increase to 31 percent.

As a next step, we can see that the three potential interventions are effective in reducing the prevalence of "I do not know". Figure 2 and Table 2 show the results. In Table 2 we show three different specifications, without any controls, shown in column (1), with all controls, shown in column (2), and with a lasso-selected set of controls, shown in column (3). Appendix Table A3 reports all the estimated coefficients of the corresponding Table 2. Adjusting for additional characteristics reduces this response bias, but does not significantly close this gap.

With the extreme intervention of deleting the option of "I do not know" from the answers, this is mechanically reduced to 0, and consequently, the gender gap is closed. Offering incentives also reduces significantly this answer. However, the gender gap is not significantly reduced with this intervention. Finally, the information nudge is also effective in reducing the percent of "I do not know". In this case, however, the effect is significantly larger for women (reduced to 8.6 percent) than for men (reduced to 5.7 percent), at the 1% significance level, such that the gender gap is reduced. In the specification without controls, in column (1), the response bias is reduced to half, from 6 to 3 percentage points, and in the specification with controls, in columns (2) and (3), the gender gap in the propensity to choose "I do not know" is eliminated. As shown in Table 2, we reject the hypothesis that all treatment effects are equal for each gender.

How do these results reducing the "I do not know" answers translate into the other performance measures? Figures 3 and 4 and Tables 3 and 4 show the results. As in Table 2, Tables 3 and 4 show three specifications, without any controls, shown in column (1), with all controls, shown in column (2), and with a lasso-selected set of controls, shown in column (3).

Appendix Tables A4 and A5 report all the estimated coefficients of the corresponding Tables 3 and 4, respectively.

All three interventions significantly increase the percent of correct answers. While the extreme intervention of deleting the option of "I do not know" closed the gap on "I do not know" answers, it does not close or reduce the gap in correct answers. It raises the percent of correct answers similarly for both men and women. The introduction of incentives significantly increases the percent of correct answers for men with respect to their baseline group, but is not effective for women. If anything, this intervention would *increase* the gender gap, although not significantly. Finally, the information increases the percent of correct answers for men and women. Contrary to incentives, the increase is significantly larger for women than for men, such that this policy can decrease the gender gap in the percent of correct answers, although significant at the 10% level. As with IDK, we reject the null hypothesis that all treatment effects in correct answers are equal for both, men and women.

A simple exercise to evaluate the estimated increase in correct answers by treatment is to compare this estimated increase in correct answers by treatment with the expected increase with pure random guessing, as detailed in Appendix B. This alternative evaluation shows that the increase in correct answers is highest relative to an expected increase from random guessing for women in the information group, while this difference is smallest for men. This result is consistent with our main results, where the gender differences in choosing IDK are reduced and even closed, resulting in smaller gender gap differences in knowledge.

Finally, an alternative measure to compare the treatment effects is analyzing the changes in wrong answers. All three interventions also increase the percent of incorrect answers. Interestingly, we also find significant differences by gender. Deleting the option of "I do not know" and introducing incentives increases the percent of incorrect answers significantly more for women than men. In fact, the incentives only impact women's performance in incorrect answers, whereas men's performance remains unchanged. The only intervention that does not affect the gender gap in the percent of incorrect answers is the provision of information. This is the only treatment that reduced the gender differences in "I do not know" and correct answers, without increasing the gap in incorrect answers.

Overall, this pattern of results remains when analyzing the Big Five questions individually, as shown in Tables A6 in the Appendix. Although the behavioral patterns go in the same direction for the five questions, the strongest effects in closing the gender gap in the provision of "I do not know" answers with the provision of information seem to come from the questions on inflation, risk diversification and bond pricing. In addition, we have also performed the analysis with alternative measures of financial literacy. We used different sets of questions included in the financial literacy section (see Table A7 in the Appendix). Specifically, we include the Big Three (column 2), which excludes the questions on the mortgages and bond pricing from the Big Five questions. We add the simple interest rate question to the Big Five questions ("Big Six", column 3), and finally we include all the questions in the financial literacy section (All, column 4). As can be read from Table A7, the results are robust to all the different definitions of the outcome variable.

The main take-away of these results is that the three interventions are highly effective in reducing the percent of "I do not know" answers and increasing both performance measures, percent of correct and incorrect answers. With respect to gender gaps, the information treatment is the only intervention that significantly decreases the gap in "I do not know" answers and correct answers. While in the control group, the gender gap in "I do not know" answers is at least of 4 percentage points and in the percent correct is of at least about 6 percentage points, in the information treatment the gender gap in the choice of "I do not know" is eliminated and the gender gap in financial literacy is reduced to half, 3 percentage points. In sum, the policy change that gets the highest support for survey design to both increase the percent correct and reduce the gender gap in financial literacy, is the information treatment.

3.3 Further Results: Evaluation of the Three Interventions on the Probability of Abandoning the Survey, Perceived Difficulty and Completion Time

We also study the impact of the treatments on measures of attrition, disutility and effort derived from the survey. Specifically, we test whether there is a differential probability of abandoning the survey, on the perceived difficulty of the survey and the completion time of the Big Five questions.

We start with the probability of abandoning the survey, which is a policy-relevant outcome, particularly, for online surveys. As mentioned in Section 2, 40dB survey company collected 8,041 surveys to obtain 6,000 completed surveys. Therefore, 2,041 survey takers left the survey before completing it. Of those, we exclude 499 individuals whose gender is not reported as they exit the survey before reaching the first question. For the 7,542 remaining participants, we can test whether men and women have a different likelihood of exiting the survey and whether the three different treatments impact differently the probability of exiting the survey.

Columns (1) and (2) in Table 5 show that 20 percent of the survey takers abandon the test and that, on average, they do it early in the questionnaire, in question number 2. Although men and women do not show a different likelihood of abandoning the test, women tend to abandon at a later question. Second, notice that survey takers are randomized after they have completed the first part of the survey (Q1-Q29 in the Appendix C), which means that we should drop the survey takers who exit the survey before reaching the assignment to treatment. Indeed, most subjects who exit the survey before completing it do it in the very first socio-demographic questions, so only 397 test takers abandon after they are assigned to either the control group or a treatment arm. Therefore, we can analyze if different interventions have a differential impact on exiting the survey using the 397 survey takers who exit the test after being assigned but before completing the test. Columns (3) and (4) in Table 5 show the results. Overall, about 5% of the survey takers abandoned the test after being assigned to a treatment group. On average they do it early in the financial literacy section, between the first and the second question. We find that women are more likely to abandon the test, 5% for men and 7% for women, although the difference is significant at 10% significance level (p-value of 0.09). More importantly, the treatment arms do not show a significantly differential impact on the probability of exiting the survey. This is reassuring from a methodological point of view, as we find no evidence that the three different interventions we study have any differential effect on completing the financial literacy survey section.

We also focus on two additional outcome variables of interest: perceived difficulty on a scale between 0 and 10 and completion time of the Big Five questions. The bottom part of

Table 1 shows the mean values of these two outcomes. Survey takers on average give a score slightly over 4 in difficulty and take about a minute and a half to do the 5 questions.

Columns (5) and (6) in Table 5 show that women find the survey more difficult. In addition, women spend more time than men completing the Big Five questions only in the intervention without the IDK. The results on these additional outcomes also reinforce the idea that omitting the "I do not know" option from the answers is impacting women more negatively than men, hence, we do not find much support for it from a policy point of view. On the contrary, the information treatment, which reduced the probability of choosing "I do not know" and increased the percent correct slightly more for women than for men reducing the gender gap, does not impact the probability of abandoning the test, the time spent in responding or perceived difficulty.

4 Concluding Remarks

Women show lower financial knowledge than men when measured by the percent of correct answers in financial literacy surveys. However, as surveys allow for "I do not know" answers, the observed gender gap may reflect a response bias from differences in choosing this answer type. Before targeting particular groups, such as women, improving the precision of financial literacy measures and behavior in surveys is important.

This paper shows that, consistent with other studies, there is a gender gap in financial literacy but that about 75 percent of this difference is explained by differences in the propensity to choose "I do not know". As the main contribution, we carried out the first RCT to evaluate how different interventions impact men's and women's propensity to choose "I do not know" answers in financial literacy surveys and, consequently, the main financial literacy measure typically reported, the percent of correct answers in the Big Five questions. We implemented a standard financial literacy questionnaire used internationally in surveys on a control group. Then, we randomly assigned participants to complete a survey where this section excluded the "I do not know" answer options, offered incentives for each correct answer, or included information specifying the differential gender propensities in choosing "I do not know".

We find that all three interventions effectively reduce the propensity to choose "I do not know" answers and therefore increase the percent correct. However, we find important gender

differences. The extreme intervention of deleting "I do not know" answers mechanically reduced the "I do not know" answer gap, but does not impact the gap in financial literacy. The incentives also reduced the "I do not know" but not the gender gap. In fact, only men significantly improve their performance. By contrast, among the three interventions, the provision of information is the only one that significantly reduces the gender gap in the propensity to choose the "I do not know" answers and the gap in percent correct to half.

These results suggest that standard surveys to measure financial literacy show imprecise gender gaps in financial literacy. In particular, they overstate it. In addition, we show that an important design policy to increase precision in measuring the gender gap in financial literacy is including a simple information nudge, which is relatively easy and costless to implement. Further research should be devoted to understanding how information treatments can work in repeated surveys.

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Figures and Tables

Figure 1: Main Outcomes in the Big Five in the Control Group
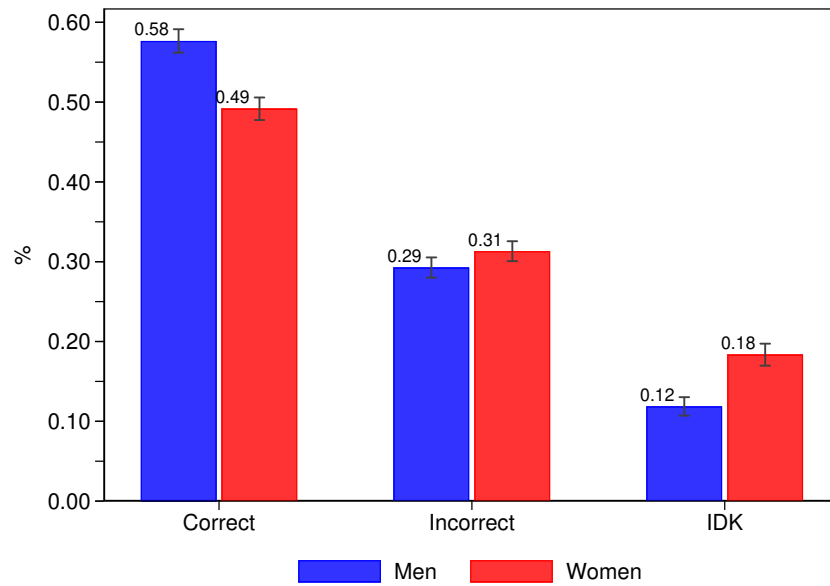

Figure 2: Big Five Percent of "I do not know" Answers
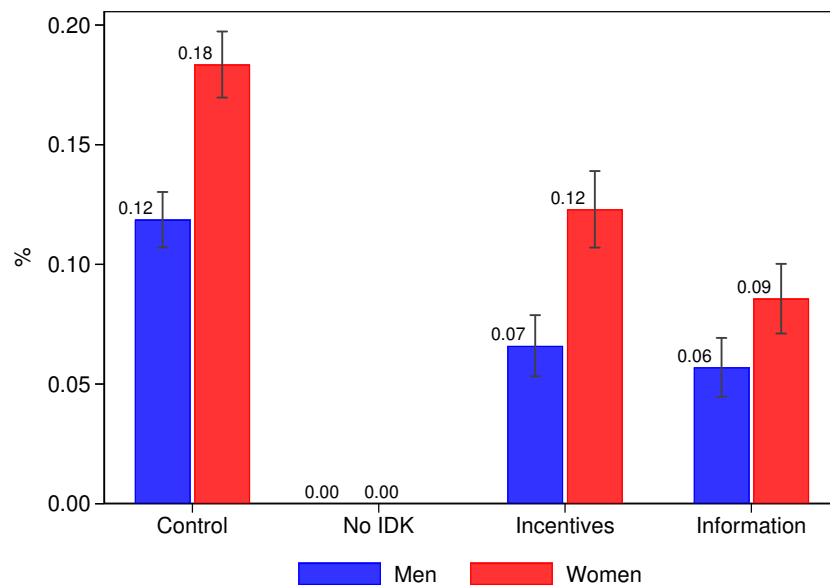
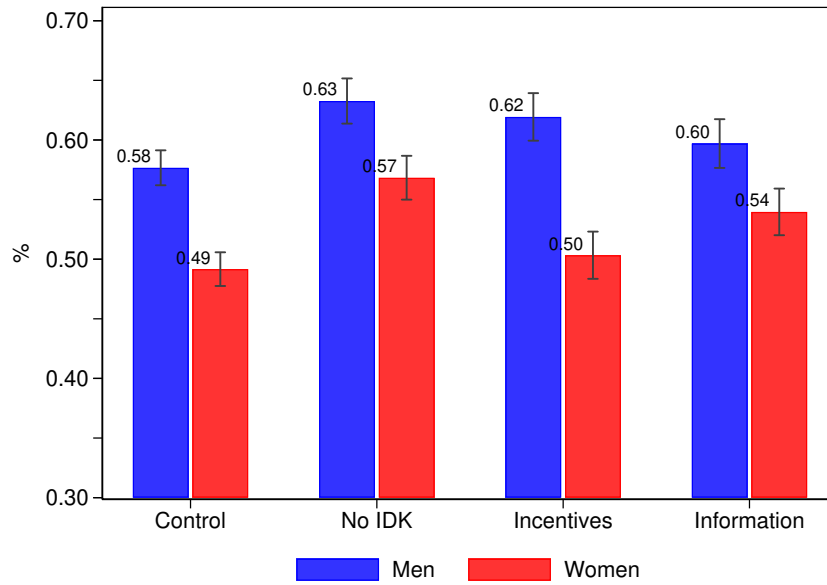## Figure 3: Big Five Perfect of Correct Answers

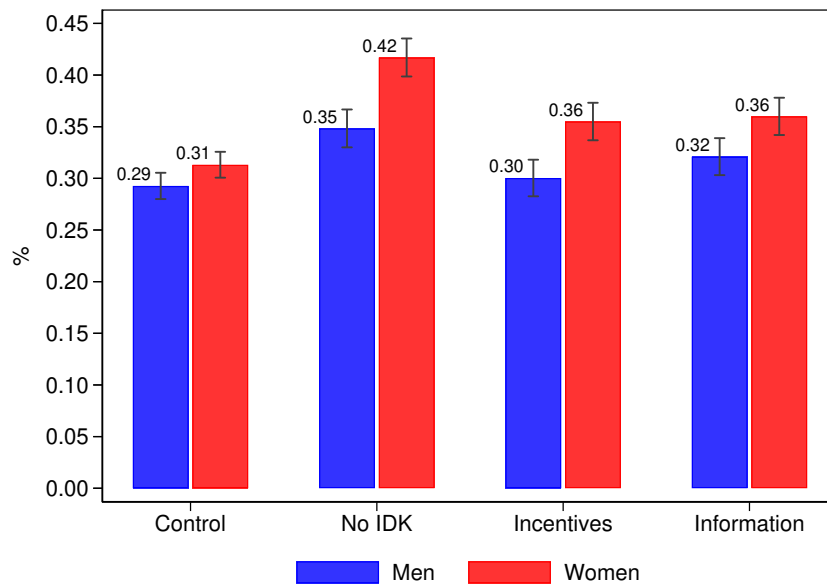## Figure 4: Big Five Percent of Incorrect Answers

Table 1: Descriptive Statistics (mean values) and Randomization

		(1) Control	(2) Without IDK	(3) Incentives	(4) Information	(5) p-value
Demographics	Woman	0.50	0.50	0.50	0.50	1.00
	Age 18-34	0.19	0.19	0.17	0.18	0.70
	Age 35-44	0.26	0.27	0.26	0.27	0.87
	Age 45-54	0.30	0.30	0.30	0.30	0.97
	Age 55-70	0.25	0.24	0.27	0.26	0.47
	Spaniard	0.91	0.93	0.93	0.91	0.16
	Pop. size 0-20th	0.21	0.18	0.19	0.20	0.16
	Pop. size 20th-100th	0.27	0.26	0.28	0.27	0.70
	Pop. size 100th+	0.52	0.56	0.53	0.53	0.16
	Primary education	0.20	0.17	0.25	0.21	0.00
	Secondary education	0.34	0.37	0.35	0.35	0.36
	University education	0.35	0.35	0.30	0.34	0.02
	Master, PhD education	0.11	0.11	0.10	0.10	0.76
	Working	0.70	0.69	0.67	0.67	0.12
	Retired	0.10	0.10	0.12	0.11	0.37
	Unemployed	0.19	0.19	0.20	0.21	0.31
Household	< 1 bookshelf at age 10	0.75	0.74	0.73	0.73	0.74
	> 2 bookshelves at age 10	0.25	0.26	0.27	0.27	0.74
	Household size	2.99	2.97	3.04	2.97	0.43
	Primary earner	0.67	0.66	0.69	0.66	0.44
	Lives with partner	0.73	0.71	0.72	0.73	0.59
	Mother: Primary education	0.60	0.57	0.59	0.59	0.60
	Mother: Secondary education	0.19	0.21	0.19	0.20	0.43
	Mother: Post-secondary education	0.20	0.19	0.19	0.19	0.80
	Father: Primary education	0.53	0.53	0.55	0.56	0.38
	Father: Secondary education	0.20	0.20	0.20	0.19	0.68
	Father: Post-secondary education	0.23	0.23	0.20	0.22	0.42
	Partner: Primary education	0.17	0.15	0.18	0.18	0.12
	Partner: Secondary education	0.24	0.25	0.24	0.23	0.78
	Partner: Post-secondary education	0.33	0.32	0.30	0.32	0.50
Assessments	Very low financial knowledge	0.02	0.02	0.02	0.03	0.70
	Low financial knowledge	0.12	0.12	0.12	0.12	0.94
	Neutral financial knowledge	0.42	0.41	0.40	0.44	0.20
	Good financial knowledge	0.38	0.41	0.40	0.37	0.09
	Very good financial knowledge	0.06	0.04	0.06	0.05	0.03
	Expected correct answers	5.58	5.73	5.79	5.52	0.00
	Interest in finance	6.10	6.13	6.14	5.97	0.35
	Risk willingness	4.65	4.77	4.74	4.62	0.48
	Lottery choice	3.62	3.58	3.67	3.65	0.77
Perceptions	Lean-in index	0.01	0.01	-0.03	0.00	0.39
	Perceived self-efficacy	3.96	4.00	4.00	4.02	0.20
	Perceived confidence	3.80	3.87	3.83	3.83	0.18
	Perceived lean-in	3.65	3.67	3.64	3.63	0.84
Managing finances	Saving products (N)	2.53	2.60	2.46	2.56	0.07
	Debt products (N)	1.39	1.39	1.36	1.42	0.48
	Online bank operations	0.80	0.82	0.80	0.81	0.66
	No bank operations	0.03	0.03	0.03	0.04	0.34
Main outcomes	Big five: IDK answers (%)	0.15	0.00	0.09	0.07	0.00
	Big five: Correct answers (%)	0.53	0.60	0.56	0.57	0.00
Other outcomes	Big five: Incorrect answers (%)	0.30	0.38	0.33	0.34	0.00
	Perceived survey difficulty	4.23	4.15	4.17	4.13	0.76
	Big-five: Completion time	99.57	102.34	100.77	102.59	0.49
Observations		2,400	1,200	1,200	1,200	

Table 2: Percent "I do not know" Answers: Big Five Questions

	(1)	(2)	(3)
Female	0.065***	0.041***	0.040***
	(0.009)	(0.009)	(0.009)
Without IDK	-0.119***	-0.115***	-0.115***
	(0.006)	(0.006)	(0.006)
Incentives	-0.053***	-0.049***	-0.049***
	(0.009)	(0.008)	(0.008)
Information	-0.062***	-0.063***	-0.063***
	(0.009)	(0.008)	(0.008)
Female x Without IDK	-0.065***	-0.067***	-0.067***
	(0.009)	(0.009)	(0.009)
Female x Incentives	-0.008	-0.015	-0.015
	(0.014)	(0.013)	(0.013)
Female x Information	-0.036***	-0.038***	-0.038***
	(0.013)	(0.012)	(0.012)
Male Control	0.119	0.119	0.119
Controls	No	All	Selected
P-value Test: treatments equal for male	0.000	0.000	0.000
P-value Test: treatments equal for female	0.000	0.000	0.000
Observations	6000	6000	6000
R-squared	0.105	0.239	0.239

Notes: OLS regression of the outcome percent IDK answers in the Big Five questions. The first column includes no control variables, the second column includes all control variables and the third column includes a lasso-selected set of control variables. To see the estimated values of all coefficients in each of the columns see Table A3 in the Appendix. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 3: Percent Correct Answers: Big Five Questions

	(1)	(2)	(3)
Female	-0.085***	-0.056***	-0.056***
	(0.010)	(0.010)	(0.010)
Without IDK	0.056***	0.052***	0.052***
	(0.012)	(0.011)	(0.011)
Incentives	0.043***	0.040***	0.040***
	(0.013)	(0.012)	(0.012)
Information	0.020	0.021*	0.021*
	(0.013)	(0.012)	(0.012)
Female x Without IDK	0.021	0.021	0.021
	(0.017)	(0.016)	(0.016)
Female x Incentives	-0.031*	-0.021	-0.021
	(0.018)	(0.016)	(0.016)
Female x Information	0.028	0.028*	0.028*
	(0.018)	(0.017)	(0.017)
Male Control	0.577	0.577	0.577
Controls	No	All	Selection
P-value Test: treatments equal for male	0.042	0.077	0.076
P-value Test: treatments equal for female	0.000	0.000	0.000
Observations	6,000	6,000	6,000
R-squared	0.037	0.176	0.176

Notes: OLS regression of the outcome percent correct answers in the Big Five questions. The first column includes no control variables, the second column includes all control variables and the third column includes a lasso-selected set of control variables. To see the estimated values of all coefficients in each of the columns see Table A4 in the Appendix. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 4: Percent Incorrect Answers: Big Five Questions

	(1)	(2)	(3)
Female	0.021**	0.017*	0.016*
	(0.009)	(0.009)	(0.009)
Without IDK	0.056***	0.056***	0.056***
	(0.011)	(0.011)	(0.011)
Incentives	0.008	0.006	0.007
	(0.011)	(0.011)	(0.011)
Information	0.028**	0.029***	0.029***
	(0.011)	(0.011)	(0.011)
Female x Without IDK	0.048***	0.051***	0.051***
	(0.016)	(0.016)	(0.016)
Female x Incentives	0.034**	0.030*	0.030*
	(0.016)	(0.015)	(0.015)
Female x Information	0.018	0.019	0.019
	(0.016)	(0.016)	(0.016)
Male Control	0.293	0.293	0.293
Controls	No	All	Selected
P-value Test: treatments equal for male	0.001	0.001	0.001
P-value Test: treatments equal for female	0.000	0.000	0.000
Observations	6000	6000	6000
R-squared	0.026	0.080	0.080

Notes: OLS regression of the outcome percent incorrect answers in the Big Five questions. The first column includes no control variables, the second column includes all control variables and the third column includes a lasso-selected set of control variables. To see the estimated values of all coefficients in each of the columns see Table A5 in the Appendix. Robust standard errors in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table 5: Further Results: Prob. of Exiting, Perceived Difficulty and Completion Time

	(1) Exit	(2) Exit Q N.	(3) Exit	(4) Exit Q N.	(5) Difficulty	(6) Difficulty	(7) Time	(8) Time
Women	0.045***	0.520***	0.006	0.170	0.368***	0.246**	-0.692	0.064
	(0.008)	(0.126)	(0.007)	(0..175)	(0.113)	(0.116)	(2.930)	(2.732)
Without IDK			0.002	0..007	-0.183	-0.146	-4.195	-3.843
			(0.008)	(0.197)	(0.137)	(0.132)	(3.084)	(3.067)
Incentives			0.005	0.151	-0.052	-0.027	-1.765	-1.952
			(0.009)	(0.217)	(0.139)	(0.133)	(3.166)	(3.225)
Information			0.006	0.248	-0.162	-0.180	0.866	1.793
			(0.009)	(0.231)	(0.145)	(0.140)	(3.136)	(3.054)
Women x Without IDK			-0.000	-0.085	0.222	0.212	13.887***	13.514***
			(0.012)	(0.287)	(0.196)	(0.191)	(4.565)	(4.467)
Women x Incentives			0.011	0.192	-0.002	-0.010	5.947	5.343
			(0.013)	(0.332)	(0.195)	(0.190)	(4.552)	(4.470)
Women x Information			-0.005	-0.264	0.130	0.198	4.265	1.638
			(0.013)	(0.319)	(0.200)	(0.196)	(4.325)	(4.225)
Men control	0.089	1.326	0.029	0.681	4.042	4.042	99.920	99.920
Sample	All	All	Treated	Treated	Treated	Treated	Treated	Treated
Controls	No	No	No	No	No	Yes	No	Yes
Observations	6764	6764	6220	6220	6000	6000	5844	5844
R2	0.000	0.001	0.001	0.001	0.007	0.067	0.003	0.058

Notes: Columns (1) and (3) show the probability abandoning or exiting the survey. Columns (2) and (4) show the number of question in which the survey taker abandons the survey. Columns (5) and (6) show the survey perceived difficulty measured in a scale between 0 and 10. Columns (7) and (8) show the time spent in responding the Big Five questions in seconds. Men control row refers to the mean value of each outcomes variable for men in the control group, except for Columns (1) and (2) that show this value for men. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

A Additional Figures and Tables

Figure A1: Diagram of the Experimental Design

```
┌─────────────────────────────────────────────────────┐
│      Demographic, Household, Perception section       │
│                   No time limit                       │
└─────────────────────────────────────────────────────┘
                          │
                          ▼
┌─────────────────────────────────────────────────────┐
│        Treatments: Financial Literacy section         │
│                 Time limit: 7 minutes                 │
└─────────────────────────────────────────────────────┘
```

Group 1: Control	Group 2: Without IDK	Group 3: Incentives	Group 4: Information
With IDK	Without IDK	With IDK	With IDK
		0.07€ per correct	"Men typically... ...to avoid answering IDK"

```
┌─────────────────────────────────────────────────────┐
│       Perception, Managing Finances section           │
│                   No time limit                       │
└─────────────────────────────────────────────────────┘
```
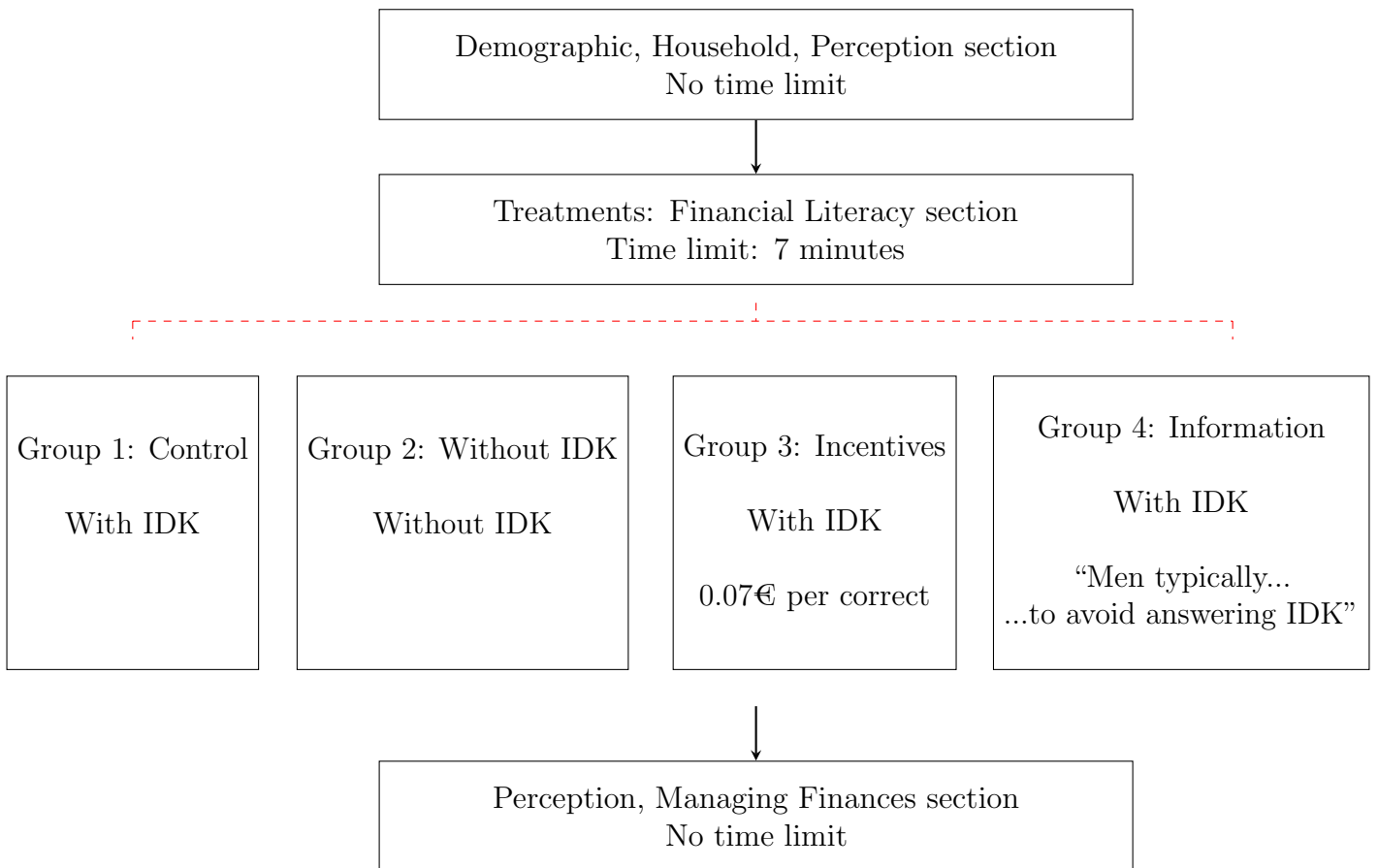
Table A1: Descriptive Statistics (mean values) and Randomization: Female Sample

		(1) Control	(2) Without IDK	(3) Incentives	(4) Information	(5) p-value
Demographics	Age 18-34	0.20	0.21	0.20	0.17	0.35
	Age 35-44	0.28	0.30	0.28	0.27	0.77
	Age 45-54	0.31	0.28	0.29	0.33	0.39
	Age 55-70	0.21	0.21	0.23	0.23	0.63
	Spaniard	0.90	0.91	0.92	0.90	0.56
	Pop. size 0-20th	0.22	0.17	0.20	0.20	0.04
	Pop. size 20th-100th	0.26	0.28	0.28	0.29	0.49
	Pop. size 100th+	0.52	0.55	0.52	0.51	0.37
	Primary education	0.21	0.15	0.26	0.20	0.00
	Secondary education	0.31	0.36	0.36	0.35	0.06
	University education	0.36	0.37	0.28	0.36	0.00
	Master, PhD education	0.12	0.13	0.10	0.08	0.02
	Working	0.67	0.66	0.63	0.61	0.08
	Retired	0.07	0.07	0.08	0.09	0.45
	Unemployed	0.25	0.24	0.28	0.29	0.18
Household	< 1 bookshelf at age 10	0.71	0.73	0.70	0.73	0.64
	> 2 bookshelves at age 10	0.29	0.27	0.30	0.27	0.64
	Household size	3.03	2.98	3.02	3.02	0.85
	Primary earner	0.51	0.50	0.54	0.49	0.35
	Lives with partner	0.72	0.70	0.69	0.70	0.61
	Mother: Primary education	0.59	0.57	0.61	0.60	0.40
	Mother: Secondary education	0.19	0.22	0.20	0.19	0.52
	Mother: Post-secondary education	0.20	0.20	0.17	0.19	0.29
	Father: Primary education	0.54	0.51	0.56	0.54	0.39
	Father: Secondary education	0.20	0.20	0.20	0.22	0.89
	Father: Post-secondary education	0.21	0.25	0.19	0.20	0.10
	Partner: Primary education	0.19	0.16	0.19	0.18	0.38
	Partner: Secondary education	0.23	0.24	0.26	0.25	0.50
	Partner: Post-secondary education	0.30	0.30	0.25	0.27	0.06
Assessments	Very low financial knowledge	0.03	0.02	0.03	0.02	0.29
	Low financial knowledge	0.15	0.16	0.16	0.14	0.84
	Neutral financial knowledge	0.44	0.43	0.39	0.47	0.07
	Good financial knowledge	0.33	0.37	0.38	0.34	0.11
	Very good financial knowledge	0.05	0.03	0.04	0.03	0.03
	Expected correct answers	5.22	5.37	5.35	5.17	0.28
	Interest in finance	5.88	5.73	5.80	5.70	0.50
	Risk willingness	4.24	4.34	4.32	4.18	0.75
	Lottery choice	3.59	3.48	3.48	3.58	0.69
Perceptions	Lean-in index	-0.12	-0.11	-0.16	-0.13	0.41
	Perceived self-efficacy	3.96	3.98	4.00	4.02	0.56
	Perceived confidence	3.82	3.85	3.79	3.83	0.73
	Perceived lean-in	3.64	3.67	3.62	3.65	0.88
Managing finances	Saving products (N)	2.35	2.42	2.21	2.33	0.04
	Debt products (N)	1.35	1.39	1.32	1.34	0.51
	Online bank operations	0.79	0.81	0.78	0.80	0.71
	No bank operations	0.04	0.04	0.04	0.06	0.27
Main outcomes	Big five: IDK answers (%)	0.18	0.00	0.12	0.09	0.00
	Big five: Correct answers (%)	0.49	0.57	0.50	0.54	0.00
	Big five: Incorrect answers (%)	0.31	0.42	0.36	0.36	0.00
Other outcomes	Perceived survey difficulty	4.41	4.45	4.36	4.38	0.94
	Big-five: Completion time	99.23	108.92	103.41	104.36	0.02
Observations		1,200	600	600	600	

Table A2: Descriptive Statistics (mean values) and Randomization: Male Sample

		(1)	(2)	(3)	(4)	(5)
		Control	Without IDK	Incentives	Information	p-value
Demographics	Age 18-34	0.17	0.17	0.15	0.18	0.49
	Age 35-44	0.25	0.25	0.24	0.26	0.87
	Age 45-54	0.30	0.31	0.30	0.28	0.58
	Age 55-70	0.29	0.27	0.30	0.28	0.63
	Spaniard	0.92	0.94	0.94	0.92	0.25
	Pop. size 0-20th	0.20	0.20	0.17	0.20	0.74
	Pop. size 20th-100th	0.28	0.24	0.28	0.25	0.15
	Pop. size 100th+	0.52	0.56	0.54	0.56	0.32
	Primary education	0.20	0.20	0.23	0.21	0.22
	Secondary education	0.36	0.38	0.34	0.35	0.61
	University education	0.34	0.34	0.32	0.31	0.61
	Master, PhD education	0.11	0.10	0.11	0.13	0.30
	Working	0.73	0.72	0.71	0.72	0.77
	Retired	0.14	0.12	0.15	0.13	0.45
	Unemployed	0.12	0.14	0.13	0.13	0.72
Household	< 1 bookshelf at age 10	0.78	0.76	0.76	0.73	0.19
	> 2 bookshelves at age 10	0.22	0.24	0.24	0.27	0.19
	Household size	2.95	2.97	3.06	2.92	0.15
	Primary earner	0.83	0.81	0.83	0.83	0.76
	Lives with partner	0.75	0.73	0.75	0.76	0.69
	Mother: Primary education	0.61	0.58	0.57	0.59	0.60
	Mother: Secondary education	0.18	0.20	0.19	0.20	0.75
	Mother: Post-secondary education	0.19	0.18	0.20	0.18	0.71
	Father: Primary education	0.52	0.54	0.54	0.57	0.18
	Father: Secondary education	0.21	0.21	0.20	0.16	0.09
	Father: Post-secondary education	0.24	0.21	0.22	0.23	0.62
	Partner: Primary education	0.15	0.14	0.17	0.17	0.24
	Partner: Secondary education	0.24	0.26	0.23	0.21	0.31
	Partner: Post-secondary education	0.35	0.34	0.35	0.37	0.71
Assessments	Very low financial knowledge	0.01	0.02	0.01	0.03	0.01
	Low financial knowledge	0.09	0.09	0.09	0.09	0.99
	Neutral financial knowledge	0.40	0.38	0.40	0.41	0.84
	Good financial knowledge	0.43	0.46	0.42	0.40	0.25
	Very good financial knowledge	0.07	0.05	0.08	0.07	0.19
	Expected correct answers	5.94	6.09	6.23	5.87	0.01
	Interest in finance	6.32	6.53	6.48	6.25	0.15
	Risk willingness	5.05	5.19	5.17	5.06	0.69
	Lottery choice	3.66	3.68	3.87	3.72	0.35
Perceptions	Lean-in index	0.13	0.12	0.10	0.13	0.80
	Perceived self-efficacy	3.96	4.01	4.01	4.02	0.41
	Perceived confidence	3.79	3.90	3.87	3.82	0.06
	Perceived lean-in	3.65	3.67	3.65	3.62	0.87
Managing finances	Saving products (N)	2.70	2.79	2.71	2.78	0.52
	Debt products (N)	1.44	1.38	1.41	1.50	0.09
	Online bank operations	0.82	0.83	0.82	0.82	0.93
	No bank operations	0.03	0.01	0.02	0.02	0.38
Main outcomes	Big five: IDK answers (%)	0.12	0.00	0.07	0.06	0.00
	Big five: Correct answers (%)	0.58	0.63	0.62	0.60	0.00
	Big five: Incorrect answers (%)	0.29	0.35	0.30	0.32	0.00
Other outcomes	Perceived survey difficulty	4.04	3.86	3.99	3.88	0.50
	Big-five: Completion time	99.92	95.72	98.16	100.79	0.51
Observations		1,200	600	600	600	

Table A3: Percent IDK Answers with All Coefficients: Big-five Questions

	(1)	(2)	(3)
Female	0.065***	0.041***	0.040***
	(0.009)	(0.009)	(0.009)
Without IDK	-0.119***	-0.115***	-0.115***
	(0.006)	(0.006)	(0.006)
Incentives	-0.053***	-0.049***	-0.049***
	(0.009)	(0.008)	(0.008)
Information	-0.062***	-0.063***	-0.063***
	(0.009)	(0.008)	(0.008)
Female x Without IDK	-0.065***	-0.067***	-0.067***
	(0.009)	(0.009)	(0.009)
Female x Incentives	-0.008	-0.015	-0.015
	(0.014)	(0.013)	(0.013)
Female x Information	-0.036***	-0.038***	-0.038***
	(0.013)	(0.012)	(0.012)
Age 18-34		0.000	0.007
		(.)	(0.006)
Age 35-44		-0.001	0.007
		(0.007)	(0.006)
Age 45-54		-0.007	
		(0.007)	
Age 55-70		-0.018**	-0.011*
		(0.007)	(0.006)
Spaniard		-0.002	
		(0.008)	
Pop. size 20th-100th		-0.002	
		(0.007)	
Pop. size 100th+		-0.004	
		(0.006)	
Secondary education		-0.005	
		(0.008)	
University education		-0.016*	-0.009*
		(0.008)	(0.005)
Master, PhD education		-0.014	-0.007
		(0.010)	(0.006)
Working		-0.002	
		(0.018)	
Retired		-0.003	
		(0.019)	
Unemployed		0.002	0.005
		(0.018)	(0.007)
> 2 bookshelves at age 10		0.002	
		(0.005)	
Household size		0.002	0.002
		(0.002)	(0.002)
Primary earner		-0.008	-0.009
		(0.006)	(0.006)
Lives with partner		-0.029***	-0.020***
		(0.008)	(0.006)
Mother: Secondary education		0.009	0.008
		(0.006)	(0.006)
Mother: Post-secondary education		0.001	
		(0.007)	
Father: Secondary education		-0.007	-0.007
		(0.006)	(0.005)
Father: Post-secondary education		-0.001	
		(0.007)	
Partner: Secondary education		0.010	
		(0.007)	
Partner: Post-secondary education		0.014*	
		(0.008)	
Very low financial knowledge		0.000	0.082***
		(.)	(0.025)
Low financial knowledge		-0.056**	0.027***
		(0.026)	(0.009)
Neutral financial knowledge		-0.082***	
		(0.025)	
Good financial knowledge		-0.106***	-0.024***
		(0.026)	(0.005)
Very good financial knowledge		-0.113***	-0.031***
		(0.027)	(0.008)
Interest in finance		-0.008***	-0.008***
		(0.001)	(0.001)
Expected correct answers		-0.001	-0.001
		(0.002)	(0.002)
Risk willingness		-0.002**	-0.002**
		(0.001)	(0.001)
Lottery choice		-0.001	-0.001
		(0.001)	(0.001)
Saving products (N)		-0.004**	-0.004**
		(0.002)	(0.002)
Debt products (N)		-0.006**	-0.006**
		(0.003)	(0.003)
Online bank operations		-0.006	-0.006
		(0.007)	(0.007)
No bank operations		0.104***	0.105***
		(0.024)	(0.024)
Lean-in index		-0.016***	-0.016***
		(0.003)	(0.003)
Perceived self-efficacy		-0.004	-0.004
		(0.003)	(0.003)
Perceived confidence		-0.013***	-0.013***
		(0.004)	(0.004)
Perceived lean-in		-0.006**	-0.006**
		(0.003)	(0.003)
Constant	0.119***	0.433***	0.332***
	(0.006)	(0.035)	(0.020)
Controls	No	All	Selected
Observations	6000	6000	6000
R2	0.105	0.239	0.239

Notes: OLS regression of the outcome percent IDK answers in the Big Five questions. The first column includes no control variables, the second column includes all control variables and the third column includes a lasso-selected set of control variables. Robust standard errors in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table A4: Percent Correct Answers with All Coefficients: Big-five Questions

	(1)	(2)	(3)
Female	-0.085***	-0.056***	-0.056***
	(0.010)	(0.010)	(0.010)
Without IDK	0.056***	0.052***	0.052***
	(0.012)	(0.011)	(0.011)
Incentives	0.043***	0.040***	0.040***
	(0.013)	(0.012)	(0.012)
Information	0.020	0.021*	0.021*
	(0.013)	(0.012)	(0.012)
Female x Without IDK	0.021	0.021	0.021
	(0.017)	(0.016)	(0.016)
Female x Incentives	-0.031*	-0.021	-0.021
	(0.018)	(0.016)	(0.016)
Female x Information	0.028	0.028*	0.028*
	(0.018)	(0.017)	(0.017)
Age 18-34		0.000	-0.036***
		(.)	(0.009)
Age 35-44		0.013	-0.023***
		(0.009)	(0.008)
Age 45-54		0.036***	
		(0.009)	
Age 55-70		0.071***	0.035***
		(0.010)	(0.009)
Spaniard		0.008	0.008
		(0.011)	(0.011)
Pop. size 20th-100th		0.007	0.007
		(0.009)	(0.007)
Pop. size 100th+		-0.000	
		(0.008)	
Secondary education		0.033***	0.033***
		(0.009)	(0.009)
University education		0.079***	0.079***
		(0.011)	(0.010)
Master, PhD education		0.074***	0.074***
		(0.014)	(0.014)
Working		-0.002	
		(0.025)	
Retired		0.003	0.005
		(0.027)	(0.011)
Unemployed		-0.010	-0.008
		(0.025)	(0.009)
> 2 bookshelves at age 10		0.009	0.009
		(0.007)	(0.007)
Household size		-0.005*	-0.005*
		(0.003)	(0.003)
Primary earner		0.004	0.004
		(0.008)	(0.008)
Lives with partner		0.012	0.012
		(0.010)	(0.008)
Mother: Secondary education		-0.021**	-0.021**
		(0.009)	(0.008)
Mother: Post-secondary education		-0.018*	-0.018*
		(0.011)	(0.010)
Father: Secondary education		0.001	
		(0.008)	
Father: Post-secondary education		-0.011	-0.011
		(0.010)	(0.009)
Partner: Secondary education		-0.000	
		(0.010)	
Partner: Post-secondary education		0.010	0.010
		(0.011)	(0.008)
Very low financial knowledge		0.000	-0.031
		(.)	(0.022)
Low financial knowledge		0.031	
		(0.023)	
Neutral financial knowledge		0.030	
		(0.023)	
Good financial knowledge		0.033	0.003
		(0.024)	(0.007)
Very good financial knowledge		0.011	-0.019
		(0.028)	(0.015)
Interest in finance		0.011***	0.011***
		(0.002)	(0.002)
Expected correct answers		0.008***	0.008***
		(0.002)	(0.002)
Risk willingness		-0.002*	-0.002*
		(0.001)	(0.001)
Lottery choice		-0.002	-0.002
		(0.001)	(0.001)
Saving products (N)		0.011***	0.011***
		(0.003)	(0.003)
Debt products (N)		0.005	0.005
		(0.004)	(0.004)
Online bank operations		0.062***	0.062***
		(0.009)	(0.009)
No bank operations		-0.050**	-0.050**
		(0.021)	(0.021)
Lean-in index		0.026***	0.026***
		(0.005)	(0.005)
Perceived self-efficacy		0.011**	0.011**
		(0.004)	(0.004)
Perceived confidence		0.007	0.007
		(0.005)	(0.005)
Perceived lean-in		0.005*	0.005*
		(0.003)	(0.003)
Constant	0.577***	0.189***	0.254***
	(0.007)	(0.039)	(0.026)
Controls	No	All	Selected
Observations	6000	6000	6000
R2	0.037	0.176	0.176

Notes: OLS regression of the outcome percent correct answers in the Big Five questions. The first column includes no control variables, the second column includes all control variables and the third column includes a lasso-selected set of control variables. Robust standard errors in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table A5: Percent Incorrect Answers with All Coefficients: Big-five Questions

	(1)	(2)	(3)
Female	0.021**	0.017*	0.016*
	(0.009)	(0.009)	(0.009)
Without IDK	0.056***	0.056***	0.056***
	(0.011)	(0.011)	(0.011)
Incentives	0.008	0.006	0.007
	(0.011)	(0.011)	(0.011)
Information	0.028**	0.029***	0.029***
	(0.011)	(0.011)	(0.011)
Female x Without IDK	0.048***	0.051***	0.051***
	(0.016)	(0.016)	(0.016)
Female x Incentives	0.034**	0.030*	0.030*
	(0.016)	(0.015)	(0.015)
Female x Information	0.018	0.019	0.019
	(0.016)	(0.016)	(0.016)
Age 18-34		0.000	0.040***
		(.)	(0.009)
Age 35-44		-0.017*	0.024***
		(0.009)	(0.008)
Age 45-54		-0.040***	
		(0.009)	
Age 55-70		-0.057***	-0.016**
		(0.010)	(0.008)
Spaniard		-0.004	-0.004
		(0.011)	(0.011)
Pop. size 20th-100th		-0.006	-0.006
		(0.008)	(0.006)
Pop. size 100th+		0.000	
		(0.008)	
Secondary education		-0.031***	-0.031***
		(0.009)	(0.009)
University education		-0.069***	-0.069***
		(0.010)	(0.010)
Master, PhD education		-0.078***	-0.079***
		(0.013)	(0.013)
Working		0.010	
		(0.023)	
Retired		0.011	
		(0.026)	
Unemployed		0.015	0.004
		(0.024)	(0.008)
> 2 bookshelves at age 10		-0.008	-0.008
		(0.007)	(0.007)
Household size		0.002	0.002
		(0.003)	(0.003)
Primary earner		0.002	
		(0.007)	
Lives with partner		0.013	0.013
		(0.010)	(0.010)
Mother: Secondary education		0.003	0.003
		(0.008)	(0.008)
Mother: Post-secondary education		0.014	0.014
		(0.010)	(0.010)
Father: Secondary education		0.008	0.008
		(0.008)	(0.008)
Father: Post-secondary education		0.016	0.016
		(0.010)	(0.010)
Partner: Secondary education		-0.011	-0.011
		(0.010)	(0.010)
Partner: Post-secondary education		-0.018*	-0.018*
		(0.010)	(0.010)
Very low financial knowledge		0.000	-0.040*
		(.)	(0.023)
Low financial knowledge		0.013	-0.027***
		(0.024)	(0.010)
Neutral financial knowledge		0.040*	
		(0.023)	
Good financial knowledge		0.063***	0.023***
		(0.024)	(0.007)
Very good financial knowledge		0.086***	0.046***
		(0.028)	(0.014)
Interest in finance		-0.002	-0.002
		(0.002)	(0.002)
Expected correct answers		-0.007***	-0.007***
		(0.002)	(0.002)
Risk willingness		0.005***	0.005***
		(0.001)	(0.001)
Lottery choice		0.003***	0.003***
		(0.001)	(0.001)
Saving products (N)		-0.006**	-0.006**
		(0.002)	(0.002)
Debt products (N)		-0.002	-0.002
		(0.003)	(0.003)
Online bank operations		-0.054***	-0.054***
		(0.008)	(0.008)
No bank operations		-0.051***	-0.051***
		(0.020)	(0.020)
Lean-in index		-0.008	-0.007
		(0.005)	(0.005)
Perceived self-efficacy		-0.006	-0.006
		(0.004)	(0.004)
Perceived confidence		0.008*	0.008*
		(0.005)	(0.004)
Perceived lean-in		0.001	
		(0.003)	
Constant	0.293***	0.369***	0.381***
	(0.006)	(0.038)	(0.025)
Controls	No	All	Selected
Observations	6000	6000	6000
R2	0.026	0.080	0.080

Notes: OLS regression of the outcome percent incorrect answers in the Big Five questions. The first column includes no control variables, the second column includes all control variables and the third column includes a lasso-selected set of control variables. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table A6: Percent IDK Answers Question by Question: Big Five Questions

	(1) Inflation	(2) Compound Interest Rate	(3) Risk Diversification	(4) Mortgages	(5) Bond Pricing
Women	0.027***	0.023**	0.064***	0.010	0.079***
	(0.010)	(0.011)	(0.017)	(0.013)	(0.017)
Without IDK	-0.046***	-0.051***	-0.196***	-0.090***	-0.193***
	(0.006)	(0.006)	(0.011)	(0.008)	(0.012)
Incentives	-0.013	-0.017*	-0.100***	-0.040***	-0.073***
	(0.009)	(0.010)	(0.016)	(0.012)	(0.017)
Information	-0.024***	-0.031***	-0.123***	-0.039***	-0.098***
	(0.009)	(0.009)	(0.015)	(0.012)	(0.017)
Women x Without IDK	-0.045***	-0.039***	-0.104***	-0.030**	-0.118***
	(0.011)	(0.011)	(0.018)	(0.013)	(0.018)
Women x Incentives	-0.017	-0.012	-0.003	-0.012	-0.029
	(0.016)	(0.016)	(0.026)	(0.018)	(0.026)
Women x Information	-0.029**	-0.010	-0.051**	-0.022	-0.079***
	(0.014)	(0.015)	(0.024)	(0.018)	(0.025)
Constant	0.317***	0.265***	0.622***	0.353***	0.609***
	(0.045)	(0.044)	(0.063)	(0.051)	(0.063)
Controls	Yes	Yes	Yes	Yes	Yes
Observations	6000	6000	6000	6000	6000
R2	0.101	0.091	0.163	0.102	0.149

Notes: OLS regression of the outcome percent IDK answers in each of the Big Five questions with all control variables included. Robust standard errors in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table A7: Percent IDK Answers with Big Five, Big Five, Big Three, Big Six and All Nine Questions

	(1) Big Five	(2) Big Five	(3) Big Three	(4) Big Six	(5) All Nine
Women	0.041***	0.040***	0.038***	0.040***	0.037***
	(0.009)	(0.009)	(0.009)	(0.008)	(0.007)
Without IDK	-0.115***	-0.108***	-0.098***	-0.113***	-0.108***
	(0.006)	(0.008)	(0.006)	(0.006)	(0.005)
Incentives	-0.049***	-0.046***	-0.043***	-0.047***	-0.044***
	(0.008)	(0.009)	(0.008)	(0.008)	(0.007)
Information	-0.063***	-0.050***	-0.059***	-0.061***	-0.056***
	(0.008)	(0.010)	(0.008)	(0.008)	(0.007)
Women x Without IDK	-0.067***	-0.072***	-0.063***	-0.064***	-0.057***
	(0.009)	(0.012)	(0.009)	(0.009)	(0.008)
Women x Incentives	-0.015	-0.009	-0.011	-0.012	-0.005
	(0.013)	(0.014)	(0.013)	(0.012)	(0.011)
Women x Information	-0.038***	-0.048***	-0.030**	-0.032***	-0.027**
	(0.012)	(0.014)	(0.013)	(0.012)	(0.011)
Constant	0.433***	0.442***	0.401***	0.429***	0.400***
	(0.035)	(0.037)	(0.037)	(0.033)	(0.029)
Controls	All	All	All	All	All
Observations	6000	6000	6000	6000	6000
R2	0.239	0.191	0.204	0.249	0.251

Notes: OLS regression of the outcome percent IDK answers in different set of question with all control variables included. Column (1) reproduces our main results for the Big Five answers, Column (2) shows the results for the Big Five anwers redefining the IDK to include the skipped answers, Column (3) uses the Big Three answers, corresponding to inflation, compount interest rate and risk diversification, Column (4) adds the simple interest rate answer to the Big Five, and Column (5) includes all questions of the section. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

B   Random Guessing Benchmark

The increase in correct answers by treatment provides an observed measure of knowledge of individuals that would otherwise have not revealed their preferred answer. This can be estimated overall or separately by gender. Additionally, a simple and alternative way to evaluate the observed increase in estimated correct answers in each of the treatments, requires comparing this observed increase to the increase we would obtain by pure random guessing. This allows us to measure whether those who indeed provide an answer in a particular treatment, who would have otherwise chosen IDK, are indeed the ones who are knowledgeable. This is the exercise we propose in this section.

To build this benchmark, we assume that every individual has a preferred answer option that is correct with certain probability. The main challenge to measure financial knowledge is that there are individuals whose type is such that, for some questions, they prefer to say IDK than to reveal their preferred answer. The extreme treatment without IDK helps infer what is the observed knowledge for these individuals (those who would have chosen IDK) while the remaining treatments, incentives and information nudge, help infer it for those different participants induced into revealing their preferred answer. That is, for those participants who respond to each different remedy (a monetary incentive or information nudge).

In the extreme treatment, some individuals might not strictly prefer an answers option to others - that is, they may have no knowledge and prefer to choose IDK. As the IDK option is not available, they are forced to choose an answer which might result in a random guessing. In this case, we remove the response bias from differential propensities to choose IDK at the expense of potentially introducing random guesses for some participants. On the remaining treatments, the individuals who now choose an answer, might differ in the probability that their answer is correct as well, including the possibility that they guess randomly.

Table B1 shows this alternative measure for each treatment, for the complete sample and by gender. Note that the propensity to respond can vary by question and treatment, and each question can have a number of different answer options. Thus, we estimate the Big-Five expected increase in correct answers from random guessing under each treatment in several steps. First, we estimate the increase in non-IDK answers for each big-Five question. Then, we weight the probability of randomly guessing each question by the increase in its

Table B1: Big-Five: Benchmark to random guessing

	(1) Δ Answers	(2) Δ Correct	(3) Expected Guess	(4) Difference
	All			
Without IDK	0.15	0.066	0.057	0.010
Incentives	0.06	0.027	0.022	0.005
Information	0.08	0.034	0.030	0.004
	Women			
Without IDK	0.18	0.077	0.069	0.008
Incentives	0.06	0.012	0.023	-0.011
Information	0.10	0.048	0.037	0.011
	Men			
Without IDK	0.12	0.056	0.045	0.011
Incentives	0.05	0.043	0.021	0.022
Information	0.06	0.020	0.0238	-0.003

non-IDK answers. This is the expected increase in correct answers we would observe for each individual question under pure random guessing, which we average to obtain the probability for our main outcome, the index for the Big-Five. That is, the expected increase in correct answers from random guess for each group, as shown in Column (3) from Table B1. Finally, we compare the observed estimated increase in correct answers by treatment (Column 2) to the expected increase with random guessing, as shown in the last column.

Overall, the observed differences are small in magnitude but these vary by group.[6] For women, we observe the biggest difference with respect to random guessing in the information treatment. This suggests that women complying with this treatment are more knowledgeable than other groups. By contrast, the difference to random guessing is smallest for men in this group. Men affected by the incentives treatment are those that are more likely to not be randomly guessing. Overall, these alternative measures suggest that while the incentive treatment is the least effective in closing the gender gap, the information treatment is the most effective.

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[6]It is worth noting that in relative terms, the size of these differences is not small. For instance, the increase in answers is 0.1 for women in the information group, so at most this is the expected increase in correct answers.

C Survey Questions in the Four Different Versions

The text in squared brackets [] is not shown to the survey respondents but we include it here to ease the understanding of the survey design to readers.

[The survey starts here:]

This Bank of Spain survey aims to measure the familiarity of the Spanish population with basic economic and financial concepts. Its duration is approximately 15 minutes. The survey is carried out in accordance with the applicable regulations on the protection of personal data, which guarantees that your data will be processed solely for statistical purposes and for quality control of the survey, guaranteeing their due integrity and confidentiality. We inform you that both your personal identification and contact data provided by 40db, as well as the academic-professional, economic-financial and related to your personal characteristics that you provide us, are processed by the Bank of Spain exclusively for (i) measure for statistical purposes the familiarity of the Spanish population with basic economic and financial concepts; and (ii) supervise and control the quality of the survey. You can withdraw your consent by sending an email to micro@bde.es and exercise your rights regarding the protection of personal data, proving your identity, either in person, by postal mail to C/Alcalá 48, 28014, Madrid (A/A Data Protection Officer) or electronically through the procedure indicated in the Virtual Office of the Bank of Spain, available at: link

For more information, you can consult the Record of Processing Activities available at:link

Q1. Do you agree to participate and the processing of your data for the purposes indicated?

a. Yes

b. No

[First part of the questionnaire: questions include socio-demographic variables, family background variables and variables measuring behavioral traits: Q2-Q29]

Q2. Are you a ...?

a. Man

b. Woman

Q3. How old were you on your last birthday?

Q4. In which country were you born?

a. Spain

b. Other, which one?

Q5. About how many books were in your home when you were 10 years old? (Do not include magazines, newspapers, or textbooks)

a. None or very few (between 0 and 10 books)

b. Enough to fill a shelf (between 11 and 25 books)

c. Enough to fill a bookshelf (between 26 and 100 books)

d. Enough to fill two bookshelves (between 101 and 200 books)

e. Enough to fill more than two bookshelves (more than 200 books)

Q6. Zip Code

Q7. What is your current relationship status?

a. I live with a partner

b. I do not live with a partner

Q8. What is your current legal marital status?

a. Single (never married or domestic partner before)

b. Married or common-law partner

c. Divorced or separated

d. Widower

e. Other, which one?

Q9. Including yourself, how many people live in your household?

a. 1 person

b. 2 people

c. 3 people

d. 4 people

e. 5 people

f. 6 or more people

Q10. Including yourself, how many people receive some type of income?

a. 0

b. 1

c. 2

d. 3

e. 4 or more

Q11. Are you the person who contributes the most income to the household?

a. Yes

b. No

[If Q11 is answered with "a" then jump to Q17]

Q12. What is your relationship with the person who contributes the most income to the household?

a. It is my partner

b. It is my father

c. It is my mother

d. He is my son

e. She is my daughter

f. Other, which one?

Q13. What are the highest level official studies that the main breadwinner of the household has completed? (We understand the main breadwinner or head of the family to be the person from whom the basic income of the family comes).

a. Can't read or write

b. Without studies or with unfinished primary studies

c. First Grade (School certificate, 1st stage of EGB, more or less up to 10 years old)

d. Second Grade - 1st Cycle (School graduate, or EGB 2nd stage, or 1st and 2nd ESO, up to 14 years old)

e. Second Grade - 2nd Cycle (FP I and II, High School, BUP, ESO 3 and 4, COU, PREU, 1 and 2 Baccalaureate, up to 18 years old)

f. Third Degree - 1st Cycle (Equivalent to Technical Engineer, 3 years, University Schools, Technical Engineers, Technical Architects, Experts, Teaching, ATS, University Diplomas, 3-year degree, Social Graduates, Social Assistants, etc.)

g. Degree, Degree - 2nd Cycle (Universities, Higher Graduates, Faculties, Higher Technical Schools, etc.)

h. Third Degree (Master)

i. Third Degree (PhD)

j. Others

Q14. What is the employment status of the main breadwinner in the household?

a. Currently working

b. Retired/pensioner/disabled

c. Unemployed, have previously worked

d. Unemployed, has not previously worked

e. Student

f. Unpaid household work

Q15. What is the current employment status of the main breadwinner? (If he/she is not currently working, please indicate the status of the last job he/she had)

a. Employee account (eg: employee)

b. Own account (eg: self-employed or entrepreneur)

Q16. What is the profession of the main breadwinner? (If not currently working, please indicate the last job held)

a. Agricultural entrepreneur with 6 or more employees

b. Agricultural entrepreneur with 1 to 5 employees

c. Farm owner with no employees

d. Member of agricultural cooperatives

e. Entrepreneur/Businessperson with 6 or more employees

f. Entrepreneur/Trader with 1 to 5 employees

g. Businessman/Trader without employees

h. Non-agricultural cooperative member

i. Self-employed Professional or Technician (Doctor, Lawyer, etc.)

j. Self-employed manual worker and Craftsman (Bricklayer, Painter, Plumber, Electrician, Upholsterer, etc.)

k. None of the above

l. Director of a Public or Private Company with 25 or more workers

m. Director of a Public or Private Company with less than 25 workers

n. Senior Management/Employee at a higher level of Companies, Public Administration or Army Chiefs (Occupations associated with 2nd and 3rd cycle university degrees)

o. Intermediate Management/Employee at the medium level of Companies, Public Administration or Army Officers (Occupations associated with 1st cycle university degrees, diplomas, etc...)

p. Foreman, Supervisor, Warrant Officer Army

q. Commercial Agent, Representative, etc...

r. Administrative

s. Specialized worker, Civil Guard and Police number

t. Seller, Clerk, etc...

u. Junior Clerk (Janitor, etc.)

v. Unskilled worker, Laborer, Domestic Service

x. Farm laborer

y. Other unqualified personnel

z. None of the above

Q17. What are the highest level official studies that you have completed? (obtaining the corresponding official degree)

[Answers as in Q13]

Q18. In which of the following situations do you currently find yourself?

a. I currently work

b. Retired/pensioner/disabled

c. Unemployed, I have worked before

d. Unemployed, has not previously worked

e. Student

f. Unpaid household work

[If Q18 answered with ("d", "e", or "f") then Q21]

Q19. What is the current labor regime in which you find yourself? (If you are not currently working, please indicate the status of the last job you had)

a. Employee account (eg: employee)

b. Own account (eg: self-employed or entrepreneur)

Q20. What is your profession? (If you are not currently working, please indicate the last job you had)

[Answers as in Q16]

[Do not show if Q8 answered with "a" or Q7 answered with "b"]

Q21. What are the highest level official studies that your partner completed? (obtaining the corresponding official degree)

[Answers as in Q13.]

[Do not show if Q8 answered with "a" or Q7 answered with "b"]

Q22. In which of the following situations is your partner currently?

a. I currently work

b. Retired/pensioner/disabled

c. Unemployed, I have worked before

d. Unemployed, has not previously worked

e. Student

f. Unpaid household work

[Show only if (Q11=b and Q12!=c) or Q11=a)]

Q23. What are the highest level official studies that your mother has completed? (obtaining the corresponding official degree)

[Answers as in Q13]

[Show only if (Q11=b and Q12!=b) or Q11=a]

Q24. What are the highest level official studies that your father has completed? (obtaining the corresponding official degree)

[Answers as in Q13.]

Q25. How would you rate your level of general knowledge on financial topics?

a. Very good

b. good

c. Neutral

d. Bad

e. Very bad

Q26. How many correct answers do you think you could have in 10 questions about basic financial topics? Use a scale of 0 to 10, where 0 means "none correct" and 10 "all correct"

Q27. What is your interest in financial matters? (We refer to the management of personal finances) Use a scale from 0 to 10, where 0 indicates "No interest" and 10 "Maximum interest"

Q28. Are you generally willing to take risks? Use a scale from 0 to 10, where 0 indicates "I am not willing to take any risk" and 10 "I am totally willing to take risk"

Q29. Choose which of the following 8 lotteries you would prefer to participate in. Each lottery has two possible payouts, each with a 50% probability:

a. Lottery 1 1.1€ with 50% and 1.1€ with 50%

b. Lottery 2 1.0€ with 50% and 1.2€ with 50%

c. Lottery 3 0.7€ with 50% and 1.6€ with 50%

d. Lottery 4 0.6€ with 50% and 1.8€ with 50%

e. Lottery 5 0.5€ with 50% and 1.9€ with 50%

f. Lottery 6 0.3€ with 50% and 2.0€ with 50%

g. Lottery 7 0.1€ with 50% and 2.1€ with 50%

h. Lottery 8 0€ with 50% and 2.2€ with 50%

[Middle part of the questionnaire: Financial Literacy questions, FQ1-FQ10. We will also underline the questions included in the big-five, which will be the main focus of our main results. Define 4 groups. Group 1: *Control*, group 2: *Without IDK*, group 3: *Incentives*, and group 4: *Information*]

The next 10 questions include various exercises. It is okay if you can not answer them all, but it is important that you try to answer each one.

If you do not know the answer, just say so. If you think you have the right answer, it is likely that you do. [Filter show if Group = 1, 3 or 4]

[If *Incentives* treatment only:]

You will earn an additional 7 cents for each correct answer. If all 10 answers are correct, you can earn 70 more cents, increasing your payment for participating by more than 60%.

[If *Information* treatment only:]

Men typically answer 7 out of 10 financial questions correctly. Women 6 out of 10. This

difference is explained mostly (65%) because women choose the answer "I do not know" more often than men. Therefore, we ask you - please - to avoid answering "I do not know".

The section must be completed in a maximum of 7 minutes. Once started, you will not be able to interrupt it. If you exceed this time, the screen will take you to the next section and you will not be able to go back. When you are ready to start, click "next".

FQ1: Imagine that 5 brothers receive a gift of 1,000 euros in total. If they share the money equally, how much will each get?

a.

b. I do not know [Filter show if Group = 1, 3 or 4]

FQ2 [Big Five.1: Inflation]: Now imagine that the 5 brothers had to wait a year to get their share of the 1,000 euros, and that inflation for that year was 8%. With that money and within a year they will be able to buy:

a. More than they could buy today with their share of the money

b. The same amount

c. Less than they could buy today

d. I do not know [Filter show if Group = 1, 3 or 4]

FQ3: Suppose you deposit 100 euros in a savings account with a fixed interest of 2% per year. If you don't make any other deposits or withdraw any money, how much money will be in the account at the end of the first year, after interest is paid? (In this account there are no commissions or taxes)

a.

b. I do not know [Filter show if Group = 1, 3 or 4]

FQ4 [Big Five.2: Interest Rates and Compounding]: Again, if you don't make any deposits or withdraw any money, how much money will be in the account after 5 years, after the

interest payment is paid? (Remember that the savings account has a fixed interest of 2% per year).

a. More than 110 Euros

b. Exactly 110 Euros

c. Less than 110 Euros

d. It is impossible to say with the information given

e. I do not know [Filter show if Group = 1, 3 or 4]

FQ5 [Big Five.3: Risk Diversification]: Generally, it is possible to reduce the risk of investing in the stock market by buying a wide variety of stocks. True or false?

a. True

b. False

c. I do not know [Filter show if Group = 1, 3 or 4]

FQ6 [Big Five.4: Mortgages]: A 15-year mortgage typically requires higher monthly payments than a 30-year mortgage, but the total interest paid over the life of the loan will be less. True or false?

a. True

b. False

c. I do not know [Filter show if Group = 1, 3 or 4]

FQ7 [Big Five.5: Bond Pricing]: What happens to the price of the bonds if the interest rate increases?

a. Falls

b. Goes up

c. Stays the same

d. The price of the bonds is not related to the interest rate

e. I do not know [Filter show if Group = 1, 3 or 4]

FQ8: In a lottery, the probability of winning a prize is 1%. How many people do you think will win a prize if 1,000 people each buy a single different ticket?

a.

b. I do not know [Filter show if Group = 1, 3 or 4]

FQ9a: If 5 machines take 5 minutes to make 5 objects, how long would it take 100 machines to make 100 objects?

FQ9b: If 5 microwaves take 5 minutes to heat 5 plates, how long would it take 100 microwaves to heat 100 plates?

FQ9c: If 5 microwaves take 5 minutes to heat 5 plates, how long would it take 100 microwaves to heat 100 plates?

a. 15 minutes

b. 10 minutes

c. 100 minutes

d. 200 minutes

e. I do not know [Filter show if Group = 1, 3 or 4]

FQ10: Imagine that you are reviewing your household budget. What is 10 − 2?

a. 3

b. 8

c. 10

d. 20

[Final part of the questionnaire: variables measuring behavioral traits.]

POSTQ1: Thinking about this section with 10 questions, how many do you think you have answered correctly?

POSTQ2: If the Spanish population answered these same 10 questions, on average, how many correct answers do you think the following groups would have? The average grade can take values between 0 and 10 where 0 indicates that none would be correct and 10 indicates that all would answer the 10 questions correctly.

a. The entire population:

b. Women:

c. Men:

d. Young people (between 18 and 30 years old):

POSTQ3: Do you have any of the following products? Click on any of the four possible answers: Yes-No-I do not know-I do not know the product

a. Checking account:

b. Savings accounts or deposits:

c. Credit card:

d. Mortgage:

e. Personal loans:

f. Individual or company pension plans:

g. Mutual funds or stocks:

h. Cryptocurrencies:

i. Life or medical insurance:

POSTQ4: In the last 12 months, have you done banking in any of the following ways? (Check all that apply)

a. By personally visiting a bank branch

b. Using an ATM

c. Calling on the phone

d. Using the computer or tablet

e. Using mobile phone apps

f. Otherwise, which one?

g. None of the above

POSTQ5: Of the following options, mark all that you have done at least once:

a. I applied for a promotion at work

b. I asked for an increase in my payroll/salary/pay

c. I was a class representative at school/institute/university

d. I competed in an individual sport (for example: swimming, tennis, judo, fencing, etc.)

e. I competed in a team sport (for example: soccer, gymnastics, basketball, volleyball, etc.)

f. None of the above

POSTQ6: Tell us to what extent you agree with each of the statements. Use a scale of 1 to 5, where 1 indicates strongly disagree and 5 strongly agree.

a. I can solve most problems if I put in the necessary effort

b. I am confident that I can handle unexpected events efficiently

c. I tend to ask questions in class/work meetings

d. Men tend to handle financial problems better than women

POSTQ7: How complicated did you find the survey? Use a scale from 0 to 10, where 0 indicates no complexity and 10 maximum complexity

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