

## Gender gaps in financial literacy: a multi-arm RCT to break the response bias in surveys

Laura Hospido\*, Nagore Iriberrí† & Margarita Machelett‡

\* Banco de España, CEMFI and IZA

† University of the Basque Country, UPV/EHU and IKERBASQUE, Basque Foundation for Science

‡ Banco de España

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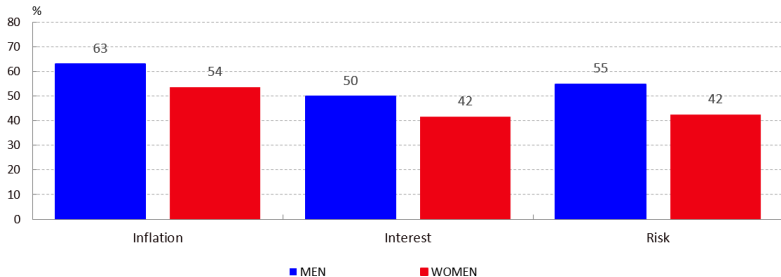
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- Financial literacy impacts economic decisions, from savings, retirement, to wealth and well-being (Lusardi and Mitchell, 2014)
  - OECD has defined financial literacy as: *A combination of awareness, knowledge, skill, attitude and behaviour necessary to make sound financial decisions and ultimately achieve individual financial wellbeing*
- Financial literacy improvement as a major policy goal (OECD, 2013)
- Existence of gender gaps
  - Persistent across countries and time (Klapper and Lusardi, 2020)

- Gender gaps partly explained by differences in observable characteristics:
  - Education, labor, household decision making, risk attitudes, stereotypes, interest, self-assessed financial knowledge, social norms (Chen and Volpe (2002), Hadar, Sood, and Fox (2010), Klapper and Panos (2011), Fonseca et al. (2012), Brown and Graf (2013), Jappelli and Padula (2013), Mahdavi and Horton (2014), Driva et al. (2016), Hsu (2016), Bucher-Koenen et al. (2017), Zaccaria and Guiso (2020), Botazzi and Lusardi (2020), Hospido et al. (2021))
- Yet, considerable gender gaps remain

- Less focus on measurement:
  - Financial literacy is measured by percentage of correct answers on questions that allow for “I do not know” answers
  - Gender gaps might reflect differences in knowledge, but also a response bias in choosing “I do not know” (Bucher-Koenen et al. (2021), Hospido et al. (2021))

PERCENTAGE OF CORRECT ANSWERS

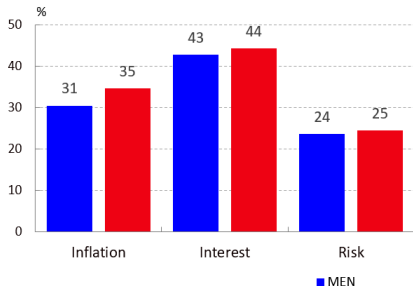


SOURCE: Banco de España calculations drawing on ECF (2016) microdata.

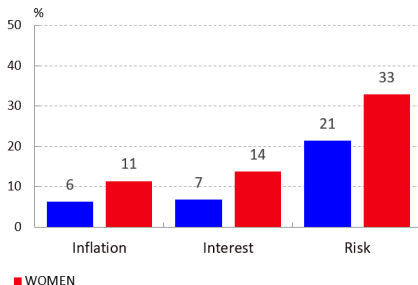
# Motivation

- Less focus on measurement:
  - Financial literacy is measured by percentage of correct answers on questions that allow for “I do not know” answers
  - Gender gaps might reflect differences in knowledge, but also a response bias in choosing “I do not know” (Bucher-Koenen et al. (2021), Hospido et al. (2021))

INCORRECT ANSWERS



"I DON'T KNOW" ANSWERS



1. Measure gender gaps in financial literacy beyond correct answers
2. Evaluate how survey interventions impact those gaps
3. Complement analysis with attrition, survey difficulty, time spent

## Contributions:

- ⇒ Relatively new channel
- ⇒ First RCT, potential interventions to inform policy and assess gaps
- ⇒ Condition on novel data on demographics, able to observe attrition

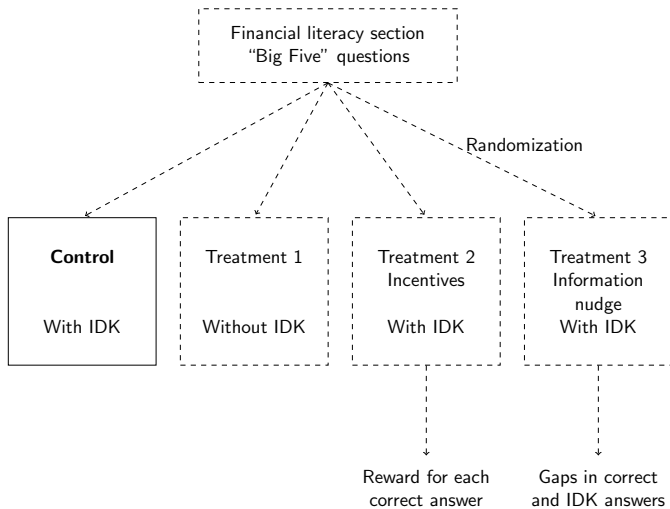
- Large-scale experiment: Online survey (6,000 participants)
- **Randomized components:** Financial literacy section with identical questions varying only treatment component
  1. Baseline, with 'I do not know' option (control)
  2. Without 'I do not know' option (treatment 1)
  3. Incentives (treatment 2)
  4. Information nudge (treatment 3)
- Pre-test survey: Pilot, IRB exemption and AEA RCT Registry (*AEARCTR-0009896*)



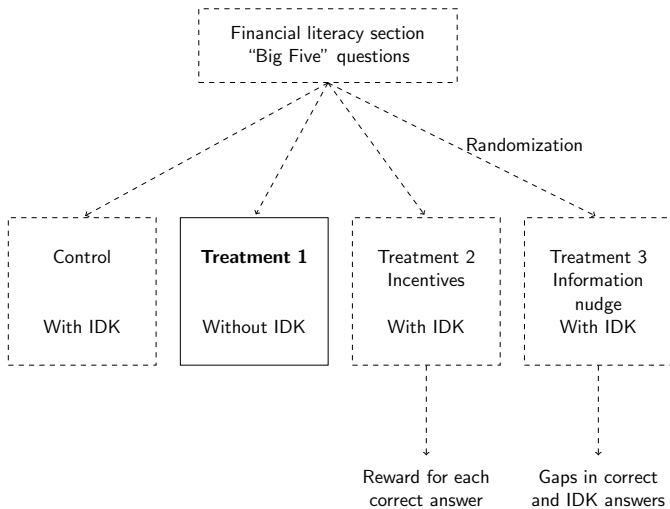
# Survey outline

- Online survey, 15 minutes, 40 questions
- Wide array of questions: Demographics, partner and parents, risk aversion, confidence, self-assessed knowledge in finance, managing financial products, ...
- Financial literacy section:
  - OECD International Network of Financial Education
  - “Big Five” questions (Lusardi and Mitchell) ▶ Big-Five
    - Inflation
    - Compound interest
    - Risk diversification
    - Mortgages
    - Bond pricing
- Survey attrition, time spent on questions, perceived difficulty

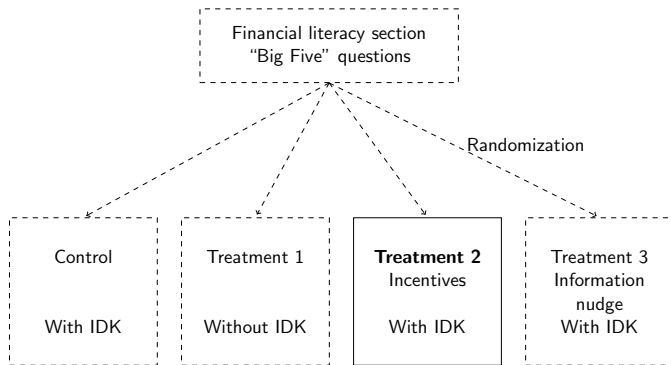
# Survey randomized components



# Survey randomized components

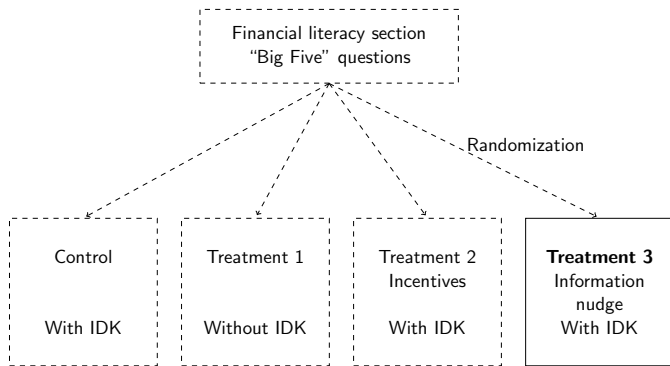


# Survey randomized components



*"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%."*

# Survey randomized components



*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 to please avoid answering "I do not know".*

[▶ Complete text](#)

# Sample statistics and balance

		(1)	(2)	(3)	(4)	(5)
		Control	Without IDK	Incentives	Information	<i>p</i> -value
Demographics	Female	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
	Working	0.70	0.69	0.67	0.67	0.12
Household	Primary earner	0.67	0.66	0.69	0.66	0.44
	Mother: Primary education	0.60	0.57	0.59	0.59	0.60
	Father: Primary education	0.53	0.53	0.55	0.56	0.38
Assessments	Very low financial knowledge	0.02	0.02	0.02	0.03	0.70
	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
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
	Big five: Incorrect answers (%)	0.30	0.38	0.33	0.34	0.00
Observations		2,400	1,200	1,200	1,200	

⇒ Overall balance across groups

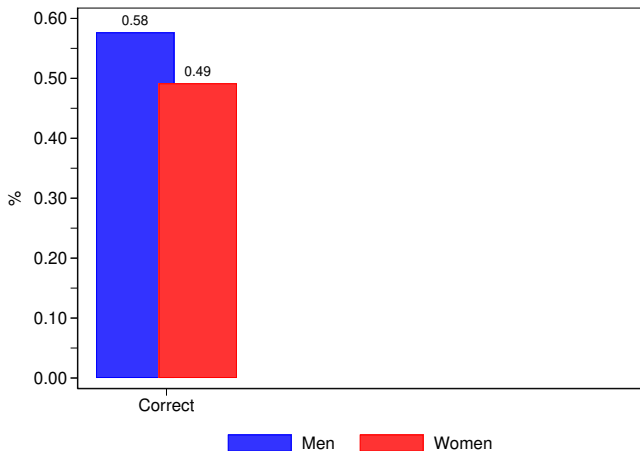
▶ Demographics

▶ Household

▶ Assessments & perceptions

▶ Managing finances

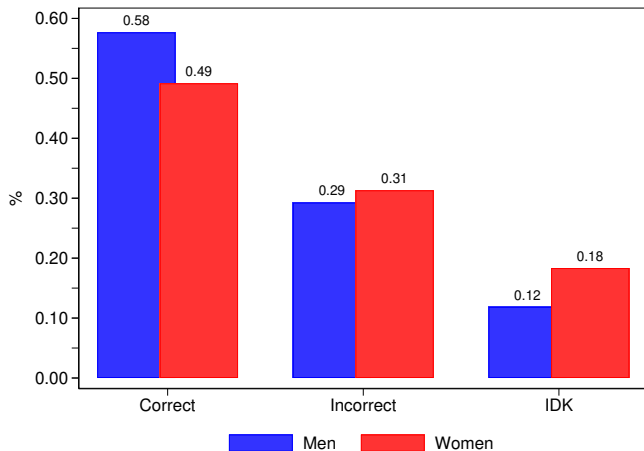
## Baseline: Big Five answers



⇒ Gender gap on correct answers: 8.5 pp less for women

⇒ Difference remains once adjusting for covariates (5.6 pp)

## Baseline: Big Five answers

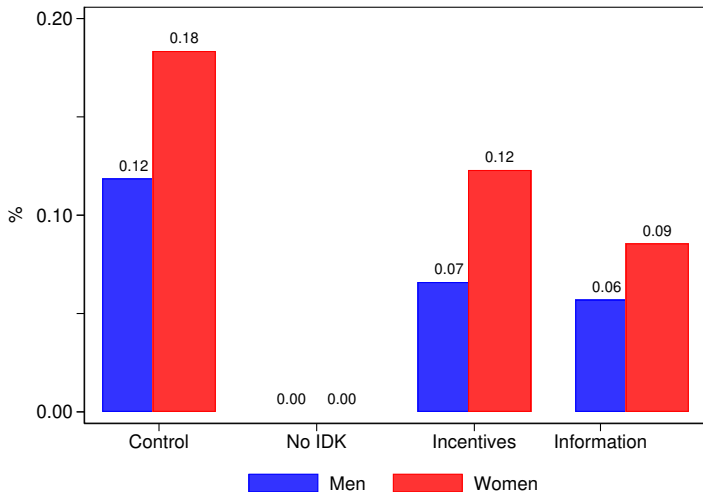


⇒ Gap on incorrect answers, greater on IDK

⇒ Correct answers gap: 1/3 from incorrect answers, 2/3 from IDK



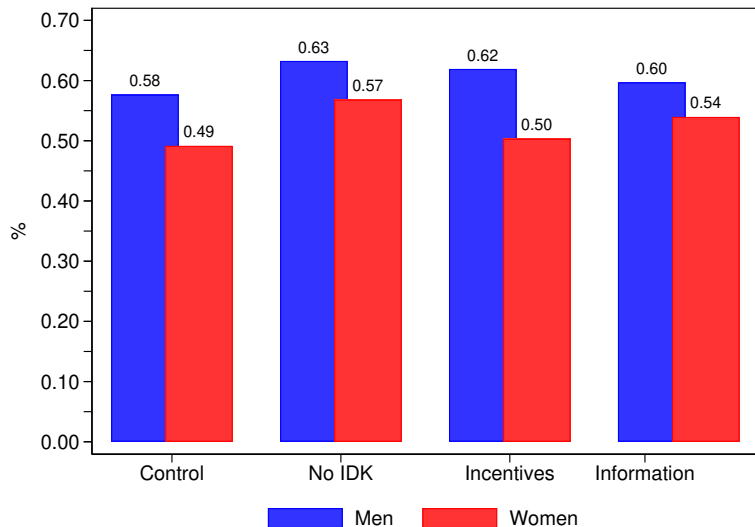
# Big Five: 'I do not know' answers



# Big Five: 'I do not know' answers

	(1)	(2)	(3)
Female	0.065*** (0.009)	0.041*** (0.009)	0.040*** (0.009)
Without IDK	-0.119*** (0.006)	-0.115*** (0.006)	-0.115*** (0.006)
Incentives	-0.053*** (0.009)	-0.049*** (0.008)	-0.049*** (0.008)
Information nudge	-0.062*** (0.009)	-0.063*** (0.008)	-0.063*** (0.008)
Female x Without IDK	-0.065*** (0.009)	-0.067*** (0.009)	-0.067*** (0.009)
Female x Incentives	-0.008 (0.014)	-0.015 (0.013)	-0.015 (0.013)
Female x Information nudge	-0.036*** (0.013)	-0.038*** (0.012)	-0.038*** (0.012)
Av. male control	0.119	0.119	0.119
Controls	No	Yes	Selected
Observations	6000	6000	6000
R2	0.105	0.239	0.239

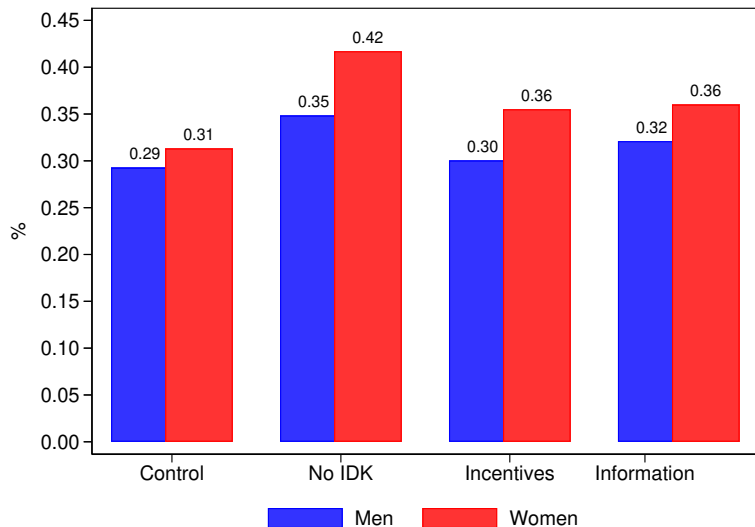
# Big Five: Correct answers



# Big Five: Correct answers

	(1)	(2)	(3)
Female	-0.085*** (0.010)	-0.056*** (0.010)	-0.056*** (0.010)
Without IDK	0.056*** (0.012)	0.052*** (0.011)	0.052*** (0.011)
Incentives	0.043*** (0.013)	0.040*** (0.012)	0.040*** (0.012)
Information nudge	0.020 (0.013)	0.021* (0.012)	0.021* (0.012)
Female x Without IDK	0.021 (0.017)	0.021 (0.016)	0.021 (0.016)
Female x Incentives	-0.031* (0.018)	-0.021 (0.016)	-0.021 (0.016)
Female x Information nudge	0.028 (0.018)	0.028* (0.017)	0.028* (0.017)
Av. male control	0.577	0.577	0.577
Controls	No	Yes	Selected
Observations	6000	6000	6000
R2	0.037	0.176	0.176

## Big-Five: Incorrect answers



## Big-Five: Incorrect answers

	(1)	(2)	(3)
Female	0.021** (0.009)	0.017* (0.009)	0.016* (0.009)
Without IDK	0.056*** (0.011)	0.056*** (0.011)	0.056*** (0.011)
Incentives	0.008 (0.011)	0.006 (0.011)	0.007 (0.011)
Information nudge	0.028** (0.011)	0.029*** (0.011)	0.029*** (0.011)
Female x Without IDK	0.048*** (0.016)	0.051*** (0.016)	0.051*** (0.016)
Female x Incentives	0.034** (0.016)	0.030* (0.015)	0.030* (0.015)
Female x Information nudge	0.018 (0.016)	0.019 (0.016)	0.019 (0.016)
Av. male control	0.293	0.293	0.293
Controls	No	Yes	Selected
Observations	6000	6000	6000
R2	0.026	0.080	0.080

1. No impacts on perceived difficulty, impacts on time spent on Big Five  
▶ Difficulty
2. No differential attrition by groups ▶ Attrition
3. Results robust to alternative FL definitions ▶ Robustness

- Baseline gender gaps in financial literacy
  - Women give 50% correct answers, men 58%
  - 2/3 of the gap from 'I do not know' answers
- Treatments reduce 'I do not know' answers
  - Information most effective for women
- Differences on correct answers
  - Without IDK and incentives most effective for men
  - Information for women
- Differences on incorrect answers
  - Incentives do not significantly impact men
  - Information does not significantly increase more for women



THANK YOU!



## Big-Five questions

- **Inflation:** Imagine (...) and that the inflation of that year was 8%. With that money and after a year, will they be able to buy: more, the same, less than what they can buy today
- **Compound interest:** Suppose you had \$100 in a savings account and the interest rate was 2% per year. After 5 years, how much do you think you would have in the account?
- **Risk diversification:** Buying a single company's stock usually provides a safer return than a stock mutual fund.
- **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.
- **Bond pricing:** If interest rates rise, what will typically happen to bond prices?

## Randomized components: Exact wording

*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.*

- **Incentives:** *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%.*
- **Information:** *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 to please 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”.*

# Sample statistics: Demographics

	(1)	(2)	(3)	(4)	(5)
	Control	Without IDK	Incentives	Information nudge	<i>p</i> -value
Demographics					
Female	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
Observations	2,400	1,200	1,200	1,200	

▶ Back

# Sample statistics: Household

	(1)	(2)	(3)	(4)	(5)
	Control	Without IDK	Incentives	Information nudge	<i>p</i> -value
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
Observations	2,400	1,200	1,200	1,200	

▶ Back

# Sample statistics: Assessments and perceptions

		(1)	(2)	(3)	(4)	(5)
		Control	Without IDK	Incentives	Information nudge	<i>p</i> -value
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
Observations		2,400	1,200	1,200	1,200	

▶ Back

# Sample statistics: Managing finances

	(1)	(2)	(3)	(4)	(5)
	Control	Without IDK	Incentives	Information nudge	<i>p</i> -value
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
Observations	2,400	1,200	1,200	1,200	

▶ Back

# Perceived difficulty, time spent

	(1) Perceived difficulty	(2) Perceived difficulty	(3) Time on Big Five	(3) Time on Big Five
Female	0.368*** (0.113)	0.246** (0.116)	-0.692 (2.930)	0.064 (2.732)
Without IDK	-0.183 (0.137)	-0.146 (0.132)	-4.195 (3.084)	-3.843 (3.067)
Incentives	-0.052 (0.139)	-0.027 (0.133)	-1.765 (3.166)	-1.952 (3.225)
Information nudge	-0.162 (0.145)	-0.180 (0.140)	0.866 (3.136)	1.793 (3.054)
Female x Without IDK	0.222 (0.196)	0.212 (0.191)	13.887*** (4.565)	13.514*** (4.467)
Female x Incentives	-0.002 (0.195)	-0.010 (0.190)	5.947 (4.552)	5.343 (4.470)
Female x Information nudge	0.130 (0.200)	0.198 (0.196)	4.265 (4.325)	1.638 (4.225)
Male control	4.042	4.042	99.920	99.920
Controls	No	Yes	No	Yes
Observations	6000	6000	5844	5844
R2	0.007	0.067	0.003	0.058



# Attrition: Incomplete surveys

	(1) Exit	(2) Exit Q N.	(3) Exit	(4) Exit Q N.
Female	0.006 (0.009)	0.476*** (0.145)	0.016* (0.009)	0.461* (0.250)
Without IDK			0.008 (0.011)	0.188 (0.293)
Incentives			0.001 (0.011)	0.023 (0.285)
Information nudge			0.011 (0.012)	0.375 (0.311)
Female x Without IDK			-0.019 (0.016)	-0.616 (0.415)
Female x Incentives			0.001 (0.016)	-0.048 (0.430)
Female x Information nudge			-0.012 (0.017)	-0.557 (0.438)
Male control	0.201	2.067	0.053	1.336
Sample	All	All	Treated	Treated
Controls	No	No	No	No
Observations	7542	7542	6397	6397
R2	0.000	0.001	0.001	0.001

# Robustness: Alternative definitions - IDK

	(1)	(2)	(3)	(4)
	Big five	Big three	FL: 6Q	FL: All
Female	0.041*** (0.009)	0.038*** (0.009)	0.040*** (0.008)	0.037*** (0.007)
Without IDK	-0.115*** (0.006)	-0.098*** (0.006)	-0.113*** (0.006)	-0.108*** (0.005)
Incentives	-0.049*** (0.008)	-0.043*** (0.008)	-0.047*** (0.008)	-0.044*** (0.007)
Information nudge	-0.063*** (0.008)	-0.059*** (0.008)	-0.061*** (0.008)	-0.056*** (0.007)
Female x Without IDK	-0.067*** (0.009)	-0.063*** (0.009)	-0.064*** (0.009)	-0.057*** (0.008)
Female x Incentives	-0.015 (0.013)	-0.011 (0.013)	-0.012 (0.012)	-0.005 (0.011)
Female x Information nudge	-0.038*** (0.012)	-0.030** (0.013)	-0.032*** (0.012)	-0.027** (0.011)
Av. male control	0.433	0.401	0.429	0.400
Controls	Yes	Yes	Yes	Yes
Observations	6000	6000	6000	6000
R2	0.239	0.204	0.249	0.251

## Robustness: Alternative definitions - Correct

	(1)	(2)	(3)	(4)
	Big five	Big three	FL: 6Q	FL: All
Female	-0.056*** (0.010)	-0.068*** (0.012)	-0.070*** (0.009)	-0.076*** (0.009)
Without IDK	0.052*** (0.011)	0.052*** (0.014)	0.041*** (0.011)	0.037*** (0.010)
Incentives	0.040*** (0.012)	0.047*** (0.014)	0.040*** (0.011)	0.046*** (0.010)
Information nudge	0.021* (0.012)	0.024* (0.014)	0.021* (0.011)	0.020* (0.010)
Female x Without IDK	0.021 (0.016)	0.009 (0.020)	0.026* (0.015)	0.028** (0.014)
Female x Incentives	-0.021 (0.016)	-0.027 (0.020)	-0.020 (0.015)	-0.025* (0.014)
Female x Information nudge	0.028* (0.017)	0.030 (0.020)	0.021 (0.016)	0.020 (0.014)
Av. male control	0.189	0.158	0.200	0.213
Controls	Yes	Yes	Yes	Yes
Observations	6000	6000	6000	6000
R2	0.176	0.185	0.228	0.256

## Robustness: Alternative definitions - Incorrect

	(1)	(2)	(3)	(4)
	Big five	Big three	FL: 6Q	FL: All
Female	0.017* (0.009)	0.031*** (0.011)	0.031*** (0.009)	0.040*** (0.008)
Without IDK	0.056*** (0.011)	0.040*** (0.013)	0.064*** (0.010)	0.063*** (0.010)
Incentives	0.006 (0.011)	-0.006 (0.013)	0.004 (0.010)	-0.004 (0.009)
Information nudge	0.029*** (0.011)	0.023* (0.013)	0.027*** (0.010)	0.022** (0.009)
Female x Without IDK	0.051*** (0.016)	0.057*** (0.019)	0.044*** (0.015)	0.034** (0.013)
Female x Incentives	0.030* (0.015)	0.032* (0.019)	0.026* (0.014)	0.024* (0.013)
Female x Information nudge	0.019 (0.016)	0.007 (0.019)	0.021 (0.014)	0.016 (0.013)
Av. male control	0.369	0.431	0.361	0.380
Controls	Yes	Yes	Yes	Yes
Observations	6000	6000	6000	6000
R2	0.080	0.095	0.120	0.144