Field Experiments in Financial Literacy and Personal Finance

Tabea Bucher-Koenen

Boot Camp 2025
June 24, 2025

ZEW Leibniz Association

DISPARITIES IN FINANCIAL LITERACY, PENSION PLANNING, AND SAVING BEHAVIOR

Tabea Bucher-Koenen

University of Mannheim and ZEW

Joint work with

Andreas Hackethal, Johannes Kasinger, Christine Laudenbach

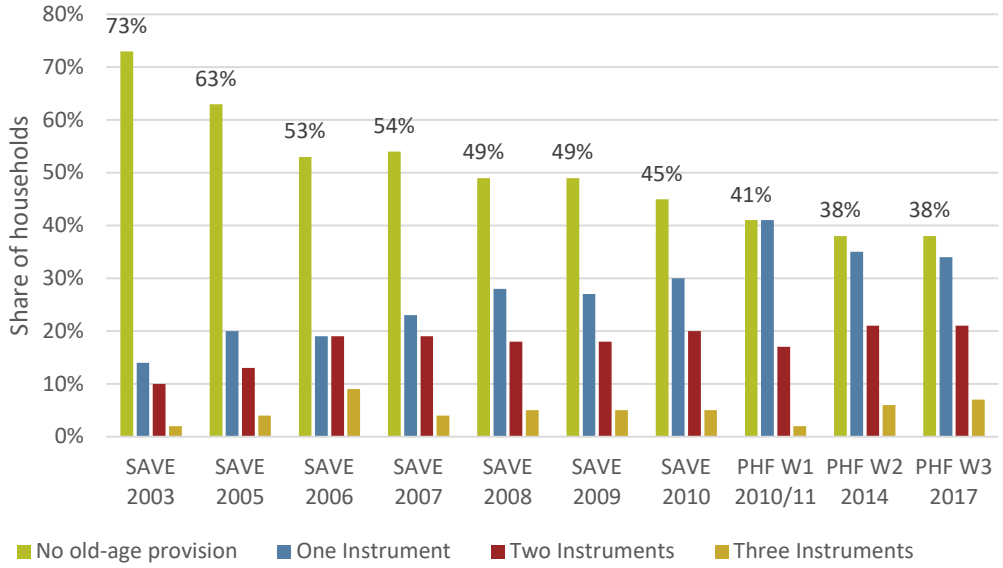
LONG-TERM TRENDS IN PENSIONS

(1) Pressure on Pay-as-you-go and defined benefit pensions due to demographic change
(2) Shift to multi-pillar pensions, increase in funded /defined contribution pensions

Implications for individuals/households

→ Increased individual responsibility for retirement income
→ Increased complexity due to pension income from multiple sources

Figure: Share of German households without supplemenatry old-age provision and by number of additional pensions



INDIVIDUAL PENSION PLANNING

- Consumption smoothing over the life-cycle
- Pension planning starts with **assessing the status quo** of pension claims, i.e. the retirement income individuals can expect given their current pension contributions.
  - Determining this **status-quo** may be a **difficult task in a multi-pillar pension system**.
  - High complexity when **forecasting** different types of pensions to the future.
  - Determine **future needs** and adjust current saving activities.
- **Pension information letters** from providers and **digitalization** make pension information more accessible.

DIGITAL PENSION DASHBOARDS

Policy initiatives to support individual pension planning

- Platforms active in Denmark (1999), Sweden (2004), Norway (2008), The Netherlands (2011), … with more European countries following suit
- Initiative of a European Tracking System
- Germany: state-provided pension dashboard has been launched in July 2023, full launch at the end of 2024, further development during 2025
- Brookings proposed the US to follow suit (John et al. 2020).

RESEARCH TOPICS

- **Pension information**
  - Who uses the information provided?
  - How does pension information affect pension planning and saving behavior?
- **Pension communication**
  - How can specific groups be targeted?
  - How can information be tailored to engage individuals?
- **Financial / Pension education**
  - How can we effectively support pension planning activities of individuals?

LITERATURE ON PENSION INFORMATION

- **Information** affects saving and investment behavior (e.g. Beshears et al. 2015, Chan and Stevens 2008)
- Personal **pension information**, such as personal information letters and general information materials, **affect pension knowledge and saving behavior**
  - Mastrobuoni (2011) pension information improves knowledge about pension provision but does not alter pension claiming
  - Goda et al. (2014) retirement projections increase contributions to employer sponsored retirement plans
  - Dolls et al. (2018) pension information letters increase contributions to tax-favoured saving accounts and labor market activity
  - Debets et al (2021) mixed evidence on pension information on pension knowledge in NL

LITERATURE ON PENSION INFORMATION

- But also ample descriptive evidence that **yearly pension letters are not read or understood** by the majority of individuals (e.g. Elling & Lentz, 2018 and Haupt 2014)
- Individuals are more likely to acquire pension information, when barriers are low (e.g. Eberhardt et al 2016)
- Substantial **heterogeneity in information needs and information behavior** (e.g. Eberhardt et al 2016)

LITERATURE ON PENSION COMMUNICATION

- Literature on **activating/engaging individuals**
  - Message framing (e.g. Eberhardt et al. 2017, 2020; van Putten et al. 2018)
  - Social norms and incentives (Bauer et al. 2017)
  - Message format and message tailoring (e.g. Knoef et al. 2020, Dinkova et al. 2018, 2019)
  - Design of planning tools (e.g. Brüggen et al. 2019)
- Very limited literature on information provision
  - Digital vs paper; long vs short reports (Hurwitz et al 2021)
  - Reducing complexity increases pension plan participation (Goldin et al 2019)
- Overall: **very low engagement**

LITERATURE ON FINANCIAL LITERACY AND PENSION PLANNING

Long history of research on financial literacy and pension planning and saving:

- **Financial literacy** causally affects **pension planning** and **wealth accumulation** (e.g. Behrman et al. 2012, Lusardi and Mitchell 2008, Bucher-Koenen and Lusardi 2011, Almenberg and Säve-Söderbergh 2011).

- **Financial education** has a causal effect on **financial literacy and financial behaviors** (Kaiser et al. 2022)
- Literature on **pension education** shows that interventions increase individuals' knowledge and have an effect subsequent behavior (e.g. Collins and Urban 2016, Billari et al 2023, Ghafoori et al. 2021)

LITERATURE ON DIGITAL PENSION DASHBOARDS

Emerging number of studies on **digital tools/apps and financial decisions**

- e.g. Carlin et al (2020), Kalda et al. (2019)
- Daminato et al. (2024) introduction of a **pension app** increases pension plan contributions substantially (esp. among men)
- Hentzen et al. (2021) heterogeneity in pension planning app adoption

Overall **limited empirical evidence** on the effects of pension dashboards on individual pension planning and saving behavior.

Research question: *Does simplifying pension information help individuals, in particular those with low financial literacy, to improve their pension planning behavior and affect saving for retirement?*

THIS PAPER IN A NUTSHELL

Goal: Test the effect of simplifying pension information on retirement planning and saving decisions, in particular for individuals with low financial literacy.

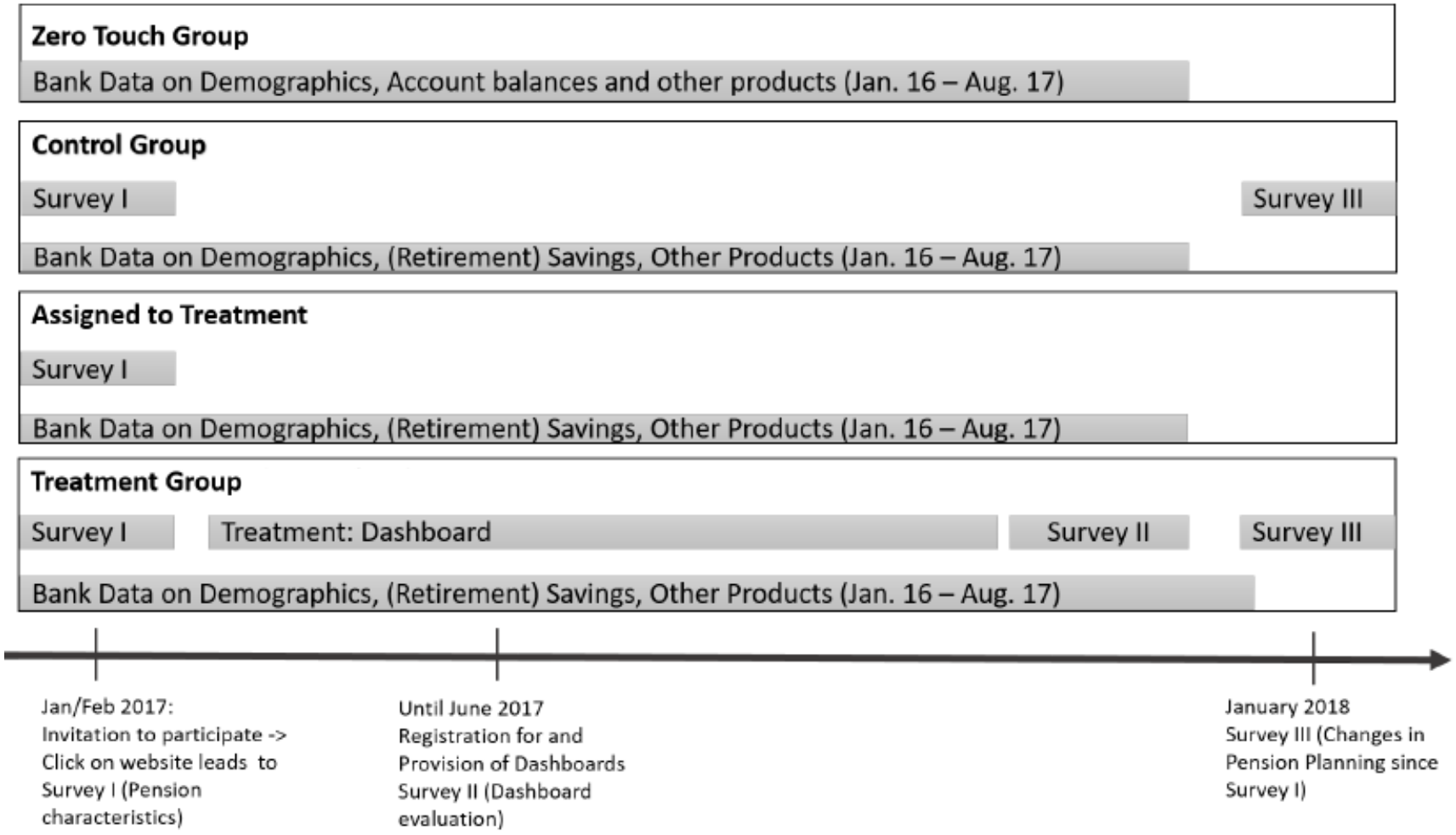
Treatment: *Pension Dashboard* – digital application that provides field study participants with an aggregated overview of their accumulated future pension claims across all three pillars of the pension system – public, occupational, and private.

Approach: *Field experiment* in cooperation with two large German banks. Combination of unique data from up to three surveys, pension contract data, and administrative panel data on account balances and transactions pre- and post experiment from the cooperating banks.

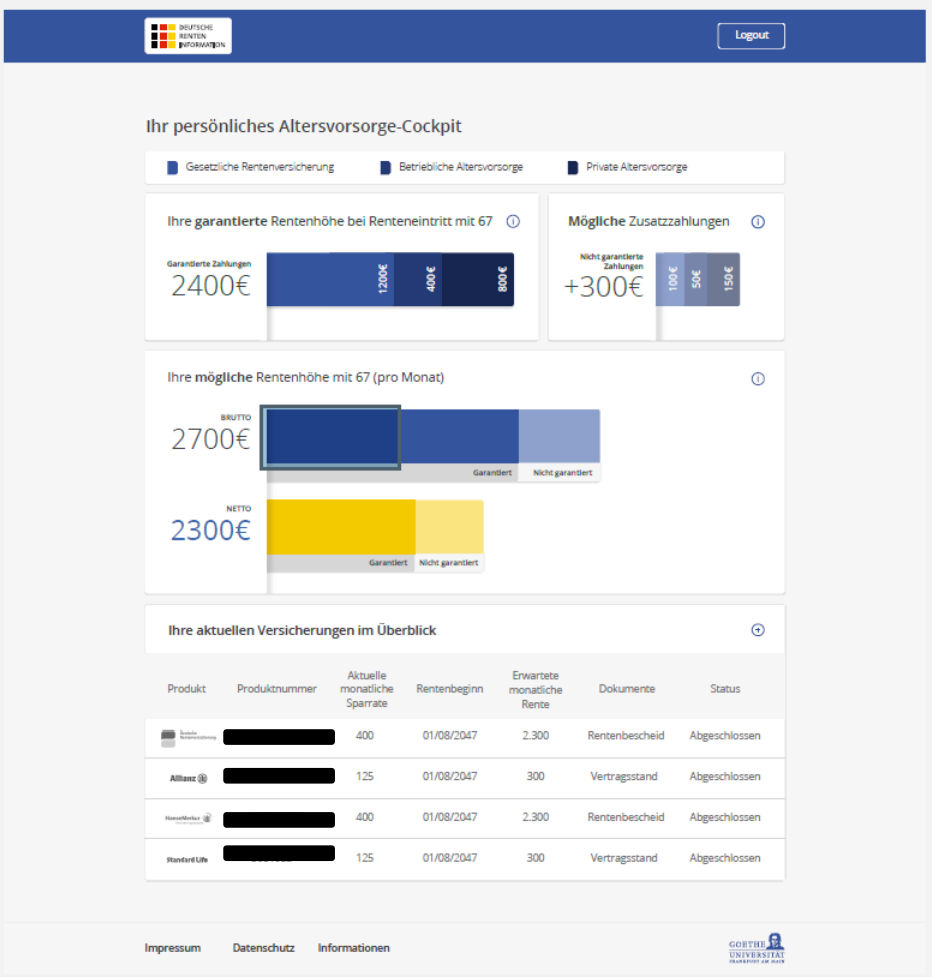
Main result: Access to the dashboard decreases self-reported uncertainty about future retirement income and *increases savings activity,* in particular among the low financially literate.

THE FIELD EXPERIMENT

Timing and experimental groups



THE FIELD EXPERIMENT - TREATMENT



- ✓ Personalized information about future pension income from **all three pillars: public, private, occupational**
- ✓ Aggregated overview of all accumulated future pension claims (**gross and net** of taxes)
- ✓ Presentation of **guaranteed pension** and possible **additional income** from profit participation / interest payments / pension increases
- ✓ **Compilation of existing information**
- ✓ Participants uploaded on average 4.5 products
- ✓ Average projected retirement income 3,287 € (std. 1,985 €)
- ✓ Effort: about 24 min per dashboard

IMPORTANT VARIABLES

Subjective pension overview

"I have a good overview over my accumulated pension entitlements today" (1=fully disagree to 7=fully agree) measured in Survey I and III

Saving balance

Savings account balance at the end of each month in Euros from administrative bank records for 12 months prior and up to 8 months after the intervention

Wealth

Wealth is equal to the sum of savings account, transfer account, and portfolio balances from administrative bank records and available for 12 months prior and up to 8 months after the intervention

Financial literacy

Test based measure based on financial literacy quiz and subjective financial literacy

IMPORTANT VARIABLES

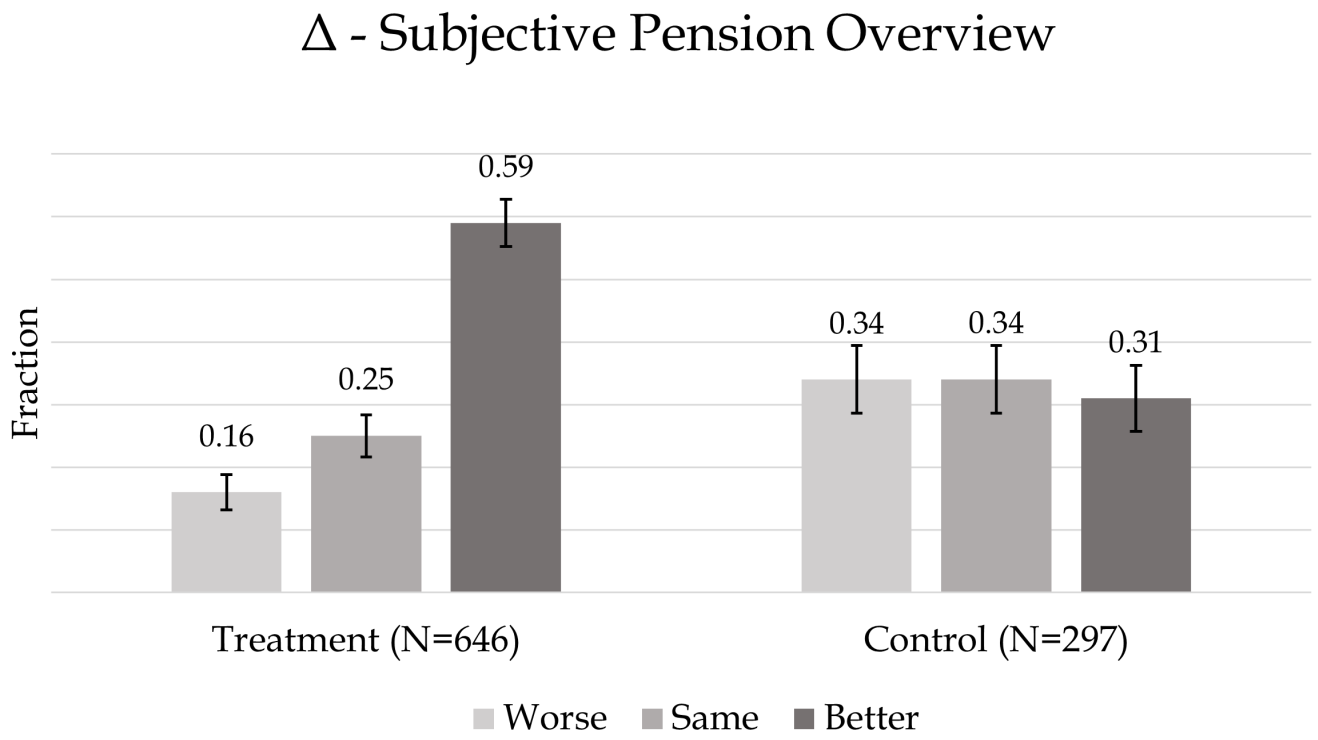
Financial literacy

- Correct answers (one point per correct answer) to the Big Three financial literacy questions (Lusardi and Mitchell 2011, 2014)
  => 82% of the respondents with three correct answers
- plus a fourth more difficult question on compounding interest (Goda et al. 2014)
  => 43% correct answers
- In total 39% of the sample answer all four questions correctly
- Sample split: High literacy if all 4 questions answered correctly; low literacy if not all 4 questions answered correctly

SUMMARY STATISTICS

Variable	Treatment	Control	Difference
Female	0.29 (0.46)	0.34 (0.47)	-0.044
Age	47.84 (7.94)	43.92 (9.65)	3.920***
Single	0.35 (0.48)	0.43 (0.50)	-0.070*
Saving account	0.57 (0.50)	0.64 (0.48)	-0.071*
Active saving account	0.51 (0.50)	0.57 (0.50)	-0.055
Savings balance in €	3,243 (12,134)	2,739 (10,280)	503
Wealth in €	24,207 (66,449)	21,296 (66,449)	2,911
Financial literacy score	3.36 (0.69)	3.15 (0.85)	0.217***
Pension overview	4.17 (1.68)	4.49 (1.96)	-0.315***

MANIPULATION CHECK



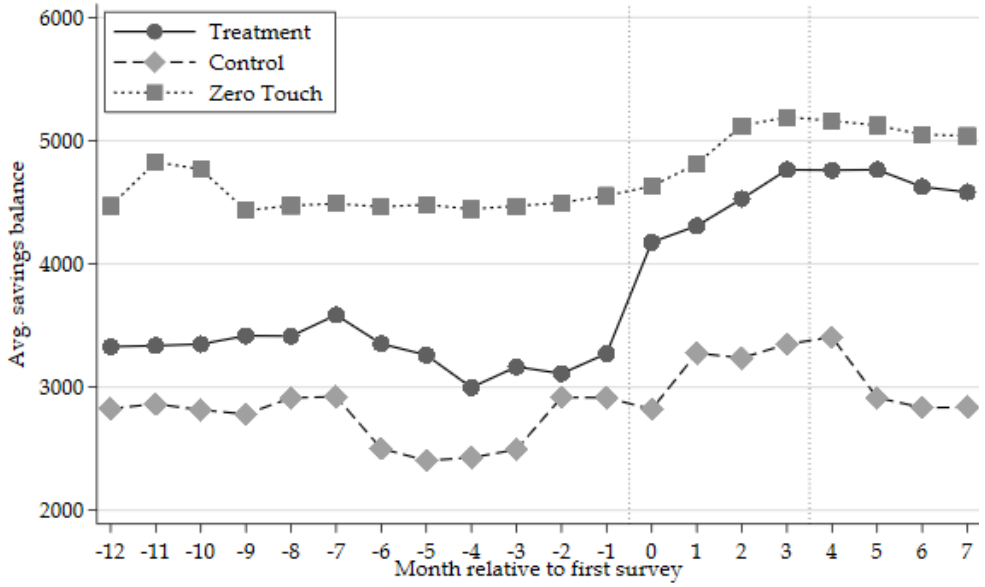
Subjective pension overview:

➔ No change in the control group

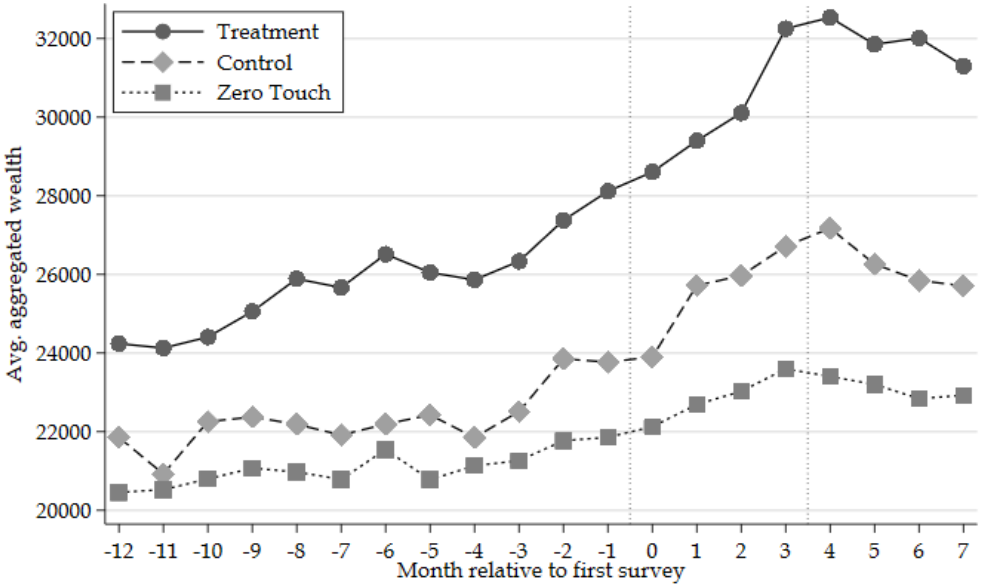
➔ Significant improvement in the treatment group

AVERAGE SAVINGS BALANCES AN WEALTH

Saving balance (monthly in €)



Wealth (monthly in €)



EMPIRICAL STRATEGY

(1) DiD and (2) dynamic DiD:

Compare changes in saving balances and wealth before and after the treatment including time and individual fixed effects

$$Y_{i,t} = \alpha_i + \lambda_t + \sum_{k=-12}^{7} \theta_k D_i^k P_i + \sum_{k=-12}^{7} \beta_k D_i^k T_i + \epsilon_{i,t},$$

Individual fixed effects

Time fixed effects

time dummies interacted with a participation dummy (treat. + contr.)

time dummies interacted with a treatment dummy

Estimated for full sample and sub-samples of high and low financial literacy

EMPIRICAL STRATEGY - IDENTIFICATION

Self-selection into treatment

(1) Selection into participation => external validity

(2) Selection into treatment (compliance)

- all differences in time-fixed unobservable characteristics are absorbed by the individual fixed effects
- critical assumption: parallel trends ➔ see estimation results later
- ITT (causal effect of a treatment offer) ➔ effect is likely to be small, because of small fraction of compliers (14.5%).

Saving adjustments in other accounts/outside the bank

- Similar effects for wealth (saving accounts are main driver of adjustments)
- Similar (or even larger) effects for subsample of active savers
- If there are large adjustments outside of the accounts with the main bank, then our estimates are conservative.

RESULTS: AVERAGE TREATMENT EFFECTS

Table 2: Average treatment effects for different wealth measures

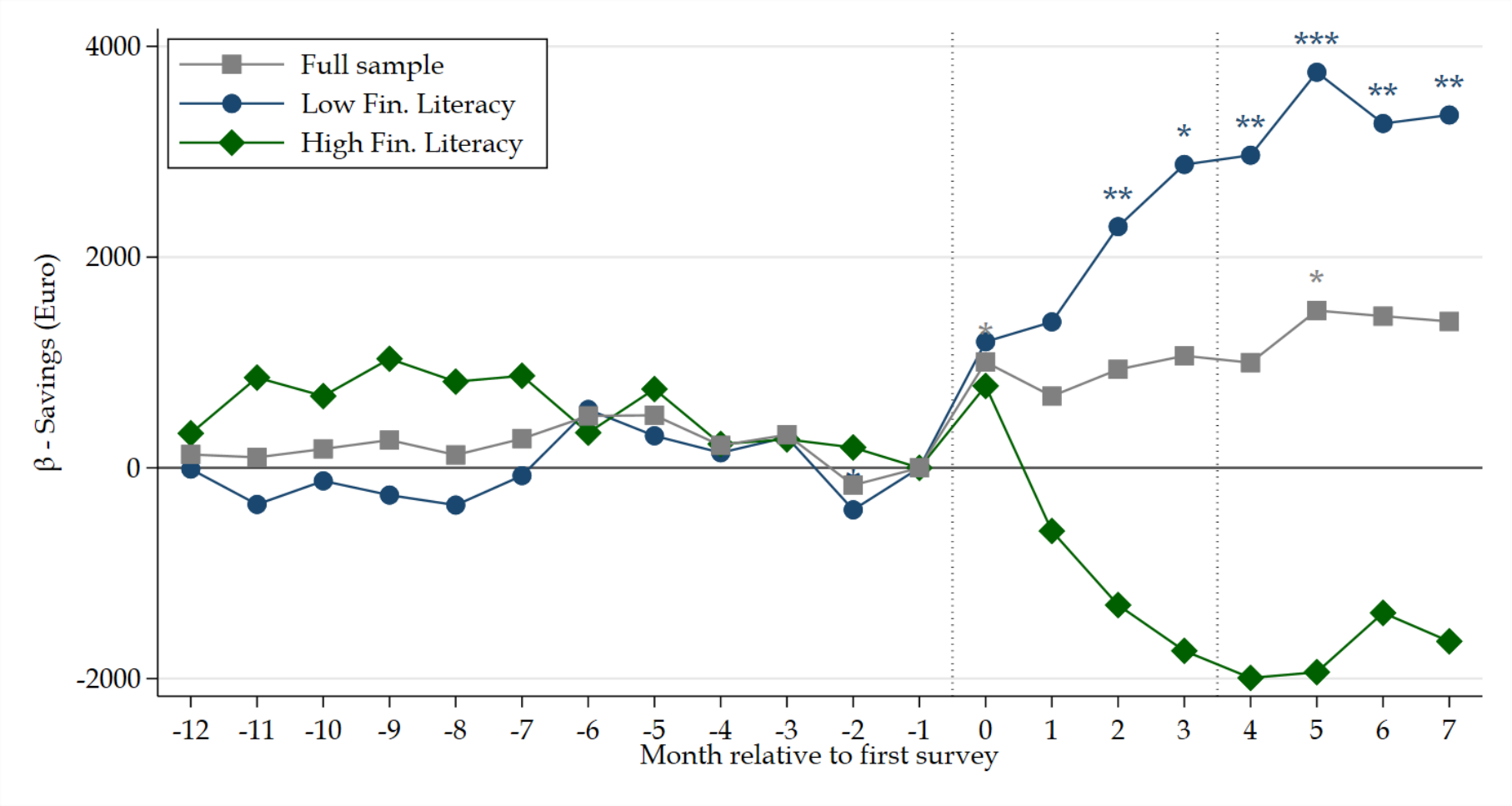
	(1)	(2)	(3)	(4)	(5)	(6)
	All clients				Active Savers	
Dep. variable	Savings	Wealth	Net wealth	Savings and portfolio acc.	Savings	Wealth
Panel A: Full sample						
Treatment Effect	1,126.89	1,984.47	3,231.26	1,706.05	2,444.32	4,549.91*
	(1.16)	(0.99)	(1.26)	(0.88)	(1.56)	(1.91)
N	11,846	11,846	11,846	11,846	6,392	6,392

RESULTS: AVERAGE TREATMENT EFFECTS

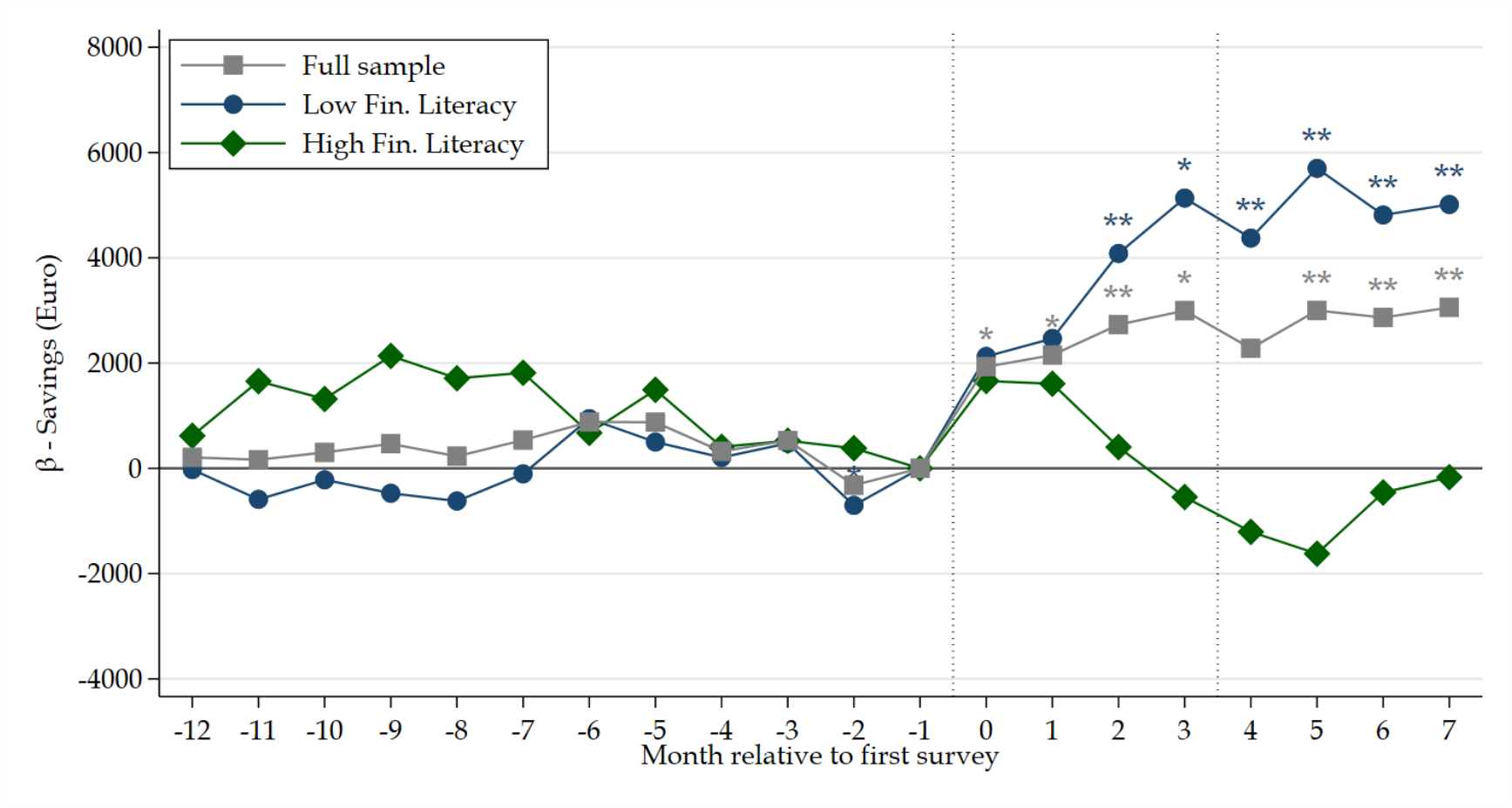
Table 2: Average treatment effects for different wealth measures

	(1)	(2)	(3)	(4)	(5)	(6)
	All clients				Active Savers	
Dep. variable	Savings	Wealth	Net wealth	Savings and portfolio acc.	Savings	Wealth
Panel A: Full sample						
Treatment Effect	1,126.89	1,984.47	3,231.26	1,706.05	2,444.32	4,549.91*
	(1.16)	(0.99)	(1.26)	(0.88)	(1.56)	(1.91)
N	11,846	11,846	11,846	11,846	6,392	6,392
Panel B: Low financial literacy						
Treatment Effect	3,354.13**	4,382.34**	6,202.38**	4,076.53**	5,018.68**	6,682.29**
	(2.38)	(2.05)	(2.11)	(2.00)	(2.16)	(2.03)
N	7,270	7,270	7,270	7,270	4,188	4,188
Panel C: High financial literacy						
Treatment Effect	-2,265.17	-2,410.17	-1,883.76	-2,557.09	-1,924.59	285.98
	(-1.56)	(-0.53)	(-0.37)	(-0.57)	(-1.38)	(0.09)
N	4,576	4,576	4,576	4,576	2,204	2,204
Month FE	Yes	Yes	Yes	Yes	Yes	Yes
Individual FE	Yes	Yes	Yes	Yes	Yes	Yes

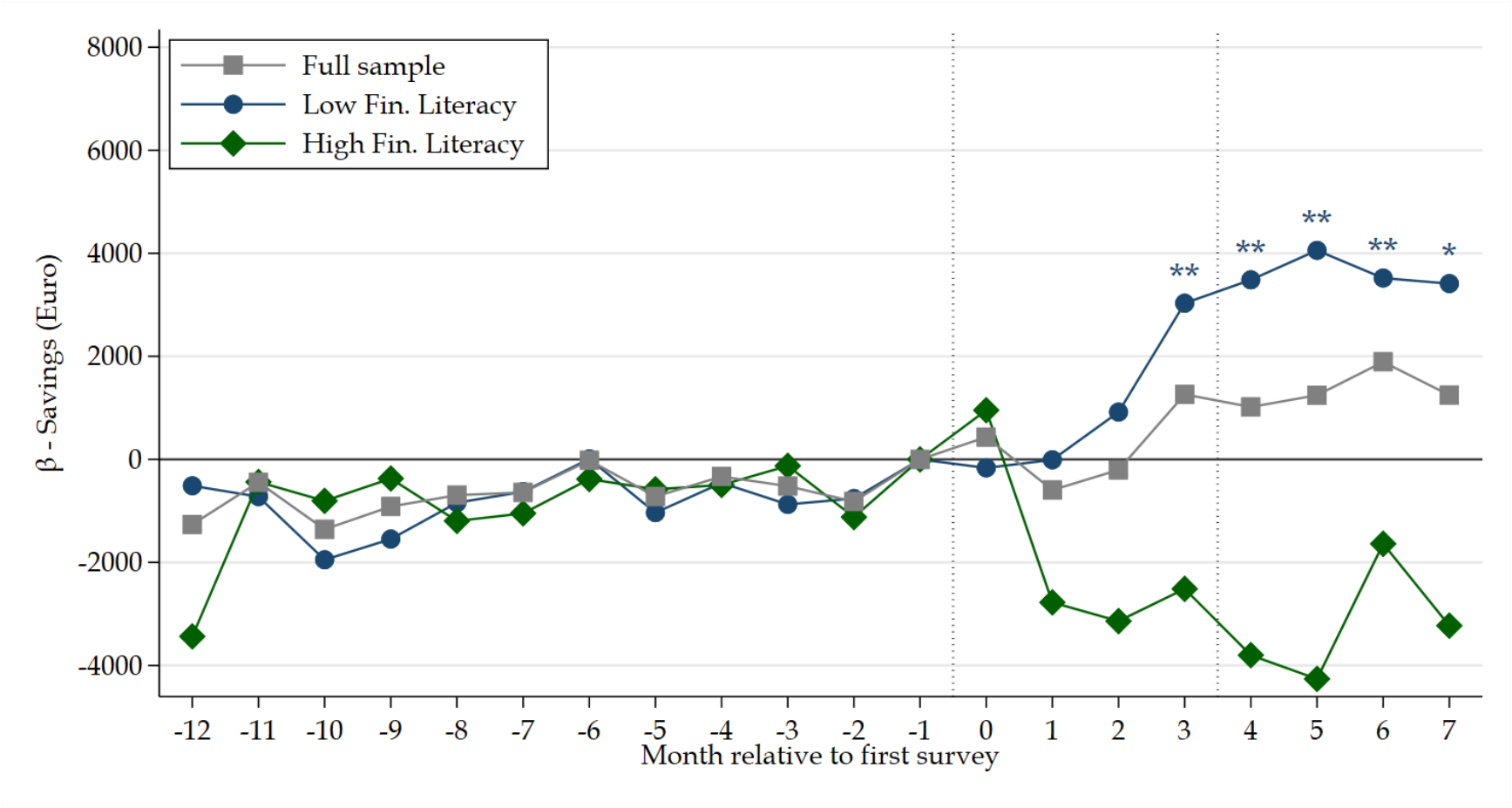
TREATMENT EFFECTS OVER TIME



TREATMENT EFFECTS ACTIVE SAVERS

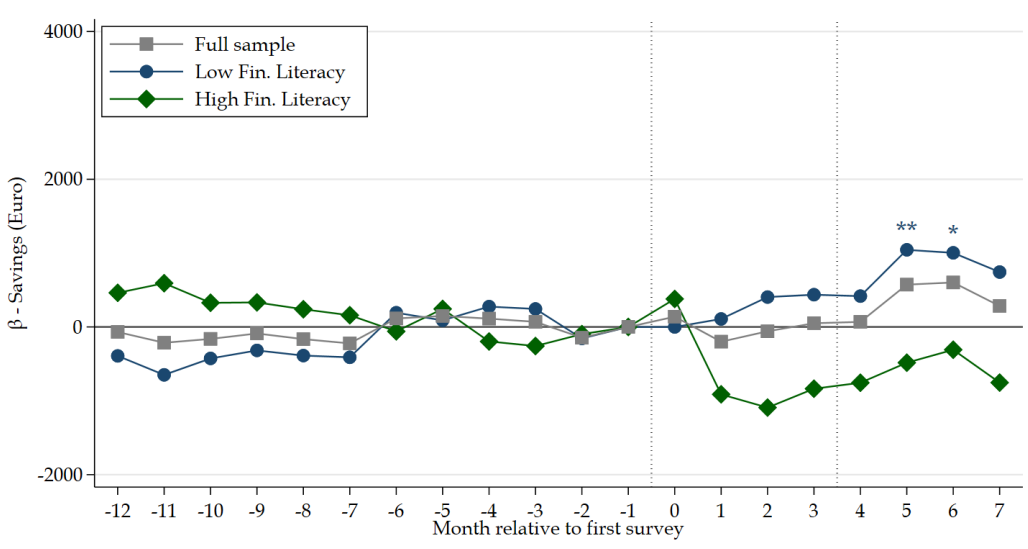


EFFECTS ON TOTAL WEALTH

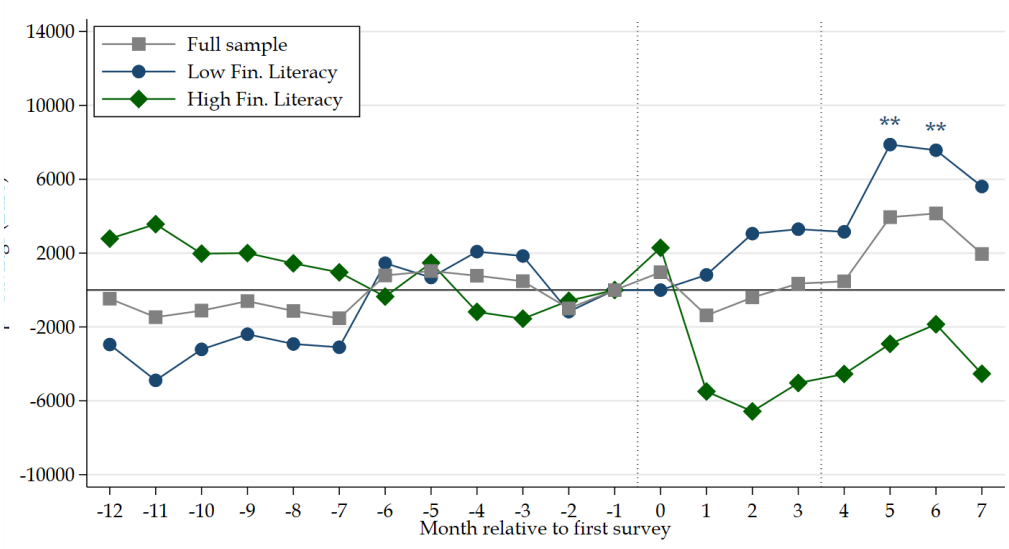


INTENTION TO TREAT EFFECTS

ITT (reduced from effect)



TOT - Treatment effect on the treated



ROBUSTNESS

1. Effects are robust
- To using a measure of subjective financial literacy
- To using alternative measures of wealth and savings

2. Effects are not driven by individuals who start looking for pension documents but fail to complete the process (dashboard effect instead of salience effect).

3. Trimming and Winsorization:
- Trimming along average pre-intervention saving account balances
- Trimming saving adaptions
- Winsorizing monthly saving balances

=> Effects remain for 1%/99% cuts; but become weaker or insignificant for 5%/95% cuts.

CONCLUSION

Results

1. Access to the pension dashboard decreases uncertainty about future retirement income and increases savings and wealth.
2. Effects are particularly strong among individuals with low financial literacy.

"External validity"

- Participants have high financial literacy / complex pension portfolios / high wealth => groups which have a high propensity to plan.
- Reaching individuals with low financial literacy / low propensity to plan is a major challenge => ongoing work in particular on women's pension planning

OPEN QUESTIONS AND CHALLENGES FOR FUTURE RESEARCH

- How can we provide **information with low barriers**?
- How can we **reach and support hard-to-reach groups,** i.e. individuals with low financial literacy / low propensity to plan?
- How can we **target pension communication to individual needs** and preferences?
- **What works for whom and why**?

- Providing better pension information has the potential to mitigate retirement planning disparities.
- More research is necessary to better understand how it works.