Are Retirement Planning Tools Substitutes or Complements to Financial Capability?

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Introduction

A large body of evidence indirectly suggests that saving behavior in U.S. defined contribution (DC) plans displays symptoms of cognitive and behavioral biases

- ▶ Low rate of understanding financial concepts (Lusardi and Mitchell, 2014)
- ▶ Large reliance on defaults (Madrian and Shea, 2001; Beshears et al., 2009)
- ▶ Exponential Growth Bias (EGB), present bias, and low financial literacy contribute to low retirement savings (Goda et al., 2014; Brown and Previtero, 2014; Goda et al., 2019; Lusardi and Mitchell, 2011).

Introduction

Potential approaches to guiding people towards "better" decisions:

- ▶ Nudges or choice architecture
- ▶ Informational interventions
- ▶ Peer effects

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- ▶ How do people respond to the intervention on average?
- ▶ *Why* are people responding to the intervention?

Our approach

We conduct a randomized control trial (RCT)* to determine how a treatment that helps people convert retirement balances and contributions into a retirement income stream affects saving behavior at a federal agency.

We investigate:

- ▶ Who uses the online tool?
- ▶ What is the effect of the treatment on average?
- ▶ How do the effects of the treatment vary based on measured characteristics known to influence retirement saving behavior?

*Registered with AEA Social Science Registry AEARCTR-0002129.

Preview of Results

- ▶ Who uses the online tool?
  - ▶ 48% of the employees (67% of survey respondents) select into using the tool
  - ▶ The selection is correlated with pre-intervention TSP contributions, but not with other observable characteristics

- ▶ What is the effect of the treatment on average?
  - ▶ We measure the treatment on the treated (TOT), which measures the effect of the treatment relative to an active control among tool users
  - ▶ The treatment increased average annual retirement contributions by \$174 (2.3 percent)

- ▶ How do the effects of the treatment vary based on measured characteristics known to influence retirement saving behavior?
  - ▶ The tool's effect is significantly greater for those with higher financial literacy, higher education and a higher financial-capability factor
  - ▶ There are no significant differences in the effect of the tool by EGB, present bias, pre-intervention contributions, or other factors

Related literature

▶ Extensive evidence documenting the effects of retirement saving interventions [e.g., automatic enrollment (Madrian and Shea 2001; Choi, Laibson, Madrian, Metrick 2004); retirement income projections (Goda, Manchester, Sojourner 2014); commitment devices (Thaler and Benartzi 2004); peer information (Duflo and Saez 2003; Beshears, Choi, Laibson, Madrian and Milkman 2014); reducing complexity (Beshears, Choi, Laibson, Madrian 2013; Choi, Laibson, Madrian 2006; Sethi-Iyengar, Huberman, Jiang 2004); anchoring (Choi, Haisley, Kurkoski, and Massey 2012)]

▶ Evidence of financial education interventions designed to address low financial literacy (e.g., Bernheim, Garrett, and Maki 2001; Bernheim and Garrett 2003; Lusardi 2008; Gale and Levine 2011; Hastings, Madrian and Skimmyhorn 2012; Fernandes, Lynch Jr., and Netemeyer 2014; Percy and Arnott-Hill, 2014)

▶ Evidence of selection into take-up among low-need populations in other contexts [health wellness (Jones, Molitor, Reif 2019); Rx plan selection (Bundorf, Polyakova, Tai-Seale 2022); SNAP take-up (Finkelstein and Notowodigdo 2019); cancer screenings (White, Adams and Heywood 2009)]

Contributions

▶ We find that helping people convert balances and contributions into a retirement income stream leads to a modest increase in savings on average

▶ Survey combined with administrative data allows examination of potential mechanisms

▶ Find evidence of positive selection into take-up of online tool and complementarities between financial capability and treatment effects

Policy implications: Online retirement savings tools are less likely to increase savings among low-saving/low-financial literacy populations

Behavioral and Perceptual Biases

Exponential-Growth Bias

Individuals neglect compounding and view the value of assets as growing less than exponentially.
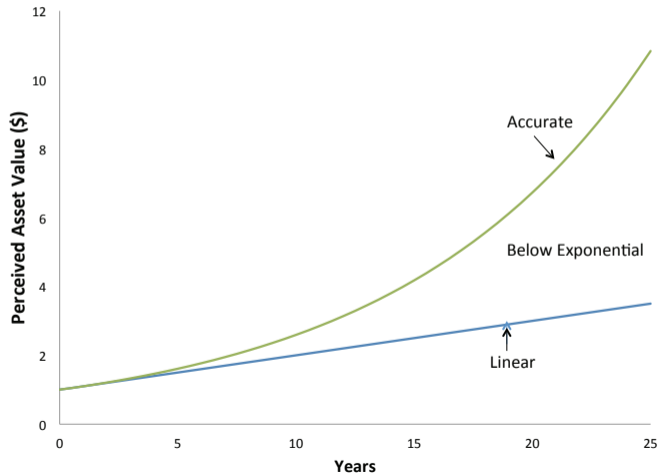
EGB and the Budget Constraint

Let $p(\vec{\imath}, t; \alpha)$ be the agent's perception of the value of a dollar invested at time t at period $T > t$:

$$p(\vec{\imath}, t; \alpha) = \prod_{s=t}^{T-1}(1 + \alpha i_s) + \sum_{s=t}^{T-1}(1 - \alpha)i_s \tag{1}$$

- ▶ $\alpha = 1$: individual correctly perceives growth to be exponential
- ▶ $\alpha = 0$: individual incorrectly perceives growth to be linear
- ▶ $\alpha \in (0, 1)$: individual perceptions in between

EGB affects the intertemporal budget constraint:

$$\sum_{s=0}^{T} \hat{c}_s \cdot p(\vec{\imath}, s; \alpha_i) \leq \sum_{s=0}^{T} y_s \cdot p(\vec{\imath}, s; \alpha_i) \tag{2}$$

▶ Elicitation

Present Bias: Quasi-hyperbolic Discount Function

We assume individual i has quasi-hyperbolic utility (Laibson, 1997) over a vector of consumption $x \in \mathbb{R}^{T-t+1}$ of the form:

$$U_{i,t}(x) \equiv u_i(x_t) + \beta_i \sum_{\tau=t+1}^{T} \delta_i^{\tau-t} u_i(x_\tau) \tag{3}$$

- ▶ δ_i is long-run discount factor (i.e. tradeoffs between future dates)
- ▶ Individual use $\beta_i \times \delta_i$ when considering tradeoffs involving today
- ▶ $1 - \beta_i$ is degree of present bias ($\beta = 1$ is not present biased)

▶ Elicitation

Experimental Design and Data

Thrift Savings Plan (TSP)

Benefits-eligible federal employees can participate in the Thrift Savings Plan (TSP), in addition to a mandatory defined benefits plan

- ▶ Base TSP contribution = 1 percent of pay
- ▶ Agency matches each dollar of an employee's first 3 percent of pay and $0.50 on the dollar for the next two percent
- ▶ Maximum contribution limit set by IRS; $18,000 in 2017
- ▶ Can elect to invest contributions in five different funds or a lifecycle fund

Default provisions

- ▶ Employees hired before August 1, 2010 had to opt-in to participate in TSP
- ▶ Employees hired on or after August 1, 2010 were automatically enrolled in TSP at a 3 percent contribution rate

OPM and Thrift Savings Plan

Partnership with the U.S. Office of Personnel Management (OPM)

- ▶ Agency that provides human resources, leadership and support to most federal agencies
- ▶ 5,472 employees as of April 2017 located primarily in DC, MD, PA and VA

Linked administrative and survey data

- ▶ Administrative data from HR records and TSP contribution elections
- ▶ Online survey fielded March-April 2017 with 26 percent response rate to elicit biases known to affect retirement savings

▶ Survey Selection

Survey Measures

- Background: household size, financial head of household, education, total household income
- Exponential Growth Bias ► Questions
- Time Preferences ► Questions
- Basic financial literacy: 5-items (Lusardi and Mitchell, 2014) ► Questions
- Retirement: total retirement savings, expected retirement age, expected rate of return, desired replacement rate
- Risk aversion: set of unfolding questions to find indifference point between sure payment and lottery
- Attitudes towards Federal Government benefits

Intervention

Together with OPM leaders, we designed both a treatment and an active control version of a new online retirement savings tool

- ▶ Treatment: provides employees with a projected retirement income based on TSP balances, contributions, Social Security, and defined benefit plan relative to goal
- ▶ Active control: provides employees with a projected retirement income based on Social Security and defined benefit plan relative to goal; does not convert TSP contributions and balances into retirement income
- ▶ Both versions allow users to adjust inputs and dynamically view how results change, and provide summary of current and new saving plan, with a way to print the output and make adjustments

Key difference: treatment tool removes the need to convert balances and contributions into a retirement income stream

Hypothesis: treatment tool relative to active control can help mediate EGB

Active Control Condition

Ballpark Savings Estimate
Are you saving enough for retirement?

More Info | Reset Data and Start Again
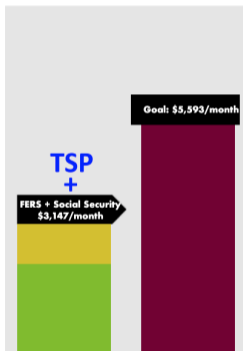
Step 1 | Step 2 | Step 3 | Step 4 | Step 5 | Step 6 | Results | What to Do Next

Are you on track to meet your goal?

FERS + Social Security: $3,147 per month
Goal Income in Retirement: $5,593 per month
Difference: - $2,446 per month

This tool calculates that you are **$2,446 below** your goal based just on your FERS benefits and Social Security income.

TSP is designed to **make up any difference** between FERS and Social Security income and your retirement goals.

Your TSP Contribution

You are currently saving 5% of your salary, and currently have a TSP balance of $300,000.

Do you think this will be enough to make up the difference?

Consider whether you need to adjust your TSP contribution rate to meet your goal income in retirement. If you would like to adjust your TSP contributions, proceed to next step find out how.

Goal: $5,593/month

TSP +

FERS + Social Security
$3,147/month

All estimates are in today's dollars

Treatment Condition

Ballpark Savings Estimate
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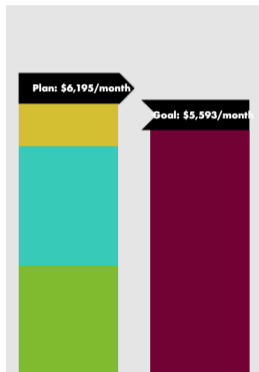
Step 1 ▸ Step 2 ▸ Step 3 ▸ Step 4 ▸ Step 5 ▸ Step 6 ▸ View Your Plan ▸ Adjust Your Plan ▸ What to Do Next

Are you on track to meet your goal?

Projected Income in Retirement: $6,195 per month
Goal Income in Retirement: $5,593 per month
Difference: $602 per month

This tool calculates that you are **$602 above** your goal.

Proceed to the next step to see how adjusting your plan can get you closer to your goal.

Plan: $6,195/month

Goal: $5,593/month

All estimates are in today's dollars

Report Issue

◀ ▶

Timeline

Results

Selection into Tool Use

▶ Among survey responders, 67% use the online tool

▶ We estimate a logit regression with tool use as the dependent variable, including EGB, present bias, financial literacy, demographics, job characteristics and prior TSP contributions

$$\text{Tool Use}_i^* = \alpha + \mathbf{X}_{i,t}\Lambda + u_i$$

$$\text{Tool Use}_i = \begin{cases} 1 & \text{Tool Use}_i^* > 0 \\ 0 & \text{otherwise} \end{cases}$$

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Findings:

- We do not find evidence that EGB, present bias, financial literacy, demographics, or job characteristics influence tool use
- However, a 1 S.D. increase in TSP annual contributions ($5,705) increases the likelihood of using the tool by 32% ($p < 0.01$)

▶ Table

Treatment on the Treated

We estimate treatment-on-the-treated (TOT) effects, which represent the differences in contributions between the treatment and active control group within the subsample of individuals who interact with the tool.

$$\text{TSP Amount}_{i,t} = \alpha + \beta \text{Post}_t + \delta \text{Post}_t \times \text{Full Tool}_i + y_t + m_t + \phi_i + u_{i,t}$$

- ▶ δ represents the TOT estimate of the treatment effect for the full treatment relative to the active control
- ▶ Post_t equals 1 after the rollout of the tool (does not vary by actual time of tool use)
- ▶ Controls include year fixed effects, month fixed effects and individual fixed effects
- ▶ We investigate heterogeneity by attribute A_i by including interactions between A_i and $\{\text{Post}_t, \text{Post}_t \times \text{Full Tool}_i\}$

Treatment on the Treated

	(1) Overall Sample	(2) Survey Sample
Post × Full Tool	174.184**	120.979
	(75.621)	(129.646)
Year F.E.	Yes	Yes
Month F.E.	Yes	Yes
Individual F.E.	Yes	Yes
Mean DV	7078.012	7577.489
Permutation P Value	0.001	0.335
R-squared	0.089	0.089
Observations	151,732	57,744

Treatment on the Treated - Heterogeneity

	(1) Std. Alpha	(2) Std. Beta	(3) Std. Financial Literacy	(4) TSP Amount per year pre Rollout	(5) Bachelor or Higher
Post × Full Tool	114.466 (129.537)	118.969 (129.367)	132.774 (129.607)	308.069* (174.319)	-210.650 (195.251)
Post × Attribute	-63.461 (84.566)	120.159 (108.571)	-166.267 (102.292)	0.073*** (0.018)	-179.543 (201.044)
Post × Full Tool × Attribute	122.769 (106.152)	-152.713 (131.581)	328.038** (130.793)	-0.022 (0.024)	496.098* (257.274)
Year F.E.	Yes	Yes	Yes	Yes	Yes
Month F.E.	Yes	Yes	Yes	Yes	Yes
Individual F.E. Yes	Yes	Yes	Yes	Yes	Yes
Mean DV	7577.489	7577.489	7577.489	7577.489	7577.489
R-squared	0.089	0.089	0.090	0.096	0.090
Observations	57,744	57,744	57,744	57,744	57,744

▶ ITT   ▶ SD of TSP Amount   ▶ TSP Rate   ▶ Assumptions   ▶ Factor Analysis

Summary of Results

- One SD higher pre-intervention contributions $\rightarrow$ 32% increase in the likelihood a person engaged with the online tool
- Overall, providing information regarding the conversion between balances, contributions and a retirement income stream led to higher contributions
  - Average annual retirement contributions increased by $174 (2.3 percent)
  - Comparable to effect of static retirement income disclosures ($85 per year, 3.6 percent; Goda et al. (2014))
- Heterogeneity analysis shows that one SD higher financial literacy is associated with a $328 higher treatment effect; similar results from Principal Component Analysis (not pre-registered)

Policy Implications

Online decision support tools are unlikely to serve the needs of populations that may be saving less than optimal or populations that have low levels of financial literacy

- ▶ Reach of the tool may be limited to high-saving populations
- ▶ Complementarities with various measures of financial capability

Examining heterogeneity by individual-level characteristics can offer some insights into mechanisms

Addressing behavioral and perceptual biases known to affect saving decisions (like EGB, present bias) remains an important objective

- ▶ Dealing with one issue at a time may not be sufficient to move behavior

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_ **and Olivia S. Mitchell**, "The Economic Importance of Financial Literacy: Theory and Evidence," *Journal of Economic Literature*, March 2014, *52* (1), 5–44.

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Additional Results

Elicitation of Biases (EGB)

Exponential Growth Bias ("Alpha"): adapted from Levy and Tasoff (2015)

- ▶ 3-question elicitation
- ▶ "An asset has an initial value of \$100 and grows at an interest rate of 10% each period. What is the value after 20 periods?" (▸ more)
- ▶ For each person i and question k: $Alpha_{i,k} = \arg\min_{\alpha \in [-1,3]} |a_k(\alpha) - a_{i,k}|$
- ▶ Average across questions: $\overline{Alpha_i} = \sum_{k=1}^{3} \dfrac{Alpha_{i,k}}{3}$

(◂ Back)

Elicitation of Biases (Time Preferences)

Time preference parameter elicitation ("Delta" and "Beta"): adapted time-staircase procedure from Falk et al. (2014)

- *Present-Future staircase:*
  "Would you rather receive \$100 today or \$[X] in 12 months?"

- *Future-Future staircase:*
  "Would you rather receive \$120 in 12 months or \$[Y] in 24 months?"

- Subjects answer 5 questions for each staircase; different base values for each set

- Subjects also asked analogous questions for 6-month periods; order of blocks randomized

- For each person i and time interval k: construct measures of $Beta_{i,k}$ and $Delta_{i,k}$ from implied indifference points

- Average across questions: $\overline{Beta_i} = \sum_{k=1}^{2} \frac{Beta_{i,k}}{2}$; $\overline{Delta_i} = \sum_{k=1}^{2} \frac{Delta_{i,k}}{2}$
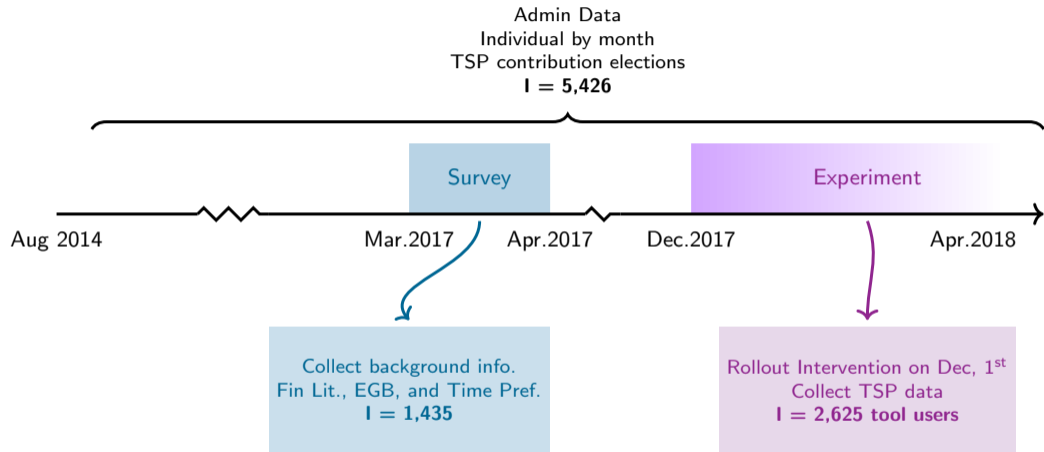
Financial Literacy (Lusardi and Mitchell, 2014)

1. Imagine that the interest rate on your savings account was 1% per year and inflation was 2% per year. After 1 year, how much would you be able to buy with the money in this account?
   - ▶ More than today
   - ▶ Exactly the same
   - ▶ Less than today
2. True or False: Buying a single company stock usually provides a safer return than a stock mutual fund.
   - ▶ True
   - ▶ False
3. Suppose you had $100 in a savings account and the interest rate was 2% per yer. After 5 years, how much do you think you would have in the account if you left the money to grow?
   - ▶ More than $102
   - ▶ Exactly $102
   - ▶ Less than $102

Financial Literacy (cont.)

4. True or False: 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
   - ▶ False

5. If interest rates fall, what should happen to bond prices?
   - ▶ They should rise
   - ▶ They should fall
   - ▶ They should stay the same
   - ▶ There is no relationship between bond prices and the interest rate

◀ Back

Timeline

Admin Data
Individual by month
TSP contribution elections
I = 5,426

Survey

Experiment

Aug 2014   Mar.2017   Apr.2017   Dec.2017   Apr.2018

Collect background info.
Fin Lit., EGB, and Time Pref.
I = 1,435

Rollout Intervention on Dec, 1st
Collect TSP data
I = 2,625 tool users

▸ Sample Diagram   ▸ Random Assignment   ◂ Back

Ballpark Savings Estimate
Are you saving enough for retirement?

More Info

Reset Data and
Start Again

Let's get started

What is your date of birth? Month: -- ◆ Year: -- ◆

When did you start working for the Federal government?
(Service Computation Date) Month: -- ◆ Year: -- ◆

Current Annual Salary $ [   ]

Expected Retirement Age [62   ]

Report Issue

Ballpark Savings Estimate
Are you saving enough for retirement?

More Info

Reset Data and Start Again

| Step 1 | Step 2 | Step 3 | Step 4 | Step 5 | Step 6 | View Your Plan | Adjust Your Plan | What to Do Next |

What lifestyle would you like in retirement?

Select your desired lifestyle in retirement. This will set your retirement income goal.

70% of Income

Expect to have **lower spending** in retirement as compared to today.

85% of Income

Expect to have **similar spending** in retirement as compared to today.

100% of Income

Expect to have **higher spending** in retirement as compared to today.

115% of Income

Or enter other amount `85` (%)

Report Issue

Ballpark Savings Estimate
Are you saving enough for retirement?

Step 1 | Step 2 | Step 3 | Step 4 | Step 5 | Step 6 | View Your Plan | Adjust Your Plan | What to Do Next

Goal: $5,649/month

Here is your Retirement Income Goal

Your monthly retirement income goal is **$5,649** a month, which is 85% of your projected final salary before taxes.

Your projected final salary takes into account the expected increase in salary until retirement, based on a historical average.

Are you on target to meet this goal?

Proceed to the next steps to find out.

All estimates are in today's dollars

Ballpark Savings Estimate

Are you saving enough for retirement?

What is your Retirement System?

- ⦿ FERS
- ○ CSRS
- ○ CSRS Offset

As a Federal employee, you fall into one of three retirement systems: FERS, CSRS, CSRS Offset.
Most people hired after 1984 are in FERS, which represents over 90 percent of Federal employees.

Ballpark Savings Estimate
Are you saving enough for retirement?

| Step 1 | Step 2 | Step 3 | Step 4 | Step 5 | Step 6 | View Your Plan | Adjust Your Plan | What to Do Next |

What are your current retirement savings?

Federal employees can save additional income for retirement through the Thrift Savings Program (TSP).

Enter Current TSP Account Balance $ `0`

Enter Your TSP Contribution
- ⦿ Percent `0` %
- ◯ Dollar $ `_____`

Max: $18,500/year or $712/pay period

Annual TSP Catch-up Contribution

Min: 0   Max: $0   6000

Enter Additional Retirement Savings Balance $ `0`

Report Issue

Ballpark Savings Estimate
Are you saving enough for retirement?

More Info

Reset Data and Start Again

Do you have other sources of retirement income?

☑ I expect to receive Social Security benefits.

Enter Expected Monthly Social Security Benefits $ [0]

Need help? Estimate my Social Security benefit
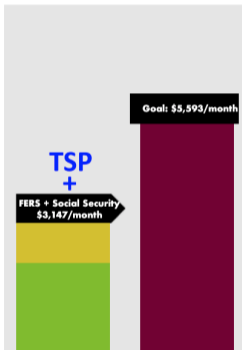
☐ I expect to work after retirement.

☐ I expect an additional pension.

Report Issue

Active Control Condition

Ballpark Savings Estimate
Are you saving enough for retirement?

| Step 1 | Step 2 | Step 3 | Step 4 | Step 5 | Step 6 | Results | What to Do Next |

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More Info

Reset Data and Start Again

Goal: $5,593/month

TSP +

FERS + Social Security $3,147/month

All estimates are in today's dollars

◀ back

Treatment Condition

Ballpark Savings Estimate
Are you saving enough for retirement?

More Info

Reset Data and Start Again

Step 1 ▶ Step 2 ▶ Step 3 ▶ Step 4 ▶ Step 5 ▶ Step 6 ▶ View Your Plan ▶ Adjust Your Plan ▶ What to Do Next

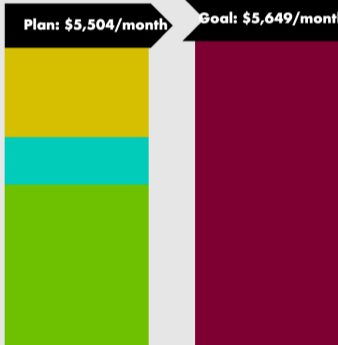## Get closer to your goal by adjusting your plan!

- Adjust plan inputs using the four tabs on the right.
- Move the slider and watch how your Plan and Goal bars adjust.
- When you are happy with your new Plan, proceed to the next step!

Plan: $5,504/month

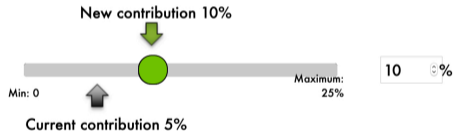Goal: $5,649/month

income in retirement.

New contribution 10%

Min: 0

Maximum: 25%

10 ⏷ %

Current contribution 5%

For instructions on **how to make this change**, go to the next page!

What if I delay changing my New TSP Contribution?

No delay

0 Never change

0 Years

New TSP Contribution

Retirement Age/ Lifestyle Goals

Other Income Sources

Assumptions

All estimates are in today's dollars

Ballpark Savings Estimate

Are you saving enough for retirement?

More Info

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Plan: $5,504/month

Goal: $5,649/month

Try adjusting your retirement age or lifestyle plans

Retirement Age

Min: 55   62   Max: 75

Retirement Goal

Retirement Income as Percentage of

New TSP Contribution

Retirement Age/ Lifestyle Goals

Other Income Sources

Assumptions

All estimates are in today's dollars

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Plan: $5,504/month   **Goal: $5,649/month**

New TSP Contribution

Retirement Age/ Lifestyle Goals

Other Income Sources

Assumptions

Try adjusting your income from other sources

Monthly Social Security - Calculate Social Security

Min: $0 $ 1,650   Max: $5,000

Post Retirement Yearly Income

Min: $0 $ 0   Max: $100,000

Years Working Post Retirement

Min: 0   0   Max: 22

All estimates are in today's dollars

Ballpark Savings Estimate
Are you saving enough for retirement?

More Info

Reset Data and Start Again

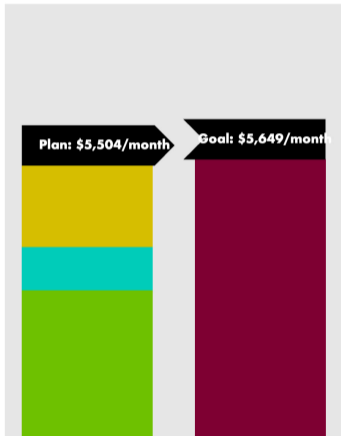Step 1 | Step 2 | Step 3 | Step 4 | Step 5 | Step 6 | View Your Plan | Adjust Your Plan | What to Do Next

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Plan: $5,504/month **Goal: $5,649/month**

New TSP Contribution

Retirement Age/ Lifestyle Goals

Other Income Sources

Assumptions

Try adjusting assumptions used to calculate your projected retirement income

Annual Wage Growth Rate

Min: 0%   Max: 6%   3.2 %

Annual Pre-Retirement Investment Return

Min: 0%   Max: 10%   5 %

Annual Post-Retirement Investment Return

Min: 0%   Max: 10%   4 %

The Inflation Rate in the Ballpark Savings Estimate is set at 2.5%

All estimates are in today's dollars

Report Issue

Ballpark Savings Estimate
Are you saving enough for retirement?

Here is a summary of your Current Saving Plan and your proposed New Saving Plan based on using this tool:

Current Saving Plan

Your Current TSP Contribution:	5% per pay period
Projected Income in Retirement:	$5,353 per month
Goal Income in Retirement:	$5,649 per month
Difference:	-$296 per month

This tool calculates that you are $296 below your goal with your Current Saving Plan.

New Saving Plan

Your New TSP Contribution:	10% per pay period
Projected Income in Retirement:	$5,504 per month
Goal Income in Retirement:	$5,649 per month
Difference:	-$145 per month

This tool calculates that you are $145 below your goal with your New Saving Plan.

Print this plan to keep for your records (Print)

Change your TSP contribution now! Here's how:

Sign into your agency's electronic payroll system and select the "Thrift Savings Plan" option. You can contribute a percentage of your salary or a fixed dollar amount.

If your agency doesn't have an electronic system you can also complete form TSP-1 and send it to your agency's payroll or benefits office.

II. CHOOSE THE AMOUNT OF YOUR CONTRIBUTIONS *Your choice will cancel all previous elections.*	To start or change the amount of traditional (pre-tax) or Roth (after-tax) contributions to your TSP account, enter **either** a whole percentage of your basic pay per pay period **or** a whole dollar amount per pay period for each type of contribution you elect. (You may choose a percentage for one type of contribution and a dollar amount for the other type of contribution.) **Remember:** A blank line next to a type of contribution equals 0% or $0 contributed.	
	6. Traditional (Pre-Tax) Contributions _____0% OR	7. $ _____ .00
	8. Roth (After-Tax) Contributions _____0% OR	9. $ _____ .00

In Section II, enter 10% in Box 6 or Box 8 on the TSP-1.

Call TSP at 1-877-968-3778 and choose option 3 for help, or visit the TSP Website, https://www.tsp.gov/forms/index.html (Select TSP-1) it includes a short video

Report Issue

◀ Back

Exponential-Growth Bias Elicitation

▶ "An asset has an initial value of \$100 and grows at an interest rate of 5% each year. How much do you think this asset is worth after 50 years?"

▶ "An asset has an initial value of \$100 and grows at an interest rate of 7% each year. How much do you think this asset is worth after 30 years?"

Factor Analysis

- Reduce the dimensionality of the heterogeneity using Principal Component Analysis
- Retain factors with the eigenvalue greater than 1 ▶ Parallel Analysis
- Examine the factor loads to give meaning to the latent factors

Note: This analysis was not pre-registered

Factor Loading Matrix

Variable	Factor1 Demographics	Factor2 Seniority	Factor3 Financial Capability	Factor4 Time Preference	Factor5 Household Composition	Factor6 Hispanic Factor	Uniqueness
Age	-0.0753	0.6838	0.0146	0.0648	-0.2091	-0.07	0.4738
Male	0.2269	-0.0046	0.3806	0.046	0.5064	0.0223	0.5446
Years of Schooling	-0.0993	-0.1911	0.7269	-0.0084	-0.1586	0.1145	0.3869
Race = White	0.925	-0.0198	-0.0022	0.0105	-0.0082	-0.2718	0.0699
Race = Hispanic	-0.0756	-0.0451	0.024	0.0178	-0.025	0.9097	0.1632
Race = Black	-0.9478	0.0585	-0.0297	-0.0367	-0.0067	-0.1584	0.071
Household Size	-0.0492	-0.0578	-0.0828	-0.0419	0.8686	-0.0349	0.2299
Tenure(in years)	-0.0802	0.8116	-0.131	0.0262	0.063	-0.0457	0.311
Is Supervisor	0.0577	0.4178	0.3047	-0.0493	0.2453	0.2889	0.5832
Tenure Description = Permanent	-0.0107	0.6444	-0.02	-0.0151	-0.0988	-0.012	0.5741
Std. Alpha	0.0448	0.1002	0.349	-0.0211	0.0972	-0.3106	0.7598
Std. Beta	0.0349	-0.0148	-0.0841	0.8349	-0.074	-0.0388	0.2875
Beta-Delta	0.0313	0.0673	0.1772	0.7921	0.0388	0.0725	0.3289
Financial Literacy	0.1299	0.0207	0.7042	0.1154	0.0648	-0.0656	0.4649
Eigenvalue	2.07686	1.75206	1.50360	1.31937	1.05755	1.04191	

Treatment on the Treated - Heterogeneity by PCA Factors

|	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	TSP Amount ($/year)	TSP Amount ($/year)	TSP Amount ($/year)	TSP Amount ($/year)	TSP Amount ($/year)	TSP Amount ($/year)	TSP Amount ($/year)
Post × Full Tool	141.889	75.229	151.798	137.219	173.534	133.807	25.538
	(130.840)	(130.527)	(131.326)	(130.473)	(135.362)	(131.544)	(134.771)
Post × Demographics	-105.760						-107.469
	(95.464)						(96.001)
Post × Full Tool × Demographics	149.497						157.211
	(128.685)						(126.854)
Post × Seniority		-293.914***					-288.275***
		(99.988)					(99.769)
Post × Full Tool × Seniority		-38.885					-67.622
		(137.083)					(133.333)
Post × Financial Capability			-126.354				-113.895
			(97.740)				(96.591)
Post × Full Tool × Financial Capability			411.633***				364.711***
			(132.631)				(128.438)
Post × Time Preference				164.910			176.523
				(109.860)			(109.173)
Post × Full Tool × Time Preference				-180.815			-180.677
				(133.436)			(132.239)
Post × Household Composition					46.222		57.651
					(104.020)		(102.362)
Post × Full Tool × Household Composition					-101.637		-113.733
					(128.338)		(125.478)
Post × Hispanic Factor						-81.289	-78.221
						(93.459)	(84.823)
Post × Full Tool × Hispanic Factor						89.919	56.255
						(108.988)	(103.873)
Year F.E.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Month F.E.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Individual F.E.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mean DV	7579.859	7579.859	7579.859	7579.859	7579.859	7579.859	7579.859
F-Statistic	1.350	0.080	9.632	1.836	0.627	0.681	
P-Value	0.246	0.777	0.002	0.176	0.429	0.410	
R-squared	0.089	0.094	0.093	0.092	0.092	0.092	0.107
Observations	56,131	56,131	56,131	56,131	56,131	56,131	56,131

◀ Back

Survey Sample

	(1) All	(2) Survey Non-Completers	(3) Survey Completer	(4) Difference
TSP Amount ($/year)	6274.0	5939.1	7205.4	-1266.219***
	(5724.1)	(5537.6)	(6119.9)	(175.365)
SD Change in TSP Amount	1.107	1.048	1.271	-0.223***
	(1.010)	(0.977)	(1.080)	(0.031)
Final TSP Rate	6.895	6.568	7.801	-1.233***
	(5.465)	(5.268)	(5.885)	(0.167)
Total Pay (in Thousand)	85.99	85.30	87.90	-2.598**
	(31.62)	(31.60)	(31.60)	(0.973)
Age	45.73	45.18	47.24	-2.052***
	(10.70)	(10.65)	(10.69)	(0.328)
Gender	0.429	0.424	0.442	-0.018
	(0.495)	(0.494)	(0.497)	(0.015)
Bachelor or Higher	0.654	0.651	0.663	-0.013
	(0.476)	(0.477)	(0.473)	(0.015)
White	0.658	0.642	0.704	-0.062***
	(0.474)	(0.479)	(0.457)	(0.015)
Observations	5,426	3,991	1,435	5,426
Chi-Squared				62.39
P-Value				0.00

Back

Selection into Survey Sample

	Logit	
	(1) In Survey Sample	(2) In Survey Sample
In Survey Sample		
Age	-0.003***	0.001
	(0.001)	(0.001)
Male	0.355***	0.356***
	(0.017)	(0.017)
White	0.351***	0.359***
	(0.037)	(0.037)
Hispanic	-0.106**	-0.077
	(0.048)	(0.049)
Black	0.202***	0.254***
	(0.039)	(0.040)
Some College or Associate	0.503***	0.492***
	(0.028)	(0.029)
Bachelor	0.105***	0.103***
	(0.021)	(0.023)
Post-Bachelor	0.315***	0.300***
	(0.024)	(0.027)
Household Size	0.054***	0.061***
	(0.006)	(0.007)
Total Pay		-0.002***
		(0.000)
Tenure in Years		-0.019***
		(0.001)
Team Leader		0.133***
		(0.047)
Supervisor or Manager		-0.001
		(0.031)
Conditional - Tenure Group 2		-0.459***
		(0.069)
Permanent - Tenure Group 1		-0.104*
		(0.063)
Part-Time		1.421***
		(0.186)
Full-Time		1.572***
		(0.169)
Constant	0.807***	-0.490***
	(0.059)	(0.188)
Mean DV	0.806	0.806
Observations	103,607	103,607

Sample Diagram
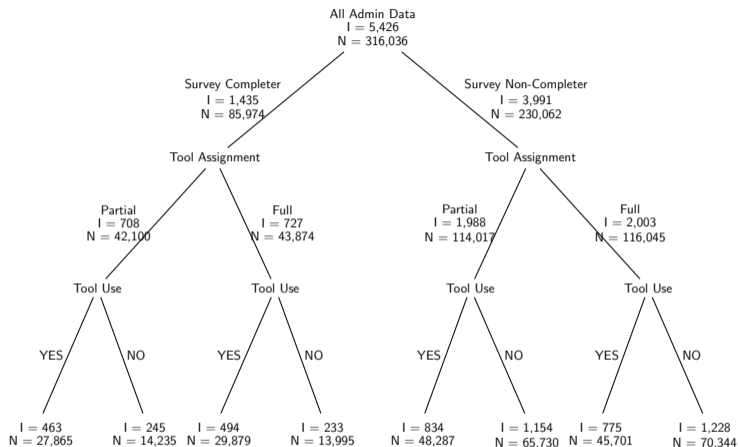
Note: *I* refers to the number of unique individuals in the corresponding node. *N* refers to the number of observations, the unit of observation is bimonthly paychecks for each individual. Survey Non-Completers include individuals who did not answer all five questions as well as individuals who did not participate in the survey at all.

Random Assignment

	(1) All	(2) Partial	(3) Full	(4) Difference
TSP Amount ($/year)	6274.8	6287.8	6262.0	25.803
	(5721.6)	(5783.8)	(5660.6)	(155.366)
SD Change in TSP Amount	1.107	1.109	1.105	0.005
	(1.009)	(1.020)	(0.998)	(0.027)
Final TSP Rate	6.899	6.899	6.898	0.000
	(5.467)	(5.611)	(5.323)	(0.148)
Mean Alpha	0.483	0.472	0.493	-0.021
	(0.826)	(0.813)	(0.838)	(0.042)
Mean Beta	1.007	1.005	1.008	-0.003
	(0.0865)	(0.0854)	(0.0875)	(0.004)
Std. Financial Literacy	-0.0753	-0.0844	-0.0664	-0.018
	(1.019)	(1.023)	(1.015)	(0.053)
Total Pay (in Thousand)	85.99	86.08	85.90	0.180
	(31.62)	(31.74)	(31.50)	(0.859)
Age	45.73	45.80	45.65	0.144
	(10.70)	(10.69)	(10.70)	(0.290)
Gender	0.429	0.428	0.429	-0.001
	(0.495)	(0.495)	(0.495)	(0.013)
Bachelor or Higher	0.654	0.659	0.649	0.010
	(0.476)	(0.474)	(0.477)	(0.013)
White	0.658	0.653	0.664	-0.011
	(0.474)	(0.476)	(0.473)	(0.013)
Observations	5,426	2,696	2,730	5,426
Chi-Squared				2.42
P-Value				0.97

Selection into Tool Use

	Logit		
	(1) Tool Participation	(2) Tool Participation	(3) Tool Participation
Tool Participation			
Mean Alpha	0.111	0.107	0.085
	(0.071)	(0.072)	(0.073)
Mean Beta	0.393	0.368	0.233
	(0.683)	(0.699)	(0.697)
Std. Financial Literacy	0.078	0.044	-0.009
	(0.056)	(0.061)	(0.063)

Selection into Tool Use (cont.)

Age	-0.001	-0.009
	(0.006)	(0.006)
Male	-0.031	-0.059
	(0.121)	(0.125)
White	0.018	0.215
	(0.292)	(0.307)
Hispanic	-0.323	-0.171
	(0.390)	(0.408)
Black	-0.240	-0.015
	(0.312)	(0.325)
Some College or Associate	0.282	0.191
	(0.198)	(0.202)
Bachelor	0.240	0.008
	(0.168)	(0.177)
Post-Bachelor	0.186	-0.108
	(0.182)	(0.202)

Selection into Tool Use (cont.)

Total Pay			0.003
			(0.003)
Tenure in Years			-0.006
			(0.009)
Team Leader			0.222
			(0.368)
Supervisor or Manager			0.415*
			(0.247)
Conditional - Tenure Group 2			0.577
			(0.494)
Permanent - Tenure Group 1			0.657
			(0.454)
Part-Time			0.845
			(0.882)
TSP Amount Pre-Rollout ($1,000/year)			0.048***
			(0.013)
Constant	0.252	0.096	-0.575
	(0.690)	(0.849)	(1.007)
Mean DV	0.667	0.668	0.668
Observations	1,435	1,393	1,392

	ITT Main		ITT Heterogeneity				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Overall Sample	Survey Sample	Std. Alpha	Std. Beta	Std. Financial Literacy	TSP Amount per year pre Rollout	Bachelor or Higher
Post × Full Tool	61.055	134.103	131.192	134.080	151.680	285.584**	-89.439
	(48.990)	(100.994)	(100.774)	(100.901)	(101.817)	(135.674)	(148.638)
Post × Attribute			41.775	30.028	-125.891*	0.081***	
			(74.787)	(73.575)	(75.388)	(0.014)	
Post × Full Tool × Attribute			80.896	21.494	238.383**	-0.021	
			(92.855)	(92.759)	(99.264)	(0.020)	
Post × Attribute=1							-90.545
							(147.613)
Post × Attribute=1 × Full Tool							337.035*
							(198.862)
Year F.E.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Month F.E.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Individual F.E.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mean DV	6188.494	7016.741	7016.741	7016.741	7016.741	7016.741	7016.741
F-Statistic			0.759	0.054	5.767	1.089	2.872
P-Value			0.384	0.817	0.016	0.297	0.090
FDR Sharpened Q-Value	0.463	0.463	0.471	0.594	0.131	0.463	0.372
R-squared	0.069	0.072	0.073	0.072	0.073	0.081	0.073
Observations	318,873	85,974	85,974	85,974	85,974	85,974	85,974

◂ back

SD Change in TSP Amount: TOT

	TOT Main		TOT Heterogeneity				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Overall Sample	Survey Sample	Std. Alpha	Std. Beta	Std. Financial Literacy	TSP Amount per year pre Rollout	Bachelor or Higher
Post × Full Tool	0.031**	0.021	0.020	0.021	0.023	0.054*	-0.037
	(0.013)	(0.023)	(0.023)	(0.023)	(0.023)	(0.031)	(0.034)
Post × Attribute			-0.011	0.021	-0.029	0.000***	-0.032
			(0.015)	(0.019)	(0.018)	(0.000)	(0.035)
Post × Full Tool × Attribute			0.022	-0.027	0.058**	-0.000	0.088*
			(0.019)	(0.023)	(0.023)	(0.000)	(0.045)
Year F.E.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Month F.E.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Individual F.E.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mean DV	1.248533	1.336639	1.336639	1.336639	1.336639	1.336639	1.336639
Permutation P-Value	0.000	0.348					
FDR Sharpened Q-Value	0.081	0.259	0.248	0.248	0.081	0.259	0.1
R-squared	0.089	0.089	0.089	0.089	0.090	0.096	0.090
Observations	151,732	57,744	57,744	57,744	57,744	57,744	57,744

◄ back

SD Change in TSP Amount: TOT

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	SD Change in TSP Amount	SD Change in TSP Amount	SD Change in TSP Amount	SD Change in TSP Amount	SD Change in TSP Amount	SD Change in TSP Amount	SD Change in TSP Amount
Post × Full Tool	0.025	0.013	0.027	0.024	0.031	0.024	0.005
	(0.023)	(0.023)	(0.023)	(0.023)	(0.024)	(0.023)	(0.024)
Post × Demographics	-0.019						-0.019
	(0.017)						(0.017)
Post × Full Tool × Demographics	0.026						0.028
	(0.023)						(0.022)
Post × Seniority		-0.052***					-0.051***
		(0.018)					(0.018)
Post × Full Tool × Seniority		-0.007					-0.012
		(0.024)					(0.024)
Post × Financial Capability			-0.022				-0.020
			(0.017)				(0.017)
Post × Full Tool × Financial Capability			0.073***				0.064***
			(0.023)				(0.023)
Post × Time Preference				0.029			0.031
				(0.019)			(0.019)
Post × Full Tool × Time Preference				-0.032			-0.032
				(0.024)			(0.023)
Post × Household Composition					0.008		0.010
					(0.018)		(0.018)
Post × Full Tool × Household Composition					-0.018		-0.020
					(0.023)		(0.022)
Post × Hispanic Factor						-0.014	-0.014
						(0.016)	(0.015)
Post × Full Tool × Hispanic Factor						0.016	0.010
						(0.019)	(0.018)
Year F.E.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Month F.E.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Individual F.E.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mean DV	1.337	1.337	1.337	1.337	1.337	1.337	1.337
F-Statistic	1.350	0.080	9.632	1.836	0.627	0.681	
P-Value	0.246	0.777	0.002	0.176	0.429	0.410	
R-squared	0.089	0.094	0.093	0.092	0.092	0.092	0.107
Observations	56,131	56,131	56,131	56,131	56,131	56,131	56,131

SD Change in TSP Amount: ITT

	ITT Main		ITT Heterogeneity				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Overall Sample	Survey Sample	Std. Alpha	Std. Beta	Std. Financial Literacy	TSP Amount per year pre Rollout	Bachelor or Higher
Post × Full Tool	0.011	0.024	0.023	0.024	0.027	0.050**	-0.016
	(0.009)	(0.018)	(0.018)	(0.018)	(0.018)	(0.024)	(0.026)
Post × Attribute			0.007	0.005	-0.022*	0.000***	
			(0.013)	(0.013)	(0.013)	(0.000)	
Post × Full Tool × Attribute			0.014	0.004	0.042**	-0.000	
			(0.016)	(0.016)	(0.018)	(0.000)	
Post × Attribute=1							-0.016
							(0.026)
Post × Attribute=1 × Full Tool							0.059*
							(0.035)
Year F.E.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Month F.E.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Individual F.E.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mean DV	1.092	1.238	1.238	1.238	1.238	1.238	1.238
F-Statistic			0.759	0.054	5.767	1.089	2.872
P-Value			0.384	0.817	0.016	0.297	0.090
FDR Sharpend Q-Value	0.463	0.463	0.471	0.594	0.131	0.463	0.372
R-squared	0.069	0.072	0.073	0.072	0.073	0.081	0.073
Observations	318,873	85,974	85,974	85,974	85,974	85,974	85,974

◂ back

TSP Rate: TOT

	TOT Main		TOT Heterogeneity				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Overall Sample	Survey Sample	Std. Alpha	Std. Beta	Std. Financial Literacy	TSP Amount per year pre Rollout	Bachelor or Higher
Post × Full Tool	0.145	0.119	0.112	0.116	0.130	0.453*	-0.372
	(0.088)	(0.162)	(0.163)	(0.163)	(0.162)	(0.233)	(0.289)
Post × Attribute			-0.061	0.130	-0.325**	0.000**	-0.667**
			(0.106)	(0.157)	(0.136)	(0.000)	(0.291)
Post × Full Tool × Attribute			0.125	-0.175	0.412**	-0.000	0.727**
			(0.128)	(0.175)	(0.171)	(0.000)	(0.349)
Year F.E.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Month F.E.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Individual F.E.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mean DV	7.687612	8.166443	8.166443	8.166443	8.166443	8.166443	8.166443
Permutation P Value	0.051	0.452					
FDR Sharpened Q-Value	0.206	0.363	0.314	0.314	0.127	0.314	0.127
R-squared	0.023	0.024	0.024	0.024	0.025	0.026	0.025
Observations	151,732	57,744	57,744	57,744	57,744	57,744	57,744

◄ back

TSP Rate: TOT

	(1) Final TSP Rate	(2) Final TSP Rate	(3) Final TSP Rate	(4) Final TSP Rate	(5) Final TSP Rate	(6) Final TSP Rate	(7) Final TSP Rate
Post × Full Tool	0.148 (0.164)	0.010 (0.167)	0.136 (0.167)	0.133 (0.164)	0.166 (0.166)	0.145 (0.165)	-0.070 (0.181)
Post × Demographics	-0.075 (0.102)						-0.079 (0.100)
Post × Full Tool × Demographics	0.147 (0.142)						0.163 (0.141)
Post × Seniority		-0.456*** (0.149)					-0.428*** (0.146)
Post × Full Tool × Seniority		0.078 (0.190)					0.025 (0.186)
Post × Financial Capability			-0.375** (0.148)				-0.357** (0.145)
Post × Full Tool × Financial Capability			0.517*** (0.187)				0.465** (0.180)
Post × Time Preference				0.178 (0.151)			0.203 (0.151)
Post × Full Tool × Time Preference				-0.183 (0.171)			-0.202 (0.172)
Post × Household Composition					0.153 (0.119)		0.152 (0.114)
Post × Full Tool × Household Composition					-0.200 (0.147)		-0.190 (0.142)
Post × Hispanic Factor						-0.097 (0.096)	-0.083 (0.084)
Post × Full Tool × Hispanic Factor						0.070 (0.118)	0.031 (0.111)
Year F.E.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Month F.E.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Individual F.E.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mean DV	8.176	8.176	8.176	8.176	8.176	8.176	8.176
F-Statistic	1.078	0.169	7.665	1.141	1.845	0.349	
P-Value	0.299	0.682	0.006	0.286	0.175	0.555	
R-squared	0.024	0.029	0.027	0.025	0.025	0.025	0.038
Observations	56,131	56,131	56,131	56,131	56,131	56,131	56,131

TSP Rate: ITT

	ITT Main		ITT Heterogeneity				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Overall Sample	Survey Sample	Std. Alpha	Std. Beta	Std. Financial Literacy	TSP Amount per year pre Rollout	Bachelor or Higher
Post × Full Tool	0.033	0.103	0.101	0.103	0.126	0.402**	-0.238
	(0.055)	(0.122)	(0.122)	(0.123)	(0.122)	(0.173)	(0.206)
Post × Attribute			0.051	0.037	-0.266***	0.000***	
			(0.089)	(0.104)	(0.098)	(0.000)	
Post × Full Tool × Attribute			0.073	0.018	0.319***	-0.000	
			(0.108)	(0.120)	(0.123)	(0.000)	
Post × Attribute=1							-0.499**
							(0.203)
Post × Attribute=1 × Full Tool							0.515**
							(0.256)
Year F.E.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Month F.E.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Individual F.E.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mean DV	6.848	7.707	7.707	7.707	7.707	7.707	7.707
F-Statistic			0.454	0.023	6.723	2.399	4.055
P-Value			0.501	0.879	0.010	0.122	0.044
FDR Sharpened Q-Value	0.568	0.568	0.568	1	0.072	0.255	0.153
R-squared	0.014	0.016	0.016	0.016	0.017	0.019	0.017
Observations	318,873	85,974	85,974	85,974	85,974	85,974	85,974

back

TSP Amount by Assumptions: TOT

	(1) TSP Amount ($/year)	(2) TSP Amount ($/year)	(3) TSP Amount ($/year)	(4) TSP Amount ($/year)	(5) TSP Amount ($/year)
Post × LR-HL Full Tool	287.964** (131.179)				
Post × HR-HL Full Tool	3.149 (104.879)				
Post × LR-LL Full Tool	211.459* (118.889)				
Post × HR-LL Full Tool	211.512 (129.502)				
Post × LR-HL Partial Tool		50.926 (105.181)			
Post × LR-HL Full Tool		314.025** (142.692)			
Post × HR-HL Full Tool		29.210 (118.974)			
Post × LR-LL Full Tool		237.520* (131.488)			
Post × HR-LL Full Tool		237.573* (141.156)			
Post × Full Tool			248.594*** (95.801)	211.489** (95.195)	280.937*** (107.046)
Post × Full Tool × High Return			-147.862 (108.815)		-144.777 (109.623)
Post × Full Tool × High Lifestyle				-73.336 (108.891)	-66.632 (109.658)
Year F.E.	Yes	Yes	Yes	Yes	Yes
Month F.E.	Yes	Yes	Yes	Yes	Yes
Individual F.E.	Yes	Yes	Yes	Yes	Yes
Omitted	All Partial	LR-LL Partial	All Partial	LL Partial	LR-LL Partial
Assumptions Type	Separating	Separating	Pooling	Pooling	Pooling
Mean DV	7078.012	7078.012	7078.012	7078.012	7078.012
R-squared	0.090	0.090	0.089	0.089	0.090
Observations	151,732	151,732	151,732	151,732	151,732

◀ back

SD Change in TSP Amount by Assumptions: TOT

	(1) SD Change in TSP Amount	(2) SD Change in TSP Amount	(3) SD Change in TSP Amount	(4) SD Change in TSP Amount	(5) SD Change in TSP Amount
Post × LR-HL Full Tool	0.051** (0.023)				
Post × HR-HL Full Tool	0.001 (0.019)				
Post × LR-LL Full Tool	0.037* (0.021)				
Post × HR-LL Full Tool	0.037 (0.023)				
Post × LR-HL Partial Tool		0.009 (0.019)			
Post × LR-HL Full Tool		0.055** (0.025)			
Post × HR-HL Full Tool		0.005 (0.021)			
Post × LR-LL Full Tool		0.042* (0.023)			
Post × HR-LL Full Tool		0.042* (0.025)			
Post × Full Tool			0.044*** (0.017)	0.037** (0.017)	0.050*** (0.019)
Post × Full Tool × High Return			-0.026 (0.019)		-0.026 (0.019)
Post × Full Tool × High Lifestyle				-0.013 (0.019)	-0.012 (0.019)
Year F.E.	Yes	Yes	Yes	Yes	Yes
Month F.E.	Yes	Yes	Yes	Yes	Yes
Individual F.E.	Yes	Yes	Yes	Yes	Yes
Omitted	All Partial	LR-LL Partial	All Partial	LL Partial	LR-LL Partial
Assumptions Type	Separating	Separating	Pooling	Pooling	Pooling
Mean DV	1.249	1.249	1.249	1.249	1.249
R-squared	0.090	0.090	0.089	0.089	0.090
Observations	151,732	151,732	151,732	151,732	151,732

TSP Rate by Assumptions: TOT

	(1) Final TSP Rate	(2) Final TSP Rate	(3) Final TSP Rate	(4) Final TSP Rate	(5) Final TSP Rate
Post × LR-HL Full Tool	0.300* (0.159)				
Post × HR-HL Full Tool	-0.060 (0.119)				
Post × LR-LL Full Tool	0.218* (0.128)				
Post × HR-LL Full Tool	0.139 (0.139)				
Post × LR-HL Partial Tool		0.010 (0.131)			
Post × LR-HL Full Tool		0.305* (0.172)			
Post × HR-HL Full Tool		-0.055 (0.136)			
Post × LR-LL Full Tool		0.223 (0.144)			
Post × HR-LL Full Tool		0.144 (0.154)			
Post × Full Tool			0.258** (0.112)	0.180* (0.105)	0.286** (0.118)
Post × Full Tool × High Return			-0.225* (0.119)		-0.222* (0.121)
Post × Full Tool × High Lifestyle				-0.070 (0.119)	-0.059 (0.120)
Year F.E.	Yes	Yes	Yes	Yes	Yes
Month F.E.	Yes	Yes	Yes	Yes	Yes
Individual F.E.	Yes	Yes	Yes	Yes	Yes
Omitted	All Partial	LR-LL Partial	All Partial	LL Partial	LR-LL Partial
Assumptions Type	Separating	Separating	Pooling	Pooling	Pooling
Mean DV	7.688	7.688	7.688	7.688	7.688
R-squared	0.024	0.024	0.024	0.024	0.024
Observations	151,732	151,732	151,732	151,732	151,732

Parallel Analysis