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EVALUATING BEHAVIORAL POLICY APPLICATIONS USING ADMINISTRATIVE DATA[‡]

Retirement Contribution Rate Nudges and Plan Participation: Evidence from a Field Experiment[†]

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A growing literature in behavioral economics documents how variation in the choice environment can affect retirement savings decisions. For example, when employees are defaulted into retirement savings plans, a higher default contribution rate translates into greater savings by participating employees (Choi et al. 2006). Similarly, making high contribution rates salient in communications with savings plan participants increases the amount that those participants choose to contribute (Choi et al. 2012; Goda, Manchester, and Sojourner 2014). Based on findings such as these, one might conclude that the most effective way to increase retirement savings in a population would be to nudge members of that population toward relatively high contribution rates.

In this paper, we investigate a potential downside to this strategy, which is that nudging people toward lower contribution rates may be more effective at increasing the number of people who participate in a savings plan at all. That is, emphasizing a low contribution rate in communications to potential participants may induce some individuals to participate who would not do so if a high contribution was emphasized instead (even if the option to contribute at the low rate remained available). Such effects might occur, for example, if individuals perceive the emphasized rate to be a savings goal, and are only motivated to pursue that goal if they perceive it to be attainable. Similarly, individuals might focus on a simplified version of the savings decision such as the dichotomous choice between contributing at an emphasized rate or not participating at all.

We present results from a large-scale field experiment that shed light on this question. In a collaboration between the Department of Defense and the Social and Behavioral Sciences Team (SBST), the Defense Finance and Accounting Service sent e-mails to approximately 630,000 US military servicemembers who were eligible for, but not currently participating in, the retirement savings plan offered to them by the federal government. The e-mails encouraged servicemembers to sign up for the plan and provided instructions for doing so. The messages varied from one another based on the contribution rate (if any) that was emphasized.

We analyze how plan participation and contributions varied among servicemembers receiving

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different messages to investigate whether low-rate messages increase participation relative to higher-rate messages as well as to messages that do not emphasize any contribution rate. We find that more servicemembers chose to participate when the emphasized rate was low (1 or 2 percent) compared to a baseline treatment group that received a message without any emphasized rate. In contrast, participation rates for medium (3–5 percent) and high (6–8 percent) rate messages resembled the rate of participation under the message with no emphasized rate. If emphasizing high contribution rates raises savings among participating decision-makers, as the prior literature finds, our results suggest that planners seeking to use nudges to increase savings may face a trade-off between expanding extensive margin participation (by emphasizing a low contribution rate) and raising the contribution rate selected by those individuals who participate (by emphasizing a high contribution rate).

I. Institutional Background

Improving the financial security of military servicemembers is an important policy goal. Only 43 percent of military servicemembers contribute to the Thrift Savings Plan (TSP), the retirement savings plan that the US federal government offers to its employees. By comparison, 87 percent of civilian federal employees participate in TSP.

The TSP is similar to a 401(k) plan that might be offered by a private employer. It allows participants to save for retirement at tax-advantaged rates, under either a Roth or traditional retirement savings plan design. Unlike many 401(k) plans offered by private employers, and unlike the version of the TSP offered to federal civilian employees, there is no employer match for participating servicemembers. A second difference from the civilian TSP is that servicemembers must actively choose to enroll in the plan in order to participate. In contrast, federal civilian employees are automatically enrolled in the TSP unless they actively decline to participate.[1]

Servicemembers who enroll in the TSP select an integer contribution rate, which corresponds to the fraction of their pay that is directed to their TSP account each pay period. In this analysis, we focus on whether servicemembers choose to contribute any amount of their base pay to a TSP plan (either traditional or Roth), as well as the fraction of their base pay that they choose to allocate to their TSP account(s).[2]

II. Experimental Design

On January 26, 2016, 699,674 servicemembers (57 percent of the active duty force) were identified by the Defense Finance and Accounting Service (DFAS) as not enrolled in the TSP. This group constitutes the sample population. By service branch, the sample population was composed of approximately 46 percent Army, 18 percent Navy, 24 percent Air Force, and 13 percent Marines. Although we do not directly observe servicemembers' age, data on current military grade suggest the sample population is relatively young. For example, the large majority (86 percent) of the sample population were enlisted servicemembers and the majority (57 percent) have served for three years or fewer.

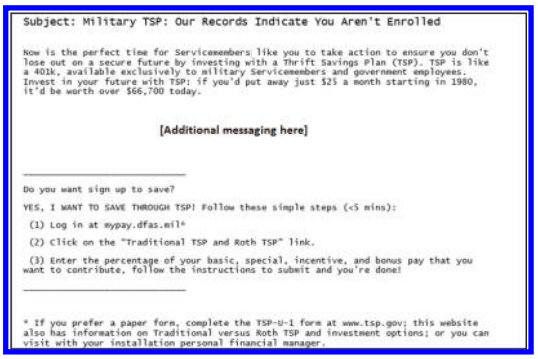
Individuals in the sample population were assigned to ten experimental groups in equal proportion based on their social security number.[3] On January 27, 2016, groups 1 through 9 received an e-mail from DFAS informing them that they were not enrolled in the TSP and encouraging them to sign up (Figure 1).[4] The messages sent to each group were identical, except that the message sent to groups 1 through 8 included the

[1] Under legislation enacted into law in late 2015, new military servicemembers will be automatically enrolled in the TSP at a 3 percent contribution rate. In addition, servicemembers participating in TSP will receive a similar match to civilians. These changes are not scheduled to take effect until January 1, 2018.

[2] While servicemembers receive different categories of pay (base, special, bonus, and incentive), and can choose to contribute a different fraction of each category to their TSP account, we focus only on base pay contributions in this paper.

[3] Specifically, servicemembers were assigned to treatment groups based on the eighth digit of their social security number (SSN). The last four digits of individuals' SSNs are randomly assigned. The eighth digit was used because a prior experiment directed at this population had been conducted on the basis of the ninth digit of servicemembers' SSN (SBST 2015).

[4] The DFAS administers the payment of military servicemembers and routinely uses an e-mail system to send out notifications regarding servicemembers pay, leave (vacation), and other human resources information.


Subject: Military TSP: Our Records Indicate You Aren't Enrolled

Now is the perfect time for Servicemembers like you to take action to ensure you don't lose out on a secure future by investing with a Thrift Savings Plan (TSP). TSP is like a 401k, available exclusively to military Servicemembers and government employees. Invest in your future with TSP: if you'd put away just $25 a month starting in 1980, it'd be worth over $66,700 today.

[Additional messaging here]

Do you want sign up to save?

YES, I WANT TO SAVE THROUGH TSP! Follow these simple steps (<5 mins):

(1) Log in at mypay.dfas.mil*

(2) Click on the "Traditional TSP and Roth TSP" link.

(3) Enter the percentage of your basic, special, incentive, and bonus pay that you want to contribute, follow the instructions to submit and you're done!

* If you prefer a paper form, complete the TSP-U-1 form at www.tsp.gov; this website also has information on Traditional versus Roth TSP and investment options; or you can visit with your installation personal financial manager.

FIGURE 1. SAMPLE MESSAGE

sentence: "Many Servicemembers like you start by contributing at least *X* percent of their basic pay into a traditional or Roth TSP account."[5] In these letters, *X* ranged from 1 to 8, depending on the group. The message received by individuals in group 9 (the baseline treatment group) did not include this sentence. Group 10 (the control) did not receive any version of the e-mail.

To analyze the results of the experiment, DFAS provided de-identified data on which members of the sample population had enrolled in TSP by the conclusion of the subsequent month (February 2016), and the contribution rates for the newly enrolled members.

III. Results

To verify the success of the randomization procedure, we begin by comparing the distribution of service branches among the experimental groups.[6] We find that service branch is not significantly correlated with any of the experimental groups, and tests for joint significance are consistent with successful randomization ($F < 0.001$ for each service branch).

Turning to our substantive results, we begin by comparing mean contributions by experimental group (Figure 2, panel A). The mean contribution rate in the control group is 0.16 percent. Pooling across treatment groups, the mean contribution rate is 0.21 percent, a 33 percent increase relative to the control ($p < 0.001$). The difference suggests that receiving a version of the treatment message causes at least some servicemembers to contribute more than they otherwise would. In contrast, differences between versions of the treatment message do not appear to have a meaningful effect on mean contributions: the mean contribution rate in the baseline treatment message, the low-rate message (groups 1 and 2), the medium-rate messages (groups 3–5), and the high-rate messages (groups 6–8) are each 0.21 percent.

However, similarities in the overall contribution rate between treatment groups may mask important differences in extensive and intensive margin participation. We investigate such effects in Figure 2, panel B. In the figure, the bars represent the fraction of servicemembers participating in TSP at any nonzero contribution rate and the lines represent the mean contribution rate among servicemembers who participate.

We begin by examining the extensive margin, our primary focus in this paper. The participation rate in the control group is 1.94 percent, suggesting that this fraction of the sample population would have enrolled in the TSP during our sample period, even without receiving one of the treatment messages.[7] The participation rate in the baseline treatment group is 2.58 percent and significantly larger than in the control ($p < 0.001$), suggesting that the e-mail was effective at increasing TSP participation. In addition, participation is approximately 0.36 percentage points higher (a 14.1 percent increase) in the low-rate groups than in the baseline treatment group ($p < 0.001$), consistent with the hypothesis that emphasizing a low contribution rate increases extensive margin participation. Participation in the mid-rate groups (2.70 percent) is slightly higher than in the baseline group (a 4.5 percent increase, $p = 0.092$).

[5] The baseline message included in these e-mails was created based on the results of a prior field experiment involving this population, conducted in May of 2015. See SBST (2015) and Benartzi et al. (2017) for details.

[6] Service branch is the only covariate we observe by experimental group.

[7] The participation rate in the control group was higher than we expected, and exceeded the monthly sign-up rate during May 2015, the one other month for which we observe new TSP enrollments. One explanation is that individuals may be particularly likely to revisit their savings decisions at the beginning of the year, when the experiment took place. Another possible explanation is that individuals may have shared the e-mails with one another (inducing individuals in the control group), which would have depressed the observed differences between treatment groups.

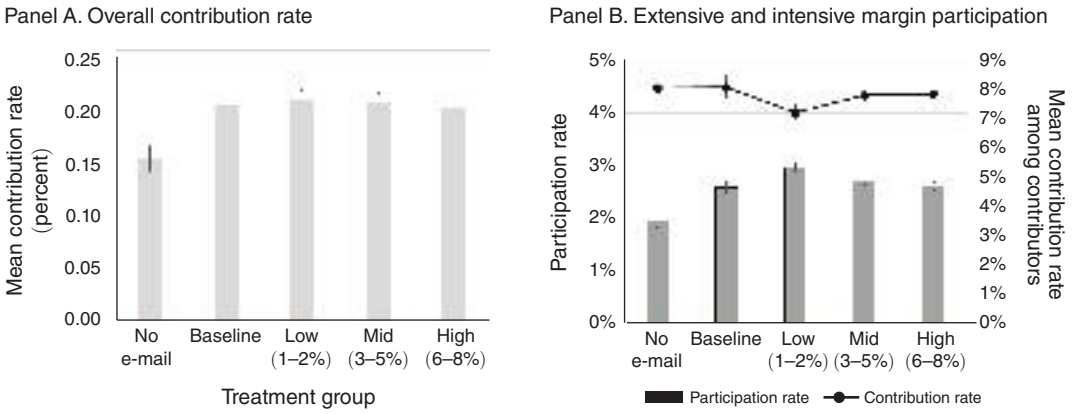


FIGURE 2. PARTICIPATION AND CONTRIBUTION RATE BY TREATMENT GROUP

Participation in the high-rate groups (2.62 percent) is similar to the baseline treatment group, and the difference is not statistically significant.

Turning to the intensive margin, the mean contribution rate is similar among TSP participants in the control group (8.07 percent) and participants in the baseline treatment e-mail (8.09 percent). However, it appears that the mean contribution rate among participants in the low-rate groups (7.22 percent) is less than in the baseline treatment group ($p < 0.001$). Mean contribution rates among participants are higher in the mid-rate groups (7.82 percent), and not statistically different from the baseline treatment group ($p = 0.250$). Interestingly, mean contribution rates among participants in the high-rate groups (7.85 percent) are similar to those in the mid-rate groups. Note that the intensive margin effects we observe may be driven by the emphasized contribution rate (i) affecting the contribution decisions of participating servicemembers, or (ii) inducing servicemembers to participate whose contribution rates are on average lower than the servicemembers who participate under the other treatments. Our data do not allow us to distinguish between these two mechanisms without additional assumptions.[8]

[8] In unreported results, we bound the intensive margin effect along the lines proposed by Lee (2009). The results of that analysis do not permit us to reject the hypothesis that the entire observed intensive margin effect is driven by changes in the composition of participating servicemembers.

IV. Discussion

Prior research suggests that nudging individuals toward high contribution rates can raise the amount that retirement plan participants choose to save. We find no independent support for that theory here—our intensive margin results could be driven by changes in the composition of plan participants rather than by changes in how much participants choose to save—but neither do our results contradict it. However, our results do suggest that the contribution rate emphasized in messages to potential plan participants affects retirement savings on a different margin: whether individuals choose to participate in the plan in the first place. In particular, we find that nudging individuals toward low contribution rates induces higher extensive margin participation in the retirement savings plan, relative to nudging individuals toward higher contribution rates, or toward no rate at all.

Our results, coupled with the prior literature, therefore suggest that planners seeking to increase savings are faced with a trade-off: nudging individuals toward a high contribution rate may induce participating individuals to save more than they would if nudged toward a low savings rate, but at the same time, such nudges may be less effective at inducing nonparticipating individuals to start participating. Determining the best contribution rate to emphasize in communications like the one we study thus depends on the goals of the planner. If the benefits from saving (at the individual level) are concave, a low contribution

rate nudge may be best. In contrast, if the individual benefits to saving are (at least locally) convex, the better policy might be to nudge toward relatively high contribution rates. If the planner cares about total saving only, the two policies may be equivalent.

Several considerations are important to keep in mind when interpreting our results. First, many of the servicemembers in the sample population had received at least one similar message in the recent past (sent approximately nine months prior), so the servicemembers we study were, by construction, selected based on being resistant to messages like our treatment. Second, we lack data on the fraction of servicemembers who opened the e-mail to view the message. As a result, our results reflect an intent-to-treat. Conditioning on the people who actually viewed the messages may yield larger differences between treatment groups. Third, we lack data on TSP sign-up apart from the one-month snapshot provided by DFAS. We expect that most of the servicemembers who were induced to enroll because of the e-mail did so within one month of receipt, but it is possible that there were some longer-term differences between treatments as well. Finally, we lack data on other methods by which servicemembers may save, such as flows into and out of individual retirement accounts. Consequently, we cannot rule out the possibility that servicemembers offset the new contributions resulting from the e-mail with a change in the amount they were saving through other methods. However, research in a different context suggests that behavior like this is more common in response to policies that provide monetary savings incentives than to interventions that change savings behavior through nudges (Chetty et al. 2014).

Finally, our results contribute to several strands of the recent behavioral economics literature. First, we add to the literature showing that small interventions can affect retirement savings behavior. In prior work, Choi et al. (2012) and Goda, Manchester, and Sojourner (2014) study field experiments in which employers sent messages encouraging employees who were participating in a retirement savings plan to increase the amount they were contributing. Our results show that interventions of the type they study may affect the extensive as well as the intensive margins of retirement savings participation in important ways.

Second, we contribute to a growing literature in psychology showing that goals or targets can be demotivating when they are perceived as unattainable (Locke and Latham 2002). A similar dynamic may operate in the context of default effects. For example, Haggag and Paci (2014) show that larger default taxicab tip amounts increase the fraction of riders choosing to leave no tip at all. In our context, emphasizing a particular contribution rate may motivate individuals to choose to save at that rate, but if the rate appears out of reach, it may lose its motivational force. Our results do not speak to the question of whether setting a very high rate (above what most people contribute) would reduce participation relative to a message that emphasizes no rate—the highest rate we consider is about equal to the average of the population. And at those rates, we see a similar participation rate as when no rate is emphasized. But our results are consistent with a model in which attainable goals may have an extra punch for those who would be turned off by even moderate contribution rate reference points. Servicemembers pessimistic about their ability to save may have been motivated to participate when provided with a seemingly attainable goal (1 or 2 percent), but may have been unaffected by seemingly out-of-reach targets when the emphasized rate was higher.

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