



## Analysis Plan

Project Name: Increasing New TSP Enrollment among USPS Employees

Project Code: 1724

Date Finalized: May 15, 2018

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### Outcome variables to be analyzed:

- Enrollment in TSP – This is a binary outcome variable {0,1}.
- TSP contribution percentage – This is a continuous variable within the interval [0,1].

### Indices:

If TSP contributions come in as dollar amounts, we will divide that dollar amount by the amount by the employee's total salary amount.

### Statistical models:

This experimental design is set up as a stepped wedge design and will be analyzed as one. Participants in the experimental pool are all USPS employees who eligible but not enrolled in TSP. They are randomly assigned to participate in Wave 1 or Wave 2 of the experiment. Complete random assignment occurred; no blocking.

Wave 1 participants received letters first. Wave 2 participants received letters 2.5 weeks later. Participants were randomly assigned to group 1 or group 2 without any blocking.

For our primary analysis, we will use an overall main model to estimate the ATE.

### Main Model

$$Y_{\{k,j\}} = \beta_0 + \beta_1 Z_{\{k,j\}} + T_j + \epsilon$$

Where T is a time fixed effect for day of the experiment, j is the day of the experiment, and k corresponds to individual in the experiment. Our coefficient of interest is  $\beta_1$ .

We also have models for immediate and lagged effects. For immediate effects, we compare Wave 1 individuals with Wave 2 individuals during the 1<sup>st</sup> week in which Wave 1 individuals receive letters but Wave 2 individuals do not.

For lagged effects, we compare Wave 1 individuals with Wave 2 individuals during the 2<sup>nd</sup> week in which Wave 1 individuals receive letters but Wave 2 individuals do no.

Secondary Model – Immediate or lagged effects, using different time intervals under which the outcomes are recorded.

$$Y_j = \beta_0 + \beta_1 Z_j + \epsilon$$

We will estimate effects with both outcomes using both models. We will use a Holm-Bonferroni correction to adjust for multiple comparisons.

**Transformations:**

See “Indices” section: If TSP contributions come in as dollar amounts, we will divide that dollar amount by the amount by the employee’s total salary amount.

**Follow-up analyses:**

Yes, there will be subgroup analyses on immediate and lagged effects, as specified in the model section.

**Inference criteria:**

- HC2 standard errors
- p-values < 0.05 as cut off criteria for significance
- We can verify our results with randomization inference, but our sample is ~86,000 and we expect the CLT to apply.

**Data exclusion:**

- We will use all of our data in the analysis.
- TSP enrollment has a binary outcome variable and we expect no outliers.
- TSP contributions is a continuous variable. Since there is a cap to USPS matching the TSP contribution (when it is 5% of salary) we do not expect many contributions of over 5% and expect most of the contributions to be within 0% to 5%.

**Treatment of missing data:**

- For TSP enrollment, if the outcome variable is NA, we will assume that it is 0 for a more conservative estimate.
- For TSP contributions, if the outcome variable is NA, we will assume that it is 0 for a more conservative estimate.

**Limitations:**

We are unable to identify any effects of the experiment longer than 2.5 weeks or so, because Wave 2 enters the treatment condition shortly after Wave 1. We had planned for more time in between, but that did not occur.

We are also may or may not be able to obtain data from a year ago, over the same timespan. If we have access to this data, we could look for more lagged effects that are longer than 2.5 weeks.