Analysis Plan

Project Name: Improving Employment Services for UI Claimants in Oregon

Project Code: 1705

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This document serves as a basis for distinguishing between planned (confirmatory) analysis and any unplanned (exploratory) analysis that might be conducted on project data. This is crucial to ensuring that results of statistical tests will be properly interpreted and reported. In order that the Analysis Plan fulfill this purpose, it is essential that it be finalized and date-stamped before we begin looking at the data — ideally, before we take possession of the data. Once this plan is finalized, a date is entered above, and the document is posted publicly on our team website.

Data and Data Structure

This section describes variables that will be analyzed, as well as changes that will be made to the raw data with respect to data structure and variables.

Outcome Variables to Be Analyzed:
Quarterly wages in Q1 2018

Transformations of Variables:
Employment will be equal to unity if the customer has positive wages (>$0) in the quarter and zero if there are zero wages or missing wages. We also will use the log of wages as a robustness check for the analysis.

Imported Variables:
Local labor market conditions possibly including: local area unemployment rate and local job growth. These will be measured both at baseline and at endline.

OES is deferring to Oregon (OR) economists for the best measures of local labor market conditions and the appropriate time frame for measurement. For example, we may use a quarterly average or a single month snapshot depending on the economists' advice.

Transformations of Data Structure:
Individual-level data will be aggregated to the field office using means.

Data Exclusion:
We will conduct analysis on baseline characteristics and endline wages to determine which observations could be overly influential. We will score observations with Cook's D. Observations

with a Cook's D greater than 4/n will be considered overly influential. We will run the analysis both with all observations as the primary test and also with influential observations excluded (if such points exist). We will run the models excluding influential observations using robust regression techniques, such as an MM-estimator.

Treatment of Missing Data:
The preliminary analysis conducted in spring 2017 revealed no significant missing data (as we only use baseline fields required for filing a claim). We will be using the same files, so there should not be missing data.

One monthly cohort of job seekers from December 2016 appears to be missing completely from the data. This is discussed in more detail under the Study Limitations.

Statistical Models & Hypothesis Tests

This section describes the statistical models and hypothesis tests that will make up the analysis — including any follow-ups on effects in the main statistical model and any exploratory analyses that can be anticipated prior to analysis.

Statistical Models:
Primary outcome: employment (wages>$0)
Secondary (exploratory) outcome: wages

Weighting: We will create weights for the size of each office pair by taking the mean number of job seekers in the pair over the field period. These will be applied as sample weights.

Primary model specification:

$$y_i = b_0 + b_1 T_i + ZX + e_i$$

This represents an OLS regression of the outcome of interest (an office-level mean aggregated from individual-level data) on a dummy for treatment (*T*) and a set of office-pair indicator variables. The regression will include weights for the mean office pair size as measured by the number of job seekers.

Covariate adjustment:

(1) $y_{ij} = BX_{ij} + \delta Z_j + v_{ij}$

(2) $\hat{\bar{v}}_j = b_0 + b_1 T_j + e_j$

To adjust for covariates, we will follow Rosenbaum's (2002) model specification and incorporate a two-stage model. We can do this because we assume the only stochastic process in the model is the assignment to treatment, with individual characteristics and local labor market conditions taken as fixed. Including covariates should improve the precision of our estimates by removing

covariate related variance from the outcome, and using this method will preserve our limited degrees of freedom.

The first stage model calculates residuals by regressing the outcome of interest on the covariates of interest, including both individual-level covariates (indexed by *i*) and office-level labor market covariates (indexed by *j*) with office-level random intercepts and slopes. We will use the individual level data for this model. The residuals from the first stage model will be saved and aggregated to office-level means. A second stage model will regress office mean residuals on a treatment indicator to estimate a treatment effect.

Given our small sample size (as counted by the number of offices), we could be concerned that observed correlations between our treatment assignment and the covariates could mask real treatment effects if we estimate the first stage regression jointly for all individuals. To guard against this possibility we will run two separate first stage regressions, one for the individuals in control offices and one for individuals in treatment offices.

Follow-Up Analyses:
There are no planned follow-up analyses.

Inference Criteria, Including Any Adjustments for Multiple Comparisons:
Inference criteria: We will compare our results to an exact null distribution created with randomization inference. Given the randomization procedure of randomizing within each of 7 matched pairs, there are 128 possible assignment combinations. We will perform the analysis for each of the combinations to create a null distribution and compare the observed results against the null distribution using a two-sided test. The p-value will be the percent of observed instances in the null distribution as or more extreme than the observed value (i.e., a two-tailed test).

Multiple comparisons: Because a similar (correlated) preliminary analysis was run on the same population, we will correct for multiple comparisons. We declared employment as the primary outcome in the preliminary and the final analysis. Therefore, we will adjust for two comparisons. The test on wages will be considered exploratory and will not have a correction for multiple comparisons. Secondary model specifications are considered as robustness checks to the primary model specification. We will use the Holm correction to p-values determined via randomization inference.

Limitations:
Changes from the preliminary analysis plan:

The original analysis plan specified several additional outcome variables, including implementation metrics such as the number of PEP plans completed and the number of emails sent, as well as unemployment related outcomes, such as whether or not the customer exhausted his or her claim, and the time between filing a claim and finding employment. None of these outcomes will be used for this analysis. Many of the implementation questions (e.g., number of PEP

plans completed and the number of emails sent) were answered in the preliminary analysis – it appears the PEP pilot was implemented with fidelity for the most part in treatment offices and was not offered in control offices – making those outcomes of limited value. The unemployment-related outcomes will not be used because of data availability. The unemployment record keeping system updates and overwrites certain fields over time. Given the preliminary results showing a null effect of the pilot on unemployment outcomes, the study team decided the level of effort required to recreate point in time records outweighed the potential benefits of including them in the final analysis.

Missing monthly cohort:
One of the main data issues was identifying the correct job seekers in the data warehouse. OR created unique identifiers for the participants which were not stored in the warehouse. OR transferred files on a regular (mostly monthly) schedule while the pilot was in the field, with a table for each monthly cohort of job seekers (people who initiated a claim in a given month).

These monthly cohort files contain all job seekers who initiated a claim in one of the study field offices during the pilot period. They also contain baseline characteristics taken from the fields on the claim application.

Because the field office location is one piece of data that is overwritten in the data warehouse, OR had to re-identify the list of study participants by trying to look through historic data values for the initial claim date and the office location at the point in time the claim was filed. OR then reapplied its pseudo-identification procedure and sent us a file (referred to as the new file) with a list of participants it believed matched the list of claimants we had from the original monthly files, and included the Q1 2018 wages for each job seeker.

When matching the new file to the monthly files, the match rates for most months was very high with only a handful of unmatched participants. The exception was for the month of December 2016, in which the new file matched almost none of the claimants found in the monthly files. This analysis will exclude the December. This could limit the generalizability of the findings, as job seekers who file a claim in December likely could be different than job seekers who file claims at other points in the year, especially due to seasonal labor market trends. Excluding the December cohort will not seriously affect the precision of the estimates because the field office is the primary unit of analysis.

Exploratory Analysis:
The effects on wages will be considered exploratory and, therefore, will not be counted as a test in the multiple comparisons correction.

Link to an Analysis Code/Script:
This analysis will use this code, written for an analysis of preliminary data, as a starting point:
https://github.com/gsa-oes/1705-Oregon-UI/blob/master/Analysis/analysis_03232017.Rmd