Pre-Analysis Plan: Does Survey Section Placement Change the Measurement of Welfare Proxies?

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We will randomly assign survey respondents to two groups. Half of our survey respondents will be assigned to the treatment group (T), for whom the survey section collecting information on household assets will figure early in the survey questionnaire. The other half of our survey respondents will be assigned to the control group (C), for whom the survey section collecting information on household assets will figure late in the survey questionnaire. We will split our respondents evenly between treatment and control groups to maximize statistical power.

First Step: Simple Statistical Tests

The first step in our statistical analysis will be to compare the mean of Y (i.e., mean value of assets) between treatment and control groups, viz. test the null hypothesis that $H_0\colon \bar{Y}_T = \bar{Y}_C$ versus the alternative hypothesis that $H_A\colon \bar{Y}_T \neq \bar{Y}_C$. We will do so for each asset category j as well as for total assets.

The second step in our analysis will be to compare the mean of σ (i.e., the standard deviation of the value of assets) between treatment and control groups, viz. test the null hypothesis that $H_0\colon \sigma_T = \sigma_C$ versus the null hypothesis that $H_A\colon \sigma_T \neq \sigma_C$. We will do so again for each asset category j as well as for total assets.

A third step will be to run a Kolmogorov-Smirnov test of equality of distributions for Y and whose null hypothesis will be such that $H_0\colon F(Y_T) = F(Y_C)$ versus the null hypothesis that $H_A\colon F(Y_T) \neq F(Y_C)$. We will do so again for each asset category j as well as for total assets. We will also examine the number of assets reported, out of our list of 40 asset categories included on our survey.

Second Step: Regression Analysis

Specifically, we will estimate the following specification, which is such that

$$Y_{ij} = \alpha_{1j} + \beta_{1j} T_i + \epsilon_{1ij}, \tag{1}$$

where Y denotes the inverse hyperbolic sine of the value of household i's assets of category j,[1] or the number of assets reported, T is a dummy variable equal to one if household i is in the treatment group and equal to zero otherwise, and ϵ is an error term with mean zero. As this experiment piggybacks by using baseline data from a "primary" randomized controlled trial (RCT), we also control for stratum fixed

[1] We take the inverse hyperbolic sine of the value of assets in each category because we expect several households to report the value of their assets to be zero in certain categories, and the inverse hyperbolic sine transformation is a log-like transformation that allows retaining zero-valued observations (Bellemare and Wichman 2020).

effects pertaining to the "primary" RCT's treatment status which is assigned at the Shakti Foundation center level.[2]

Using the results from Equation (1), we will run the following tests:

1. A test of the null hypothesis $H_0: \beta = 0$ versus the alternative hypothesis $H_A: \beta \neq 0$,
2. A Breusch-Pagan test of different group-wise heteroskedasticity across treatment and control groups. Specifically, for Equation (1), this will require getting the residuals (i.e., $\hat{\epsilon}$), squaring them (i.e., $\hat{\epsilon}^2$), and regressing the squared residuals from Equations (1) on those equations' respective right-hand side variables to finally test the null hypothesis $H_0: \beta = 0$ versus the alternative hypothesis $H_A: \beta \neq 0$. Again, β denotes to the coefficient on the treatment variable, and
3. A Kolmogorov-Smirnov test of equality of distributions for $\hat{\epsilon}^2$ and whose null hypothesis will be such that $H_0: F(\hat{\epsilon}_T^2) = F(\hat{\epsilon}_C^2)$ versus the null hypothesis that $H_A: F(\hat{\epsilon}_T^2) \neq F(\hat{\epsilon}_C^2)$.

Clustering here is both a sampling and design issue (Abadie et al., 2022), and so we will cluster standard errors at the group (i.e., treatment or control) and community levels using two-way clustering. To adjust for multiple hypothesis testing, we will use the Benjamini, Krieger, and Yekutieli (2006) method to compute sharpened q-values that control the false discovery rate (FDR). We will use the Anderson (2008) implementation of their approach, which computes the lowest value of the sharpened q-value for which we can reject the null, so that our q-values can be interpreted in the same way that conventional p-values are. We will also explore treatment heterogeneity, i.e., how the effect of being assigned to the treatment group varies by a subset of variables in X.

References

Abadie, Alberto, Susan Athey, Guido W. Imbens, and Jeffrey Wooldridge. When should you adjust standard errors for clustering? *Quarterly Journal of Economics,* forthcoming (2022).

Anderson, Michael L. "Multiple inference and gender differences in the effects of early intervention: A reevaluation of the Abecedarian, Perry Preschool, and Early Training Projects." *Journal of the American Statistical Association* 103, no. 484 (2008): 1481-1495.

Bellemare, Marc F., and Casey J. Wichman. "Elasticities and the inverse hyperbolic sine transformation." *Oxford Bulletin of Economics and Statistics 82*, no. 1 (2020): 50-61.

Benjamini, Yoav, Abba M. Krieger, and Daniel Yekutieli. "Adaptive linear step-up procedures that control the false discovery rate." *Biometrika* 93, no. 3 (2006): 491-507.

[2] The Shakti Foundation is a non-governmental organization that aims to provide financial services to disadvantaged households in Bangladesh.