# ECON 626: Empirical Microeconomics

## Implementing Manski and Lee Bounds

Department of Economics
University of Maryland
Fall 2019

The data set file `ECON626L10A1data.dta` contains one round of follow-up data from a randomized evaluation of an active labor market program that provided aspiring entrepreneurs in Nairobi with cash grants (described in Brudevold-Newman, Honorati, Jakiela, and Ozier 2017). Five years after the intervention, young women in the treatment and control groups were surveyed three times over the course of one year; in each of these three survey rounds, we observe some attrition.

1. How much attrition is observed overall? Is it correlated with treatment? In what sense? What is the observed level of differential attrition.

2. If you ignore attrition, what is the estimated impact of treatment on income five years after the intervention? What is the estimated impact of treatment on the probability of self-employment?

3. Characterize the Manski bounds on the the impact of treatment on income.

4. Compute the upper and lower Manski bounds on the impact of treatment on self-employment:

   (a) Impute the lower bound by generating a variable equal to 0 for everyone in treatment group who was not surveyed at endline, and equal to 1 for everyone in the control group who was not surveyed at endline (and equal to the observed value of `selfemp` for everyone surveyed at endline). Regress this variable on `treatment` to calculate the Manski lower bound.

   (b) Impute the upper bound by generating a variable equal to 1 for everyone in treatment group who was not surveyed at endline, and equal to 0 for everyone in the control group who was not surveyed at endline (and equal to the observed value of `selfemp` for everyone surveyed at endline). Regress this variable on `treatment` to calculate the Manski upper bound.

5. Compute the upper and lower Lee bounds for the impact of treatment on income. (Hint: use the `xtile` command to identify observations above the $94^{\text{th}}$ or $95^{\text{th}}$ percentile in terms of income within the treatment group.)

6. Compute the upper and lower Lee bounds for the impact of treatment on self-employment.

7. Confirm your answers (up to rounding error) for (4) and (5) using the `leebounds` command.

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## Treatment Effects on Never-Attritors

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1. Generate a data set with 10,000 observations, half of which are treated. Generate an outcome `ystar` that is equal to 0 for half the treatment and half the control observations. For the other half of the observations, set `ystar` equal to $rnormal(1,1) + \texttt{treatment} * 2$. Generate $y =$ `ystar` for non-missing observations. Let half of the 0 observations in the control group be missing, while only one observation is missing from each of the other three groups (treated zero and non-zero observations and untreated non-zero observations).

2. Regress `ystar` on `treatment`. This is the true effect. What is it, and why?

3. What coefficient do you expect when you regress `y` on `treatment`?

4. Use the Lee Bounds command. How wide is the confidence interval?

5. Tighten the Lee bounds using the `nonzero` variable. The result should have a very narrow confidence interval — why? Why is the point estimate what it is, in relation to the parameters above?