Short Practice 3

European Field Experiments Summer School 2018

Question 1

Gerber and Green, Chapter 9, question 6:

Rind and Bordia studied the tipping behavior of lunchtime patrons of an "upscale Philadelphia restaurant" who were randomly assigned to four experimental groups. One factor was server sex (male or female), and a second factor was whether the server draws a "happy face" on the back of the bill presented to customers.[1] Download the data located at https://isps.yale.edu/FEDAI.

1. Suppose you ignored the sex of the server and simply analyzed whether the happy face treatment has heterogeneous effects. Use randomization inference to test whether $Var(\tau_i) = 0$ by testing whether $Var(Y_i(1)) = Var(Y_i(0))$. Construct the full schedule of potential outcomes by assuming that the treatment effect is equal to the observed difference-in-means between $Y_i(1)$ and $Y_i(0)$. Interpret your results.
2. Write down a regression model that depicts the effect of the sex of the waitstaff, whether they write a happy face on the bill, and the interaction of these factors.
3. Estimate the regression model in (b) and test the interaction between waitstaff sex and the happy face treatment. Is the interaction significant?

Bonus: Plot the experimental data in the way that most appeals to you. Good plots display both the raw data and the model at the same time. Make good use of colors or facets. The whole story of the experiment should be clear from the plot.

[1] The authors took steps to ensure the blindness of the servers to the happy face condition, which was determined only moments before the bill was delivered. The authors also instructed waitstaff to deliver bills and walk away, so that there would be no additional interaction with customers. It is not clear whether the sex of the server was randomly assigned.