Name: Student ID:

Case Study: Minimum Wage and the NJ/PA fast food industry

In 1992, New Jersey raised its minimum wage to $5.05 per hour, giving it the highest minimum wage in the country. To study the impact of the new policy on employment levels, economists David Card and Alan Krueger surveyed 410 fast-food restaurants in New Jersey and in the neighboring state of Pennsylvania (which did not change its minimum wage law)[1]. They collected a variety of covariates prior to the institution of the law, and then called back afterwards and collected information about the number of full-time workers employed.

A version of their data is available in the dataframe `fastfood1` in the `stat20data` package[2]. Note that columns labeled with a `_2` suffix are those collected as part of the second callback (after the law went into effect).

1. What is the causal question this study seeks to answer? Identify the treatment and control conditions.

2. Do you think this study is best considered a randomized experiment, a natural experiment, or an observational study requiring matching? Explain your reasoning.

3. Load the `fastfood1` dataframe in R. Write code to create a new column giving effective full-time employment by adding the number of full time employees at each restaurant to half the number of part-time employees at each restaurant.

[1] Card, D., & Krueger, A. B. (1994). Minimum Wages and Employment: A Case Study of the Fast-Food Industry in New Jersey and Pennsylvania. *The American Economic Review*, 84(4), 772-793.

[2] 11 stores that were either permanently closed by the time of Card & Krueger's second callback or refused to participate in the second callback have been removed from the data. Missing values have also been filled in with synthetic values for the purposes of this assignment.

4. Examine the covariate names in the `fastfood1` dataframe and the first few values of each. *Without looking more deeply at the data*, sketch a Love plot with a few covariates you believe are potentially important showing the level of balance across treatment groups you expect to be present. Remember to label your axes.

5. Create a Love plot in R and sketch its actual appearance below (you do not need to copy the code down here). Compare it to your answer from the previous question and discuss any differences.

6. Write code to conduct optimal matching and create a new version of the Love plot showing both pre-match and post-match balance. Copy your code below.

7. Compute the average treatment effect for effective full time employment and copy the code you used here. Make a causal claim with this estimate in one sentence.

8. Imagine that you had the data on the fast-food restaurants in New Jersey in the time period surrounding the minimum wage increase, but *no data for the ones in Pennsylvania*. How might you measure the effect of the minimum wage increase on effective full time employment? Answer in one to two sentences.