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 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.

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[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 for a few potentially important covariates 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. Compare it to your answer from the previous question and discuss any differences.

6. Pick the variable with the largest absolute standardized mean difference and write code to conduct a hypothesis test to see if its imbalance differs significantly from zero.

7. Do the answers to questions 5 and 6 support your answer to question 2, or do they suggest you should revise your answer? Explain.

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

9. Based on your answer to question 2 (and any revisions to that answer in question 7), compute and report the associated effect estimate for effective full time employment. Write a sentence summarizing the associated causal claim.

10. For one of the study types that you did NOT select in question 2 or question 7, describe how a hypothetical study of minimum wage and fast food employment could be conducted using this strategy instead (expensive/impractical hypothetical approaches are acceptable for this question).