UNIVERSITY OF Bayreuth

Causal Inference - Spring 22

Assignment 1

Due at Noon of Friday of Week 5

WORD LIMIT: 4,000 WORDS, EXCLUDING CODE

Note: This is a hard limit, not a benchmark.

Exercise 1

Imagine the following setup. You have causal a question, i.e. you want to see what is the effect of a variable X on a variable Y. You want to estimate this effect using a linear regression predicting Y from X. Provide a list of reasons for which you might consider including other independent variables in your analysis. Does it matter if you have experimental or observational data? What characteristics do these variables need to have? Provide an example either from one of your seminar papers or from other readings.

Exercise 2

The Syrian civil war that began March 2011 has led to one of the largest refugee and displacement crisis of our time, affecting millions of people and spilling into surrounding countries. Since 2011, Sweden welcomed around 150,000 Syrian refugees and randomly allocated them across a share of their local councils. Researchers would like to evaluate whether this random influx of refugees has led to voting for extreme right candidates in recent local elections. Evaluate the SUTVA in this context.

Exercise 3

Past research suggests that ballot secrecy influences turnout. This is an extra concern for habitual nonvoters who are less likely to turn out if they think that their vote is not secret. A recent field

Table 1: Variable Description

vote2014 (Outcome)	Did the respondent vote in 2014 (1, yes/0, no)
mail (Treatment)	1 received mail, 0 did not receive mail
vote_year	voting in the relevant year
d_age	respondent's age
d_gen_female	R's gender (1, female/0, male)
d_race_blk	R's race, Black
d_race_hsp	R's race, Hispanic
d_race_other	R's race, Other
never_voted	R has never voted

experiment sent mails to a random group of nonvoters around the 2014 election in Mississippi reminding them that their vote is secret (the data set - ballot.csv - is available on the course webpage).[1] A sample of the treatment mail can be found in Figure 1 at the end of this document. In this exercise you are asked to vet the experiment. Although the variable names are self-explanatory, Table 1 can be helpful.

1. First, confirm that the randomization process was successful by making sure that individuals in treatment and control groups are similar in all relevant aspects. (either prepare a table or a figure)

2. Report the *Average Treatment Effect* and make sure that the effects you calculated are robust to the inclusion of covariates (report the regression models in a single table).

3. Now imagine the researchers had sent the information digitally and, thus, were able to observe who actually opened and read the letter. The variable *Open* indicates whether a respondent opened the digital file or not (*0 = didn't open; 1 = opened*). Calculate the *Intent-to-Treat Effect* and *Complier Average Causal Effect (CACE)*. How does the CACE compare to the *Average Treatment Effect*?
   Hint: How does OPEN *causally relate to* MAIL*?*

Exercise 4

In this exercise you will design your own experiment. You may suggest any kind of experiment you want (lab experiment, field experiment, survey experiment).

Your proposal should be in the form of a research proposal or *pre-analysis plan* that sets out in detail how the experiment will be run. Registering a pre-analysis plan helps convince your readers that

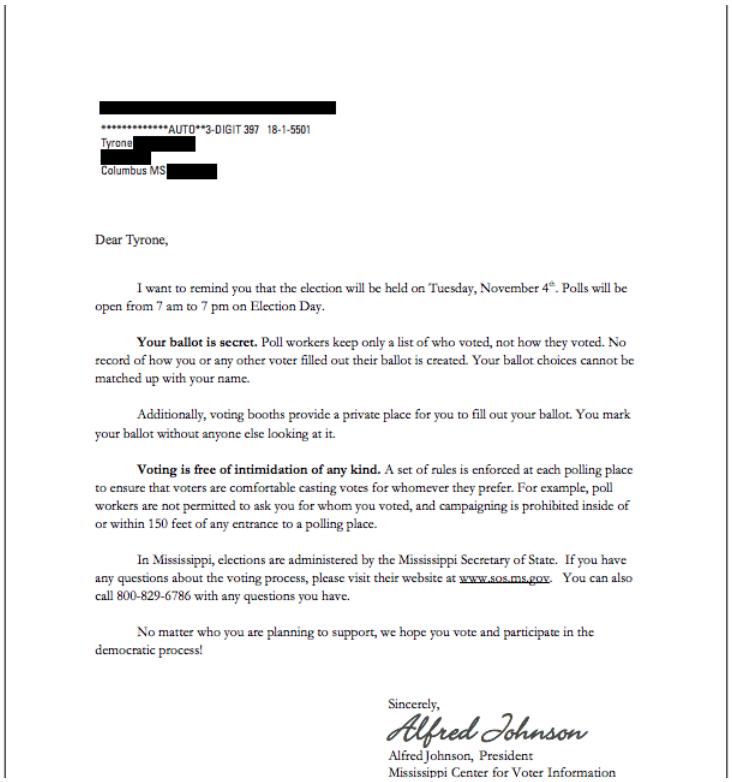
[1] Gerber, A. S., Huber, G. A., Fang, A. H., & Reardon, C. E. (2017). The effect on turnout of campaign mobilization messages addressing ballot secrecy concerns: A replication experiment. PloS one, 12(8), e0182199.

you have not engaged in "p-hacking", i.e. searching for specifications, subgroups, and measurement strategies that yield the results you want. Chapter 13 (Section 13.1) of Gerber and Green *Field Experiments* is a good guide to writing a research proposal. The EGAP website also has many actual examples of registered pre-analysis plans (https://egap.org/registry/).

Your writeup should address the following points:

1. Introduce your topic and explain why it is important.
2. Spell out the research hypothesis: what question does the experiment address? What is the estimand of interest? (Explain using potential outcomes notation.) What effect(s) do you expect?
3. Describe the treatment in detail.
4. Describe the ideal sampling strategy for including subjects in the experiment.
5. Describe exactly what pre-treatment data will be collected, if any.
6. Will your design include a manipulation check? If so, describe it.
7. Describe in detail the outcome measure(s).
8. Describe how you plan to analyze the data.
9. Do you expect the treatment effect to differ across subgroups? Which subgroups? Why and How?

Figure 1: Sample of a mail sent to Mississippi registered non-voters



[redacted]
**********AUTO**3-DIGIT 397 18-1-5501
Tyrone [redacted]
[redacted]
Columbus MS [redacted]

Dear Tyrone,

I want to remind you that the election will be held on Tuesday, November 4th. Polls will be open from 7 am to 7 pm on Election Day.

Your ballot is secret. Poll workers keep only a list of who voted, not how they voted. No record of how you or any other voter filled out their ballot is created. Your ballot choices cannot be matched up with your name.

Additionally, voting booths provide a private place for you to fill out your ballot. You mark your ballot without anyone else looking at it.

Voting is free of intimidation of any kind. A set of rules is enforced at each polling place to ensure that voters are comfortable casting votes for whomever they prefer. For example, poll workers are not permitted to ask you for whom you voted, and campaigning is prohibited inside of or within 150 feet of any entrance to a polling place.

In Mississippi, elections are administered by the Mississippi Secretary of State. If you have any questions about the voting process, please visit their website at www.sos.ms.gov. You can also call 800-829-6786 with any questions you have.

No matter who you are planning to support, we hope you vote and participate in the democratic process!

Sincerely,
Alfred Johnson
Alfred Johnson, President
Mississippi Center for Voter Information