Finger Exercises due Sep 18, 2024 07:30 CST Completed

8.1

2/2 points (graded)

Fill in the blanks. $T^{\dagger} = E[Y_1 - Y_0]$ is ATE ✔ Answer: ATE while $T^{*} = E[Y_1 - Y_0|X = 1]$ is ATT ✔ Answer: ATT .

Explanation

$T^{\dagger} = E[Y_1 - Y_0]$ is the Average Treatment Effect (ATE) while $T* = E[Y_1 - Y_0|X = 1]$ is the Average Treatment Effect for the Treated (ATT). ATE is the causal effect of the treatment on the whole population if everyone were treated. ATT is the causal effect of the treatment on the people who received the treatment.

Submit You have used 1 of 2 attempts

Answers are displayed within the problem

$$E[Y_1 \mid X = 1] - E[Y_0 \mid X = 0] = \underbrace{E[Y_1 \mid X = 1] - E[Y_0 \mid X = 1]}$$
$$+ \underbrace{\{E[Y_0 \mid X = 1] - E[Y_0 \mid X = 0]\}}$$

8.2

3/3 points (graded)

Fill in the blanks. On the right of the above equation, the first part is the ATT ✔ Answer: ATT and the second part is the bias ✔ Answer: bias . Randomization is one of the methods to ensure treatment-control balance which is represented by bias ✔ Answer: bias = 0.

Explanation
The first part is ATT: $T^* = E[Y1-Y0|X = 1] = E[Y1|X = 1] - E[Y0|X = 1]$. The second part is the bias: the difference in expected potential outcomes if not treated between those who are treated and those who are not treated. You can see that this term is zero when the condition of treatment-control balance holds because balance implies that $E[Y0|X = 1] = E[Y0|X = 0]$. By randomized experiments or quasi-experiments, we can have the treatment-control balance and therefore solve the fundamental problem of causal inference.

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Answers are displayed within the problem

8.3

1/1 point (graded)
Why does the Vietnam Draft Lottery in 1972 allow us to learn about the effects of military service on subsequent civilian earnings?

- [ ] Because it created sequential dates of birth from January 1 to December 31 to determine the priority to be called up for military service.
- [x] Because it randomized the dates of birth throughout the year to determine the priority to be called up for military service.
- [ ] Because the Vietnam War happened to end before half of the dates of birth were called up for military service.
- [ ] Because half of the dates of birth were called up for Vietnam War and the other half were called up for Korean War.

✔

Explanation
The Vietnam Draft Lottery in 1972 gives us an example of a natural experiment. It randomized the dates of birth throughout the year to determine the priority to be called up for military service. Therefore, we can compare people with low draft lottery numbers (i.e., who were very likely to be called up) and people with high draft lottery numbers (i.e., who were not likely to be called up) to learn about the effects of military service on the assumption that people born on those dates were otherwise comparable.

Submit You have used 1 of 2 attempts

ℹ Answers are displayed within the problem

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