Development Data Boot Camp
Introduction and Preparation: Introduction to Randomized Controlled Trials

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Description about Randomized Control Trial

RCT Definition

An experiment which randomly assigns an intervention to a target population in an effort to circumvent any bias caused by unobserved characteristics

* it is seen as close to a scientific study as economists can get

JPAL - RCT quickly explained (video)

Examples from JPAL

Research question:

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Randomized Controlled Trails!

How an RCT is implemented?

1. define two groups: treatment and control **randomly**
2. observe outcomes of interest prior to intervention(observe at baseline)
3. apply an intervention (or policy) to the treatment group
4. observe outcomes after intervention (observe at endline)
5. estimate effects of the intervention on the treatment group

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Question:

During this process, how can we ensure that other factors that could influence the outcome have been controlled ?

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Question:

During this process, how can we ensure that other factors that could influence the outcome have been controlled ?

- Balance check

How to understand the RCT result?

The baseline observe for control group:

$$\mathbb{E}[Y|D=0, T=0]$$

The baseline observe for treatment group:

$$\mathbb{E}[Y|D=1, T=0]$$

The endline observe for control group:

$$\mathbb{E}[Y|D=0, T=1]$$

The endline observe for treatment group:

$$\mathbb{E}[Y|D=1, T=1]$$

How to understand the RCT result?

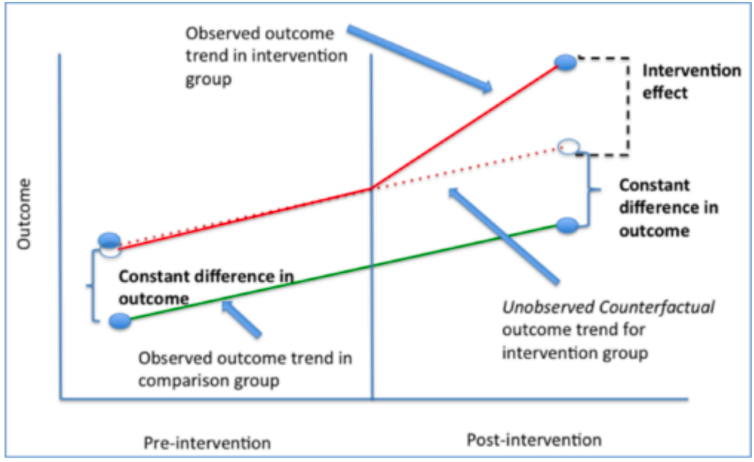

Figure 1: Counterfactual DID - visually

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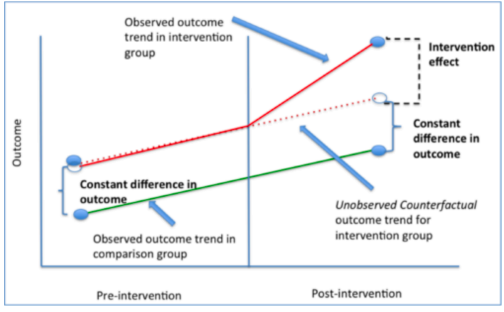

Average Treatment Effect:

$$ATT = (\mathbb{E}[Y|D = 1, T = 1] - \mathbb{E}[Y|D = 0, T = 1]) - (\mathbb{E}[Y|D = 1, T = 0] - \mathbb{E}[Y|D = 0, T = 0])$$

- RCT is the clear and clean way to get at causal inference

Main Points of RCT

- RCT is the clear and clean way to get at causal inference.
- Researchers are interested in the effect of causes, not causes of the effect
  - just want to know the effect of intervention, not understanding why this intervention has this effect
- The result is the **causal effect** of a policy intervention
  - outcomes of interests are measured to estimate the average treatment effect

Drawbacks of RCT

1. It could be very costly to implement!
2. External validity is limited
3. Ethical Dilemmas
    * researchers have historically used people they deemed more disposable to run experiments on

Conclusion

"While RCTs are extremely useful, they have a time and place. Before employing RCT, it is essential that researchers consider all the pros and cons to ensure the experiment isn't unethical or design in a way which provide bias or results which are too narrow".

— Jevay Grooms