

# Natural and Quasi-Experiments

Cyrus Mohammadian

University of California

*mohammadian@chapman.edu*

March 7, 2018

- 1 Housekeeping
- 2 Natural Experiments
- 3 Quasi-Experiments

- Homework 2 will be graded and returned on Monday
- Lit Reviews one week from today!

# Natural Experiments

- Random assignment happens as consequence of nature (accidental experimental variation)
- Subjects do not self-select into treatment and control groups -known as "as if randomization"
- Assignment to treatment and control groups is uncorrelated w/ alternative explanations
- Internal validity is greater in true experiments

## True Experiments

- 1 Treatment and control groups
- 2 Randomization
- 3 Control over treatment

## Natural Experiments

- 1 Treatment and control groups
- 2 "As-if" randomization
- 3 No control over treatment

# Oregon Medicaid expansion lottery 2008

- So what happens when a bunch of poor and previously uninsured people get health insurance?
- Budget surplus for Medicaid: had enough for 10k more individuals
- But 200,000 would be eligible by even slightly reducing eligibility requirements
- So state officials hold lottery registration: 75,000 apply
- 10,000 are chosen randomly

## Other Examples

- Does service in the military affect future lifetime earnings? Uses Vietnam draft as randomization instrument
- Does fasting during pregnancy affect fetus and child development? Uses fasting during Ramadan as randomization instrument
- Does air pollution affect fetal development? Used Beijing's air pollution clean up efforts before the 2008 Olympics as an instrument of randomization
- Does watching Fox News affect one's political voting behavior? Uses the ordinal rank of Fox News channel on various media markets as instrument of variation
- Does media propaganda affect political attitudes? Uses whether East Germans were geographically located in a spot where their TV sets received signal from West Germany as randomization instrument

# Quasi-Experiments

- Similar to natural experiments except no random assignment happens (causal inference is weaker internal validity takes a hit)
- Synthetic controls and matching



- Difference in difference
  - Compares the changes in outcome over time between treatment and comparison groups to estimate impact.
- Regression discontinuity design
  - Used when there's some kind of criterion that must be met before subjects can participate in the intervention being evaluated (known as a threshold)
  - Threshold is used to compare "like groups"
  - Those well below and above threshold are clearly very different but those hovering at the margins are likely very similar
  - RDD is based on comparison of the difference in average outcomes for the groups hovering at threshold (right above and right below).  
Example: Test Scores and Tutoring

- Propensity score matching
  - Matching refers to selection of control group cases based on specific criteria of similarity
  - PSM ensures that the average characteristics of the treatment and comparison groups are similar
- Nonequivalent group design
  - Involves pre-test / post-test design (pre-test becomes control)