6th class  Part I (all synchronous)  -1-  

Exam tomorrow!
1. Don’t be these are short-answer questions. Usually 1-2 sentences will do.

2. Questions are not an invitation to upload all of your knowledge onto the answer sheet.

   = Key is to use that knowledge to solve the problem. Excessive verbiage will count against you.

4. No trick questions. I want you to do well. I will be in a chat room for 1st 30 minutes to answer questions of clarification.

5. Questions? The exam will contain things we cover in class or in my asynchronous lectures.

6. Time for questions at the end of the class

7. Questions?
More into using regression for causal analysis, beginning with two techniques:

Regression discontinuity (this week) and fixed effects (differ vs. differ) next week.

Last week's asynchronous lecture set up some of the key ideas, especially for RD.

This week, we'll start with a general point: destruction that matters in all causal analyses.

- Intent to treat (ITT)
- Treatment on the TOT treated
  - aka. Local average treatment effect (LATE)
  - aka. Compliance average causal effect (CACE)
- Impact on the treated (TOT)

Impact of the effect of the program
- Even if it isn't universally taken up

Miraculously, under fairly general conditions TOT/LATE/etc. = ITT

2.6 people who take up
Today ITT estimates are straightforward and familiar.

\[ y = a + b_1T + b_2 \text{controls} \]

where \( T \) = offered vs treatment

(Our earlier example assumed 100 take-up)

If 100%, then \( ITT = TOT \text{ per} \)

\[ \text{everyone's treated} \]

\[ TOT = \frac{ITT}{1.0} = ITT \]

\text{ITT estimates are very useful for policy: I only control the offer and not take-up.}

\text{TOT estimates are obviously valuable -- what is the causal impact of participation in the program?}

\text{How to estimate TOT in light of selection bias?}

\[ \text{MAGIC!} \]
Suppose you offer a behavior or skill training program designed to reduce crime to (at random)

100 treatment group individuals
100 control group individuals

if untreated take up by Ts, then just ignore

\[ \text{Crime} = \alpha + \beta_1 T + \beta_2 \text{Controls} \]

\[-1 \text{ if } T\]
\[0 \text{ if } C \]

But now suppose only 50% take up (50 of 100 Ts)

ITT is still fair: \[ \text{Crime} = \alpha + \beta_1 T + \beta_2 \text{Controls} \]

But what about the effectiveness of the program for those who participated??

Key is the if 50% take up in the Ts, then 50% of Cs would have taken it up if they had had a chance.

Suppose total number of crimes by Cs is 200

Ts is 150

\[ ITT? = \alpha + \beta_1 T + \beta_2 \text{Controls} \]

\[-50 \text{ per 100 Ts offered}\]
6th class Part 4

600

300

200

100

C

T

Key is that given chance how many chimes T’s not taking up on progem omitted — say it is 125

We’re left with 50 fewer chimes for those who would have taken up the progem and they been offered it.

TOT - 50 per 50

or -100 per 100

TOT = \frac{11}{11}
New game
Two ways to estimate TOT

1. ITT/Completers

2. Regress $C = a + b \cdot \text{Take-up} + \epsilon$, others

How to get probability of take-up?

Regress with $take-up = c + d \cdot \text{another stuff}$

Look at Cates et al, eqns 1-3 on page 116