6th class Part I (all synchronous)

~~Stats~~ Exam tomorrow!

1. ~~Don't use the~~ 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 cover things we cover in class or in my asynchronous lectures.

6. Time for questions at the end of the class

7. Questions?

Move into using regression for causal analysis, beginning with two techniques.

Regression discontinuity (this week) and
Fixed effects / diffs in diffs) 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~~ distinction that matters in all causal analyses

Intent to treat (ITT) (causal impacts)	Treatment on the TOT treated aka. Local average treatment effect (LATE) aka Compliance average causal effect (CACE) Impact on the treatment (IOT)
Impact of the offer of the program (even if it isn't universally taken up)	Impact of participating in the program

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

$$= \frac{ITT}{\%\text{ of people who take up}}$$

ITT estimates are straightforward and familiar

$y = a + b_1 T + b_2 \text{controls}$

where T = offered the treatment

(our earlier examples assumed 100% take up)

If 100%, then ITT = TOT/etc -- everyone's treated

$$TOT = \frac{ITT}{1.0} = ITT$$

TOT estimates are tricky: If 50% of people offered don't take it up, why didn't they?? ~~omitted~~ selection / omitted variable bias

ITT estimates are very useful for policy: I only control the offer and not take up.

TOT ~~estimates~~ estimates are obviously valuable -- what is the causal impact of participating in the program?

How to estimate TOT in light of selection bias?

MAGIC!

Suppose you offer a behavioral ~~program~~ program designed to reduce crime to (at random)

100 treatment group individuals

100 control group individuals

if universe take up by Ts, then just regress

$$Crime = a + b_1 T + b_2 Controls$$

T = 1 if T
0 if C

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

ITT is still this: $Crime = a + b_1 T + b_2 Controls$

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

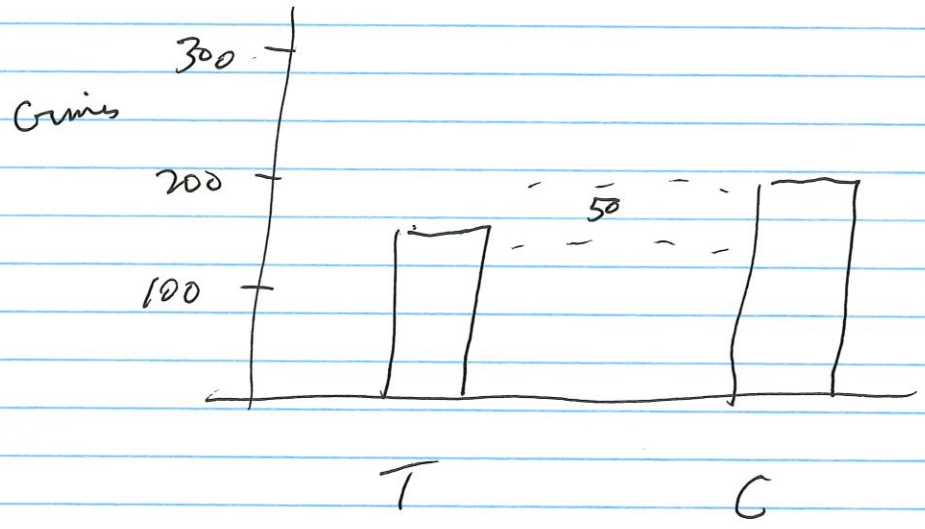
Key is that if 50% take up in the Ts, then 50% of Cs would have taken it up if they had had a chance

Suppose total number of crimes by Cs is 200
Ts is 150

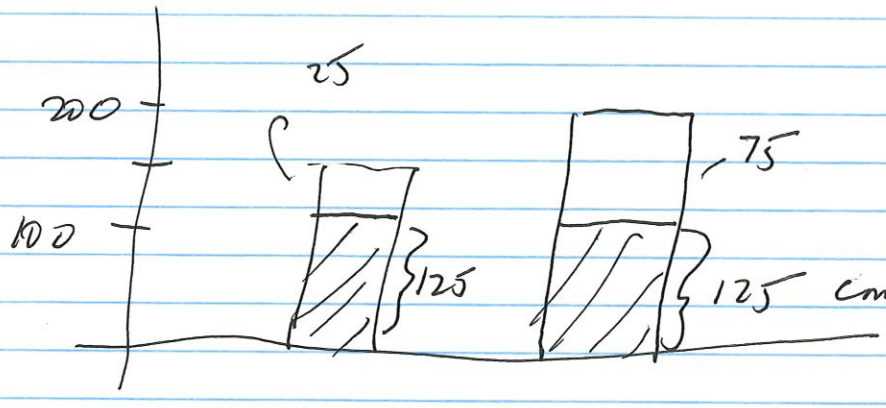
ITT? $a + b_1 T + b_2 Controls$

$\boxed{-50}$ per 100 Ts offered the program

what about TOT



Key is that you can observe how many crimes T's not taking up the program committed -- say it is 125



committed by "would be" noncompliers

We're left with 50 fewer crimes for treated Ts than for Cs who would have taken up the program had they been offered it.

TOT -50 per 50

or -100 per 100

$$TOT = \frac{ITT}{\text{take up rate}}$$

Two ways to estimate TOT

1. ITT / compliers
2. Regress $C = a + b_1$ Prob of Take-up $+ b_2$ Controls

How to get probability of take up?

Regress whether take-up $= c + d_1$ assigned to T $+ d_2$ Controls

Look at Cortes et al equation 1-3 on page 116