Class 13
Case studies:
The minimum legal drinking age

November 24, 2015
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Today’s agenda

• Some quick i>clicker questions about the readings
• More in depth on the reading
• Hands on
Office Hours cancelled this week

• Wednesday 11/25 before Thanksgiving is a non-instructional day, no office hours

• Happy Thanksgiving!

• Be careful if you’re traveling! There’s a storm coming

• See you next Tuesday for our last class
What is the minimum legal drinking age today?

A. Age 21 everywhere in the U.S.

B. It varies; it’s 21 here but lower elsewhere
What are the minimum legal ages for:
(1) Voting  (2) Driving  (3) Drinking  (4) Military

A. Age 21 across the board

B. 18  18  21  18

C. 18  16  21  21

D. 18  16  21  18
Because we have health insurance,

A. It’s nobody’s business what I do with my own health
B. It’s everybody’s business what I do
C. If I do bad things to my health, other people lose
D. If I do good things to my health, other people lose
Story arc of the course

• Randomized controlled trials
  - When we apply a treatment $x$ to one *randomly selected* group and see how it changes an outcome $y$

• Observational studies
  - When we see groups with different $y$’s and $x$’s, what do we do?

• In-between studies: Exogenous variables like weather, the macroeconomy, season of birth(?), end of wars

• “Regression discontinuity” tests: looking for smoothness breaks in data where treatments occur
Another storyline

• Adolescence & young adulthood is a dangerous time

• Motor vehicle accidents are the big killer

• But other accidents are also common

  - Next time, we discuss *bicycling*

• Danger might be lessened for people with more education, but it’s hard to tell
Some philosophy

• Sometimes it may be tempting to argue for restricting people’s behavior

• It’s also tempting to emphasize the value of freedoms

• Where do we draw the line?

• One theory, from economics: When behaviors cause *externalities* — effects on other people
  
  - A positive externality might be somebody’s gardening
  
  - Smoking or drunk driving would be a negative externality
Dangerous philosophy?

- Do people always make the best choices?
- How do we know when they don’t?
- Choices over the life cycle:
  - We agree that children often don’t make the best choices
  - Sometimes adults don’t make good choices, but it’s often rare that we can legally do much about it (read: guns)
  - Increasingly salient: aging can hinder good choosing
Optimal legal drinking age

- People drink alcohol because it brings enjoyment

- But drinking can also impose costs, like motor vehicle fatalities

- Enjoyment might be constant through age, while the risk of motor vehicle accidents definitely falls with age

- Economists might try to find the “optimal age” where the costs of drinking have fallen enough so that they are outweighed by the benefits
Feasibility

• Benefits associated with alcohol consumption are hard to measure

• Costs are easier

• But we don’t have a lot of variation in the legal drinking age, pretty much stuck with 18-21

• So Carpenter and Dobkin look at these ages
Problems with statistical inference

\[ y_i = \alpha + \beta x_i + \varepsilon_i \]

- When \( y \) is an adverse outcome and \( x \) is alcohol use
  - The problem is that a third variable \( z \) like risk-taking might be causing \( y \) and \( x \)
  - The \( \beta \) that you’d estimate is just descriptive, not a causal parameter

- Also, imposing a legal minimum drinking age would probably affect only a subset of more law-abiding i’s
History of MLDA

• Age of majority used to be 21, for voting, drinking, etc.

• Age of military conscription has traditionally been 18

• Then along came the Vietnam War

• 26th Amendment lowered voting age to 18, became effective July 1, 1971

• Many states lowered MLDA to 18 also
Analytical strategies

1. “Panel analysis” of state-level data over time
   - Drinking age, motor vehicle fatality rate
   - Some states receive the “treatment” of higher MLDA before the controls do
   - But states are different, so observing how they change rather than static differences is important
   - This is sometimes called difference-in-differences

2. “Regression discontinuity” — in patterns of death rates through age around the MLDA, is there a jump?
Visualization of panel estimates

Suppose we introduce reduced-fat donuts

What’s the effect?

Ideal comparison: Homer with donuts vs. Krusty without
Visualization of panel estimates

Weight

0 1 2 3 4 5 6 7 8 time
Motor Vehicle Fatality Rate

(data are made up and not to scale)
Results

• MLDA of 21 seems to
  - Reduce the rate of motor vehicle fatality among 18-20 year olds by 17%
  - Also reduce the rate among 21-24 year olds by 11%

• Why do motor vehicle deaths fall among those aged 21-24?
  - Spillover or externality effect?
  - Effects of other contemporaneous policies like MADD campaigns?
Regression discontinuity

• Sometimes treatments are applied on one side of a threshold

• Cleanest examples: You visit your doctor and
  
  - If your body mass index is above 25 or 30, your doctor suggests lifestyle changes like diet & exercise
  
  - If your blood pressure is above 140/90, your doctor might suggest lifestyle changes and/or medication

• Suppose we had a lot of data on patients’ BP’s
Imaginary data on BP

Suggest lifestyle change?

yes

no

100 110 120 130 130 140 150 systolic BP
Is there a discontinuity at age 21?

Death rate by motor vehicle accident per 100,000

Source: Carpenter and Dobkin (2011)
Is there a discontinuity at age 21?

Source: Carpenter and Dobkin (2011)
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Is there a discontinuity at age 21?

Source: Carpenter and Dobkin (2011)
Results

- The regression discontinuity test suggests that MLDA of 21 seems to
  - Reduce the overall mortality rate among 19-20 year olds by 8.7%
  - Reduce suicide mortality rate by 20.3%
  - Reduce motor vehicle mortality rate by 12.2%
  - Reduce alcohol-related mortality rate by 41.4% (because it’s usually so rare)
Other findings

• Carpenter and Dobkin (2011) also report jumps at the MLDA in

  - Emergency department visits
  - Hospital stays
  - Arrest rates

• Data from 2000-2006 show an 11% increase in arrest rates at age 21, nuisance and violent crimes
Benefits vs. costs

• After an amazing set of gymnastics, C&D say that
  - Own costs of a drink around ages 18-20 average $15 per drink on top of the actual price of the drink
  - Externalities that harm other people generate another $2.63 per drink

• It doesn’t seem reasonable that an 18-20 year old would be willing to pay this much for a drink

• Lowering the MLDA seems like a bad idea