L&S 39G

Health, Human Behavior, and Data

Prof. Ryan Edwards

Class 10
More strong exogeneity:
Are recessions good for your health?

November 3, 2015
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Today’s agenda

• General feedback on the midterm drafts: Good job!
• Some quick i>clicker questions about the readings
• More in depth on the reading
• Hands on
  - Wine regression data
  - Mortality and unemployment
Midterm drafts

• Good job!

• A key part of life is meeting deadlines, bravo!

• Some papers are in better shape than others

• I’ll have detailed comments for you later this week

• Final papers are due on Tuesday, December 8
Ashenfelter’s data

Folder:

http://demog.berkeley.edu/~redwards/ls39g.html

Direct link:

http://demog.berkeley.edu/~redwards/Courses/LS39G/c9_ashenfelter.csv

Documentation:

http://demog.berkeley.edu/~redwards/Courses/LS39G/c9_ashenfelter.html
Cyclical mortality data: Swedish GDP & $e_0$ from 1820-2008

Folder:

http://demog.berkeley.edu/~redwards/ls39g.html

Direct link:

http://demog.berkeley.edu/~redwards/Courses/LS39G/c10_sweden.csv
i>clicker question 10.1

During an economic boom, what usually happens to traffic accidents?

A. They rise

B. They fall

C. Nothing happens
During an economic boom, what usually happens to cancer deaths?

A. They rise
B. They fall
C. Nothing happens
Should government policy promote recessions?

A. Yes
B. No
C. Maybe
Current events: World Series, data, and “heart”

- A book and movie called “Moneyball” chronicled the data-driven efforts of the Oakland A’s to find cheap ways to win in the 2000s.

- But we think that data-driven front offices are now much more the rule rather than the exception.

- Still, different teams have different in-house algorithms, and may have different data.

- The data-driven theme does not appeal to “purists.”
Hot off the presses

- Angus Deaton (2015 Nobelist) and Anne Case published a paper Monday in the Proceedings of the National Academy of Sciences

- Mortality rates among white Americans aged 45-54 is rising

- Earlier studies had examined < 50 or > 50 and had not seen this trend

- Appears to be associated with chronic pain and disability, opioid use and overdose
Story arc of the course thus far

• Some basics in health economics

• Randomized controlled trials
  - When we apply a treatment x to one group and see how it changes 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
More on the weather: season of birth

Figure 1: Seasonality in Average Daily Births: United States, Germany, and Australia, 2000-2010

Note: The y-axis is the difference in log points between the average number of daily births in a given month relative to June. These data come from the United Nations Statistics Division (2014).
Figure 3: Estimated Temperature-Fertility Relationship: Effect of Daily Mean Temperature >80 °F Relative to 60-70 °F on Log Birth Rate, by Months from Exposure

Note: The diamonds are the point estimates and the brackets represent +/- two standard errors. The estimates can be interpreted as the impact on the log monthly birth rate, in log points, of one additional day with a mean temperature >80 °F relative to 60-70 °F. The model has year-month fixed effects, state-by-calendar-month fixed effects, state-by-calendar month quadratic time trends, and state-year fixed effects. We control for fraction of days with precipitation between 0.01 and 0.50 inches and over 0.51 inches in each month. In addition, we control for effects for up to 24 months after exposure (and 3 months prior to exposure as a placebo check). Estimates are weighted by state-year population. Standard errors are clustered at the state-level. The gray shading highlights both 0 and 9 months from exposure.
Today: Macroeconomic variables

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

- When \( y \) is health and \( x \) is employment or income,
  - For individuals, we know that \( x \) causes \( y \), but \( y \) also reverse-causes \( x \)
  - What about environmental variables \( z \) that are exogenous?
  - In particular, if \( z \) represents macroeconomic conditions determined by millions of other people
Macroeconomic variables

- Unemployment rates or employment/population ratios
- Gross Domestic Product (GDP), Gross State Product (GSP), or income
- Prices, or the rate of change in prices = inflation
- Unemployment rates tend to fluctuate around a number like 5%
- Other variables tend to grow over time
Health and the macroeconomy

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

- When \( y \) is health, \( x \) is own-unemployment, and \( z \) is an exogenous unemployment rate:

- What sign do we think \( \beta \) has?
  - Probably negative: health declines with unemployment

- What sign do we think \( \delta \) has?
  - Common sense suggests it should also be negative, but it might also depend whether we’re controlling for \( x \)
  - Bad times (\( z \) is high) might make you unemployed (raise \( x \)), but if they don’t, maybe you could even be better off?
Mass layoffs are serious

• Sullivan and von Wachter (QJE, 2009) look at mass layoffs in Pennsylvania in the 1980s

• Mass layoff = plant closing where everybody goes, avoiding usual problems with selection

• They find sharp decreases in earnings and a persistent 15% disadvantage

• Mortality jumps and then falls, but may reduce life expectancy at age 40 by 1–1.5 years
Source: Sullivan and von Wachter (2009)

**Figure I**


Solid line represents coefficient estimates of the interaction of year effects and displacement dummies in a regression model of log quarterly earnings including year fixed effects, person fixed effects, and a quartic for age. Two standard error bands are drawn around main effects.
FIGURE II
The Effect of Displacement on Log-Odds of Death by Years since Displacement
(Sample of Men in Stable Employment 1974–1979, Firm 1979 Employment ≥50,
No Further Presence Restriction in PA Labor Market)

(A) Effect by years since displacement for workers born 1930–1959 (including two standard error bands). Solid line represents coefficients of log-odds model of mortality on years since displacement and basic other control variables. These are the main effects corresponding to column (1), Table IV. Dashed lines represent two-standard-errors bands. (B) Simulated effect of displacement by current age and age at displacement for workers born 1920–1959. The lines represent coefficients from a log-odds model of death on four dummies for current age interacted with displacement, to which dummies for years since displacement were added, as well as a dummy for whether age at displacement was sixty or greater. Coefficients are taken from column (3), Table IV. See text for details.
But how do macroeconomic shocks work?

- The Great Depression of 1929-1933+ (C. Romer, 2003)
  - Prices fell by 33%
  - Industrial production fell 47%, real GDP 30%
  - Unemployment rate rose to above 20%

- Recession of 1981-1982
  - Real GDP fell 2%, unemployment rate peaked under 10%

- Great Recession of 2007-2009
  - Real GDP fell 4%, unemployment rate peaked at 10%

- Even in deep recessions, unemployment rises from 5% to 10%
Definitions

• Procyclical
  - Stuff that rises with the business cycle, like GDP, prices, inflation, interest rates

• Countercyclical
  - Stuff that falls with the business cycle, like the unemployment rate, government fiscal policy

• Acyclical
  - Stuff that doesn’t respond to the business cycle
Health economics

**Mechanism A:** The opportunity cost of time

- In the Grossman model, people make investments in health using healthy time & purchases
- Some healthy things, like exercise, probably can’t be purchased
- Unhealthy things can always be purchased
- Macroeconomic variables — good or bad times — affect the price of time, a.k.a. your wages
- When the price of time rises during goods times, the opportunity cost of spending healthy time rises, we do less
Mechanism B: Health as an input into production

- Construction is very cyclical
- Construction also requires a lot of physical exertion and involves danger
- Pollution may rise during good times

Mechanism C: External sources of death

- Traffic gets worse during good times (right?!)
- Drinking & driving rises, intentional homicides may rise, but suicides tend to fall during good times
Mechanism D: Migration flows

• People usually move a lot for jobs in the U.S., it's rare they move for other things (except maybe schooling)

• Movers might be less familiar with new areas, accidents more likely

• Healthy people move, sick people stay; we might see spurious positive correlation between average health and average economic conditions in a state

Mechanism E: Good times may drain cheap labor out of health care, especially nursing homes

• Some critical jobs in health care are staffed by workers with low education — nursing aids (orderlies, attendants)

• Stevens et al. (AEJEP 2015) find much procyclical mortality in nursing homes, and employment of nursing aids is countercyclical
Another thought: Cash in pockets might be bad

Source: Evans and Moore (RESTAT 2012)
FIGURE 2.—RELATIVE DAILY MORTALITY RISK (95% CONFIDENCE INTERVALS), WITH AND WITHOUT MENTION OF SUBSTANCE ABUSE, MCOD DATA, 1978–1988, ALL AGES

A: Substance Abuse Related

B: Non-Substance Abuse Related
Source: Ruhm (2000)

**Figure I**

Total Mortality and Unemployment Rates (Detrended and Normalized)
Figure 2.  Unemployment and Age-Standardized CHD Mortality Rates in California and Texas

Source: Ruhm (2007)
Source: Sullivan et al. (2015)

**Figure 1. By Age, Semi-Elasticity of Mortality with Respect to Unemployment**

*Notes:* Log-linear models estimated separately for each age. Controls include state and year fixed effects, state trends, and demographic and education variables. Bars give 95 percent confidence intervals. Standard errors clustered on state.
Inside the results

• Cyclicality of cause-specific mortality
  - Traffic fatalities are strongly procyclical
  - Suicides are countercyclical
  - Cancer deaths are acyclical

• Age-specific effects
  - A lot of action among young working ages and in retirement, less at ages 45-64
Behavioral changes

• Smoking prevalence and levels are procyclical

• But alcohol use seems to be countercyclical

• Body weight is procyclical, and “individuals are more likely to be in the healthiest weight range in bad economic times”

• Physical activity and diet improve in bad times

• But preventive care also seems to be procyclical