

Week 1 Panel Data

Nick Graetz¹

¹ University of Pennsylvania, Population Studies Center

9/4/2020

TODAY

1. Quick overview of class
2. R Basics
3. Latex: R Markdown / Overleaf
4. R Training (into office hours)

WHAT ARE WE DOING?

- ▶ We know what panel data are: repeated observations over a unit (for us, an individual)

WHAT ARE WE DOING?

- ▶ We know what panel data are: repeated observations over a unit (for us, an individual)
- ▶ What are we trying to do?

WHAT ARE WE DOING?

- ▶ We know what panel data are: repeated observations over a unit (for us, an individual)
- ▶ What are we trying to do?
- ▶ Predictive inference (in- or out-of-sample) vs. causal inference

PREDICTIVE INFERENCE

- ▶ Predictive inference is used to describe or forecast

PREDICTIVE INFERENCE

- ▶ Predictive inference is used to describe or forecast
- ▶ Perhaps we want to infer something in-sample about some underlying population parameter, but we have to deal with unit heterogeneity (i.e. correlated errors)

PREDICTIVE INFERENCE

- ▶ Predictive inference is used to describe or forecast
- ▶ Perhaps we want to infer something in-sample about some underlying population parameter, but we have to deal with unit heterogeneity (i.e. correlated errors)
- ▶ Perhaps we want to forecast out-of-sample (or in-sample with tiny samples), and need to leverage these more complex correlation structures (space, time, etc.)

PREDICTIVE INFERENCE

- ▶ Predictive inference is used to describe or forecast
- ▶ Perhaps we want to infer something in-sample about some underlying population parameter, but we have to deal with unit heterogeneity (i.e. correlated errors)
- ▶ Perhaps we want to forecast out-of-sample (or in-sample with tiny samples), and need to leverage these more complex correlation structures (space, time, etc.)
- ▶ In our class, we will be using panel data analysis largely to describe, test group differences, etc.

CAUSAL INFERENCE

- ▶ Lots of panel data techniques assume that you've randomized something.

CAUSAL INFERENCE

- ▶ Lots of panel data techniques assume that you've randomized something.
- ▶ In sociology and demography, people are almost always using observational data.

CAUSAL INFERENCE

- ▶ Anytime we start introducing independent variables to explain differences (“links”, “determinants”, “associations”) we are implicitly relying on lots of causal assumptions.

CAUSAL INFERENCE

- ▶ Anytime we start introducing independent variables to explain differences (“links”, “determinants”, “associations”) we are implicitly relying on lots of causal assumptions.
- ▶ For example, why are there group differences in some parameter?

CAUSAL INFERENCE

- ▶ Things like fixed effects “help” in this case, in the sense that you’re conditioning on unobserved time-invariant confounders, but there are a lot of other considerations.

CAUSAL INFERENCE

- ▶ Things like fixed effects “help” in this case, in the sense that you’re conditioning on unobserved time-invariant confounders, but there are a lot of other considerations.
- ▶ Matthay et al (2020): Alternative causal inference methods in population health research: Evaluating tradeoffs and triangulating evidence