Dissertation Workshop: Panel Data - Problem Set

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Do as much as you can in class, and finish the rest in your own time

More Guns Less Crime

More guns, less crime. This is the claim of an in(famous) book. It shows that violent crime rates in the United States decrease when gun ownership restrictions are relaxed. The data used in Lott's research compares violent crimes, robberies, and murders across 50 states to determine whether the so called "shall" laws that remove discretion from license granting authorities actually decrease crime rates. So far 41 states have passed these "shall" laws where a person applying for a licence to carry a concealed weapon doesn't have to provide justification or "good cause" for requiring a concealed weapon permit.

Load the guns.csv dataset directly into R by running the following line:

```
a <- read.csv("http://philippbroniecki.github.io/philippbroniecki.github.io/assets/data/guns.csv")
```

The data includes the following variables:

- *mur* - Murder rate (incidents per 100,000)

- *shall* - =1 if state has a shall-carry law in effect in that year, 0 otherwise

- *incarc_rate* - Incarceration rate in the state in the previous year (sentenced prisoners per 100,000 residents; value for the previous year)

- *pm1029* - Percent of state population that is male, ages 10 to 29

- *stateid* - ID number of states (Alabama = , Alaska = 2, etc.)

- *year* - Year (1977 - 1999)

a) Estimate the effect of *shall* using a simple linear model and interpret it.

b) Estimate a unit fixed effects model and a random effects model. Are both models consistent. If not which is the appropriate model? Use a consistent model to estimate the effect of the shall laws on the murder rate.

c) Think of a theoretical reason to control for time fixed effects (what confounding sources could bias our estimate of the shall laws?). Test for time fixed effects using the appropriate test. If time fixed effects are required, re-estimate the fixed effects model as a twoway fixed effects model and interpret the effect of lax gun laws.

d) Correct the standard errors to account for heteroskedasticity and serial correlation. Does the conclusion regarding the effect of the shall laws change?

e) Test for cross-sectional dependence and if present, use the SSC estimator to correct for heteroskedasticity, serial correlation, and spatial dependence. Does our conclusion regarding the effect of the shall laws change?