Spatial Econometrics Lab Exercises

Essex Summer School 2024

Day 07

Task 1

Let's first continue with the AFDC data used in the tutorial session.

1. Use the `lm(.)` function from the base `R` to replicate that non-spatial fixed-effects regression model;
2. Estimate the SAR model with both state and year fixed-effects;
3. Estimate the SAC model with state fixed-effects;
4. Calculate the three kinds of average effect (with uncertainty) of all RHS variables based on the model estimates from 3 – ** try to make the calculation as automated as possible.

Task 2

Data: `2-1_homicide_South_1960_1990.dta` (unit = county, time = decade); $\mathbf{W}$: `2-2_W_South_adj.csv` (first column = county ID)

1. You choose to estimate a random-effects model, `hrate` $\sim$ `ln_population + ln_pdensity + gini`, but worries about the presence of spatial dependence – perform a statistical test against it;
2. Estimate the SAR random-effects model;
3. On average, how was a county's homicide rate influenced by the changing `gini` elsewhere (90% confidence interval)?
4. Update the model in 2 to alleviate the concern that the contagion of homicide seems to existing only because of some murder epidemic at some particular time periods;
5. Based on the updated model in 4, try to further control the state fixed-effects;
6. Do a statistical test you see fit to examine whether the inclusion of the state fixed-effects in 5 is necessary – put differently, whether are they "significant?"