Pol Sci 630: Problem Set 10: 2SLS, Matching, Outlier, Heckman

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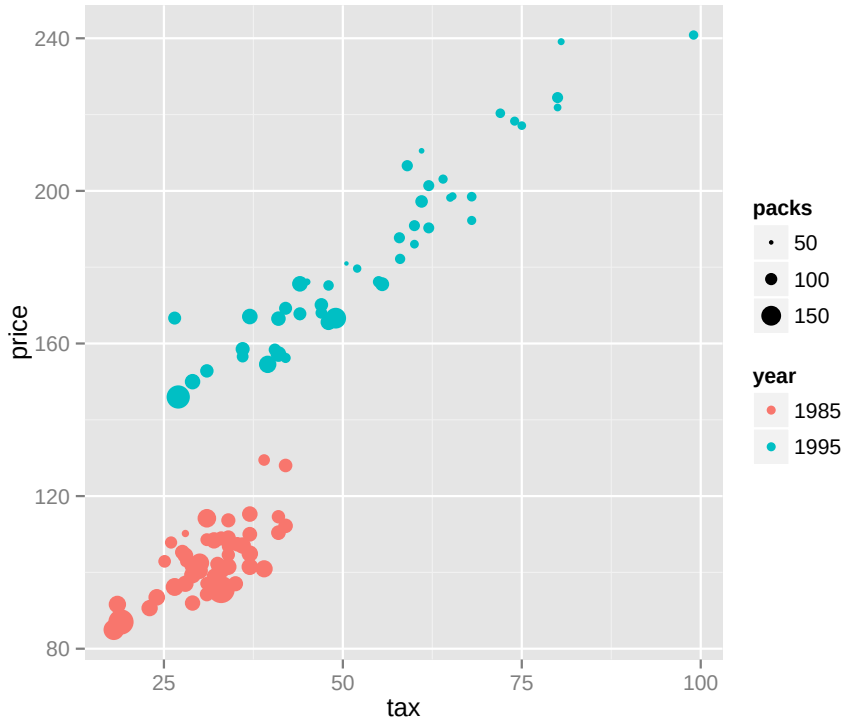
Due Date: Tue, Nov 3, 2015, 12 AM (Beginning of Lab)

1 2SLS

1.1 Load dataset CigarettesSW from package AER

1.2 Plot the following

What can we say about the relationship between tax, price, and packs? Note: This is a good way to show the relationship between 3 variables with a 2D plot.



1.3 Divide variable income by 1000 (for interpretability)

1.4 Run 2SLS

Run 2SLS with `ivreg`. Outcome: packs. Exogenous var: income. Endogenous var: price, whose instrument is tax. Interpret the coefficient of `income` and `price`.

1.5 2SLS diagnostics: use F-test to check for weak instrument

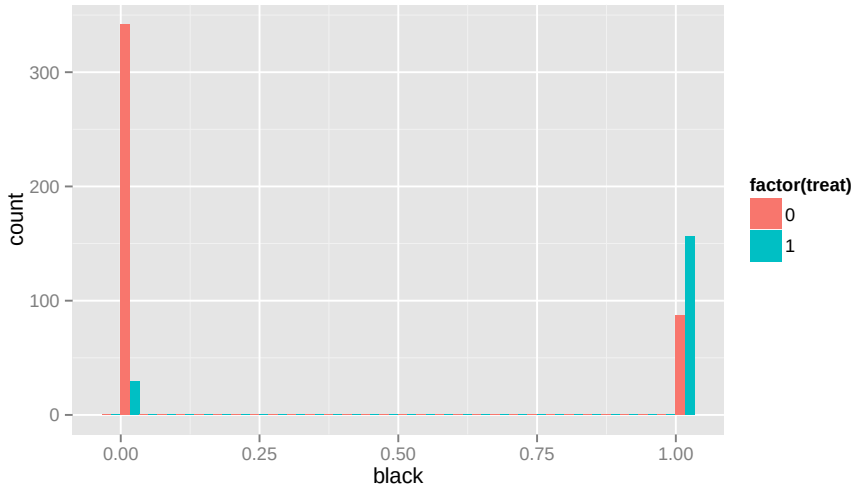
1.6 2SLS by hand

Run the 2SLS by hand, i.e. not using `ivreg`, but run 2 stages of `lm`. Do you get the same estimate from `ivreg`?

2 Matching

2.1 Load dataset lalonde from MatchIt, show covariate imbalance by plotting

Plot the following. Hint: Look up `position="dodge"` for ggplot2



2.2 See the effect of omitting an important variable

Regress re78 against 1) treat, age, educ; 2) treat, age, educ, black. Do the treatment effect differ a lot? Why?

2.3 Running CEM: Matching and check balance

Match the treatment and the control group based on age, educ, and black. Check the balance

2.4 Running CEM: Analysis after matching

Run a weighted regression of re78 against 1) treat, age, educ, 2) treat, age, educ, and black. Do the treatment effect differ? Compare this result with part 2.

3 Heckman

3.1 Load Mroz87 data from package sampleSelection

3.2 Run a Heckman model

The selection variable is lfp. Run a heckman model with huswage, kid5, educ, city explaning the selection, and educ and city explaning the outcome variable log(wage). Interpret the result for the outcome model

3.3 Outlier

Load the anscombe dataset (the famous Anscombe quartet). Run a regression of y3 against x3, and find the outlier using any tools that we have discussed (DFbeta, cook distance, etc.)

Brownie point: Fit a linear model for y1 agains x1, y2 against x2, etc. What spooky thing did you notice?