Advanced Applied Econometrics – selected OLS topics

Stata exercise on Oster bounds

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Emily Oster, an econometrician at Brown, recently augmented the AET-argument to also capture movements in the R-squared. This is readily usable in Stata in the "`psacalc`" package.

Lets take a look:

Open Stata and install `psacalc` by typing `ssc install psacalc`

Load the automobile data that we already looked at. `sysuse auto`

We already examined the sensitivity of the effect of weight on price – remember the regression anatomy? Clearly things are not well specified. Now lets use the Oster-method (AET plus looking at changes in R-squared) to get bounds for the estimate of the effect of weight on price. For this, run:

```
regress price foreign mpg weight headroom trunk

psacalc beta weight
```

What is the estimated beta under the assumption that the violation of the CIA is proportional to selection on observables? Does this increase or decrease our confidence in our estimated effect of weight on price?

Can you also estimate the required `delta` for a specified R_max that would make the estimate statistically insignificant?

Now use the approximation formula from the lecture. Can you replicate your result by plugging in the coefficient movements and changes in R-squared?

From the regression anatomy example in the lecture, we saw that the homoscedasticity assumption seems unlikely to hold. We know that we can estimate heteroscedasticity-robust errors. In Stata, this is implemented for us by adding ", `robust`" to the multiple regression at the end.

How do the coefficient on weight and the estimated standard errors change? When thinking about the hypothesis test with H0 weight has no effects, what is more problematic in this application: violating homoscedasticity or violating $E(Xe)=0$?