MOOC Econometrics

Training Exercise 4.2

Notes:

- This exercise uses the datafile `TrainExer42` and requires a computer.

- The dataset `TrainExer42` is available on the website.

Questions

In this exercise we reconsider the example from lecture 4.1 where an analyst models sales of ice cream over time as a function of price and where price is possibly endogenous due to strategic behavior of the salesperson. In this case the salesperson knows that when a particular event is organized, demand tends to be high. Therefore she may set a high price when there is such an event.

We consider the following data generating process

$$\text{Sales} = 100 - 1 \times \text{Price} + \alpha\text{Event} + \varepsilon_1$$
$$\text{Price} = 5 + \beta\text{Event} + \varepsilon_2,$$

where Event is a 0/1 dummy variable indicating whether an event took place at a point in time. However, when trying to estimate the price coefficient the analyst does not have the Event dummy variable and simply regresses Sales on a constant and Price.

The dataset `TrainExer42` contains sales and price data for different values of α and β. For each scenario the same simulated values for ε_1 and ε_2 were used. Specifically, the data contains 4 price series and 16 sales series. Price variables "PriceB" give the price assuming that $\beta =$B, for B= 0, 1, 5, 10. Sales variables "SalesA_B" give the sales for $\alpha =$A and $\beta =$B, where A also takes the values 0, 1, 5, 10.

(a) First consider the case where the event only directly affects price ($\alpha = 0$). Estimate and report the price coefficients under all 4 scenarios for β and calculate the R^2 for all these regressions. Do the estimated price coefficients signal any endogeneity problem for these values of α and β? Can you also explain the pattern you find for the R^2?

(b) Repeat the exercise above, but now consider the case where the event only directly affects sales, that is, set $\beta = 0$ and check the results for the four different values of α.

(c) Finally consider the parameter estimates for the cases where the event affects price *and* sales, that is, look at $\alpha = \beta = 0, 1, 5, 10$. Can you see the impact of endogeneity in this case?