

Introductory Econometrics
Universidad Carlos III de Madrid

1. Consider Wooldridge's dataset ATTEND.RAW to study the relation between the final grades for college students and class assistance and homework. Class assistance is measured as the rate (in percentage terms) of attended classes by the student (*atndrte*), homework is the rate of homework handed in by the student and, finally, final grades are standardized (*stndfnl*). Use the linear model

$$stndfnl = \beta_0 + \beta_1 atndrte + \beta_2 hwrt e + \varepsilon \quad (1)$$

to explain the relation between the proportion of attended classes and the final grade, where β_0 and β_1 are unknown parameters and ε is an error term.

- (a) Obtain and interpret the OLS estimates.
(b) Obtain $\hat{C}(stndfnl, atndrte)$ and $\hat{V}(atndrte)$. Then, get the OLS for δ_1 in the "short" model,

$$stndfnl = \delta_0 + \delta_1 atndrte + \varepsilon',$$

(ε' is another error term) using

$$\hat{\delta}_1 = \frac{\hat{C}(stndfnl, atndrte)}{\hat{V}(atndrte)}.$$

Use also the E-views commands to compute $\hat{\delta}_1$ and check that you get the same results.

- (c) Compute $\hat{C}(atndrte, hwrt e)$ and using a. y b., and:

$$\hat{\delta}_1 = \hat{\beta}_1 + \hat{\beta}_2 \frac{\hat{C}(atndrte, hwrt e)}{\hat{V}(atndrte)},$$

obtain $\hat{\delta}_1$ and check that you get the same results as in b. Comment on the consequences of omitting *hwrt e* in the short model over the interpretation of the parameters.

2. In this exercise, we use Wooldridge's dataset KIELMC.RAW to study the effect on the installation of an incinerator on the prices of near-by houses (This dataset was originally used in K.A. Kiel and K.T. McClain (1995), "House Prices During Siting Decision Stages: The Case of an Incinerator from Rumor Through Operation," *Journal of Environmental Economics and Management* 28, 241-255). The set of variables is:

<i>price</i> =	house selling price
<i>age</i> =	house age
<i>area</i> =	size of house in square feet
<i>dist</i> =	distance in feet from house to incinerator
<i>baths</i> =	number of bathrooms in the house
<i>nbh</i> =	code for neighborhood quality from 1 to 6 (1: best)

and the model is

$$\log(price) = \beta_0 + \beta_1 dist + \beta_3 age + \beta_4 age^2 + \beta_5 \log(area) + \beta_6 baths + \varepsilon$$

- (a) Estimate the model and interpret each of the coefficients.
(b) Compute an estimation for the expected elasticity, ceteris paribus, of the price with respect to the age of the house for house at the critical age (that is, the age at which the sign of the partial effect changes).
(c) Compare β_1 with an estimator of the slope in a "short" model which only uses *dist* as regressor.