

Due in class Tuesday, October 23  
(20 points)

The data for this assignment are contained in both the Excel file 'e418data3.xls' and the STATA file 'e418data3.dta' available at <http://u.arizona.edu/~rlo>. These data pertain to a cross-section sample of 27 production establishments in the primary metals (SIC 33) industry. Be sure to attach the supporting computer print out to the completed assignment, show your work, and make clear where your answers are shown..

The variables of interest for this exercise are *valueadd* (value added used as a measure of production), *labor* (a measure of labor input) , and *capital* (gross value of plant and equipment).

1. Use *OLS* to estimate the production function  $\ln(Q_i) = \beta_0 + \beta_1 \ln(L_i) + \beta_2 \ln(K_i) + u_i$ ,  $i = 1, \dots, 27$  (where  $Q$  is *valueadd* ,  $L$  is *labor*, and  $K$  is *capital*). Assume that  $u \sim N(0, \sigma_u^2)$ .
2. Conduct the following hypothesis tests at the 5% level of significance.
  - a.  $H_0: \beta_0 = 0$ ,  $H_1: \beta_0 \neq 0$ .
    - (1) Construct and use a 95% confidence interval for your test.
    - (2) Construct and use a 95% critical region for your test.
  - b.  $H_0: \beta_2 = 0.33$ ,  $H_1: \beta_2 \neq 0.33$ .
    - (1) Construct and use a 95% confidence interval for your test.
    - (2) Construct and use the 't' ratio for your test.
  - c.  $H_0: \beta_1 = 0$ ,  $H_1: \beta_1 > 0$ .
    - (1) Construct and use a 95% critical region for your test.
    - (2) Construct and use the 't' ratio for your test.
  - d.  $H_0: \beta_1 < 1$ ,  $H_1: \beta_1 > 1$  (use a 't' ratio test).
  - e. Use an 'F' test to test the following hypotheses:
    - (1)  $H_0: \beta_1 = 0, \beta_2 = 0$ ,  $H_1: \sim H_0$ .
    - (2)  $H_0: \beta_1 + \beta_2 = 1.0$ ,  $H_1: \beta_1 + \beta_2 \neq 1.0$ .
    - (3)  $H_0: \beta_1 = 2\beta_2$ ,  $H_1: \beta_1 \neq 2\beta_2$ .