

AEB 6571 - Econometric Methods II

Problem Set I.A

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1. A primary result of Lau's normalized profit function is that optimizing behavior yields a supply function (related to the firm's marginal cost function). The typical assumption is that the feasible production set

$$\{y, x\} = \{z\} \in T \quad (1)$$

where y is a vector of outputs, x is vector of inputs, z is a netput vector (augmented matrix of inputs and outputs), and T is the convex technology set. This set implies a supply function

$$y_j = f(p_1, p_2, \dots, p_k, w_1, w_2, \dots, w_m) \quad (2)$$

with the property that the level of supply is non-negative in own price and negative with respect to at least one input price. This is a complicated way to say that we can define a supply curve which is increasing in output price and decreasing in some subset of input prices. The Excel dataset KLEM-Prob01-17-12.xls contains data for capital, labor, energy, and materials used by agriculture along with the price of each input, and the level of agricultural output and output prices.

- a. Using this dataset construct the variance matrix the log change in output and input prices.
- b. What are the Eigenvalues of this data?
- c. Compute the conditional correlation matrix for the log change in output and capital prices given the log change in energy and materials prices.

2. Set up two regression equations. In the first regression equation the log change in capital will be a function of the log change in input and output prices while in the second equation the log change in labor is a function of input and output prices (remember the column of ones for the constant). Jointly regress the two models using Kronecker products and verify the results using single regression equations.