

Econ 220B, Winter 2009
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Problem Set 2
Due Wednesday January 21

This problem set asks you to replicate and extend the analysis by Hayashi and Nerlove of cost functions for electricity generation. You can download the data set from

<http://fhayashi.fc2web.com/hayashi%20econometrics/ch1/NERLOVE.ASC>

This text file has data on 145 electric utility companies in 1955 for the following:

Column 1: total costs (call it TC) in millions of dollars

Column 2: output (Q) in billions of kilowatt hours

Column 3: price of labor (PL)

Column 4: price of fuels (PF)

Column 5: price of capital (PK)

Note that Columns 4 and 5 are in reverse order to that reported in equation (1.7.7) in Hayashi's text— in equation (1.7.7), the price of capital p_{i2} is the next-to-last variable and the price of fuel p_{i3} is the last variable, whereas in the database, the price of fuel is the next-to-last variable and the price of capital is the last variable. You can analyze this data set using any software package you like. Programming the formulas yourself in MATLAB might give you the deepest understanding and preparation for Econ 220C, but you are free to use any other "canned" software package you are familiar with. You should hand in a copy of your computer output along with a brief write-up of your calculations and answers to the following specific questions.

1.) Replicate the estimate of the unrestricted model in equations (1.7.4) and (1.7.7) of Hayashi's text.

2.) Suppose that you wanted to test the null hypothesis that the coefficient on the price of fuel is really 0.4. Calculate the test statistic for this hypothesis and its p -value three different ways, and summarize in each case whether you would reject or fail to reject the hypothesis.

i.) a t -test of the null hypothesis that $\beta_F = 0.4$.

ii.) Formulate an F test using equation (1.4.9). What are \mathbf{R} and \mathbf{r} ?

iii.) Re-estimate the regression imposing the restriction and use formula (1.4.11).

3.) Suppose next that you wanted to test the null hypothesis of homogeneity ($\beta_3 + \beta_4 + \beta_5 = 1$). Again test this restriction two ways, using formulas (1.4.9) and (1.4.11).