ECO 3123 – Spring 2014 **B. Goungetas**

Mid-term Examination #2 (Take-home Part)

Due on 4/09/2014 @ 7:30 PM (before the start of the class session)

The purpose of this take-home exam is to learn how to:

- Estimate the parameters of multiple regression models,
- Interpret the fitted regression parameter estimates,
- Perform hypotheses tests of model parameters, and
- Perform some additional test procedures with the general F test.

The Excel spreadsheet **Electric_Utilities_Data** [electric(2).xls] contains data on the output and production costs of 123 electric utilities in 1970. Specifically, the spreadsheet includes the following variables:

- Cost - Production cost (in millions of dollars)
- Output - Production output (in millions of KwH)
- Pr_Labor - Price of labor (in dollars per worker)
- Pr_Capital - Price of capital (in dollars per unit of capital)
- Pr_Fuel - Price of fuel (in dollars per million BTUs).

1. Estimate a cost of production function by running a regression of **Cost** on an **Intercept**, **Output**, **Pr_Labor**, **Pr_Capital**, and **Pr_Fuel**.
2. Discuss the fitted regression results (magnitude and sign of parameter estimates, statistical significance of each model parameter, model fit, etc.).
3. Do the signs of the estimated parameters meet your prior expectations? Why or why not?
4. Interpret the parameter estimate of **production output**. Compute and interpret the elasticity of **Cost** w.r.t. **Pr_Fuel** (at the mean values of **Cost** and **Pr_Fuel**).
5. Compute (manually) the 95% confidence interval for the **Pr_Capital** parameter.
6. At the 1% level of significance test the hypothesis
   H_0: Pr_Labor parameter ≤ 0 (vs. H_1: Pr_Labor parameter > 0) .
7. Test the **overall model fit** at the 5% level of significance.
8. I suspect that the cost of production function for utilities with production output **in excess of 10,000,000 KwH** is different from the cost of production function for utilities with output of **10,000,000 KwH or less**. Test the validity of my suspicion at the 5% level of significance.

Please provide a copy of your software printout along with your answers.