**636, Fall 2010**

# Homework 5,

Due October 19, before class begins.

Note: This homework uses data from ds4.xls

1. [Data from Gujarati] The data in sheet 2 of the excel file for this homework are related to a demand for money exercise. Consider the following demand function for money from the period 1980-2007.

$$M_t = \beta_1 Y_t^{\beta_2} r_t^{\beta_3} \exp^{e_t}$$

Where
M = real money demand
Y = real GDP
r = interest rate

To convert nominal quantities into real quantities, create new variables by dividing M and GDP by (CPI/100). Call these variables rm2 and rgdp, respectively. Any variable transformed into log equivalents should be relabeled as: "ln_*name*" where name is the original label. Also note that you are given two interest rates (long term and short term). Do questions a) through d) using first the long term rate and then the short-term rate.

a) Given the data, estimate the above demand function. What are the income and interest rate elasticities of the demand for money? Do you reject the default null hypotheses of no relationships in the model.

b) Manually evaluate (using a t-test) the null hypothesis that $\beta_2 = 1$.

c) Show that the F-statistic from the command "test ln_rgdp=|" is equal to the squared t-statistic calculated in b).

d) Run a restricted version of the model with the restriction that $\beta_2 = 1$.

e) Using the regression results from **both** a) and d), construct an F-test from equation (6.26) on page 93 of the notes to test the null hypothesis $\beta_2 = 1$. Get your degrees of freedom correct. Verify that this equals the answer in c).

f) Explain why equation (6.28) would have to be modified to get the same results in c) and e).

g Should the interest rate variable be retained in the model, and if so, which one?

h) Calculate the Jarque-Bera test statistic and determine if it is significant

at the 5% level. What does this tell you? Here are a few steps:

-in postestimation, to place the errors in a variable named *errs*, type:
*predict errs, resid*

-get a detailed summary: *summary errs, detail*

-using the skewness and kurtosis numbers, calculate JB [Stata acts as a calculator by using the *di* command]

i) Run three STATA tests for normality: a) *sktest errs* b) *swilks errs* and c) *sfrancia errs* . Discuss your results.

2. To study the per capita consumption for chicken in the U.S., data is provided in sheet 3 of the excel file. Never estimate with the original data.

a) Other than the year, convert all data to natural logs. Use the ln_ prefix.

b) Estimate the double log model using only the first two independent variables. Interpret thoroughly the model result. Do the results jive with demand theory?

c) Estimate the double log model using the first four independent variables.

d) Have the computer print a WALD test to evaluate if the last two parameters (on ln_X4 and ln_X5) are jointly equal to zero. In other words, run:

.test ln_x4 ln_x5

e) Using the results in b) and c), test the restriction that the last two parameters (on ln_X4 and ln_X5) are jointly equal to zero. In other words, use equation 6.26 and note that it produces the same result provided in d).

f) Estimate a full quadratic version of the double log model using variables ln_X2, ln_X3, and ln_X6. You need three additional squared terms and three additional cross terms. Convert only the data already transformed to logs. Evaluate the marginal values of each ln_X2, ln_X3, and ln_X6. Show in detail what the computer is doing for the marginal value on ln_X2.