Data Exercises

Chapter 6 *Non-linear Estimation*

The main topic is non-linear estimation using OLS. Please make sure you have fully answered the questions from the previous chapter before going on to these new ones:

1. Re-estimate the multiple regression (linear equation) with a quadratic term in mpg. This will require you to create a new variable with a name such as 'Mpgsq' and add it to the list of independent variables in the regression menu.

2. Interpret the coefficients on the quadratic terms (that is the square term and mpg itself).

3. Estimate a double-log version of the car acceleration equation by taking natural logs of all the variables to get the estimating equation:

Log (accel) = $b_0 + b_1$ Log (mpg) + b_2 Log(weight) + b_3Log(horse) + u

You must make new variables (for example by putting 'L' in front of the names of the old ones) in the transformations menu where you must select the compute menu.

4. Interpret the coefficients, significance tests and R squared from this equation.

5. Compare the coefficients from this equation with the elasticities with respect to

mpg, weight and horsepower that you calculated last week from the linear equation.

6. By now you should have run several regressions for an equation of the form

Acceleration = function of (miles per gallon, weight, horsepower).

Please check that you have performed the linear, the double-log, and the equation in linear form apart from a quadratic in weight. If you have not estimated all of these please do so. You should also have calculated elasticities at the mean for the linear model and the turning point for the quadratic in weight. If you have not done these tasks please do so now.

7. Present the linear, double-log and quadratic in weight versions of the model in one table which shows the results for each side by side in three columns of coefficients with standard errors in brackets underneath. Show the sample sizes, the R squareds, and the 'F for the equation' at the bottom (with its degrees of freedom in brackets) subscripted to the 'F' ratio.

8. Using the above answers and any other evidence you feel is relevant try to come to some conclusion as to which of the three functional forms, you have been asked to estimate is your **preferred equation.**