Homework 1 Due Thursday Jan 21st

1. Do the Fundamental Econometrics Concepts review attached at the end.

I will mark sections that need to be corrected, and you will resubmit those sections.

I strongly encourage you to write this up in a way that you can use it as a reference for yourself throughout the course.

Questions 2-5 are a review of 561

1. [From Wool C5.3] Suppose you are interested in the effect of parental education on child birthweights.
2. Your initial model is

*bwght* = β*0 +* β*1motheduc+u*

Suppose that mothereduc was a binary variable that was equal to 1 if a mother had completed high school and 0 if a mother had not completed high school. Interpret the coefficients *β0* and *β1.* [I’m not asking you to run this regression, just explain how to interpret coefficients on binary variables.]

1. Your next model is

 *bwght* = β*0 +* β*1cigs+* β*2parity+*β*3faminc+*β*4motheduc+*β*5fatheduc +u*

 Suppose that faminc was measured in logs. How would you interpret *β3*? [I’m not asking you to run this regression, just explain how to interpret coefficients on logged variables.]

1. Your next model is

 *bwght* = β*0 +* β*1cigs+* β*2parity+*β*3faminc+*β*4faminc2 +*β*5motheduc+*β*6fatheduc +u*

How would you explain the effect of family income? [I’m not asking you to run this regression, just explain how to interpret coefficients in quadratic models.]

1. Use BWGHT.RAW for the following problem. Please include your log file in your homework so I can correct mistakes in your commands.

Estimate the regression equation in (2b). What is the estimated coefficient on the number of cigarettes? Interpret it. What do we mean by asking “is that coefficient statistically significant”? What is the relevant hypothesis test and its associated test statistic? What do you conclude and why?

1. Conduct an F test for whether or not parental education (both mother and father) are jointly significant. What is the test statistic? How is it distributed? What do you conclude and why?
2. Now construct an LM test of whether motheduc and fatheduc are jointly significant.

[NOTE: In obtaining the residuals for the restricted model, be sure that the restricted model is estimated using only those observations for which all the variables in the unrestricted model are available.]

1. Show that the estimated *coefficient* $\hat{β}\_{1} $and estimated *standard errors* for $\hat{β}\_{1} $in this 2 variable regression model
2. $\left(y\_{i}\right)= \hat{β}\_{0}+\hat{β}\_{1}\left(x\_{i}\right)+\hat{u}\_{i}$

are equivalent to those in this model

(b)$\left(y\_{i}-\overbar{y}\right)= \hat{β}\_{1}\left(x\_{i}-\overbar{x}\right)+\hat{u}\_{i}$

If you need to draw on other assumptions/properties of the OLS estimator in your derivation, state these.