Homework # 2
Economics 113 - Fall 2010
Due Thursday, November 18th, beginning of class!
Please report all regression output and commands.

Problem 1
Using WageData.TXT from the course website, please run the following regression.

\[
\log(wage) = \beta_0 + \beta_{Educ} \cdot Edu + \beta_{Exper} \cdot Exper + \beta_{Tenure} \cdot Tenure + \beta_{IQ} \cdot IQ + \beta_{M\text{Educ}} \cdot MEduc + \beta_{F\text{Educ}} \cdot FEduc + u
\]  

Here, wage is the monthly wage, Educ is years of education, Exper is years of experience, Tenure is years of tenure, IQ is IQ, and M\text{educ} is mother’s education in years, and F\text{educ} the father’s education in years.

a. What is the $R^2$ for this regression?

b. Does Educ significantly affect wages? That is, can you conclude that $\beta_{Educ}$ is significantly different from zero? Test this hypothesis at the 95% level.

c. Please construct a 99% confidence interval for $\beta_{IQ}$. Please interpret your results.

d. Suppose that I reject the hypothesis that $\beta_{F\text{Educ}} = 0$ in favor of a two-sided alternative. What does this mean? What is the probability that I’m wrong? Interpret the result.

e. Suppose that I claim the effect of experience is the exact same as tenure. Derive an equation to test this hypothesis, and estimate the new equation using R. Am I correct?

f. For this next part, estimate the following equation:

\[
wage = \beta_0 + \beta_{Educ} \cdot Edu + \beta_{Tenure} \cdot Tenure + \beta_{IQ} \cdot IQ + u
\]

Please derive the equation you would use to generate a prediction (with standard error) for a person with 20 years of education, 5 years of tenure, and an IQ of 140. Please use R to generate a 90% confidence interval for this prediction.

Problem 2
Using the WageData.TXT dataset from the website, we wish to compare a few different wage regressions. Please use a 10% significance level for all regressions, and conduct hypothesis tests where necessary. Suppose that we start with the following model, hereafter referred to as the basic model:

\[
\log(wage) = \beta_0 + \beta_1 \cdot edu + \beta_2 \cdot exper + u
\]

Is the basic model preferred to the following model? Why or why not?

\[
\log(wage) = \beta_0 + \beta_1 \cdot edu + \beta_2 \cdot exper + \beta_3 \cdot tenure + \beta_4 \cdot brthord + u
\]