

Homework # 1

Economics 113 - Fall 2009

Due Friday, November 20th, beginning of class!

Please report all regression output and commands.

Problem 1

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

$$\log(\text{wage}) = \beta_0 + \beta_{\text{Educ}}\text{Educ} + \beta_{\text{Exper}}\text{Exper} + \beta_{\text{IQ}}\text{IQ} + \beta_{\text{MEduc}}\text{MEduc} + \beta_{\text{FEduc}}\text{FEduc} + u \quad (1)$$

Here, *wage* is the monthly wage, *Educ* is years of education, *Exper* is years of experience, *IQ* is IQ, and *MEduc* is mother's education in years, and *FEduc* the father's education in years.

- What is the R^2 for this regression?
- Does IQ significantly affect wages? That is, can you conclude that β_{IQ} is significantly different from zero? Test this hypothesis at the 95% level.
- Please construct a 99% confidence interval for β_{Exper} . Please interpret your results.
- Suppose that I reject the hypothesis that $\beta_{\text{MEduc}} = 0$ in favor of a two-sided alternative. What does this mean? What is the probability that I'm wrong? Interpret the result.
- Suppose that I claim the effect of parental education on wages does not differ between mother and father. Derive an equation to test this hypothesis, and estimate the new equation using R. Am I correct?
- For this next part, estimate the following equation:

$$\text{wage} = \beta_0 + \beta_{\text{Educ}}\text{Educ} + \beta_{\text{Exper}}\text{Exper} + \beta_{\text{IQ}}\text{IQ} + u$$

Please derive the equation you would use to generate a prediction (with standard error) for a person with 10 years of education, 5 years of experience, 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 5% 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:

$$\log(\text{wage}) = \beta_0 + \beta_1\text{educ} + \beta_2\text{exper} + u$$

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

$$\log(\text{wage}) = \beta_0 + \beta_1\text{educ} + \beta_2\text{exper} + \beta_3\text{sibs} + \beta_4\text{brthord} + u$$

- Now compare the basic model with the following model:

$$\text{wage} = \beta_0 + \beta_1\text{educ} + \beta_2\text{exper} + \beta_3\text{sibs} + \beta_4\text{brthord} + u$$

Which is preferred? Why or why not?

- Starting from the basic model, do the returns to education depend on your IQ? Choose a new specification, regress it, and test the hypothesis at the 95% level.
- Starting from the basic model, I claim that there is a level of education, above which the returns to education fall. Choose a new specification, regress it, and test this hypothesis at the 95% level. If there is such a level of education, does it seem reasonable?