

## Economics 113, Homework #2 - Professor Spearot

Due Monday, Nov. 17th, Beginning of Class

### Problem 1

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

$$\log(wage) = \beta_0 + \beta_{ten}tenure + \beta_{ten2}tenure^2 + u$$

Here, *wage* is the monthly wage and *tenure* is job tenure in years.

- Suppose that I claim that the relationship between wage and tenure is not linear. What is the probability that I'm wrong?
- Please solve for the length of job tenure at which the returns to additional time at the same job are zero. Is this a maximum or minimum? Why?

### Problem 2

Next, please estimate the effect of categorical factors on wages using the following specification:

$$wage = \beta_0 + \beta_{married}Married + \beta_{Urban}Urban + \beta_{South}South + \beta_{First}First + u$$

where *Urban* = 1 if the respondent lives in an Metropolitan Statistical Area and 0 otherwise, and *South* = 1 if the respondent lives in the South and 0 otherwise, *Married* = 1 if the respondent is married and 0 otherwise, and *First* = 1 if the respondent was the first born child in his/her family and 0 otherwise.

- Please write down the code used to construct the variable *First* using the variable *Brthord*.
- Please construct and interpret a 90% confidence interval for  $\beta_{First}$ .
- Please construct and interpret a 99% confidence interval for  $\beta_0$ .

### Problem 3

Finally, please estimate the effect of continuous and categorical factors on wages using the following specification:

$$\log(wage) = \beta_0 + \beta_{Educ}Educ + \beta_{First}First + \beta_{EF}Educ \cdot First + u$$

- Please construct and carefully interpret a 90% confidence interval for  $\beta_{Educ}$ .
- There are a variety of reasons why a first born child may receive more resources than later arriving children, and therefore benefit more from education. Please evaluate this hypothesis using the 95% confidence level and a two sided test. Please interpret your result, and interpret your coefficient estimate from your regression.