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.

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

Here, \( wage \) is the monthly wage and \( tenure \) is job tenure in years.

a. Suppose that I claim that the relationship between wage and tenure is not linear. What is the probability that I’m wrong?
b. 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.

a. Please write down the code used to construct the variable \( First \) using the variable \( Brthord \).
b. Please construct and interpret a 90\% confidence interval for \( \beta_{First} \).
c. 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:

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

a. Please construct and carefully interpret a 90\% confidence interval for \( \beta_{Educ} \).
b. There are a variety of reasons why a first born child may receive more resources that 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.