

Econ 741 Homework 3

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1 Question 1: Polynomials (Stata)

Lets see how income varies with age. First construct your sample. We will want to study individuals who are (inclusively) between 16 and 65 years of age, have positive earnings, and worked more than 1000 hours in a year. Pick a polynomial specification (of age) to run.

- a Present the results from your regression. (5 points)
- b Explain why you picked the specification you did. (6 points)
- c Give the marginal effect and the average of the marginal effects. (4 points)
- d Discuss the significance of your polynomial overall as well as the individual terms. (4 points)

2 Question 2: Indicator Variables and Interactions (Stata)

Lets now see how earnings varies with marriage. Use the marst variable to create three indicator variables for whether people are a) never married b) currently married c) formerly married.

- a Put all three indicator variables into your model. Discuss the results. (6 points)
- b Run a model that will test whether or not married people see their wages go up more quickly with age than people who were never married. Discuss the results. (8 points)

3 Question 3: Functional Form (Stata)

Construct a variable that is years of education. Report and interpret (in one sentence each) the following coefficients with a model of earnings on education:

- a Linear-Linear (4 points)
- b Log-Linear (4 points)
- c Linear-Log (4 points)
- d Log-Log (4 points)

4 Question 4: Heteroskedasticity (Stata and R)

- a Is there evidence of heteroskedasticity based on age? Show me in a picture. Discuss. (12 points)

Yes. If there were no heteroskedasticity in the data the residuals plotted against the independent variable would be random. In the figure below we see that there is an upward curve in the data. It is certainly not random. Therefore the data shows clear heteroskedasticity.

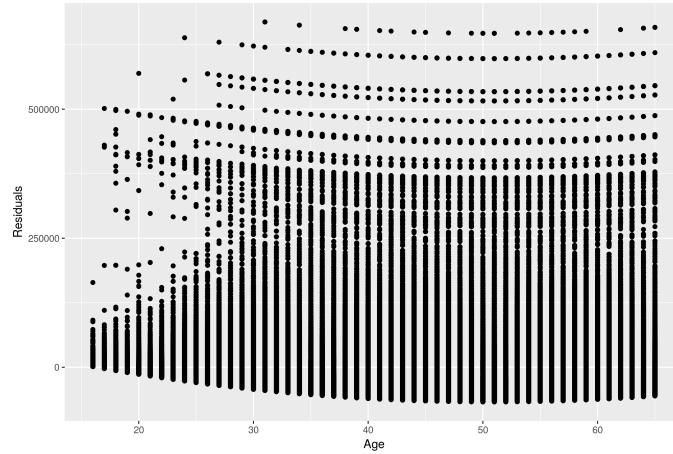


Figure 1: Residuals vs Age

b Obtain robust standard errors in R and Stata. (18 points)

The values of the robust standard errors found in R were as follows:

With no adjustment for degrees of freedom:

Age: 23.6251

Age2: 0.3024647

Cons: 399.5719148

We adjusted these values for the degrees of freedom using:

$N/(N - k)$

Age: 23.625128

Age2: 0.302465

Cons: 399.572365

Using Stata we found the following values for robust standard errors:

Age: 23.62513

Age2: 0.302465

Cons: 399.5724