

Econ 741 Homework 3

John Appert, Randall Chicolla, Andrea Franz

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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)

In the linear-linear model β_0 is -23558 and β_1 is 4759. This implies that every year of additional education is worth 4800 dollars in increased wages. However, there is obviously a problem with this model as at no education it predicts negative wages.

- b Log-Linear (4 points)

In the Log linear model β_0 is 0.87 and β_1 is 0.11. This implies that every additional year of education increases earnings by 11 percent.

- c Linear-Log (4 points)

In the linear log model β_0 is -159301.4 and β_1 is 76774.66. ???

- d Log-Log (4 points)

In the log log mode β_0 is 5.544492 and β_1 is 1.771558. This implies that the elasticity of wages to education is 1.77 and that at no education wages are expected to be roughly 244 dollars.

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.

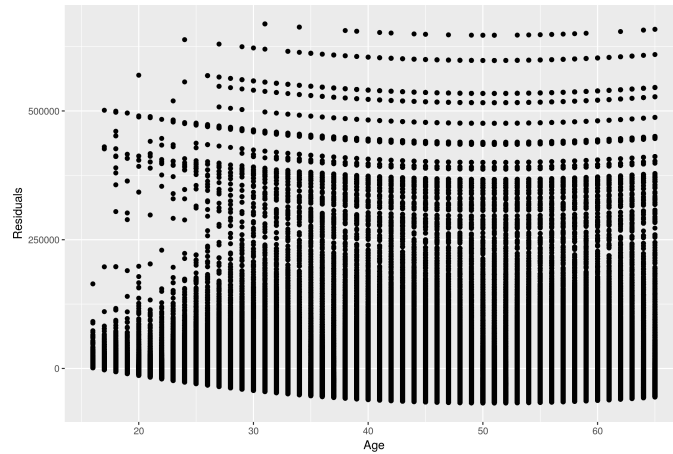


Figure 1: Residuals vs Age

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