

# Econ 3040 - Assignment 4: Polynomials, Logs, Interactions

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Due date: December 12th, 2022. Worth 3% of your final grade.

Instructions: Submit your assignment in the “Assignment 4” drop box on UM Learn. Include your name and student number. Do not copy and paste output from R. Format your results nicely. Submit the R code that you used for each question in your assignment.

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Use a version of the CPS dataset from class.

```
cps <- read.csv("https://rtgodwin.com/data/cpsassign.csv")
```

Table 1: Description of the variables in the CPS data set.

ahe	average hourly earnings in dollars
female	dummy variable =1 if worker is female
age	age in years
yrseeduc	number of years of education
location	a categorical variable that locates a worker in either the “midwest”, “northeast”, “south” or “west”

1. Estimate a model with **ahe** as the dependent variable, and all the other variables as regressors. Estimate a cubic model for both **age** and **yrseeduc**. Determine the appropriate degree for the polynomials through a series of tests. Report your tests, and estimate and report your preferred model.
2. Estimate a model where you allow the **female** dummy variable to interact with the age and education variables.
3. What is the effect of **yrseeduc** on **ahe** for women vs. men? Consider the cases of a woman vs. a man with 12 years of education, gaining an extra year.
4. Test for heteroskedasticity. Use White’s heteroskedastic robust standard errors, regardless of the result of the test. What changes when you use White’s estimator?