

ECON 3040 – Assignment #4 – Polynomials and F-tests

- Submit your assignment in the “Assignment 4” drop box on UM Learn. Include your name and student number.
- You must complete your assignment individually.
- Submit relevant R code for each question.
- Format your results nicely.

This assignment uses a version of the CPS data set. Load the data using:

```
cps <- read.csv("http://home.cc.umanitoba.ca/~godwinrt/3040/data/assign4.csv")
```

- 1.) With *wage* as the dependent variable, estimate a model that allows *education* and *experience* to have a non-linear effect. Include all variables in the data set (except *wage*) as regressors, with the addition of $education^2$ and $experience^2$. That is, estimate a model with a polynomial of degree $r = 2$ for *education* and *experience*.
- 2.) Determine the appropriate degree (r) for the polynomial from question 1. That is, use t -tests to decide whether $education^2$ and $experience^2$ should be in the model. Report your estimated model.
- 3.) For each regressor (except the *education* and *experience* variables) in your model from question 2, test the null hypothesis that the variable has no effect on *wage*. For the categorical variables with more than two categories (such as *ethnicity*), you will need to use an F-test.
- 4.) For any one of the F-tests that you did from question 3, calculate the F-test statistic using the R^2 from the unrestricted and restricted models.
- 5.) Estimate a new model that excludes all regressors that are insignificant (you did all of these tests for significance in question 3). Report your results.
- 6.) What is the estimated increase in *wage* due to 1 extra year of *experience*? [Consider a 1 unit increase in *experience* for two different representative cases.]