Econ 3040 - Assignment 4: Polynomials, Logs, Heteroskedasticity, DiD

Ryan T. Godwin

Due date: March 31. 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. Submit the `R` code that you used for each question in your assignment.

---

1. Use the diamond data from class:

   ```
   diam <- read.csv("https://rtgodwin.com/data/diamond.csv")
   ```

   a) Estimate a model with price as the dependent variable. As explanatory variables, use: *carat*, $carat^2$, *colour*, and *clarity*.

   b) What is the estimated effect of an increase in *carats* of 0.1 on the price of a diamond? Use your model from part (a), and remember that for a non-linear relationship the effect of an increase in *carats* depends on the value of *carats* itself (so you should try two different scenarios).

2. Use the CPS dataset from class:

   ```
   cps <- read.csv("http://rtgodwin.com/data/cps1985.csv")
   ```

   a) Estimate a model with $\log(wage)$ as the dependent variable (note the **log**!). For explanatory variables use *education*, *gender*, *age*, and *experience*.

   b) What is the estimated effect of education on *wage*? Is it significant?

   c) Use White's heteroskedastic robust standard errors. What important result changes when you use White's estimator?

      You need to install and load the following packages:

      ```
      install.packages("lmtest")
      library(lmtest)
      install.packages("sandwich")
      library(sandwich)
      ```

3. Use the New Jersey minimum wage data:

   ```
   did <- read.csv("https://rtgodwin.com/data/card.csv")
   ```

   a) Estimate the DiD model from class, but add `CO_OWNED` as an additional regressor.

   b) What is the DiD estimate for the effect of the minimum wage increase on employment?