

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

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Due date: November 25. 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?