Homework 6

Economics 7103

Spring semester 2023

1 Python

1.1

This should be a sharp RD as all cars longer than 225 inches are treated, impacting their MPG. However, outliers may exist.

1.2

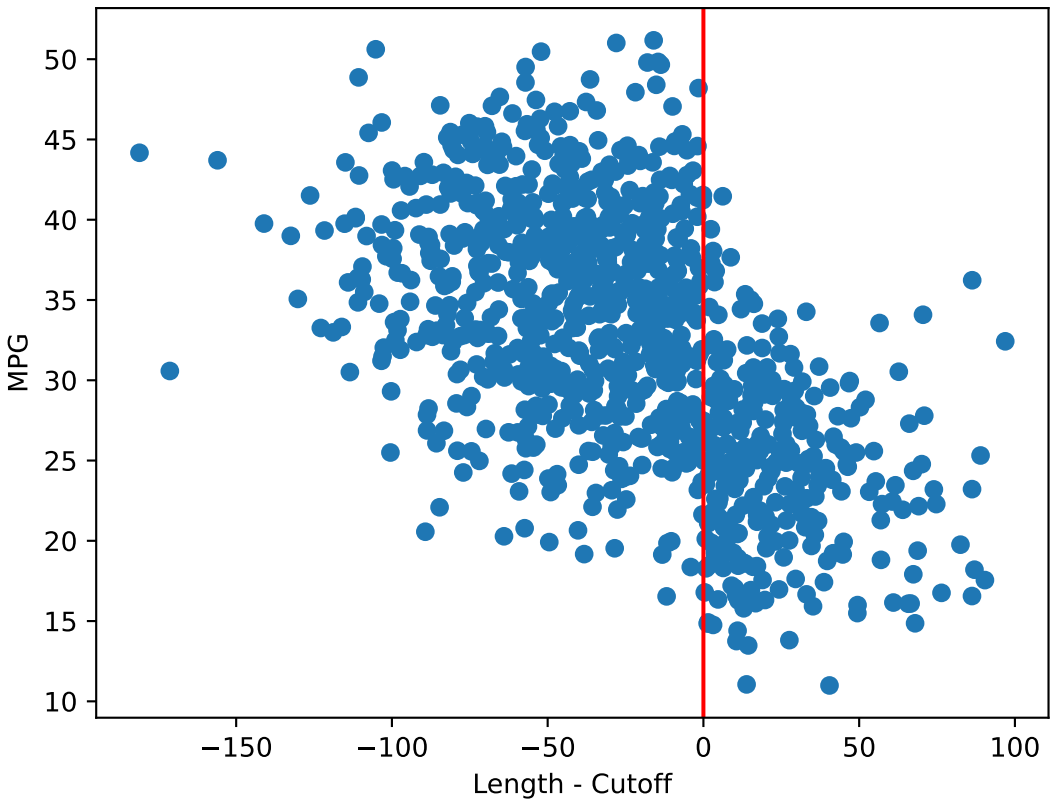

Figure 1: MPG vs Length

Bunching is defined as the pattern where data points seem to cluster in specific regions. There does not seem to be any evidence of bunching (Figure 1). However, there does seem to be a discontinuity at the cutoff for MPG.

1.3

The treatment effect is -8.27 mpg for the treated as shown in Table 1. The figure associated with it is Figure 2.

Table 1: First order polynomial RD

	Dependent variable:
	(1)
Treated	-8.27***
	(0.65)
Length minus Cutoff	-0.04***
	(0.01)
Constant	33.76***
	(0.41)
Observations	1,000
R^2	0.40
Adjusted R^2	0.40
Residual Std. Error	6.16
F Statistic	389.15***
Note:	*p<0.1; **p<0.05; ***p<0.01

1.4

The first stage treatment effect is 0.0002. RD plot: Fig3.

1.5

The treatment effect is 1.525. RD plot: Fig4.

1.6

The average treatment effect is -735.62.

2 Stata

2.1

Summary stats: Table 2
Graph: Figure 5

2.2

The F test gives a really high score of 38079. This tells us it might be a reasonable instrument.

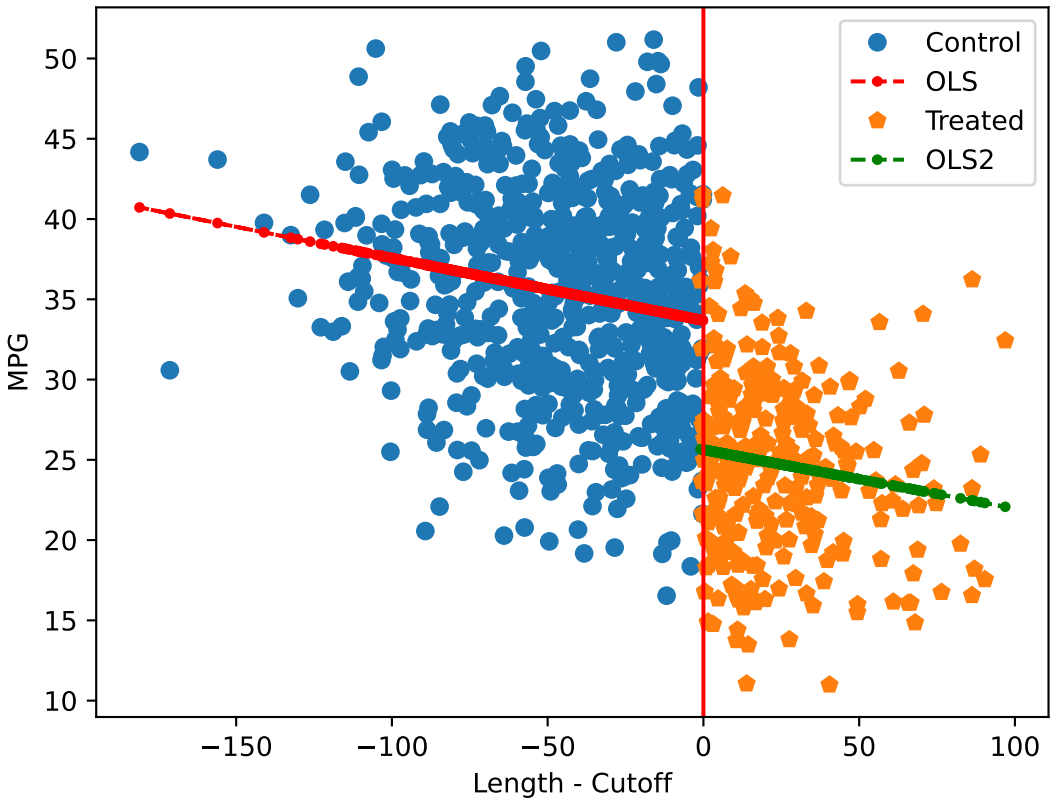

Figure 2: First order polynomial fit

	Dependent Variable: Car	
		(1)
	VARIABLES	Second-Stage Results: RD as IV
	mpg	-13.780
		(16.713)
	car	-3,274.540***
[]article		(262.455)
	Constant	22,245.661***
		(495.148)
	Observations	1,000
	R-squared	0.193

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 2: Summary Stats

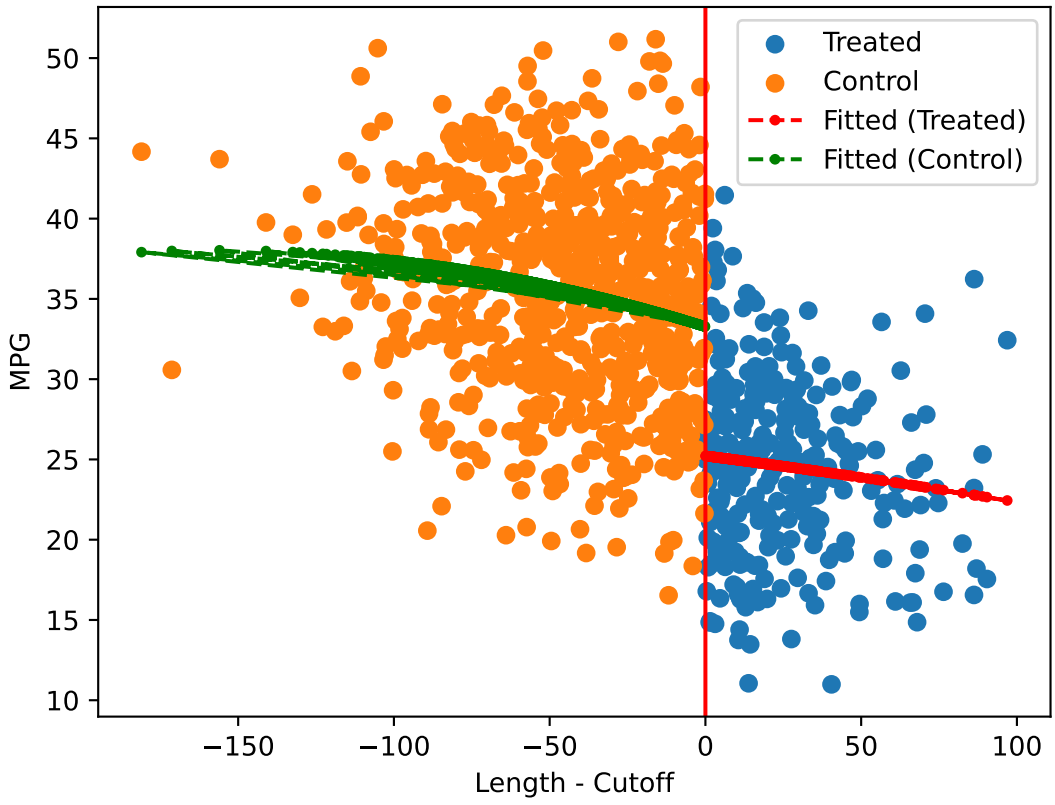

Figure 3: Second order polynomial fit

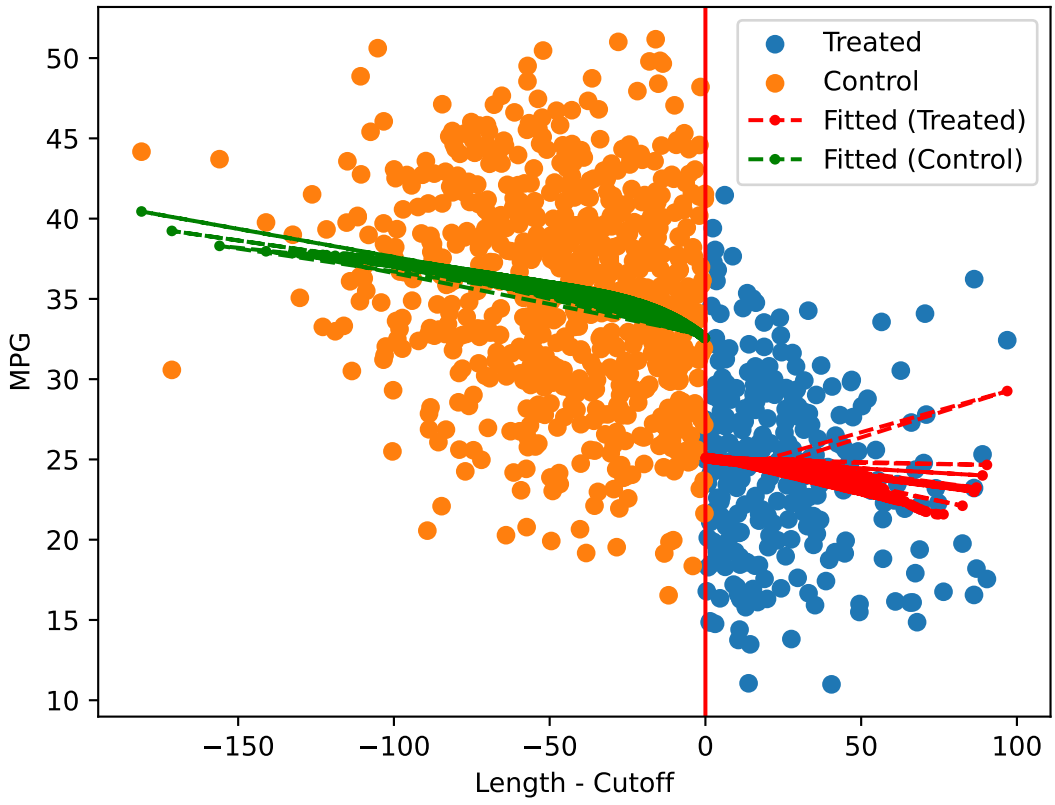

Figure 4: Fifth order polynomial fit

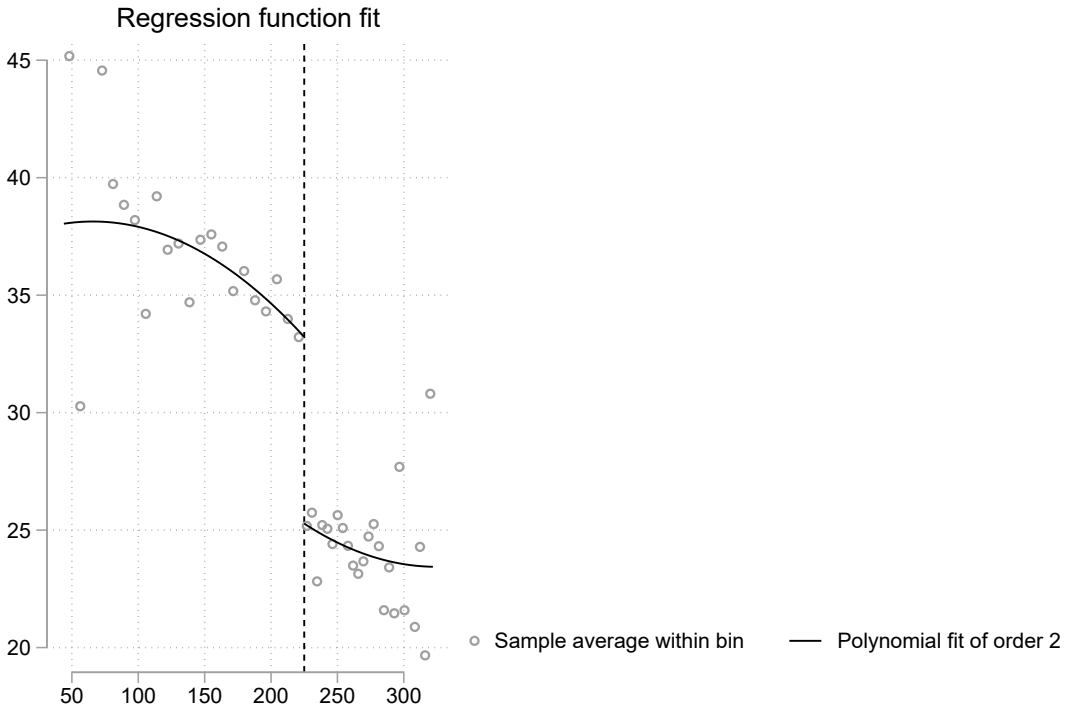

Figure 5: MPG(Predicted) vs length