

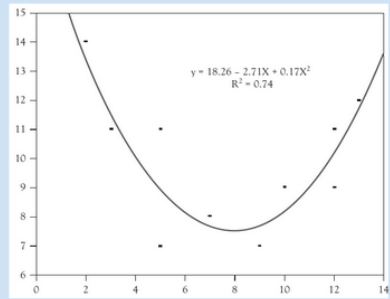
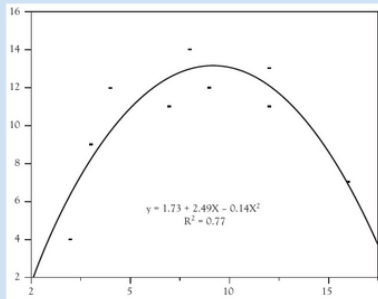
Today's Agenda

Extending the OLS Regression using Dataset 1

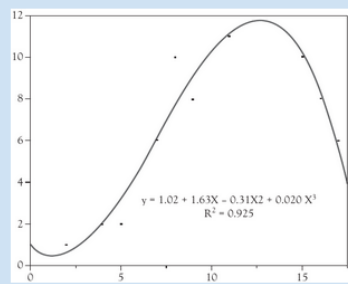
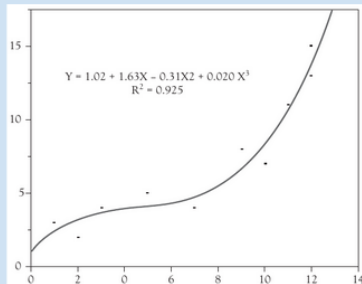
- 1 Dummy predictors
- 2 Categorical predictors
- 3 Transforming the variables
- 4 **Transforming the model**

Justin Leinaweaver (Spring 2022)

Quadratic Function



Cubic Function



Transforming the Model

Fit three separate OLS models to the data.

- 1 A standard, simple OLS model
- 2 An OLS with a quadratic function
- 3 An OLS with a cubic function

Do states with more manufacturing have larger economies?

Regress GDP (billions) on Manufacturing as:

- 1 A standard, simple OLS model
- 2 An OLS with a quadratic function
- 3 An OLS with a cubic function

Do states with more manufacturing have larger economies?

Regress GDP (billions) on Manufacturing as:

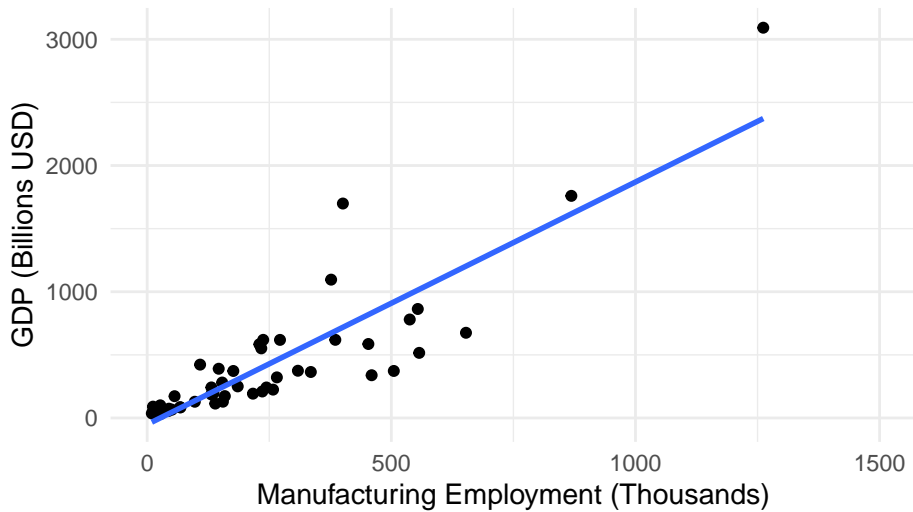
- 1 Manufacturing
- 2 $\text{Manufacturing} + \text{Manufacturing}^2$
- 3 $\text{Manufacturing} + \text{Manufacturing}^2 + \text{Manufacturing}^3$

	GDP (billions)		
	(1)	(2)	(3)
Manufacturing	1.92* (0.16)	0.77* (0.35)	2.10* (0.77)
Squared		0.001* (0.0003)	-0.002 (0.002)
Cubed			0.0000 (0.0000)
Constant	-51.20 (53.79)	87.00 (61.08)	1.36 (74.17)
Observations	50	50	50
Adjusted R ²	0.75	0.80	0.81
Residual Std. Error	268.27 (df = 48)	239.24 (df = 47)	232.61 (df = 46)
F Statistic	148.54* (df = 1; 48)	100.07* (df = 2; 47)	71.81* (df = 3; 46)

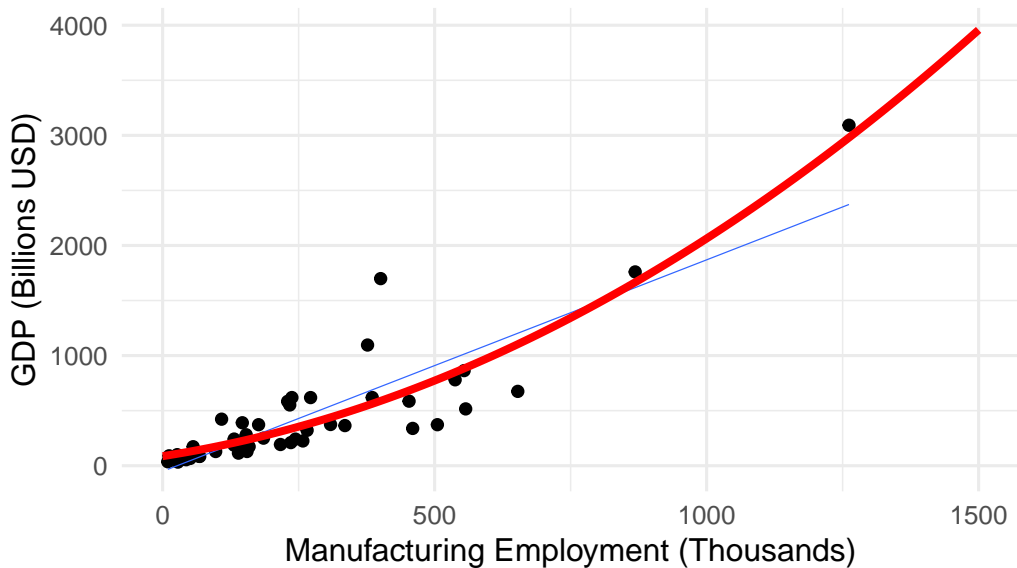
Note:

*p<0.05

Linear Model



Quadratic Model



Cubic Model



Does homeownership explain the size of the economy?

Regress GDP (billions) on Homeownership as:

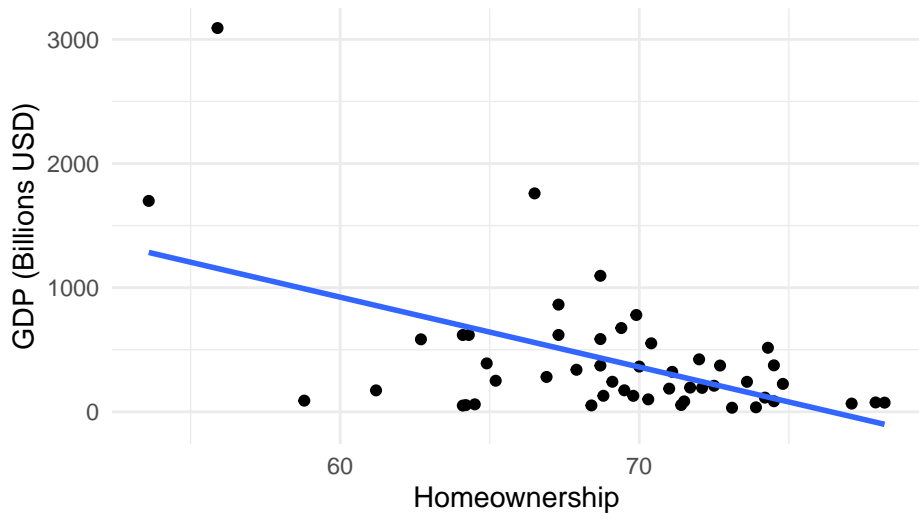
- 1 A standard, simple OLS model
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	GDP (billions)		
	(1)	(2)	(3)
Homeownership	-56.30* (12.70)	-579.69* (212.84)	-6,694.52* (2,976.30)
Squared		3.90* (1.59)	96.59* (45.03)
Cubed			-0.47* (0.23)
Constant	4,301.63* (879.84)	21,723.19* (7,122.48)	155,210.00* (65,182.20)
Observations	50	50	50
Adjusted R ²	0.28	0.34	0.39
Residual Std. Error	457.31 (df = 48)	434.93 (df = 47)	420.67 (df = 46)
F Statistic	19.64* (df = 1; 48)	13.89* (df = 2; 47)	11.31* (df = 3; 46)

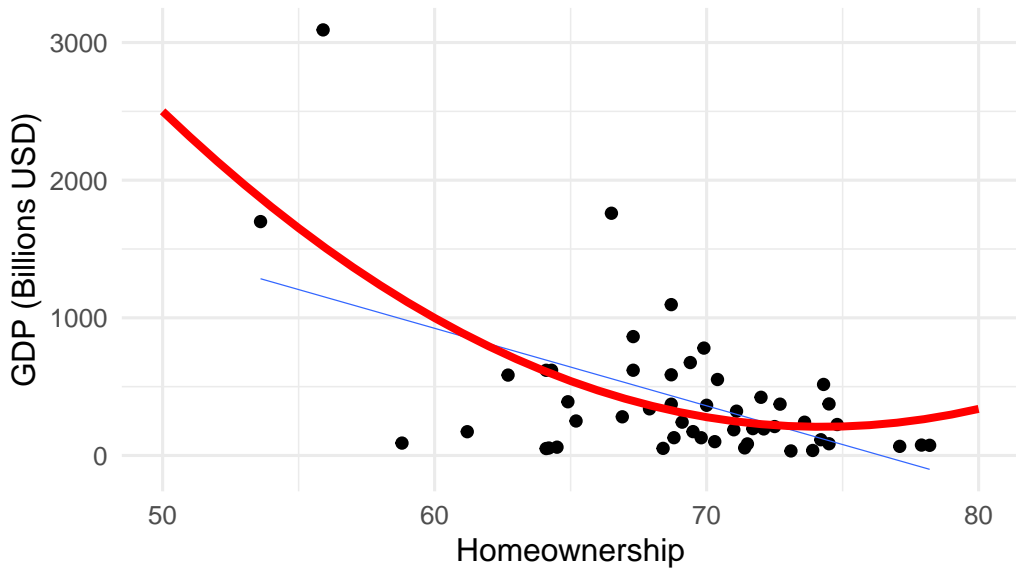
Note:

*p<0.05

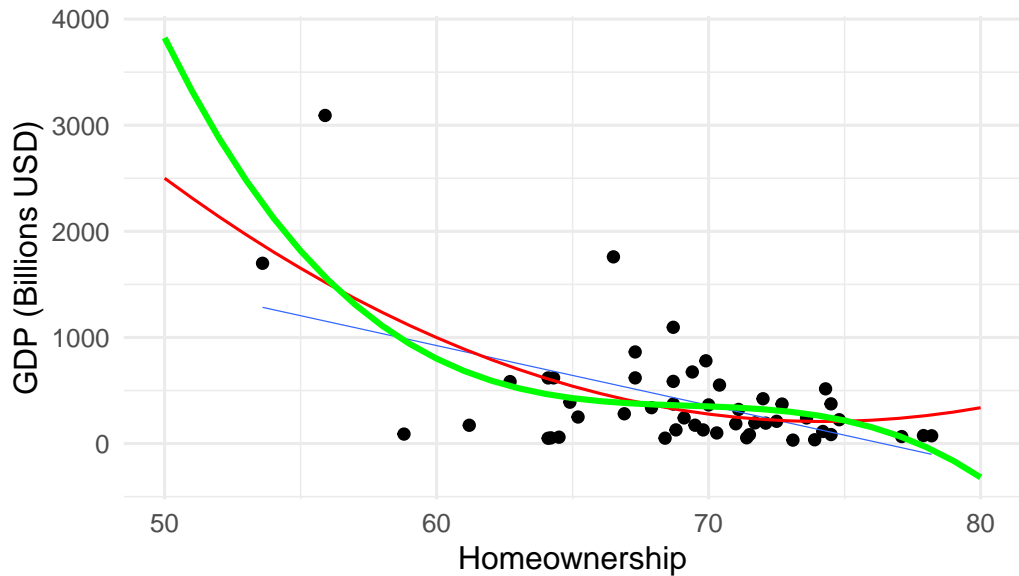
Linear Model



Quadratic Model



Cubic Model



Does unemployment explain the size of the economy?

Regress GDP (billions) on Unemployment as:

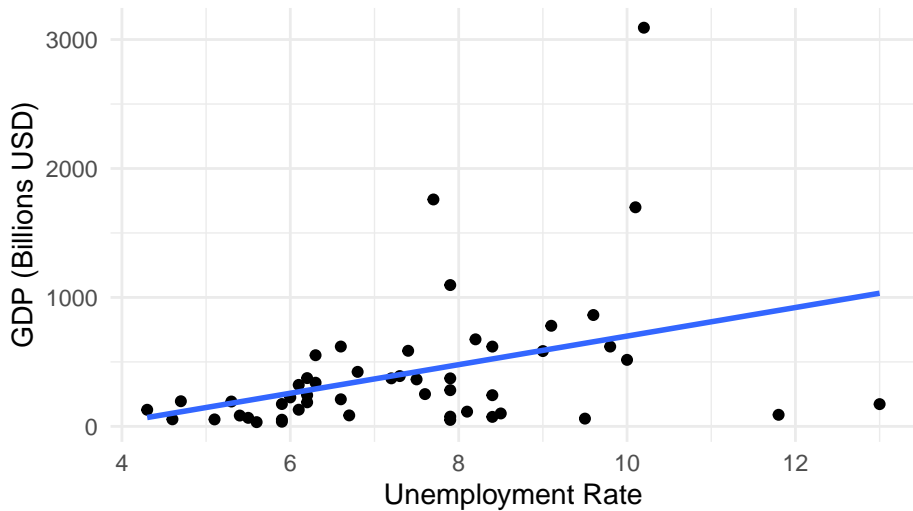
- 1 A standard, simple OLS model
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	GDP (billions)		
	(1)	(2)	(3)
Unemployment	110.80* (38.97)	451.98 (247.19)	−2,018.53 (1,253.15)
Squared		−21.11 (15.11)	285.01 (153.11)
Cubed			−12.01 (5.98)
Constant	−407.76 (297.43)	−1,706.80 (975.16)	4,602.56 (3,280.45)
Observations	50	50	50
Adjusted R ²	0.13	0.14	0.20
Residual Std. Error	502.19 (df = 48)	497.28 (df = 47)	481.97 (df = 46)
F Statistic	8.09* (df = 1; 48)	5.10* (df = 2; 47)	4.96* (df = 3; 46)

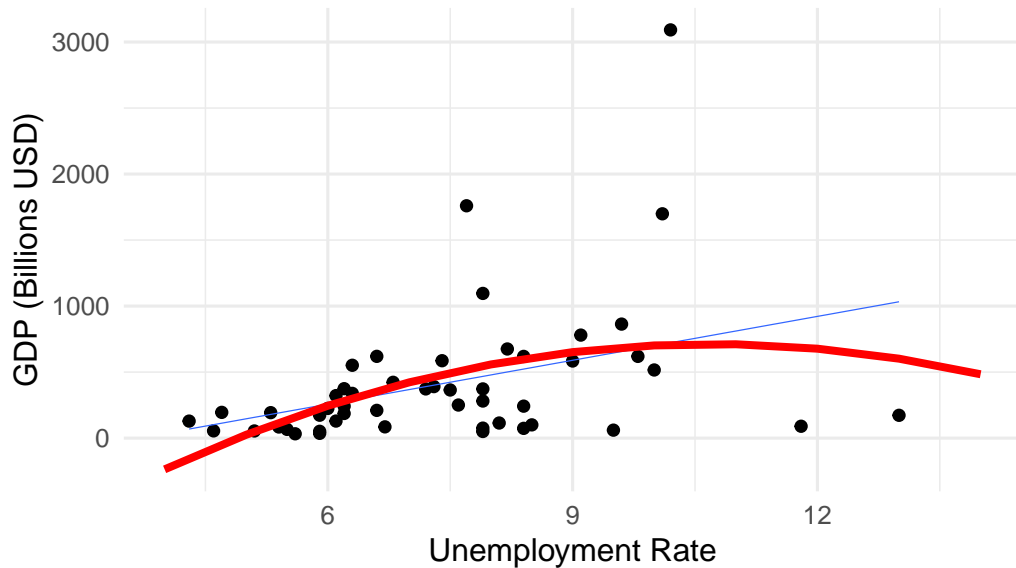
Note:

*p<0.05

Linear Model



Quadratic Model



Cubic Model

