

Predicting Beef Cattle Yield

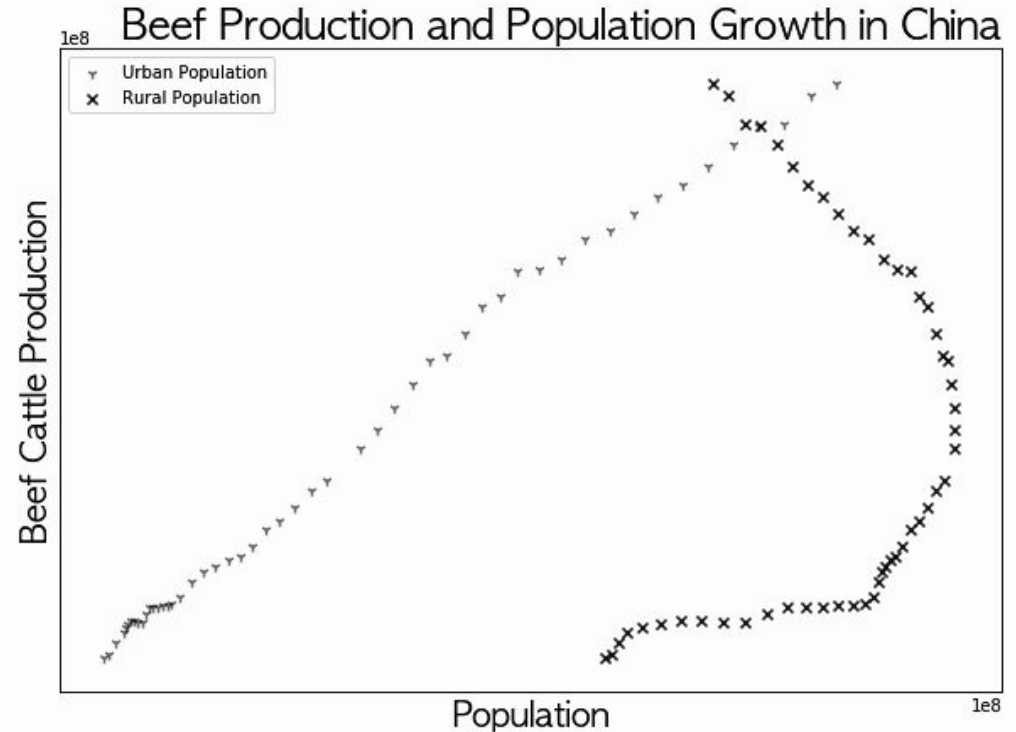
Modeling our food system with regression analysis



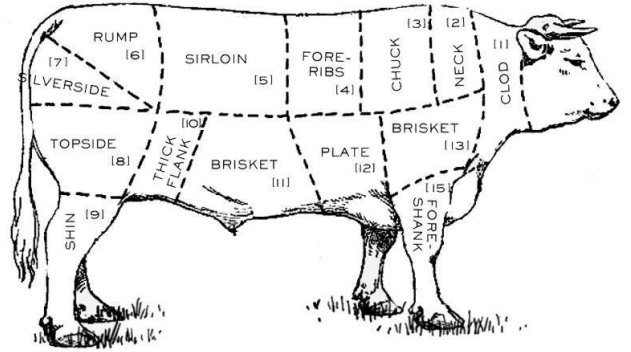
Connor Eaton
Metis: Project Luther

An Increasing Appetite

- Rising supply and demand
- Positives and negatives
- Globalised production



Complex Production



Gathering, scraping, and processing data

Environmental

- Country --> GDP
- Annual sum rainfall
- Urban Population
- Rural Population



Cattle

- Cattle head
- **Production (y)**
- Mean weight
- Supply per capita
- Harvested animals



Agronomic

- Corn yield and area
- Soy yield and area



Feature engineering

- Getting data on same order of magnitude
- Log transforming certain features
- Standard scalar
- Creating new features
- Reducing features



Regularization and reducing complexity

Environmental

- ~~Country~~ > GDP
- ~~Annual sum rainfall~~
- Urban Population
- ~~Rural Population~~
- + China



Cattle

- Cattle head
- Production (y)
- ~~Mean weight~~
- Supply per capita
- Harvested animals

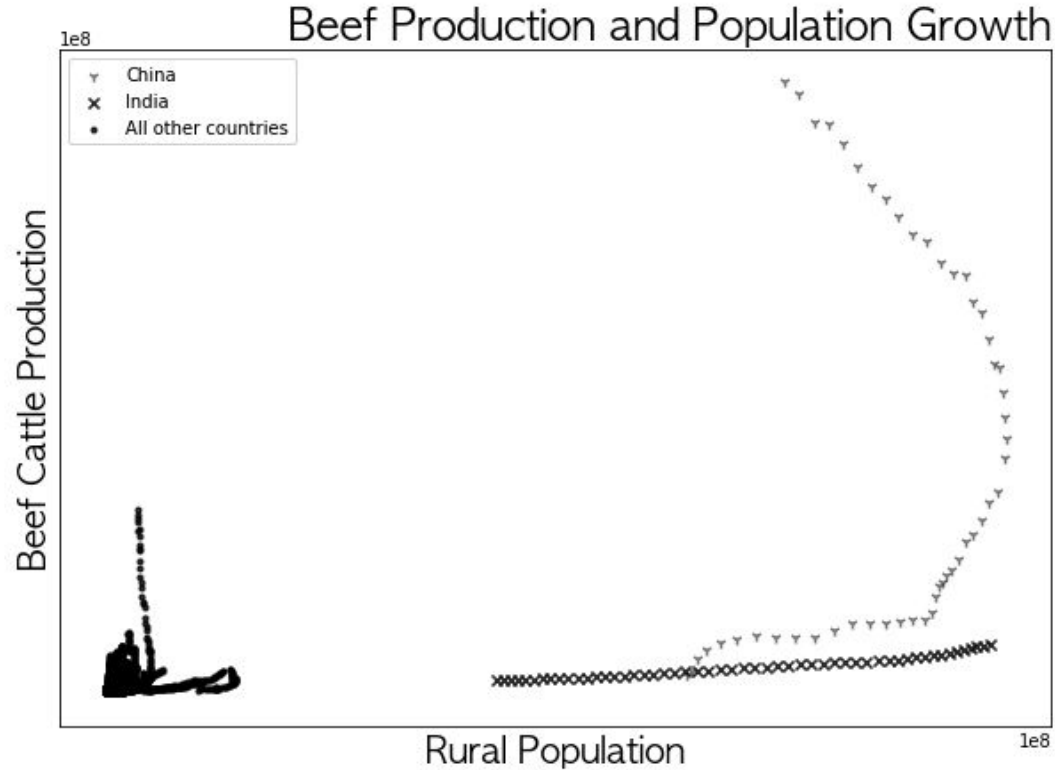


Agronomic

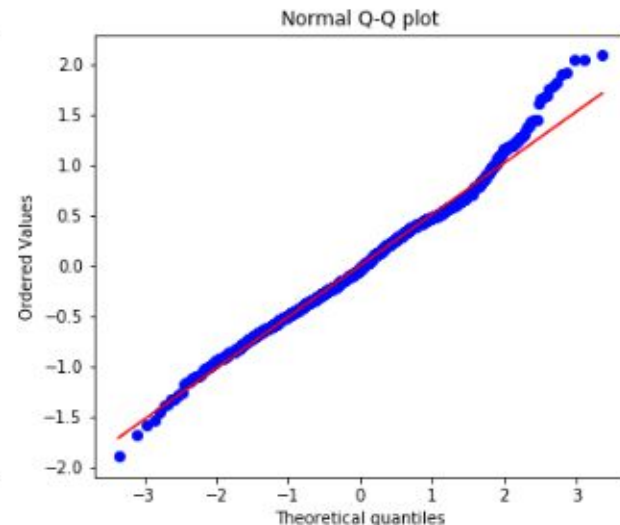
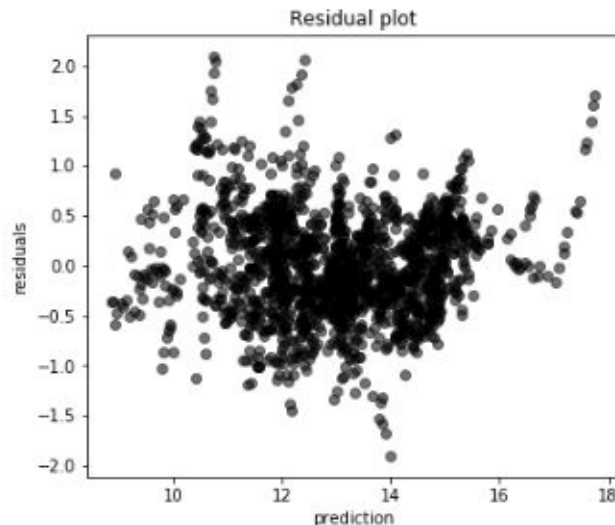
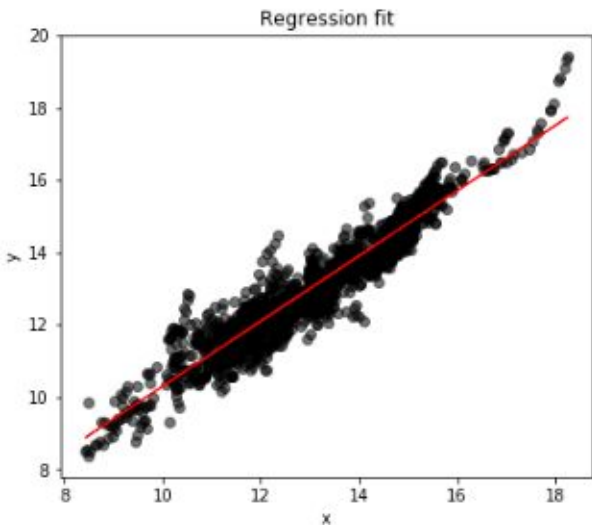
- Corn yield and area
- ~~Soy yield~~ and area



Regularization and reducing complexity



Training data with RidgeCV.

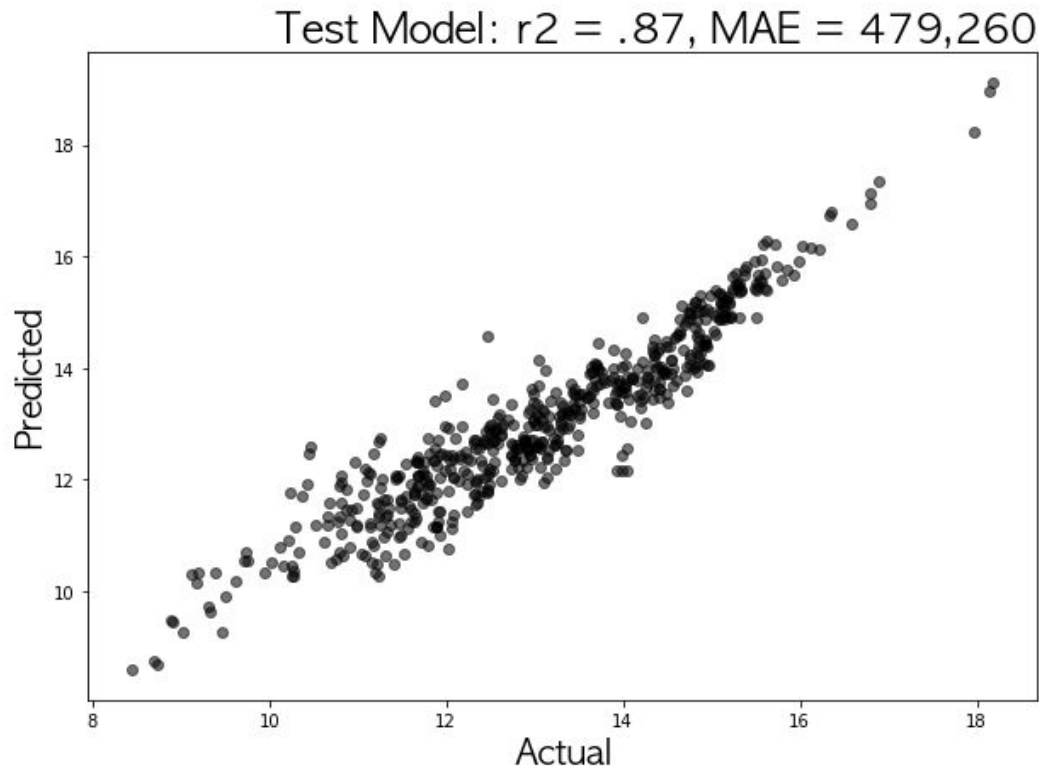


MAE = 455,886

$R^2 = .898$

Alpha = .0001

RidgeCV Model - Test data

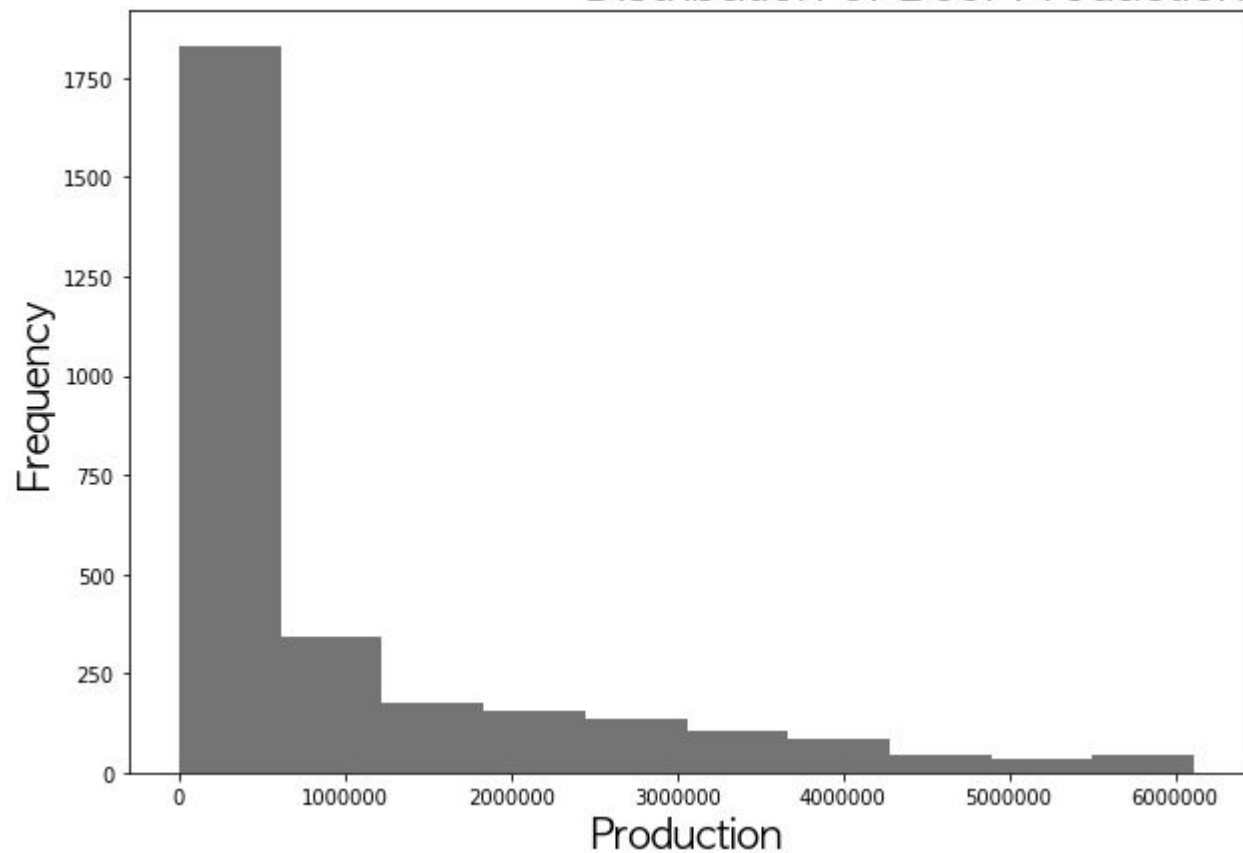


Thank you



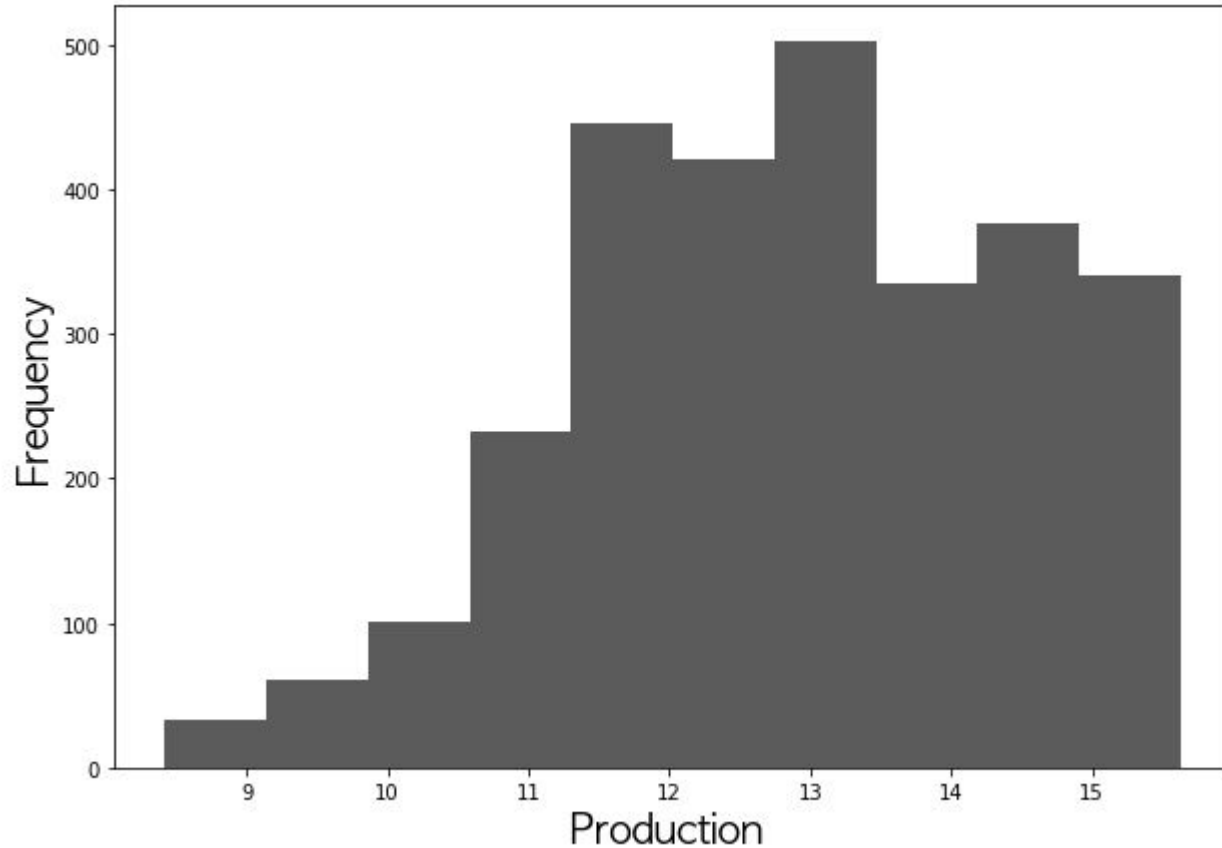
Appendix

Distribution of Beef Production



Raw data

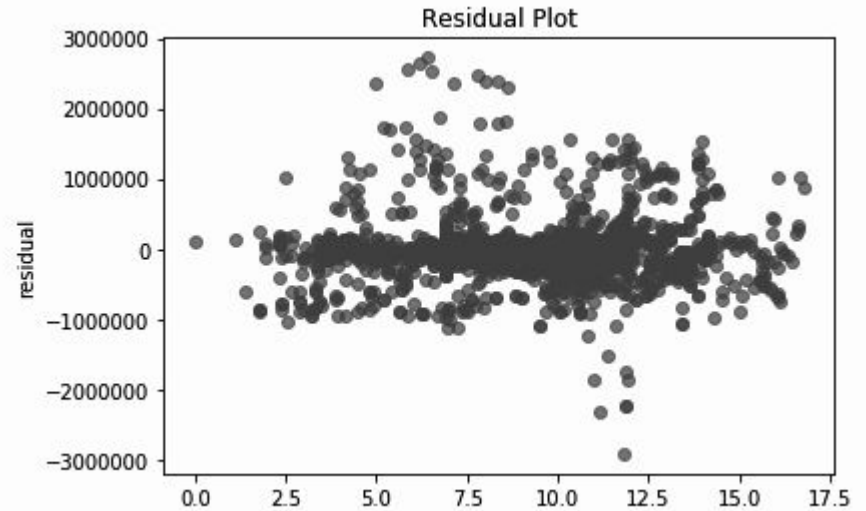
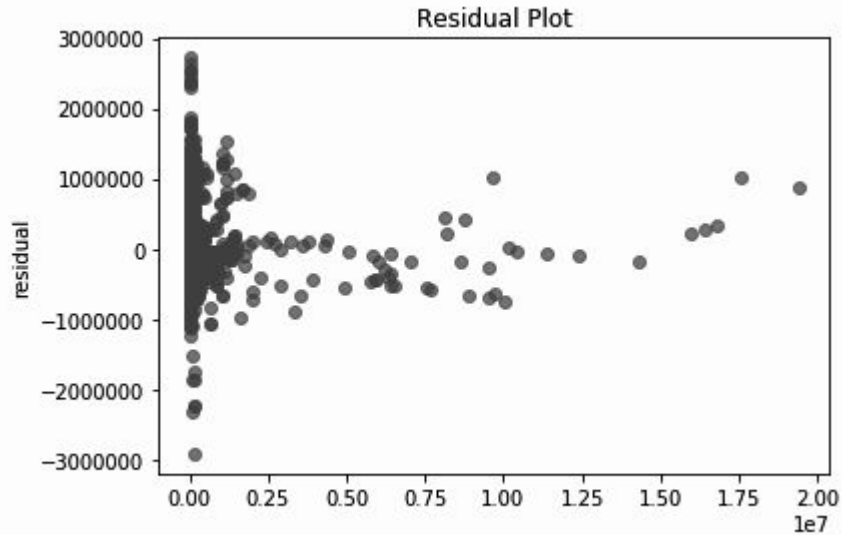
Distribution of Beef Production



Log transform data

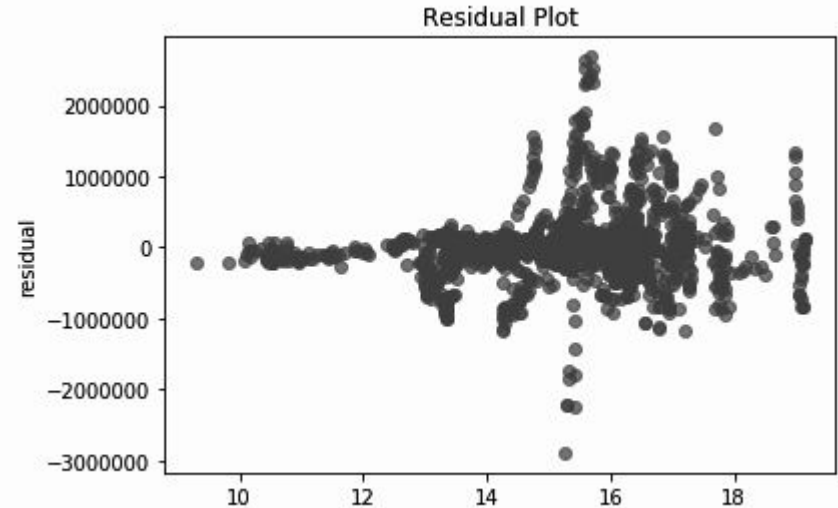
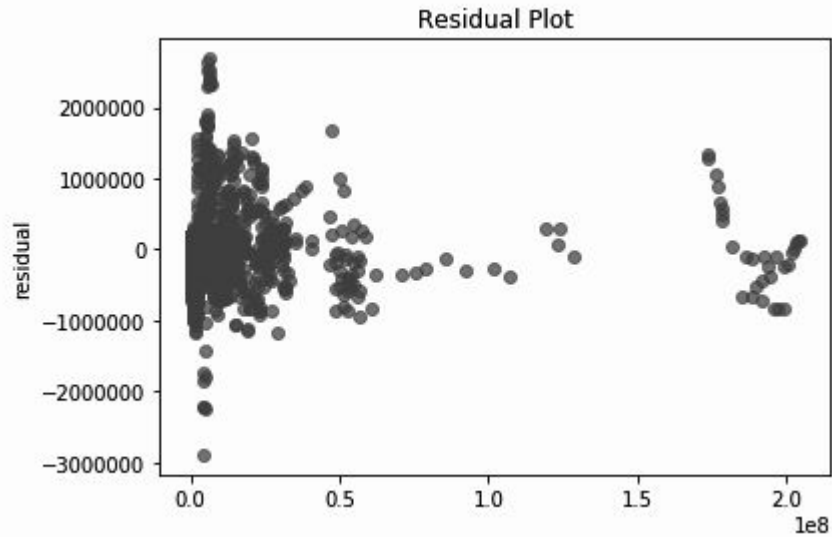
Zeroes not included
in plot.

Log transform examples: residual plots



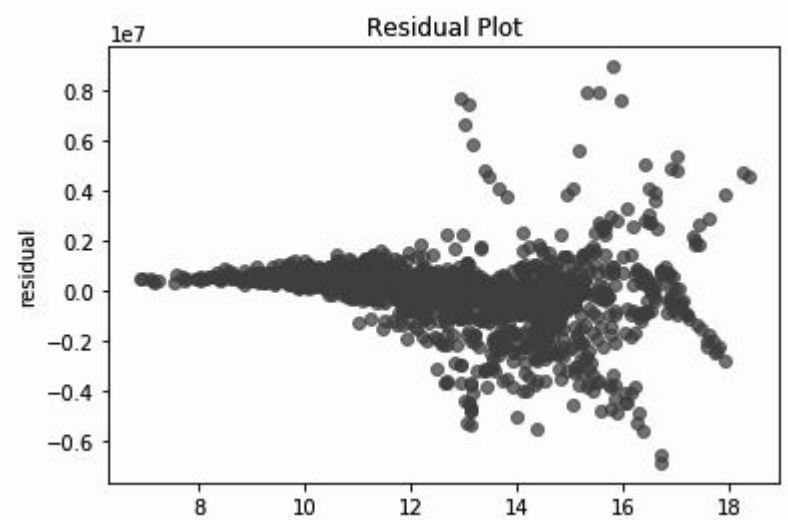
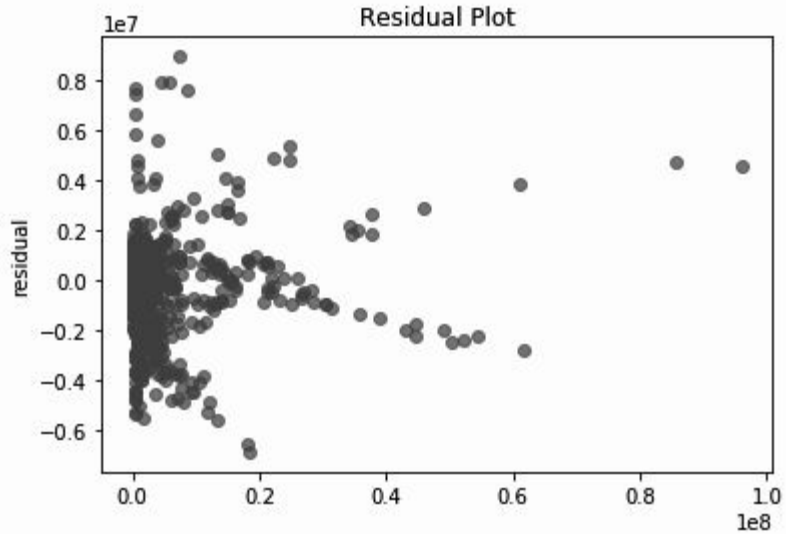
Feature: Soy area -- log transformed

Log transform examples: residual plots



Feature: Cattle head

Log transform examples: residual plots



Feature: GDP

Image credits

<https://www.rawpixel.com/image/481572/grazing-cow-jean-bernard-1775-1883-original-rijksmuseum-digitally-enhanced-rawpixel>

<https://sibleyfineart.com/tutorial--draw-grass.htm>

<http://clipart-library.com/maize-cliparts.html>

<https://www.goodwood.com/estate/farmer-butcher-chef/>