Predicting Canadian Food Prices

Patrick Walter

Background: Canada's Food Price Report

- This year the 8th edition of Canada's Food Price Report was published as a collaborative effort between Dalhousie University and University of Guelph.
- The report looks at factors that affect the future prices seen by consumers for food over the next 12-month period.
- Includes the key drivers of the upcoming year's food prices such as Climate, Energy Costs, Inflation, Policy Context, Food Processing Industry, Consumer Debt and Deleveraging and many more.
- The report divides the CPI basket into food categories including Dairy and Eggs, Fruit and Nuts, Meats, Vegetables, and Fish and Seafood.

Background: Consumer Price Index

- An indicator of the changes in prices experienced by Canadians, obtained by comparing the rising or falling cost of a fixed basket of good and services.
- Fixed basket means that products and services are of the same quality and quantity and therefore these changes in cost are a true reflection of the pure price changes.
- Data is released monthly and open to the public on Statistics Canada's website as part of the CANSIM database.

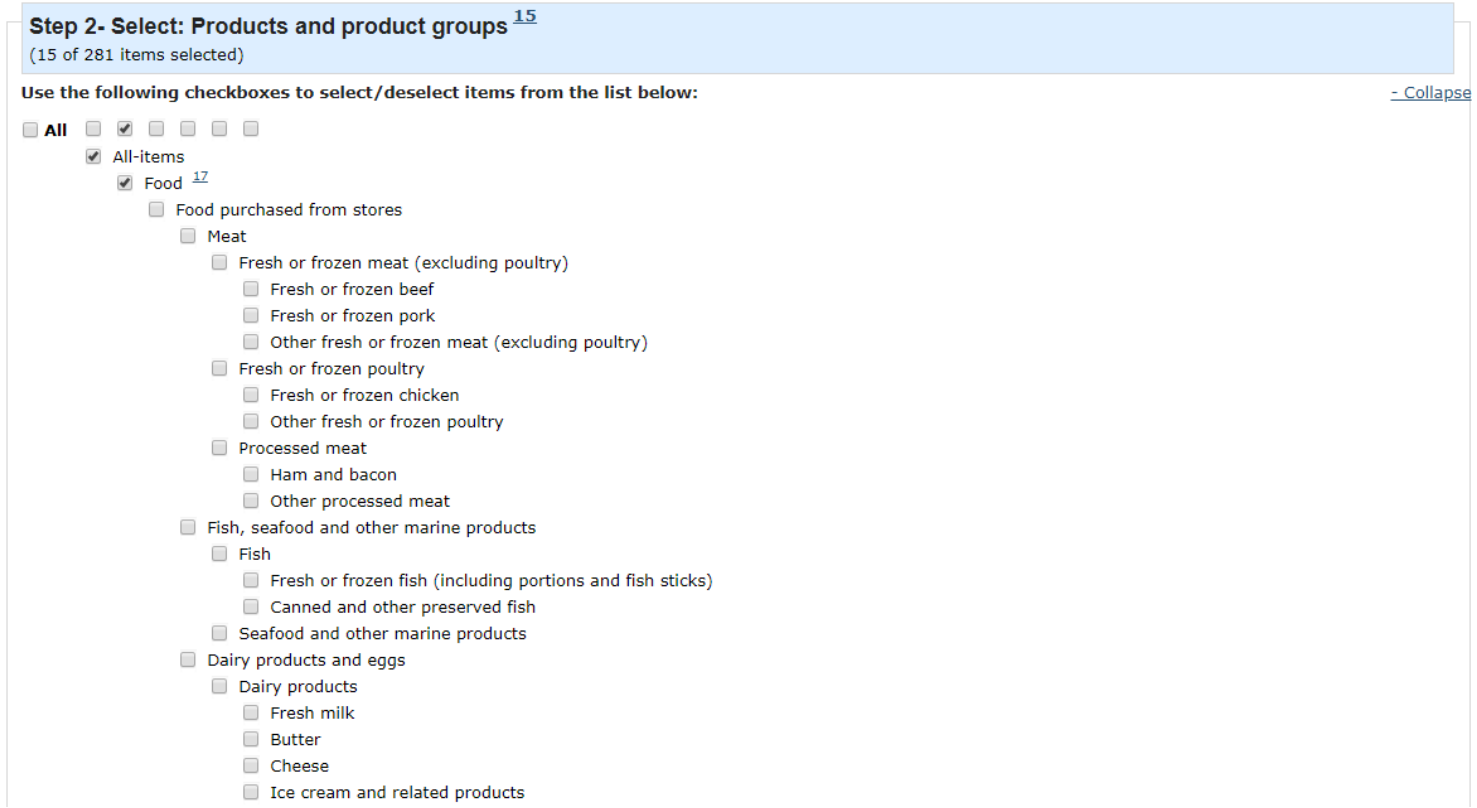
Background: Consumer Price Index

Consumer Price Index, by province (monthly) (Canada)

	February 2017	January 2018	February 2018	January 2018 to February 2018	February 2017 to February 2018
	2002=100			% change	
Canada					
All-items	**129.7**	**131.7**	**132.5**	**0.6**	**2.2**
Food	141.7	144.7	**144.7**	0.0	2.1
Shelter	137.6	139.7	**140.0**	0.2	1.7
Household operations and furnishings	121.7	122.4	**123.4**	0.8	1.4
Clothing and footwear	92.9	91.7	**93.3**	1.7	0.4
Transportation	131.9	137.2	**137.7**	0.4	4.4
Health and personal care	123.3	125.1	**125.6**	0.4	1.9
Recreation, education and reading	113.2	111.8	**114.1**	2.1	0.8
Alcoholic beverages and tobacco products	159.2	163.2	**164.1**	0.6	3.1
Special aggregates					
All items excluding food	127.3	129.2	**130.1**	0.7	2.2
All items excluding energy	127.8	129.5	**130.3**	0.6	2.0
Energy	151.1	159.5	**159.1**	-0.3	5.3

Source: Statistics Canada, CANSIM, table 326-0020 and Catalogue nos. 62-001-X and 62-010-X.
Last modified: 2018-03-23.

Background: Consumer Price Index



Background: Consumer Price Index

Selected items [Add/Remove data]

Geography = Nova Scotia
Products and product groups [15] = Coffee and tea

2017											2018	
February	March	April	May	June	July	August	September	October	November	December	January	February
Percentage Change (period-to-period)												
	3.5	0.4	-1.0	0.7	-2.1	0.8	2.1	-1.0	-1.5	4.5	-1.3	1.4

Background: Consumer Price Index

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Geography = Nova Scotia
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2017											2018	
February	March	April	May	June	July	August	September	October	November	December	January	February
Percentage Change (year-to-year)												
												6.5

Research Objectives

- Train and test predictive models for predicting the average national food price as reported by the CPI for a twelve month period for 5 years, from 2012 to 2016.
- Train and test predictive models for predicting 21 other targets in the CPI basket for the years 2016 and 2017.
- Gain insight on what years were difficult to predict, and what products were difficult to predict.

Dataset

- The original dataset was built by Jay Harris for his work on the 2017 and 2018 Canada Food Price Report and his thesis research titled *A Machine Learning Approach to Forecasting Consumer Food Price*
- It was constructed using a wide range of financial and econometric data from public and private institutions totaling 280 attributes
- The data set began at January 1985 with monthly records concluding at August 2017 giving 291 records.
- 22 targets from the CPI basket, mostly food products.

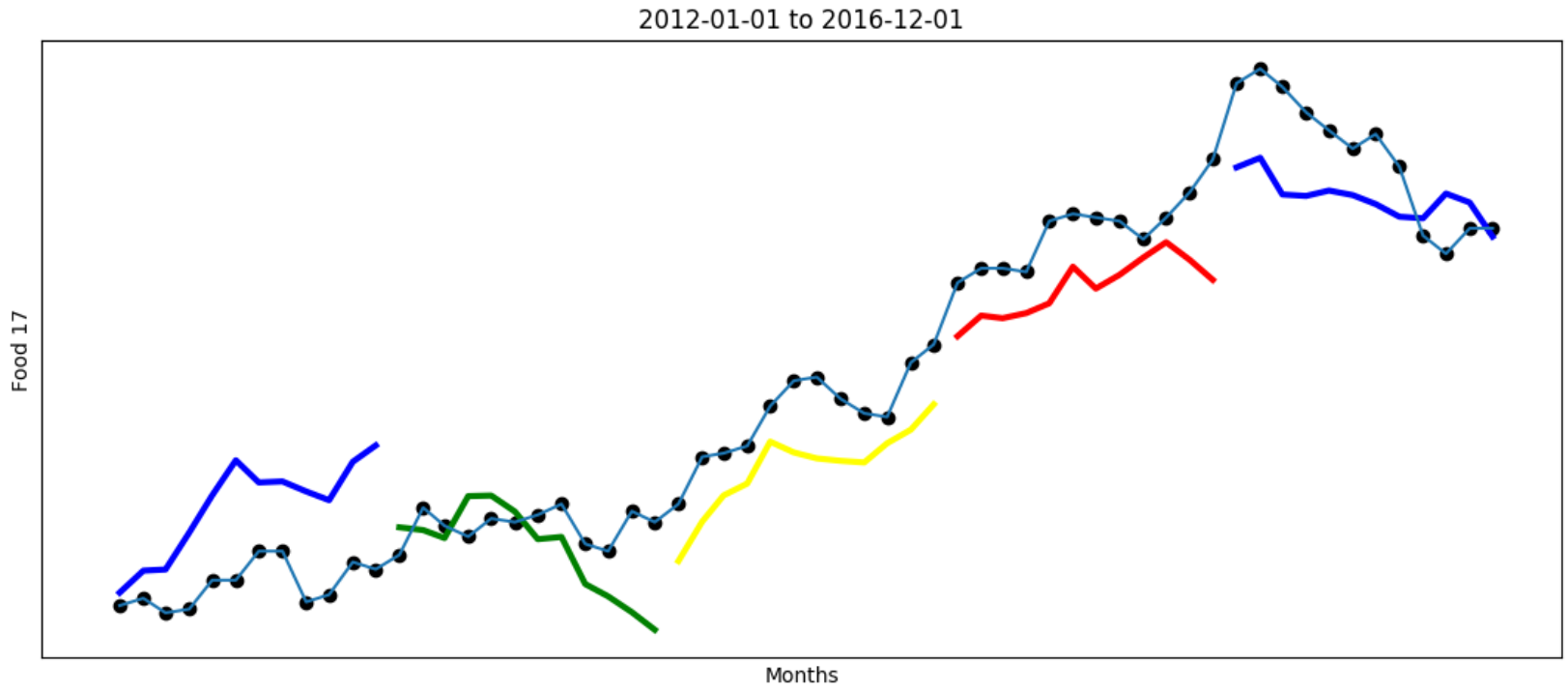
Data Preprocessing

- Pandas *dataframes* was used to manipulate the data.
- *Dataframe* is a tabular data structure that has labeled axes.
- Dividing the dataset in targets and attributes
- Capping the dataset at 1999
- Removing any columns that were incomplete
- Creating train and test *dataframes* for each of the five years
- Creating *dataframes* for each of the individual targets

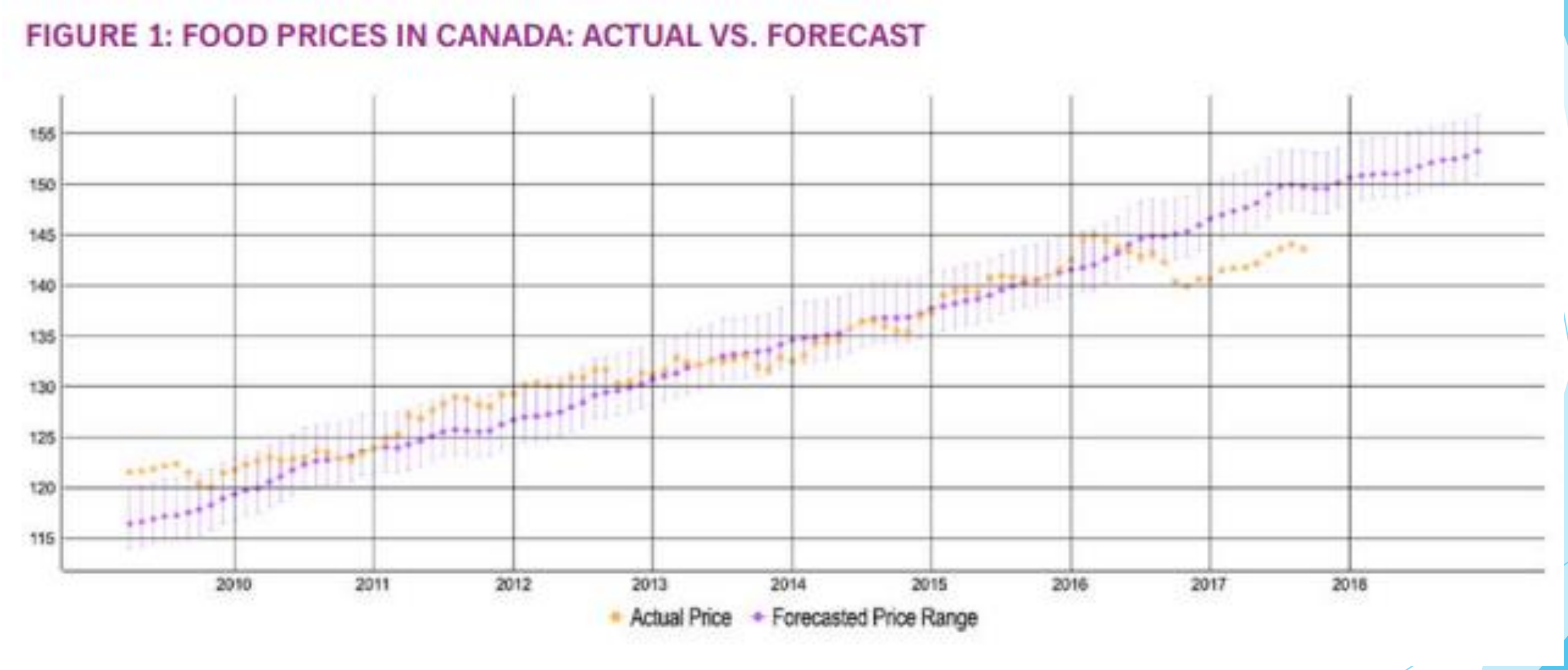
Tools: Python Scikit Learn

- A machine learning library for Python with a wide variety of implementations for popular algorithms.
- This research used the ordinary least squares linear regression implementation. Easy to use to train and test linear regression models.
- Feature selection, using mutual information and a selector to select the highest scoring features.

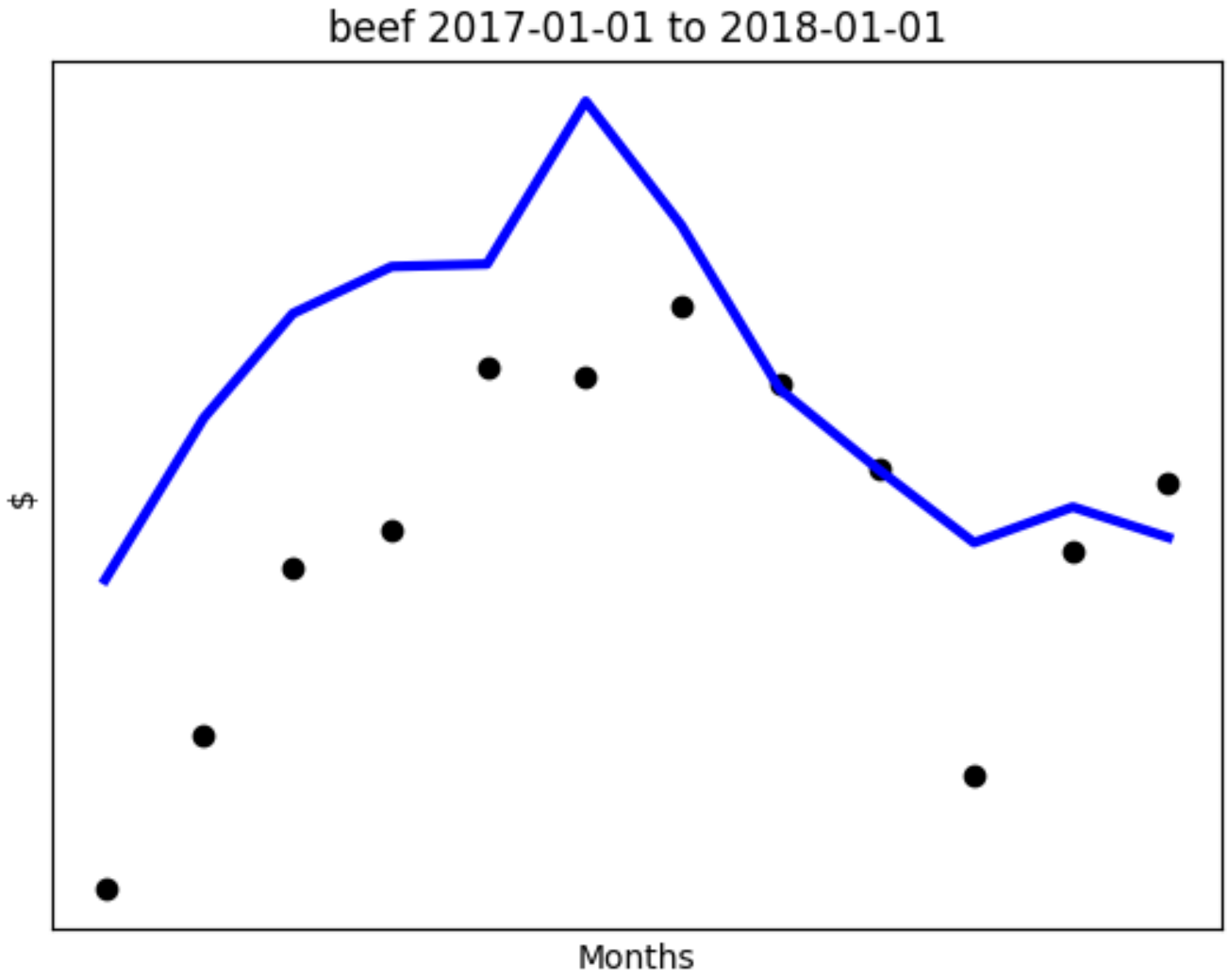
Capturing downward trends, k=25



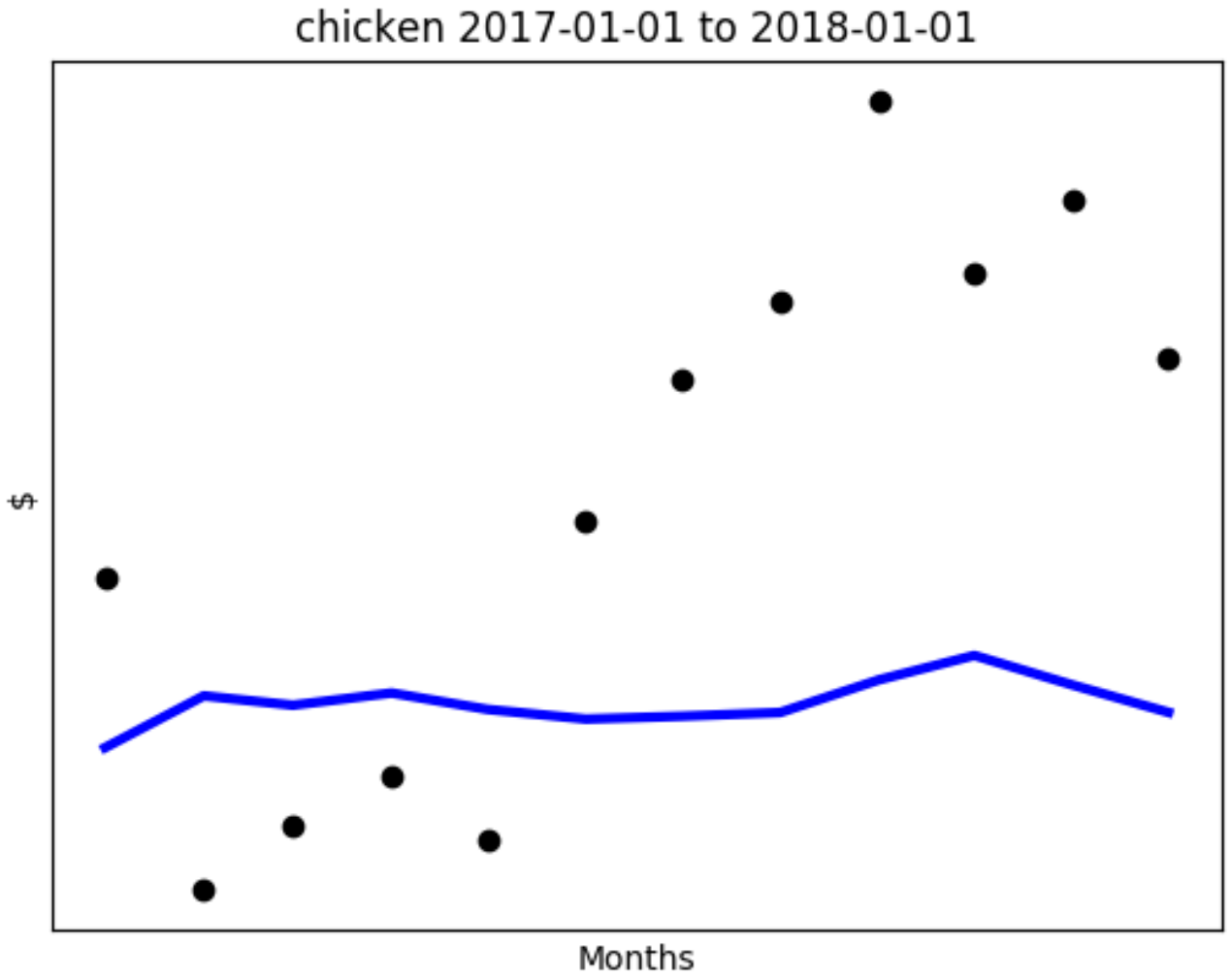
Food Price Report 2018



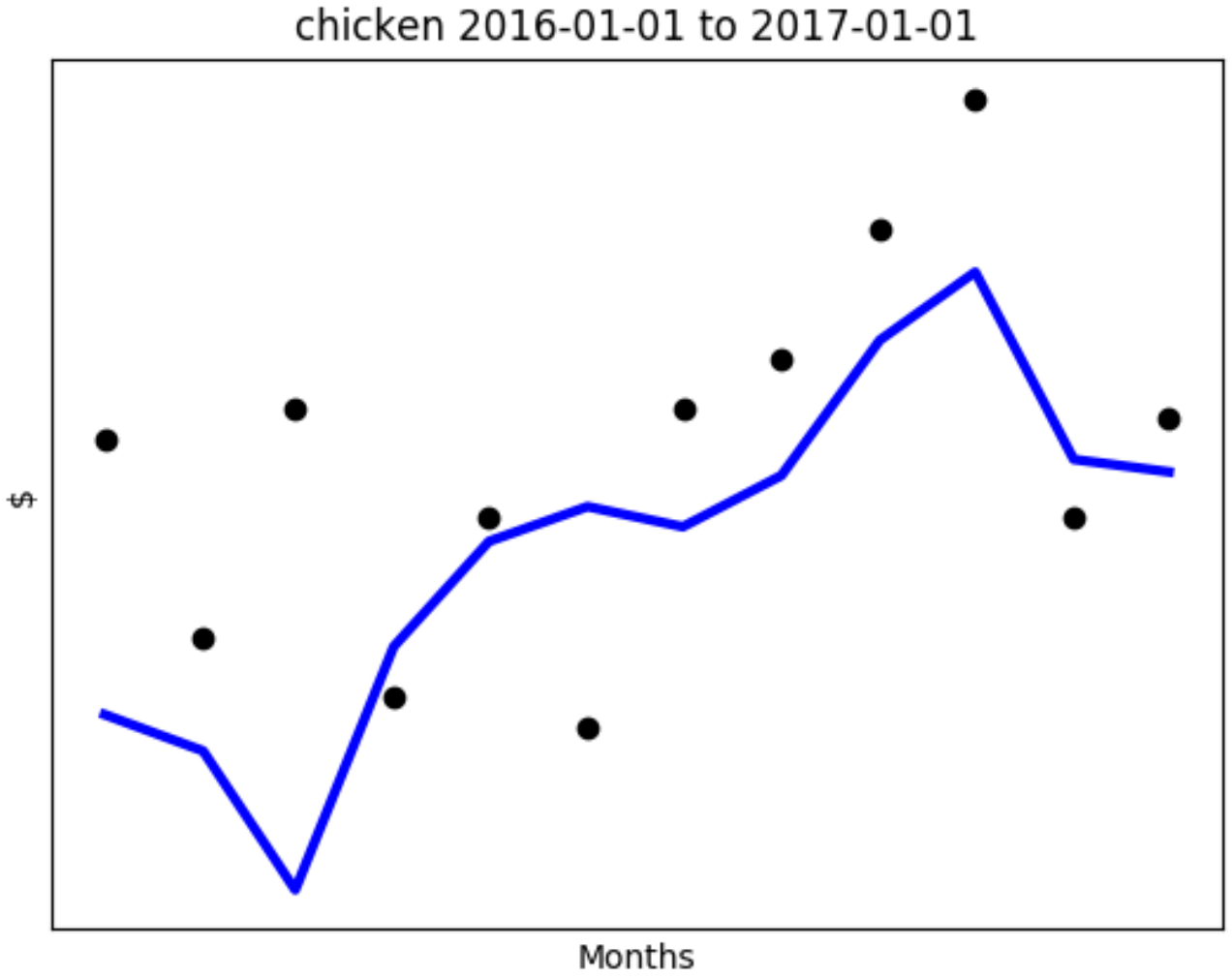
Individual Foods



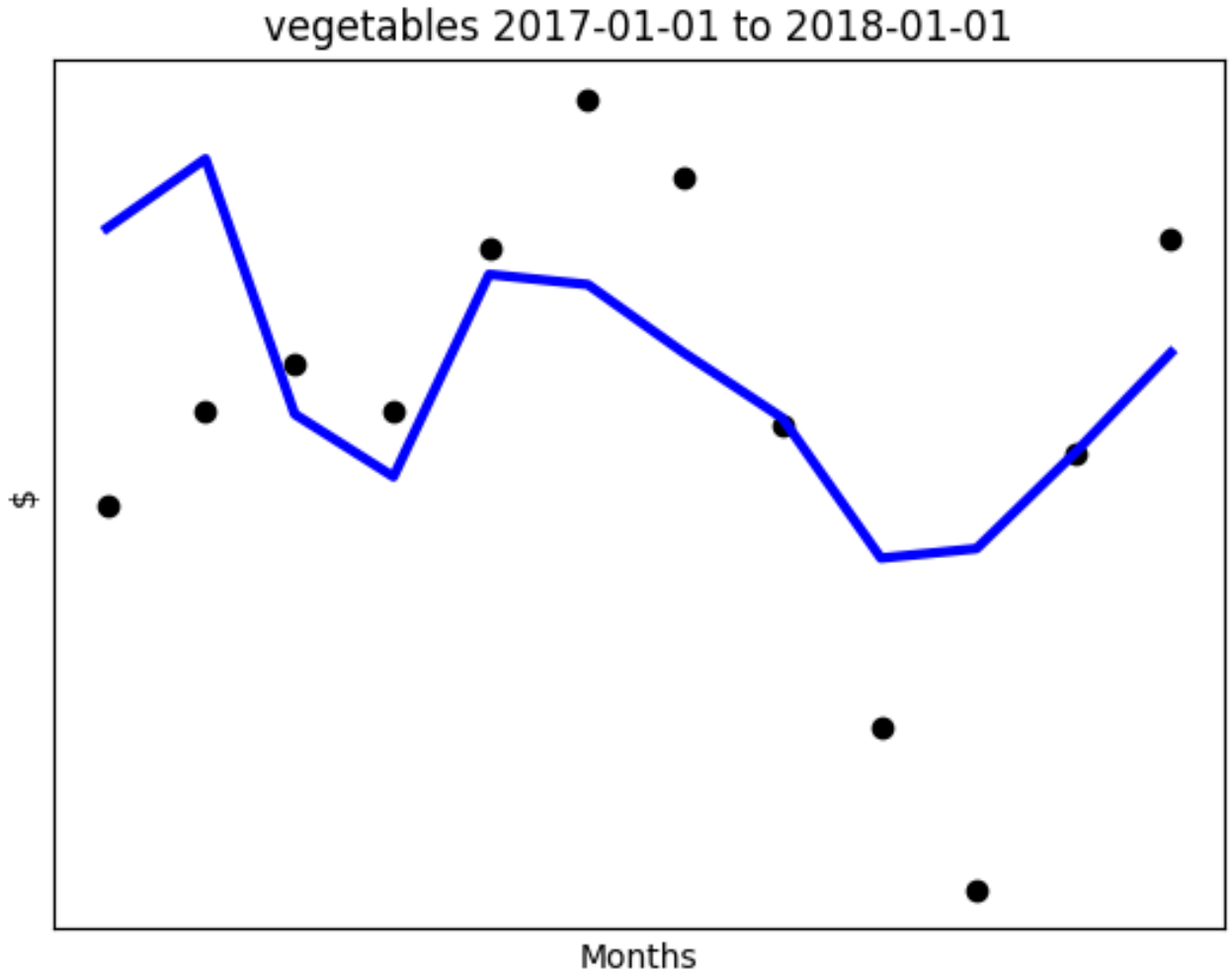
Individual Foods



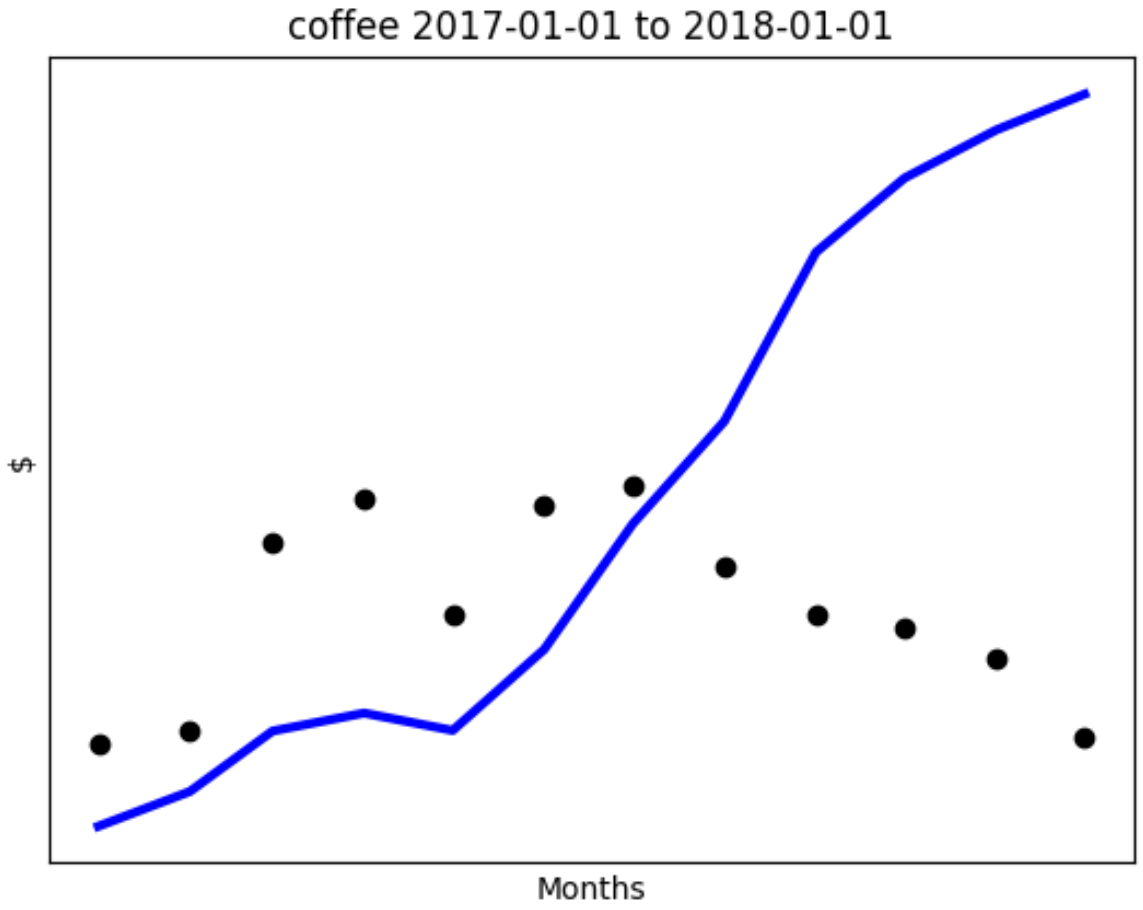
Individual Foods



Individual Foods



Individual Foods



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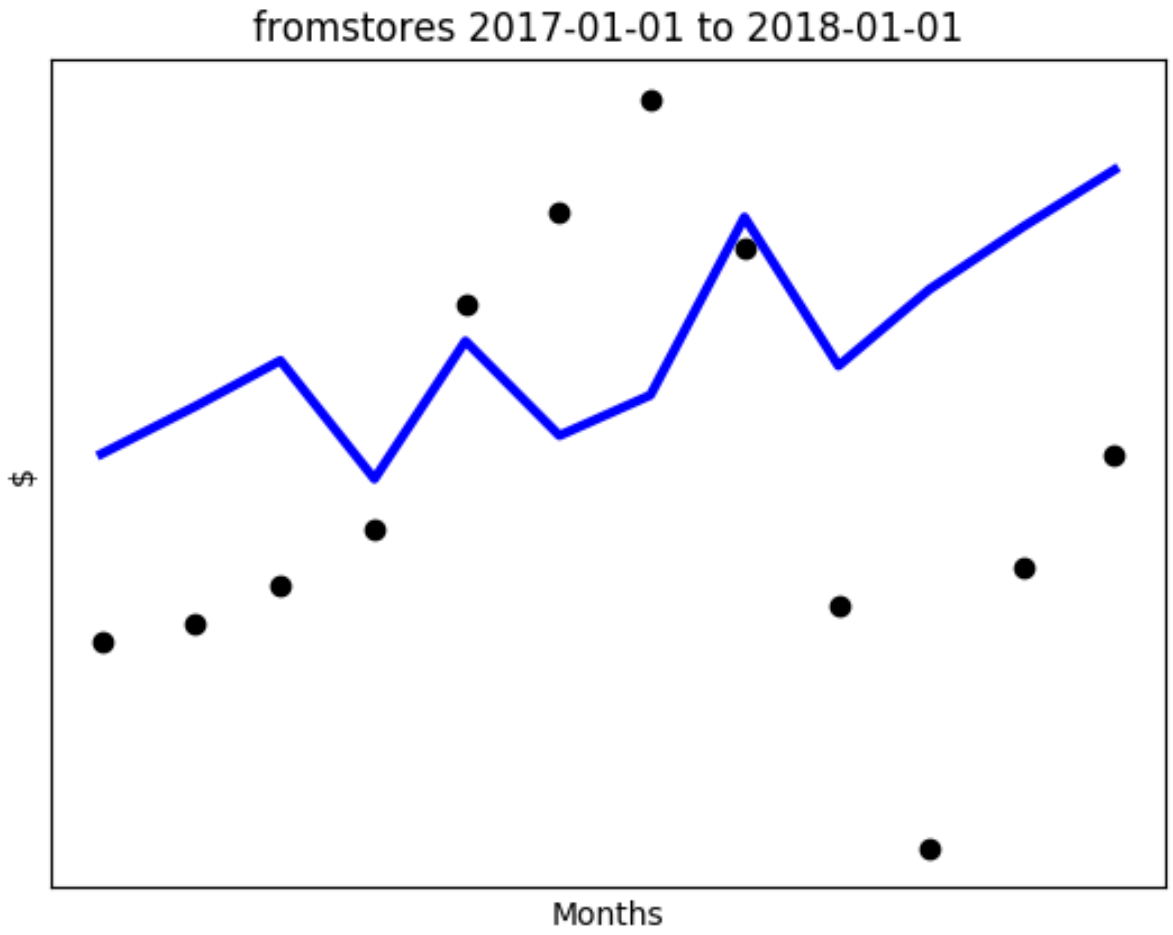

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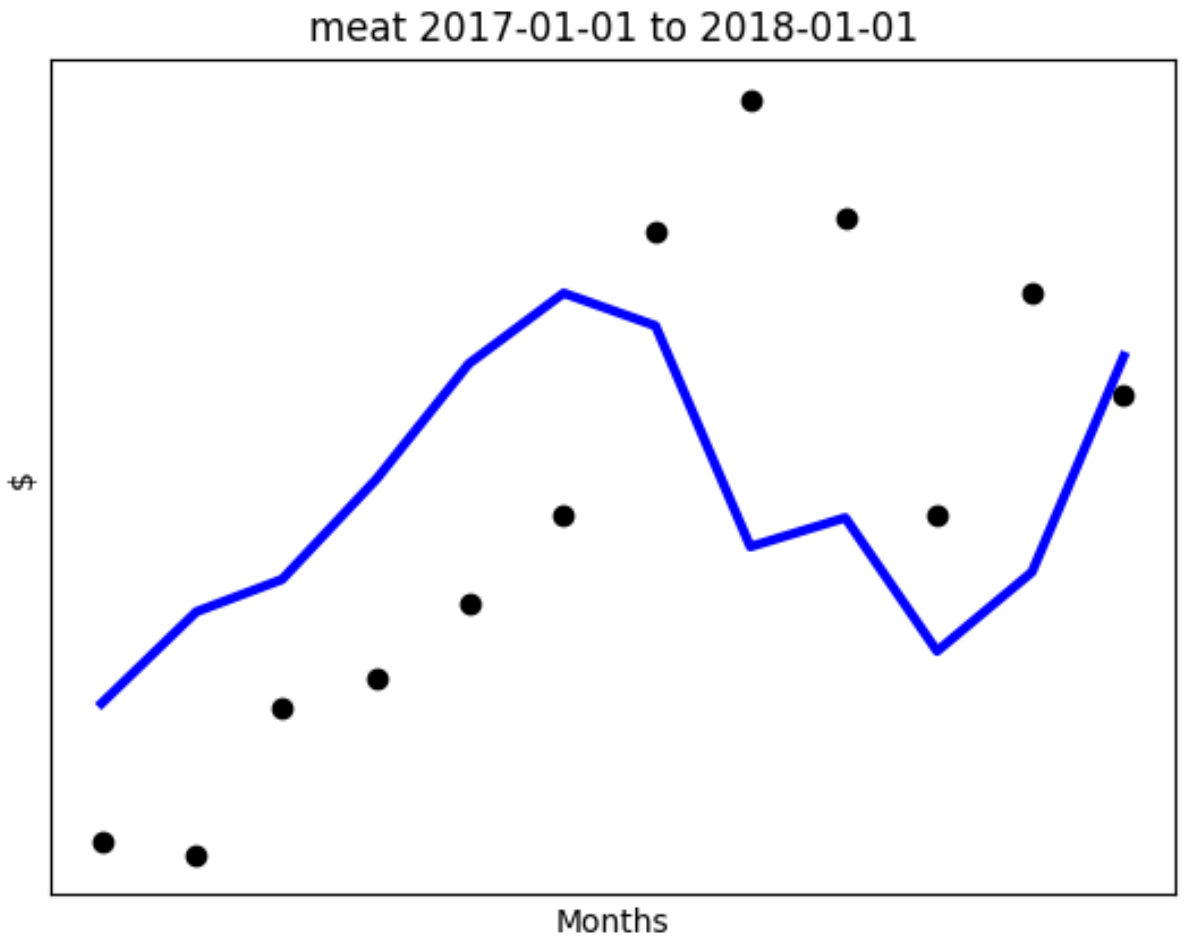

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