Research Proposal

ECON 4115

Forecasting U.S. Gas Prices

Introduction

The goal of this project is to create an accurate forecasting model for the price of gasoline in the U.S. using its own time series data and data on crude oil prices. The forecasts for this data could be used by consumers to help make decisions for purchasing and using gasoline. These forecasts could also be used by economists and other researchers in tandem with other forecasting models to predict the status of the economy.

When reviewing other literature, it appears that most existing forecasts try to predict natural gas and crude oil prices, without a focus on consumer fuel prices. One paper, cited below, used consumer survey data to forecast gas prices, since survey data before has out-performed traditional time-series forecasting models.

Summary of the Data

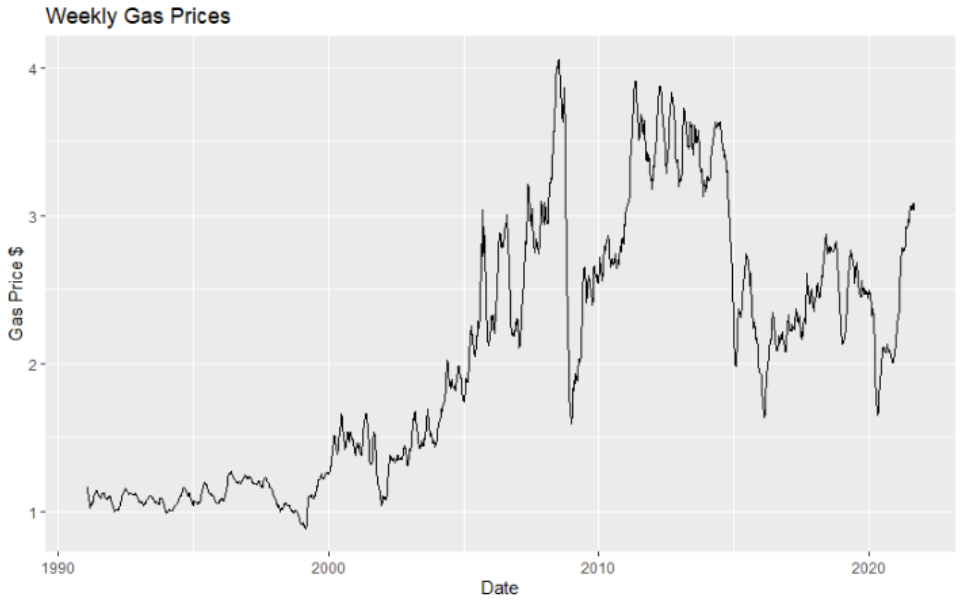
The first time series tracks the average gas prices in the U.S. from 1991 to 2021. This data is collected weekly (every Monday at 8:00 am) and measured in dollars per gallon. Approximately 900 retail outlets are surveyed for self-serve gas prices, and these are averaged to provide the reported values. This data was obtained from the FRED database.

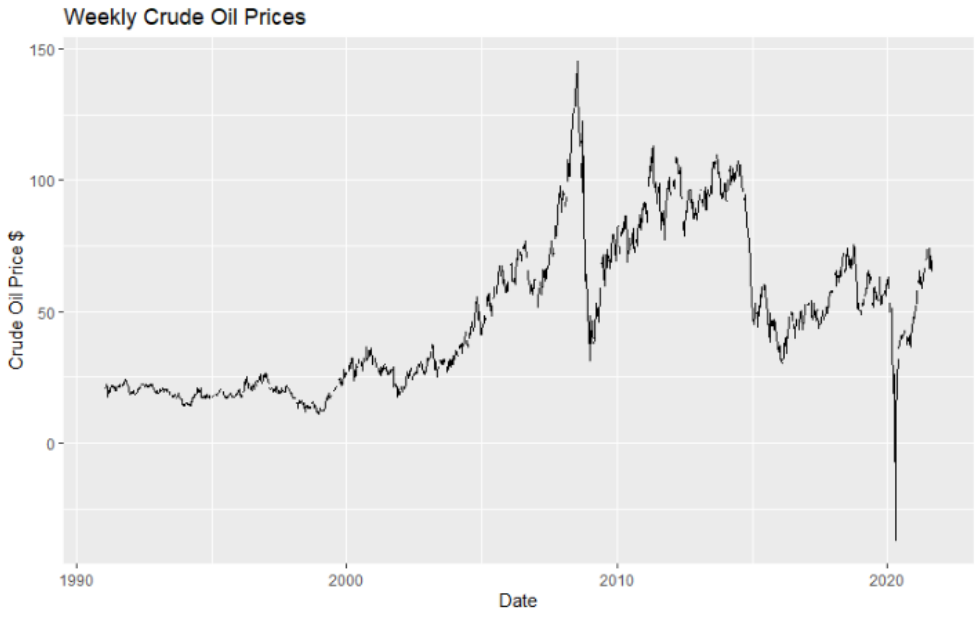
The second time series, intended to be used in conjunction with the first, is of the price of crude oil from 1986 to 2021. This data is collected daily and is measured in dollars per barrel. West Texas Intermediate is used as the benchmark oil for the prices.

Summary Statistics

Time Series	Min	1st Quartile	Median	Mean	3rd Quartile	Max	Standard Deviation
Gas	0.885	1.192	2.026	2.051	2.713	4.054	0.862
Oil	-36.98	19.85	33.03	44.43	63.46	145.31	28.74

Introductory Graphs





Possible Forecasting Method

The initial idea for this project was to forecast gas prices, while also considering crude oil prices as an explanatory variable. The forecasting horizon would likely be short-term; within a couple weeks, due to the volatile nature of the data. The accuracy of the forecast will be measured using the standard measures discussed in class, such as mean absolute error, root mean squared error, mean absolute percentage error, and mean absolute squared error. Different forecasting methods will be tried, and the one with the lowest error values will be considered viable.

Works Cited

Anderson, Soren T., Ryan Kellogg, James M. Sallee, and Richard T. Curtin. 2011. "Forecasting Gasoline Prices Using Consumer Surveys." *American Economic Review*, 101 (3): 110-14.

U.S. Energy Information Administration, Crude Oil Prices: West Texas Intermediate (WTI) - Cushing, Oklahoma [DCOILWTICO], retrieved from FRED, Federal Reserve Bank of St. Louis; https://fred.stlouisfed.org/series/DCOILWTICO, September 30, 2021.

U.S. Energy Information Administration, US Regular Conventional Gas Price [GASREGCOVW], retrieved from FRED, Federal Reserve Bank of St. Louis; https://fred.stlouisfed.org/series/GASREGCOVW, September 30, 2021.