Gas Price Predictions

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Business Problem:

- Gas prices impact financial decisions.
- Knowledge is power.
- Companies and individuals can benefit from this information.

Data Collection

Retrieved data from: the Energy Information Administration(EIA) Open Data API, Federal Reserve Economic Data, and Matteo Iacovello's Geopolitical Risk Index dataset. All spanning 25 years of information beginning in '95.

Target variable:

- Gas price in USD

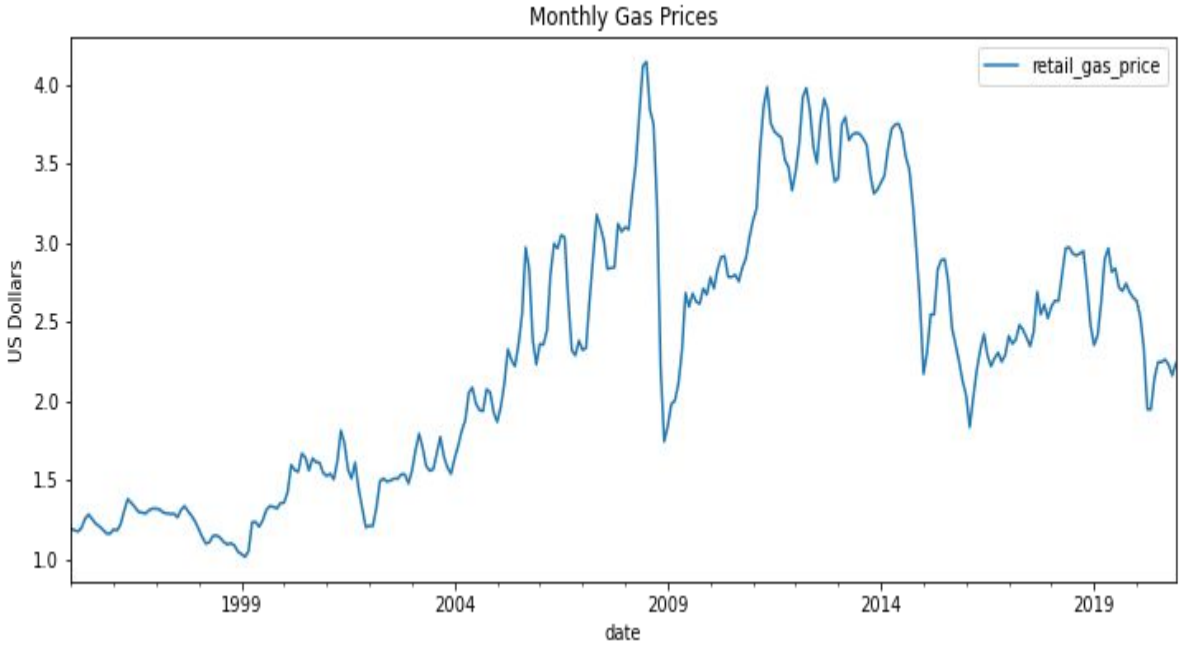
Exogenous variables:

- Crude Oil prices
- Oil Supply
- Oil production
- Imports
- Federal and state gas taxes
- Inflation
- Geopolitical risks

Gas prices

Important trends:

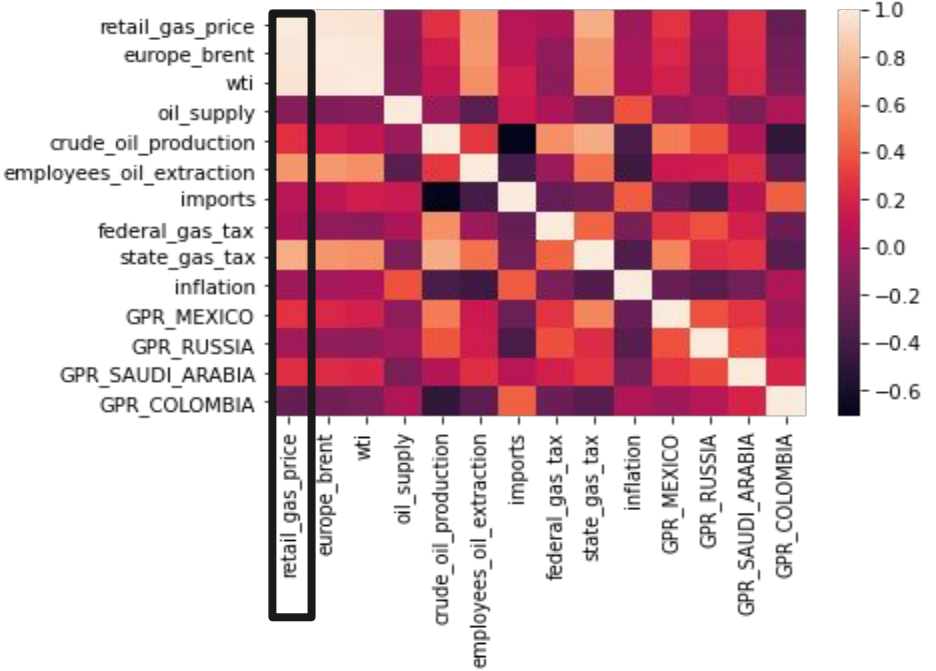
- 2008 recession
- 2014 gas price drop
- 2020 covid gas price drop



Important Exogenous Features

Notice how much of an impact crude oil prices (Europe Brent and WTI) have on the pricing of gas

Other impactful variables include state gas tax, and the number of employees extracting oil



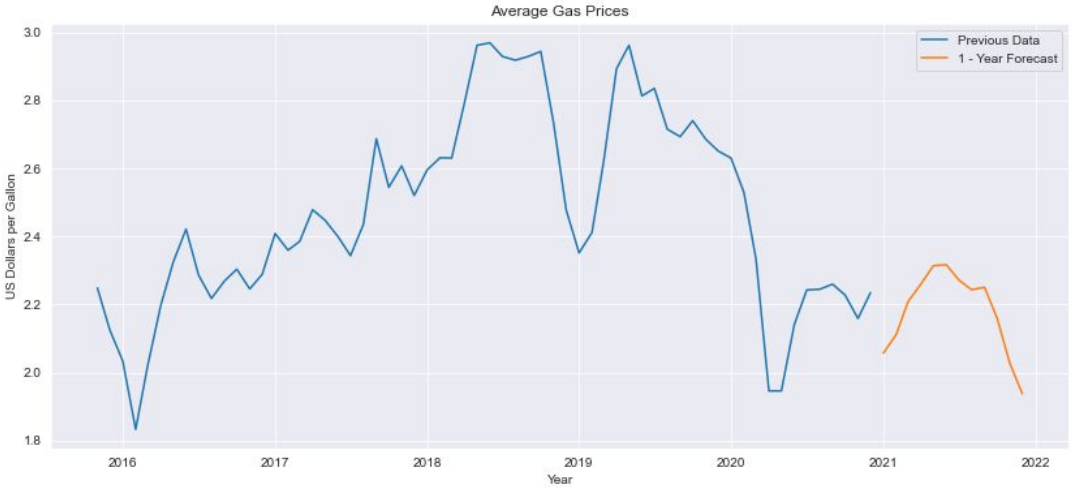
Model results

Model	RMSE
Arima	0.210446
Seasonal Arima	0.197893
Facebook Prophet	0.148618
Arima w/ Exogenous	0.159185
Seasonal Arima w/ Exogenous	0.175602

We ran 5 models - Arima, Seasonal Arima, Facebook Prophet, Arima with Exogenous variables, and Seasonal Arima with Exogenous variables to predict the retail gas price

After the predictions, we calculated the Root Mean Squared Error(RMSE) to evaluate each time series, the lower the better

Next Fiscal Year Predictions



date	predicted gas price
2021-01-01	2.057189
2021-02-01	2.111994
2021-03-01	2.207844
2021-04-01	2.260065
2021-05-01	2.314176
2021-06-01	2.317410
2021-07-01	2.272633
2021-08-01	2.243652
2021-09-01	2.250692
2021-10-01	2.160796
2021-11-01	2.026207
2021-12-01	1.937391

Next steps

- Add exogenous variables to Facebook Prophet model
- Conduct more inference research into the exogenous variables and influence on gas prices
- Collect smaller scale data, like state or region

References

https://www.eia.gov/opendata/

https://fred.stlouisfed.org/

https://www.matteoiacoviello.com/gpr.htm#data