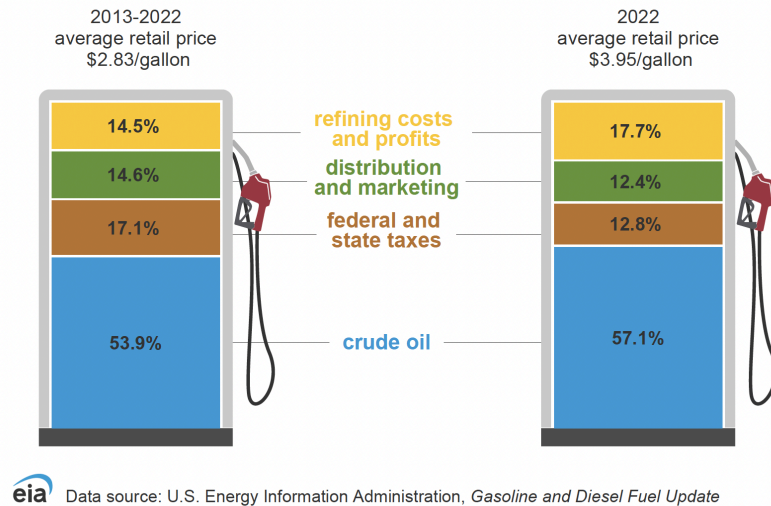


Gas Price Modeling using Economic Indicators

A UVA Data Science Case Study by Alex Smithgall, 2024

What do we pay for per gallon of retail regular grade gasoline?



Prompt: In the wake of war in Ukraine, global oil supplies have been strongly impacted. This raises questions as to how accurately we can predict national oil prices. According to the US Energy Information Administration (EIA): the retail price of gasoline is most heavily impacted by the price of crude oil, followed by state and federal taxes, distribution and marketing, and refining costs and profits [1]. But how do we represent these values in ways that a computer could understand and compute a model?

Practicing fitting a model and running predictions on time-series data is one of the most important applications of machine learning. Your group is tasked with investigating financial indicators that could be tied to the price of gasoline in order to create a predictive model to determine future gasoline prices. You need to ensure that variables are predictive of real-life trends. You will be given an initial dataset which contains a few important variables such as inflation, unemployment rate, and the price of crude oil, the S&P 500, and various energy ETFs. However, there are likely other external factors that cause the price of gasoline to fluctuate overtime [2]. You are tasked with finding additional variables and building a model to predict gasoline prices.

You will be given data from 2004-2020. Once finished, you will submit your model to be used to predict gas prices from 2021-2023, and the groups with the best models will receive extra credit. Try your best to find a model that works well and interesting predictive variables.

Deliverables: Once finished with this case study, you should have a github repository containing the analysis materials and a 3-minute pdf presentation of your results.

Elements of the repository include:

- Dataset with any added variables
- Model processing and analysis
- RData environment with a model to be used in the competition

[1] "Factors affecting gasoline prices - U.S. Energy Information Administration (EIA)." Accessed: May 08, 2024. [Online]. Available: <https://www.eia.gov/energyexplained/gasoline/factors-affecting-gasoline-prices.php>

[2] "Motor Fuels: Understanding the Factors That Influence the Retail Price of Gasoline," United States Government Accountability Office, GAO-05-525SP, May 2005.