

GOLD AND SILVER PRICE FORECASTING

MATH-7360: Midterm Project Report

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Introduction

Gold and silver have been important commodities throughout history. These commodities have been used as currencies for thousands of years. Egyptians began producing gold-bearing shekels around 1500 B.C. and silver coins started appearing in the same areas several hundred years later.

The Founding Fathers of the United States also used gold to stabilize the young USD. The Coinage Act of 1792 was the first law in writing to set an exchange rate for the USD. The act specifically declared that 15 pounds of silver was equal to 1 pound of gold. Additionally, it established that each dollar was equivalent to 0.057 ounces of fine gold or 0.85 ounces of fine silver¹.

Given the historical significance of gold, the researchers have decided to develop a predictive model to forecast the price of gold.

Datasets

The [datasets](#) provide 10 years (2013-2023) of information about the commodity price and history such as:

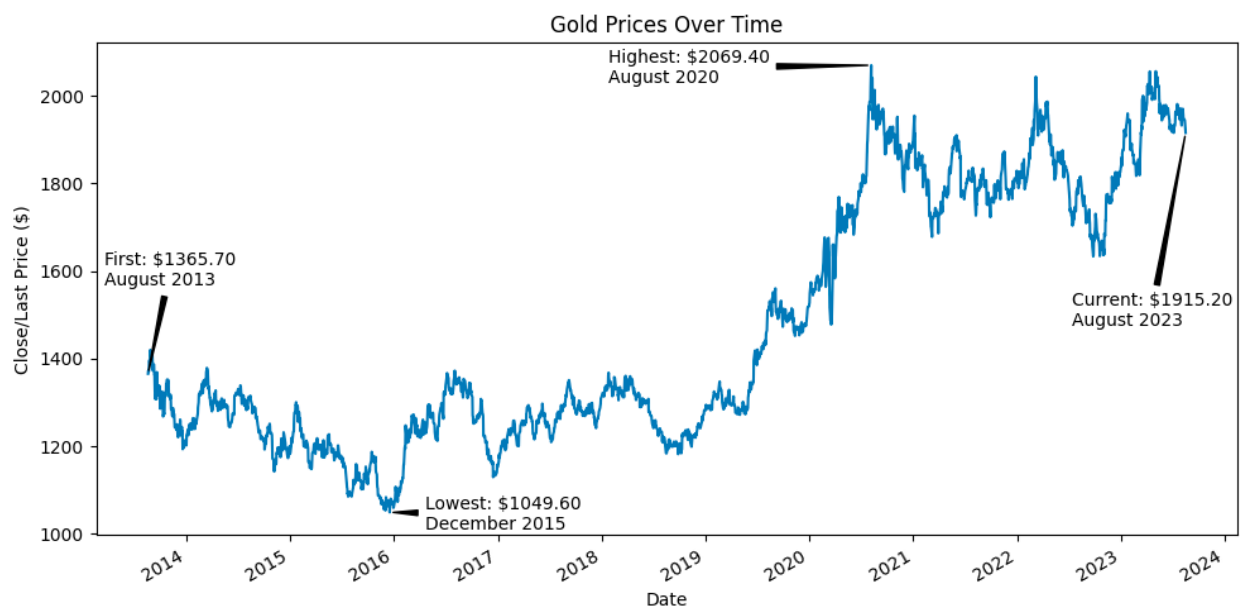
- 1) Date – The date of data collected
- 2) Close/Last (\$) – The price the commodity closed at during market hours
- 3) Volume – Total number of trades with commodity
- 4) High (\$) – The highest price the commodity achieved in each day
- 5) Low (\$) – The lowest price the commodity experienced in each day

The researchers are adding additional features to the datasets such as ‘Daily Return’ and ‘Average Price (on a given day)’.

Exploratory Data Analysis

To start off the data analysis, researchers had null values to take care of. There were 28 null values within the columns of ‘Volume’. To remedy this, we can use average yearly volume to fill in these values. Now, we no longer have any null values present within either dataset.

The graph below shows the price history of gold within our dataset:



There are several dates to take notice of. The lowest price of gold occurred in December 2015 where the commodity was priced at \$1049.60. This occurred because of uncertainty on the timing of potential interest rate increases². Another point to note is August 2020, where the commodity reached the highest price of \$2069.40. This occurred during the COVID-19 lockdown and was caused by investors fearing a second wave of the virus. These investors bought the commodity as a safer place to store their wealth³.

The graph below shows the price history of silver within our dataset:



Silver, like gold, fluctuates in response to global conditions, supply and demand, and other economic factors. While they may be subject to similar influences, silver and gold prices sometimes respond to different degrees. One of the most notable differences in our graphs is during COVID-19. Over the pandemic, silver was hit much more drastically than gold, reaching its lowest over the last ten years. On the flip side, silver went up 48% in 2020, recovering to its highest value in the last 10 years⁴. As aforementioned, toward the end of the pandemic, investors stored their wealth in precious metals which caused silver to skyrocket.

Similarities and Differences

Silver and gold appear to follow very similar trends. This makes sense considering that they are both precious metals. Gold, however, is a more stable commodity while silver is volatile. While they respond to similar events, silver's volatility makes it a risky investment. Perhaps we will be

able to see this in our forecast analysis. Maybe gold will have a tighter confidence interval than silver because of silver.

References

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www.theguardian.com/business/2020/aug/05/after-covid-19-just-how-high-will-prices-go-in-the-2020-gold-rush.
4. "Silver Was the Top Performing Commodity in 2020, Will Copper Be Next?" *U.S. Global Investors*, [no publication date], <https://www.usfunds.com/resource/silver-was-the-top-performing-commodity-in-2020-will-copper-be-next/>.