

Global Gold Prices Analysis and Visualization Using Tableau

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Abstract- Gold is one of the most valuable and widely traded commodities in the world, playing a significant role in global financial markets, investment portfolios, and economic stability. Due to its ability to act as a hedge against inflation, currency fluctuations, and economic uncertainties, the analysis of gold prices and supply has become increasingly important for researchers, investors, and policymakers. This project focuses on the analysis and visualization of global gold price and supply trends from 2010 to 2025 using Tableau, a powerful data visualization tool. The dataset used in this study contains information related to gold prices, gold supply, demand, trading volume, countries, regions, market types, and other economic attributes. The dataset was collected from reliable sources and processed to ensure consistency and accuracy. Data preprocessing techniques were applied to organize and prepare the dataset for visualization and analysis. Various dimensions and measures present in the dataset enabled a comprehensive study of gold market behavior across different geographical regions and time periods. To gain meaningful insights, multiple visualization techniques were implemented using Tableau. These include line charts, bar charts, dual-axis charts, funnel charts, waterfall charts, heat maps, highlight tables, geographical maps, timelines, crosstabs, and interactive dashboards. The visualizations were designed to explore trends in gold prices, compare gold supply across countries and regions, analyze trading volumes, and identify patterns over time. Interactive features such as filtering, highlighting, and dashboard actions were also incorporated to improve user exploration and data interpretation. The analysis revealed noticeable variations in gold prices and supply over the years, highlighting the influence of market conditions and regional factors on gold-related activities. Comparative visualizations helped identify differences among countries and regions, while time-series analysis provided insights into long-term trends and fluctuations. The dashboards enabled users to interact with the data and obtain a clearer understanding of relationships between different variables. Overall, this project demonstrates the effectiveness of data visualization in transforming complex financial datasets into meaningful and easily understandable insights. The findings contribute to a better understanding of global gold market trends and showcase how Tableau can be used as an effective tool for exploratory data analysis, decision-making, and financial market research.

Keywords- Gold Prices, Gold Supply, Data Visualization, Tableau, Financial Analysis, Dashboard, Time-Series Analysis, Global Market Trends.

I. INTRODUCTION

Gold has long been recognized as a universal symbol of wealth, stability, and economic strength. From ancient civilizations to modern financial systems, gold has consistently held its value and significance, serving not only as a precious metal for ornamentation but also as a reliable investment asset. In the context of the global economy, gold plays a crucial role as a hedge against inflation, currency fluctuations, and economic

uncertainties. As a result, understanding the behavior of gold prices and supply across different regions and time periods has become increasingly important in the field of data analysis and financial studies. Previous studies highlight that gold is an important financial asset influenced by factors like inflation, economic conditions, and global uncertainties. According to reports by the World Gold Council, gold demand and supply vary across regions and time periods.

Research by the International Monetary Fund also shows that currency fluctuations and interest rates significantly impact gold prices. These studies support the need for analyzing gold price trends using data visualization techniques to better understand patterns and variations.

In today's data-driven environment, large volumes of data are generated and analyzed to extract meaningful insights that support decision-making processes. This project focuses on analyzing a structured dataset related to global gold prices and supply. The dataset includes multiple attributes such as date, country, gold prices (including open, close, high, and low values), gold supply in tonnes, and gold purity grades like 22K and 24K. These attributes provide a comprehensive view of the gold market, allowing for a detailed examination of both temporal trends and geographical variations.

The primary objective of this analysis is to explore and understand the patterns, trends, and relationships within the gold market using data visualization techniques. By utilizing tools such as line charts, bar graphs, heat maps, crosstabs, and highlight tables, the dataset is transformed into visually meaningful representations. These visualizations help in identifying fluctuations in gold prices over time, comparing gold supply across different countries, and understanding the influence of gold purity on its market value. Additionally, heat maps and highlight tables provide an intuitive way to quickly interpret variations and intensity of values across different dimensions.

Through this analytical approach, the project aims to convert raw numerical data into clear, structured, and insightful information. It enables a better understanding of how gold prices change over time, how supply varies across countries, and how different factors are interconnected within the dataset. This not only enhances data interpretation skills but also demonstrates the practical application of data visualization in solving real-world problems.

Overall, this study provides a detailed and comprehensive analysis of the global gold market using modern data visualization techniques. It highlights the importance of data in understanding economic trends and emphasizes how effective visualization can simplify complex information, making it more accessible and meaningful for analysis and decision-making.

II. LITERATURE SURVEY

Anil, et al., mainly focused on analyzing past gold price trends and forecasting future prices [1]. The authors studied historical gold price data over several years to understand how prices change over time. They used statistical methods like time series analysis to predict future gold prices. The study helps in understanding long-term gold price patterns and how forecasting models can be applied for investment decisions.

Chopra, et al., explained how advanced analytics and market trends can be used to predict gold prices[2]. The study focuses on recent gold price data and analyzes how economic factors and market behavior influence price movements. It highlighted the importance of using modern analytical techniques to improve prediction accuracy. The paper shows how data analysis plays a major role in financial forecasting.

Agarwal, et al., discussed gold price prediction using machine learning techniques[3]. The authors used historical gold price data and applied different models like regression and decision tree methods. They compared the accuracy of these models and analyzed which one performs better. The study concludes that machine learning models can be effective in predicting gold prices when trained properly.

Ahmad, et al., compares traditional statistical models with machine learning models for gold price prediction[4]. The authors analyzed historical gold price data and applied different techniques to check which model gives more accurate results. The study shows that modern machine learning approaches can sometimes perform better than traditional forecasting methods. It mainly focuses on comparing performance and accuracy.

Lakshmaiah, et al., focuses on predicting gold prices using deep learning techniques like CNN and Bidirectional LSTM[5]. The author used historical market data and applied advanced neural network models to capture complex patterns in gold price movements. The research explains how deep learning models can improve prediction accuracy compared to basic models. It highlights the importance of using modern AI techniques in financial forecasting.

Ghule ,et al., focuses on gold price prediction using machine learning techniques[6]. The authors analyzed historical gold price data from different years and applied models such as regression and other predictive algorithms. The main aim of the

study was to check how accurately machine learning models can forecast gold prices. The results show that AI-based techniques can help in understanding price trends and fluctuations effectively.

Tung, et al., compares gold with other investment markets to determine whether gold is a safe investment option[7]. The authors used mathematical and analytical methods to study different financial markets during various economic conditions. The research mainly focuses on analyzing gold's performance during unstable economic periods. The study concludes that gold is considered a relatively safer investment during financial uncertainty.

Roh,et al.,examines the relationship between gold prices and inflation[8]. The authors analyzed financial and economic data over several years to study how gold behaves during inflationary periods. The study explains that gold is often seen as a hedge against inflation and tries to measure this relationship using statistical methods. The findings support the idea that gold prices are influenced by inflation trends.

Sabek,et al., presents a historical analysis of gold prices and discusses gold as an economic indicator[9]. The authors studied past gold price movements over different economic cycles, including growth and recession periods. They also used forecasting techniques to predict future trends. The research shows that gold prices reflect economic uncertainty and can indicate market conditions.

Zhou,et al., focuses on the impact of geopolitical risks on gold prices[10]. The authors analyzed periods of political instability and global uncertainty to examine how gold prices reacted during those times. The research shows that gold prices tend to increase when geopolitical risks rise, as investors move towards gold as a safe investment. The paper highlights the strong connection between global risk factors and gold price movements.

III. MATERIALS AND METHODS

1. The dataset used in this project belongs to the gold price and supply analysis domain, focusing on understanding trends, variations, and comparisons across different countries over time. The data was collected from reliable online sources related to global gold price datasets.

2. The dataset consists of multiple attributes, including both numerical and categorical variables. Key attributes include Close Price, Open Price, High Price, Low Price, Gold Supply Tonnes, and Date, which are mainly numerical in nature. Additionally, categorical attributes such as Country, Gold Grade, and Market Type are included to provide meaningful classification and grouping of the data.
3. The dataset contains a sufficient number of samples covering the time period from 2010 to 2025, allowing effective time-series analysis. It also includes date and time attributes, which help in identifying trends, patterns, and changes over the years.
4. From a geographical perspective, the dataset includes indicators such as country names and region-based information, enabling comparative analysis across different countries. In some cases, geographic representation can also be extended using latitude and longitude values.
5. The level of granularity in the dataset is maintained at a country-wise and yearly level, ensuring that each record represents a unique combination of time and location. This helps in performing detailed and accurate analysis without redundancy.
6. In this project, Tableau (Tableau Public/Desktop) was used as the primary tool for data visualization and analysis. A standard computer system was used to process the dataset and generate various visual representations such as charts, heat maps, and tables.

IV. ANALYSIS AND DISCUSSIONS

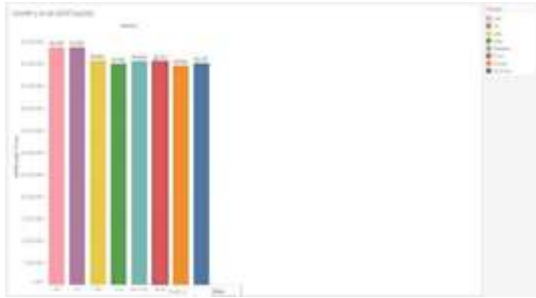
Initially, the collected dataset was carefully cleaned and organized by handling missing values and correcting any inconsistencies. After preprocessing, the dataset was imported into Tableau for further analysis. Different analytical techniques such as aggregation (SUM and AVG), filtering, sorting, and grouping were applied to explore the data effectively.

Various types of visualizations including bar charts, line graphs, heat maps, highlight tables, and geographic maps were created to represent the data in a clear and meaningful way. Time-series analysis was performed using the date attribute to study the trends in gold prices and supply over the years.

Additionally, interactive dashboards were designed where multiple charts were connected using highlighting and filtering

actions. This allowed better comparison, where selecting a data point in one chart automatically highlights related information in other charts.

Finally, the visualizations were analyzed to identify patterns, relationships, and key insights regarding gold price variations and supply distribution across different countries.



1. Fig. 1. Country-wise Gold Supply Comparison

Description: This chart presents the comparison of gold supply across different countries. It helps identify the contribution of each country to the global gold market. The USA and the UK show the highest gold supply values, followed by the UAE, India, Germany, China, Canada, and Australia. The relatively small variation among countries indicates a balanced distribution of gold supply, while the leading countries play a significant role in influencing global gold availability and market trends.

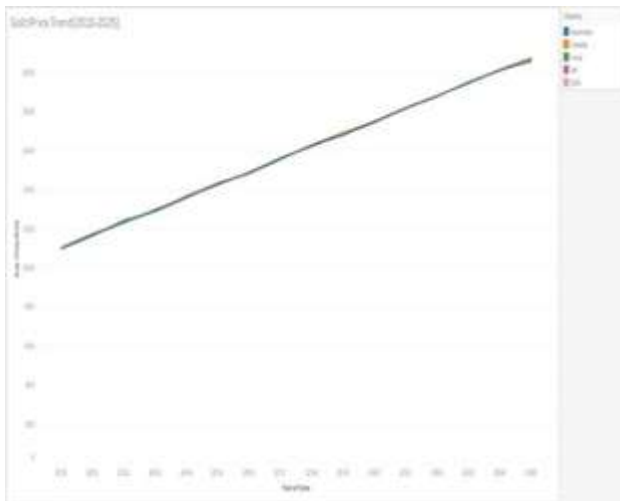


Fig. 2. Trend of Gold Prices Over Time (2010–2025)

Description: This line chart illustrates the trend of gold prices from 2010 to 2025. The graph shows a steady increase in gold

prices throughout the period, indicating a strong upward market trend. The continuous growth suggests that gold remained a valuable investment asset over time.



Fig. 3. Average Gold Prices Across Different Countries

Description: This bar chart compares the average gold prices among different countries. The values are relatively similar, indicating that gold prices remain largely consistent across global markets. Minor variations reflect regional economic and market influences.

Table 1. Country-wise Comparison of Gold Close Prices

Country VS Close Price

Country	Close Price
Australia	284,200.1
Canada	284,164.9
China	284,011.3
Germany	284,059.2
India	284,220.0
UAE	283,996.4
UK	284,160.2
USA	284,230.6

Description:

This crosstab presents the closing gold prices for different countries. It enables comparison of market values across regions and helps identify countries with relatively higher or lower closing prices.

Table 2. Country-wise Gold Supply Comparison

Country VS Gold Supply	
Country	
Australia	50,107
Canada	49,598
China	50,514
Germany	50,624
India	50,005
UAE	50,821
UK	53,783
USA	53,728

Description:

This table compares gold supply levels among different countries. The data highlights variations in gold availability and identifies countries that contribute more significantly to overall gold supply.

Table 3. Comparison of Gold Grades and Closing Prices

Gold Grade vs Close Price	
Gold Grade	
22K	1,124,289
24K	1,148,753

Description:

This table compares different gold grades and their corresponding closing prices. The results indicate that higher-purity gold grades tend to have higher market prices than lower-purity grades.

Country vs Low Price(HEAT MAP)

Country	
Australia	2.2
Canada	1.4
China	2.9
Germany	3.6
India	4.1
UAE	9.5
UK	7.4
USA	2.4

Fig. 4. Heat Map of Country-wise Low Gold Prices

Description:

This heat map visualizes the lowest gold prices across different countries. Color intensity represents variations in price levels, allowing quick identification of countries with relatively higher or lower minimum gold prices.

Country vs Close Price(HEAT MAP)

Country	
Australia	0.1
Canada	4.9
China	1.3
Germany	9.2
India	0.0
UAE	6.4
UK	0.2
USA	0.6

Fig. 5. Heat Map of Country-wise Gold Closing Prices

Description:

This heat map displays closing gold prices across countries. The varying color shades help compare price differences and highlight regional patterns in gold market performance.

Country VS Gold Supply(HEAT MAP)

Country	
Australia	07
Canada	98
China	14
Germany	24
India	05
UAE	21
UK	83
USA	28

Fig. 6. Heat Map of Country-wise Gold Supply

Description:

This heat map represents gold supply distribution among different countries. The color intensity indicates the magnitude of supply, making it easier to identify major contributors to gold availability.

Country vs Gold Supply Tonnes(Highlight Table)

Country	Gold Supply Tonnes
Australia	50,107
Canada	49,598
China	50,514
Germany	50,624
India	50,005
UAE	50,821
UK	53,783
USA	53,728

Fig.7.Country-wise Gold Supply Tonnes (Highlight Table)

Description:

This highlight table presents the distribution of gold supply tonnes across different countries. Color intensity is used to represent the magnitude of gold supply, where darker shades indicate higher values and lighter shades indicate lower values. The visualization enables quick comparison of gold supply levels among countries and helps identify major contributors to overall gold availability.

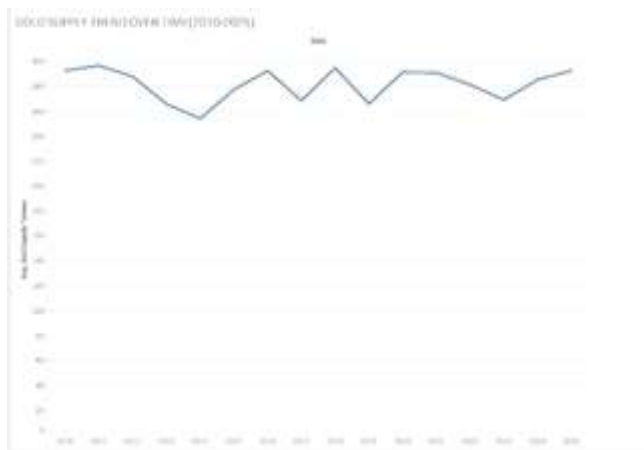


Fig. 8. Trend of Gold Supply Over Time (2010–2025)

Description:

This line chart illustrates changes in gold supply between 2010 and 2025. The graph shows fluctuations over the years, indicating that gold supply varies due to production, market demand, and economic conditions.



Fig. 9. Comparative Analysis of Gold Price and Supply Trends (2010–2025)

Description:

This dual-axis chart compares gold prices and gold supply over time. While gold prices show a consistent upward trend, gold supply fluctuates, suggesting that factors beyond supply also influence gold prices.

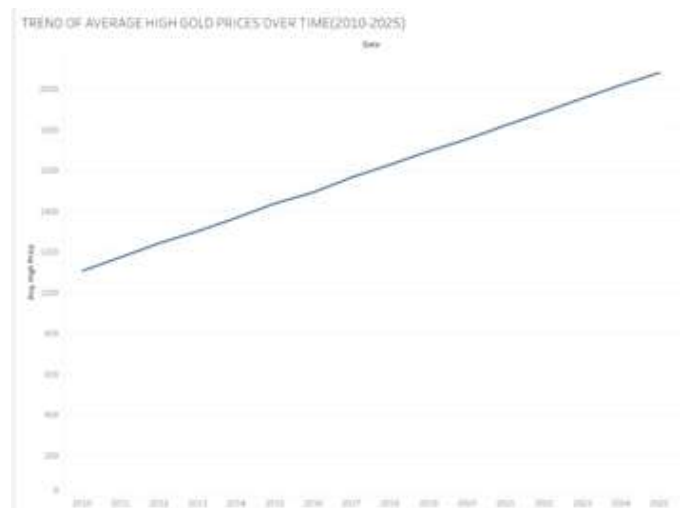


Fig. 10. Trend of Average High Gold Prices (2010–2025)

Description:

This line chart shows the trend of average high gold prices over the study period. A continuous rise is observed, indicating sustained growth in gold value and increasing market demand.

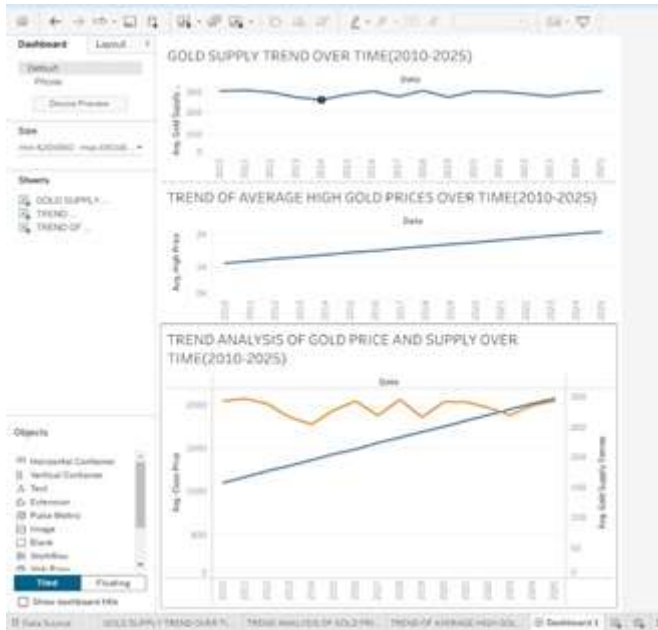


Fig. 11. Interactive Dashboard for Gold Price and Supply Analysis

Description:

This dashboard integrates multiple visualizations to provide a comprehensive analysis of gold prices and supply trends. It enables efficient comparison, trend identification, and interactive exploration of gold market behavior.

Description:

This dashboard combines charts and highlight tables to compare gold supply across countries. It provides an interactive view of supply distribution and supports detailed comparative analysis.



Fig. 13. Geographical Visualization of Gold Demand by Country

Description:

This map displays gold-related values across different countries using geographic representation. Variations in color intensity indicate differences in demand levels, facilitating regional comparison.

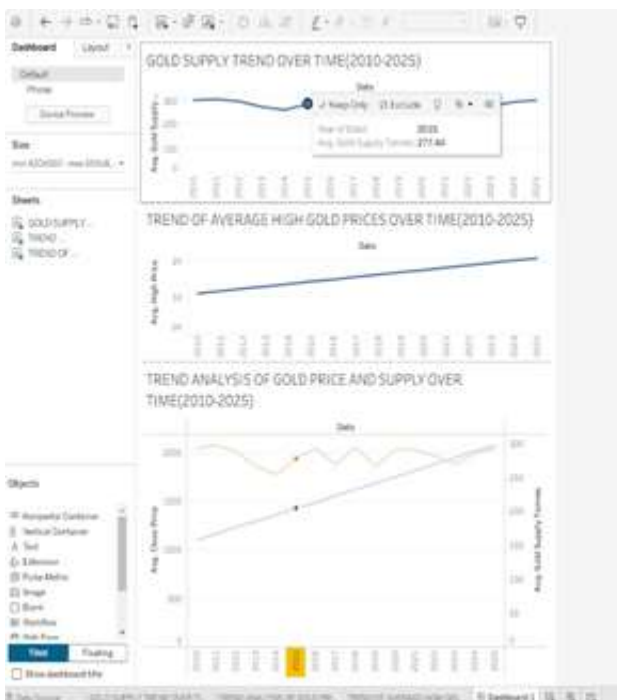


Fig. 12. Dashboard for Country-wise Gold Supply Analysis



fig. 14. Timeline Analysis of Gold Supply across Countries

Description:

This timeline chart presents year-wise changes in gold supply for multiple countries. The visualization helps identify trends, fluctuations, and comparative growth patterns over time.

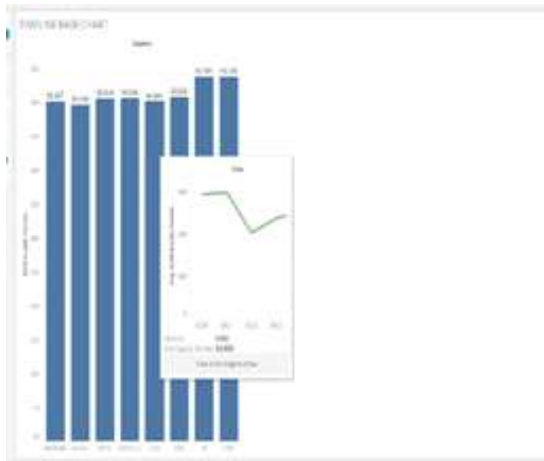


Fig. 15. Baseline Comparison of Gold Supply Across Countries

Description:

This chart provides a baseline comparison of gold supply among countries. It highlights differences in supply magnitude and helps identify countries with relatively higher contributions.

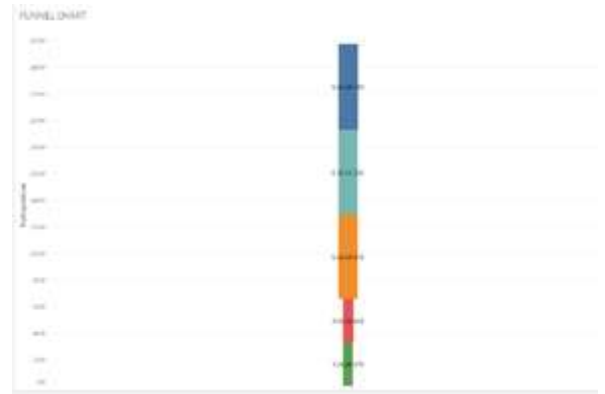


Fig. 17. Funnel Chart of Gold Demand Distribution

Description:

This funnel chart represents the distribution of gold demand across different categories or stages. The varying segment sizes indicate the relative contribution of each category to the total demand. The visualization helps identify dominant contributors and provides a clear overview of how gold demand is distributed within the dataset.



Fig. 16. Waterfall Chart of Interest Rate Distribution by Region

Description:

This waterfall chart illustrates the cumulative contribution of different regions to the total interest rate values. Each bar represents the incremental increase or decrease contributed by a region, enabling easy identification of regions with greater influence on the overall value. The chart helps in understanding the distribution and impact of regional interest rates.

VI. CONCLUSION

This project successfully analyzed and visualized global gold prices and supply trends from 2010 to 2025 using Tableau. As discussed in the introduction, gold plays a crucial role in the global economy as a valuable investment asset and a safeguard against economic uncertainties. Through the use of a structured dataset and various visualization techniques, the study provided meaningful insights into the behavior of gold prices, supply patterns, trading volumes, and regional variations.

The visual analysis revealed that gold prices generally exhibited an upward trend over the study period, while gold supply and other market-related factors showed variations across different countries and regions. Interactive visualizations such as line charts, bar charts, maps, funnel charts, waterfall charts, heat maps, highlight tables, and dashboards helped transform complex data into clear and understandable patterns. These visual representations enabled effective comparison, trend identification, and deeper exploration of the relationships between different variables.

The findings of this study demonstrate the importance of data visualization in financial analysis and decision-making. By presenting information in an interactive and visually

meaningful manner, Tableau enhanced the understanding of global gold market dynamics and facilitated the discovery of valuable insights. Overall, the project highlights how analytical and visualization tools can be effectively utilized to study financial datasets, monitor market trends, and support future research in the field of economic and investment analysis.

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