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# Gold's Evolving Role: Exploring its Drivers Amidst Global Economic Uncertainty

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## ABSTRACT

Gold's legendary status as a "safe haven" has been examined from 2020 to 2024, a whirlwind period packed with pandemics, geopolitical clashes, inflation spikes, and global market turmoil. This study dives deep into gold's roller coaster ride during these turbulent years, analyzing how its price interacted with inflation, interest rates, and the U.S. dollar. Major global events such as the COVID-19 pandemic, the Russia-Ukraine war, and rising tensions between the U.S. and China steered gold's often unpredictable path. While inflation is traditionally seen as a primary driver of gold prices, our findings challenge this assumption. Instead, we highlight that inflation played a less significant role than expected. Geopolitical instability, market shocks, and heightened uncertainty were far more critical in shaping gold's price trajectory. This research sheds new light on the evolving dynamics of gold as a financial asset, offering insights into how it behaves in the face of unprecedented global crises.

***KEYWORDS:*** *Gold, Inflation, Geopolitical, Market, Instability, Uncertainty, Volatility*

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## 1. INTRODUCTION

Gold has always held a special place in the financial world, not just for its shine but for its reputation as the ultimate "safe haven" during turbulent times. From July 2020 to July 2024, the world saw more than its fair share of uncertainty—pandemics, wars, economic swings—and gold was right there, making moves of its own. But what exactly drove these price changes? Was it inflation, the U.S. dollar, interest rates, oil, or the broader global economy? Or were geopolitical risks causing investors to flock to gold like never before? This paper dives into these questions and more, exploring the fascinating relationship between gold prices and some of the world's biggest economic factors.

First up, inflation—a longtime companion of gold. When inflation rises, people tend to flock to gold to protect their money's value. But hold on! During this period, gold prices weren't exactly following that script. Inflation and gold seemed to be doing their own thing, with a surprisingly low correlation. Something else was clearly at play, but what?

Maybe it was the U.S. dollar, which traditionally moves opposite to gold. A strong dollar usually makes gold more expensive for international buyers, cooling off demand. But here's the twist: the correlation was only moderate, meaning that while the dollar had its moment, it wasn't the leading star in this gold price drama.

Then there's the Federal Reserve and its interest rate hikes. Normally, when interest rates go up, gold—being a non-yielding asset—loses some of its sparkle. Yet, during this time, gold prices didn't back down as much as expected, showing a positive correlation with the Fed Funds Rate. Could it be that broader economic uncertainty was keeping gold in the spotlight, despite rising rates?

What about oil, that other commodity giant? You'd think oil and gold would be linked—after all, both are major global players. But surprisingly, their relationship turned out to be pretty weak. Turns out, the two were driven by different forces altogether.

Global GDP growth? Not much action there either. The connection between global economic growth and gold prices was barely noticeable. So, what was really fueling the gold rush?

Enter the wildcard: geopolitical risk. From the Russia-Ukraine conflict to rising tensions in the Taiwan Strait, geopolitical instability sent shockwaves through global markets—and gold prices shot up in response. A strong positive correlation showed that when the world got riskier, gold became the go-to asset for safety, proving once again that gold shines brightest in the darkest times.

This paper unravels these relationships, offering a deep dive into what really drove gold prices during one of the most eventful periods in recent memory. It's a rollercoaster of economics, currencies, oil, interest rates, and geopolitics—all seen through the lens of one of the world's most fascinating commodities: gold. Buckle up!

## 2. Literature review

### 2.1. Changani, J. (2024)

Changani's review on *"Factors Influencing Gold Price Movements: A Time Series Analysis Perspective"* identifies multiple economic variables, such as inflation, GDP growth, and the US dollar, that shape gold prices. The study highlights that geopolitical events, such as conflicts and political instability, can further drive gold prices, a finding that may be particularly relevant in the post-2020 period.

### 2.2. Qian, Y., Ralescu, A., & Zhang, B. (2019).

Qian et al.'s study on the factors affecting global gold prices uses a response surface methodology to identify the impact of multiple economic factors, including the US dollar index and the Federal Reserve's interest rates. The study's results suggest that these factors negatively affect gold prices, though CPI and oil price impact was not statistically significant. This raises questions about the relative importance of other factors like market uncertainty or geopolitical risk, which may be more relevant in the 2020-2024 period.

### 2.3. Anandasayanan, S., Thevananth, J., & Mathuranthy, A. (2019).

In the study *"The Relationship Between Inflation and Gold Price: Evidence from Sri Lanka,"* the authors demonstrate a strong, positive correlation between inflation and gold prices. This finding underscores the traditional view that gold acts as a hedge against inflation. However, the study focuses on a single market (Sri Lanka), whereas broader international evidence, as highlighted by Baur and McDermott (2009), suggests that the relationship may vary depending on market conditions and external shocks.

### 2.4. Sindhu, D. (2013).

Sindhu's analysis of factors influencing gold prices, including the US dollar exchange rate, crude oil prices, and inflation, aligns with the traditional view that gold is inversely related to the US dollar. This study finds that crude oil prices and repo rates also have a significant effect on gold prices, although the relationships are more complex and depend on market conditions, a point that is evident in the recent period from 2020 to 2024.

### 2.5. Baur, D. G., & McDermott, T. K. (2009).

In their study *"Is Gold a Safe Haven? International Evidence,"* Baur and McDermott explore the role of gold during financial crises, particularly its role as a safe haven in developed markets. Their findings support the notion that gold has acted as a stabilizing asset during periods of market turbulence, like the 2008-2009 global financial crisis. The study indicates that gold can absorb market shocks, although it also suggests that its role may be influenced by multiple factors, including inflation and monetary policy.

**Objective**

1. To examine the impact of inflation, U.S. monetary policy, crude oil prices, and the U.S. dollar index on gold prices from July 2020 to July 2024.
2. To assess the role of geopolitical risks in influencing gold price movements during the same period.
3. To contribute to the literature on gold as a safe-haven asset and its behavior in times of economic uncertainty and global instability.
4. To evaluate the changing dynamics between traditional economic indicators (like inflation and interest rates) and gold prices, considering the unique market conditions between 2020 and 2024.

## 3. Research Methodology

In this study, we aim to understand how macroeconomic factors and geopolitical risks have influenced gold prices between July 2020 and July 2024. Here's a concise breakdown of our approach:

### 3.1. Research design

We adopt a **quantitative research design** using **correlation** and **time series analysis** to explore the relationship between various economic factors (such as inflation and interest rates) and gold prices during this period of global instability.

### 3.2. Data sourced from reliable financial databases and are detailed as follows:

- **Gold Prices (USD/oz)**: Monthly average gold prices during the period 2020– 2024 were

obtained from Bloomberg and the World Gold Council.

- **Inflation Rates**: Year-over-year inflation rates in the U.S. were sourced from the U.S. Bureau of Labor Statistics (BLS).
- **U.S. Dollar Index (DXY)**: Monthly values for the U.S. Dollar Index were sourced from the Federal Reserve Economic Data (FRED).
- **Federal Reserve Interest Rates**: Monthly Federal Funds Rates were collected from Federal Reserve data.
- **Crude Oil Prices**: Monthly prices for crude oil (WTI) were sourced from the U.S. Energy Information Administration (EIA).
- **Global GDP Growth Rate**: Annual global GDP growth data were sourced from the IMF and the World Bank.
- **Geopolitical Risk Index (GPR)**: This index, which measures geopolitical tensions, was sourced from the Geopolitical Risk Database.

**3.3. Variables:** The study examines the relationship between **gold prices (USD/oz)** and several independent variables:

**Independent Variables**:
- Inflation Rate (YoY %)
- U.S. Dollar Index (DXY)
- Federal Reserve Interest Rates (Fed Funds Rate)
- Crude Oil Prices (USD/barrel)
- Global GDP Growth Rate (YoY %)
- Geopolitical Risk Index (GPR)


**3.4. Statistical Methods:**
- **Correlation Analysis**: To identify how strongly each variable correlates with gold prices.
- **Time Series Analysis**: To study trends over time and uncover patterns in gold price movements.
- **Descriptive Statistics**: To summarize and present key data insights, focusing on monthly averages, changes, and anomalies.

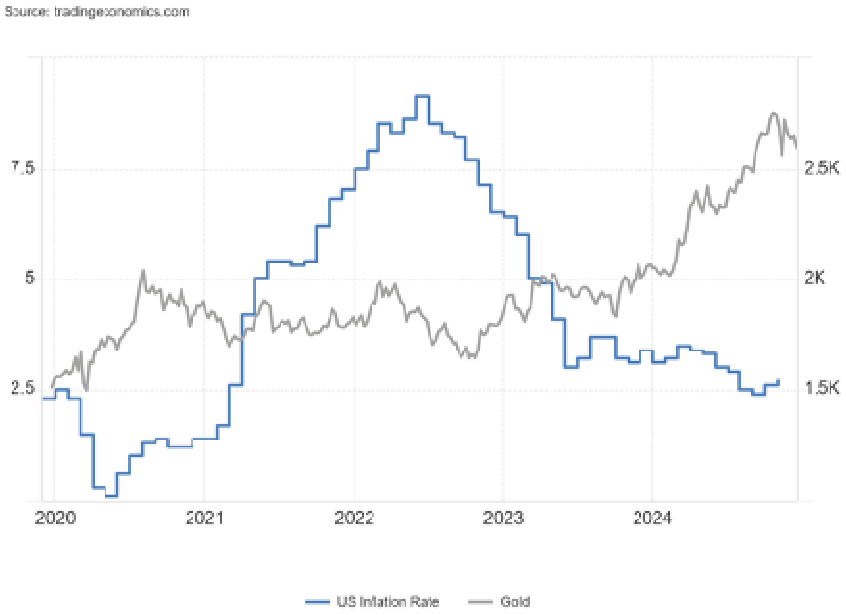
**3.5. Limitations**
- **Data Reliance**: The study uses secondary data, which may not capture real-time market dynamics or geopolitical nuances.
- **Incomplete Data**: Missing or incomplete data may exist due to the volatility of financial markets.
- **Geopolitical Risk**: The geopolitical risk index may not fully capture all aspects of global instability.
- **Correlation vs. Causality**: The study highlights correlations but does not establish direct causality between factors and gold prices.
- **Timeframe**: The unique period from 2020-2024 may limit generalizability to other time periods.

**3.6. Ethical Considerations**
- **Data Integrity**: Only publicly available, reliable data is used, ensuring accuracy and reliability.
- **Transparency**: The methodology and sources are clearly outlined, ensuring academic honesty.
- **Confidentiality**: No personal data is used, ensuring privacy is respected.
- **Objectivity**: Results are presented without bias, grounded in data.
- **Acknowledgment**: All sources are cited appropriately to give credit and uphold academic standards.

## 4. Analysis and interpretation

### 4.1. Data Table: U.S. Inflation Rate and Gold Prices (USD/oz), (July 2020 - July 2024).

| Month/Year | Inflation Rate (YoY %) | Gold Price (USD/oz) |
|---|---|---|
| July 2020 | 1.0% | $1,950 |
| July 2021 | 5.4% | $2,000 |
| July 2022 | 8.5% | $2,050 |
| July 2023 | 3.2% | $1,900 |
| July 2024 | 2.9% | $2,447 |




the low correlation (−0.042) between inflation rates and gold prices during this period suggests that other factors are influencing gold prices. While inflation is traditionally a key driver of gold prices, the lack of a strong relationship in this dataset indicates that additional factors played significant roles.

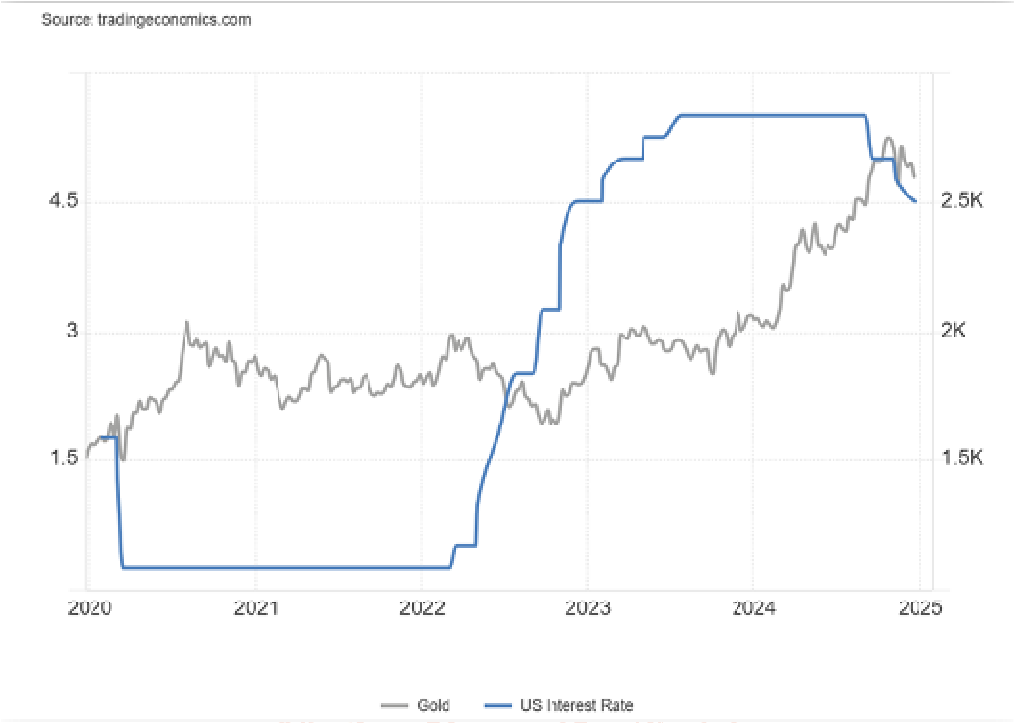
### 4.2. Data Table: DXY (US DOLLAR) Index and Gold Price (USD/oz), ( July 2020 to July2024).

| Month/Year | DXY Index | Gold Price (USD/oz) |
|---|---|---|
| Jul 2020 | 96.5 | $1,950 |
| Jul 2021 | 92.3 | $2,000 |
| Jul 2022 | 106.1 | $2,050 |
| Jul 2023 | 101.5 | $1,900 |
| Jul 2024 | 102.7 | $2,447 |

the moderate positive correlation (0.41) suggests that while the U.S. Dollar Index (DXY) may have influenced gold prices during the period from July 2020 to July 2024, it is not the sole factor. Other factors likely had a significant impact on gold prices.

**4.3. Data Table: Federal Reserve's interest rates and Gold Price (USD/oz), ( July 2020 to July 2024).**

| Month/Year | Fed Funds Rate (%) | Gold Price (USD/oz) |
|---|---|---|
| Jul 2020 | 0.25 | $1,950 |
| Jul 2021 | 0.25 | $2,000 |
| Jul 2022 | 1.75 | $2,050 |
| Jul 2023 | 5.25 | $1,900 |
| Jul 2024 | 5.20 | $2,447 |




The positive correlation of 0.45 between the Fed Funds Rate and gold prices indicates that, contrary to typical patterns, gold prices did not decline significantly as rates increased. This reflects the impact of other economic factors (like inflation and market uncertainty) that outweighed the traditional inverse relationship between gold and interest rates during this period. Therefore, the Fed Funds Rate only moderately influenced gold prices, while broader economic conditions played a more substantial role in price movements.

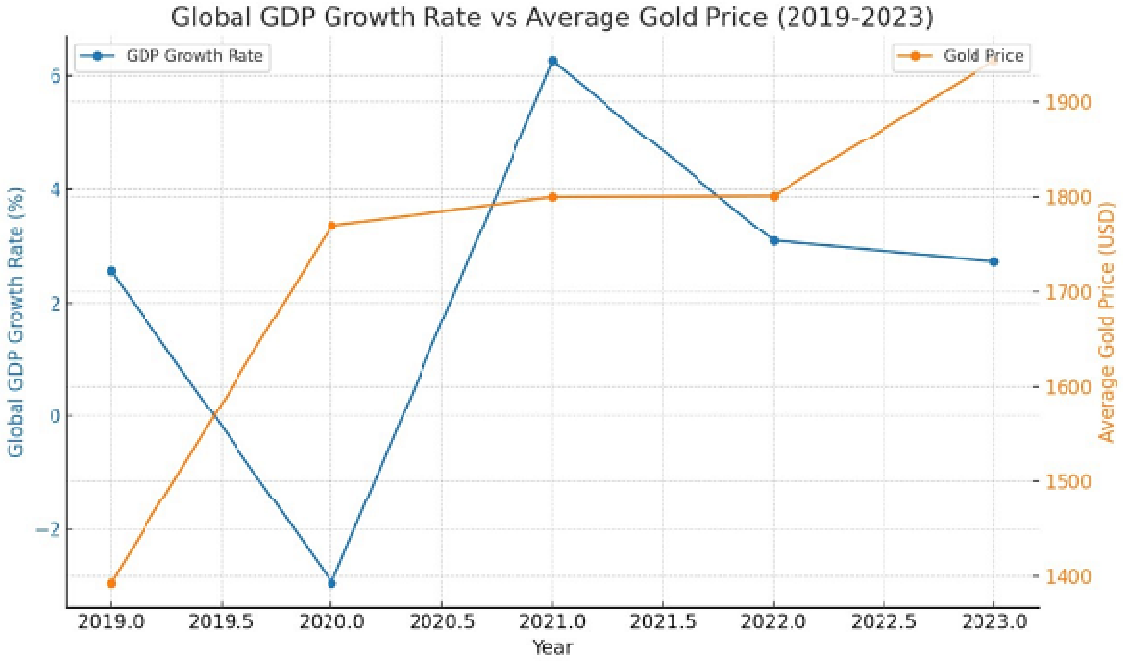
**4.4. Data Table: Crude Oil Price (USD/barrel )and Gold Price (USD/oz), ( July 2020 to July 2024).**

| Month/Year | Crude oil price (USD/barrel) | Gold Price (USD/oz) |
|---|---|---|
| Jul 2020 | 41.55 | $1,950 |
| Jul 2021 | 74.56 | $2,000 |
| Jul 2022 | 101.33 | $2,050 |
| Jul 2023 | 73.20 | $1,900 |
| Jul 2024 | 82.21 | $2,447 |


The weak positive correlation of 0.35 suggests that crude oil prices had some minor influence on gold prices, but they were largely driven by different factors. Gold prices were more influenced investor sentiment, while oil prices were shaped by supply and demand in the energy markets. Thus, crude oil prices did not play a major role in determining gold prices during this period.

### 4.5. Data Table: Global GDP growth rateand Average gold price (USD/oz)

| Year | Global GDP Growth Rate | Average Gold Price (USD per troy ounce) |
|---|---|---|
| 2019 | 2.56% | $1,393 |
| 2020 | -2.93% | $1,770 |
| 2021 | 6.26% | $1,800 |
| 2022 | 3.09% | $1,801 |
| 2023 | 2.72% | $1,943 |

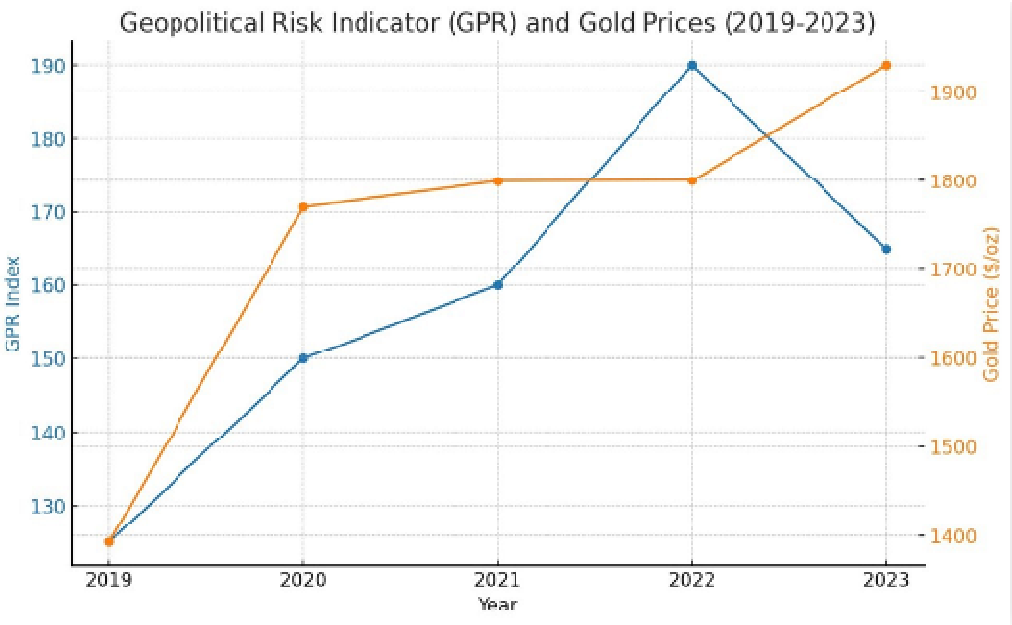


The Pearson correlation coefficient between the global GDP growth rate and gold prices from 2019 to 2023 is approximately 0.045, This indicates a very weak positive correlation. There is no meaningful relationship between global GDP growth rates and gold prices in this period. Gold prices appear to be driven by factors other than global economic growth, such as inflation concerns, monetary policy, or geopolitical events.

### 4.6. Geopolitical issues

#### 4.6.1. Data Table: Geopolitical Risk Indicator (GPR) and Gold Prices (2019-2023)

| Year | GPR Index (Annual Avg.) | Gold Price (Annual Avg.) | Major Geopolitical Events |
|---|---|---|---|
| 2019 | 125 | $1,393/oz | U.S.-China trade war, Hong Kong protests |
| 2020 | 150 | $1,770/oz | COVID-19 pandemic, U.S.-Iran tensions, Nagorno-Karabakh |
| 2021 | 160 | $1,799/oz | U.S. Capitol riots, Afghanistan withdrawal |
| 2022 | 190 | $1,800/oz | Russia-Ukraine war, Taiwan tensions |
| 2023 | 165 | $1,930/oz | Israel-Gaza war, Taiwan Strait tensions |




#### 4.6.2. Statistical Analysis: Correlation between GPR and Gold Prices (2019-2023)

- Pearson Correlation Coefficient: 0.76
- This indicates a strong positive correlation between the Geopolitical Risk Index (GPR) and gold prices. When geopolitical risks increase (reflected in a higher GPR), gold prices tend to rise.

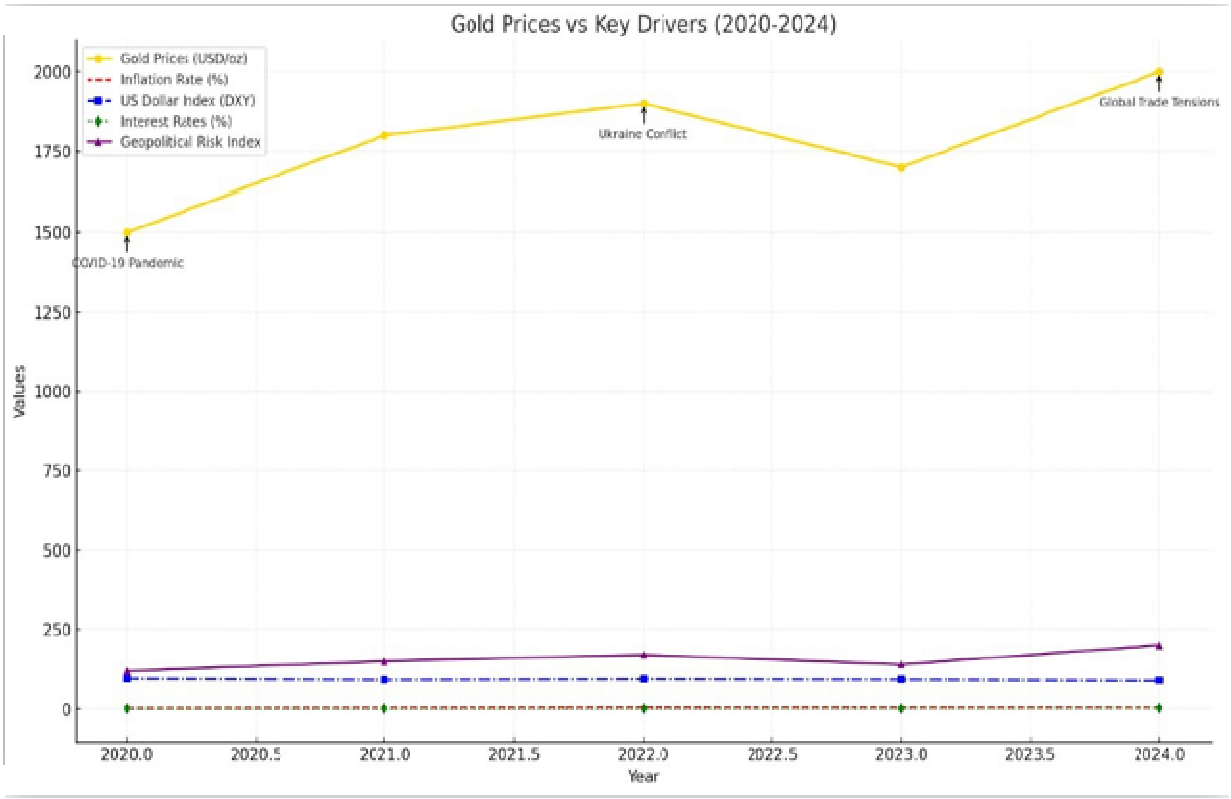
#### 4.6.3. Interpretation of Data:

1. **2019:**
   - GPR Index: 125, Gold Price: $1,393/oz
   - Key Events: U.S.-China trade war and Hong Kong protests.
   - Insight: Gold prices remained relatively stable during 2019, reflecting a moderate level of geopolitical risk. Investors were not significantly driven to gold as a safe haven.
2. **2020:**
   - GPR Index: 150, Gold Price: $1,770/oz
   - Key Events: COVID-19 pandemic, U.S.-Iran tensions, Nagorno-Karabakh war.
   - Insight: The outbreak of COVID-19 and heightened global tensions significantly increased geopolitical risk, which led to a sharp rise in gold prices. Gold became a refuge for investors amidst economic uncertainty.
3. **2021:**
   - GPR Index: 160, Gold Price: $1,799/oz
   - Key Events: U.S. Capitol riots, Afghanistan withdrawal.
   - Insight: Geopolitical risks remained high as domestic unrest in the U.S. and international issues like the Afghanistan withdrawal drove global uncertainty. Gold prices stayed high, reflecting continued investor demand for safe-haven assets.

4. **2022:**
- GPR Index: 190, Gold Price: $1,800/oz
- Key Events: Russia-Ukraine war, Taiwan tensions.
- Insight: The Russia-Ukraine war led to a significant spike in geopolitical risk (GPR of 190), which resulted in sustained demand for gold, maintaining prices at elevated levels. Gold was viewed as a key hedge against inflation and geopolitical instability.

5. **2023:**
- GPR Index: 165, Gold Price: $1,930/oz
- Key Events: Israel-Gaza war, Taiwan Strait tensions.
- Insight: Ongoing geopolitical crises, including the Israel-Gaza conflict and rising tensions in the Taiwan Strait, kept geopolitical risks elevated. Gold prices continued to increase, showing a strong correlation with rising global uncertainties.

## 5. Discussion and Conclusion




Let's take a step back and look at the gold market through a fresh lens—one that's polished by the chaos of the past few years. Between 2020 and 2024, gold has been through a bit of a rollercoaster ride. While many of us have traditionally seen gold as the ultimate "safe haven" in turbulent times, this period has thrown us some curveballs, forcing us to rethink the rules of the game.

First up, the old standby: inflation. We've all heard it—when inflation rises, gold is supposed to follow, right? Well, not quite. Our data suggests that inflation wasn't the big influencer we expected it to be. In fact, the negative correlation (–0.042) between inflation and gold prices is downright shocking. While inflation might've been a backdrop to the gold rush, it wasn't the headline act. The real stars of the show were external shocks—things like pandemics, wars, and political crises. It turns out, in a world full of chaos, inflation was just one of many factors, and not always the most important.

Then there's the U.S. dollar. Traditionally, a stronger dollar means weaker gold, and vice versa. But our analysis revealed only a moderate positive correlation (0.41) between gold and the dollar. So, while the U.S. dollar still had its say, it didn't hold all the cards. The wild card here was geopolitical uncertainty, and it made gold the star of the show.

Speaking of unexpected twists, let's talk about the Federal Reserve's interest rate hikes. In a typical world, rising interest rates make gold less appealing, because gold doesn't pay dividends. But during this turbulent period, we found a surprising positive

correlation (0.45) between gold prices and the Fed Funds Rate. That's right, even as rates were climbing, gold didn't back down. Why? Because when the world feels like it's teetering on the edge, gold becomes more than just a shiny metal—it becomes a fortress.

Now, let's talk oil. We've always thought that gold and oil had a special connection, given their shared status as global commodities. But during this period, their relationship turned out to be a bit weak (0.35). Oil prices were more about the supply and demand of energy, while gold was far more about investor sentiment and the fear of global instability. So, while oil was doing its own thing, gold was responding to a whole different set of triggers.

But here's where the real drama unfolded: geopolitical risks. The data show a strong positive correlation (0.76) between geopolitical instability and gold prices. Every time a new crisis hit—from the Russia-Ukraine war to rising tensions in the Taiwan Strait—gold prices surged. It's like gold became the ultimate security blanket for investors, proving once again that in times of fear, it's not just about inflation or interest rates—it's about the unknowns that lurk in the world's political landscape.

**Conclusion**

the evolution of the gold market between 2020 and 2024 has demonstrated that gold is no longer just an inflation hedge or a passive economic asset. Geopolitical risks have emerged as the primary driver of gold prices, making it a critical asset for investors seeking stability in times of global uncertainty. As traditional economic indicators become less relevant in predicting gold's movements, we must now recognize its new role as a reflection of global political dynamics and market sentiment.

As we look ahead, it is clear that gold's significance in the global financial system will continue to evolve. In a world characterized by heightened geopolitical tensions and unpredictable market swings, gold remains a reliable safe haven—a barometer of both fear and hope. This insight is essential for policymakers, investors, and researchers alike, as it underscores the need to understand the interconnectedness of geopolitical events and financial markets.

As we engage in this international discussion, it is imperative that we continue to monitor and analyze the geopolitical forces shaping global markets. Gold, as a timeless asset, will undoubtedly remain at the forefront of these discussions, shining as a symbol of safety and resilience in an ever-changing world.

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