

Exploring the Dynamics of Gold Prices in India: Factors and Trends

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Abstract

Gold is often sought as a hedge against inflation, demonstrating resilience in maintaining its value when other assets experience declines. This research endeavor is designed to inquire into the intricate factors that have led to a substantial upswing in gold prices within the Indian market from the years 2012 to 2022. The foundation of the study rests on secondary data curated from the database of the Reserve Bank of India on the Indian economy. The primary focus of the analysis centers around the annual domestic gold prices, computed by averaging the gold prices for each month throughout a given year. To initiate the investigation, Karl Pearson's correlation coefficient is computed to establish relationships between the identified time series. The significance of these correlations is rigorously examined through ANOVA. The research study underscores the significant influence of key economic indicators, namely the GDP of India, Inflation rate, and Dollar exchange rate, on the fluctuations in gold prices. The statistical significance of these predictors implies their crucial role in shaping the dynamics of the gold market. This empirical evidence holds substantial implications for various stakeholders. Investors are advised to adopt a nuanced approach, considering not only market trends but also the broader economic context, as reflected in the GDP, inflation, and exchange rate factors.

Keywords: Gold Prices, Gold, Factors, Gold trends, India

1. Introduction

Gold, renowned as one of the most esteemed metals, has traditionally held significant value, serving as the benchmark for numerous currencies throughout history, a system known as the gold standard (Kohl, 2011). Beyond its monetary function, gold has symbolized purity, intrinsic worth, regality, and various amalgamations of these attributes. Its role extends to international transactions, where it plays a pivotal part. The 1990s witnessed a substantial surge in gold consumption, attributed to the liberalization of gold import policies, robust economic expansion, and favorable fluctuations in gold prices (Parimi, 2018). This period marked a notable acceleration in the utilization of gold, underscoring its enduring relevance in economic and symbolic contexts. There is a significant upward trajectory in both the monetary and non-monetary requisition for gold. This heightened demand is observed among individual purchasers, institutional investors, and even nations. Since the year 2001, there has been a



substantial and abrupt escalation in the price of gold. This surge in gold prices is indicative of a pronounced shift in demand dynamics across various sectors and entities (Mishra, 2014). Over the past decade, gold prices have surged by a substantial 900%. While traditionally regarded as a secure investment in India, the dynamics surrounding gold have evolved. It is now actively traded and forecasted as a commodity. Gold has entered a secular bull market, witnessing a continuous rise in prices. Distinguishing itself from other commodities, gold consistently yields significant returns for investors. In India, gold has historically been utilized for jewelry, but it has also long served as an investment option and a hedge against financial risks (Garg, 2020). There is a prevailing belief that gold prices will experience a steep ascent in the forthcoming period. The role of gold in investment has gained heightened attention, particularly since the onset of the transformative economic crisis in 2008 (Baur and McDermott, 2009).

1.1 History of Gold

For millennia, gold has held immense value due to its aesthetic appeal, scarcity, and durability. Among the earliest metals employed by humans, gold has left an indelible mark on various cultures throughout history. Archaeological discoveries in Anatolia, dating back to around 6000 BCE, unveiled the earliest known gold artifacts. Revered by the ancient Egyptians as the flesh of the gods, gold adorned the tombs of pharaohs, including the renowned Tutankhamun. The ancient Greeks and Romans, too, highly prized gold, utilizing it for crafting coins, jewelry, and artistic masterpieces. Temples and public edifices were adorned with gold in both societies. Following the decline of the Western Roman Empire, gold's use waned in Europe but persisted in regions like China and India. In China, gold found its place in crafting jewelry, coins, and ornamental items, while in India, it assumed a sacred significance in religious ceremonies. The Renaissance witnessed a resurgence of gold in Europe, where it was employed anew for crafting jewelry, coins, and artworks, as well as embellishing churches and public structures. The 19th century marked a significant chapter with gold rushes in the United States and Australia, leading to an augmented gold supply and a subsequent decline in its price. Nevertheless, gold retained its popularity, enduring as a favoured material for jewelry, coins, and various artifacts. In the 20th century, gold served as a currency during World War II, and post-war, the establishment of the Bretton Woods system pegged the value of the US dollar to gold. The collapse of this system in the 1970s ushered in freely fluctuating gold prices. In contemporary times, gold serves diverse purposes. It continues to be a sought-after material for jewelry, coins, and decorative items. Moreover, gold holds a vital role in industries such as electronics and dentistry. As a safe-haven investment, gold sees heightened demand from investors during periods of economic uncertainty. The enduring legacy of gold, spanning cultural symbolism and practical applications, underscores its multifaceted significance in today's world.

1.2 Current Trends of Gold

The current trajectory in the gold market is optimistic, reflecting a year-to-date increase in prices exceeding 6%. Several factors contribute to this bullish trend, notably the ongoing

conflict in Ukraine and other global geopolitical tensions, which have heightened the demand for gold as a perceived safe-haven asset. Gold is often sought as a hedge against inflation, demonstrating resilience in maintaining its value when other assets experience declines. Additionally, a weaker US dollar renders gold more appealing to investors beyond the United States.

Looking ahead, the outlook for gold remains positive, with analysts anticipating a sustained upward trajectory in the short term. Some predictions even suggest a potential return to all-time highs. Supporting this outlook are the actions of central banks worldwide, as they have consistently increased their gold reserves in recent years, signifying confidence in the asset and potentially leading to further price appreciation. Furthermore, the demand for gold is projected to continue growing in emerging markets as these economies expand and wealth accumulates. The bullish trend in gold is further underscored by recent data. Global gold demand in the third quarter of 2023 witnessed a remarkable 28% year-over-year increase, reaching 1,181 tonnes. Year-to-date demand surged by 18% compared to the same period in 2021, reverting to pre-pandemic levels. Notably, investment demand for gold saw robust growth in Q3, with gold ETF inflows totalling 212 tonnes, marking the highest quarterly total since Q4 2020. Central banks maintained their status as net buyers of gold during Q3, adding a net 399 tonnes to their reserves. These trends collectively emphasize that gold continues to be perceived as a valuable asset by both investors and central banks. The substantial increase in investment demand, coupled with central banks' sustained interest, signifies the enduring relevance and attractiveness of gold in the current economic landscape (World Gold Council, 2023).

The research concentrates on scrutinizing various elements that influence the escalation of gold prices, with a particular focus on India. The findings presented in the study elucidate the impact of both monetary and non-monetary factors on the surge in gold prices and assess their ramifications on the Indian economy. The primary objective of this research is to investigate the catalysts behind the upswing in gold prices. This inquiry delves into the repercussions of factors like the international business environment, political landscape, market conditions, integration into the commodity market, consumer purchasing patterns, and inflation on gold prices, specifically within the Indian context during the period from 2012 to 2022.

2. Literature review

For the present research investigation, the scholars have reviewed pertinent literature from diverse national and international journals. In an article by Krauth (2011), various factors influencing gold prices are discussed. Ho *et al.* (2010) emphasize the impact of the dollar index on gold prices. Aggarwal and Lucey (2005) explore the phenomenon of gold prices surpassing psychological price barriers (Kanjilal and Ghosh, 2017). Feldstein (1978) sheds light on the correlation between gold prices and inflation. Greely and Currie (2005) delve into the causes behind the increased demand for gold over the past decade and its contribution to the escalation of gold prices. Butler (2012), in his book, expounds on how the rising gold prices can influence the economies of countries and provides measures to navigate through this scenario.

In his publication, Fan Fei (2010) elucidates another endeavour to unravel the movements in gold prices post the Bretton-Woods system, which marked the conclusion of the last

international monetary regime hinged on gold. The author notes that in recent years, there has been a substantial surge in gold prices globally. The significance of gold in investment has garnered increased attention since the onset of the transformative economic crisis in 2008. Authors Liao S. & Chen argue that commodity prices should exert varying degrees of influence on individual industries rather than the entire market. They posit that fluctuations in gold prices are influenced by the pronounced shifts in oil prices, a trend that commenced in 2005 and appears to be expanding. According to Mishra and Mohan (2012), domestic and international gold prices are intricately interconnected. The paper examines the nature of changes in the factors impacting international gold prices over the past two decades. Short-term volatility in international gold prices traditionally stemmed from factors like global commodity prices, the US dollar exchange rate, and equity prices. In another work by Mishra et al. (2012), an analysis is undertaken to scrutinize the potential causal relationship between domestic gold prices and stock market returns in India. The study, spanning from January 1991 to December 2009, utilizes the Granger causality in the Vector Error Correction Model. The findings indicate evidence of feedback causality between the variables.

3. Objectives

The primary goals of this investigation are as follows:

1. Examine the current status of gold and its pricing within the Indian economy.
2. Analyze the factors that contribute to the escalation of gold prices in India.
3. Assess the repercussions of rising gold prices on the Indian economy.

4. Research methodology

This research study is designed to delve into the intricate factors that have led to a substantial upswing in gold prices within the Indian market from the years 2012 to 2022. The foundation of the study rests on secondary data curated from the database of the Reserve Bank of India on the Indian economy. The primary focus of the analysis centers around the annual domestic gold prices, computed by averaging the gold prices for each month throughout a given year. To initiate the investigation, Karl Pearson's correlation coefficient is computed to establish relationships between the identified time series. The significance of these correlations is rigorously examined through ANOVA. All statistical computations have been meticulously carried out using the IBM SPSS 20.0 version, ensuring a robust and reliable analysis. This comprehensive approach aims to provide a thorough understanding of the dynamics behind the observed surge in gold prices, shedding light on the multifaceted influences that have shaped this economic phenomenon over the specified period.

5. Empirical analysis

Figure 1 provides a comprehensive overview of the gold prices per troy ounce spanning the years 2012 to 2022, with values denominated in USD. The data, sourced from Statista in 2023, serves as a crucial reference for understanding the fluctuating trends in the valuation of gold

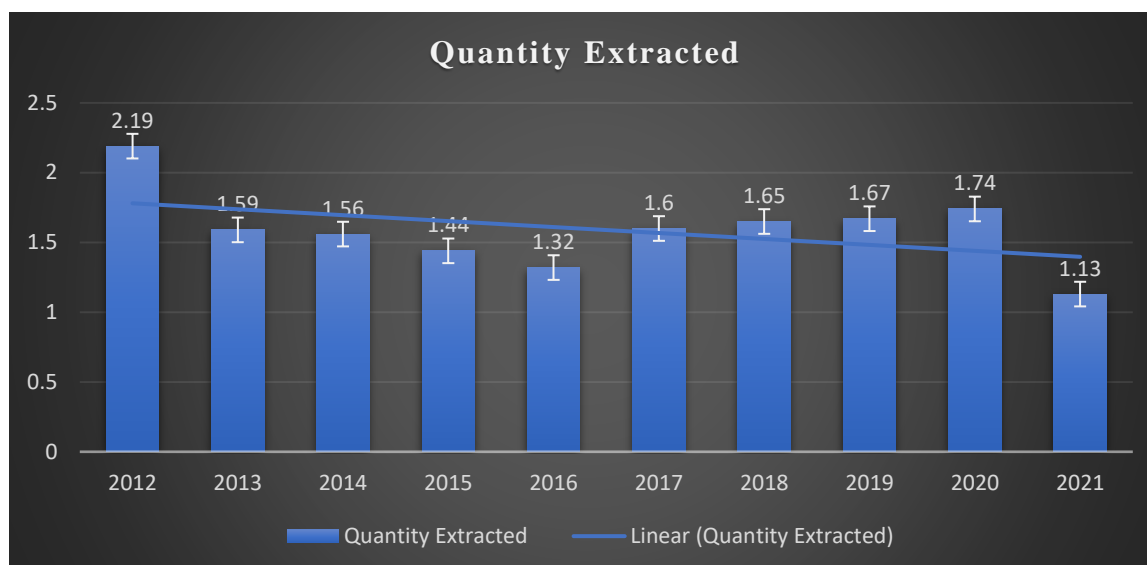
Figure1. Gold price per troy ounce from 2012-2022 (in USD)



Source: (Statista,2023)

over this specified time frame. Analyzing the figures, it is evident that the price of gold witnessed notable variations during this period. In 2012, the gold price stood at 1675.2 USD per troy ounce, marking the initial benchmark for the subsequent years. Subsequent years, however, experienced a downward trajectory, with 2013 recording a notable decline to 1205.9 USD. This trend persisted in 2014 and 2015, with gold prices continuing to decrease to 1183.4 USD and 1060.83 USD, respectively. The following years, 2016 through 2018, depict a reversal in this trend, witnessing a gradual but consistent increase in gold prices. In 2016, the price rose to 1141.25 USD per troy ounce, followed by a further uptick in 2017 to 1302.8 USD and in 2018 to 1279 USD. This upward momentum continued into 2019, reaching a notable high of 1514.75 USD. The year 2020 emerges as a pivotal point, witnessing a substantial surge in gold prices to 1887.6 USD per troy ounce. Although a marginal decline occurred in 2021, with the price settling at 1805.85 USD, the overall trend remains elevated compared to the preceding years. The most recent data for 2022 indicates a marginal increase to 1813.75 USD. In essence, Figure 1 encapsulates the dynamic nature of gold prices over the specified decade, reflecting the impact of various economic and geopolitical factors on the valuation of this precious metal. Figure 2 presents a concise overview of the production volume of gold in India spanning the years 2012 to 2022, with the data measured in metric tonnes. Sourced from Statista in 2023, this Figure provides valuable insights into the annual extraction quantities, shedding light on the trends and fluctuations in gold production within the specified timeframe. Analyzing the figures reveals a dynamic pattern in the production of gold in India during the period under consideration. In 2012, the quantity extracted was recorded at 2.19 metric tonnes, establishing a baseline for the subsequent years. However, the following years witnessed a decline in production, with 2013 marking a notable decrease to 1.59 metric tonnes, followed by further reductions in 2014 (1.56 metric tonnes) and 2015 (1.44 metric tonnes). The downward trend persisted in 2016, reaching a production volume of 1.32 metric tonnes. However, a reversal in

Figure 2. Production volume of gold in India from 2012-22 (in metric tonne)

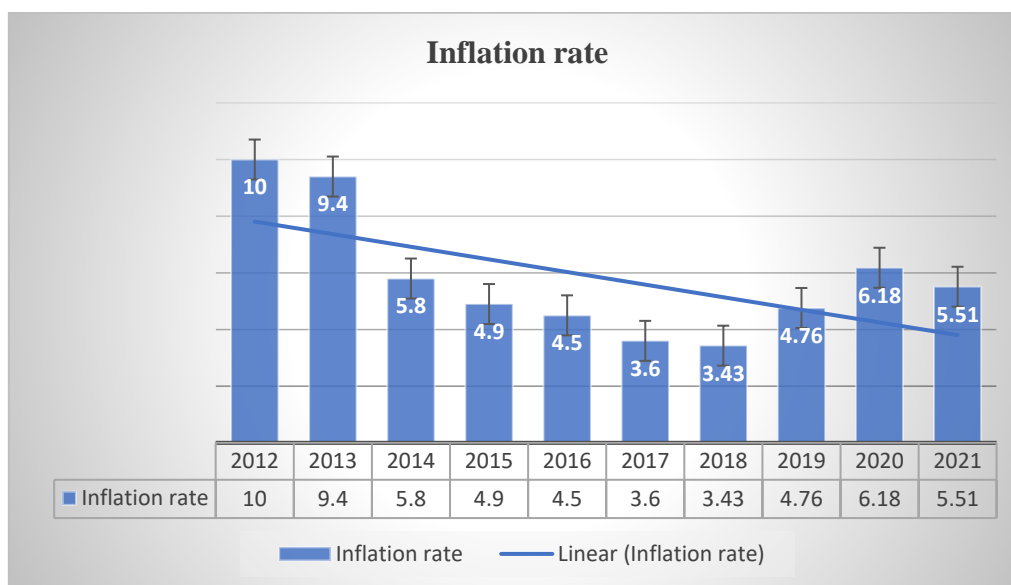


(Statista, 2023)

this pattern became evident in 2017, with gold production increasing to 1.6 metric tonnes. This upward trajectory continued in the subsequent years, with 2018, 2019, and 2020 recording production volumes of 1.65, 1.67, and 1.74 metric tonnes, respectively. The year 2021 stands out as a departure from this trend, experiencing a substantial decline in gold production to 1.13 metric tonnes. This dip is further emphasized in the most recent data for 2022, with a marginal increase to 1.25 metric tonnes. In summary, Figure 2 encapsulates the nuanced dynamics of gold production in India over the specified period, reflecting the interplay of various factors such as economic conditions, mining practices, and regulatory influences on the extraction quantities of this precious metal.

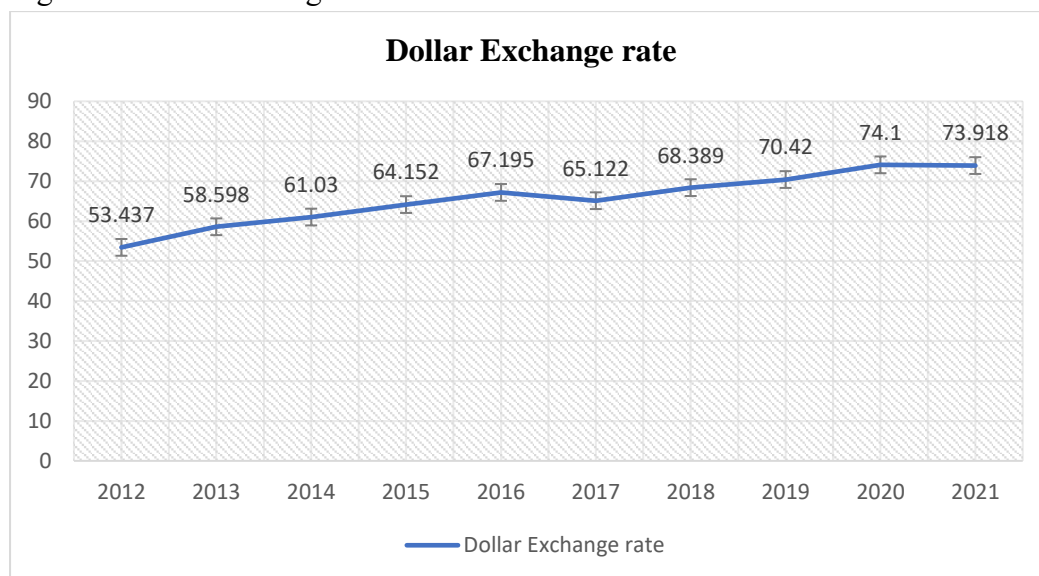
Figure 3 provides a comprehensive overview of the inflation rates in India spanning the years 2012 to 2022, with the data presented in percentage points. Sourced from Statista in 2023, this Figure serves as a valuable resource for understanding the trends and fluctuations in inflation within the specified timeframe. Examining the data reveals a dynamic pattern in the inflation rates across the years. In 2012, the inflation rate was reported at 10%, indicating a double-digit increase in the general price level within the economy. The subsequent years witnessed a gradual decrease in inflation, with 2013 recording a rate of 9.4%, followed by further declines in 2014 (5.8%) and 2015 (4.9%). The trend continued in 2016, with a relatively lower inflation rate of 4.5%. Subsequent years, namely 2017 (3.6%) and 2018 (3.43%), saw a continued moderation in inflation, reflecting a period of relative price stability. However, 2019 marked a slight increase in the inflation rate to 4.76%, which further escalated in 2020 to 6.18%, potentially influenced by various economic factors, including global events and domestic conditions. The year 2021 continued the upward trend, with an inflation rate of 5.51%, and this trajectory further intensified in 2022, reaching 6.66%. Overall, Figure 3 encapsulates the nuanced dynamics of inflation in India over the specified period, offering insights into the economic conditions and price movements within the country. The data highlights periods of both inflationary pressures and relative stability.

Figure3. Inflation rate in India from 2012-22 (in percentage)



Source: (Statista, 2023)

Figure4. Dollar exchange rate in India from 2012-22

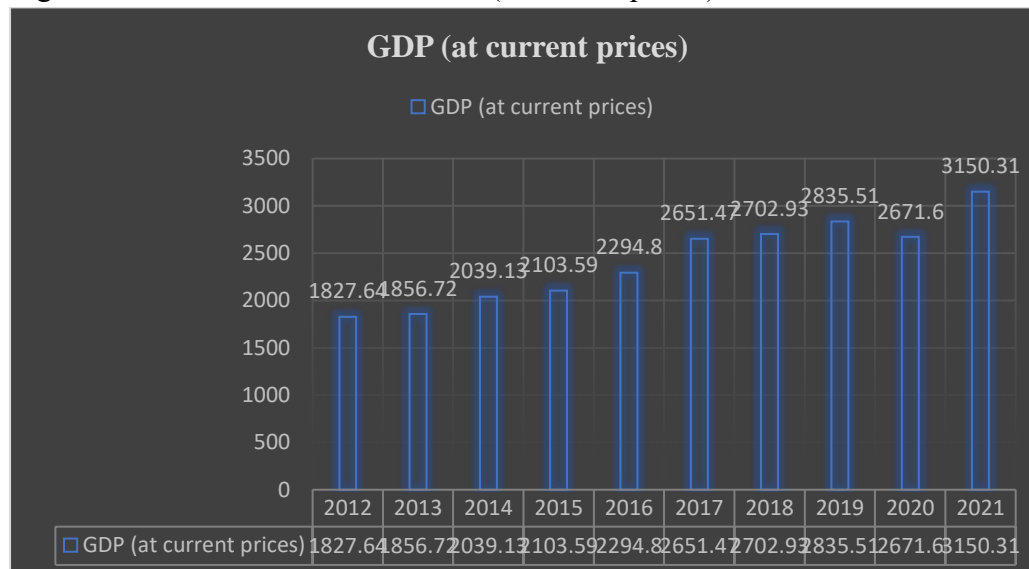


Source: (OECD, 2023)

Figure 4 presents the annual dollar exchange rates in India spanning the years 2012 to 2022. The data, sourced from the OECD in 2023, provides crucial insights into the fluctuations of the Indian rupee against the US dollar over the specified period. Examining the Figure reveals a dynamic trend in the exchange rates. In 2012, the exchange rate stood at 53.437 Indian Rupees per US Dollar. Over the subsequent years, there was a noticeable upward trajectory in the exchange rate, indicating a depreciation of the Indian Rupee against the US Dollar. By 2013, the exchange rate had increased to 58.598, continuing to rise in 2014 (61.030) and 2015 (64.152). The year 2016 marked a further increase to 67.195, reflecting the changing dynamics of currency valuation. However, 2017 saw a slight decrease with the exchange rate at 65.122, suggesting a temporary stabilization. The trend reversed in 2018, reaching 68.389, and continued to rise in 2019 (70.420) and 2020 (74.100), potentially influenced by economic

factors and global market conditions. In 2021, the exchange rate exhibited a marginal decrease to 73.918, indicating some level of stabilization or a potential adjustment in the currency markets. Nevertheless, by 2022, the exchange rate increased to 78.604, signifying a notable depreciation of the Indian Rupee against the US Dollar. Figure 4 captures the dynamics of the dollar exchange rates in India over the specified period, reflecting fluctuations that could be attributed to various economic, geopolitical, and market factors. The data provides a valuable perspective for analyzing currency movements.

Figure5. GDP of India from 2012-22 (at current prices)



(Statista, 2023)

Figure 5 presents the Gross Domestic Product (GDP) of India at current prices for the years 2012 to 2022, offering valuable insights into the economic performance and growth of the country over this period. The data, sourced from Statista in 2023, illustrates the monetary value of all goods and services produced within the Indian economy. Analyzing the Figure reveals a generally upward trajectory in India's GDP during the specified years. In 2012, the GDP stood at 1827.64 units of the local currency (not specified), serving as a baseline for subsequent years. The ensuing years witnessed consistent growth, with the GDP reaching 1856.72 in 2013 and further escalating to 2039.13 in 2014. Continuing this growth pattern, the GDP increased to 2103.59 in 2015 and saw a more substantial rise to 2294.8 in 2016, indicating significant economic expansion. The positive trend persisted in 2017, with the GDP soaring to 2651.47, showcasing robust economic performance. This growth continued in 2018 (2702.93) and 2019 (2835.51), reflecting the resilience and dynamism of the Indian economy. However, the year 2020 recorded a decrease in GDP to 2671.6, potentially influenced by global events such as the COVID-19 pandemic and its economic repercussions. Despite this setback, the Indian economy rebounded strongly in 2021, with the GDP surging to 3150.31, surpassing pre-pandemic levels. The positive momentum persisted in 2022, with the GDP reaching 3389.69, indicating sustained economic growth. Overall, Figure 5 provides a comprehensive overview of India's GDP at current prices, revealing a generally upward trajectory with periodic fluctuations. The

data serves as a crucial reference point for understanding the economic trends and performance of India over the specified years.

Table1. Inter-item correlation matrix

Correlations					
		Gold price	Inflation rate	Dollar exchange rate	GDP of India
Gold price	Pearson Correlation	1	.261	.390	.484
	Sig. (2-tailed)		.466	.265	.157
	N	10	10	10	10
Inflation rate	Pearson Correlation	.261	1	-.652*	-.639*
	Sig. (2-tailed)	.466		.041	.047
	N	10	10	10	10
Dollar exchange rate	Pearson Correlation	.390	-.652*	1	.894**
	Sig. (2-tailed)	.265	.041		.000
	N	10	10	10	10
GDP of India	Pearson Correlation	.484	-.639*	.894**	1
	Sig. (2-tailed)	.157	.047	.000	
	N	10	10	10	10
*. Correlation is significant at the 0.05 level (2-tailed).					
**. Correlation is significant at the 0.01 level (2-tailed).					

Source: Authors' calculations

Table 1 presents the inter-item correlation matrix, examining the relationships between gold price, Inflation rate, Dollar exchange rate, and GDP of India. The correlations are assessed using Pearson correlation coefficients, providing insights into the degree and direction of associations among these economic variables. Analyzing the correlations, we observe that gold price exhibits a positive correlation with the Inflation rate ($r = 0.261$), Dollar exchange rate ($r = 0.390$), and GDP of India ($r = 0.484$). While these correlations suggest a tendency for gold prices to move in tandem with these factors, the significance tests indicate that these associations are not statistically significant at conventional levels ($p > 0.05$). The Inflation rate demonstrates a positive correlation with gold price ($r = 0.261$), indicating a potential relationship between higher inflation and increased gold prices. However, this correlation is not statistically significant ($p > 0.05$). Additionally, the Inflation rate displays a negative correlation with the Dollar exchange rate ($r = -0.652$) and the GDP of India ($r = -0.639$), both of which are statistically significant at the 0.05 level. This suggests that higher inflation is associated with a weaker Dollar exchange rate and a lower GDP for India. The Dollar exchange

rate reveals a positive correlation with gold price ($r = 0.390$) and a strong positive correlation with GDP of India ($r = 0.894$), both of which are statistically significant at the 0.05 and 0.01 levels, respectively. This implies that a higher Dollar exchange rate is linked to increased gold prices and a stronger GDP for India. Lastly, the GDP of India exhibits positive correlations with gold price ($r = 0.484$) and Dollar exchange rate ($r = 0.894$), both of which are statistically significant at the 0.05 and 0.01 levels, respectively. These findings suggest that a growing GDP is associated with higher gold prices and a stronger Dollar exchange rate. While certain correlations are statistically significant, the overall associations provide a nuanced understanding of how these economic factors interrelate.

Table2. Model summary of selected variables

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.890 ^a	.791	.687	164.84339	2.881
a. Predictors: (Constant), GDP of India, Inflation rate, Dollar exchange rate					
b. Dependent Variable: Gold price					

Source: Authors' calculations

The model summary table (Table 2) presents key statistics for the regression model predicting gold prices based on selected variables, including the constant term, GDP of India, Inflation rate, and Dollar exchange rate. The high Multiple Correlation Coefficient (R) of 0.890 indicates a strong positive linear relationship between the predictors and gold prices. The R Square value of 0.791 suggests that approximately 79.1% of the variability in gold prices is explained by the model. The Adjusted R Square, accounting for the model's complexity, is 0.687. The standard error of the estimate is 164.84339, reflecting the average difference between observed and predicted values. The Durbin-Watson statistic, at 2.881, indicates no significant autocorrelation in the residuals. In summary, the model exhibits a robust fit, explaining a substantial portion of gold price variability, and the absence of significant autocorrelation suggests the model adequately captures the relationship between gold prices and the specified predictors.

Table3. ANOVA results

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	618677.466	3	206225.822	7.589	.018 ^b
	Residual	163040.051	6	27173.342		
	Total	781717.517	9			
a. Dependent Variable: Gold price						
b. Predictors: (Constant), GDP of India, Inflation rate, Dollar exchange rate						

Source: Authors' calculations

The ANOVA results, as presented in Table 3, evaluate the overall statistical significance of the regression model predicting gold prices based on the selected variables, including the constant

term, GDP of India, Inflation rate, and Dollar exchange rate. The regression sum of squares (618677.466) is significantly different from zero, with a mean square of 206225.822. The F-statistic of 7.589 is associated with a p-value of .018, indicating statistical significance at the 0.05 level. This suggests that at least one of the predictors in the model has a statistically significant relationship with gold prices. The residual sum of squares (163040.051) represents the unexplained variability in gold prices after considering the predictors. The overall model, considering all predictors, is statistically significant in explaining the variance in gold prices, as evidenced by the significant F-statistic. Therefore, the ANOVA results support the conclusion that the regression model is a meaningful and statistically valid predictor of gold prices.

6. Conclusion and suggestion

The research study underscores the significant influence of key economic indicators, namely the GDP of India, Inflation rate, and Dollar exchange rate, on the fluctuations in gold prices. The statistical significance of these predictors implies their crucial role in shaping the dynamics of the gold market. This empirical evidence holds substantial implications for various stakeholders. Investors are advised to adopt a nuanced approach, considering not only market trends but also the broader economic context, as reflected in the GDP, inflation, and exchange rate factors. Policymakers can leverage these findings to formulate targeted policies that mitigate the potential economic repercussions of volatile gold prices. For researchers, the study paves the way for the development of more sophisticated and accurate forecasting models that account for the intricate relationships between these economic indicators and gold prices. The call for future research to explore additional factors, such as global economic growth and geopolitical risks, adds a layer of complexity to our understanding of gold price determinants. The study's alignment with existing research, particularly Mishra and Mohan (2012), reinforces the robustness of these economic indicators in predicting gold price movements on a global scale. Furthermore, the study's real-time relevance is highlighted by its ability to explain recent market trends, like the impact of inflation in India and the depreciation of the US dollar, on gold prices. Several factors influence gold price dynamics, including supply and demand dynamics, inflation/deflation trends, interest rates, currency movements, geopolitical events, investor perceptions, central bank policies, and technical advancements. Factors that influence supply and demand dynamics include mining output, central bank purchases, and jewelry demand. Gold is frequently viewed as an inflation hedge, and it tends to climb during periods of economic uncertainty. Interest rates and currency movements influence the potential cost of owning gold, with a weaker dollar often resulting in higher gold prices. Understanding these processes necessitates a combination of basic analysis, technical analysis, and knowledge of larger economic and geopolitical developments. In summary, this research contributes valuable insights that enhance our comprehension of the intricate interplay between economic indicators and gold prices.

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