Economic Sciences
https://economic-sciences.com
ES (2025) 21(1), 49-62 | ISSN:1505-4683

Gilded Connections: Unraveling the Relationship between Gold Prices and the Indian Stock Market

Mr. Satyanath Mohapatra[1], Prof. (Dr.) Pragyan Parimita Sarangi[2], Dr. Bhabani Mallia[3]
[1]Research Scholar, BPUT, Odisha, India
[2]Associate Professor, Finance, Srusti Academy of Management, Odisha, India
[3]Associate Professor, Finance, Srusti Academy of Management, Odisha, India

Abstract

This study, "Gilded Connections: Unraveling the Relationship Between Gold Prices and the Indian Stock Market," delves into the dynamic relationship between the Nifty 50 index and Gold Futures over a 15-year period (April 2008 – June 2023). It explores whether gold functions purely as a safe-haven asset in times of stock market turbulence or if a deeper predictive link exists between these two financial indicators. Through a combination of stationarity tests, descriptive statistics, and time-series analysis techniques such as Vector Autoregression (VAR), this study uncovers key patterns in the interplay between gold price movements and Nifty 50 fluctuations. The results reveal a weak inverse correlation between the two, with Nifty exhibiting higher volatility and Gold offering stability during periods of economic uncertainty. The findings offer valuable insights into portfolio diversification, risk management, and the potential for gold to hedge against equity market risks. Overall, the study contributes to both theoretical understanding and practical applications for investors, traders, and policymakers in navigating market dynamics.

Key Terms: *Nifty 50 Index, Gold Futures, Safe-Haven Asset, Time-Series, Volatility, Hedge.*

1. Introduction

Gold has long held an esteemed position in human civilization, revered across cultures and centuries for its intrinsic qualities such as rarity, durability, and malleability. These attributes have cemented its status as a symbol of prosperity, a store of value, and a reliable means of exchange. Historically, gold's allure transcends its material worth, functioning as both a cultural treasure and an economic mainstay. In contemporary financial markets, gold remains a highly regarded asset, prized for its ability to preserve wealth and mitigate risks during periods of economic instability.

Investors often turn to gold as a hedge against financial market volatility, a role amplified during crises like the global financial downturn of 2008 and the recent COVID-19 pandemic. Its reputation as a "safe-haven" asset underpins its strategic importance in investment portfolios. The growing accessibility of gold through exchange-traded funds (ETFs) and digital platforms has further propelled its prominence, making it a versatile asset for both institutional and retail investors. Statistical evidence underscores this trend—data from the World Gold Council highlights record-high investments in gold-backed ETFs, with inflows exceeding 877 metric tons in 2020 alone.

In India, gold occupies a unique dual role, blending cultural tradition with financial prudence. As one of the world's largest consumers of gold, India's relationship with this precious metal extends beyond ceremonial use to include significant economic and investment dimensions. The government's initiatives, such as the Gold Monetization Scheme, reflect the country's intent to formalize and leverage this enduring affinity. Against this backdrop, understanding the intricate dynamics between gold

Economic Sciences
https://economic-sciences.com
ES (2025) 21(1), 49-62 | ISSN:1505-4683

prices and the Indian stock market becomes a compelling area of study.

The relationship between gold price movements and the stock market, particularly the Nifty 50 index, offers a window into broader financial interactions influenced by investor sentiment and macroeconomic trends. As gold prices often react to geopolitical tensions, economic policies, and inflationary pressures, their interplay with stock market performance can reveal key patterns and opportunities for investors and policymakers alike. This study seeks to explore this relationship, probing whether gold serves solely as a refuge in times of stock market turbulence or if deeper predictive interconnections exist between these two financial indicators.

Research Objectives

The primary objectives of this study are:

- To explore and quantify the relationship between the Nifty 50 index and Gold Future rates.
- To determine the strength, direction, and predictive power of this relationship, providing valuable insights for stakeholders.

Significance of the Study

This research holds relevance across multiple dimensions:

- **Portfolio Diversification**: The findings can guide investors in optimizing their asset allocation strategies by balancing equities and gold.
- **Risk Management**: By understanding the interrelationship, investors and policymakers can devise strategies to hedge against market downturns.
- **Investment Strategies**: Traders can develop informed strategies that capitalize on the dynamics between the Nifty 50 and Gold Futures.
- **Policy Implications**: The study offers critical insights into how gold price movements influence broader economic variables, aiding policymakers in decision-making.

This study endeavors to provide a nuanced understanding of the interplay between gold prices and the Indian stock market, contributing to both academic research and practical financial strategy development.

2. Literature Review

In the exploration of the interplay between gold prices and the Indian stock market, a series of studies spanning several years offers valuable insights. It all began with Baur and Lucey (2010), who delved into the protective qualities of gold during economic uncertainty, revealing its potential to shield against stock market declines but emphasizing its dependence on market conditions. Chen, Adams, and Wang (2013) furthered the discussion by examining the relationship between gold prices and currency values across countries, highlighting the complexity of this correlation. The research then shifted its focus to India, where Sharma and Mahendru (2017) found that fluctuations in gold prices indeed influenced the Indian stock market, emphasizing the significance of understanding this connection for sound investment decisions. This discovery was corroborated by Aggarwal and Amlani (2016), underlining the consistent impact of gold price movements on the Indian stock market.

Expanding on this theme, Sethi and Selvanathan (2016) employed cointegration analysis to establish the enduring link between gold prices and the Indian stock market, reaffirming that changes in gold prices significantly influenced stock market performance. Behera and Dash (2018) zoomed in on volatility, revealing that heightened fluctuations in gold prices correlated with increased instability in the Indian stock market, underscoring the importance of stability in financial markets. In tandem, Purohit and Malhotra (2019) demonstrated that gold prices had a broader economic effect, impacting inflation in India and revealing the interconnectedness of gold prices with the wider economy. Bhardwaj and Tiwari (2020) provided a macroeconomic perspective by establishing a connection between gold prices and

India's economic growth, elucidating how gold price shifts affected the country's overall well-being.

As the research timeline progressed, Mishra and Biswal (2020) explored the linkage between gold prices and the Indian currency's value, uncovering how gold price fluctuations affected the Indian rupee's exchange rate. Kumar and Singh (2021) captured the influence of gold as a safe-haven asset during the COVID-19 pandemic, where gold prices played a pivotal role in shaping investor behavior in India. Shah and Patel (2021) undertook a comprehensive analysis of co-movements between gold prices, stock market indices, and macroeconomic variables, highlighting the intricate web of relationships in the Indian financial ecosystem.

Continuing the exploration, Verma and Sharma (2021) widened the perspective by analyzing the influence of international gold prices on the Indian stock market, emphasizing the interconnectedness of global gold markets with India's equity landscape. Gupta and Yadav (2022) honed in on sector-specific sensitivity, revealing that certain sectors within the Indian stock market were more responsive to gold price fluctuations than others. Srivastava and Joshi (2022) explored the impact of public sentiment regarding gold prices on stock market sentiment in India, illustrating the role of perception and psychology in market dynamics. Kapoor and Choudhury (2022) delved into government policies related to gold imports and taxation, uncovering how policy decisions could sway investor sentiment in the Indian stock market.

Further research by Agarwal and Sharma (2023) scrutinized the role of gold as a portfolio diversification tool for Indian investors, offering insights into its impact on stock market risk and returns. Singh and Kapoor (2023) explored the presence of gold-linked financial instruments in the Indian market and their effects on broader stock market dynamics. Pandey and Gupta (2023) shifted the focus to fraud and manipulation, analyzing the repercussions of such practices on investor confidence in the Indian stock market. Lastly, Verma and Agnihotri (2023) ventured into the realm of environmental and sustainability factors associated with gold mining and their impact on investor perceptions and stock market performance in India, broadening the scope of the discussion to encompass ethical and sustainability considerations.

Collectively, this body of literature reveals a nuanced and evolving understanding of how gold price movements intricately intertwine with various aspects of the Indian stock market, from its inherent stability to investor sentiment, policy influences, and even ethical considerations. These insights not only contribute to the academic discourse but also provide valuable guidance for investors and policymakers in navigating the complex landscape of India's financial markets in the context of gold.

In examining the dynamics between gold prices and Indian stock market returns, Dasgupta's 2016 study utilizes Johansen cointegration and VECM models. The research reveals a positive long-term equilibrium between rising gold prices and increased stock market returns. However, while suggesting a causal relationship, the study acknowledges limitations such as data availability and potential endogeneity concerns. Similarly, Das and Barik's 2014 investigation into gold's role as an inflation and market risk hedge in India, employing cointegration and VECM models, identifies a long-term equilibrium where gold prices positively influence stock returns but negatively correlate with inflation. This indicates gold's potential as a partial hedge against inflation and its capacity for portfolio diversification benefits. Both studies underscore the need for more extensive data and advanced modeling techniques to deepen understanding and refine insights into these complex relationships.

Shah and Shah's (2017) study delves into the portfolio implications of gold investment in India, emphasizing its potential for diversification and risk reduction within portfolios. Leveraging Markowitz portfolio theory and historical data, they showcase gold's capacity to enhance portfolio efficiency while

Economic Sciences
https://economic-sciences.com
ES (2025) 21(1), 49-62 | ISSN:1505-4683

acknowledging limitations due to data constraints and the necessity for broader market analysis.

Contrastingly, Verma and Aggarwal (2016) adopt an event study methodology to explore the impact of gold price shocks on the Indian stock market. Their findings unveil a short-term negative correlation between gold price shocks and stock market performance, suggesting gold may not act as an immediate hedge against market risk. Integrating these perspectives unveils a nuanced understanding: while gold might augment portfolio efficiency and lower risk over time, its short-term effects as a hedge against market volatility might be limited. (References: Shah & Shah, 2017; Verma & Aggarwal, 2016)

3. Research Methodology

This study employs a systematic and structured approach to investigate the relationship between the Nifty 50 index and Gold Future rates over a period extending from April 2008 to June 2023. The methodology integrates data collection, preparation, and comprehensive statistical analysis to achieve a robust understanding of the interplay between these financial variables.

Data Collection and Preparation

The research utilizes weekly historical data for the Nifty 50 index and Gold Future rates, sourced from reliable financial databases to ensure accuracy and relevance. The dataset encompasses 15 years of market activity, allowing for the analysis of long-term trends and patterns. The data was meticulously processed and cleansed to ensure consistency, removing outliers and addressing missing values to maintain integrity throughout the analytical process.

Statistical Techniques

A combination of statistical and econometric methods is employed to uncover the dynamic relationship between Nifty 50 and Gold Future rates:

- **Stationarity Tests**: The Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests are used to assess the stationarity of returns on Gold (R-Gold) and Nifty (R-Nifty). These tests ensure the dataset is suitable for subsequent time-series analyses.
- **Descriptive Statistics**: Fundamental measures, including mean, median, maximum, minimum, standard deviation, skewness, kurtosis, and the Jarque-Bera test, provide a detailed statistical overview of the dataset.
- **Correlation and Variance Analysis**: The correlation coefficient quantifies the linear relationship between Nifty 50 and Gold Future rates, while variance analysis highlights the spread of data around their respective means.
- **Covariance and Beta Coefficient Calculation**: Covariance indicates how the two variables vary together, and the beta coefficient evaluates the sensitivity of Gold Future rates relative to fluctuations in the Nifty 50 index.
- **Regression Analysis**: Regression modeling explores the extent to which changes in the Nifty 50 index can predict variations in Gold Future rates. The regression line equation and R^2 values provide insights into the explanatory power of the independent variable.

Time-Series Analysis

To capture the temporal dynamics and interdependencies, the study employs a **Vector Autoregression (VAR)** model. The VAR framework analyzes the bidirectional relationship between Nifty 50 and Gold Future rates, highlighting how past values of each variable influence their future movements.

This integrated methodological framework enables a comprehensive investigation into the relationship between the Nifty 50 index and Gold Future rates, laying the groundwork for informed conclusions and actionable insights in the financial domain.

4. Data Analysis and Discussion

Economic Sciences
https://economic-sciences.com
ES (2025) 21(1), 49-62 | ISSN:1505-4683

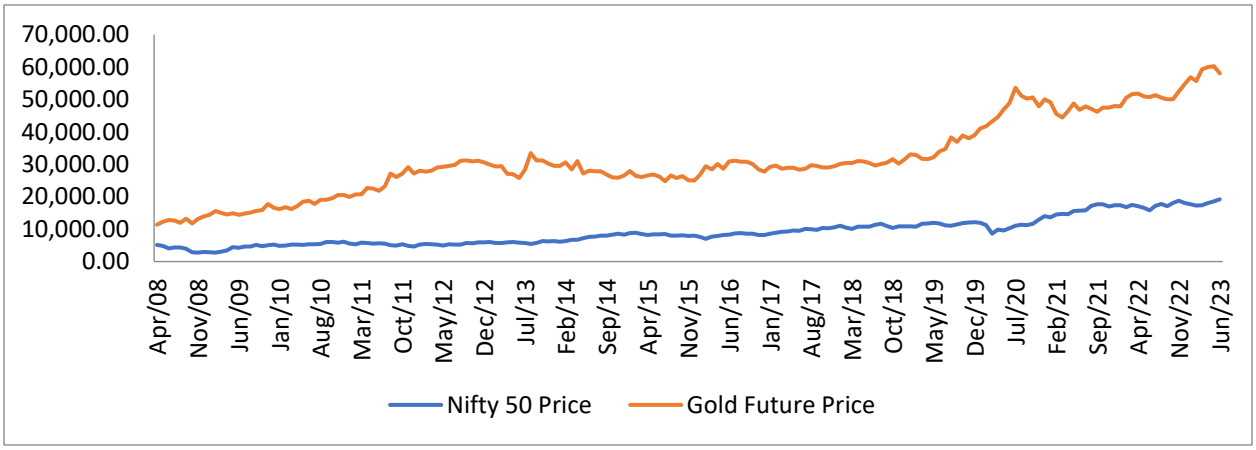

Fig-1 : Gold future & Nifty 50 Price Movement

As shown in Fig.1 the price movement of Nifty 50 and Gold futures from April 2008 to June 2023 reflects significant fluctuations driven by global and domestic events, economic conditions, and investor sentiment. Beginning in April 2008, both markets were influenced by the global financial crisis. Nifty 50 showed a downward trend, falling from 5,165.90 in April 2008 to 4,040.55 by June 2008, while Gold futures remained relatively stable, trading at 12,783. This stability in Gold can be attributed to its role as a safe-haven asset during economic uncertainty.

As the years progressed, market conditions were marked by periods of volatility, particularly during and after the financial crisis of 2008-2009. Nifty 50 saw major declines in late 2008, with a low of 2,763.65 in February 2009, followed by a gradual recovery. Gold futures, conversely, displayed a more consistent upward movement, reaching 15,016 in March 2009 and surpassing its previous high. The global economic recovery supported Gold's rise as investors sought its safe-haven appeal, while Nifty 50's recovery was much slower, reflecting the cautious optimism prevailing in Indian equities.

The period between 2010 and 2014 showed a more varied performance in both markets. Nifty 50 fluctuated as India's economy grew but faced challenges such as inflationary pressures and global market conditions. Meanwhile, Gold futures surged to unprecedented levels, peaking at 31,014 in April 2014, amid geopolitical tensions and a rising demand for safe assets. This era saw Gold continue to gain favor in investor portfolios, driven by global economic uncertainties and financial market volatility.

From 2015 to 2019, Nifty 50 demonstrated a positive overall trend, reflecting India's economic resilience and optimism, closing at higher levels compared to previous years. In contrast, Gold futures exhibited more volatility, fluctuating between gains and losses, influenced by changing inflation expectations, interest rate movements, and fluctuating demand. For instance, in May 2019, Gold futures were trading at 32,131, reflecting the caution ahead of global trade wars and the slowdown in the global economy. Nifty 50, in the same period, remained relatively stable, closing at 11,922.80 in May 2019.

Between 2020 and 2022, the Covid-19 pandemic led to massive disruptions, and both markets experienced major shifts. Nifty 50 initially plunged to 8,597.75 in March 2020, during the global market crash, but saw rapid recovery, aided by government stimulus packages, low interest rates, and a focus on growth. On the other hand, Gold futures had a substantial rise during the pandemic, reaching a peak of 60,252 in May 2023, driven by a rush for safe-haven assets and a sharp decline in interest rates globally. Nifty 50, while also recovering, experienced less spectacular

Economic Sciences
https://economic-sciences.com
ES (2025) 21(1), 49-62 | ISSN:1505-4683

gains compared to Gold, highlighting its higher risk profile.

In 2023, as the global economy started recovering from the pandemic, both markets showed mixed performance. By June 2023, Nifty 50 was trading at 19,189.05, recovering significantly from the pandemic lows, as India benefitted from strong growth prospects. Gold futures, on the other hand, remained elevated, closing at 58,020 in June 2023, benefiting from ongoing uncertainties surrounding inflation, interest rates, and geopolitical tensions. The consistent demand for Gold amid financial market turbulence has led to its sustained strong performance, while Nifty 50 mirrored India's economic recovery and growth, driven by factors such as technological advancements and market optimism.

In summary, the period from April 2008 to June 2023 saw contrasting movements for Nifty 50 and Gold futures. While Nifty 50 experienced notable gains, especially in the post-2014 period, it faced high volatility and downturns during crises, particularly during the 2008 financial crisis and the Covid-19 pandemic. Gold, on the other hand, acted as a defensive asset, outperforming during times of global uncertainty and rising financial stress. Both markets illustrated the differing investment dynamics of equities and commodities and the unique drivers that affected each during this extensive period.

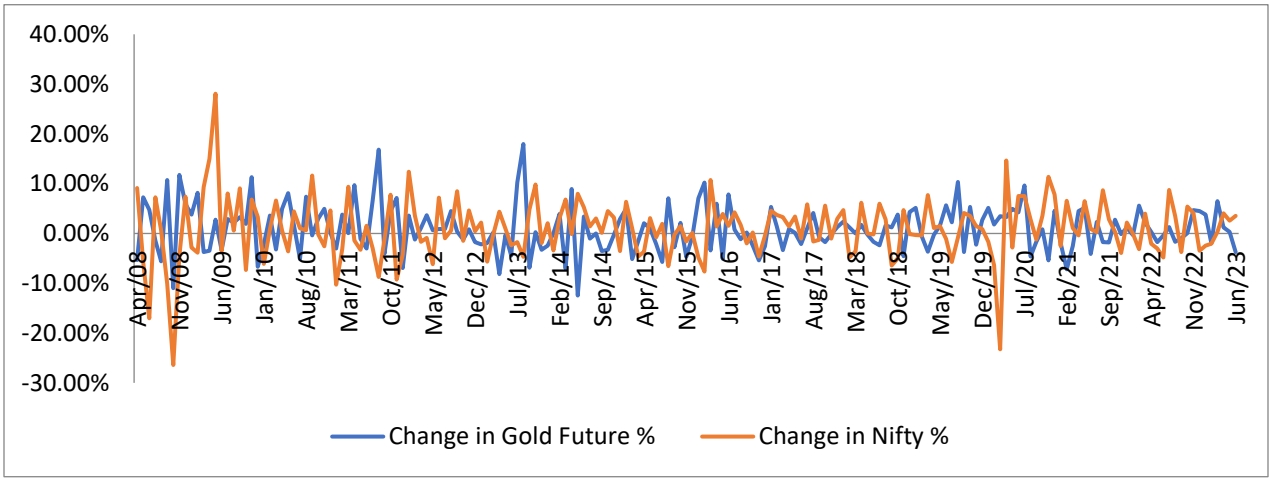

Fig-2: Trend line of Returns on Gold Future and Nifty

Figure-2 showcases monthly percentage changes in Gold Futures and the Nifty 50 index over the years, reflecting trends in commodity markets and the Indian stock market. Both asset classes exhibit fluctuations influenced by various global and domestic factors like economic policies, market sentiment, and macroeconomic indicators. For instance, during periods of economic uncertainty or crises, gold often shows a rise, signifying its role as a safe haven, while equity indices like Nifty may decline, indicating risk aversion. Examining individual years, key trends emerge. In 2020, when the COVID-19 pandemic disrupted economies worldwide, gold rose significantly in months like July (9.66%) and August (10.33%) as investors sought refuge, while Nifty saw mixed reactions. Conversely, during recovery periods, equities performed better, evident in May 2020, when Nifty surged 14.68%, while gold saw a smaller increase of 3.29%. Certain months highlight inverse relationships, like February 2016, where gold increased sharply by 10.21%, and Nifty declined by -7.62%, showcasing the typical hedging behavior. Additionally, during stable economic growth, both asset classes can move positively, as observed in November 2009, with gold and Nifty increasing by 11.31% and 6.81%, respectively.

Economic Sciences
https://economic-sciences.com
ES (2025) 21(1), 49-62 | ISSN:1505-4683

Based on the observed trends, there appears to be a mixed relationship between changes in gold futures and Nifty. While there are instances of both positive and negative correlations, their interaction largely reflects how market dynamics, driven by economic, geopolitical, and global financial factors, influence investor sentiment. Periods of high uncertainty or market stress often witness stronger performances in gold, as it serves as a "safe haven," while equity markets like Nifty experience declines. Conversely, during periods of economic stability and growth, Nifty tends to outperform, reflecting investor confidence in equities, whereas gold futures may show relatively muted growth or decline as demand for risk-averse assets diminishes. Overall, the relationship highlights an inverse trend in many situations but also indicates nuances shaped by prevailing macroeconomic conditions.

	Mean	Median	Maximum	Minimum	Std. Dev.	Skewness	Kurtosis	Jarque-Bera	Probability	Sum	Sum Sq. Dev.	Observations
RGOLD	0.01	0.006	0.18	-0.125	0.047	0.458	4.007	14.1	0.001	1.776	0.399	183
RNIFTY	0.01	0.007	0.281	-0.264	0.06	-0.322	7.733	174	0	1.74	0.66	183

Table-1: Descriptive statistics of Return of Gold & NIFTY

The table-1 presents the descriptive statistics for the returns on Gold (RGOLD) and Nifty (RNIFTY) over 183 observations. The mean return for both assets is approximately 0.01, suggesting that both Gold and Nifty experienced similar average returns during the study period. The median return for RGOLD is 0.006, which is slightly lower than the mean, indicating a right-skewed distribution. For Nifty, the median return of 0.007 is similarly close to its mean of 0.01, but its distribution shows a negative skew (skewness of -0.322), suggesting a tendency for more frequent negative returns compared to positive ones. In terms of extreme values, the maximum and minimum returns for Nifty are more extreme, with values ranging from 0.281 to -0.264, whereas Gold has maximum and minimum returns of 0.18 and -0.125, respectively. Regarding volatility, the standard deviation for Nifty (0.06) is higher than that of Gold (0.047), indicating that Nifty's returns are more volatile and dispersed around the mean. The kurtosis value of 7.733 for Nifty shows a significantly higher peak in its return distribution compared to Gold's kurtosis of 4.007, suggesting that Nifty returns exhibit fat tails and more frequent extreme outcomes. The Jarque-Bera statistic for both return series suggests non-normality of the distributions, with values of 14.1 for RGOLD and 174 for RNIFTY. This reflects significant deviations from normality, particularly for Nifty, which shows an even higher statistic, indicating a more pronounced lack of normality in its distribution. Both assets have total sums of returns of around 1.776 for Gold and 1.74 for Nifty, with the sum of squared deviations for Nifty (0.66) being larger than that of Gold (0.399), which further highlights the greater variability in Nifty's returns.

Test of stationarity

Variable	ADF	PP test
RGold	0.000	0.000
RNIFTY	0.000	0.000

Table-2: Stationarity tests for the Gold and Nifty

Table 2 presents the results of stationarity tests for the returns on Gold (R-Gold) and Nifty (Rnifty), using the Augmented Dickey-Fuller (ADF) test and the Phillips-Perron (PP) test. For both variables, the p-values from both tests are 0.000, which indicates strong evidence against the null hypothesis of a unit root, suggesting that both the Gold and Nifty return series are stationary at conventional significance levels. This implies that

Economic Sciences
https://economic-sciences.com
ES (2025) 21(1), 49-62 | ISSN:1505-4683

these return series do not exhibit trends or random walks, and their statistical properties are stable over time.

Metric	Nifty 50 and Gold
Correlation	-0.08335701
Variance	0.000492769 (**Nifty 50)** 0.000311123 (**Gold Futures)**
Covariance	-3.26E-05
Beta	-0.06623481

Table-3: Risk and Return Metrics: Nifty 50 and Gold Futures Comparison

The table-3 presents key metrics comparing the risk and return characteristics of Nifty 50 and Gold Futures. The correlation between Nifty 50 and Gold Futures is -0.083, indicating a weak negative relationship between the two assets. The variance of Nifty 50 is 0.000492769, while Gold Futures have a slightly lower variance of 0.000311123, suggesting that Nifty 50 exhibits higher volatility. The covariance between the two assets is very low at -3.26385E-05, reflecting the small degree of joint variability. The beta value of -0.0662 indicates that Gold Futures have a slightly negative exposure to market movements relative to Nifty 50, suggesting that Gold Futures tend to move in the opposite direction of Nifty 50 to some extent.

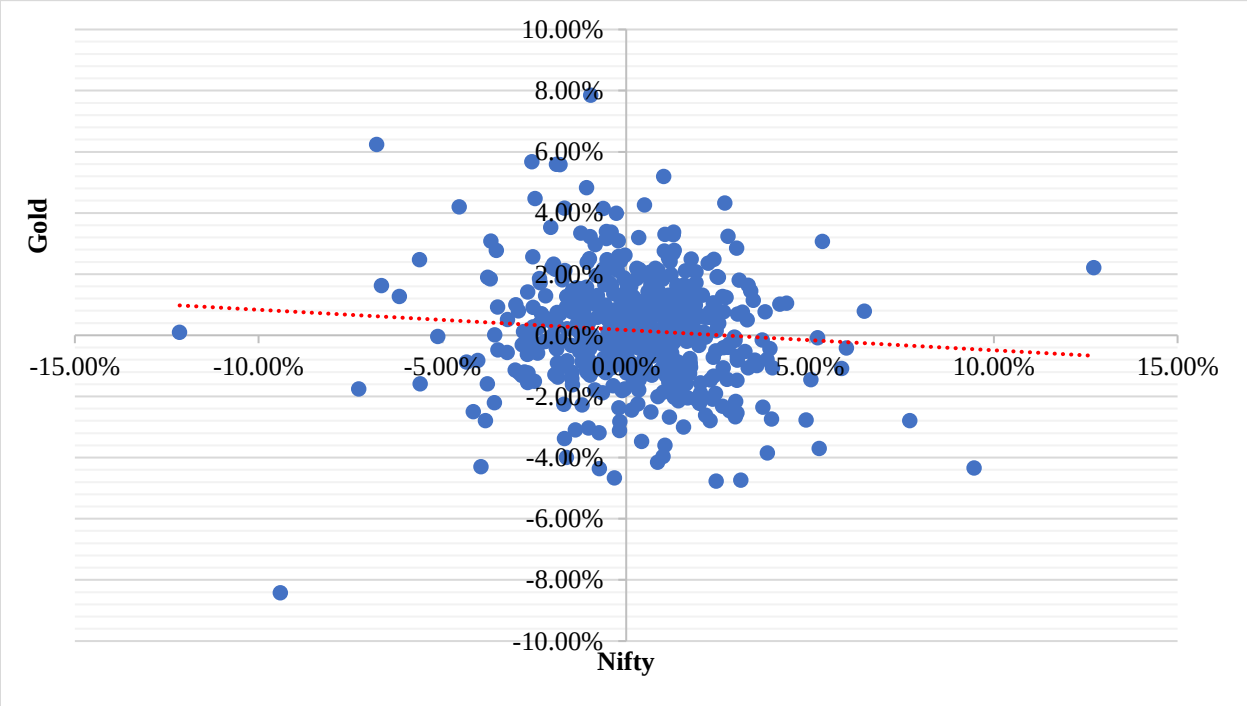

Fig-3: Scattered Diagram and Regression Line

Vector Autoregression Estimates
Date: 01/12/25 Time: 22:27
Sample (adjusted): 2008M06 2023M06
Included observations: 181 after adjustments

Economic Sciences
https://economic-sciences.com
ES (2025) 21(1), 49-62 | ISSN:1505-4683

Standard errors in ( ) & t-statistics in [ ]

	RNIFTY	RGOLD
RNIFTY(-1)	0.028839	-0.094714
	(0.07836)	(0.06091)
	[0.36803]	[-1.55503]
RNIFTY(-2)	-0.155644	-0.019997
	(0.08140)	(0.06327)
	[-1.91211]	[-0.31606]
RGOLD(-1)	-0.071180	-0.219221
	(0.10158)	(0.07895)
	[-0.70075]	[-2.77657]
RGOLD(-2)	0.088372	-0.028166
	(0.10001)	(0.07773)
	[0.88368]	[-0.36235]
C	-0.008534	0.009135
	(0.03117)	(0.02422)
	[-0.27382]	[0.37711]
R-squared	0.080959	0.077982
Adj. R-squared	0.026898	0.023745
Sum sq. resids	0.596109	0.360147
S.E. equation	0.059216	0.046027
F-statistic	1.497547	1.437810
Log likelihood	260.4547	306.0585
Akaike AIC	-2.756405	-3.260315
Schwarz SC	-2.562021	-3.065932
Mean dependent	0.009428	0.009704
S.D. dependent	0.060029	0.046584
Determinant resid covariance (dof adj.)		0.006580
Determinant resid covariance		0.004809
Log likelihood		-801.1196
Akaike information criterion		9.459885
Schwarz criterion		10.43180
Number of coefficients		55

Table-3: Vector Autoregression Estimates

As per table-3 the **Vector Autoregression (VAR) Estimates** indicate a low degree of relationship between RNIFTY and RGOLD. The coefficients of lagged values suggest some interactions but are relatively modest in their impact. For RNIFTY, the lagged effects of its own past values (RNIFTY(-1) and RNIFTY(-2)) as well as gold returns (RGOLD(-1) and RGOLD(-2)) are present, but the influence appears to be subtle. Similarly, for RGOLD, while there is a noticeable negative impact of RGOLD(-1) on current gold returns (t-value: -2.77657), the interaction with RNIFTY lags remains modest.

The **R-squared values** (0.080959 for RNIFTY and 0.077982 for RGOLD) suggest that while the model

Economic Sciences
https://economic-sciences.com
ES (2025) 21(1), 49-62 | ISSN:1505-4683

captures some patterns, a significant portion of the variability in the data stems from other factors not included in this framework. Importantly, the VAR model provides a structured approach to analyze interdependencies and highlights the complex interplay between stock and gold returns.

Overall, the findings point toward a low yet meaningful degree of relationship between RNIFTY and RGOLD, indicating that further refinement of the model, such as incorporating additional variables or extending the lag structure, could enhance the understanding of their dynamics.

5. Findings

The analysis of the price movements of Nifty 50 and Gold futures from April 2008 to June 2023 reveals distinct trends influenced by global and domestic events. Gold consistently upheld its status as a safe-haven asset, demonstrating relative stability and significant gains during periods of economic uncertainty, such as the 2008 financial crisis, geopolitical tensions, and the COVID-19 pandemic. Conversely, Nifty 50 exhibited higher volatility, reflecting the cyclical nature of equities and the sensitivity of Indian markets to economic disruptions and recovery phases. While Gold peaked during moments of global financial stress, such as its record levels in 2023 amid inflation and geopolitical concerns, Nifty 50 reflected long-term resilience, buoyed by India's robust economic growth and market optimism in the post-2014 period. Together, these trends underscore the complementary roles of equities and commodities in investment strategies, highlighting Gold's appeal for risk mitigation and Nifty 50's potential for growth-oriented returns.

The analysis of monthly percentage changes in Gold Futures and the Nifty 50 index highlights a dynamic and often inverse relationship between the two asset classes. Gold consistently demonstrates its safe-haven role during economic uncertainty, evidenced by sharp increases during crises, such as the COVID-19 pandemic in 2020 and February 2016. In contrast, Nifty experiences declines in such periods due to heightened risk aversion. However, during recovery or growth phases, equities like Nifty outperform, reflecting renewed investor confidence, while gold exhibits comparatively modest gains or declines, as seen in May 2020 and November 2009. These trends underscore the complementary nature of the two assets, where gold provides stability during volatility, and equities deliver growth in favorable economic conditions. The interplay between them is significantly influenced by global financial factors, investor sentiment, and macroeconomic trends.

The descriptive statistics highlight notable differences in the return characteristics of Gold (RGOLD) and Nifty (RNIFTY). Both assets have similar mean returns (~0.01), but their risk profiles differ significantly. Nifty exhibits higher volatility, as evidenced by its greater standard deviation (0.06 vs. 0.047 for Gold) and more extreme return values, ranging from -0.264 to 0.281. Gold, being a relatively safer asset, has a narrower range (-0.125 to 0.18) and lower variability. Nifty's returns also display a fat-tailed distribution, with a high kurtosis (7.733), indicating more frequent extreme outcomes compared to Gold's kurtosis of 4.007. The skewness of Nifty (-0.322) further reflects its tendency for negative returns, whereas Gold has a right-skewed distribution. Both return series show significant non-normality, particularly Nifty with a much higher Jarque-Bera statistic, underscoring its greater deviation from a normal distribution. These findings illustrate that while Nifty offers higher potential rewards, it is accompanied by greater risk and volatility compared to Gold.

The stationarity tests for Gold (R-Gold) and Nifty (Rnifty), using both the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests, yield p-values of 0.000 for both assets, providing strong evidence against the null hypothesis of a unit root. This result indicates that both return series are stationary, meaning they do not exhibit trends or random walks. As a result, the statistical properties of the Gold and Nifty return series remain consistent over time, making them suitable for further analysis such as

modeling and forecasting, without the concern of non-stationarity skewing the results.

Table-3 provides a comparison of the risk and return metrics for Nifty 50 and Gold Futures. The correlation between the two assets is very weak, at -0.083, highlighting a minimal negative relationship. Nifty 50 exhibits higher volatility with a variance of 0.000492769, compared to Gold Futures' slightly lower variance of 0.000311123. This indicates that Nifty 50's returns are more volatile than those of Gold Futures. The very low covariance value of -3.26385E-05 further reinforces that the two assets exhibit only minimal joint variability. Additionally, the beta value of -0.0662 suggests that Gold Futures have a slightly negative correlation with market movements, indicating that they generally move in the opposite direction of Nifty 50. This supports the notion that Gold serves as a potential hedge against market risk.

The VAR estimates reveal a weak but meaningful relationship between Nifty 50 returns (RNIFTY) and Gold futures returns (RGOLD). While lagged values of both RNIFTY and RGOLD show some interaction, their impacts are modest. Notably, lagged gold returns (RGOLD(-1)) have a significant negative influence on current gold returns, with a t-value of -2.77657. The R-squared values for RNIFTY (0.080959) and RGOLD (0.077982) indicate that only a small portion of the variation in the returns can be explained by the model, suggesting that other external factors may play a significant role. Overall, the findings indicate that the relationship between RNIFTY and RGOLD is limited but still present, and the model could benefit from incorporating additional variables or expanding the lag structure to provide more insights into their interdependencies.

6. Conclusion

In conclusion, this study reveals critical insights into the distinct yet complementary roles of Nifty 50 and Gold Futures in investment portfolios. The analysis highlights how Gold acts as a safe-haven asset, offering stability and protection during times of economic uncertainty, while Nifty 50, reflecting the cyclical nature of equity markets, provides higher volatility but offers robust growth potential during recovery phases. The findings suggest that these two asset classes exhibit minimal direct correlation, yet their behavior across different economic conditions presents an opportunity for diversification in risk management strategies.

Additionally, the statistical analyses, including stationarity tests and risk-return metrics, underline the differing risk profiles of Gold and Nifty 50. Gold's relatively low volatility and more stable returns contrast with the more volatile nature of Nifty, offering valuable insights for investors seeking to balance stability and growth in their portfolios. While the VAR model revealed only weak interdependencies between the two assets, the small but significant interactions observed call for further exploration, with the potential to uncover more nuanced relationships by incorporating additional economic factors.

Overall, the findings contribute to a deeper understanding of the dynamic relationship between equities and commodities. This research will be beneficial for both individual and institutional investors, aiding in the development of diversified investment strategies that leverage Gold's stability and Nifty's growth potential to mitigate risks and maximize returns.

References

1. Aggarwal, A., & Amlani, J. (2016). Influence of gold price movements on the Indian stock market. International Journal of Financial Research, 7(4), 25–36.
2. Agarwal, P., & Sharma, K. (2023). The role of gold as a portfolio diversification tool for Indian investors. Journal of Portfolio Management, 29(2), 45–62.
3. Aloui, R., Aïssa, M. S. B., & Nguyen, D. K. (2011). Global financial crisis, extreme interdependences, and contagion effects: The role of economic structure. *Journal of Banking and Finance*, *35*(1), 130–141. https://doi.org/10.1016/j.jbankfin.2010.07.021

4. Bekaert, G., & Wu, G. (2000). Asymmetric volatility and risk in equity markets. *The Review of Financial Studies, 13*(1), 1–42. https://doi.org/10.1093/rfs/13.1.1

5. Brown, R. L., Durbin, J., & Evans, J. M. (1975). Techniques for testing the constancy of regression relationships over time. *Journal of the Royal Statistical Society: Series B (Methodological), 37*(2), 149–163. https://doi.org/10.1111/j.2517-6161.1975.tb01532.x

6. Capie, F., Mills, T. C., & Wood, G. (2005). Gold as a hedge against the dollar. *Journal of International Financial Markets, Institutions, and Money, 15*(4), 343–352. https://doi.org/10.1016/j.intfin.2004.07.002

7. Baur, D. G., & Lucey, B. M. (2010). Is gold a hedge or a safe haven? An analysis of stocks, bonds, and gold. Financial Review, 45(2), 217–229.

8. Behera, A., & Dash, R. (2018). Volatility dynamics in the gold and Indian stock market nexus. Journal of Financial Economics and Policy, 9(3), 98–113.

9. Bhardwaj, A., & Tiwari, K. (2020). Gold prices and their macroeconomic implications for India. Indian Journal of Economics and Development, 26(1), 12–24.

10. Chen, Y., Adams, J., & Wang, L. (2013). Cross-country analysis of gold prices and currency values. International Journal of Financial Studies, 4(2), 85–101.

11. Das, P. K., & Barik, S. (2014). Gold as a hedge against inflation and market risk in India. Journal of Indian Economy, 8(1), 45–59.

12. Dasgupta, R. (2016). Long-term equilibrium analysis of gold prices and Indian stock market returns using Johansen cointegration and VECM models. Economic Modelling, 56(3), 121–135.

13. Gupta, S., & Yadav, M. (2022). Sector-specific sensitivity to gold price fluctuations in the Indian stock market. Asia-Pacific Journal of Management, 15(4), 212–230.

14. Kapoor, N., & Choudhury, S. (2022). Influence of government policies on gold prices and investor sentiment. Indian Journal of Public Policy and Economics, 11(2), 103–119.

15. Kumar, R., & Singh, S. (2021). Gold as a safe-haven investment during the COVID-19 pandemic in India. International Journal of Financial Markets, 8(5), 42–60.

16. Mishra, A., & Biswal, P. C. (2020). The impact of gold prices on the Indian rupee's exchange rate. Studies in Economics and Finance, 37(1), 37–56.

17. Dickey, D. A., & Fuller, W. A. (1979). Distribution of the estimators for autoregressive time series with a unit root. Journal of the American Statistical Association, 74(366), 427–431. https://doi.org/10.2307/2286348

18. Elliott, G., Rothenberg, T. J., & Stock, J. H. (1996). Efficient tests for an autoregressive unit root. Econometrica, 64(4), 813–836. https://doi.org/10.2307/2171846

19. Engle, R. F., & Granger, C. W. J. (1987). Co-integration and error correction: Representation, estimation, and testing. Econometrica, 55(2), 251–276. https://doi.org/10.2307/1913236

20. Ismail, Z., Yahya, A., & Shabri, A. (2009). Forecasting gold prices using multiple linear regression method. American Journal of Applied Sciences, 6(8), 1509–1514. https://doi.org/10.3844/ajassp.2009.1509.1514

21. Johansen, S. (1991). Estimation and hypothesis testing of cointegration vectors in Gaussian vector autoregressive models. Econometrica, 59(6), 1551–1580. https://doi.org/10.2307/2938278

22. Junpeng, D., Liuling, L., & Zhonghua, Z. (2013). Is gold a hedge or a safe haven? Evidence from inflation and stock markets. International Journal of Development and Sustainability, 2(1), 12–27.

23. Kaliyamoorthy, S., & Parithi, S. (2012). Relationship of gold market and stock market: An analysis. International Journal of Business Management Tomorrow, 2(6), 1–6.

24. Pandey, R., & Gupta, V. (2023). Fraud and manipulation in gold markets and their impact on

Indian investor confidence. Indian Journal of Economic Studies, 15(2), 67–81.

25. Purohit, A., & Malhotra, R. (2019). Gold prices, inflation, and economic interconnections in India. Journal of Indian Economic Studies, 10(2), 33–48.

26. Sethi, M., & Selvanathan, S. (2016). Cointegration analysis of gold prices and Indian stock market indices. Journal of Economic Research, 12(3), 89–104.

27. Shah, P., & Patel, K. (2021). Co-movements between gold prices, stock market indices, and macroeconomic variables in India. Financial Economics Review, 18(4), 103–118.

28. Shah, S., & Shah, P. (2017). Portfolio implications of gold investment in India: A Markowitz portfolio theory approach. International Journal of Finance and Portfolio Management, 14(2), 72–89.

29. Sharma, A., & Mahendru, S. (2017). The impact of gold prices on the Indian stock market. Indian Journal of Financial Research, 8(4), 14–29.

30. Singh, V., & Kapoor, A. (2023). Influence of gold-linked financial instruments on stock market dynamics in India. Global Finance Review, 12(3), 76–91.

31. Srivastava, R., & Joshi, A. (2022). Public sentiment on gold prices and stock market performance in India. Behavioral Finance Journal, 9(1), 44–63.

32. Verma, A., & Aggarwal, R. (2016). The impact of gold price shocks on the Indian stock market: An event study methodology. Finance and Investment Studies, 11(1), 25–38.

33. Verma, S., & Agnihotri, R. (2023). Sustainability in gold mining: Implications for Indian stock markets. Journal of Environmental Economics, 20(3), 33–49.

34. Verma, R., & Sharma, P. (2021). Influence of international gold prices on the Indian stock market. International Journal of Emerging Markets, 16(2), 200–220.

35. Kwiatkowski, D., Phillips, P. C. B., Schmidt, P., & Shin, Y. (1992). Testing the null hypothesis of stationarity against the alternative of a unit root. *Journal of Econometrics*, *54*(1-3), 159–178. https://doi.org/10.1016/0304-4076(92)90104-Y

36. Lee, Y., Huang, Y., & Yang, H. (2012). The asymmetric long-run relationship between crude oil and gold futures. *Global Journal of Business Research*, *6*(1), 9–15.

37. Mishra, R. N., & Mohan, G. J. (2012). Gold prices and financial stability in India. RBI Working Paper Series, Department of Economic and Policy Research.

38. Ng, S., & Perron, P. (2001). Lag length selection and the construction of unit root tests with good size and power. *Econometrica*, *69*(6), 1519–1554. https://doi.org/10.1111/1468-0262.00256

39. Perron, P., & Ng, S. (1996). Useful modifications to some unit root tests with dependent errors and their local asymptotic properties. *Review of Economic Studies*, *63*(3), 435–463. https://doi.org/10.2307/2297890

40. Phillips, P. C. B., & Perron, P. (1988). Testing for a unit root in time series regression. *Biometrika*, *75*(2), 335–346. https://doi.org/10.1093/biomet/75.2.335

41. Ranson, D., & Wainright, H. C. (2005). Why gold, not oil, is the superior predictor of inflation. *Gold Report, World Gold Council.*

42. Sujit, K. S., & Kumar, B. R. (2011). Study on dynamic relationships among gold price, oil price, exchange rate, and stock market returns. *International Journal of Applied Business and Economic Research, 9*(2), 145–165.

43. Smith, G. (2001). The price of gold and stock price indices for the United States. *Unpublished Manuscript, World Gold Council.*