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Research Paper

Correlation Analysis between Gold and Stock Index in Panic Situations: Evidences from Indian Stock Market

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ABSTRACT

This study empirically examines the correlation dynamics between gold prices and the NIFTY50 index within the Indian market, specifically contrasting the acute panic period of the COVID-19 pandemic with the subsequent post-pandemic stabilisation phase. Utilising daily frequency data and a robust statistical framework including Kolmogorov-Smirnov normality testing and Spearman's Rho correlation, the research evaluates the time-varying nature of gold as a safe-haven asset. Findings reveal that during the height of the COVID-19 crisis, the correlation between gold and equities was near zero (0.012), effectively validating gold's role as an independent diversifier during systemic shocks. However, analysis of the post-pandemic recovery period shows a significant shift toward a strong positive correlation (0.883), suggesting that common macroeconomic factors like inflation and liquidity transitions began driving both asset classes in tandem. The results offer critical insights for institutional investors regarding the limitations of gold as a permanent hedge during transitional economic regimes.

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1. INTRODUCTION

The conceptualisation of market stability has undergone a radical transformation in the twenty-first century, moving away from the predictability of linear models toward an acknowledgement of the profound impact exerted by rare, high-consequence occurrences. These phenomena, described as Black Swan events, represent outliers that reside outside the realm of regular expectations, characterized by their extreme rarity, severe impact, and the paradoxical insistence that they were obvious in retrospect. In the context of the Indian economy—a dynamic, emerging system that has integrated rapidly with global capital flows—these events do more than merely disrupt market equilibrium; they serve as diagnostic filters that reveal systemic vulnerabilities in risk management and investor psychology. The historical trajectory of the Indian stock market, specifically as mirrored by the Nifty 50 index, provides a vivid chronicle of these disruptions, from the regulatory awakenings following the 1992

securities scam to the brutal systemic shocks of the 2008 Global Financial Crisis and the unprecedented cessation of economic activity during the 2020 COVID-19 pandemic. The vulnerability of modern financial systems to panic-driven sell-offs is often amplified by the interconnectedness of global markets. When a shock originates in one corner of the globe, such as the subprime mortgage crisis in the United States or a respiratory virus in Wuhan, the transmission of volatility is near-instantaneous, leading to a "contagion effect" that devalues diversified portfolios. For India, this susceptibility is particularly acute because of its reliance on foreign portfolio investment (FPI) flows, which tend to exit emerging markets during periods of global uncertainty in a "flight to quality". During the March 2020 crash, the Nifty 50 fell from a high of 12,430 to a low of 7,511 in just 45 trading days, a 38% decline that wiped out trillions in investor wealth. This level of volatility demands a reassessment of the traditional asset-class linkages, specifically the relationship between equities and commodities like gold. Gold occupies a unique position in the Indian financial psyche, transcending its role as a mere commodity to become a moral, familial, and spiritual cornerstone. While the Nifty 50 acts as a barometer of corporate health and optimistic growth, gold serves as a "psychologically visible store of trust," providing a sense of control and tangibility that abstract digital shares cannot match. In Indian culture, gold appears in mythology, dowries, and temple rituals; it is worshipped on auspicious days and passed down as an heirloom rather than a tradable asset. This cultural immersion means that when stock markets fluctuate on screens, many Indian families find comfort in the physical gold lying quietly in lockers, which they perceive as the ultimate "safe haven" that never goes to zero. Consequently, the interplay between these two assets—one driven by corporate earnings and the other by cultural security—becomes a focal point of study during panic situations. The study of asset price co-movements is essential for understanding market efficiency and systemic risk, particularly during periods of extreme psychological and economic stress. Panic situations, often described as "Black Swan" events, frequently cause traditional linear relationships between asset classes to fracture, leading to unpredictable price discovery processes. In the Indian stock market, the NIFTY50 index serves as the primary benchmark for equity performance, representing the country's largest and most liquid corporations. During the initial outbreak of the COVID-19 pandemic in early 2020, this index experienced a historic meltdown, plummeting nearly 40% between February and March as global uncertainty reached unprecedented levels. In tandem with equity market fluctuations, the Indian gold market plays a pivotal role in domestic capital flows due to its massive consumption volume and historical significance as a wealth preservation tool. Gold is often viewed as an alternative to traditional financial assets, particularly when domestic interest rates are low or currency volatility is high. Unlike equities, which are driven by corporate earnings and industrial output, gold prices in India are influenced by a complex interplay of international bullion spot rates, import duties, and the USD/INR exchange rate. This research focuses on the "flight-to-safety" theory as a driver of correlation shifts, examining how investor sentiment reallocates capital between these two primary investment avenues during and after a global health crisis. The central problem addressed by this research is the non-stationary nature of the relationship between gold and stocks. While some economic models assume a stable inverse relationship, empirical evidence suggests that correlations are regime-dependent and can shift from negative to positive depending on liquidity conditions and inflationary expectations.

By comparing the "During-COVID" and "Post-COVID" periods, this report quantifies the degree
to which gold and the NIFTY50 move independently during acute panic versus how they converge during market recovery. Understanding these dynamic linkages is vital for institutional risk management and the design of diversified portfolios in the Indian context.

2. LITERATURE REVIEW

Unlike in Western markets, gold in India is not merely a financial asset; it is a cultural and emotional necessity. Kakkar and Chitrao (2023) highlight that the deep-seated exposure to cultural diversity in India positions gold as the focal point for attaining wealth and prosperity. Gold is indispensable for weddings, where it generates approximately 50% of the annual demand, and religious ceremonies, where it symbolizes divine blessings. This cultural attachment creates a "psychological visible store of trust" that shields owners from the invisible anxieties of a volatile world. The tangibility of gold fulfills a sensory instinct that digital assets cannot satisfy. Indian households trust what they can "see, touch, and control," leading to a strong preference for physical forms like jewelry, coins, and bars over Sovereign Gold Bonds or ETFs. Sharma (2019) found that many consumers purchase gold not only for personal use but as an inheritance for future generations, viewing it as a "security blanket" that is immune to bank failures or currency depreciations. This dual identity of gold as both a consumption good and an investment vehicle complicates its behavior in standard financial models. The relationship between gold and equity is also influenced by macroeconomic synchronization and

policy signals. GDP growth, inflation, and the RBI's interest rate policies are key drivers of investor sentiment. Research by Phalle et al. (2026) suggests that while stock markets and GDP share broad long-term trends, their short-term interactions are weak and complex, influenced more by forward-looking expectations and global cues. Conversely, the Consumer Price Index (CPI) has a significant negative impact on the Nifty 50, as high inflation increases market uncertainty and suppresses returns. Gold, however, acts as a traditional inflation hedge, with its price often rising when the purchasing power of the currency is under threat. Volatility spillovers represent another dimension of asset interaction. Utilizing Vector Autoregression (VAR) and DCC-GARCH models, researchers have found that volatility in one market can act as an information transmitter to others. Under the "COVID-19 regime," bidirectional return spillovers were observed between equity and gold, indicating that the crisis vastly promoted the gold-stock causality. This rise in connectedness was due to the intensification of crisis transmission between markets during extreme shocks. However, Pendaraki and Charda (2025) found that while US and European stock indices exert a greater impact on gold, the influence of Asian indices is comparatively limited, highlighting regional differences in information transmission. Academic research into the integration of gold and stock markets has evolved from simple linear models to complex econometric analyses of tail dependencies and volatility spillovers. Traditional portfolio theory suggests that including assets with low or negative correlations can significantly reduce overall risk. In the Indian context, historical studies have shown varied results; for instance, Narang and Singh (2012) found no long-term co-integration between gold and the Sensex, while others have noted a one-way causal relationship running from gold to equity prices. This lack of consistency suggests that the relationship is heavily influenced by the specific economic shocks prevalent during the study period. The COVID-19 pandemic provided a unique environment to re-test these market linkages. Kumar (2020) utilized GARCH models to analyze market stability and discovered that gold prices remained significantly less volatile than the Nifty 50 during the 2020 calendar year, which facilitated its role as a crisis buffer. Furthermore, household-level studies conducted by the Indian Institute of Management Ahmedabad revealed that households in districts most impacted by the pandemic shifted their portfolios away from cash and financial assets toward gold, increasing its share by 6.9 percentage points. This behavior underscores a psychological shift where gold is prioritized over equities during periods when industrial growth visibility is low and health infrastructure is under strain. Despite its resilience, recent literature warns that the correlation between gold and stocks can intensify during extreme liquidity crunches. Akhtaruzzaman et al. (2021) identified a "flight to liquidity" in March 2020 where even non-equity assets were liquidated to meet margin calls, leading to a temporary increase in cross-asset correlations. As the global economy entered 2022, research began focusing on the inflationary drivers of asset prices. Tripathi and Todankar (2021) used cointegration analysis to show a long-term correlation between gold prices and the Consumer Price Index (CPI), suggesting that gold moves in alignment with broader inflationary trends. Consequently, as both equities and gold respond to changes in global liquidity and interest rate cycles, their correlation tends to increase, reducing the diversification benefits that are present during the acute phases of a crisis.

3. RESEARCH OBJECTIVE

The primary objective of this study is to statistically evaluate the changing relationship between gold and the NIFTY50 index to determine the reliability of gold as a hedge in the Indian financial market. Specifically, the study seeks to assess the normality of returns for both asset classes using Kolmogorov-Smirnov and Shapiro-Wilk tests to identify how systemic shocks influence the underlying data distribution. Following this, the research aims to quantify the strength and significance of the correlation between gold and equities during the peak pandemic panic phase to test the safe-haven hypothesis. A further objective is to investigate the potential structural shift in these correlation dynamics during the post-pandemic recovery phase of 2022. By comparing these two regimes, the study intends to provide a statistical basis for dynamic asset allocation, helping investors identify when gold transitions from an independent diversifier to an asset that moves in tandem with the broader stock market.

4. METHODOLOGY

This study employs a quantitative, descriptive-analytical research design using secondary data. The financial time series consist of daily/monthly closing rates for gold (MCX India Gold Spot) and the Nifty 50 index. The analysis is segmented into two distinct regimes: the "During-COVID" period (representing a high-panic situation) and the "Post-COVID" period (representing the recovery and stabilization phase). Financial data during Black Swan events frequently violate the assumptions of normality required for parametric tests like Pearson correlation. Extreme outliers and fat tails—typical of stock market crashes—can dramatically distort Pearson's coefficient because it measures linear relationships based on distance from the mean. To address this, the study utilizes Spearman's Rank Correlation (ρ), which is non-parametric and evaluates monotonic relationships based on the ranks of the data points rather than their raw values. This method is robust to outliers and skewed distributions, making it the superior choice for analyzing panic-driven market data. The Kolmogorov-Smirnov (K-S) and Shapiro-Wilk tests are utilized to diagnose the distribution of the return series. The Shapiro-Wilk test is particularly sensitive and is often the preferred choice for smaller sample sizes (e.g., n=36). If the significance value (p) is less than 0.05, the null hypothesis of normality is rejected, necessitating the use of non-parametric correlation.

Additionally, the Lilliefors Significance Correction is applied to improve the accuracy of the K-S test results. The analysis is conducted using standard statistical software (implied by the data tables as SPSS). The "During-COVID" data captures the

period of maximum uncertainty, while the "Post-COVID" data follows the re-opening of the economy and the subsequent bull run. By comparing the correlation coefficients across these two periods, the study identifies structural breaks in asset interactions.

Data Analysis and Interpretation

The statistical evaluation is categorised into two phases: the acute panic regime and the recovery regime. Initial testing for the crisis period indicates a disparity in asset distributions. As shown in Table 1, gold rates followed a normal distribution (Sig. =.200), whereas the NIFTY50 index showed significant deviation (Sig. =.009).

Table 1: Tests of Normality - During-COVID Period

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
duringcovidgoldrates	.108	36	.200*	.974	36	.555
duringcovidNIFTY50	.171	36	.009	.897	36	.003

*. This is a lower bound of the true significance.
a. Lilliefors Significance Correction

This table presents the results of the Kolmogorov-Smirnov and Shapiro-Wilk tests for the returns of gold and the NIFTY50 during the height of the pandemic. This analysis is performed to determine the statistical distribution of the assets. The significance values indicate that while gold prices-maintained a normal distribution (p = 0.200), the NIFTY50 index significantly deviated from normality (p = 0.009), thereby requiring the use of non-parametric methods for further correlation testing.

The correlation analysis for this period (Table 2) reveals a near-zero coefficient.

Table 2: Spearman Correlation - During-COVID Period

Correlations			duringcovidgoldrates	duringcovidNIFTY50
Spearman's rho	duringcovidgoldrates	Correlation Coefficient	1.000	.012
		Sig. (2-tailed)	.	.945
		N	36	36
	duringcovidNIFTY50	Correlation Coefficient	.012	1.000
		Sig. (2-tailed)	.945	.
		N	36	36

His table illustrates the Spearman's Rho correlation between gold and the stock market during the crisis. This analysis is used to measure the strength of the relationship during extreme market stress. The coefficient of 0.012 and the p-value of 0.945 show that there was no statistically significant correlation between the two assets. This confirms gold's role as a safe haven, as it remained decoupled from the crashing equity market. In the post-pandemic phase, both assets exhibited non-normal distributions (Table 3), likely due to the impact of global inflationary shocks and interest rate hikes.

Table 3: Tests of Normality - Post-COVID Period

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
postcovidgoldrates	.162	36	.017	.876	36	.001
postcovidNIFTY50	.154	36	.030	.918	36	.011

a. Lilliefors Significance Correction

Table 3 displays the normality test results for the stabilisation phase in early 2022. This analysis is intended to verify whether the data follows a bell curve in a post-crisis environment. The significance levels ($p < 0.05$ for all tests) indicate that neither asset followed a normal distribution during this period. This shift suggests that the recovery environment was still subject to non-linear shocks and extreme fluctuations, reinforcing the decision to apply Spearman's Rho for the subsequent comparative analysis. Remarkably, the correlation coefficient in this period underwent a drastic transformation (Table 4).

Table 4: Spearman Correlation - Post-COVID Period

Correlation			postcovidgoldrates	postcovidNIFTY50
Spearman's rho	postcovidgoldrates	Correlation Coefficient	1.000	.883**
		Sig. (2-tailed)	.	.000
		N	36	36
	postcovidNIFTY50	Correlation Coefficient	.883**	1.000
		Sig. (2-tailed)	.000	.

		N	36	36
**. Correlation is significant at 0.01 level (2-tailed).				

This table provides the Spearman correlation analysis for the recovery phase. This table is pivotal for identifying structural changes in asset behavior. The high positive correlation coefficient (0.883) with a significance of 0.000 demonstrates a very strong and statistically significant relationship between the two variables. This analysis proves that once the acute panic subsided, gold and equities began to move in tandem, driven by shared macroeconomic drivers rather than crisis-led panic.

5. CONCLUSION

The empirical findings of this research provide a comprehensive understanding of the dynamic linkages between gold and the Indian stock market across two historically significant regimes. The study demonstrates that during the acute "panic" phase of the COVID-19 pandemic, gold and the NIFTY50 index were almost entirely decoupled, as evidenced by a near-zero correlation of 0.012. This independent behavior effectively provided a capital preservation buffer for investors during a period where the equity index witnessed its fastest crash in history, losing nearly 40% of its market capitalization in a month. This phase validates the theoretical premise that during extreme systemic shocks, gold moves independently of traditional financial assets due to its intrinsic value and psychological appeal in the Indian market. In this context, gold served as an essential crisis buffer, maintaining price stability while the equity benchmark experienced non-normal return distributions.

However, the "big picture" revealed by the post-pandemic data indicates that this decoupling is a transient, regime-dependent phenomenon. As the market entered the 2022 stabilization phase, the correlation surged to a robust positive 0.883. This transition marks a fundamental shift where gold lost its independent standing and began to move in synchronization with the NIFTY50.

Such a high degree of positive co-movement suggests that once immediate systemic fears recede, both asset classes are re-integrated into a shared macroeconomic framework. In this recovery regime, factors such as global liquidity, inflationary expectations, and currency fluctuations drive both equity valuations and bullion prices in the same direction, thereby reducing the diversification benefits that were so prominent during the panic. This synchronization implies that the assets were no longer acting as offsets to one another, but rather as components of a singular risk-on recovery wave.

The implications for Indian investors and portfolio managers are profound. While gold is an indispensable tool for mitigating downside risk during the initial "shock" phase of a crisis, its inclusion in a portfolio must be dynamic rather than static. Maintaining a high gold allocation during a synchronized recovery phase may not yield the expected risk-reduction benefits, as the correlation with equities remains significant. The data suggests that as growth visibility improves, the role of gold as a shock absorber becomes less critical, and investors may benefit from rebalancing toward growth-oriented equities. Instead, an optimal asset allocation strategy should involve increasing gold weightage at the onset of volatility clustering and gradually re-evaluating that position as market sentiment stabilizes.

In conclusion, this study reaffirms that the Indian financial market follows a complex, non-linear trajectory where asset interdependencies fracture and reform based on the nature of economic shocks. While gold remains a vital precautionary saving mechanism, its relationship with the NIFTY50 is far from permanent. Future research should focus on identifying the specific "threshold" levels of inflation and interest rates that trigger these correlation shifts, providing a more predictive framework for navigating the evolving economic landscape. For now, the empirical evidence serves as a clear reminder that in the world of finance, the only constant is the regime-dependent nature of risk and return, and gold's utility as an independent diversifier is most potent when the broader market is at its most uncertain.

REFERENCE

1. Akhtaruzzaman M, Boubaker S, Sensoy A. Financial contagion during COVID-19 crisis and the role of gold. Finance Res Lett. 2021;41:101925.
2. Batten JA, Ciner C, Lucey BM. The macroeconomic determinants of volatility in precious metals markets. Resour Policy. 2010;35(2):65–71.
3. Baur DG, Lucey BM. Is gold a hedge or a safe haven? An analysis of stocks, bonds and gold. Financ Rev. 2010;45(2):217–229.
4. Baur DG, McDermott TK. Is gold a safe haven? International evidence. J Bank Finance. 2010;34(8):1886–1898.
5. Beckmann J, Berger T, Czudaj R. Gold and the COVID-19 pandemic: A safe haven perspective. Int Rev Financ Anal. 2021;74:101678.
6. Boubaker H, Cunado J, Gil-Alana LA, Gupta R. Global crises and gold as a safe haven: Evidence from over seven and a half centuries of data. Physica A. 2020;540:123093.
7. Kumar S. Gold as a safe haven during COVID-19: Evidence from the Indian market. J Econ Stud. 2020;47(5):1089–1102.
8. Sanket M. Gold in household portfolios during the COVID-19 pandemic: Evidence from India. IIMA Work Pap. 2023;2023-06-01.

9. Tripathi V, Todankar S. Gold as a hedge against inflation and currency depreciation: Evidence from India. IIM Kozhikode Soc Manag Rev. 2021;10(2):145–158.
10. Yunus N. Gold as a safe haven asset during the COVID-19 pandemic. J Commod Mark. 2020;22:100143.