



An Empirical Study of Inflation, Gold Returns, NIFTY 50 Returns, and Gold ETF Inflows in India

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Abstract: Gold and equities are both investment options in India, with gold being a safe haven in periods of economic uncertainty and inflation, and equities offering scope for higher returns with increased market risk. This paper studies inflation, gold returns, NIFTY 50 returns, and Gold Exchange Traded Funds (ETF) inflows in the Indian economy. The paper uses secondary data from the monthly basis for 12 years from 2014 to 2025. The paper applies descriptive statistics like EDA, correlation, time series analysis for trend and seasonality and regression to study the relations between the variables.

The paper tries to establish if inflation has a significant impact on gold returns and NIFTY 50 returns, and if inflation and NIFTY 50 returns have a significant impact on Gold ETFs inflows. The paper finds that inflation has a very weak relationship with gold returns and no linear relationship with NIFTY 50 returns. It also finds that the regression results for both relationships are insignificant, and inflation has little to no impact on explaining the variations in gold and NIFTY 50 returns. The paper also finds that the multiple regression of inflation and NIFTY 50 returns is also not a significant predictor of Gold ETFs. The paper also studies yearly trends and seasonal trends of gold and NIFTY 50 returns.

The paper concludes that inflation in isolation does not have a statistically significant effect on the gold returns, NIFTY 50 returns, and Gold ETF inflows during the time period studied. The results suggest that other macroeconomic, financial, and market variables might be more significant predictors of the three aspects. The paper adds to the body of literature that studies the relationship between inflation and investment options in the Indian financial market.

Keywords: Inflation, Gold Returns, NIFTY 50, Gold ETF Inflows, Investment Behavior, Indian Stock Market, Gold Investment, Financial Markets, Correlation Analysis, Regression

1. INTRODUCTION

For households in India, the gold has long been more than just an investment; it is more rooted into the cultural, social, and moral aspect of Indian society. Traditionally, gold in India symbolizes wealth, prosperity, security, and the status of the household

so the Indians prefer investing in gold more. It is often used as a form of gift or blessings during weddings, festivals, and other significant life events, symbolizing its emotional and moral values. For many generations, gold has served as a reliable store of value that looks more like a hedge against

economic uncertainties in the future, and an instrument to preserve the wealth of families. The physical form of gold i.e. jewelry, coins, and bars offer assurance, trusted by Indian families across urban as well as rural areas.

Despite this cultural correspondence for gold, there has been a gradual but notable change in the investment aspect among the Indian households in recent decades. With the more liberalized economy of the Indian, increment in financial literacy of individuals, and greater and easy access to formal financial markets, investing in stocks has become more accessible. The stock market offers the potential for higher and comparatively fast returns to traditional assets, even if it comes with higher risk and volatility. Younger generations and urban investors, in particular, do increasingly see stocks as viable long-term investments to build good wealth and meet their financial goals.

An analytical factor influencing these investment decisions is inflation, the rate at which the general level of prices for goods and services rises, deteriorating the purchasing power. In India, inflation has been quite a challenge, impacting the savings and investments of investors. Inflationary pressures reduce the real value of money over time, creating urgency for investors to find the assets that preserve or grow their wealth in real terms. This economic reality has significant implementations for how Indian households budget their investments between gold and stocks.

Gold has traditionally been considered as a hedge against inflation in India. During the time of rising inflation, the increasing gold price helped investors protect their wealth. The psychological comfort of holding a physical asset that does not lose its value influences many households to increase their gold when inflation spikes. Therefore, this behavior of keeping gold as their primary form of asset is considered common in Indian households.

However, investing in physical gold comes with some serious and practical challenges, including concerns about security, storage costs, and liquidity. Keeping these issues in mind, modern financial instruments such as gold Exchange-Traded Funds (ETFs) have gained quite popularity in India. Gold ETFs allow investors to buy and sell gold in electronic form through stock exchanges, which combines the benefits of gold as an inflation hedge with the convenience and transparency of stock market trading. This innovation has attracted buyers to include younger, tech-savvy investors looking for safer and new ways to invest their money who look

after gold as an asset against inflation. This paper will discuss how inflation has influenced the investment preferences of Indian households which in turn changes their attitude towards gold and stocks.

By discussing the relationship between rising inflation and changing investment patterns of Indian households this research paper will throw light on the dynamic nature of the Indian economy. It will also focus on why gold has been a favourite investment option during inflationary periods in spite of various challenges involved with it. Also, the paper will bring out the importance of innovation in financial products like Gold Exchange Traded Funds which attract more investors due to its various benefits.

In short, the relationship between gold and stock investments in India is a debatable issue and whether it is influenced by inflation or not. The investment preferences of Indian households are complicated and multifaceted and cannot be decided on the basis of a single factor. This research paper will go into the details of this topic in order to fully understand the impact of inflation on investment preferences of Indian households.

2. LITERATURE REVIEW

Nisarga, M. and Marisetty, N. (2023) investigates the impact of macroeconomic and financial variables such as BSE Sensex, crude oil prices, CPI inflation, USD/INR exchange rate and Reserve Bank of India (RBI) repo rate on domestic gold prices over a 5-year (N = 60 months), 3-year (N = 36), and 1-year (N = 12) using SPSS descriptive statistics and multiple linear regression. Their results indicate that inflation had a significant positive relationship with gold prices during the five-year period ($\beta = 2.3465$, $p < 0.001$) and the three-year period ($\beta = 1.4836$, $p = 0.00673$), but not in the one-year period. The five-year model explained 97.57% of the variation in gold prices ($R^2 = 0.9757$), compared with 71.51% for the three-year model. Therefore, the study suggests that the relationship between inflation and gold prices is stronger over longer periods.

Singh, A. and Kaur, N. (2024) analyse the attributes that drive gold purchases among 613 individuals' investors from six Northern Indian cities (Amritsar, Jalandhar, Ludhiana, Chandigarh, Gurugram, and Noida) using Exploratory Factor Analysis (EFA) through Principal Component Analysis and Varimax rotation. The study finds six underlying factors representing 73.99% of total variance (family and

culture, diversification, safety, financial security, wealth, and liquidity). It was seen in the findings of the study that 72.3% of respondents buy gold for special occasions like marriages and festivals, while 47.96% of respondents see gold as an investment. Also 55.2% of respondents think that an increase in import duty would negatively impact their gold investment, whereas 39.7% think that GST would discourage investment.

Harini, B. Gowda and Vineesha, C. (2025) evaluates the influence of rising gold prices on investment preferences among middle-class buyers using descriptive survey research design. They report that 43.8% of respondents select inflation as the main driver of gold price hikes followed by Rupee depreciation (29.7%). Over 76% of households view gold as a safe investment while 47.7% prefer jewellery over digital investments. Due to low affordability (67.7% rating gold as less or much less affordable as compared to 5 years prior), households make adjustments: 35.4% reduce purchase quantities, 27.7% purchase lower purity gold, 26.2% delay purchases while 32.3% actively transfer savings into other assets such as mutual funds and fixed deposits.

Amra Mariyam, P. (2016) analyses gold price hike impact on consumers in the Tirunelveli district (N=30) using Garrett's Ranking Technique. The study ranks Adornment first (score 60.61), followed by Investment (53.23), Liquidity (44.80), and Lack of Better Alternatives (41.34). Despite high prices, 52% of consumers do not postpone gold purchases due to its deep rootedness in our culture, creating a demand which contributes to India's Current Account Deficit (CAD).

Baber, P., Baber, R., and Thomas, G. (2012) examine the factors affecting domestic gold prices in India during the period 2002–2012. The study uses secondary time-series data from the Reserve Bank of India and analyses gold prices, CPI inflation, and the USD/INR exchange rate using SPSS. It finds a strong positive relationship between CPI inflation and gold prices, with a correlation of 0.696. The USD/INR exchange rate also shows a positive relationship with gold prices, with a correlation of 0.280. Therefore, the results indicate that rising inflation and rupee depreciation are positively associated with higher domestic gold prices.

Al-Abedallat, A.Z. (2026) examines the major global macroeconomic factors affecting gold prices and the

role of gold as a safe-haven asset during economic uncertainty. The study uses a qualitative review of literature. It focuses on gold supply and demand, interest rates, inflation, financial market uncertainty, and currency purchasing power. It finds that gold prices generally have an inverse relationship with the US dollar and that lower interest rates can increase demand for gold. It also highlights the growing role of central bank gold purchases and gold's ability to preserve purchasing power during periods of economic uncertainty. However, the study identifies risks such as price unpredictability, storage costs, lack of regular income, and the possibility of losses during financial crises. The study therefore presents gold as an important asset but not a risk-free investment asset.

The study concluded an investor is supposed to diversify his investments by dividing them into three sections, for example: the first section is gold, the second section is cash in banks, and the third section is diversified investments (real assets and financial assets).

3. METHODOLOGY

3.1. Data Sources and Study Period

The study is based on secondary data covering a period of 12 years, comprising 144 monthly observations. The required data were collected from reliable and publicly available sources. The data sources used for the study are as follows:

- Consumer Price Index (CPI) Inflation: Monthly CPI inflation data were obtained from the Ministry of Statistics and Programme Implementation (MoSPI), Government of India.
- Gold Returns: Historical gold price data used to compute monthly gold returns were obtained from Kaggle.
- Stock Returns: Historical stock market data were sourced from Nifty Indices and used to calculate the corresponding monthly stock returns.
- Gold ETF Inflows: Monthly data on Gold Exchange-Traded Fund (ETF) inflows were obtained from the Association of Mutual Funds in India (AMFI).
- The data collected from these sources were compiled and processed to ensure consistency across the study period. Appropriate statistical techniques were subsequently applied to examine the relationship between inflation, gold returns, stock returns, and Gold ETF inflows.

3.2. Statistical Techniques Used

- **Exploratory Data Analysis:** In this case, EDA was conducted to have an initial insight into the data. The descriptive statistics and graphs were used to understand the data's main features. Such features include the data's central tendency, variability, and distribution. The variables' trends, outliers, and other relevant information were also identified using EDA. (Padave, 2026; Panwale et al., 2026)
- **Linear Regression Analysis:** The linear regression technique was employed to establish a relationship between gold returns and the independent variables. Specifically, the statistical technique was used to estimate the association's direction and magnitude and evaluate the predictability of gold returns using the independent variables.
- **Time Series Analysis:** A time series analysis was conducted to understand the data's behavior over time. Trends and fluctuations of the data in monthly intervals were monitored to observe the patterns and changes over time.
- **Estimating Gold Returns:** The gold returns were estimated using the monthly basis of gold prices. As a result, the returns of gold were determined by the percentage change of gold prices between consecutive months.
- **Seasonality Analysis:** A seasonality analysis was conducted to monitor the variations of gold returns across months. This technique aims to identify if gold returns demonstrate month-wise patterns in the analyzed time frame.

3.3. Variables

- **CPI Inflation (%):** Inflation is costly. It discourages savings and investment by creating uncertainty about future prices. And it forces businesses and individuals to spend time and resources predicting future prices and hedging against the risk of unexpected changes in the price level. It causes the economy to operate less efficiently, hampering economic growth and ultimately reducing standard of living. Consumers' cost of living depends on the prices of the many goods and services they consume and the share of each good or service in the household budget. To measure the average consumer's cost of living, government agencies conduct household surveys to identify a basket of commonly purchased items and

then track the cost of purchasing the basket over time. (Housing expenses, including rent and mortgages). The cost of this basket at a given time expressed relative to a base year is Consumer Price Index (CPI), and the percentage change in the CPI over a certain period is Consumer Price Inflation.

- **Gold Price Return (%):** Gold price returns basically show how much the price of gold has changed over a period of time. The change is taken in percentage terms, so it tells us whether the price has increased or decreased compared to the previous period. For this study, the return is calculated on a monthly basis. Gold has been studied quite a lot because its price behavior can be different when there is uncertainty or volatility in the market.
- Gold returns are also important for this study because of their connection with Gold ETFs. A Gold ETF allows investors to invest in gold without actually buying and storing physical gold. Since the ETF is linked to the price of gold, changes in gold prices can also be related to changes in investor flows into these funds. Hence, monthly gold price returns are taken as the independent variable in this study, while Gold ETF inflows are taken as the dependent variable. Using monthly returns helps us look at what happens to ETF inflows when the price of gold changes from one month to the next.
- **Nifty 50 Return (%):** The Nifty 50 Index is chosen as a proxy for Indian equity market returns. While individual stock prices vary, retail household participation in equities is captured via aggregate mutual fund inflows, index funds, and SIPs, making the Nifty 50 benchmark an accurate reflection of how household equity investments perform relative to gold and inflation.

- **Gold ETF Inflows (₹ Crores):** Gold ETFs are paper gold traded right on the stock exchange, where every unit tracks the actual price of the yellow metal. When we talk about inflows, we just mean fresh money coming in as people buy units, and outflows mean cash leaving when they cash out and sell.

- In financial research, these movements act like a real-time mood ring for investors. By watching how money flows in and out of these funds, we can actually see how everyday people and institutions react when inflation starts biting or the stock market takes a wild ride, shifting their cash back and forth between safe-haven gold and riskier stocks.

4. OBJECTIVES

- I.Exploratory data analysis of all variables.
- II.To analyse the trends of Gold Returns over the 12 yearly study period.
- III.To analyse the trends of Nifty50 Returns over the 12 yearly study period.
- IV.To examine the impact of inflation on Gold returns.
- V.To examine the impact of inflation on NIFTY50 returns.
- VI.How inflation and stock market performance drive Gold ETF inflows.

5. DATA ANALYSIS

5.1. Exploratory analysis of all variables.

Exploratory Data Analysis (EDA) was conducted to examine the distribution, variability, and relationships among monthly CPI inflation, Nifty 50 returns, gold returns, and Gold ETF returns for the period 2014–2025.

5.1.1. Descriptive statistics: Various measure of central tendencies and dispersions and graphical methods like boxplots, and scatter plots were used to assess the characteristics of the variables, identify potential outliers, and examine their relationships.

Table 1: Descriptive statistics of the variables

Variable	Mean	Median	Minimum	Maximum	Standard Deviation
CPI Inflation Rate	4.813	4.915	0.00	8.60	1.779
Nifty 50 Returns	1.093	1.160	-23.25	14.68	4.515
Gold Returns	1.578	0.905	-7.30	12.71	3.999
Gold ETF Returns	1260.	-	-	44,244.	5938.801

We can see from Table 1, CPI inflation has the lowest variability of all, with a mean of 4.81% and standard deviation (SD) of 1.78%. Nifty 50 and gold have higher variabilities, with an SD of 4.52% and 4%, respectively. Notably, gold ETF has a large range with mean and median being too far from each

other, with one outlier that might need special consideration.

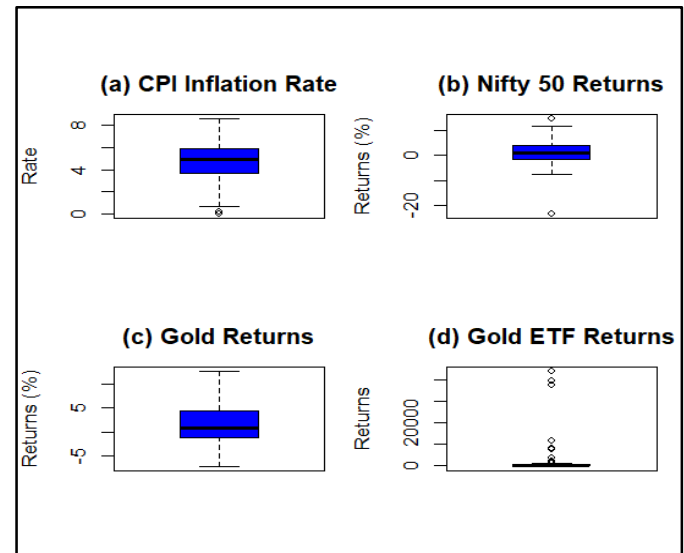


Figure 1: Boxplots of CPI inflation, Nifty 50 returns, gold returns and Gold ETF returns

It further illustrates the distribution of the variables and highlights the presence of extreme observations, particularly in Gold ETF returns.

5.1.2. Karl Pearson's correlation: The correlation coefficients were calculated between the various combinations of available variable to understand the correlation structure. Firstly, let us visualise this structure through pairwise scatter plot –

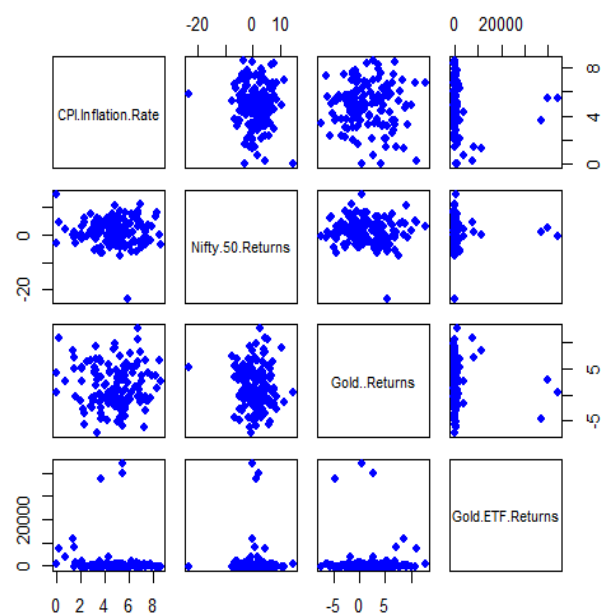


Figure 2: Scatter plot matrix showing pairwise relationships among CPI Inflation Rate, Nifty50 Returns, Gold Returns, and Gold ETF Returns.

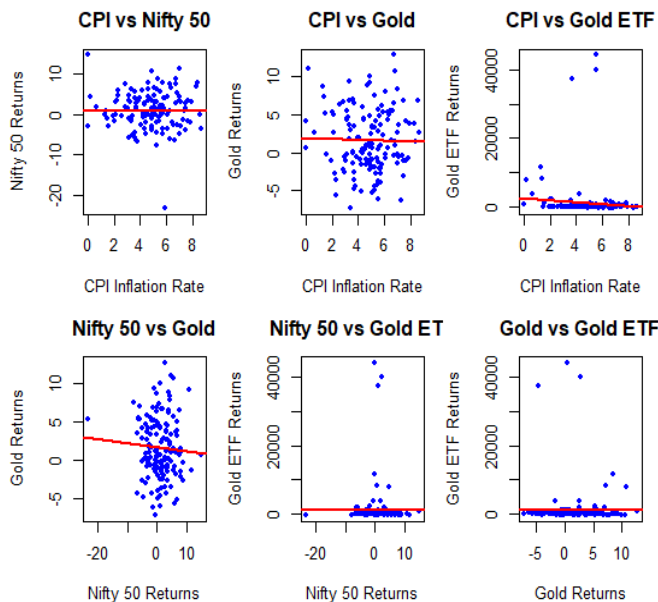


Figure 3: Bivariate scatter plots and fitted trendlines evaluating individual correlations between CPI Inflation Rate, Nifty50, Gold, Gold ETF returns.

Secondly, the Pearson's correlation matrix is calculated to have an exact numerical value for a linear correlation between variables.

Table 2: Correlation Matrix of the Variables

Variable	CPI Inflation Rate	Nifty 50 Returns	Gold Returns	Gold ETF Returns
CPI Inflation Rate	1.000	-0.015	-0.023	-0.079
Nifty 50 Returns	-0.015	1.000	-0.061	-0.010
Gold Returns	-0.023	-0.061	1.000	-0.008
Gold ETF Returns	-0.079	-0.010	-0.008	1.000

The correlation values are all close to zero which means there is a weak linear relationship among the four variables. CPI Inflation has a weak negative relationship with Nifty 50 Returns and with Gold Returns and with Gold ETF Returns. The number for CPI Inflation and Nifty 50 Returns is -0.015. The number for CPI Inflation and Gold Returns is -0.023. The number for CPI Inflation and Gold ETF Returns is -0.079. Nifty 50 Returns and Gold Returns have a weak negative correlation. The number for 50

Returns and Gold Returns is -0.061. In total the variables do not show linear associations in the dataset.

5.2. To Analyse the Trend and Seasonality of Gold Returns Over The 12 Yearly Study Period

To look at how gold returns moved over the 12-year study period a linear trend model was used. The method applied was the Principle of Least Squares. Monthly gold returns were treated as the variable while time was the independent variable. The trend equation that came from this model helped to understand the direction of the movement. It also provided forecast values of gold returns for the time period under study.

After analyzing the trend seasonal indices were calculated for each month. This was done to find the repeating pattern in returns that happens every year month by month. The seasonal index shows how a specific month performs compared to the return across all months. These indices were then combined with the long-term trend to estimate what the expected monthly gold return should be. This approach gives a picture of both the long-term trend and the seasonal behavior in gold returns, during the study period.

Trendline

The graph below demonstrates the behavior of gold returns over the time span of 12 years data from 2014-2025.

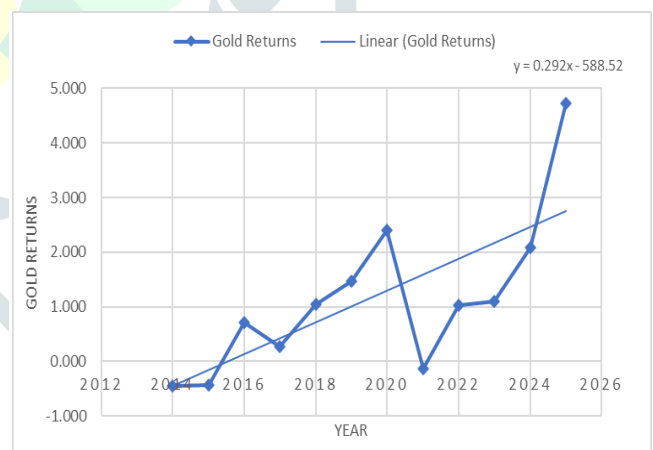


Figure 4: Behavior and linear trend equation for Gold Returns over a 12 year-period (2014-2025)

The fitted trendline equation is,

$$Y = 0.292X - 588.52$$

This equation displays a positive slope indicating a strong upwards long trend from 2014-2025.

Forecasting

• Prediction of gold return in Year 2035, using the trendline equation $Y = 0.292(2035) - 588.52 = 5.7\%$ where 2035 is X value. The model projects a gold return value of 5.7% in Year 2035. Driven by a positive annual slope coefficient of +0.292, this results in a non-stationary upward trend.

• Prediction of gold return in Year 2040, using the trendline equation $Y = 0.292(2040) - 588.52 = 7.16\%$ where 2040 is X value. The predicted gold return for the year 2040 is 7.16%

• The mean changes over time rather than remaining constant. Therefore, the graph demonstrates that gold returns follow a non-stationary upward trend with an average annual increase of +0.292 units, indicating strong positive long-term growth despite significant short term market volatility.

Seasonality of monthly gold returns from 2014-2025

By Method of Simple Averages, we estimated the seasonality of every month from Year 2014-2015, the Seasonal Index measures how a specific month performs relative to the overall monthly baseline average. The sum of all 12 monthly seasonal indices equals 1200 so for each month yields an average seasonal baseline of 100.

- Index >100: Month outperforms the yearly average.
- Index <100: Month underperforms the yearly average.

Seasonal Indices

$$= \left(\frac{\text{Average of individual month}}{\text{Average of monthly average}} \right) \times 100$$

Table 3: Monthly Seasonal Indices and Performance Summary.

Month	Seasonal indices
Jan	28.38
Feb	322.76
Mar	89.39
Apr	79.5
May	160.37
Jun	32.42
Jul	96.83
Aug	136.4
Sep	88.31

Oct	83.62
Nov	-5.56
Dec	87.59

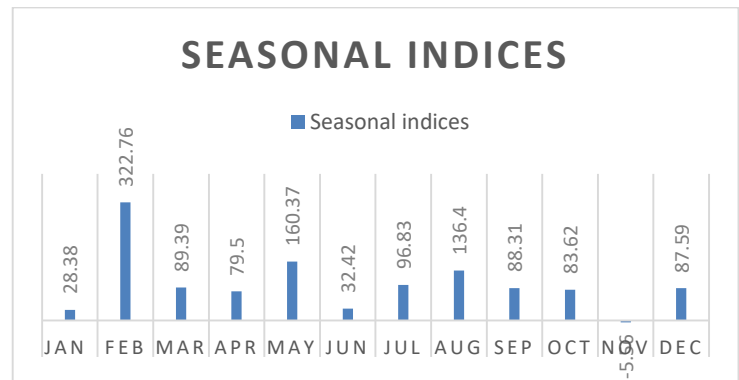


Figure 5: Monthly Seasonal Indices for Gold Returns over a 12 year-period (2014-2025)

Peak Performing Months (Strongest returns)

- February (322.76) is the strongest month of the year, delivering returns over 3 times higher than the monthly baseline. It outperforms the index by (+222.76).
- May (160.37) is the second highest month of the year which outperforms the index by +60.37.
- August (136.40) is the third highest month of the year whose index outperforms by +36.40,
- July (96.83), March (89.39), September (88.31), December (87.59), October (83.62), April (79.5) are Mid-Performing months having seasonal index values between 79.50 and 96.83

Table 4: Seasonality Adjusted Monthly Forecasts of Gold Returns

Month	Adjusted indices	Seasonal	Year 2035	Year 2040
Jan	0.2838		0.134805	0.169334
Feb	3.2276		1.53311	1.925801
Mar	0.8939		0.424603	0.53336
Apr	0.795		0.377625	0.47435
May	1.6037		0.761758	0.956874
Jun	0.3242		0.153995	0.193439
Jul	0.9683		0.459943	0.577752
Aug	1.364		0.6479	0.813853
Sep	0.8831		0.419473	0.526916
Oct	0.8362		0.397195	0.498933
Nov	-0.0556		-0.02641	-0.03317
Dec	0.8759		0.416053	0.52262
	Forecasted	Yearly	5.700048	7.16006
	Return			

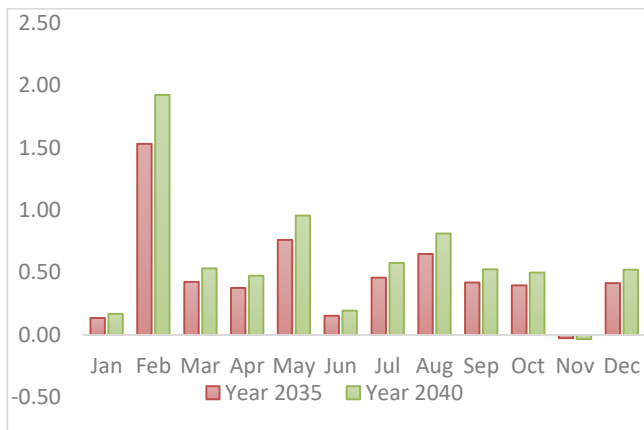


Figure 6: Seasonality Adjusted Monthly Forecasts of Gold Returns

Seasonality-adjusted forecasts show a change in the expected monthly gold returns over the year. February has the forecasted return for both 2035 and 2040 while November has the lowest expected return. Overall seasonality-adjusted forecasts suggest that the seasonal pattern in gold returns will likely keep going. The size of gold returns changes from month to month. Is higher in several months, in 2040 compared with 2035. These results show how important it is to add effects when predicting monthly gold returns.

5.3. To Analyse the Trends of Nifty 50 Returns Over the 12 Yearly Study Period.

The graph below represents the stationary curve of Nifty50 stock returns for the time period of 2014-2025 yearly data and the dotted line represents the Linear Trendline.

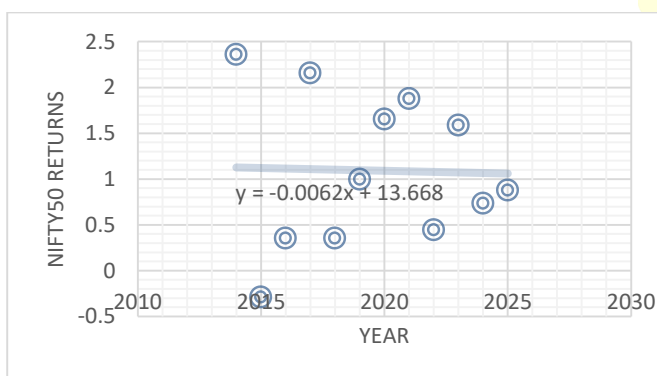


Figure 7: Stationary curves and linear trend equation for Nifty 50 stock returns (2014-2025)

In finance, stock prices are typically non-stationary because they grow over time whereas the stock returns are almost stationary. When returns get too high, stocks become expensive due to which investors stop purchasing, which results in pulling the returns down. When returns drop too low, the stock becomes cheap and investors rush to buy

shares which then pushes returns back up. The curve constantly bounces up and down within a fixed band (between 0.000 and 2.500). It does not completely drop to zero or infinity permanently. Nifty50 stock returns demonstrate statistical stationarity, characterized by constant mean, variance and covariance over time.

The Trendline Equation is $Y = -0.0062X + 13.668$. The negative slope shows that the Nifty50 returns experience a very slight downward trend in returns over this specific 12-year period. There is high volatility as returns fluctuate heavily but the overall baseline remains nearly flat.

Forecasting Nifty50 returns for year 2035, $Y = -0.0062(2035) + 13.668 = 1.051$

Using the trendline equation, the forecasted baseline return for the year 2035 is calculated as 1.051.

Forecasting Nifty50 returns for year 2040, $Y = -0.0062(2040) + 13.668 = 1.02$

Using trendline equation, the forecasted baseline return for the year 2040 is calculated as 1.02

The negative slope coefficient indicates for Year 2035 and Year 2040 the projected return decreases by 0.0062 units. That is for every year that passes, the model's predicted return drops by 0.0062 units. As the slope is extremely close to zero, the decline is minor indicating the long-term trend is essentially flat.

5.4. Model – I: To Examine the Impact of Inflation on Gold Returns

Hypothesis

H_0 (Null hypothesis): Changes in inflation do not cause gold investments to change. i.e. Inflation has no effect on gold.

H_1 (Alternative hypothesis): Changes in inflation do cause gold investments to change. i.e. higher inflation drives changes in gold.

Statistical model:

$$\text{Gold Returns} = \beta_0 + \beta_1(\text{CPI inflation})$$

Model Estimates:

Table 5: Model Parameter Estimates and t-statistics.

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	2.51607	0.99480	2.52921	0.01252	0.54953	4.48261	0.54953	4.48261
X	5	3	9	4	7	2	7	2
Variable 1	-	0.19393	-	0.14677	-	0.10041	-	0.10041
	0.28295	3	1.45901		0.66632	8	0.66632	8

Since the P-value is greater than the 5% significance level (0.05), we fail to reject the null hypothesis. This suggests that CPI inflation does not make a statistically significant contribution to explaining the variation in gold returns. The result indicates that the observed relationship between inflation and gold returns may not be strong enough to establish a reliable predictive effect in the given model. Therefore, CPI inflation alone does not provide sufficient statistical evidence for explaining changes in gold returns.

Individual Testing using t-test: - The model parameter is assumed to be equal to zero under the null hypothesis. We reject the null hypothesis when the P-value is less than 0.05. From the above table, the P-value for the intercept is 0.012524, while the P-value for CPI is 0.14677 which leads to the rejection of the null hypothesis, indicating that the model parameters of CPI Inflation does not have a statistically significant individual effect on gold returns.

On the basis of data and findings the above stated model is able to explain 1.477% of the variation in gold returns% i.e. by the Consumer Price Index (CPI) Inflation rate% and the rest 98.523% of variation is due to other factors. The low R^2 value indicates that inflation alone has a weak relationship with gold returns. Gold returns may also be affected by several other factors, such as interest rates, exchange rates, market conditions and demand-supply factors. Therefore, changes in inflation explain only a small proportion of the variation in gold returns.

5.5. Model – II: To Examine the Impact of Inflation on NIFTY50 Returns

Hypothesis

H_0 (null hypothesis): Inflation has no effect on NIFTY 50 stock returns. Or Consumer price index inflation does not significantly drive stock market returns.

H_1 (Alternative hypothesis): Inflation does have an effect on NIFTY 50 stock returns. Or Inflation directly impacts the performance of stock market returns.

Statistical model:

$$\text{NIFTY 50 returns} = \beta_0 + \beta_1(\text{CPI inflation})$$

Model Estimates:

Table 6: Model Parameter Estimates and t-statistics.

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	1.277274	1.092277	1.169368	0.244214	-0.88195	3.4365	-0.88195	3.4365
X Variable 1	-0.0382	0.212935	-0.17939	0.857884	-0.45913	0.382734	-0.45913	0.382734

Model parameter is equal to zero under null hypothesis. From the above table the P-values are 0.244214 for intercept and P-value for Nifty 50 stock returns as 0.857884, which are greater than 0.05 so we accept the null hypothesis, this indicates the model parameter of CPI Inflation does not impact the Nifty 50 stock returns %.

Only 0.0227% of proportion of variation in NIFTY 50 returns are explained by Consumer Price Index (CPI) Inflation rate% and the rest 99.97% of variation is due to other factors. The extremely low R-square value indicates that inflation alone has a negligible linear relationship with NIFTY 50 returns. Stock market movements are primarily affected by other external drivers such as corporate earnings, global market conditions, interest rates, and investor sentiment rather than monthly CPI inflation alone.

5.6. Model – III: To Examine the Effect of Stock Market Performance and CPI On Gold ETF Inflows.**Hypothesis**

Ho (null hypothesis): Inflation and Nifty 50 returns together have no effect on Gold ETF inflows. Or There is no significant difference in Gold ETF Inflows due to CPI Inflation Rate and NIFTY 50 Returns.

H1(alternate hypothesis): Inflation and Nifty 50 returns together have effect on Gold ETF inflows. Or There is a significant difference in Gold ETF Inflows due to CPI Inflation Rate and NIFTY 50 Returns.

Statistical model:

$$\text{Gold ETF Inflows} = \beta_0 + \beta_1(\text{CPI Inflation}) + \beta_2(\text{NIFTY50})$$

Model Estimates:

Table 7: Model Parameter Estimates and t-statistics.

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	2548.061	1444.28	1.7642	0.0798	-307.1980	5403.32	-307.198	5403.32
X Variable 1	-263.993	280.2446	-0.942	0.3477	-818.017	290.031	-818.017	290.031
X Variable 2	-14.979	110.432	-0.135	0.8922	-233.29	203.337	-233.296	203.337

P-value from above table we received as 0.079858 for intercept, P-value for Nifty 50 stock returns as 0.892299 and P-value for CPI Inflation rate % is 0.347799, which is greater than 0.05 so we accept the null hypothesis, this indicates the model parameter of CPI Inflation and NIFTY 50 returns do not impact the Gold ETF Inflows%.

6. RESULTS AND DISCUSSION

6.1. Objective 1: Exploratory Data Analysis:

- According to the descriptive statistics, the average monthly CPI inflation rate comes up to 4.81%, the standard deviation being 1.78%. Meanwhile, the mean of the NIFTY 50 return is recorded at 1.09% with a standard deviation of 4.52%; in contrast, the mean of gold returns is 1.58% and standard deviation 4.00%.
- Following the results of correlation analysis, the variables included in the study do not have any meaningful linear relationships. The correlation between gold returns and CPI inflation was -0.023 , and between NIFTY 50 returns and CPI inflation was -0.015 . CPI faced a weak negative correlation with Gold ETF inflows as well (-0.079). The correlation coefficient of NIFTY 50 returns with gold returns is -0.061 .
- In general, the correlation coefficients were very close to zero which proves that no significant linear correlations could be found among the variables in the study. The boxplots also show the presence of outliers, especially for the Gold ETF variable which makes applying its data in the regression analysis with caution.

6.2. Objective 2 and 3: Analysis and comparison of trends of GOLD and NIFTY 50 returns over the taken period of time

- Gold Returns the graph demonstrates that gold returns follow a non-stationary upward trend with an average annual increase of $+0.292$ units, indicating strong positive long-term growth despite significant short term market volatility.
- The seasonal analysis reveals a clear month-wise variation in the expected performance of gold returns. The estimated seasonal indices show that February is the strongest-performing month, with a seasonal index of 322.76, indicating that the expected return in February is substantially higher than the average monthly level. The index exceeds the baseline of 100 by 222.76 points, making February the most favourable month in terms of expected gold returns. This pattern is also reflected in the seasonally adjusted forecasts, with February recording the highest expected return of 1.53% in 2035 and 1.93% in 2040.
- May emerges as the second strongest month, with a seasonal index of 160.37, followed by

August with an index of 136.40. These values indicate that both months are expected to perform above the average seasonal level. The predicted returns for May increase from 0.76% in 2035 to 0.96% in 2040, while August increases from 0.65% to 0.81%, suggesting relatively stronger expected performance in these months in the later forecast period.

- The months of July, March, September, December, October, and April fall within the moderate-performing category, with seasonal indices ranging from 79.50 to 96.83. Although these months do not show the exceptionally high seasonal effects observed in February, May, and August, their expected returns remain relatively stable. Among these months, July has the highest seasonal index at 96.83, while April records the lowest at 79.50 within this group.
- For NIFTY 50 the trend graph shows stationarity for the return of investments made by people. The curve constantly bounces up and down within a fixed band (between 0.000 and 2.500). It does not completely drop to zero or infinity permanently.

6.3. Objective 4 and 5: Impact of inflation on Gold and NIFTY 50 returns

The aim was to study whether gold investment is better than stock investment during periods of inflation. To evaluate this, two separate simple linear regression models ($Y = \beta_0 + \beta_1 X$) were conducted using the Consumer Price Index (CPI) inflation rate as the independent variable.

Model 1: Gold Returns vs. Inflation

The regression analysis yielded a small R-square, indicating that changes in the CPI inflation rate explain only 1.47% of the variance in gold returns. Global testing via Analysis of Variance (ANOVA) gave a F-value of 2.128 with a P-value of 0.146. Hence, we fail to reject the null hypothesis. The outcome indicates that the model parameters do not predict old returns, and inflation does not have a statistically significant effect on gold investments.

Model 2: NIFTY 50 Returns vs. Inflation

The regression model for stock returns could explain only 0.0227% of the variation in NIFTY 50 performance. The ANOVA yielded an F-value of 0.032 and a P-value of 0.857. The outcome demonstrates that CPI inflation does not significantly predict or impact NIFTY 50 stock returns.

Neither Gold nor NIFTY 50 stocks exhibit a direct, statistically significant linear dependence on monthly CPI inflation rates. Over 98% to 99% of the price variance in both asset classes is driven by external factors, meaning inflation alone cannot be used as an accountable predictor for returns in either market.

6.4. Objective 6

- To examine whether inflation and stock market performance influence investment in gold a multiple linear regression model was created. The dependent variable in this model was Gold ETF inflows. The independent variables were CPI inflation and NIFTY 50 returns. Thus, the inflation and stock returns together explain 0.64% of the changes in Gold ETF inflows.
- The overall regression model was not statistically significant. This was shown by an F-statistic of 0.451 and a P-value of 0.637. At the level neither CPI inflation nor NIFTY 50 returns had a statistically significant connection with Gold ETF inflows. Both P-values were higher than the 5% significance level. As a result, the null hypotheses were not rejected.

7. LIMITATION

The primary objective of this study was to check whether gold gives a better investment than stocks during inflation for 12 yearly data, and to observe if rising consumer prices indicate Indian households to shift their investments from stocks to gold. Because the P-values for both individual models exceeded the 0.05 threshold of significance, the null hypotheses were accepted. This indicates that over 98% to 99% of the price movements in both gold and the stock market are driven by external factors and not by monthly inflation rates. The results suggest that monthly inflation alone is not sufficient to explain the movements in gold and NIFTY 50 returns. The weak statistical relationship indicates that these returns may respond more to other market and economic conditions. Hence, inflation does not appear to be a major factor in explaining the monthly changes observed during the study period.

8. CONCLUSION:

The study looked at how gold performed over 12 years. It used methods like exploring data looking at trends and checking for patterns that happen each season. The results gave some information about

how golds return changed and what might be connected to people putting money into gold ETFs in India.

The trend analysis showed that gold returns go up and down over time. The trend line helps predict what might happen next. The seasonal analysis found that gold returns are not the same every month. February was the month for gold then May and August. November did not do well. The forecasts that adjusted for the season suggest that gold might do better in 2040 than in 2035. These are just predictions made by the model not sure things.

The study also looked to see if prices or how the stock market does affect people's choices to invest in gold through ETFs. The results from the regression did not show a strong connection. The changes in inflation and stock market returns explained little of what happened with gold ETF inflows. Neither of those factors was important at the 5% level. So, the study did not find that higher prices or bad stock market days make Indian investors choose gold ETFs more.

Overall, the results show that gold has seasonal patterns and has times when it is likely to do better or worse. The amounts of money going into gold ETFs can't be fully explained just by inflation or by how the stock market does. People who invest in gold might be looking at things like interest rates how money is valued, the price of gold around the world economic worry, political situations and the general feeling about the market. Future studies could look at those things. Use different ways to understand how people, in India invest in gold.

CONFLICT OF INTEREST AND FUNDING

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AUTHOR CONTRIBUTIONS

S.P. supervised the study and provided guidance on the research design, methodology, and critical revision of the manuscript. S.P., V.R., D.B., P.P., S.G., and S.Y. were involved in developing the survey instrument, collecting and preparing the

data, and conducting the preliminary analysis. All authors contributed to the interpretation of the findings and the preparation of the manuscript. They collectively discussed the results, reviewed the final version of the manuscript, and approved it for submission and publication.

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