



## **An Analytical Study of Measuring Real Growth of Gold and Sensex Index in India with Adjusted Inflation**

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### **Abstract**

In the financial industry, a security can often be described as a market component created with the goal that it will generate revenue in the years to come or increase in price. The research's purpose was to ascertain how the inflation rate impacted the Sensex's Index and gold value in various years. Secondary data on the gold value in India, the Sensex, and the rate of inflation are considered for this reason. The main aim of research was to determine the association between the gold amount and the Sensex, two possible investments, and to evaluate both of them with the rate of inflation. Numerous testing methods, including paired t-tests, regression analysis, and correlation analysis, are used for evaluating the data. The study came to the conclusion that it shows a strong correlation between the values of the Sensex and actual gold prices. The index's performance and gold values have a strong correlation, according to the regression study. The mean values of the two variables are evaluated with the paired t-test. The means of both parameters have diverged significantly. Investors can study this valuable data intended for a long period to come when making financial choices about what kinds of investments to undertake.

**Key words:** Investors, Gold Value, Index, Association, Rate of Inflation

### **Introduction**

Investors can increase their money by investing in different investment avenues and use it to achieve their long-term financial objectives. The resources you have will probably yield profits once you invest them. Because of effect of capitalizing, person can certify that conclusions are correct and live every day to the fullest without worrying about their financial expectations. It regulates a person's spending habits. It controls how much and when a person must spend in order to have sufficient fund to fulfil future needs. An investor may make investments in institutions using a variety of methods, such as commodities such as gold, mutual funds, monetary instruments, real estate, equities, and bonds. Capital for investment or funds can be invested



in a variety of ways. In particular, two investment options are analysed in this study: the Sensex Index and gold.

### **Gold**

Since gold is an investment that provides security in the face of governmental unpredictability, business risks, and financial imbalances, investors frequently move to it. Gold is particularly attractive during difficult times because of its track record of reliability and its lack of correlation with other savings. According to this reasoning, gold has historically been utilized as a sort of hedge against big risks and significant market conditions that could alter anticipated investment strategies. Gold is noticeable, in contrast to bonds and shares. Majority individuals decide that taking a high level of flexibility in international markets is crucial regardless of the financial or political climate. Generally speaking, the value rises when trust in other monetary sectors falls, especially during times of high price increases, volatile economies, or global instability. When there are alternatives, Indian investors have always favoured gold.

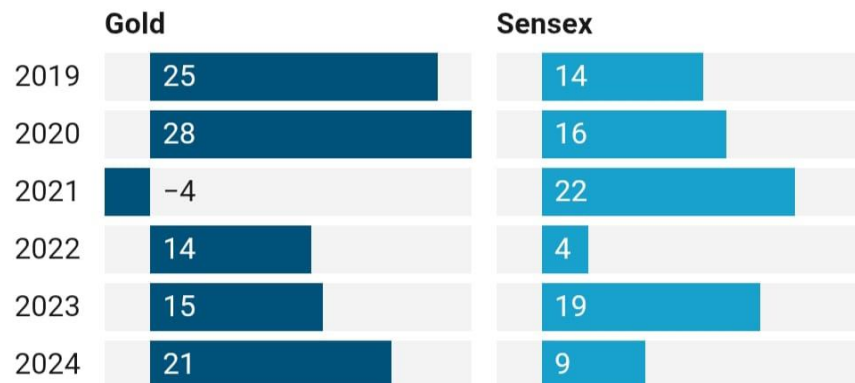
### **Sensex**

Nowadays, the Nifty and the Sensex are the two important indicators that stand in for the Indian stock market, respectively. These factors defined a noteworthy influence on the Indian economy and are significant indices for everyone involved and decision-makers. One of the greatest and most popular stock exchange indicators in India is the Bombay Stock Exchange (BSE) Sensex, or commonly Sensex. A variety of the greatest and most extensive equities on the BSE are included. It is also useful to produce a regulated, trustworthy investment framework and promoted the growth of the Indian stock market. A modest stock market was also established, mostly as a result of the indexes' support in attracting new investors to the stock market.

The BSE in India uses the Sensex as its main index. A significant proportion of the Indian economy is represented by the Sensex, which is made up of 30 of the biggest and most actively traded equities on the BSE. It is compared to the current market value and modified for volatility. An important indicator that displays the global performance of some of the most popular and often traded stocks, the BSE Sensex is a vital resource for traders trying to make decisions regarding the ever-changing equity market.



## Gold vs Sensex



Ace Equity/HDFC Securities  
Chart:



**Sources:** The Economic Times

Over the past 6 years, gold has outperformed the Sensex, with an average profit of 16% compared to 14%. With the exception of 2021, yellow metal has consistently generated substantial returns. Sensex has experienced double-digit gains from 2019 to 2023.

In the year 2024, gold provided 21% in returns, while the underlying stock index only returned 9%. Specialists in the stock exchange argue about whether it is feasible for gold or the value of the Sensex to reach the one lakh landmark in 2025. The final result will be influenced by a number of variables, such as the national economy, world affairs, and US Federal Reserve policy actions.

Because of a stronger strategy and portfolio are going to increase the US dollar, which therefore will be detrimental to the two financial assets, the US Fed's stance on prices will have an impact across stocks and bullion purpose.

## Review of literature

Sarker, 2024, stated in their research how the price of gold, which has a wide range of attributes, is influenced by a number of economic factors. India's stock market is extremely volatile. It is vital for asking about variations in the level of influence and exchanges in the market. The study's primary goal was to look into the fluctuations in the value of gold, the connections between those fluctuations, and the yield on investments made in India. The evaluation concludes that this is a co-integration, a long-term relationship and steady



movement among the price of gold and stocks. The current analysis of the direct causal relationship between the Sensex and the factors driving gold becomes crucial for investors wishing to make investments.

Hegde et al., 2024, revealed in their study that the stock exchange and gold represent two significant investment options, each of which has a unique effect on the state of the economy. This research looks at the dynamic association amongst the Indian gold sector and the Indian stock exchange, which stands denoted by the BSE and Nifty 50, over a different time of ten years. Finding the basic patterns and relationships among various asset types was the main objective of the study. The research's outcomes showed a adverse link with gold earnings and asset return, and the regression technique highlighted that changes in gold prices have no effect on stock indexes. The current study broadens our knowledge of the intricate interaction between the value of gold and the Indian stock market.

Selvan et al., 2020, explained in their research that, from the opinion of individual investors, gold continues to be the greatest mutual choices for investment and holds a large place in the worldwide economy. These days, the main focus of financial research is gold. This study examines the evolving link that exists between how well stocks perform and gold's worth, with particular reference to the Bombay Stock Market Index (Sensex). The results of an examination showed a consistent relationship between index returns and the overall gold value. The Indian gold prices could be assessed from stock prices. Because contributors can acquire from this research and advantage since a diversity of investments, the analysis is noteworthy.

Bhatia et al., 2017, discovered that gold is a dependable choice in times of rising prices or disappointing stock market performance. According to new research from the Federal Reserve, individuals have started to use gold to protect their assets during challenging times. Compared to the long-running tradition of purchasing gold, the Indian equity expense country is still relatively fresh. Establishing an association among shifts in the gold value as well as indexes of stocks was the aim of this present effort. The primary objective for learning was to identify the similarities and differences between the Sensex index & gold value. The outcomes of the research show no linking amongst the Sensex & the gold value. Because of outcomes, gold might be added to the accumulation to expand it. This study plan can be used by users to fulfil selection by considering the price drive of gold and the Sensex.

Kaur et al., 2017, consider that gold and other metals have always been seen as excellent investments in India, and their remarkable rise over the years has fully validated the common wisdom supporting that view. Due to volatile markets, stakeholders are concerned that it frequently moves from risky assets like equities to gold. Examining the impact of gold prices on the Indian stock market, represented by the BSE-Sensex, is the key purpose of study. The results showed a favourable relationship between two factors: the gold values as well as the Sensex. This showed which a rise in the price of gold encourages the Sensex Index to rise and vice



versa. It is more crucial for investors to expand their investment strategies based on pricing, based on the research.

### **Purpose of Research**

- To identify whether the Sensex index and gold prices shift in parallel or in opposition at periods of time.
- To examine gold and Sensex returns over time and to find out a connection between the rate of inflation and the values of the Sensex and gold over various time periods.

### **Research Methodology**

The approaches, strategies, and processes used to gather and analyse data are all included in the methodology of the study. It gives the entire research process a methodical and structured foundation. The specific research goals serve as the foundation for the research approach. The various decisions made regarding practice, such as the procedures for collecting and evaluating data and the reasons behind these findings, are described by a research methodology.

- **Research Area**

The Indian gold price, rate of inflation, and stock market specifically, Sensex are the areas of the study.

- **Sources of Data**

The paper's primary goal is to observe the golds profits and BSE Sensex profits after adjusting with rate of inflation & also to ascertain how the two parameters relate to one another, the value of gold as well as the BSE Sensex. For this purpose, the secondary data of research have been collected.

- **Study Period**

This is accomplished by using secondary data on inflation rates, Indian gold prices, and the BSE Sensex index of the Indian stock market over a period of twenty years from 2005 to 2025.

- **Data Collection**

The data of Indian gold prices, BSE Sensex and monthly rate of inflation gathered from the official websites of the organization.

- **Statistical Techniques**

Percentage analysis, Paired t-test, Correlation analysis, Regression analysis, charts and tables was used to analyse and describe the sample data.

### **Research Hypothesis**

H0 -There is no significant association among the means of Real Value of Gold & Real Sensex.

H0 - There is no significant correlation between Real Value of Gold and Real Sensex.



H0 - There is no significant association between Real Price of Gold and Real Sensex.

### Analysis and Interpretation of Sample Data

In research, statistical data analysis plays a key role in determining market movements and investment behaviours. To understand the variables' association, analysis of information employs a numerous of statistical techniques. The research can decide that how can inflation impacts various investment possibilities by looking at past data on a number of aspects. The study can determine the true values of gold and the Index of Stocks of India in order to compute the real value of money at various times in history. The outcome of data analysis can be used by financial investors and organizations to inform prospective investment and monetary selections.

**Table 1 – Data related to Gold Price and Return, Sensex Price and Return and Rate of Inflation**

| Year | Monthly<br>Inflation<br>rate | Gold<br>Return | Sensex<br>Return | Real<br>Gold<br>Return <sup>1</sup> | Real<br>Sensex<br>Return | Gold<br>Price | Real<br>Gold<br>Price <sup>2</sup> | BSE<br>Sensex | Real<br>BSE<br>Sensex |
|------|------------------------------|----------------|------------------|-------------------------------------|--------------------------|---------------|------------------------------------|---------------|-----------------------|
| 2005 | 4.25                         | 2.06           | 12.24            | -2.1                                | 7.66                     | 7417.34       | 7114.95                            | 6555.94       | 6288.67               |
| 2006 | 4.75                         | 35.95          | 51.31            | 29.79                               | 48.27                    | 10084         | 9626.73                            | 9919.89       | 9470.06               |
| 2007 | 6.11                         | 14.48          | 42.05            | 7.89                                | 33.87                    | 11544.6       | 10879.84                           | 14090.92      | 13279.54              |
| 2008 | 5.51                         | 26.56          | 25.25            | 19.95                               | 18.71                    | 14611.1       | 13848.07                           | 17648.71      | 16727.05              |
| 2009 | 8.1                          | 23.61          | -46.6            | 14.34                               | -50.6                    | 18060.9       | 16707.59                           | 9424.24       | 8718.08               |
| 2010 | 16.22                        | 10.82          | 73.57            | -4.65                               | 49.35                    | 20015.1       | 17221.73                           | 16357.96      | 14074.99              |
| 2011 | 9.3                          | 22.31          | 12.04            | 11.9                                | 2.51                     | 24481.1       | 22398.08                           | 18327.76      | 16768.31              |
| 2012 | 8.25                         | 41.57          | -6.19            | 30.78                               | -13.34                   | 34658.8       | 32017.37                           | 17193.55      | 15883.19              |
| 2013 | 10.79                        | 2.8            | 15.71            | -7.21                               | 4.44                     | 35629.9       | 32159.85                           | 19894.98      | 17957.38              |
| 2014 | 8.6                          | -11.63         | 3.11             | -18.63                              | -5.06                    | 31485.2       | 28991.9                            | 20513.85      | 18889.36              |
| 2015 | 5.19                         | -0.24          | 42.26            | -5.16                               | 35.24                    | 31409.8       | 29860.06                           | 29182.95      | 27743.08              |
| 2016 | 5.69                         | -3.35          | -14.78           | -8.55                               | -19.37                   | 30355.7       | 28721.45                           | 24870.69      | 23531.73              |
| 2017 | 3.17                         | 8.4            | 11.2             | 5.07                                | 7.78                     | 32906.2       | 31895.12                           | 27655.96      | 26806.2               |
| 2018 | 5.07                         | 4.42           | 30.04            | -0.62                               | 23.77                    | 34362.1       | 32704.01                           | 35965.02      | 34229.58              |
| 2019 | 1.97                         | 10.02          | -1.97            | 7.89                                | -3.86                    | 37806.2       | 37075.81                           | 35256.69      | 34575.55              |
| 2020 | 7.59                         | 20.31          | 15.51            | 11.82                               | 7.36                     | 45486.4       | 42277.54                           | 40723.49      | 37850.63              |
| 2021 | 4.06                         | 20.08          | 13.66            | 15.39                               | 9.23                     | 54620.4       | 52489.33                           | 46285.77      | 44479.89              |
| 2022 | 6.01                         | -1.39          | 25.34            | -6.98                               | 18.23                    | 53861.4       | 50807.85                           | 58014.17      | 54725.19              |

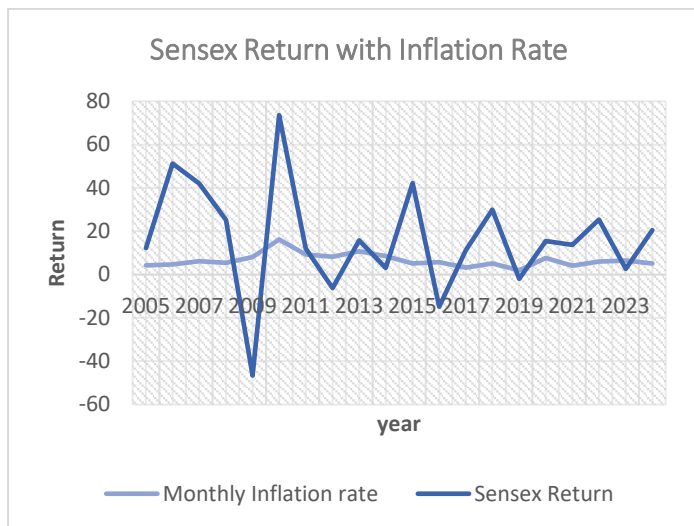
<sup>1</sup> Real Return =  $1 + \text{Gold or Sensex Return} / 1 + \text{Inflation Rate} - 1 * 100$  (www.investopedia.com)

<sup>2</sup> Real Price =  $\text{Gold or Sensex Price} / 1 + \text{Inflation Rate}$  (www.investopedia.com)



|      |      |      |       |       |       |         |          |          |          |
|------|------|------|-------|-------|-------|---------|----------|----------|----------|
| 2023 | 6.52 | 17.4 | 2.65  | 10.21 | -3.63 | 63233.1 | 59362.65 | 59549.9  | 55904.9  |
| 2024 | 5.1  | 8.34 | 20.49 | 3.08  | 14.64 | 68508.4 | 65184.02 | 71752.11 | 68270.32 |

**Figure 1: Relationship of Sensex Return with Inflation Rate**

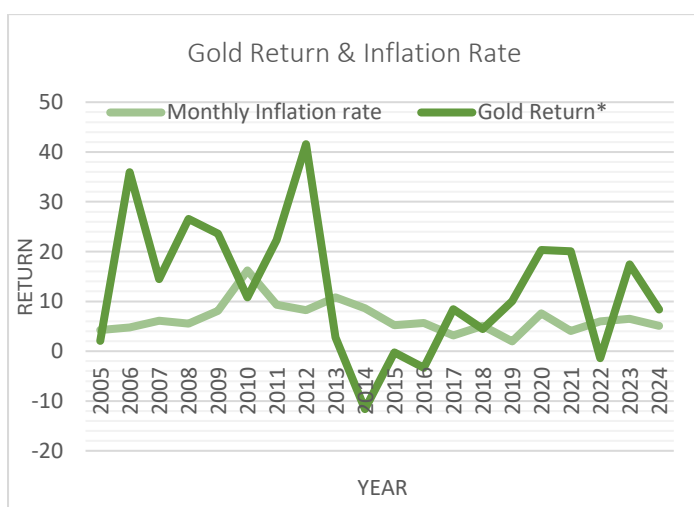


### Analysis

Data regarding the inflation rate and Sensex return from 2005 to 2024 are shown in this image. It describes how the inflation rate and returns on the Sensex are compared. We may observe that the inflation rate curve is consistent or varies little over the years; however, the Sensex return line swings significantly.

**Interpretation:** Between 2009 and 2020, the Sensex return trend was characterized by a significant downward tendency. It might show the impact of financial crises and COVID-19. It revealed as of the mentioned figure that the rate of inflation and the profit on the Sensex are unrelated. It indicates that the stock exchange is unaffected by the rate of inflation

**Figure 2: Comparison of Gold Return with Inflation Rate**

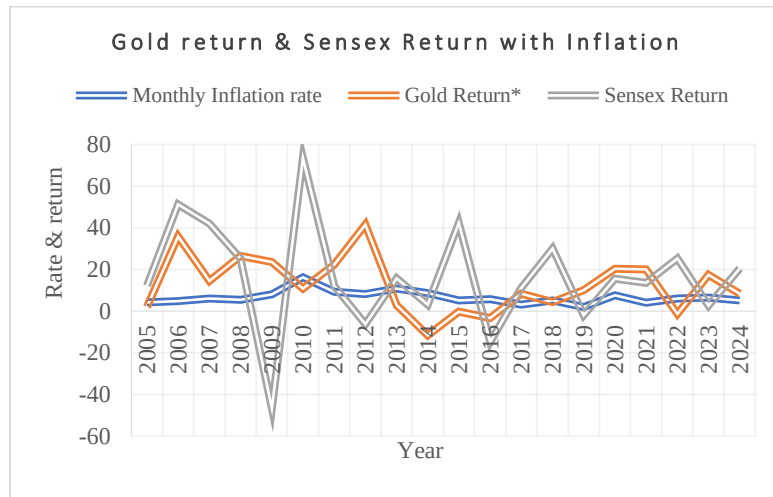


**Analysis:** The information on the inflation rate and gold value is depicted in this picture. When correlated to other choices for investing, the income from gold is more diverse. It may suppose that it was greater fluctuations in the gold return pattern over time. In contrast to gold returns, the price increase trend stays constant. The trend for gold returns peaks in 2012 and

**Interpretation:** The information shows that the lines of two variables have opposing relationships at various years. It indicates that gold is a preferred investment among Indians because it offers protection in

a volatile economy. We can examine from the information that the price of gold may not be impacted by inflation in some years. There has no longer been any correlation between inflation levels and gold return, which suggests that the price of gold affects other aspects as well.

**Figure 3: Relationship among Gold Return, Sensex Return and Inflation Rate**



### Analysis

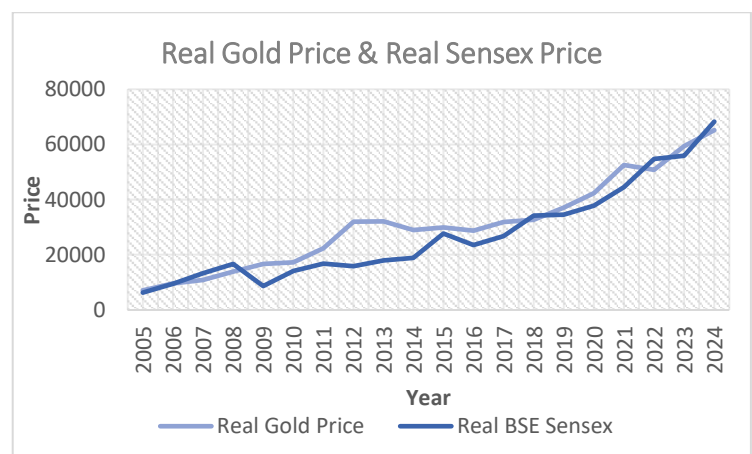
The figure compares three variables over multiple periods of time, including inflation rate, Sensex return, and gold return. It can determine that, over the course of several years, the earnings on gold were extra reliable than those on the Sensex. At various periods, the returns on the Sensex swing. The line representing inflation stays constant.

**Interpretation:** The information regarding the gold return and Sensex return is displayed in this image. We may observe that the return on gold is high when the stock industry is falling and low when the stock market is up. It implies that because gold is safer or more secure than stocks, investors may decide to buy it instead of stocks during markets that are volatile.

**Figure 4: Comparison between Real Price of Gold & Real Sensex Index**

### Analysis

The information regarding the gold return and Sensex return is displayed in this image. We may observe that the return on gold is high when the stock industry is falling and low when the equity market is up. It implies that because gold is safer or more secure than securities, traders may decide to buy it instead of stocks during volatile markets.



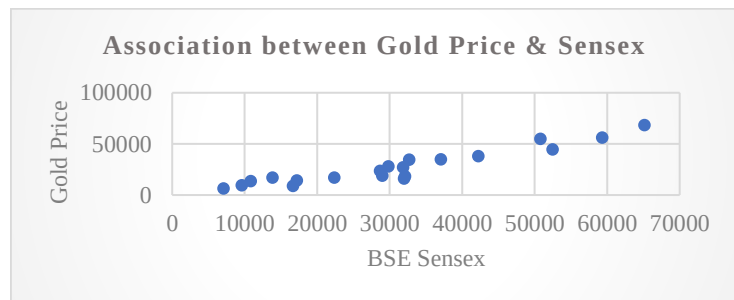


**Interpretation:** It is possible for investors to have similar profits on their two investments. Therefore, when making investment selections, everyone involved must choose both investments for their investment mix. Given that investors may favor both gold and stocks as investments, gold and the Sensex have historically behaved similarly.

### Correlation Analysis

**Table 2 – Correlation among Gold Price & Sensex Index**

|                 | Actual Gold Price | Real BSE Sensex |
|-----------------|-------------------|-----------------|
| Real Gold Price | 1                 |                 |
| Real BSE Sensex | 0.94755386        | 1               |



The graph above displays data on the present value of gold as well as the Sensex index. The purpose of the correlational study is to ascertain how these two parameters relate to one another. Based on the particular table, the two factors—the price of the Sensex and gold—have a Pearson correlation value of 0.941553. It is almost one. The null hypothesis (H0) is shown to be rejected. It indicates that the real gold prices and the Sensex Index diverge significantly.

The correlation coefficient is really close to one. It indicates that there is a strong and favourable relationship between both of these factors. It suggests that there is a high link among these variables. According to this research, both assets undertake similarly over a long period of time since both components may be impacted by a single similar issue, such as price increases. As a result, the prospective investor may choose to make investments in both kinds of resources.

**Table 3 - Correlation among Gold Return and Sensex Return**

|                    | Real Gold Return | Real Sensex Return |
|--------------------|------------------|--------------------|
| Real Gold Return   | 1                |                    |
| Real Sensex Return | -0.031718762     | 1                  |



To ascertain the link between the earnings of the BSE and gold, all elements are put through a correlational assessment, as the following table illustrates. The research indicates that the Pearson correlation test is (-0.0371). It shows that there is almost no connection between the two commodities' returns. It suggests that two investment options may eventually move in unison. It decided that altering stocks might not result in a significant change in the price of gold.

The outcomes of the investigation show that the earnings of both kinds of securities have not changed. As a result, individuals can choose various long-term assets based on their tolerance for volatility. This data indicates that during volatile economic circumstances, the gold values is greater than the stock exchange. Over time, the price of the index fluctuates considerably.

### **Regression Analysis**

**Table 4- Data related to Regression Analysis**

| <b>Regression Statistics</b> |             |
|------------------------------|-------------|
| Multiple R                   | 0.94755386  |
| R Square                     | 0.897858318 |
| Adjusted R Square            | 0.89218378  |
| Standard Error               | 5433.225423 |
| Observations                 | 20          |

Information regarding a regression study connecting the prices of real gold and the Sensex is provided in the data table. To determine if each of them are related, the regression test is utilized. The value of p is lower than 0.05, based on examination. It indicates the rejection of a null hypothesis H<sub>0</sub>. The Sensex index and real gold are significantly correlated.

The finding examine that the multiple R value is 0.9475. The data shows the adjustments to both assets are done jointly. R is equal to 0.8978. It states that fluctuations in the value of gold over time are largely influenced by modifications to the equity sector. As per to this analysis, the index's performance and the value of gold are highly correlated. Both options for investing provide investors with the same future income as well as return on investment.



**Paired T-test**

**Table 5 - Data related to paired t-test**

|                | <b>Intercept</b> | <b>Real BSE Sensex</b> |
|----------------|------------------|------------------------|
| Coefficients   | 6471.84444       | 0.900642155            |
| Standard Error | 2302.001885      | 0.071600098            |
| t Stat         | 2.811398411      | 12.57878387            |
| P-value        | 0.01155098       | 0.00                   |
| Lower 95%      | 1635.517944      | 0.750215931            |
| Upper 95%      | 11308.17094      | 1.051068379            |

|              | <b>Real Gold Price</b> | <b>Real BSE Sensex</b> |
|--------------|------------------------|------------------------|
| Mean         | 31067.19735            | 27308.685              |
| Variance     | 273798678              | 303064185.2            |
| Observations | 20                     | 20                     |

|                              |                   |
|------------------------------|-------------------|
| Pearson Correlation          | <b>0.94755386</b> |
| Hypothesized Mean Difference | 0                 |
| df                           | 19                |
| t Stat                       | 3.020951963       |
| P(T<=t) one-tail             | 0.003513885       |
| t Critical one-tail          | 1.729132812       |
| P(T<=t) two-tail             | 0.007027769       |
| t Critical two-tail          | 2.093024054       |

The paired t-test allows us to examine the average value of real gold and the Sensex. The paired t-test's one- and two-tail p values are both below the 0.05 level. It shows that the null hypothesis was disproved and that the average values of the real gold price and the index known as the Sensex index varied significantly.

The average price of gold is greater than the price of the Sensex. It indicates that the stock market is much more volatile than the price of gold. Investors, participants, or institutions of finance utilize these findings to decide whether to make purchases during protracted market volatility. Investors may be able to lower their risk and increase earnings in the years to come with the aid of our studies.



## **Conclusion**

This study explored the relationship between the BSE Sensex and the price of gold over the years. The paired t-test comparing the gold & Sensex average values was applied for comparison. The results of the paired t-test showed that the average of the actual gold price and the real Sensex value differed significantly. It implies that over a longer amount of time, the two resources operate identically. The results of the relationship analysis test showed a high correlation between the true value of the Sensex and actual gold. After controlling for inflation, the regression study also found a notably favourable correlation among the Sensex and gold prices.

The research defined that the swings of the Sensex index and gold price are comparable over a long period of time. These possibilities for investment are chosen by individuals at various times. Participants can use the study to analyse market trends for a range of financial choices. Investors are therefore able to decide on changes to their portfolios and various investment programs. Traders and decision-makers can use this conclusion to classify data regarding the real gold return and Sensex return, which helps to increase profits and lower risk.

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