

# Impact of Domestic Gold Prices on Stock Returns in Indian Stock Market

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## Abstract :

*Investments in gold and share markets have been a vital avenue for various investors over decades. Investors these days prefer to transfer the savings to such investments which give them better returns. This also shows the risk taking ability of the investors. The present study attempts to find out the relationship between the two investment avenues i.e. Gold and Share Market, and their daily returns. For the purpose of study, daily returns have been calculated for 50 companies consisting Nifty 50, and Gold. The period of study is 5 years from April 2010 to March 2015. The returns have been converted into log form for normality purpose. Statistical software's such as E-Views and Gretl have been used to analyze the data. The study made use of statistical techniques such as, Correlation Analysis, Regression Analysis and Granger Causality Test to find the results. The study found inverse relationship between gold returns and stock returns. The results do not provide sufficient evidence that the gold returns have an impact on the overall individual company stock returns. But when gold returns were regressed over Nifty 50 returns, the result clearly indicated the gold returns do significantly affect the Nifty 50 stock returns. However no causation effect was found for the same.*

**Key Words :** *Stock Returns, Gold Returns, Nifty 50, Granger Causality Test*

## Introduction

Culturally people of India have great excitement for gold from history immemorial. The gold in any shape and in any form is treated equal. Gold has no expiry date and has great demand not due to its storage value but also due to its fascination among people. Gold's relationship with mankind has very long history. Gold was considered as money and property until the discovery of other forms of currency in market. The storage value of gold makes it a reliable wealth in the economy. That is why investors always closely monitor prices of this precious metal. There are many factors which affect gold prices and its value.

When prices of commodity (gold) increase in markets, usually the supply of commodity cannot meet demand and that's why value will increase, and leads to hike in its production; this suggests that demand of gold has more impact on gold's value. It is also affected because of strikes or supply shortages. The state of global economy has also great influence on the value of Gold. Whenever economic condition of countries collapses, the gold is that precious metal which helps to improve the economy. If the dollar (a key global currency) weakens, many investors around the world will begin to sell the currency and buy gold for relative security, hence demand for gold rises; when dollar strengthens, this results in fall of gold

demand. With rising wages, increasing inflation and interest rate convergence, the emerging market currencies have depreciated with time, leading to increase in demand of gold in such economies.

Mining companies as well as central banks have large reserves of gold stock and they buy and sell gold as per their notion of economy and currency. Hard and tough measures are taken by both Government and Central Banks from time to time to restrain and curb gold's import even amid slowing gold demand against the back drop of a strong rally in equities.

Higher domestic gold demand and gold inventories have impact on price movements of gold metal. For example India is more consumer of gold metal than China, this high demand significantly impacts prices of gold. Demand for gold is also dependent on the monsoon in India which is uncertain, thereby making agriculture scenario uncertain, which directly affects market of gold for buying and selling. If there is poor agriculture income to farmers in a season, they cannot purchase the gold, because demand comes from rural area for gold jewelry more as a tradition and store of wealth.

China has dumped huge amount of gold in market causing the price of the precious gold to fall down. This has resulted into more pressure on selling of gold in

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market. Investors nowadays are considering stock market as an investment avenue than the traditional gold investment. But a key question arises as to how to strike trade-off between two avenues? Whether there is some association between returns of two markets? Hence this study has been undertaken to examine the association between the returns generated by gold and stock market.

## Review of Literature

Reviews of some studies are presented as follows: Roache and Rossi (2009) used an event study methodology to investigate which and how macro-economic announcements affect commodity prices. The results showed that gold is unique among commodities, with prices reacting to specific scheduled announcements in the United States and the Euro area in a manner consistent with gold's traditional role as a safer security and store of value.

Kulkanaya, Amonsri and Ueatrakunkamol (2010) selected four hundred people who used to buy gold for saving and investment in the Bangkok Metropolitan Area, through a simple random sampling technique to study the factors that influence their gold consumption for savings and investments. Kumar and Sujit (2011) made an effort to test the relationship among gold price, stock returns, exchange rate and oil price. The researchers collected daily data for their study purpose from 1998 to 2011 constituting 3485 observations. The techniques of time series were used. They tried to capture dynamic and stable relationship among these variables by using vector autoregressive and co-integration technique.

Sindhu (2013) focused on the factors like exchange rate of US dollar with INR, crude oil prices, repo rate and inflation rate. Each of the factors was studied with relation to the gold prices. Bhunia and Mukhuti (2013) examined the impact of domestic gold price on stock price indices in India. The researchers collected the secondary data for the period 1991 to 2012 from World Gold Council database and BSE and NSE database, and used unit root test and Granger causality test.

Ibrahim, Kamaruddin and Hasan (2014) conducted a study to analyze the factors that affect the prices of gold in Malaysia. The researchers used multiple linear regression model to study the important relationship between dependent and independent variables. The period of study was 10 years from 2003 to 2012. The researchers highlighted three independent variables that affect the prices of gold which are crude oil prices, inflation rates and exchange rates.

Bhunias and Pakira (2014) examined the impact of gold

price and exchange rates on sensex in India for the period from 1991 to 2013 by using daily data, and used unit root test, Johansen Co-integration test and Granger causality test. The study also investigated the relationship between three financial variables of gold price, exchange rates and SENSEX between 1991 and 2013. Chandani (2014) analyzed the various factors which affect the price of the gold during the last decade. The researcher also used the reports of the World Gold Council, Reserve Bank of India among others to shape out the development and the movement of the price of gold and the factors affecting the same. The researchers used various tools to analyze the movements in the price of the gold.

Tripathi, Parashar and Singh (2014) made an attempt to look into the existence of casual relationship between gold prices in India and foreign exchange reserves, exchange rate (USD) and crude oil price, and various other global factors, by taking monthly time series data of variables covering the period of nine years from 2004 to 2013. In order to examine the relationship among these variables the researchers employed Unit Root test, Co-integration test, and Granger Causality test by using statistical software E-views. Baur, Beckmann & Czudaj (2014) systematically evaluated the determinants of gold prices and used mean squared error and predictive likelihood to measure the forecasting performance. The findings of the study showed that as compared to other frameworks, Dynamic Model Averaging improves forecasts. Also the study provided a clear evidence of time variation of the predictors of gold price.

Johnson & Lamdin (2015) examined the returns of gold, gold mining stocks and diversified portfolio comprising US stocks for the period 2006 to 2015. The study found that gold returns explain well the gold mining stock returns than the stock returns. The gold returns were noticed to be less correlated with stock returns than the gold mining stock returns. The study concluded that for a portfolio aimed at risk reduction, gold is more preferred than gold mining stocks.

Malliaris and Malliaris (2015) investigated the behaviour of gold prices using variables such as equity volatility, equity returns, euro and oil prices by making use of decision tree methodology. The efficiency of explaining changes in gold prices was studied using Cleveland Financial Stress Index. The researchers found that returns of gold depend on various factors across various regimes.

Huang (2016) showed that the ratio of gold to platinum prices forecast the future stock returns. It was also found to be significantly associated with the option implied riskrecursive preferences and shocks for platinum and gold which can account for asset pricing dynamics and explain why in bad times, the gold prices fall.

Bams, Blanchard, Honarvar and Lehnert (2016) analyzed the gold and oil price uncertainty with respect to stock returns. The researchers observed that with an increase in stocks, the gold and oil markets coincide with negative returns. The researchers concluded that the uncertainty in oil prices is sector specific factor and it is priced within only oil industries. Whereas, the uncertainty in gold price is asset specific and it is not priced within industries.

Caliskan and Najand (2016) examined the association of price of gold and stock market returns. The study emphasized that the price of gold to increase or decrease in relation to positive or negative stock returns. The researchers also argued that more or less gold may be demanded by investors to make profits out of market fluctuations.

Majority of the researchers have exclusively focused on analyzing gold as an investment avenue and some have attempted to analyze the association of gold returns and stock returns. But a comprehensive study investigating the association of gold returns and stock returns considering individual stocks and thereby comparing the impact on the index on which these individual stocks are listed was missing. The present study bridges this gap and analyses the impact of gold returns on stock returns, and its association between both individual 50 stocks as well as index.

### **Objectives of the Study**

The present study sets the following four objectives:

- To analyze the relationship between gold returns and individual company stock returns.
- To study the association between gold returns and Nifty 50 index returns
- To evaluate the impact of gold returns on individual company stock returns and Nifty 50 index returns
- To assess the causation effect between gold returns and Nifty 50 index returns

### **Hypotheses of the Study**

Following hypotheses are developed for the purpose of study:

- $H_{01}$ : The gold returns do not significantly affect the individual company stock returns.
- $H_{02}$ : There exists no significant impact of gold returns on Nifty 50 Index returns.
- $H_{03}$ : Nifty 50 returns does not granger cause gold returns.
- $H_{04}$ : Gold returns does not granger cause Nifty 50 returns.

### **Research Methodology**

The present study attempts to find out the relationship between two investment avenues i.e. Gold and Share Market and their daily returns, which have been calculated for 50 companies consisting Nifty 50 index and Gold Prices. The period of study is 5 years from April 2010 to March 2015.

The stock returns and gold returns are calculated using the formula  $\ln(P1/P0)$ , where P1 represents the current price and P0 reflect the previous price. Returns have been converted into log normal form for normality purpose. The Classical Linear Regression Model (CLRM) or Ordinary Least Square Model (OLS) assumes that the data selected for the study is normally distributed, without which the analysis will give spurious results. The required data relating to the selected 50 companies have been extracted from the official website of National Stock Exchange. All 50 companies selected for the purpose of study are listed on Nifty 50 Index as of 31th December 2015. The data relating to gold prices have been obtained from the official website of [goldpriceindia.com](http://goldpriceindia.com).

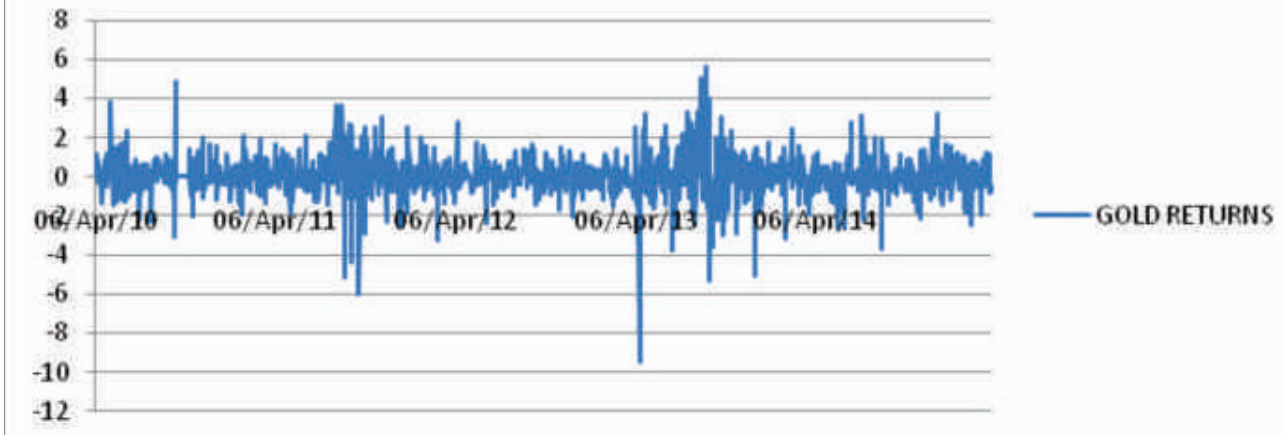
To sort and scrutinize the data, Microsoft Excel has been used. To further analyze the data using statistical techniques, econometrics software's such as E-Views and Gretl have been used. The study makes use of statistical techniques like Correlation Analysis, Regression Analysis and Granger Causality Test.

### **Data Analysis & Findings**

#### *Volatility of Gold and Nifty 50 Index Returns*

Figure 1 depicts the volatilities in gold returns over the period 2010-15.

**Fig. 1: Gold Returns**



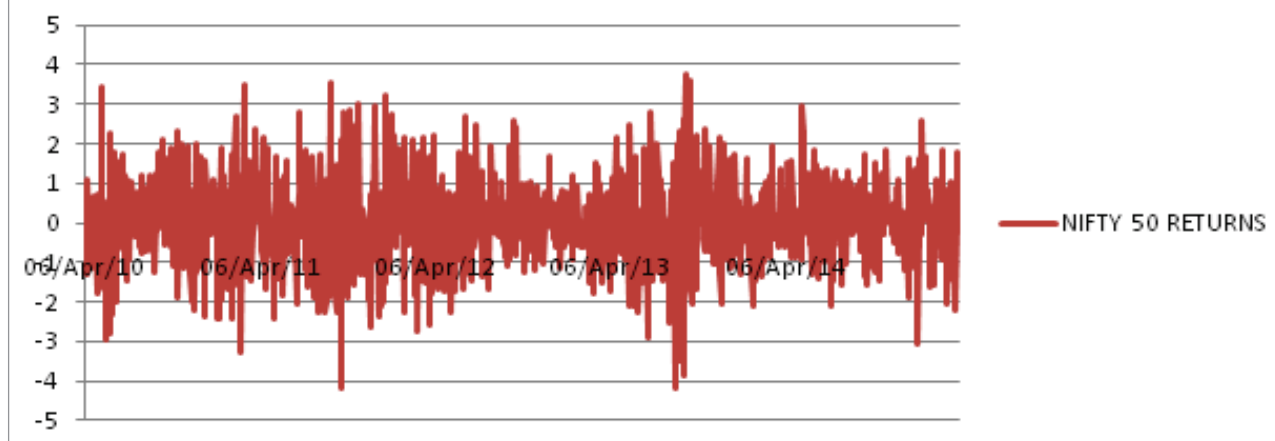
From figure 1, it can be noticed that the fluctuations are less for the gold returns for the year 2011 and 2012. But the variation have been found more for the period December 2011-March 2012 and December 2013-March 2014. The daily returns have fluctuated violently for the selected period of study. But the overall outlook for the period 2010-2015 conveys a message that the returns are promising for the investors. A decline in returns can be noticed after April 2014. Figure 2 presents the volatilities in Nifty 50 returns during the period 2010-15.

rational investor who maintains the investment for a longer period of time. But currently stock market is flooded with short term traders or speculators, as a result of which the volatility in stock returns might occur. As compared to gold returns, the volatility of Nifty 50 returns has been found to be more.

#### *Descriptive Statistics and Correlation Results*

Table 1 presents summary of Descriptive Statistics and

**NIFTY 50 RETURNS**



It is evident from figure 2 that the returns have varied violently for the said five year period i.e. 2010-2015. The variation was found to be least for the period September 2012-December 2012. The reason for such a high volatility of returns lies with the fact of the amount of risk involved in share market. The risk is minimal for a

Correlation and Regression Results for individual companies. The descriptive statistics have been obtained using statistical software Gretl, correlation and regression results have been compiled using econometric software E-views.

**Table 1: Descriptive Statistics and Correlation Results for Gold and Individual Nifty 50 companies**

Returns	Mean	Standard Deviation	Skewness	Kurtosis	Correlation	P-value
Gold	0.036	1.082	-0.678	11.828	1.000	NA
Individual Stock						
ACC	0.038	1.624	0.315	4.449	-0.065	0.022**
Adani Ports	0.055	2.499	0.078	4.565	-0.063	0.308
Ambuja Cement	0.063	1.994	0.176	4.645	-0.067	0.019**
Asian Paints	-0.069	6.788	-32.006	1087.030	-0.063	0.027**
Axis Bank	-0.066	5.126	-25.495	803.887	-0.049	0.084*
Bajaj Auto	-0.005	2.564	-17.004	469.678	-0.047	0.101
Bank of Baroda	-0.127	5.117	-25.777	814.847	-0.055	0.052**
Bharti Airtel	0.020	2.013	0.189	4.311	-0.082	0.004***
BHEL	-0.200	5.266	-24.414	756.461	-0.094	0.000***
BOSCH	0.137	1.388	1.224	7.480	-0.020	0.492
BPCL	0.041	2.936	-11.403	280.656	-0.080	0.004***
CAIRN	-0.037	1.790	-0.115	4.107	0.005	0.857
CIPLA	0.052	1.519	0.055	5.038	-0.089	0.001***
Coal India	0.004	1.779	0.213	8.100	-0.024	0.394
Dr Reddy's Lab	0.073	1.448	-0.152	4.286	-0.016	0.573
GAIL	-0.011	1.686	-0.019	4.033	-0.026	0.360
GRASIM	0.019	1.686	-1.711	33.617	-0.088	0.002***
HCL	0.080	2.789	-13.958	360.584	-0.063	0.026**
HDFC Bank	-0.052	4.840	-29.837	990.185	-0.044	0.721
HDFC	-0.069	4.837	-28.349	925.054	-0.010	0.119
Hero Moto Co	0.016	1.830	0.498	9.390	-0.002	0.954
HINDALCO	-0.038	2.537	0.152	3.806	-0.049	0.845
HUL	0.103	1.566	1.349	14.018	-0.011	0.690
ICICI Bank	-0.097	5.015	-26.503	846.487	-0.030	0.288
Idea	0.089	2.229	0.142	4.559	-0.076	0.007***
INDUSIND Bank	0.126	2.195	-0.040	4.356	-0.093	0.001***
Infosys	-0.019	2.737	-15.180	389.475	0.003	0.926
ITC	0.014	2.518	-18.101	506.994	-0.027	0.351
Kotak Bank	0.036	2.608	-12.176	303.581	-0.032	0.257
L&T	-0.004	2.255	-3.930	69.684	-0.117	0.000***
Lupin	0.009	4.875	-29.532	976.521	-0.003	0.928
Maruti	0.073	1.807	-0.031	7.340	-0.044	0.120
M&M	0.058	1.841	0.024	3.796	0.011	0.701
NTPC	-0.032	1.668	-0.420	8.950	-0.133	0.000***
ONGC	-0.103	4.534	-26.319	839.285	-0.031	0.275
PNB	-0.165	4.970	-25.688	811.632	-0.031	0.274
POWERGRID	0.019	1.428	-0.222	7.708	-0.045	0.114
Reliance	-0.030	1.676	0.052	3.623	-0.058	0.043**
SBIN	-0.175	6.830	-30.450	1017.340	-0.015	0.602
Sunpharma	-0.056	5.255	-25.269	744.394	-0.026	0.363
Tata Motors	-0.038	5.281	-25.104	786.798	-0.016	0.578
Tata Power	-0.246	6.946	-30.597	1023.434	0.038	0.186
Tata Steel	-0.068	2.186	0.195	3.734	-0.052	0.070*
TCS	0.088	1.691	0.134	6.642	-0.057	0.046**
Tech Mahindra	-0.034	4.450	-25.708	813.229	-0.038	0.176
Ultratech	0.071	1.695	0.140	4.914	-0.088	0.002***
VEDL	-0.083	2.583	0.430	5.919	-0.046	0.109
Wipro	-0.023	2.226	-9.617	213.351	-0.034	0.224
Yes Bank	0.001	0.026	0.431	9.389	-0.077	0.006***
ZEEL	0.015	2.812	-12.171	303.046	-0.015	0.604

(\*1% level of significance, \*\*5% level of significance, \*\*\*10% level of significance)

The statistical mean or average is used for performance measurement. Usually, higher mean value indicates a better performance. The mean daily return of gold is 0.036%. When it is compared with the mean daily returns of 50 companies selected for the study, it is evident that majority of the stocks of companies are providing higher returns than the gold. This is justified with the fact that the risk element is also very high while investing in shares rather than investing in gold. This risk element is evident from standard deviation, being 1.082 for gold returns. The lower value of standard deviation indicates low variation. Thus it can clearly be noticed that the standard deviation for majority of stock returns is higher as compared to gold returns. This proves that investment in shares, although gives high returns, it can be very risky too. Hence some investors prefer gold as an investment avenue over share market.

The table 1 also exhibits the correlation values which have been obtained from Karl Pearson's Correlation Matrix computed by using E-Views. If an investor is finding stock market profitable, he tries to divert his funds to stock market rather than investing in gold and vice versa. This is evident from the above result. It can be clearly noticed that the relationship between gold returns and the individual company stock returns has been negative for most of the companies. Hence to conclude that there exist inverse relationship between gold returns and stock returns.

It is clear from table 1 that there is a negative relationship between majority of the individual company stock returns and the gold returns. The negative association of -0.10 between gold returns and the Nifty 50 Returns is further emphasized in the Table 2. When the stock market is more profitable, the investors divert their money from gold investment to stock market. But if stock market witnesses wild fluctuations and risk rises, investors prefer gold as an investment avenue. Hence the negative relation between gold returns and stock returns is justified.

*Regression Analysis*

The present study also covered regression of gold returns over individual company stock returns using Ordinary Least Square Model. For this purpose, 50 regression results were obtained using E-views. The independent variable for all 50 regression results was gold returns. The results do not provide sufficient evidence that the gold returns have an impact over the individual company stock returns. As the p-value for some of these company returns is less than 0.01, 0.05 and 0.10, the null hypotheses is rejected at 1%, 5% and 10% respectively which reflects an impact in select cases only. But for some of the companies the p-value is more than 0.01, 0.05 and 0.10, which does not lead to rejection of the null hypotheses at 1%, 5% and 10% respectively and thereby it suggests no significant impact.

*Correlation Analysis between Gold and Nifty 50 Index*

Table 2 shows the results of correlation analysis between gold returns and Nifty 50 returns.

**Table 2: Correlation Results**

Returns	Gold Returns	Nifty 50 Returns
Gold Returns	1	-0.108076
Nifty 50 Returns	-0.108076	1

Table 3 presents the results of regression analysis carried out to find out if there exists a significant impact of gold returns on the Nifty 50 Index returns.

Dependent Variable: Nifty 50 Returns

As discussed earlier, the regression of the gold returns with individual company stock returns forming a part of Nifty 50 Index suggested that no significant evidence was found to make conclusion as the impact was noticed for some companies and there was absence of any significant impact for others (Table 1). Hence regression of gold returns was performed on Nifty 50 Index returns, as all the individual 50 companies are listed in the said index.

**Table 3: Regression Results**

Variable	Coefficient	Standard Error	t-statistic	P-value
C	0.040234	0.030055	1.338660	0.1809
Gold Returns	-0.107102	0.027989	-3.826646	0.0001***
Adjusted R-square	0.010883	Durbin-Watson stat		1.872089

(\*1% level of significance, \*\*5% level of significance, \*\*\*10% level of significance)

It is evident from table 3 that the Adjusted R-square value is found to be low because the data is of the nature of time series and daily returns have been calculated. The Durbin Watson value is 1.87 which is closer to 2 which reflect that there is no autocorrelation in the data. As the returns are converted to log normal form, the data is also normally distributed. The p-value of 0.0001 obtained from the above result clearly indicates that the null hypothesis is rejected at 1% level of significance. This provides the evidence that the gold returns do significantly affect the Nifty 50 stock returns. The reason being, investors consider both these investment avenues considering the returns and risks and thereby make decision of investment.

*Granger Causality Test*

Table 4 presents the results of granger causality tests.

**Table 4: Results of Granger Causality Test**

Null Hypothesis	Observations	F-Statistic	P-Value
Nifty 50 Returns does not Granger Cause Gold Returns	1239	1.25630	0.2851
Gold Returns does not Granger Cause Nifty 50 Returns		1.71794	0.1799

The correlation results mere explained the association between gold returns and stock returns but did not elaborate on the causation effect. Hence the present study also attempts to find out if there exist causation effect between gold returns and Nifty 50 returns. For this purpose Granger Causality Test was carried out. The results reveal that in the case of testing the causation effect from Nifty 50 returns to gold returns, the null hypothesis is not rejected at 5% level of significance. Hence Nifty 50 returns does not granger cause gold returns. Also in the case of testing the causation effect from gold returns to Nifty 50 returns, the study fails to reject the null hypothesis at 5% level of significance. Therefore, gold returns also do not granger cause Nifty 50 returns. The results of the study indicate no causation effect between gold returns and stock market as the perception of investors is very different while investing in both these investment avenues.

The present study carries the limitation that the period of study is limited to only 5 years. Also the study takes into consideration only Nifty 50 Index and thereby ignores other indices of NSE and BSE. The study can be further extended by increasing the period of study and indices. Also analyses can be performed sector-wise to see how the relation between gold returns and stock returns vary across various sectors in India.

**Conclusion**

Investments in gold and share market have been vital avenues for various investors over several decades. The present study attempted to find out the relationship between these two investment avenues i.e. Gold and Share Markets and their daily returns. The required data relating to the selected 50 listed companies of Nifty 50 was extracted from the official website of National Stock Exchange. For the purpose of study, daily returns had been calculated for these 50 companies and gold. The results revealed that as compared to gold returns, the volatility of Nifty 50 returns was found to be more. The returns have varied violently for the said five year period i.e. 2010-2015. The variation was found to be least for the period September 2012-December 2012. The reason for such a high volatility of returns lies with the magnitude of risk involved in share market. The risk may be minimal for an investor who maintains the investment for a longer period of time.

From the present study it can be clearly noticed that the relationship between gold returns and the individual company stock returns have been negative for most of the companies. Hence it can be concluded that there exist inverse relationship between gold returns and stock returns. The results do not provide sufficient evidence that the gold returns have an impact over all the individual company stock returns. But when gold returns were regressed over Nifty 50 returns, the result clearly indicated that the null hypothesis is rejected at 1% level of significance. This suggests that the gold returns do significantly affect the Nifty 50 stock returns. Using Granger Causality Test, no causation effect was found between Nifty 50 returns and gold returns. The reason being, investors consider both these investment avenues considering the returns and risks associated and thereby make decision of investment. The results of the study also did not show any evidence of causation effect between gold returns and stock market as the perception of investors is very different while investing in both these investment avenues.

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