An Empirical Study on Impact of Gold Price on the Movement of Indian Stock Market– with Special Reference to BSE500 and NSE500

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Abstract

The gift investigation has been embraced to anlayse the effect of gold price on the development of Indian economic alternate. At this motive gold price and statistics of BSE500 and NSE500 are taken as elements. Information for the above factors are gathered for a time of 16 years from 2002 to 2018 on normal agenda with all out amount of perceptions of 3740. The examination applied tremendous insights, connection, relapse research, ADF unit root check, Johansen co-coordination test and Granger causality test for examination. The examination located that gold charge and the development of Indian financial exchange have huge splendid dating and vital and low outstanding impact on improvement of Indian securities trade, for the reason that numerous elements are accountable for the improvement of financial change, gold rate is one in each of them. Gold price, BSE500 and NSE500 had unit root in the course of the research time body. The examination did not discover any co-becoming a member of connection between gold price and Indian securities alternate within the course of the research time frame. It is likewise confirm that gold charge did not have granger motive on Indian securities trade as a long manner as BSE 500 and NSE 500 and Indian economic alternate moreover did not have granger reason on gold value for the duration of the exam time body. It is inferred that modifications in gold fee have noteworthy effect on market it development in India, however that impact isn't distinguished.

I. INTRODUCTION

Securities exchange is one of the top favored hypothesis roads for financial experts, as it offers cheap price of return in rate promote it. Essential nature of provide marketplace is change; economic professionals convey in coins through variance in securities change. Market improvement can be comprehended with the help of report framework. Bombay Stock Exchange (BSE) and National Stock Exchange (NSE) are the primary inventory trades in India with the a part of ninety nine.Five percentage of all out offer exchange collectively within the country. Sensex of BSE and Nifty of NSE are the well-known records and that they incorporate 30 and 50 corporations in my view. These inventory trades keep up massive based totally files likewise, among them BSE500 and NSE500 are mainstream and huge based totally totally documents with remembering pinnacle 500 corporations for terms their market capitalisation. Financial trade is being vacillated by using one of a kind function of various reasons. Among one in all a kind motives, complete scale economic variables are assuming a large manner in influencing the market development. For the most element country wide large scale financial elements are influencing the improvement of securities change, for instance, GDP improvement charge, swelling fee, good buy fee listing, and so forth.

After globalization popular economic factors are likewise influencing the improvement of securities trade, for instance, gold fee, silver price, FII project, etc. Among them gold fee is one of the key not unusual complete scale economic additives that is influencing the improvement of Indian securities exchange. Speculators want to vicinity resources into cost show off whilst the market is choice, else they circulate for ware promote it for reasonably-priced profits. In item put it up for sale gold is most loved ware thru financial professionals with the aid of different feature of successive variance in its charge. As an different venture avenue for rate promote it, it's miles regarded as that gold fee modifications affect the development of Indian securities alternate. The scientists have considered the impact of gold charge at the improvement of Indian economic change.

II. SURVEY OF LITERATURE

Amalendu Bhunia and Sanjib Pakira (2014) taken into consideration the impact of Gold Price and Exchange charges on the development of SENSEX throughout 23 years from 1991 to 2013 on every year premise. The exam located that gold price and conversion scale impacted the development of SENSEX. Kumar Saurabh (2012) examined the impact of gold fee, WPI, CPI, IIP and FII speculation on Indian monetary trade all through nine years from 2004 to 2012. The research placed that gold value, unrefined petroleum price, and FII had vital impact on the income of the Indian securities exchange. Banumathy K and Azhagaiah R (2014) broke down causal connection between inventory fee and gold charge in India making use of Granger causality take a look at inside the direction of ten years from 2004 to 2013. The exam found causal connection among stock price and gold fee in Indian economic exchange. Mukhopadhyaya (2011) in his examination show that American Stock change, Crude oil price, FII and Gold rate did no longer impact Indian securities exchange instability. Sujit and Rajesh Kumar (2011) broke down elements dating among gold cost, oil rate, swapping

scale and securities change returns for the period from January 2003 to September 2008. They determined that gold price, oil rate and conversion general had direct impact on advertise returns. Srinivasan (2014) in his research placed that Gold charge and swapping scale did no longer have sway at the development of Indian securities exchange. Balwinder Singh and Kriti Chitkara (2016) evaluated the effect of gold rate and unrefined petroleum on financial alternate instability in India for the duration of 7 years from May 2005 to March 2011 depending on every year data. The outcome indicated that there was effect of gold cost and raw petroleum price on Indian monetary exchange.

III. ARTICULATION OF THE PROBLEM

Gold is considered one in all the products, that is exchanged universally. For the maximum element economic experts want to location resources into numerous undertaking roads. They do now not positioned property into a selected sort of undertaking constantly, they try to have gainful portfolio .A economic professional might no longer care to place sources into value alone in constantly. In the event that the price show off is not remarkable, the monetary professional appears for trade hypothesis roads specially products put it up for sale, duty, one of a kind kind of protections, and so forth. In ware put it on the market, severa merchandise are exchanged, of which gold is assuming pressing technique, thinking about that go to change is to be had in gold rate. In this manner, Investors like to place belongings into gold for making reasonable return, every so often high-quality yield. As a worldwide and most exchanged product the arena, the rate of gold inside the market may effect the development of financial exchanges. Subsequently the expert has acquainted gold rate as a unfastened factor to study the effect on the development of Indian securities change.

Targets

The examination has been tried with the accompanying desires.

• To take a look at the relationship between and effect of gold fee and improvement of Indian securities exchange.

• To examine the co-incorporation connection among gold fee and Indian securities alternate and

• To dissect causal connection between gold price and Indian monetary exchange.

Philosophy

The present exam manages looking at the impact of gold rate on the development of Indian securities exchange. At this motive world gold cost has been taken as unfastened aspect and Indian financial trade as some distance as expansive primarily based information BSE500 of Bombay Stock Exchange (BSE) and NSE500 of National Stock Exchange (NSE) were taken as reliant elements. Gold charge and statistics records were accumulated for the for a time of 16years on regular time desk from 1.1.2002 to 31.12.2018. It comes 3740 perceptions at every listing and gold fee. The records of BSE500 became gathered from legitimate website online of BSE (www.Bseindia.Com) and the information of NSE500 come to be accrued from real web website online of NSE (www.Nseindia.Com). The information of Gold charge end up collected from the financial site of www.In.Funding.Com. The exam has carried out photograph insights, Kurtosis and Skewness take a look at to test the nation of dissemination and Jarque-Bera check become executed to check whether the facts have been widely speakme circulated. To take a look at unit base of decided on non mainstream gamers and gold rate, Augmented Dickey Fuller (ADF) Unit root check became carried out. This take a look at modified into made whether or not or not the time association statistics are desk bound or no longer. By and big this test is made in advance than making the exam of co-coordination test, because the check can be made on non-desk bound time arrangement statistics. The specialists have moreover implemented Johansen co-mixture test subsequent to

putting forward that the considered lists had unit root (non-desk sure) through the use of utilizing ADF unit root take a look at. The take a look at is made to analyze co-coordination connection among Indian securities trade and gold price. It additionally investigates the thinking about the fact that quite some time ago run concord courting most of the time association elements. On the off danger that factors are co-coordinated, it implies they couldn't go together with the drift separated over some undefined time frame on a regular. This check gives the results whether or not two elements co-coordinate or not, so the studies has likewise carried out Granger loss take a look at to check out causal connection among double go affiliation facts. Right now test has been carried out to realize causal connection amongst Indian securities alternate and gold charge. This take a look at offers aftereffect of which variable reasons any other the opportunity way around.

The correlation model used for the study is,

$$r = \frac{1}{N}\sum\left[\frac{(x_i - \bar{x})}{SD_x} \cdot \frac{(y_i - \bar{y})}{SD_y}\right] \quad \ldots\ldots\ldots\ldots (1)$$

Where, N indicates number of observations, x indicates return on gold price and y indicates return on Indian stock market (BSE500/NSE500).

The regression model used for analysing the impact of gold price on the movement of Indian stock market is,

$$IM_i = \alpha + \beta GP_i + \varepsilon_t \quad \ldots\ldots\ldots.(2)$$

Where, IM indicates Indian stock market, α represents intercept, GP represents return on gold price and ε indicates error term.

For the purposes of correlation and regression analysis, return on Indian stock market indices are calculated as follows.

$$MR_c = \frac{IM_{ct} - IM_{ct-1}}{IM_{ct}} \times 100 \quad \ldots\ldots\ldots(3)$$

Where, MR indicates market return, IM indicates Indian stock market, c indicates index

(BSE500/NSE500), t represents current year and t-1 represents previous year.

Return on gold price was calculated as follows,

$$GPR_c = \frac{GP_t - GP_{t-1}}{GP_t} \times 100 \qquad \text{............(4)}$$

Where, GPR indicates return on gold price, GP indicates gold price, t represents current year and t-1 represents previous year.

The model used to calculate ADF Unit root test is presented below (Gujarati, 2003).

$$\Delta Y_t = \beta 1 + \beta 2_t + \delta y_{t-1} + \sum_{i=1}^{m} a\, i \Delta y_{t-i} \qquad \text{..................(5)} + \varepsilon_t$$

Where ε_t is error term, Y_t is a random walk with drift around a stock trend, 't' is current day, 't-1' is previous day, 'm' is the lag order of the first difference autoregressive process, β is the coefficient on a time trend,

The model used to calculate Johansen co-integration test between Indian stock market and gold price is as follows.

$$\lambda\, trace\, (r) = -T \sum_{i=r+1}^{n} \log(1 - \lambda_i) \qquad \text{..................(6)}$$

$$\lambda\, trace\, (r) = -T \log(1 - \lambda_{r+1}) \qquad \text{..................(7)}$$

   r =   number of separate series

   T =   number of usable observations

   λ =   estimated Eigen values

   The models used to calculate Granger causality test is presented below.

$$IM_t = \sum_{i=1}^{n} a_i GP_{t-i} + \sum_{j=1}^{n} \beta_j IM_{t-j} \qquad \text{..................(8)} + u_{1t}$$

$$GP_t = \sum_{i=1}^{n} \lambda_i GP_{t-i} + \sum_{j=1}^{n} \delta_j IM_{t-j} \qquad \text{..................(9)} + u_{2t}$$

Where, IM is Indian marketplace, GP is Gold Price, u1t and u2t are blunder term and anticipated that they'll be uncorrelated, 'n' is the maximum intense variety of slacked perceptions and are the parameters to be evaluated.

IV.   RESULTS AND DISCUSSION

Table 1 provides expressive insights of lists BSE 500, NSE 500 and gold charge for the research time of 16 years from 2002 to 2018. It gives endorse, middle, maximum excessive and least traits, widespread deviation, skewness, kurtosis, Jarque-Bera check and its P esteem. So as to understand ordinary dispersion of facts an invalid speculations that the selected documents and gold price are not generally circulated the concept has been attempted using Jarque-Bera check.

Table 1: Descriptive Statistics of Gold Price and Indian Stock Market

	BSE500	NSE500	GOLD
Mean	5889.91	3712.44	946.44
Median	6386.89	3970.55	954.25
Maximum	12074.35	9436.95	1888.70
Minimum	1002.93	671.55	278.10
Std. Dev.	3069.01	1919.75	448.09
Skewness	0.09	0.13	0.07
Kurtosis	2.08	2.14	1.75
Jarque-Bera	137.54	126.36	248.52
Probability	0.00	0.00	0.00
Observations	3740	3740	3740

Source: Computed from Secondary Data

Table 1 shows that mean value of the indices BSE 500 and NSE 500 stood at 5889.91 and 3712.44 respectively and the mean value of gold price is 976.44 US$ per ounce. Standard deviation of the selected indices and gold price show that there was moderate level of deviation in the indices and gold price from their mean values. The indices of BSE500, NSE 500 and gold price are normally

distributed during the study period, since the calculated values of Skewness are near zero. It is also observed that both the indices and gold are positively skewed; hence there are more chances for positive returns than negative returns. The calculated values of hypothesis of BSE 500, NSE 500 and gold price are 2.08, 2.14 and 1.75 respectively, they are less than 3, hence both the indices and gold price are less peaked than normal distribution. The results of Jarque-Bera test of BSE500,NSE500 and gold price stood at 137.54,126.36 and 248.52 respectively, they are statistically significant at 1% level, hence the null hypothesis is rejected and therefore the indices of BSE500, NSE500 and gold price are normally distributed during the study period.

Correlation Analysis

In order to know relationship between gold price and Indian stock market, correlation analysis has been made between gold price and market proxies of BSE500, NSE500. Apart from correlation analysis regression analysis also applied and the results are presented subsequently.

Table 2: Correlation between Gold Price and Indian Stock Market

Variables	BSE500	NSE500	Gold Price
BSE500	1	0.851 (0.000)	0.076 (0.000)
NSE500	0.851 (0.000)	1	0.071 (0.000)
Gold Price	0.076 (0.000)	0.071 (0.000)	1
No. of Observations		3739	

Source: Computed from Secondary Data

Table 2 indicates that the relationship among's BSE 500 and NSE 500 is extraordinarily excessive and advantageous (0.851), it's far moreover noteworthy. It shows that both the enterprise sectors BSE and NSE are shifting all the whilst for the duration of the examination time frame. Relationship among's Gold and BSE 500 is 0.076 and among Gold fee and NSE 500 is zero.071, both the results are factually noteworthy at 1 percentage stage. Subsequently

Indian securities alternate and gold value have crucial effective courting, yet the quantum of courting is extraordinarily low.

Relapse Analysis

Relapse investigation has likewise been made among gold value and Indian economic change to recognize the quantum of effect of gold value adjustments on the development of Indian securities exchange. For this cause return on BSE 500 and NSE 500 are determined for 3739 exchanging days and earnings for gold fee is additionally determined. Gold value has been taken as unfastened element and marketplace intermediaries of the documents BSE500 and NSE500 are taken as reliant elements. Table three offers ANOVA results and relapse consequences for gold price and improvement of Indian securities trade regarding return on BSE500 and NSE500.

Table 3: Regression Analysis of Gold Price and Indian Stock Market

BSE500						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	0.07	0.02		3.01	0.00
	Gold Price	0.09	0.02	0.08	4.68	0.00
	Adj. R^2	0.006				
	F Value under ANOVA	21.88 (0.00)				
NSE500						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	0.07	0.03		2.60	0.01
	Gold Price	0.10	0.02	0.07	4.38	0.00
	Adj. R^2	0.005				
	F Value under ANOVA	19.18 (0.00)				

ANOVA results between gold price and return on BSE500 show that the calculated value of F-statistics is 21.88, it is statistically significant at 1 percent level. Hence the regression model is fit for the study. The calculated value of F-Statistics in ANOVA under regression analysis is 19.18, it is significant at 1 percent level as shown by the result of P value. Hence the regression model framed for the variables changes in gold price and return on NSE 500 is the fit for the study.It could be known from 3 that the calculated value of co-efficient between gold price and BSE500 is 0.08, it is significant as shown by the results of t-statistics and P value. Hence changes in gold price have significant impact on movement of BSE 500. One point change in gold price has positive change in BSE500 to the extent of 0.08 points. The calculated value of adjusted R^2 is 0.006, it means changes in gold price explained the variation in BSE500 to the extent of less than a percent. Many factors are responding for movement of stock market in India, gold price is one among them. Even though it has significant impact, but the quantum of impact is very low. Table 3 also reports that the regression co-efficient between gold price and movement of NSE 500 index is 0.07, it is statistically significant at 1 percent level as per the results of t-statistics and P value. Hence gold price has significant and positive impact on movement of Indian stock market in terms of return on NSE 500.But the quantum of impact is very low. The independent variable (gold price) explained the dependent variable (NSE 500) to the extent less than a percent. It is considered to low.

ADF Unit Root Test

The above results show the concept of relationship and quantum of impact of gold fee on economic alternate of India. In the attitude on breaking down profoundly, the specialist has implemented Johansson co-becoming a member of take a look at to understand whether or not gold value and Indian financial alternate are moving together, this investigation is suitable just when the time arrangement facts are non-desk bound, to check desk bound of the elements. Expanded Unit Root take a look at has been carried out. The analyst has likewise applied Granger causality check to realize ADF, which variable impact another are and the other manner around. Table 4 gives the effects of ADF Unit pull take a look at on the factors gold cost, the lists of BSE500 and NSE500. For this purpose the accompanying invalid hypothesis is encircled.

H_o1: Gold price, BSE500 and NSE500 are non-stationary.

Table 4: Unit Root Test

Variable	ADF Statistics	P-Value	Critical Value	Hypothesis
Gold Price	-1.44	0.56	1% -3.4319 5% -2.8621 10% -2.5671	Accepted
BSE500	-0.82	0.81	1% -3.4319 5% -2.8621 10% -2.5671	Accepted
NSE500	-0.81	0.81	1% -3.4319 5% -2.8621 10% -2.5671	Accepted

It is seen from table 4 that the determined estimation of ADF measurements of Gold value, BSE500 and NSE500 are - 1.44, - 0.82 and - 0.81 individually, They are not factually huge as appeared by the consequences of P esteem, Since they are not exactly the table worth. Consequently the invalid theory is acknowledged and subsequently the factors gold value, BSE500 and NSE500 have unit root and they are capricious. At the end of the day, the time arrangement information of these factors are not stationary and they are fit for additional investigation, for example, co-coordination and causality test.

Johansen co-combination Test

Johansen co-combination test investigations whether gold cost and Indian financial exchange are moving together or not. At the end of the day, it tests whether these two factors are have co-combination relationship or not. For this reason an invalid

speculation has been confined as follows and the outcomes are introduced in table 5.

Ho: Gold cost and Indian financial exchange as far as BSE500 and NSE500 don't have co-mix relationship.

Table 5: Johansen Co-Integration Test

Unrestricted Co-integration Rank Test (Trace) at 5%						
Hypothesized No. of CE(s)	**Eigen Value**		**Trace Statistic**		**Critical Value**	**Prob.****	
	BSE500	**NSE500**	**BSE500**	**NSE500**		**BSE 500**	**NSE500**
None	0.0006	0.0006	2.90	2.90	15.49	0.97	0.98
At most 1	0.0002	0.0002	0.64	0.68	3.84	0.42	0.40
Unrestricted Co-integration Rank Test (Maximum Eigen Value) at 5%						
Hypothesized No. of CE(s)	**Eigen Value**		**Trace Statistic**		**Critical Value**	**Prob.****	
	BSE500	**NSE500**	**BSE500**	**NSE500**		**BSE 500**	**NSE500**
None	0.0006	0.0006	2.90	2.26	15.49	0.98	0.97
At most 1	0.0002	0.0002	0.68	0.64	3.84	0.40	0.40

Source: Computed from Secondary Data

Table 5 suggests that the determined estimations of observe nicely worth and maximum intense eigen estimation of gold rate and BSE500 are 2.9095 and a pair of.2694 in my opinion, they're not precisely the primary well really worth, so they are not measurably huge. Thus the invalid hypothesis is stated and on this manner gold charge and Indian securities exchange as an extended way as BSE500 are not co-coordinated, as such, those factors aren't moving collectively.

It is likewise acknowledged from desk five that the decided estimations of observe measurements and most excessive eigen estimation of the list of NSE500 are 2.9087 and a couple of.2766 in my view, they're not exactly the separate simple capabilities. In this way, the outcomes aren't factually noteworthy. Subsequently the invalid concept is stated and alongside those lines gold rate and Indian monetary alternate as a long manner as NSE500 are not co-coordinated. As it had been, the ones elements aren't moving together.

Granger Causality Test

The relapse examination tests the impact of a loose element on subordinate variable. There, a specific variable has been popular as reliant and each different or now not many as needy. In any case, in economic exchange it can not be stated that variable X impacts variable Y, variable Y can also effect variable X. In this way, the expert has implemented Granger causality test. It tests which variable motives another. For this reason invalid theories are encircled and the outcomes are added in table 6.

Table 6: Granger Causality Test

BSE500				
Null Hypothesis	**Obser-vations**	**F-Statistic**	**Prob.**	**H₀**
BSE500 does not Granger Cause Gold price	3739	0.52	0.59	Accepted
Gold price does not Granger Cause BSE500		0.33	0.71	Accepted
NSE500				
Null Hypothesis	**Obser-vations**	**F-Statistic**	**Prob.**	**H₀**
NSE500 does not Granger Cause Gold price	3739	0.65	0.52	Accepted
Gold price does not Granger Cause NSE500		0.50	0.60	Accepted

Table 6 indicates that gold value didn't have granger cause on Indian economic exchange as a long way as income for BSE500 and BSE500 did now not have granger reason on gold price, for the cause that decided F-measurements are 0.Fifty and zero.33 separately and they're not factually critical as seemed with the resource of the aftereffects of P esteems. The decided estimations of F-insights of speculations one and among gold value and the list of NSE 500 are zero.Sixty 5 and 0.50, they're no longer factually noteworthy, henceforth each the invalid theories are recounted and in this manner gold price did not have granger purpose on NSE 500 and NSE 500 didn't have granger cause on gold price.

V. CONCLUSION

The investigation predicted to anlayse the effect of gold value on the improvement of Indian monetary exchange. It has been completed with show off

intermediaries of huge primarily based definitely documents of BSE500 and NSE500. The connection examination uncovers that, gold price and the development of Indian monetary trade have big powerful relationship and relapse studies display that adjustments in gold rate have massive splendid effect at the improvement of Indian securities alternate, but the quantum of impact is low, seeing that severa components are accountable for the improvement of securities change, gold value is certainly one of them. Gold fee, BSE500 and NSE500 had unit root within the path of the exam time body, so these elements are non-stationery. It is found from the consequences of Johansen co-reconciliation test that gold fee and Indian securities exchange concerning each BSE500 and NSE500 are not transferring collectively and they may be transferring freely their very personal way, given that they do now not have co-incorporation dating throughout the research time frame. It is additionally show that gold value didn't have granger cause on Indian financial exchange regarding BSE 500 and NSE 500 and Indian securities alternate likewise did now not have granger purpose on gold charge at a few stage within the research time frame. It is inferred that variances in gold charge have noteworthy effect on advertise improvement in India, but that impact isn't always eminent.

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