

Long-Term Nexus Between Gold Prices and Stock Market : Insights of India

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Abstract

Globally, gold is considered as a safe and more profitable investment against inflation during market turbulence, and gold price fluctuations impact the economic growth as well as the stock market. This paper aims to examine the causal relationship between gold and stock market employing the cointegration test for the period between January 1994 and December 2018. The results found no cointegration relationship between gold price and stock market prices in the long-run. The results would foster the understanding about to what extent gold prices and stock market are associated to each other which will further facilitates the investors, portfolio managers, and policy makers.

Key Words

Stock Market, Gold Prices, Vector Autoregression, Cointegration Approach

INTRODUCTION

Due to interdependence in the global financial market, the commodity market has risen and it's led stock markets and foreign exchange markets. Indian stock market is highly influenced by two variables: gold prices and exchange rates. Generally, there is a reverse association between the gold price and stock price (Bouri *et al.*, 2017). In this line, when the stock prices go down due to market turbulence, investors invest in gold. The one major reason to invest in gold is less fluctuation in its price (Yahyazadehfar and Babaie, 2012, Bhunia, 2013). Moreover, gold is considered as safe investment option and therefore, investors prefer to

invest in stable alternative assets as gold prices remain constant during the financial turbulence and economic turmoil (Bhunia, 2013).

India is the largest gold consuming country in the world as it is considered as one type of property and symbol of prosperity. Besides, population boom is another cause for consistent increase in the demand of gold in India. As per World Gold Council, India is a leading gold importer, and in this line, international gold prices directly impact domestic gold prices. India's gold demand in the third quarter during 2018 was 964.3 tonnes that are 13% higher than the previous record (WGC, 2018). Moreover, the gold demand is anticipated to increase up to 33% and more than 1,200 tonnes by 2020 in India. Hence, the high demand of gold is impacting its prices, and high prices of gold would impact the stock price (Tursoy and Faisal, 2018).

Gaur and Bansal (2010) argued that, in periods of crisis, the weakening stock market always results in increasing gold rates. Le and Chang (2012) observed a significant association between stock market prices and gold prices, and affirmed that the stock market is a reason for raising the gold rate. Using daily data for the period 1996-2007, Gilmore *et al.* (2009) found that stock market index is linked with gold price index in the long-term and both variables impact each other in the short-term. There is clear evidence that in economic uncertainty and market turbulent periods, as the stock prices decrease which increase decline in gold price increases and attention focuses on gold as a safe haven. Gold performs a vital role in portfolio diversification and hedging but gold prices have a negative impact on the stock prices. Small changes in gold prices indicate the position of safe investment (Baur, 2012; Tursoy and Faisal, 2018). It is, therefore, important to understand the changing behavior of gold prices for making investment decisions (Ewing and Malik, 2013). The more fluctuations in gold prices is an alert for the investors and expose them to risk which, in turn, enhances investors' interest to understand the reaction of stock markets to the gold price movement (Tully and Lucey, 2007).

The remains of the paper are constructed as follows. The 2nd section sheds light on the earlier studies. The 3rd section presents the data and outlines the methodology of the study. The 4th section discusses empirical results and the end section concludes the study.

LITERATURE REVIEW

The relationships between financial and commodity markets are documented in the vast literature. We present and discuss here interactions between the commodity and the stock market. The brief reviews of the related and

relevant literature are as under :-

Bhunia and Das (2012) examined that the causal associations between the prices of gold and stock in the context of India by employing a Vector Error Correction Model (VECM) for the period from April 2001 to March 2011. The study results confirmed causality between the selected variables.

Kaliyamoorthy and Parithi (2012) investigated the relationship between the gold market and stock market for a period from June 2009 to June 2010 using the Chi-Square technique. The study reported no relationship between the stock market and gold. Further, the study found that during the period under study both the stock market and gold prices showed a rising trend, but the stock market was not the reason for increasing the gold rate.

Smith (2001) studied the cointegration between gold prices and stock prices in context to the US by using Granger Causality Test. The results of the study indicated that there is a unidirectional causality for the return of gold from US stock returns.

Mukhuti and Bhunia (2013) studied the long-run interaction between gold prices and stock prices. The study reported there is no co-integration between gold price and Sensex, as well as between gold price and Nifty. Moreover, Multivariate Co-integration Test results showed that there is a presence of a co-integration relationship between the gold price and two stock market indices. Further, gold price in India is influenced by the Indian stock market indices in the long-run.

Sreekanth and Veni (2014) studied that the long-term and the short-term association between Nifty and gold by using VECM and Granger Causality Test. The study result indicated that the gold prices are sufficient to explain the moments of nifty in the short-run and long-run. Finally, the results of the Granger Causality test confirmed the long-run causality from gold prices to Nifty.

Kothar and Gulati (2015) analyzed the relationship between the prices of gold and stock of India and also compared investment purpose in gold and stock market from 1979 to 2013. The result highlighted a high degree of positive correlation between both the variables and unidirectional causality from stock to gold prices. Moreover, the result indicates that investment hold strategy in the stock market over the long-run.

Tiwari et al. (2015) examined the causality between economic growth and the stock market in India using monthly data for the period between April 1993 and January 2011 applying Granger Causality test. The study result confirmed that in a long-term unidirectional causal relationship from stock prices to industrial production. Moreover, developments in industrial production are leading by stock

market prices in India.

Ingalhali et al. (2016) indicated that there existed only unidirectional relationship among the gold and stock prices. Further, gold and stock prices index were positively highly correlated. The researcher explains the stock market as the indicator for economic growth.

Shaique et al. (2016) investigated the long-term interaction between gold prices and the KSE 100 index using monthly data between 1993 and 2014. The study result reported no long-run relationship between KSE 100 index and gold prices. Further, the result showed investors should not consider KSE 100 index and gold prices as close alternatives.

Bouri et al. (2017) used daily data from 2011 to 2017 to examine the causality association between gold and the stock market in India and China in the short and long-term. The study result concluded both gold and stock market affect each other in China and India.

Maghyereh et al. (2017) employed the DCC-GARCH model to examine dynamic correlation and hedge ratio between gold, crude oil, and equity using daily data from January 2004 to May 2016. Researchers highlighted significant spillovers from oil to equities and report heavy dependence of the local economies on oil. Moreover, the spillovers of gold on the stock markets are insignificant.

Ahmed (2018) applied the cross-correlation function to evaluate co-movements between prices of natural gas and the stock market. The daily sample period has been used from January 2012 to February 2017. The study found that the existence of mean and variance dynamics between natural gas and stock market of Qatar's developing market.

Benkraiem (2018) applied Quantile ARDL to examine the linkages among the prices of heating, gasoline, diesel, WTI, natural gas, and stock market of US using monthly time series from January 1999 to September 2015. The study result concluded that both crude oil and natural gas are dynamics associated with the stock market in both long and short-term.

Lin (2018) studied daily closing data of stock index called SSE composite, from July 2013 to July 2017, employing the GARCH type models to examine the fluctuations of stock prices in China. The result claimed the price series significant effects by ARCH and GARCH and helpful for significant forecast performance.

Mo et al. (2018) utilized the cointegration and DCC-MGARCH model and studied the dynamic long-term association between the US dollar, crude oil, and gold market. The daily data set used from 1990 to 2016. The study found both

crude oil and gold dependence on each other positively, and dynamic negative influence of oil-dollar. The study result also reported of causal relationship from gold to US dollar, and from US dollar to crude oil.

Tursoy and Faisal (2018) used monthly data from January 1986 to November 2016 to examine the short-term and long-term relationship between crude oil, gold and stock prices by employing the autoregressive distributed lag model. The study result found opposite interaction between the stock prices and gold prices. Besides, the result concluded between the stock prices and crude oil prices positive interaction in both long-term and short-term.

OBJECTIVE OF THE STUDY

To examine the long-term relationship between gold prices and stock market prices.

RESEARCH METHODOLOGY

Scope of the Study

The study particularly focuses on gold prices and National Stock Exchange (Nifty) index prices with a causal effect of each other. The data has been taken for the time period from January 1994 to December 2018 with total 5,965 observations. Indian economy in the recent past has experienced a volatile situation in its financial mistakes.

Sources of Data

In the present research work, Indian gold prices and the closing price of the stock market of Nifty have been taken for the selected period. The study considered daily data comprising the Nifty and gold prices. Secondary data was collected from National Stock Exchange database (www.nseindia.com) and World Gold Council database (www.gold.org).

Tools Employed

The empirical test has been arranged by using econometric techniques. The Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) unit root test have been used to check the stationarity of the time series data. Moreover, the Vector Autoregression (VAR) model has been applied in the series to determine lagged selection. Further, cointegration test has been used to investigate the relationship between variables in long-term in case of the time series data are integrated at first different level.

EMPIRICAL RESULTS AND DISCUSSIONS

Descriptive Statistics

The descriptive statistics of time series are depicted in Table 1. Daily average prices series of the stock and gold are positive. Standard deviations are higher for stock prices than gold price. Moreover, daily gold average price is higher than stock price. The Jarque-Bera Test of Normality does not accept the null hypothesis for both data series at 1% level of significance and states that the series are not normally distributed.

Table 1
Descriptive Statistics

Variables	Mean	Median	Maxi.	Mini.	Std. Dev.	Skewness	Kurtosis	J-Bera
Nifty	8.07	8.33	9.37	6.69	0.82	-0.18	1.54	497.91***
Gold	10.42	10.44	11.48	9.30	0.78	-0.06	1.34	605.21***

Note : *** indicates Jarque-Bera at the 1% significance level.

Unit Root Tests

The unit root test was used to check stationarity of the time series data. This test is based on that Null hypothesis (H0) of all variables are not stationary. The results indicate that the null hypothesis cannot be rejected for all variables in the level forms. Further, the null hypothesis is rejected for all variables when applying ADF and PP tests after the first differences series. The result concludes both variables are stationary at first differences. Further, we apply the cointegration test to check whether cointegration between variables exists or not.

Table 2
Unit Root Test Results

Variables	ADF		PP		Result
	At Level	At First Difference	At Level	At First Difference	
Nifty	-0.29	-72.33***	-0.27	-72.21***	I(1)
Gold	-0.19	-78.07***	-0.19	-78.06***	I(1)

Note : *** indicates unit root at the 1% significance level.

Johansen Cointegration Test

Unit root tests affirm that both variable series are integrated at first difference. However, in the long-run, it cannot be expected, the integrated series behaves in the same direction. The cointegration tests perform to analysis long-term relationship between two non-stationary series. For cointegration analysis, we employed Johansen Cointegration Test (1988) to determine the long-term relationship between the series. The result claimed no cointegration relationship between the variables in the long-run.

Table 3
Trace Test Results

Hypothesized No. of CE's	Eigenvalue	Trace Statistics	Critic Value 5%	Probability
None ($r = 0$)	0.001538	9.196143	15.49471	0.3476
At most $1r \leq 1$	0.000000	0.019506	3.841466	0.8888

Table 4
Maximum Eigenvalue Test Results

Hypothesized No. of CE's	Eigenvalue	Maximum Eigenvalue	Critic Value 5%	Probability
None ($r = 0$)	0.001538	9.176638	14.26460	0.2718
At most $1r \leq 1$	0.000000	0.019506	3.841466	0.8888

Before applying the Johansen Cointegration Test, we determined the lagged ratio through the unrestricted Vector Autoregression (VAR) model. The lagged ratio has been selected based on the Schwarz information criterion (SC) and Hannan-Quinn information criterion (HQ) criteria. Table 3 and Table 4 show the results of the trace test and the maximum Eigenvalue Test respectively.

Vector Autoregression Estimates

Table 5 reports the Vector Autoregression Test's result. Cointegration Test indicates that there is no cointegration among variables. We employed Johansen VAR model for the further analysis. Results of VAR test reported the absence of causality from any series of the other series. Result indicated that majority of the impact in stock and gold prices is mainly because of their own innovations and fluctuation.

Table 5
Vector Autoregression Test Result

Dependent Variables → Independent Variables	Nifty		Gold	
	Coefficient Error	Std.	Coefficient Error	Std.
Nifty _{t-1}	1.064672***	(0.01295)	0.006481	(0.00881)
Nifty _{t-2}	-0.066336***	(0.01296)	-0.005298	(0.00882)
Gold _{t-1}	0.003879	(0.01905)	0.988709***	(0.01298)
Gold _{t-2}	-0.002101	(0.01904)	0.010061	(0.01297)
C	-0.004752	(0.00322)	0.003623*	(0.00219)

Note : ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively.

CONCLUSION

This study attempts to test the causal relationship between gold prices and Nifty index prices in context to India by using daily data for the period 1994 to 2018. Time series of the data were found non-stationary at level and stationary after first difference therefore; the long-run relationships between the two variables were tested applying Johansen Cointegration Analysis. Results claimed no cointegration relationship between the gold and stock market in the long-term. Moreover, the study found that the financial crisis in the stock market is prohibited with the control of gold prices in the long-term. Further, investors do not behave rationally and their herding behavior is observed in their reactions to price fluctuations. Our findings corroborate previous studies showing no cointegration relationship between gold prices and equity markets such as Kaliyamoorthy and Parithi (2012); Mukhuti and Bhunia (2013) and Shaique *et al.* (2016). Our results are important for financial market participants, researchers, policy makers and portfolio managers.

References

- Ahmed, W. M. A. (2018), On the Interdependence of Natural Gas and Stock Markets Under Structural Breaks, *The Quarterly Review of Economics and Finance*, 67 : 149-161.
- Ali, I. (2016), Stock Market Volatility and Returns : A Study of NSE and BSE in India,

International Journal of Humanities and Social Science Studies, II(IV) : 202-211.

- Awe, O. O. (2012), On Pair-wise Granger Causality Modelling and Econometric Analysis of Selected Economic Indicators, 1-17. Available at from Interstatstatjournals.net/YEAR/2012/articles/1208002.pdf
- Baur, D. G. (2012), Asymmetric Volatility in the Gold Market, *Journal of Alternative Investments*, 14 : 26-38.
- Benkraiem, R.; Lahiani, A.; Miloudi, A.; and Shahbaz, M. (2018), New Insights into the US Stock Market Reactions to Energy Price Shocks, *Journal of International Financial Markets, Institutions and Money*, In Press.
- Bhunia, A. (2013), Investigating the Impact of Gold Price and Exchange Rates on Sensex : An Evidence of India, *European journal of Accounting, Finance and Business*, 2(1) : 1-11.
- Bhunia, A.; and Das, A. (2012), Association Between Gold Prices and Stock Market Returns : Empirical Evidence from NSE, *Journal of Exclusive Management Science*, 1(2) : 1-7.
- Bhunia, A.; and Mukhuti, S. (2013), The Impact of Domestic Gold Price on Stock Price Indices — An Empirical Study of Indian Stock Exchanges, *Universal Journal of Marketing and Business Research*, 2(2) : 35-43.
- Bouri, E.; Roubaud, D.; Jammazi, R.; and Assaf, A. (2017), Uncovering Frequency Domain Causality Between Gold and the Stock Markets of China and India : Evidence from Implied Volatility Indices, *Finance Research Letters*, 23 : 23-30.
- Capies, F.; Mills, T.C.; and Wood, G. (2005), Gold as a Hedge Against the Dollar, *Journal of International Financial Markets, Institutions and Money*, 15 : 343-352.
- Ciner, C. (2011) Commodity Prices and Inflation : Testing in the Frequency Domain, *Research in International Business and Finance*, 25 : 229-237.
- Contuk, F.Y.; Burucu, H.; and Gungor, B. (2013), Effect of Gold Price Volatility on Stock Returns : Example of Turkey, *International Journal of Economics and Finance Studies*, 5(1) : 119-140.
- Ewing, B.T.; and Malik, F. (2013), Volatility Transmission Between Gold and Oil Futures Under Structural Breaks, *International Review of Economics and Finance*, 25 : 113-121.
- Ftiti, Z.; Guesmi, K.; and Abid, I. (2016), Oil Price and Stock Market Co-movement : What Can We Learn from Time-Scale Approaches? *International Review of Financial Analysis*, 46 : 266-280.
- Gaur, A.; and Bansal, M. (2010), A Comparative Study of Gold Price Movements in Indian and Globalmarkets, *Indian Journal of Finance*, 4(2) : 32-37.

- Gilmore, C. G.; McManus, M. G.; Sharma, R.; and Tezel, A. (2009), The Dynamics of Gold Prices, Goldmining Stock Prices and Stock Market Prices Co-movements, *Research in Applied Economics*, 1(1) : 1-19.
- Hakan, G.; Fatma, G.; Merve, A. Z.; and Bolor, L. (2005), Effects of Oil Price, Interest Rate and Dollar Price of Euro on Gold Price. In Empirical Studies in Social Sciences, 6th International Student Conference, Izmir University of Economics, Izmir Turkey, 1-11. Available at: <http://interstat.statjournals.net/ YEAR/ 2012/ articles/1208002.pdf>.
- Ingallhalli, V.; Poornima, B. G.; and Reddy, Y. V. (2016), A Study on Dynamic Relationship Between Oil, Gold, Forex and Stock Markets in Indian Context, *Paradigm*, 20(1) : 1-9.
- Jensen, G. R.; Johanson, R. R.; and Mercer, J. M. (2000), Efficient Use of Commodity Future in Diversified Portfolios, *Journal of Future Market*, 20(5) : 489-506.
- Jo, S.K.; Kim, M. J.; Lim, K.; and Kim, Y. (2018), Correlation Analysis of the Korean Stock Market : Revisited to Consider the Influence of Foreign Exchange Rate, *Physica A*, 491 : 852-868.
- Kaliyamoorthy, S.; and Parithi, S. (2012), Relationship of Gold Market and Stock Market : An Analysis, *International Journal of Business and Management Tomorrow*, 2(6) : 1-6.
- Kang, S. H.; McIver, R.; and Yoon, S. M. (2017), Dynamic Spillover Effects Among Crude Oil, Precious Metal, and Agricultural Commodity Futures Markets, *Energy Economics*, 62 : 19-32.
- Kothar, A.; Gulati, D. (2015), Investment in Gold and Stock Market : An Analytical Comparison, *Pacific Business Review International*, 7(9) : 65-68.
- Le, T. H.; and Chang, Y. (2012), Oil Price Shocks and Gold Returns, *International Economics*, 131(3) : 71-104.
- Lin, Z. (2018), Modelling and Forecasting the Stock Market Volatility of SSE Composite Index Using GARCH Models, *Future Generation Computer Systems*, 79 : 960-972.
- Maghyreh, A. I.; Awartani, B.; and Tziogkidis, P. (2017), Volatility Spillovers and Cross-Hedging Between Gold, Oil and Equities : Evidence from the Gulf Cooperation Council Countries, *Energy Economics*, 68 : 440-453.
- Mo, B.; Nie, H.; and Jiang, Y. (2018), Dynamic Linkages Among the Gold Market, US Dollar and Crude Oil Market, *Physica A*, 491 : 984-994.
- Mukhuti, S.; and Bhunia, A.; 2013. Is it true that Indian gold price influenced by Indian Stock Market Reaction? *Journal of Business Management and Economics*, 4(8) : 181-186.
- Narang, S. P.; and Singh, R. (2012), Causal Relationship Between Gold Price

- and Sensex : A Study in Indian Context, *Vivekananda Journal of Research*, 1(1) : 33-37.
- Orlowski, L.T. (2017), Volatility of Commodity Futures Prices and Market Implied Inflation Expectations, *Journal of International Financial Markets, Institutions and Money*, 51 : 133-141.
- Prakash. P.; and Sundararajan, S. (2014), An Empirical Analysis on the Relationship Between Gold and Silver with Special Reference to the National Level Commodity Exchanges in India, *International Journal on Recent and Innovation Trends in Computing and Communication*, 2(8) : 2224-2233.
- Raza, N.; Shazad, S. J. H.; and Tiwari, A. K. (2016), Asymmetric Impact of Gold, Oil Prices and Their Volatilities on Stock Prices of Emerging Markets, *Resources Policy*, 49 : 290-301.
- Shaique, M.; Aziz, A.; and Herani, G. M. (2016), Impact of Gold Prices on Stock Exchange Market : A Case of Karachi Stock Exchange Market of Pakistan, *International Journal of Accounting and Economics Studies*, 4(1) : 60-63.
- Smith, G. (2001), The Price of Gold and Stock Price Indices for the United States, *Adrienne Roberts FT Personal Finance*, 1-35.
- Sreekanth, D.; and Veni, L. K. (2014), Causal Relationship Between Gold Price and Nifty - An Empirical Study in Indian Context, *Asian Journal of Research in Banking and Finance*, 4(5) : 253-265.
- Tiwari, A. K.; Mutascu, M.I.; Albulescu, C.T.; and Kyophilavong, P. (2015), Frequency Domain Causality Analysis of Stock Market and Economic Activity in India, *International Review of Economics and Finance*, 39 : 224-238.
- Tursoy, T.; and Faisal, F. (2018), The Impact of Gold and Crude Oil Prices on Stock Market in Turkey : Empirical Evidences from ARDL Bounds Test and Combined Cointegration, *Resources Policy*, 55 : 49-54.
- Tully, E.; and Lucey, B. M. (2007), A Power GARCH Examination of the Gold Market, *Research in International Business and Finance*, 21(2) : 316-325.
- WGC (2018), Gold Demand Trends Q3 2018. Available at: <https://www.gold.org/goldhub/research/gold-demand-trends/gold-demand-trends-q3-2018>.
- Yahyazadehfar, M.; and Babaie, A. (2012), Macroeconomic Variables and Stock Price : New Evidence from Iran, *Middle-East Journal of Scientific Research*, 11(4) : 408-415.