



Examining Day Wise Volatility of Gold Prices in India

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Abstract: This study is all about gold price volatility in India. Gold is a yellow precious metal, the chemical element of atomic number 79, used in jewellery and decoration and to guarantee the value of currencies. In India gold is believed to be very precious. On some occasion to buy gold is believed to be sign of auspice. But as all know that the price of gold is changing day by day. On independence 1947 price was 88.62 for 10gram. And now in 2016 price of gold is Rs.28, 623.50. In this study the price of gold were collected from January 2013 to December 2017. In this period also the price of gold surely go upward and downward. This is called volatility. Main reason of this study is to examine the price volatility from 2013 to 2017. Also you can find the volatility in each year from 2013 to 2017 and also the price affected on the very next day. Like what will be the effect of Monday's price on Tuesday, same way Tuesday's effect on Wednesday and so on. From this study it can be clear that how much price of gold volatile. Also clear that on which day price will be more and on which day price will be less. So this study will surely help to identify volatility in price of gold in Indian market.

I. INTRODUCTION

This study is about the “examining volatility in gold prices in India”, as title suggests is all about the variation. The price of gold has been collected from January 2013 to December 2017. After that the gold prices separated as year & day wise, in this study the effect of the price on the next day has been examine. And also the graph of the volatility of prices mentioned in study. Also found that on which day the price of gold is highest or lowest.

Gold:

What is Gold? Origin / Meaning of the name Gold

The name originates from the Old English Anglo-Saxon word 'geolo' meaning yellow. The Symbol Origin is from the Latin word 'aurum' meaning 'shining dawn' which is in reference to Aurora, the Roman Goddess of dawn. Gold was once referred to as one of the 'Noble Metals' which also included Silver and Platinum. Noble Metals were so called due to their long association with the aristocracy

Facts about the History of the Discovery of Gold Element - A Metal of Antiquity
Gold was discovered in Ancient times and used by the ancient South Americans, Asians, Egyptians, Greeks, Romans and Chinese. It is mentioned in the Bible. Gold is measured by troy weight and by gram. The term 'carat' meaning purity is used to indicate the amount of gold present, with 24 carats being pure gold and lower ratings proportionally less. Gold is one of the metals referred to as one of the 'Metals of Antiquity'. The ancient 'Metals of Antiquity' together with their approximate dates of discovery and use are Gold (6000BC), Copper (9000BC), Silver (4000BC), Lead (6400BC), Tin (3000BC), Iron (1500BC) and Mercury (1500BC).

Granger causality:

Granger causality (or "G-causality") was developed in 1960s and has been widely used in economics since the 1960s. However it is only within the last few years that applications in neuroscience have become popular.

Granger causality is a statistical concept of causality that is based on prediction. According to Granger causality, if a signal X1 "Granger-causes" (or "G-causes") a signal X2, then past values of X1 should contain information that helps predict X2 above and beyond the information contained in past values of X2 alone. Its mathematical formulation is based on linear regression modeling of stochastic processes (Granger 1969). More complex extensions to nonlinear cases exist, however these extensions are often more difficult to apply in practice.

Formula:

$$X1(t) = \sum_{j=1}^p A11,j X1(t-j) + \sum_{j=1}^p A12,j X2(t-j) + E1(t)$$

$$X2(t) = \sum_{j=1}^p A21,j X1(t-j) + \sum_{j=1}^p A22,j X2(t-j) + E2(t)$$

Volatility:

Volatility is the relative rate at which the price of a security moves up and down. The more the price moves up and down, the more volatility it is considered to have.



What is 'Volatility'

Volatility is a statistical measure of the dispersion of returns for a given security or market index. Volatility can either be measured by using the standard deviation or variance between returns from that same security or market index. Commonly, the higher the volatility, the riskier the security

II. LITERATURE REVIEW

Singh & Singh (2010) examined the linkages of stock markets of India and China with the United states stock market. Using Granger causality, they found unidirectional causality from US markets to Indian stock market and suggested that short term diversifications are limited between Indian stock market and the US stock market.

Abken (1980) explains the economics that underlies the movements in the price of gold. The spot prices of all storable commodities including gold are particularly influenced by the anticipation of future spot prices. In the case of gold, the relative insignificance of flow supply and demand compared to stock, the relative insensitivity of flow supply and demand with respect to spot price movements and changes in the gold price especially sensitive to changes in its anticipated future spot price, the episodic run-ups and run-downs in the price of gold associated with periods of economic and social turmoil, have all fascinated the frequently bewildered observers of gold market. At such times, analysts often conclude that mob psychology overwhelms the market as market participants lose sight of so called market fundamentals. However the theory and empirical evaluation of gold price movements presented here demonstrate that ad hoc appeals to mob psychology are unnecessary to explain the behavior of gold price. The paper states that economic theory appears sufficient to account for gold price movement in recent years

Christie, Chaudhry & Koch (2000) analyzed the impact of macro-economic announcements on the intraday data of gold and silver prices in the US for the period 1992-1995. Linear Regression was used to analyze the impact of the news announcements. The asset price variance was found to be very high in the news announcement days than the non-announcement days. Gold and silver prices were actively responding to the CPI, unemployment rate and GDP announcements.

Worthington & Pahlavani (2006) emphasized the stable relationship between gold price and inflation rate and they insisted that gold be an appropriate hedge against inflation in the US.

Tully & Lucey (2007) found that APGARARCH model was a good fit for examining the conditional volatility of gold prices in the UK. They used likelihood ratios to test the goodness of fit. They also analyzed the impact of macroeconomic variables on the conditional volatility of gold price in the UK. Among the macroeconomic variables studied, only US dollar was found to have a significant impact on the gold price.

Dempster, Natalie (2006) stated that gold is the status symbol of India and gold plays in rites continues the culture. Rites include not only consumer behaviour and also the various occasion related opportunities to buy gold such as religious festivals and marriages. These kinds of various occasions also tend to attach people into cultural practices; otherwise Indians' attachment on gold is question mark. In this article the author strongly said that the buying ability of the people not only decided by monetary status of people but also by the cultural belief and practices.

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The present paper attempts to investigate the existence of causal relationship between gold prices in India and various other global factors vis-à-vis Foreign Institutional Investment (FII), Standard & Poor's 500 (S&P-500), Foreign Exchange Reserves (Forex Reserves), Exchange rate (USD) & Crude oil price. For the purpose of study monthly time series data of abovementioned variables have been studied covering the period of nine years from April, 2004 to March, 2013. In order to examine relationship among these variables Unit Root test, Co-integration test, Granger Causality test have been employed using E-Views 5 statistical software package. The results suggest long run integration between these variables further it was found that all abovementioned global factors do not Granger Cause Gold price in India however it was found that Gold price Granger Cause Exchange Rate (USD) and Crude oil price during the period under study.

Dr. Bimal Jaiswal , Ms. Shiva Manoj Gold is considered the most feasible element of investment. In the times of crisis also, it has proved to be most accessible and investors of all ages have taken it as the safest one to cope with crisis. In India, Gold has been a pillar of tangible, storable and transportable wealth. It is the core component of Indian culture-social and financial both. In commodity market, gold has its unique relevance. But fluctuations in its prices make a weird situation in the market. This paper deals with various aspects attached to gold like its relevance, reasons for price fluctuation and impact on Indian economy in the times of global crisis.

III. RESEARCH METHODOLOGY

Objective of study:

- To examine the price volatility of gold price every year



- To examine the effect of gold price to next day

Research design:

- Descriptive research, also known as statistical research describes data and characteristics about the population or phenomenon being studied.

Data collection method:

- Secondary data

Sample size:

- Daily gold price.(from January 2013 to December 2017)

Data analysis:

- Data analysis done through reviews

Scope of the study:

- The study can also be applicable for other year also
- Can also examine the effect of price on next day gold price

Limitation:

- The data are collected only for 5 years.

IV. DATA ANALYSIS

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
Mean	2562.253	2565.731	2576.817	2562.236	2567.739
Median	2549.23	2548.19	2581.47	2549.78	2557.64
Maximum	2953.7	3072.46	3137.06	3011.34	2986.57
Minimum	2241.34	2232.04	2222.32	2231.87	2242.81
Std. Dev.	165.6157	168.8074	167.0725	168.0596	166.0639
Skewness	0.37585	0.456964	0.34262	0.360745	0.363138
Kurtosis	2.497147	2.704469	2.86091	2.501293	2.433564
Jarque-Bera	8.349528	9.418238	4.990852	7.852824	8.659996
Probability	0.015379	0.009013	0.082461	0.019714	0.013168
Sum	627751.9	628604.1	631320.1	627747.9	629096.2
Sum Sq. Dev.	6692568	6953012	6810822	6891543	6728840
Observations	245	245	245	245	245

This table represents descriptive statistics of daily prices of gold. It can be seen that highest price of gold is on Wednesday. The maximum volatility is also found on Tuesday (on the basis of standard deviation 168.8074). The value of skewness is not equal to zero on any day that means data is skewed. The value of kurtosis is greater than zero which indicates price of gold follow leptokurtosis. Leptokurtosis situation arises when high volatility period of financial markets are followed by relatively stable period. The result of Jerque-Bera test exceeds critical values of any reasonable significance level.

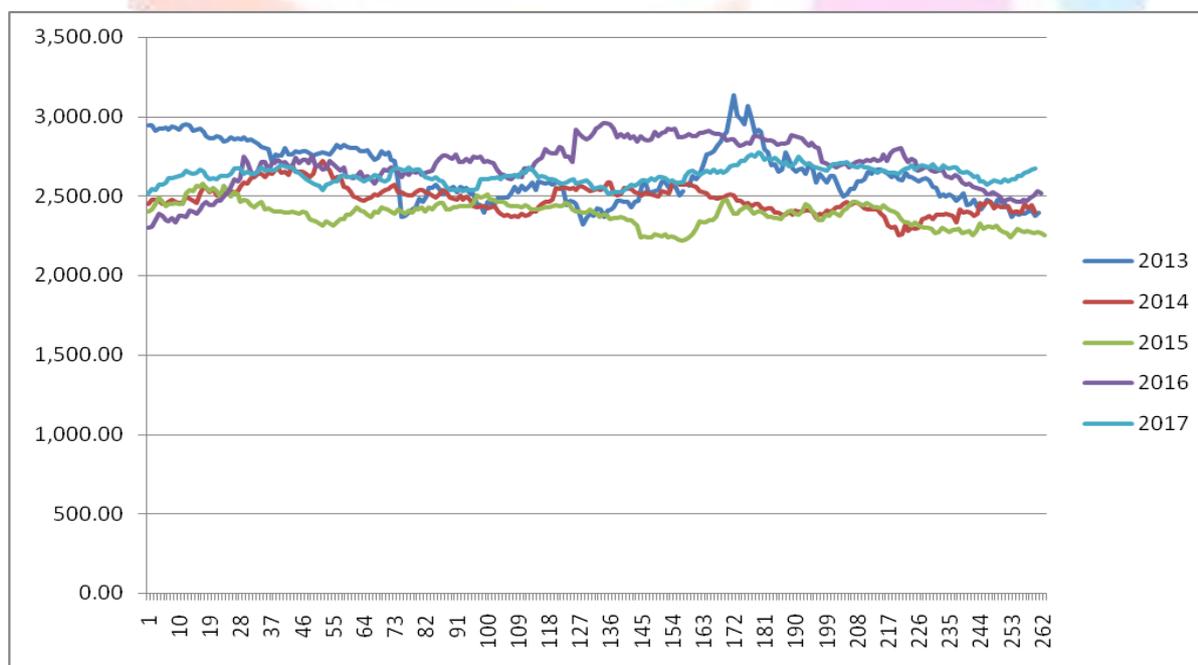
Pair wise Granger Causality Tests			
Date: 01/12/18	Time: 16:22		
Sample: 1	260		
Lags: 2			
Null Hypothesis:	Obs	F-Statistic	Prob.
TUESDAY does not Granger Cause MONDAY	256	4.16607	0.0166



MONDAY does not Granger Cause TUESDAY		142.715	4.0E-42
WEDNESDAY does not Granger Cause MONDAY	243	1.0495	0.3517
MONDAY does not Granger Cause WEDNESDAY		12.6896	6.00E-06
THURSDAY does not Granger Cause MONDAY	258	4.49144	0.0121
MONDAY does not Granger Cause THURSDAY		72.1216	2.00E-25
FRIDAY does not Granger Cause MONDAY	254	24.3014	2.00E-10
MONDAY does not Granger Cause FRIDAY		2.36336	0.0962
WEDNESDAY does not Granger Cause TUESDAY	243	5.65287	0.004
TUESDAY does not Granger Cause WEDNESDAY		0.39148	0.6765
THURSDAY does not Granger Cause TUESDAY	256	33.3486	1.00E-13
TUESDAY does not Granger Cause THURSDAY		7.51558	0.0007
FRIDAY does not Granger Cause TUESDAY	254	82.4715	3.00E-28
TUESDAY does not Granger Cause FRIDAY		2.02585	0.134
THURSDAY does not Granger Cause WEDNESDAY	243	0.44959	0.6384
WEDNESDAY does not Granger Cause THURSDAY		0.73714	0.4796
FRIDAY does not Granger Cause WEDNESDAY	243	6.15826	0.0025
WEDNESDAY does not Granger Cause FRIDAY		1.90188	0.1516
FRIDAY does not Granger Cause THURSDAY	254	39.9482	9.00E-16
THURSDAY does not Granger Cause FRIDAY		0.49054	0.6129

Null hypothesis are displayed in above output. Null hypothesis can be rejected if F values are more than 3.84. As null hypothesis rejected reversed will be accepted, in the very first example we can see that Tuesday do not effect on the Monday but reversed Monday does effect on the Tuesday. And other will also work accordingly.

Price of gold year wise



In the above chart there is comparison of 5 years (2013, 2014, 2015, 2016, 2017). We can clearly see that the price of gold is not fixed its fluctuate all the time. We can also see that in the year 2015



V. CONCLUSION & SUGGESTION

In very first observation Tuesday do not effect on the Monday but reversed Monday does effect on the Tuesday. Price of gold is different every day, in which the price of the gold is highest on Wednesday (3137.06)& lowest on Wednesday (2222.32).

From the above statistic we can clearly stated that the price is randomly fluctuated. But there is one cycle which go upward than downward, we can invest money when it is downward, so according to that cycle the price will go up. In India season like diwali, dhanteras, to purchase the gold is believed to be auspice. So the demand of gold will go high, so the price also goes higher. So always try to purchase gold when the price is low. The value of skewness is not equal to zero on any day that means data is skewed.

VI. SUGGESTION

- In the above study we have examined the day in which price of gold is high or low.
- So one can sell gold on Wednesday because price of gold is high. So it will give more price than any other day

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