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Gold Price Analysis using Chow Test

KEYWORDS: Gold Price, Chow Test, Investor, Financial Market, Indian Commodity Market

Thangjam Ravichandra
Assistant Professor, Department of Professional Studies, Christ University, Bangalore, India

Tushar Saini
Final Year Student BCOM F&A, Department of Professional Studies, Christ University, Bangalore, India

ABSTRACT *The study projects about the seasonal effect of gold across various years in Indian Commodity Market. There are several factors affecting the prices of gold which is been highlighted in the report. Moreover, a statistical tool is been used i.e. Chow test, which after analyzing proves that there is seasonal effect on the gold prices in India. Gold in India is a need for any occasions, regardless of the price and it is analyzed to find the effect of the price increase. It is been highlighted in the project the different level of price rise in different year and what could be the further predictions. After analyzing the Indian Commodity Market, certain observations are given in accordance to the findings of the study. Thus, the seasons are a big influential factor in the commodities and financial markets.*

INTRODUCTION:

Gold, like no other metal, has a fascinating history and a special place in the world. For thousands of years it has been used as an ornament, a currency and standard for global currencies, being called as a safer heaven, Gold is primarily a monetary asset and partly a commodity. Providing a market that is highly liquid in its nature, and extending an open window to be pledged easily during difficult timesfor securing financial accommodation. Diversified use of gold has lead to the increase in demand of the gold in jewelry, investment and industrial market segments, providing a good boost to the economy multiplier.Individuals are highly sentimental about the gold jewelry,coins and bricks in their possession. Acquisition of gold is considered auspicious and necessary factor for sense of wellbeing. It is a sign of purity.holding economic, religious and tradition values attached to it. Gold holds a value in almost every aspect of business, survival and wealth, gold is a supreme form of commodity an individual can hold and rely upon. Pure extracted gold is very soft and is hardened by adding copper alloy or other base metal. The gold content of gold alloy is measured in carats (k). Pure gold being designated as 24k. The scope of the gold is not only restricted to the physical purchase but also virtual domain. Gold is heavily traded in capital markets in form of various instruments such as ETF's, future contracts etc. It is traded on recognized exchanges such as MCX and NCDEX. The central banks of a country regulate physical Gold supply, also the central bank hold the largest deposits of gold with it. Gold is a great hedge against uncertainty and insecurity. In the near future gold ETF's (exchange traded funds) will gain much better edge over Mutual funds markets. Gold prices are also leading indicatorsof an economy functioning, usually when gold prices rise means the currency of a country weakens against its counter parts, this could be due to various factors such as increase in inflation and low interest rates over the long term investments etc. Investors with a portfolio of diversified assets may experience a decline of certain stocks and bonds and an increase in the price of gold in a struggling economy to generate optimum returns from investments.

REVIEW OF LITERATURE

There are various products of finance introduced in the market for wealth maximization i.e. derivatives, hedge funds, mutual funds, ETF's etc. The major stumbling blocksuch concepts are; that they all are exposed to systematic risk. The Indian Gold demand has recovered and gone up since start of 2010, in 2011 the nation saw jewelry and investment demand of 933.4 MT. In 2011, India was by far largest single investment market and accounted for 25% of the total bar and coin demand. India imported a record of 969 MT of gold in 2011(Source: MCX). Gulati &Mody (1982) studied the gold's price from 1972 to 1982 which was a period featuring large fluctuation in gold price, and concluded that the main factors of the fluctuations are: Inflationary expectation, exchange rate fluctuations and changes in interest rates. Dr.M.Jayanthi, T. Poongothai, R. Preethi (April 2014), in their paper on "An Investor's Investment in Gold: Physical Vs Paper" observed that for Indian's Gold is an important form of investment and it is more than just an asset. The study was concluded stating that for traditional, religious and prestigious value people prefers physical gold over paper gold. Chua et al.(1990) and Jaffe (1989) analyzed benefits of investment diversification in gold. Jaffe (1989) also concluded that gold gives an advantage in investment diversification. By conducting an empirical test BahramAdrangi et al (2003) studied the relationship between real gold returns and inflation. The main object of the study was to establish whether Gold acts a reliable hedge against inflation or not. To study the hypothesis the authors covered a period starting from January 1968 to December 1999 and concluded that there exist a positive relationship between expected inflation and real gold returns. Ismail et al(2009) reflects the fact that several variables like USD/Euro exchange rate , Inflation rate, Money supply (M1), NYSE Index, S&P Poor Index and US dollar index have an influence on gold prices globally.

STATEMENT OF THE PROBLEM:

Seasonality is observable in a wide variety of variables i.e in business, sales, production, inventory, man-hours and the best time to discount can be at least partially predicted by seasonal effects. Gold is no different. In different months price swings occur somewhat predictably year after year. The autumn effect can also be characterized by a higher unconditional and conditional volatility than in other seasons. The fluctuating in the gold price and the entire time hike in the gold prices has affected the Indian market and economy as a whole.

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OBJECTIVES OF THE STUDY

- To study the volatility of gold prices
- To study the effect of seasonal factors on the volatility of gold prices

HYPOTHESIS

Null hypothesis (H0):
There is no significant relationship between the dependent and independent variables of the equation, in the context of this study dependent variable being gold price and independent variable being the seasons.

Alternate hypothesis (H1):
There is a significant relationship between the dependent and independent variables, in the context of this study dependent variable being gold price and independent variable being the seasons.

ANALYSIS

Chow test is a test depicting structural change; it is a statistical analysis of coefficients in two linear regressions on independent data sets. It is a technique commonly used to verify the presence of structural break.

$$Chow = \frac{(SSE_1 - SSE_2)/J}{SSE_2/(T-K)}$$

Formula:
VI(i) For all observations:

Regression Statistics	
Multiple R	0.695818623
R Square	0.484163556
Adjusted R Square	0.475975676
Standard Error	13.68717268
Observations	65

ANOVA					
	df	SS	MS	F	Significance F
Regression	1	11077.66216	11077.66216	59.13173522	1.24544E-10
Residual	63	11802.33784	187.3386959		
Total	64	22880			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	-43.21028648	10.0550303	-4.297380036	6.10407E-05	-63.30366118	-23.11691177	-63.30366118	-23.11691177
X Variable 1	0.002944465	0.00038291	7.689716199	1.24544E-10	0.002179282	0.003709649	0.002179282	0.003709649

VI(ii) For the 1st half:

Regression Statistics	
Multiple R	0.97276074
R Square	0.946263458
Adjusted R Square	0.944344295
Standard Error	2.076852692
Observations	30

ANOVA					
	df	SS	MS	F	Significance F
Regression	1	2126.727121	2126.727121	493.0606929	2.56706E-19
Residual	28	120.772879	4.313317106		
Total	29	2247.5			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	-27.36183949	1.967171403	-13.90923	4.24285E-14	-31.39140744	-23.33227154	-31.39140744	-23.33227154
X Variable 1	0.001886873	8.49753E-05	22.20497001	2.56706E-19	0.001712809	0.002060937	0.001712809	0.002060937

VI(iii) For the remaining data:

Regression Statistics					
Multiple R	0.686642508				
R Square	0.471477934				
Adjusted R Square	0.455462114				
Standard Error	7.561512949				
Observations	35				
ANOVA					
	df	SS	MS	F	Significance F
Regression	1	1683.176223	1683.176223	29.43826342	5.25065E-06
Residual	33	1886.823777	57.17647808		
Total	34	3570			

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	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	154.3717585	19.6467721	7.857359857	4.66436E-09	114.4001001	194.3434168	114.4001001	194.3434168
X Variable 1	-0.003719694	0.000685569	-5.425703956	5.25065E-06	-0.005114494	-0.002324893	-0.005114494	-0.002324893

VI(iv) Calculations:
For Chow Test of the Gold Prices of 2010 till 2015

Fcal 16.78734542

p-value 0.000021

DISCUSSION:
The study proposes that the P value of 0.000021 is less than (<) 0.005.therefore we reject the null hypothesis which states that there is no significant event between the two variable and **select the alternative hypothesis which states that there is a significant relationship between the two presented variable, which for the purpose of this study is seasons and gold prices.**

General observations:
From the above generated results and observing the results of the chow test it is proved that the prices of the gold are affected on occurrence of an event (traditional, religious and societal events). It has also been observed that there significant increase in the prices in few months followed by less significant impact of the prices in some months. It have been noticed that the gold prices plunge high on certain months. In march, April the prices remains rigid and there is very less volatility in the price reason being the events being exclusive of the purchase of the gold as a traditional practice followed, the events such as mahashivratri, holi, ram navami, st. josephs day, easter, Good Friday. Such events do not have any relevance in buying of gold as a traditional practice. In the month of June and July, the gold commodity makes a significant addition to its value, as it is proved that markets perform well during the period of Ramadan and AkshayaTritya which is considered to be the best time for marriages and building relationship in the communities also is concerned with heavy purchase of gold. In the month of October, November and December the prices soar to the top most level as the occasions such as Dusshera, Karwachauth, Dhanteras, Diwali, New Year Celebration are celebrated in the stated months and as a fact all of the above stated occasions are concerned with the purchase of gold as a traditional practice. Ex. on the event of Dhanteras, purchase of gold is considered as a good omen. People greet each other with gold presents on Diwali and Karwachauth. New year are always awaited event people usually buy jewelries, pendants and gold items as presents for dear ones. The effect of increase in gold prices lasts till February till the occasion of Valentines Day, where love is defined in measure with the jewelries and gifts.

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