

A Study on Gold Prices Movement and Prediction

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Abstract

To analyze the effectiveness of factors like US Dollar rates, SENSEX and crude oil rates on the prices of gold and to predict the future prices of gold. The required data is of secondary nature and will be available through various sources like magazines, research papers and articles. Although we should note that gold price movements depend on many factors such as demand and supply, which affect. The regression coefficients only address the factor taken into consideration. Through the project it is understood that crude oil and gold rates have negative correlation, SENSEX and gold rates too have negative correlation. USD rates and gold rates however have positive correlation. Using regression analysis and correlation analysis will give us an understanding of how the gold rates fluctuate with crude oil, SENSEX and USD rates.

Keywords: Gold prices, Sensex, demand, supply, dollar rates, crude oil rates

Introduction

Gold plays an important role in the culture of India. This is because it is seen as both jewelry and an investment option that can be used in times of financial crisis. India is one of the largest consumers of gold. Although in recent years it has started to lose its worth. Since its price is going down people have started to purchase and keep them in hopes of getting substantial profit in hopes its price increases sometime in the future. Although gold cannot be viewed as the best investment option as it is unproductive. A bar of gold remains a bar of gold even after many years. The same money that a person is investing in gold can be invested in government bonds or common stocks which will give principal as well as interest. Or the same amount of money deposited in a bank will give interest in the coming years. Hence one can say its returns are lesser than that of other investments.

Traditionally gold played a major role during times of political and economic crises and during Stock Market crashes; where gold had responded with elevated prices and a source of hedge against all the inconsistencies in economy.

Gold was the fundamental currency of the money system in the past and then became a reserve tool that pegged to Dollar after the Bretton Woods agreement (Obstfeld and Taylor, 2017). After 1973 some European Countries permitted their trade rates drift against dollar and convertibility of dollar against the gold finished. Under these conditions gold lost the property of being a methods for trade and turn into an individual investment funds apparatus and a piece of Central Bank Reserves.

Usually there is always an increase in the demand for gold during the festive seasons and weddings and hence its price will go up .While the demand and supply for gold plays a big role in its price, there are also other factors that influence the price as well. They include inflation, crude oil rates, SENSEX, global movement, interest rates, supply and demand, ETFs, changes in dollar value and so on. Inflation, or the rising price of goods and services affect the gold prices. Increasing or higher levels of inflation leads to increase in gold prices, whereas decreasing inflation leads to decrease in gold prices. Hence inflation and gold prices have inverse relationship.

Inflation is almost always a sign of growth of the economy (Friedman, 2017). When an economy is expanding, the Federal Reserve to increases the money supply. Expanding the money supply decreases the value of the existing notes in circulation in the economy, making it more costly to purchase assets that are a seeming store of value, such as gold. Supply and demand is one of the most basic of the factors that affect the gold prices (O'Connor, 2015). An increased demand with a reduced supply of goods increases the price of that particular good or service. Conversely, an excessive supply of goods with low demand can lead to its reduction in prices.

Electronic-Traded Funds or ETFs influence the prices of gold. ETFs are basket funds investors can acquire which allow for an increased liquidity and the likely capability to spread their risks over a large number of assets for a minimum cost (Buckle et al., 2018). As the investment demand for gold changes, the price can be influenced by the buying and selling activity of ETFs. In 2016 the cash inflows of gold increased, which lead to the purchasing activity of ETFs to rise.

This purchasing activity likely had a positive impact on the gold prices. With the year 2018 being the year with the greatest fall in the value of gold, this study is conducted to analyze gold price movement and then predicting the future prices of gold. Gold is a precious metal which is used for making jewellery because of its malleable and ductile nature. It is also a good investment asset. It helps to preserve the buyer's buying power. Gold is known to have maintained its value throughout decades. As of data of 2017, the world's largest producer of gold was China which produced about 455 tones, followed by Australia which had produced 270 tones. The third largest producer went to Russia which mined 250 tones.

There are diverse techniques by which gold mining organizations are ranked. One is by their yearly production. Another is by their money cost per ounce, that is, how much cash it costs them to mine the gold. Precious metals industry requires large capital because building mines, production infrastructure and expenditures that are required for its long term survival all add to the costs. The most popular of the precious metals industries is gold. There are various factors that affect the prices of gold but demand and supply factors are among the most important ones.

If the Gold price reduces, demand for gold increases and SENSEX will also reduce (Jain and Biswal., 2016) If Gold increases, people will raise their investment in stock, so the SENSEX will rise. When the SENSEX goes up, the Rupee value strengthens against the US Dollar value and the prices of gold will start to decrease. The reason for this to happen is that most of the big market players invest in shares or gold. When the share market sentiments recover, they change their investments from gold to the shares. Hence, SENSEX and the gold rates are negatively correlated.

Literature Review

Koutsoyiannis (1983) found that the gold costs are influenced by the USA economy instead of worldwide monetary conditions. It is expressed that US dollar is the Exchange rate giving the universal liquidity, gold costs are communicated in US dollars and crude oil costs are cited in US dollars. Hence, a negative connection between US dollar and gold costs are found. Harmston (1998), tried the connection between UK, USA, France, Germany and Japan acquiring power equality and gold value vacillations somewhere in the range of 1870 and 1996. Results demonstrate that vacillations are found in the gold costs because of nation emergencies and

worldwide emergencies however gold keeps its obtaining power being utilized a store of significant worth. Gold serves a few capacity on the world economy, and its connection with monetary and macroeconomic factors are settled (Pierdzioch et al., 2014). Adrangi et al. (2003) reason that gold has a positive association with expected inflation there exists no association with sudden inflation.

Christie-David et al. (2000) pursued the news reports for 23 months somewhere in the range of 1992 and 1995 so as to demonstrate the impacts of macroeconomics news writes about gold costs. In this examination, pamphlets of different macroeconomic factors, slacked estimations of neighbourhood government bonds, future costs of gold and silver is utilized. Thus, it is discovered that all the valuable metal instruments are influenced emphatically by news about limit use rate. Gold costs influenced the news about maker value file, shopper value record and GDP and both gold and silver costs are influenced by the news about joblessness proportion. In addition, it is seen that news about spending shortfalls have no critical impact on gold costs. Smith (2001) investigated the association between gold expense and stock exchange esteem list using each day, step by step and month to month data beginning from 1991 to 2001. Four gold expenses and six stock exchange records were joined into the examination. A short run relationship was found in the relavant period between gold expense and stock exchange esteem record. Tully and Lucey (2007) investigated the impacts of some macroeconomic factors on gold expenses. In the 1984-2003 period, a relationship was found among step by step and future expenses of gold and US Dollar.

Objectives of the study

- To analyze the effectives of factors like US Dollar rates, SENSEX and crude oil rates on the prices of gold.
- To predict the future prices of gold.
- To provide suggestions, if any, based on the study conducted.

Research Methodology

The research methodology adopted will be descriptive in nature as the data available on gold prices, US Dollar rates, SENSEX and crude oil rates are always based on past statistics and future trends are uncertain. Suitable statistical methods and techniques will be adopted for arriving at conclusion based on statement of problem.

The data will be gathered from various sources such as Money control, BSE database, Weizmann Forex articles and Economic Times newspaper. The sample comprises of US Dollar rates, Crude oil rates, SENSEX with relation to the gold rates.

The required data is of secondary nature and will be availed through various sources like magazines, research papers and articles. The research study has been taken for the period 45 days. Studying of past data available from secondary sources and performing tabulation as per suitable statistical measures like regression analysis. Microsoft Excel Software package will be used to perform calculations and graphical representation.

Correlation analysis is a statistical method of analysis that is used to study the relationship between two variables. If a correlation is found out between two variables then that means that the change in one variable will lead to change in the other variable. It helps to express the relationship between variables. There are two types of correlation: Positive correlation This is said to exist when the increase in one variable leads to the increase in other variable. In other words those variables are positively correlated. Negative correlation It is said to exist when one variable decreases and the other variable increases. In other words they are negatively correlated. The research involves different factors like SENSEX rates, US dollar rates and crude oil rates affect gold rates. Hence regression analysis will be used to arrive at a conclusion. The research work will be performed on the basis of secondary data gathered from available sources, tabulated and analyzed as per the requirement of the research work under the guidance of mentor.

Results and Discussion

The research involves different factors like SENSEX rates, US dollar rates and crude oil rates affect gold rates. Hence regression analysis will be used to arrive at a conclusion. The research work will be performed on the basis of secondary data gathered from available sources, tabulated and analyzed as per the requirement of the research work under the guidance of mentor.

Regression analysis is used to determine the relationship between two or more variables where a change in the dependant variable is related to the change in one or more independent variables. Regression depicts how an independent variable is related to a dependant variable. It helps to predict the value of dependant variable based on the value of independent variable.

Table 1 Regression Statistics

Regression Statistics	
Multiple R	0.836416245
R Square	0.699592135
Adjusted R Square	0.692605906
Standard Error	34.58610046
Observations	45

Table 2 ANOVA

	df	SS	MS	F	Significance F
Regression	1	9542.612	9542.612	2.537933	0.118465499
Residual	43	161679.7	3759.993		
Total	44	171222.3			

Table 3 Regression Statistics

Regression Statistics	Value
Multiple R	0.934298963
R Square	0.872914553
Adjusted R Square	0.863615617
Standard Error	23.03754307
Observations	45

Using regression we have found out the values of the coefficients a, b₁, b₂ and b₃ in the regression equation.

They are as follows: a = 2021.07, b₁ = -12.045, b₂ = -0.0246, b₃ = 40.258

The standard error for each coefficients are 653.14, 1.6202, 0.004053525 and 1.958 respectively. As we know standard error is the estimation of measure of the accuracy of the predictions made using regression.

The t-stat (t statistic) is the coefficient divided by its respective standard error. Standard error is an estimation of the standard deviation of the coefficient.

The t statistic for: a = 3.0973, b₁ = -7.433, b₂ = -6.070 and b₃ = 4.9120

The p-value for each term tests then null hypothesis that the coefficient is equal to zero, which means no effect. The p values are: a = 0.003546, b₁ = 4.05E-09, b₂ = 3.44E-07 and b₃ = 1.49E-05

Table 4 ANOVA

	<i>Df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	119785.8	119785.8	100.1387	8.45E-13
Residual	43	51436.53	1196.198		
Total	44	171222.3			

Table 5 Correlation between gold rates and crude oil rates

	y	x2
Y	1	
x2	-0.84064	1

From the table we can note that the coefficients are

$$a = 3575.857545$$

$$b = -5.6142$$

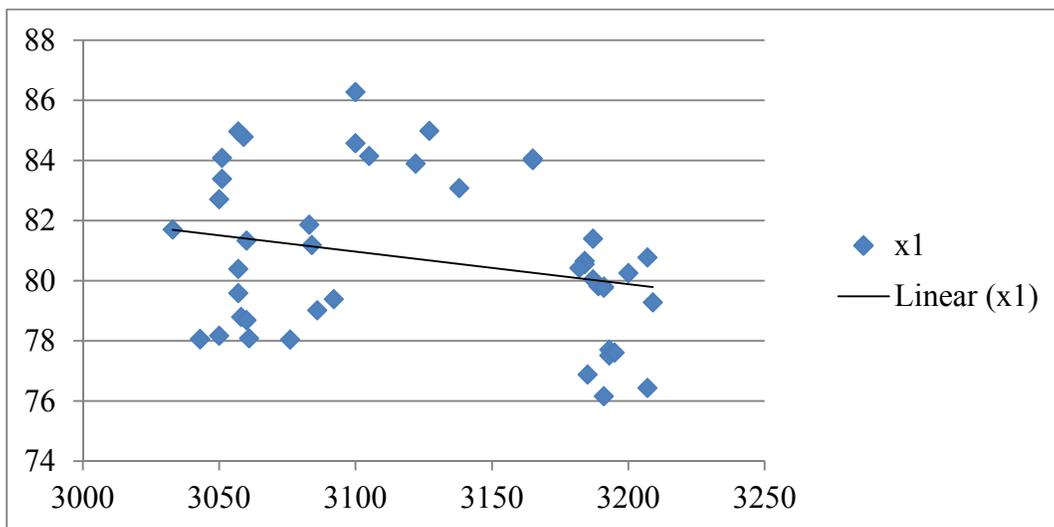


Figure 1 Correlation between gold rates and crude oil rates

Figure 1 shows the scatter diagram for correlation between gold and crude oil rates. Since the trendline slopes downward, they have negative correlation.

Table 5
gold rates and

	<i>Y</i>	<i>x1</i>
<i>Y</i>	1	
<i>x1</i>	-0.25792	1

Correlation between
SENSEX

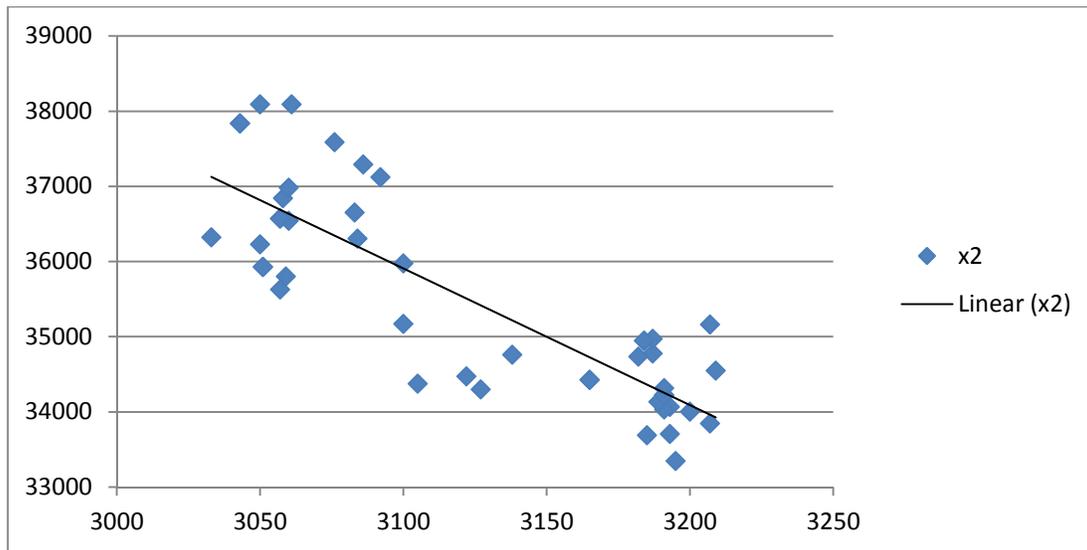


Figure 2 Correlation between gold rates and SENSEX

Figure 2 shows the scatter diagram for correlation between gold and SENSEX rates. Here the trendline slope downward. Hence they have negative correlation.

Table 6 Correlation between gold and USD

	<i>y</i>	<i>x3</i>
<i>Y</i>	1	
<i>x3</i>	0.624894	1

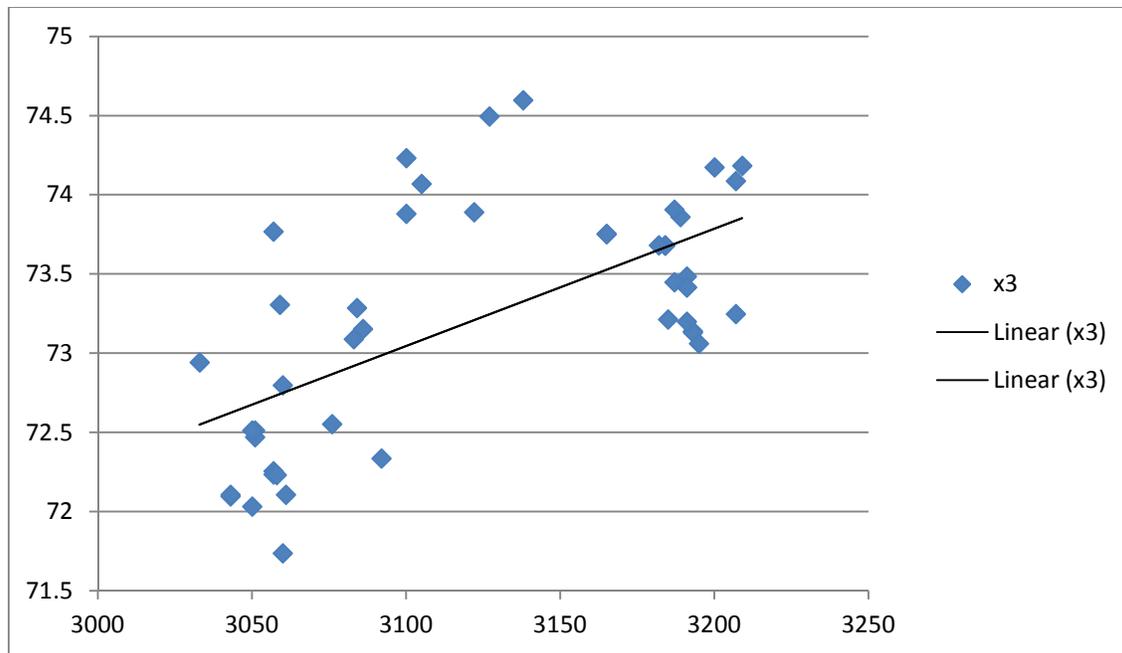


Figure 3 Correlation between gold rates and USD

Figure 3 shows the scatter diagram for correlation between gold and USD rates. Since the trendline slopes upward, they have positive correlation.

Using regression analysis we have found out how the value of gold fluctuates with changes in SENSEX, USD and crude oil rates.

Now we can predict the value of gold if the values of the other three factors are known. We just have to substitute the known values of crude oil, SENSEX and USD rates to find out the future gold rates.

$$Y = a + b_1x_1 + b_2x_2 + b_3x_3$$

This is the formula for regression that we used. Now x_1 , x_2 and x_3 represent the rates of crude oil, SENSEX and USD respectively. If their rates are known, it is easy to predict the gold prices using the above equation.

We have also found out regression analysis of gold with crude oil, gold with SENSEX and gold with USD rates respectively.

We also found out the correlation between gold and crude oil rates, gold and SENSEX, gold and it is evident that the correlation coefficient between gold rates and SENSEX is -0.84064. The correlation coefficient between gold rates and USD is 0.624894.

Conclusion

The Gold rates and USD rates have a positive correlation. Using MS Excel and regression analysis, we can find out the future gold prices. This can be done by substituting the other known variables into the regression equation. Since correlation coefficient between gold rates and crude oil is -0.25792, they have weak negative correlation. This means that they have an inverse relationship. So if the crude oil rates increase, the gold rates decrease and if the crude oil rates decrease, gold rates increase. Hence the increase in one leads to decrease in the other and vice versa. The price movements depend on many factors such as demand and supply, which affect. The regression coefficients only address the factor taken into consideration. The analysis will be based on the previous information and studies available and is limited to the specific objectives of the study. The correlation coefficient between gold rates and SENSEX is -0.84064. This means that gold rates and SENSEX have negative correlation. The variables move in opposite directions. Hence the increase in SENSEX leads to decrease in gold rates and vice versa.

The correlation coefficient between gold rates and USD is 0.624894. This depicts that gold rates and USD rates have positive correlation. Both variables move in the same direction. Hence increase in one of the variable will result in an increase in the other variable. This depicts that gold rates and USD rates have positive correlation. Hence increase in one of the factors will result in an increase in the other factor. Now we know how the gold rates fluctuate with change in crude oil, SENSEX and USD rates and also predict the future gold prices.

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