INTERNATIONAL JOURNAL OF ADVANCE RESEARCH, IDEAS AND INNOVATIONS IN TECHNOLOGY

ISSN: 2454-132X

(Volume2, Issue3)

Available online at: www.Ijariit.com

AN ANALYTICAL STUDY ON FORECASTING MODEL WITH SPECIAL ATTENTION TO GOLD PRICE

DHANALAKSHMI. P.M
Department of Statistics
SV University, Tirupati, India
dhanalaxmi.pari@gmail.com

P. R. S. Reddy
Department of Statistics
SV University, Tirupati, India

Abstract - A commodity with resonance is Gold. Gold is used as currency over the centuries. Gold is unique in nature due to its capability of being hedge in opposition to inflation. It has strong stability to withstand in financial crises and volatility. Although the social esteem that the gold business adds to social orders far and wide, particularly in poorer nations, is less apprehended and frequently distorted. As of late, the worldwide gold cost pattern has pulled in a great deal of consideration and the cost of gold has unnerving spike contrasted with recorded pattern. In times of vulnerability financial specialists consider gold as a fence against unexpected debacles so the fore-casted price of gold has been a subject of most elevated amongst all. In this research the primary focal area for examination is to add to a determining model for gold price in which this will be done through Box-Jenkins, ARIMA (Autoregressive Integrated Moving Average) and time series analysis model of forecasting. The main objective of this research is to investigate the factors which influencing gold price of the gold market. Data for analysis is collected from variable data sources in order examine the impact and contribution of factors on gold price. Based on identified factors, the gold price will be predicted for upcoming years.

Keywords - Gold, Time Series, forecasting model, ARIMA, Box-Jenkins, Gold Price

I. INTRODUCTION

Gold is one of the unique commodities on account of its store of worth potential and venture resource status. It is the main product which holds esteem amid times of money related and financial emergencies [1]. Irrespective of the length of time that the world economy stays dubious and financial specialists feel expansion and sovereign default, gold will keep its charm [4].

Gold is utilized as a fence against expansion and a place of refuge amid emergencies. Gold has additionally other recognized qualities. Its supply is aggregated throughout the years and its worldwide yearly physical creation can be as little as 2% of aggregate supply, subsequently as opposed to different items its yearly generation may not influence its cost as different components do. In addition, dissimilar to costs of bonds, the gold cost relies on upon future free market activity, and in this way it is forward-looking. A heap of other worldwide variables influence the cost of gold, which thus, can be principally characterized into six classes: The business cycle consider; the ostensible element; the loan cost figure; the ware calculate; the conversion scale market component; and the stock value element. As indicated by standard in the writing, one element is made in light of the primary key segment of every set or coalition of variables. Hence, for instance, for the business cycle element, we utilize the primary guideline segment of the four stationary and institutionalized variables. The business cycle element is spoken to by a monetary action variable, which is the mechanical generation of the first and second biggest economies, specifically the United States and China, and also for Japan and Europe. A change in this monetary movement will expand the modern and adornments requests for gold as an aftereffect of expanded world generation and salary [1] [6] [7].

At a large scale level, forecasting gold cost has a ton of uses in developing markets. Bullish patterns are normal for gold, for development of gigantic measure of obligation. The move by national banks to purchase Gold as of late in addition to late get in physical streams from West to East is proof to backing to this. Following the patterns in Gold costs and leading a value conjecture is pertinent from the perspective of Gold makers, speculators and different national banks on the planet. Being the second biggest buyer of Gold on the planet, 75% of Gold interest in India has taken the type of gems in the most recent decade [4].

The cost of gold has been rising step by step, the apprehension of the world economy have brought on the cost of gold to thunder. At the point when outside countries that hold billions of dollars in US obligation begins purchasing gold since they fear the estimation of the dollars will go down, the rising cost of gold turns out to be more than a curiosity [5]. Cost of gold can't be controlled. In any case it can be measured and forecast for future choices. Forecasting models in light of time arrangement information and relationship between progressions of different markers are extremely prevalent, since they are more viable and have less remaining blunders and estimate mistakes.

Forecasting is a procedure in administration to help basic leadership. It is additionally depicted as the procedure of estimation in obscure future circumstances. In a more broad term it is usually known as forecast which alludes to estimation of time arrangement or longitudinal sort information. The most prevalent model for this technique is presented by the Box-Jenkins model. Box-Jenkins has proposed the Time-series autoregressive incorporated moving normal (ARIMA) model for estimating. Like whatever other such strategies, it requires authentic time arrangement information on the variable under estimating. It expect that the future estimations of a period arrangement have an unmistakable and positive practical association with present, past qualities and background noise.

ARIMA offers a decent strategy for foreseeing the extent of any variables. The model has been effectively tried in numerous forecasting [2]. The examination between the estimated London day by day gold prices came about because of the Economic Research Center and ARIMA model has been finished. Their research concludes that exclusive straightforward ARIMA is ease and viably enough to foresee gold cost. Also, Box-Jenkins' ARIMA is generally used to foresee the future results for monetary or budgetary purposes [3].

II. LITERATURE REVIEW

Banerjee, D., (2014) "Forecasting of Indian Stock Market utilizing Time-series ARIMA Model" connected ARIMA model taking into account which she foresee the future stock records which affect the execution of the Indian economy. In her paper she initially decided the ARIMA display then she estimated the Sensex through model approval and toward the end the repeat acceptance was finished.

Abdullah Lazim (2012) tended to the estimating of gold bullion coin costs through ARIMA demonstrate and had finished up by proposing that the gold bullion coin offering costs are in upward patterns and could be considered as a commendable speculation. Wouter the loosen in his exploration paper "An audit on the determinants of the cost of gold" has referred to the distinctive components connected with the gold value variance.

Deepika M G, Gautam Nambiar and Rajkumar M (2012) attempted to think about the Forecasting of gold cost through ARIMA model and Regression however their finding proposes that reasonable model was not recognized to forecast Gold cost through ARIMA Model subsequently Regression investigation was done in the later piece of their study.

Shahriar and Erkan (2010) studied on worldwide gold business sector and gold value estimating. They dissected the world gold business sector from January 1968 to December 2008. They connected an adjusted econometric form of the long haul pattern returning hop and plunge dissemination model for determining normal asset ware costs. Assessments of element bounce and plunge as parameters were gotten utilizing the model.

Ismail, Yahya and Shabri (2009) built up Forecasting model for foreseeing gold value utilizing Multiple Linear Regression (MLR). They got four diverse models in light of a few financial variables. In this study Prais - Winsten system was utilized to appraise the relapse coefficients what's more; they discovered this system effectively tackling the issue of connected blunder terms.

To forecast the gold cost of Thai, two forecasting models, for example, Multiple-Regression, and Auto-Regressive Integrated Moving Average (ARIMA) are utilized. From the above two figure models, ARIMA was closed as the best model for determining gold cost in the brief timeframe. The result demonstrates that currencies of United States, Canada, Japan, Australia and British impacts gold cost of Thai [13].

ARIMA model can anticipate the future cost from authentic information. It doesn't give any hypothetical foundations. Various Regression with basic straight relapse strategy can be utilized to discover which elements in economy can influence the development of Thai gold cost. The month to month costs information beginning from Jan 1, 1998 to October 30, 2005. The outcome is found from Multiple Regression that fours elements altogether influence the change of Thai gold cost are World gold value, US-Thai swapping scale, Consumer Price Index and (911) terrorism in the United States [14].

Lawrence (2003) revealed that there is correlation existing between returns on gold and changes in variable e.g. inflation, GDP and interest rate. Sjaastad and Scacciavillani (1996) conducted study which reports that gold has value against inflation. Baker and Van-Tassel (1985) documented that inflation rate plays major role in gold price. Sherman (1983) tested the log of price of gold which is positively correlated with respect to inflation which may be anticipated and/or unanticipated. Kaufmann and winters (1989) explained that gold price is depends on changes in inflation rate of US.

III. Main Objective:

The main objective of this study is to forecast the gold price for the year of 2017 and 2018 by analyzing the identified influencing factors of gold price.

The factors such as Indian currency and NIFTY 50 value are chosen from the literature review for forecasting the gold price.

IV. METHODOLOGY

My study is based on secondary data collection method. The details of data collection are as follows. Since there was research carried out on forecasting of gold price for the years of 2004-2013. I have initiated my research from the year of 2014 for the forecasting process.

A. Data collection

In this study, the secondary data for predicting gold price is collected from **GOLD PRICE INDIA.COM** (Available at: http://www.goldpriceindia.com/). Data is collected for last 3 years: 2014-2015 and this year up to May 2016 [15].

The currency value is collected from the website free currency converter.

- For the year of 2014: Available at: http://freecurrencyrates.com/en/exchange-rate-history/USD-INR/2014/yahoo
- For the year of 2015: http://freecurrencyrates.com/en/exchange-rate-history/USD-INR/2015/yahoo
- For the year of 2016 (up to May): http://freecurrencyrates.com/en/exchange-rate-history/USD-INR/2016/yahoo [21]

A. Prediction of Previous year Gold Price

The value of NIFTY 50 is collected from Investing.com. Available at: http://in.investing.com/indices/s-p-cnx-nifty-historical-data [22].
After collection of data, we have analyzed the gold priced for the years of 2014 to May 2016 based on currency rate and share value (NIFTY50) of respective years. The obtained results are shown in the following figure 1-3.

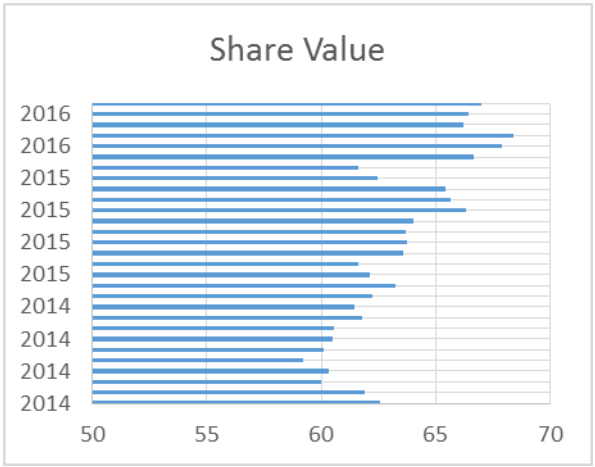

Fig.1 Share value range for the years of 2014 to May 2016.

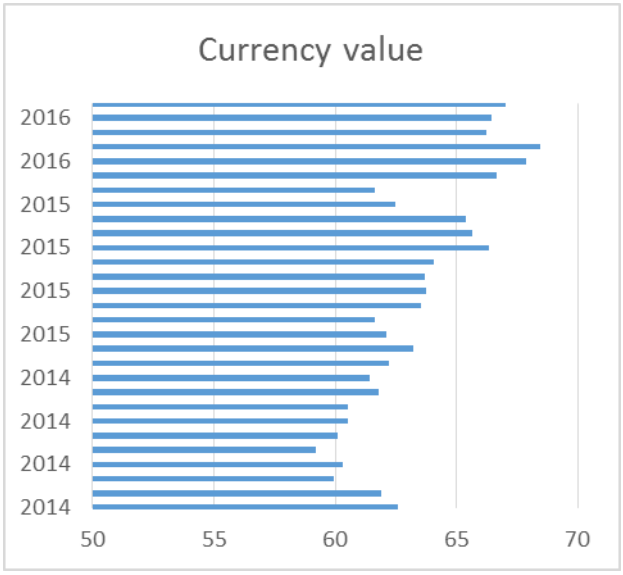

Fig.2 Currency value range for the years of 2014 to May 2016.

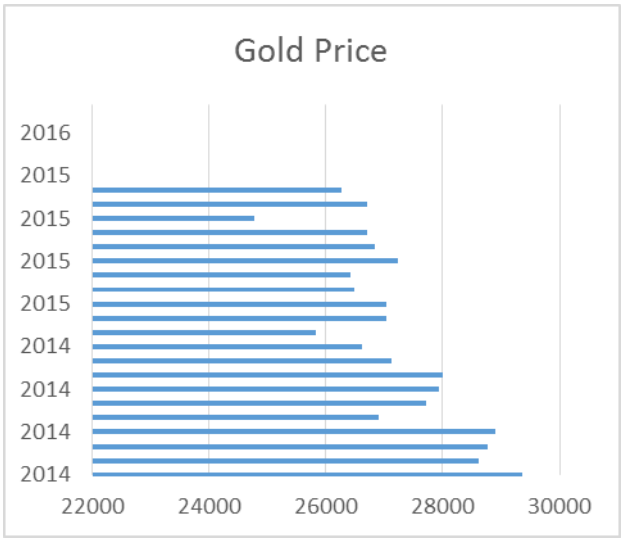

Fig.3 Gold Price range for the years of 2014 to May 2016

V. FUTURE FORECASTING

A. ARIMA MODEL

ARIMA is a time series technique for short run forecasting. ARIMA is an extensive tool which is widely used for forecasting process, since the advancement of statistical software. By considering the general model of ARIMA. I have proposed a new model for forecasting. Forecasting for the years of 2017 and 2018 was carried out using ARIMA MODEL – Auto Regressive Integrated Moving Average

B. Forecasting Approach in ARIMA:

Non stationary factor (i.e. changing Variable) - $Y_t = (1-2)^d X_t$ ..(1), where X_t is real number and t is an integer

Wide – Sense Stationary

$(1-\sum_{i=1}^{p}\phi : L)Y_t = (1+\sum_{i=1}^{q}\theta : L)\varepsilon_t$ ..(2), where L is Lag operator (converting one or two time series into new time series)

C. General ARIMA Model:

$(1-\phi_1 B-\phi_2 B^2-\phi_3 B^3(1-B)Y_t = (1+\theta_1 B)\varepsilon_t$ ..(3)

The above model (3) is simplified into the following model (4).

$Y_t = (1+\phi_1)Y_{t-1}-(\phi_1-\phi_2)Y_{t-2}-(\phi_2-\phi_3)Y_{t-3}-\phi_3 Y_{t-4}+e_t\phi_1 e_{t-1}$ ..(4)

D. PROPOSED MODEL:

$$Y_t = \left[\left(1+\frac{\phi_t}{X_{t1}\beta_{t2}}\right)Y_{t-1}-\left(\frac{\phi-\phi_2}{X_{t2-t1}\beta_{t2-t1}}\right)Y_{t-2}-.....-\left(\frac{\phi_t-\phi_{t-1}}{X_{tn-1}\beta_{tn-1}}\right)\right] .. (5),$$

Where X_t is share value, β_t is currency value, Y_t is gold price, and ϕ is regression factor.

VI. RESULTS

By the utilization of proposed model, I have predicted the gold price for the years of 2017 and 2018. The resulting graphs are shown below.

A. Forecasted Currency Value:

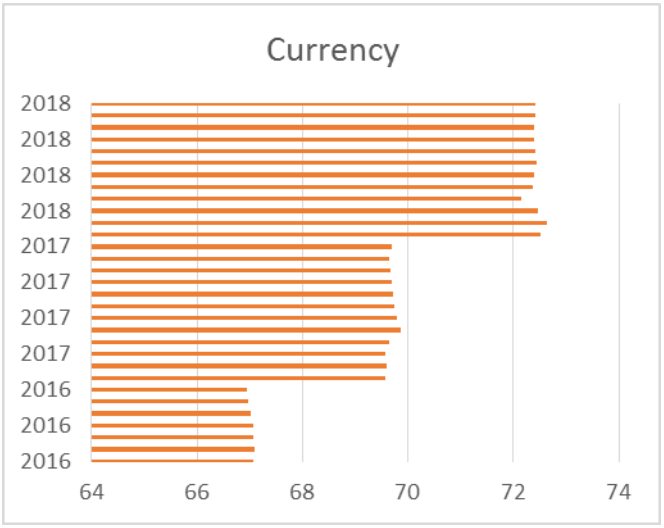

Fig.4 Predicted currency value for the years of 2017 and 2018

B. Forecasted Share Value:

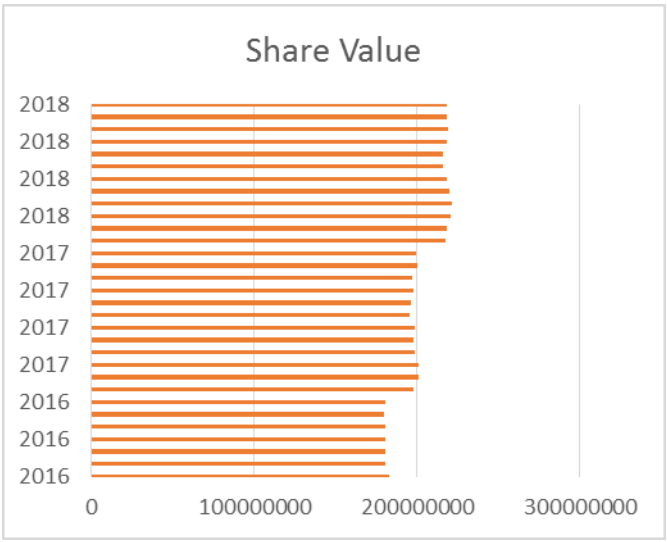

Fig.4 Predicted Share value for the years of 2017 and 2018

C. Forecasted Gold Price

The gold price was forecasted using currency value and share value by the proposed model. The resulting graph is shown in the following figure.

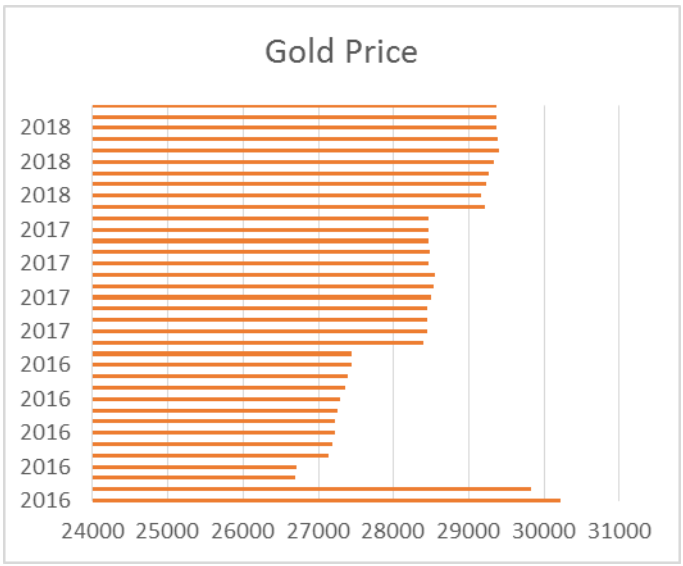

Fig.6 Gold Price range for the years of 2017 and 2018.

VII. CONCLUSION

I have forecasted gold prices and explained that the gold price has long term relationship with currency value and share value. In India, Gold is utilized as luxury material. Price of Gold increases when there is decrease in currency value and

share value, which results in increase in cost of gold. Hence, Gold is represented as good inflation hedge. I have found that the analyzed Independent variables enable to forecast the price of gold over years, when compared to other models. The maim implication of the result is that since Gold appears to be an applicable financial hedge and also in inflation hedge, government strategies to control the import of gold might be purposeless. Still the huge gold import is the reason for worry as they have kept India's present record shortfall high prompting weight on the currency value. My research recommends that strategies address the reasons for expansion and give elective venture chances for retail financial specialists might better serve the target of reducing gold imports.

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