

Gold Prices Movements and Predictions with Reference to Indian Context

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ABSTRACT --The purpose of the research is to forecast the gold price (IND), with the assistance of traditional method of Time Series, for example Box –ARIMA model, which gives us better outcomes for decision making, and furthermore helps the investors in forecasting the effectiveness of savings in the Gold Market. During this investigation the data of gold price from 2014 to 2019 have taken for examining the influence for predicting of gold price based on Time Series ARIMA (p,d,q) model. Forecasting is a capacity in the executives to help decision making. It is additionally described as the procedure of estimate in unknown future situations. In an increasingly broad term it is normally known as prediction which refers to estimation of time series or longitudinal type data. Gold is a valuable yellow product which can be convert into cash at any time. Time series ARIMA is the best technique for forecasting, modeling and characterization, all of which have been utilized in this investigation. For optimum accuracy Auto Correlation and Partial Correlation analysis have been utilized as a statistical support, and simultaneously. The rate of gold is keep on rising every day. So, by predicting the price of gold an individual can buy and invest his money on gold according to his suitability. The ARIMA model helps in finding the cost of gold in coming year. Research implication: people who are trading in different market share and people who are in the field of buying and selling of gold are also going to be benefited by this research. The findings of through ANIMA model the movement of gold price for coming next 5 years is predicted.

Keywords--Forecasting, Gold Price, Trade Deficit, ARIMA Model.

I. INTRODUCTION

Gold plays a vital function in the way of life of India. That is because it's miles seen as both earrings and a funding alternative that can be used in times of financial disaster. India is one in every of the most important consumers of gold. Although in current years it has started to lose it's really worth. Considering its rate goes down people have started to purchase and maintain them in hopes of getting giant profit in hopes its charge will increase sometime within the destiny. A bar of gold stays a bar of gold even after a few years. All over the world, during generations, gold is cash. The ancient logician Aristotle wrote that money has to be long lasting, divisible, consistent, and convenient and own price in itself. Gold meets each considered one of these characteristics. Traditionally gold played a first-rate position at some point of times of political and monetary crises and for the duration of inventory marketplace crashes; in which gold had responded with improved expenses and a supply of hedge in opposition to all of the inconsistencies in economy. Gold was the major cash of the cash framework previously and after that turned into a save tool that pegged to Dollar after the Bretton Woods understanding.

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Further down these instances gold misplaced the belongings of being a way of exchange and become a private financial savings device and part of important financial institution Reserves.

Commonly there's always a boom in the call for gold at some point of the festive seasons and weddings and as a result its fee will cross up even as the call for and deliver for gold plays a large function in its charge, there also are different elements that impact the price as nicely. They consist of inflation, crude oil rates, SENSEX, global motion, hobby costs, supply and demand, ETFs, adjustments in dollar fee and so on.

There are changing estimates of the total volume of gold mined. The purpose for the change is that gold has been mined for about a thousands of years. Another aim is that some nations are not mainly open about how much gold is being mined. In addition, it is hard to account for the gold output in illegal mining activities.

In December 2017 India's "Trade Deficit" broadened to its most noteworthy in over three years as higher import bills for gold and unrefined petroleum burdened rising fares, government information appeared on Monday. The exchange shortfall INTRD=ECI extended to \$14.88billion a month ago from \$13.83 billion in November 2017, information from the Ministry of Commerce and Industry appeared. The "Trade Deficit" has widened by about \$36.4billion in the initial 75% of the current monetary year to \$114.86 billion.

That could put pressure on the present record deficiency of Asia's third biggest economy. India, the world's third greatest oil shopper, sent in unrefined and refined items worth \$10.35 billion, around 35 percent over a year prior, to a great extent because of a spurt in worldwide oil costs LCOc1. Gold imports by India, is the second greatest buyer in the world of the valuable metal after China, flooded 71.5 percent to \$3.4 billion, the information appeared. The nation's abroad gold buys in December 2017 remained at 70 tons, up 40 percent from year prior, temporary information from valuable metals consultancy GFMS appeared. Generally imports during December 2017 rose by 21.12 percent to \$41.91 billion.

The costs of gold are determined by different factors other than demand and supply. The examination will investigate different variables like SENSEX, USD rate and unrefined petroleum rate and how they will influence the cost of gold. This study will help in predicting the exact or closely gold price in near future.

II. LITERATURE REVIEW

Smith (2001) explored the connection amid gold cost and stock trade value list utilizing day by day, week after week and month to month information starting from the year 1991 to 2001. Four gold costs and six stock trade lists were incorporated into the examination. A short run relationship was seen in the relevant period between gold cost and stock trade value file. The gold costs are influenced by the USA economy instead of overall 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. In this manner, a negative connection between US dollar and gold costs are found (Koutsoyiannis, 1983). The connection between UK, USA, France, Germany and Japan obtaining power equality and gold value vacillations somewhere in the range of 1870 and 1996. Results demonstrate that changes are found in the gold costs because of nation emergencies and worldwide emergencies yet gold keeps its obtaining force being utilized a store of significant worth (Harmston, 1998). 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 covers gold costs. In this examination, pamphlets of

different macroeconomic factors, slacked estimations of neighborhood government bonds, future costs of gold and silver is utilized. Thusly, it is discovered that all the valuable metal instruments are influenced decidedly by news about limit use rate. Gold costs influenced the report about maker value list, shopper value record and GDP and both gold and silver costs are influenced by the report about joblessness proportion. In addition, it is seen that report about spending shortages has no critical impact on gold costs.

Tully and Lucey (2007) utilized an APGARCH model so as to examine influences of some macroeconomic factors on gold costs. In the 1984-2003 period, a relationship was found among day by day and future costs of gold and US Dollar. Mui and Chu (1993) utilized the consolidated time arrangement estimating strategy and a composite time arrangement gauging system to anticipate the cost of gold. They applied three weighting strategies (the customary equivalent weight [EW] technique, the variance covariance grid [VC] strategy, the chances network [OM] strategy) in the joined determining demonstrating. Contrasting the estimates produced by univariate investigation utilizing the ARIMA model, bivariate examination with joined gauges and multivariate investigation for composite figures, the creators reasoned that the consolidated determining models outflank the univariate model of ARIMA and the bivariate exchange capacity models, while the composite gauging model is prevalent. Ismail et al. (2009) suggested the Multiple Linear Regression (MLR) model for forecasting the future cost of gold. The MLR model depends on financial variables that impact the cost of gold, for example, swelling, money value developments and others. As far as forecast, the subsequent model accomplished a more significant level of prescient precision than the principal model. Khashei et al. (2008) Gold costs pursue a characteristic univariate time arrangement information and one of the strategies to figure gold costs is Box-Jenkins, explicitly the autoregressive incorporated moving normal (ARIMA) models. This is because of its factual properties, precise determining over a brief timeframe, simplicity of execution and ready to deal with non-stationary information. Regardless of the way that ARIMA is incredible and adaptable in anticipating, anyway it can't deal with the unpredictability and nonlinearity that are available in the information arrangement. Mandelbrot (1967) presented the fractal hypothesis. He noticed that fractal hypothesis as a relationship alluded to the likeness between the entire and the parts, has self-comparative attributes, is by and large steady and locally arbitrary and can't be portrayed by customary Euclidean geometry. As indicated by the hypothesis of the Mandelbrot fractal test, this paper proposes another test strategy that coordinates fractals and multi-fractals. Toda and Yamamoto (1995) technique for Granger causality test is generally increasingly effective in little example information measures and is especially suitable for time arrangement for which the request for coordination isn't known or may not be fundamentally the equivalent, or the request for joining is more than two. Another bit of leeway of this system is that it doesn't require the pretesting of the time arrangement for co-mix properties inasmuch as the request for combination of the procedure doesn't surpass the genuine slack length of the model.

Dooley, Isard and Taylor (1995) in their few exact examinations found that gold has informative power in foreseeing developments in return rates notwithstanding the developments in fiscal basics and different factors that enter standard swapping scale models. Sajaastad and Scacciallani (1996) inspected the connection between the gold cost and outside trade advertise for the period 1982-1990 wherein they discovered noteworthy impact of progress in European cash on the costs of gold where less impact of US dollar. They additionally found that among significant monetary forms changes in the genuine trade rates clarify practically 50% of the variety in the gold cost. Karunakaran (2011) found that in wake of money related emergency in 2008 national banks of rising and

propelled economies began aggregating gold as a piece of hold the executives by either purchasing new load of gold or by halting selling of their current supplies of gold. Hassani, et al., (2015) evaluated the suitability of diversities of prevailing forecasting techniques there was 17 methods at providing accurate and significant statistically forecasts for the gold price. Out of the 17 methods forecasting techniques evaluated 9 of forecasting methods are greater for their skill to provide a forecast which outperforms random walk. Though, none of them is capable to outperform the random walk at horizons of steps ahead from 1 and 9. The experiments show that based on the RMSE, exponential smoothing (ETS) achieves the best with ARIMA. Collaborative models was also used determining the forthcoming momentum of the gold and silver stock price, whether it will rise or decrease for the following relative to current days stock price. The usage of the hybrid stacking and bagging ensemble method, they got a significant accuracy of 85 percent for predicting gold stock. The model is accurate and is showing a significant result than numerous neural network methods (Mahato, 2014).

Aye et al., (2015), examined the probable factors inducing the value of gold. The benefit of using dynamic model selection is that it allows the model parameters and the set of predictors to adjust over time. The examination of data it was recognized that to obtain best prediction performance, we must allow model development and parameter evolution as supported by DMA and DMS. Kristjanpoller, Fadic and Minutolo (2014) suggested that and expert system, in specific the ANN-GARCH, which increases the accurateness of forecast prophesied by GARCH models. The proficient system is sensitive to behavior among variables such that the results improved forecasts.

The objective of the study:

1. To investigate which technique is best to predict the cost of gold for future.
2. To know the effect of rising of gold prices in the future by using suitable technique.

III. METHODOLOGY

Gold throughout the year has been one of the unpredictable metals and its cost has likewise observed to be continue rising in the financial market. Thus investors need to properly analysis this movement of the gold market before investing into such market. The goal of this investigation is to estimate this immense volatility of the eliminate with the assistance of ARIMA model. ARIMA model is a very effective tool and technique, automatically trends to find out the average of the fluctuation of costs of this metal over the time period. With the end goal of this examination we have utilized partial correlation, Auto partial correlation, along with ARIMA to analysis the movement of gold price (IND). Also, Statistical strategies utilized Commodity Forecasting, Time Series Analysis, and application of ARIMA utilizing of SPSS programming. This paper studies the secondary data. So for the prediction of gold price for the future we took the past data of last 5 years (2014-2019), current year (2019) and current year October 2019 into the consideration.

IV. DATA ANALYSIS AND INTERPRETATION

For this project the data of last 5 years (2014-2019), current year (2019) and current year October 2019 has been collected. The fluctuation in the prices of each month is recorded and in this past data we found that the price of the gold keeps up and down according to the season. In the further examine it is also found that there is no such

huge difference in the price of the gold from the January 2014 to December 2019. Taking this assumption into consideration, the data of last 5 years are analyzed and forecasted the price of gold for the future.

Table 1: Time Series Model

			Model Type
Model ID	Year	Model_1	ARIMA(0,1,0)
	GP_January	Model_2	ARIMA(0,0,0)
	GP_Febuary	Model_3	Holt
	GP_March	Model_4	ARIMA(0,0,0)
	GP_April	Model_5	ARIMA(0,0,0)
	GP_May	Model_6	Holt
	GP_June	Model_7	ARIMA(0,0,0)
	GP_July	Model_8	ARIMA(0,0,0)
	GP_August	Model_9	ARIMA(0,0,0)
	GP_September	Model_10	ARIMA(0,0,0)
	GP_October	Model_11	Holt
	GP_November	Model_12	Holt
	GP_December	Model_13	Holt

Table 1 represents the ARIMA model of time series model in January the result was ARIMA(0, 0, 0), February Holt, March ARIMA(0, 0, 0), April ARIMA(0,0,0), May Holt, June ARIMA(0,0,0), July ARIMA(0,0,0), August ARIMA(0,0,0), Sept ARIMA(0,0,0), October (Holt), November Holt, December (Holt).

Table 2: Model Summary

Fit Statistic	Mean	SE	Minim um	Maxi mum	Percentile						
					5	10	25	50	75	90	95
Stationary			-		-	-	-	3.280			
R-squared	.387	.478	5.313 E-18	.996	5.313 E-18	5.020 E-18	3.578 E-18		.910	.978	.996
R-squared			-		-	-	-	6.559			
	.328	.418	5.313 E-18	1.000	5.313 E-18	4.922 E-18	3.144 E-18		.788	.939	1.000
RMSE	1481. 639	637. 128	.000	2508. 563	.000	297.93 2	1231.2 88	1498. 651	1814. 004	2410. 083	2508. 563
MAPE	3.766	1.78 8	.000	6.686	.000	.800	2.975	3.493	5.131	6.545	6.686

MaxAPE	7.541	3.824	.000	14.992	.000	.909	5.302	8.465	9.203	13.541	14.992
MAE	1061.734	508.060	.000	1891.520	.000	227.196	826.187	948.638	1475.840	1838.624	1891.520
MaxAE	1992.626	955.361	.000	3713.600	.000	275.484	1467.258	2219.600	2447.885	3403.920	3713.600
Normalized BIC	15.131	.551	13.870	15.977	13.870	14.122	14.864	15.163	15.502	15.915	15.977

From the table 2 where the date is constant and value is variable we get R-square 0 .328 which is less than 1, this makes it clear that gold value can be predicted with the help of linear Time series model. The Table 3 represents the model statistics of January to December of the gold prices.

Table 3: Model Statistics

Model	Number of Predictors	Model Fit statistics			Ljung-Box Q(18)			Number of Outliers
		Stationary R-squared	R-squared	MAP E	Statistics	DF	Sig.	
Year-Model_1	0	.	1.000	.000	.	0	.	0
GP_January-Model_2	0	6.559E-18	6.559E-18	3.612	.	0	.	0
GP_February-Model_3	0	.996	.124	3.300	.	0	.	0
GP_March-Model_4	0	-5.313E-18	5.313E-18	3.164	.	0	.	0
GP_April-Model_5	0	-4.337E-18	4.337E-18	4.150	.	0	.	0
GP_May-Model_6	0	.892	.848	2.000	.	0	.	0
GP_June-Model_7	0	.000	.000	5.410	.	0	.	0
GP_July-Model_8	0	-1.843E-18	1.843E-18	6.334	.	0	.	0
GP_August-Model_9	0	-4.012E-18	4.012E-18	4.852	.	0	.	0

GP_September-Model_10	0	-2.277E-18	2.277E-18	6.686	.	0	.	0
GP_October-Model_11	0	.902	.800	2.960	.	0	.	0
GP_November-Model_12	0	.935	.775	2.990	.	0	.	0
GP_December-Model_13	0	.912	.721	3.493	.	0	.	0

Table 4: Forecast

Model		2019	2020	2021	2022
Year-Model_1	Forecast	2019	2020	2021	2022
	UCL	2019	2020	2021	2022
	LCL	2019	2020	2021	2022
GP_January-Model_2	Forecast	28574	28574	28574	28574
	UCL	32267	32267	32267	32267
	LCL	24880	24880	24880	24880
GP_February-Model_3	Forecast	30355	30710	31066	31421
	UCL	35760	36115	36470	36825
	LCL	24951	25306	25661	26016
GP_March-Model_4	Forecast	28440	28440	28440	28440
	UCL	32563	32563	32563	32563
	LCL	24316	24316	24316	24316
GP_April-Model_5	Forecast	29160	29160	29160	29160
	UCL	33735	33735	33735	33735
	LCL	24586	24586	24586	24586
GP_May-Model_6	Forecast	31300	32281	33262	34243
	UCL	33670	34698	35725	36751
	LCL	28929	29864	30799	31735
GP_June-Model_7	Forecast	28872	28872	28872	28872
	UCL	34230	34230	34230	34230
	LCL	23514	23514	23514	23514
GP_July-Model_8	Forecast	28484	28484	28484	28484
	UCL	35448	35448	35448	35448
	LCL	21519	21519	21519	21519
GP_August-Model_9	Forecast	29095	29095	29095	29095
	UCL	33795	33795	33795	33795

	LCL	24394	24394	24394	24394
GP_September-Model_10	Forecast	28804	28804	28804	28804
	UCL	35086	35086	35086	35086
	LCL	22523	22523	22523	22523
GP_October-Model_11	Forecast	32837	34244	35650	37057
	UCL	36799	38284	39768	41250
	LCL	28875	30203	31533	32864
GP_November-Model_12	Forecast	31452	32740	34027	35314
	UCL	35327	36697	38066	39433
	LCL	27577	28782	29988	31196
GP_December-Model_13	Forecast	31802	33161	34521	35880
	UCL	36572	37955	39337	40720
	LCL	27033	28368	29704	31039

Table 4 represents the forecast of the UCL (the upper control limit) and the LCL (the lower control limit) values of January to December from 2019 to 2022. The Table 5 represents the ARIMA model description of January to December of Model 1 to Model 12. .

Table 5: Model Description

			Model Type
Model ID	Jan	Model_1	ARIMA(0,0,0)
	Feb	Model_2	ARIMA(0,0,0)
	Mar	Model_3	ARIMA(0,0,0)
	Apr	Model_4	ARIMA(0,0,0)
	May	Model_5	ARIMA(0,0,0)
	Jun	Model_6	ARIMA(0,0,0)
	Jul	Model_7	ARIMA(0,0,0)
	Aug	Model_8	ARIMA(0,0,0)
	Sep	Model_9	ARIMA(0,0,0)
	Oct	Model_10	ARIMA(0,0,0)
	Nov	Model_11	ARIMA(0,0,0)
	Dec	Model_12	ARIMA(0,0,0)

Table 6: Model Fit											
Fit Statistic	Mea n	SE	Mini mum	Maxi mum	Percentile						
					5	10	25	50	75	90	95

Stationary R-squared	.500	.283	.077	.880	.077	.092	.265	.462	.820	.871	.880
R-squared	.500	.283	.077	.880	.077	.092	.265	.462	.820	.871	.880
RMSE	1462 .431	467. 297	660. 140	2538. 473	660. 140	771. 801	1136 .304	1426 .131	1727 .160	2309 .909	2538. 473
MAPE	3.29 5	.950	1.74 1	5.595	1.74 1	1.94 8	2.60 6	3.31 5	3.76 2	5.05 9	5.595
MaxAPE	6.74 4	2.33 0	2.30 8	11.90 7	2.30 8	2.93 2	5.89 8	6.60 8	7.45 6	11.0 32	11.90 7
MAE	927. 014	270. 204	492. 880	1563. 680	492. 880	536. 968	749. 580	912. 162	1078 .900	1423 .976	1563. 680
MaxAE	1841 .350	616. 601	662. 700	3065. 400	662. 700	859. 590	1495 .075	1719 .050	2324 .900	2859 .840	3065. 400
Normalized BIC	15.1 22	.669	13.6 29	16.32 2	13.6 29	13.8 97	14.7 08	15.1 68	15.5 52	16.1 08	16.32 2

From the above table where the date is constant and value is variable we get R-square 0 .500 which is less than 1, this makes it clear that gold value can be predicted with the help of linear Time series model.

Table 7: Forecast								
Model		2019	2020	2021	2022	2023	2024	2025
Jan- Model_1	Forecas t	29274.5 8	29508.1 7	29741.7 6	29975.3 5	30208.9 4	30442.5 3	30676.1 3
	UCL	33970.9 5	34204.5 4	34438.1 3	34671.7 2	34905.3 1	35138.9 1	35372.5 0
	LCL	24578.2 0	24811.8 0	25045.3 9	25278.9 8	25512.5 7	25746.1 6	25979.7 5
Feb- Model_2	Forecas t	30278.0 0	30633.2 0	30988.4 0	31343.6 0	31698.8 0	32054.0 0	32409.2 0
	UCL	35670.4 7	36025.6 7	36380.8 7	36736.0 7	37091.2 7	37446.4 7	37801.6 7
	LCL	24885.5 3	25240.7 3	25595.9 3	25951.1 3	26306.3 3	26661.5 3	27016.7 3
Mar- Model_3	Forecas t	30263.3 0	30871.2 0	31479.1 0	32087.0 0	32694.9 0	33302.8 0	33910.7 0
	UCL	34424.1 8	35032.0 8	35639.9 8	36247.8 8	36855.7 8	37463.6 8	38071.5 8
	LCL	26102.4 2	26710.3 2	27318.2 2	27926.1 2	28534.0 2	29141.9 2	29749.8 2

Apr-Model_4	Forecas t	31094.5 0	31739.2 0	32383.9 0	33028.6 0	33673.3 0	34318.0 0	34962.7 0
	UCL	35851.5 2	36496.2 2	37140.9 2	37785.6 2	38430.3 2	39075.0 2	39719.7 3
	LCL	26337.4 8	26982.1 8	27626.8 8	28271.5 8	28916.2 8	29560.9 8	30205.6 8
May-Model_5	Forecas t	31338.9 0	32320.0 0	33301.1 0	34282.2 0	35263.3 0	36244.4 0	37225.5 0
	UCL	33439.7 6	34420.8 6	35401.9 6	36383.0 6	37364.1 6	38345.2 6	39326.3 6
	LCL	29238.0 4	30219.1 4	31200.2 4	32181.3 4	33162.4 4	34143.5 4	35124.6 4
Jun-Model_6	Forecas t	31082.1 0	31818.8 0	32555.5 0	33292.2 0	34028.9 0	34765.6 0	35502.3 0
	UCL	36736.0 1	37472.7 1	38209.4 1	38946.1 1	39682.8 1	40419.5 1	41156.2 1
	LCL	25428.1 9	26164.8 9	26901.5 9	27638.2 9	28374.9 9	29111.6 9	29848.3 9
Jul-Model_7	Forecas t	30776.2 0	31540.4 0	32304.6 0	33068.8 0	33833.0 0	34597.2 0	35361.4 0
	UCL	38854.7 6	39618.9 6	40383.1 6	41147.3 6	41911.5 6	42675.7 6	43439.9 6
	LCL	22697.6 5	23461.8 5	24226.0 5	24990.2 5	25754.4 5	26518.6 5	27282.8 5
Aug-Model_8	Forecas t	31377.6 0	32138.6 0	32899.6 0	33660.6 0	34421.6 0	35182.6 0	35943.6 0
	UCL	35754.6 9	36515.6 9	37276.6 9	38037.6 9	38798.6 9	39559.6 9	40320.6 9
	LCL	27000.5 1	27761.5 1	28522.5 1	29283.5 1	30044.5 1	30805.5 1	31566.5 1
Sep-Model_9	Forecas t	32009.0 0	33077.2 0	34145.4 0	35213.6 0	36281.8 0	37350.0 1	38418.2 1
	UCL	37540.3 0	38608.5 0	39676.7 0	40744.9 0	41813.1 0	42881.3 1	43949.5 1
	LCL	26477.7 0	27545.9 0	28614.1 0	29682.3 0	30750.5 0	31818.7 1	32886.9 1
Oct-Model_10	Forecas t	32957.8 0	34364.4 0	35771.0 0	37177.6 0	38584.2 0	39990.8 0	41397.4 0
	UCL	36392.4 7	37799.0 7	39205.6 7	40612.2 7	42018.8 7	43425.4 7	44832.0 7

	LCL	29523.1 3	30929.7 3	32336.3 3	33742.9 3	35149.5 3	36556.1 3	37962.7 3
Nov- Model_11	Forecast	31588.8 0	32876.2 0	34163.6 0	35451.0 0	36738.4 0	38025.8 0	39313.2 0
	UCL	34874.1 8	36161.5 8	37448.9 8	38736.3 8	40023.7 8	41311.1 8	42598.5 8
	LCL	28303.4 2	29590.8 2	30878.2 2	32165.6 2	33453.0 2	34740.4 2	36027.8 2
Dec- Model_12	Forecast	32010.9 0	33370.0 0	34729.1 0	36088.2 0	37447.3 0	38806.4 0	40165.5 0
	UCL	36391.7 0	37750.8 0	39109.9 0	40469.0 0	41828.1 0	43187.2 0	44546.3 0
	LCL	27630.1 0	28989.2 0	30348.3 0	31707.4 0	33066.5 0	34425.6 0	35784.7 0

Table 7 represents the forecast of the UCL (the upper control limit) and the LCL (the lower control limit) values of January to December from 2019 to 2025.

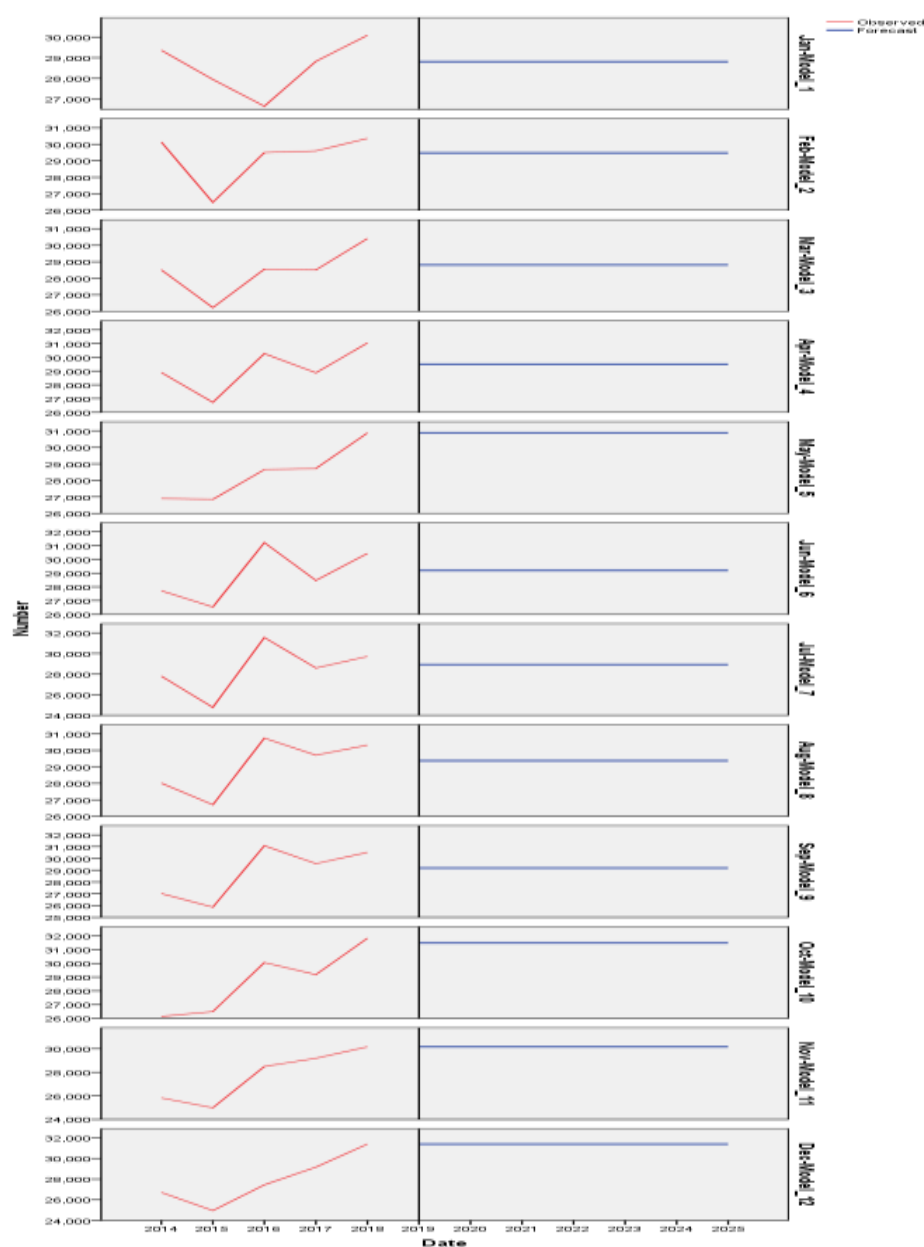


Figure 2: ARIMA Model

Figure 1 represents the ARIMA model of the gold prices 12 models were generated for each month January to December.

Table 8: Simple Model Description

			Model Type
Model ID	Jan	Model_1	Simple
	Feb	Model_2	Simple
	Mar	Model_3	Simple
	Apr	Model_4	Simple
	May	Model_5	Simple

	Jun	Model_6	Simple
	Jul	Model_7	Simple
	Aug	Model_8	Simple
	Sep	Model_9	Simple
	Oct	Model_10	Simple
	Nov	Model_11	Simple
	Dec	Model_12	Simple

Table 8 represents the model description of the simple model, from January to December , 12 different models were generated for 12 months.

Table 9: Model Fit

Fit Statistic	Mean	SE	Minimum	Maximum	Percentile						
					5	10	25	50	75	90	95
Stationary	.032	.526	-.993	.570	-.993	-.875	-.480	.240	.471	.555	.570
R-squared	-.063	.231	-.273	.285	-.273	-.264	-.233	-.186	.238	.282	.285
RMSE	1957.927	384.739	1406.541	2709.620	1406.541	1434.787	1672.944	1871.777	2211.171	2635.402	2709.620
MAPE	4.992	1.346	2.742	7.245	2.742	3.083	4.042	4.712	6.002	7.181	7.245
MaxAPE	10.427	2.660	6.984	16.979	6.984	7.327	8.905	9.445	12.197	15.576	16.979
MAE	1424.702	373.238	815.865	2064.826	815.865	894.592	1138.771	1395.641	1721.106	2026.433	2064.826
MaxAE	2865.678	652.318	2156.011	4205.739	2156.011	2158.803	2354.777	2632.468	3440.225	4026.983	4205.739
Normalized BIC	15.446	.388	14.820	16.131	14.820	14.859	15.166	15.391	15.724	16.074	16.131

From the above table where the date is constant and value is variable we get R-square -0.063 which is less than 1, this makes it clear that gold value can be predicted with the help of linear Time series model.

Table 10: Forecast

Model		2019	2020	2021	2022	2023	2024	2025
Jan-Model_1	Forecast	28805.78	28805.78	28805.78	28805.78	28805.78	28805.78	28805.78
	UCL	32972.38	33070.78	33166.96	33261.06	33353.22	33443.55	33532.15

Feb-Model_2	LCL	24639.18	24540.78	24444.60	24350.50	24258.34	24168.01	24079.41
	Forecast	29475.33	29475.33	29475.33	29475.33	29475.33	29475.33	29475.33
	UCL	34295.06	34352.92	34410.11	34466.65	34522.55	34577.84	34632.53
Mar-Model_3	LCL	24655.61	24597.74	24540.56	24484.02	24428.12	24372.83	24318.13
	Forecast	28810.42	28810.42	28810.42	28810.42	28810.42	28810.42	28810.42
	UCL	33396.96	33565.28	33727.84	33885.20	34037.83	34186.12	34330.43
Apr-Model_4	LCL	24223.88	24055.55	23892.99	23735.63	23583.01	23434.71	23290.40
	Forecast	29495.20	29495.20	29495.20	29495.20	29495.20	29495.20	29495.20
	UCL	34600.95	34737.93	34871.42	35001.68	35128.92	35253.36	35375.16
May-Model_5	LCL	24389.46	24252.48	24118.98	23988.73	23861.48	23737.05	23615.24
	Forecast	30869.63	30869.63	30869.63	30869.63	30869.63	30869.63	30869.63
	UCL	34774.81	36391.91	37632.82	38678.97	39600.67	40433.95	41200.23
Jun-Model_6	LCL	26964.44	25347.34	24106.43	23060.28	22138.58	21305.30	20539.02
	Forecast	29194.83	29194.83	29194.83	29194.83	29194.83	29194.83	29194.83
	UCL	35107.53	35204.05	35299.03	35392.57	35484.71	35575.52	35665.06
Jul-Model_7	LCL	23282.12	23185.61	23090.62	22997.08	22904.94	22814.13	22724.59
	Forecast	28916.44	28916.44	28916.44	28916.44	28916.44	28916.44	28916.44
	UCL	36439.55	36481.10	36522.43	36563.54	36604.42	36645.09	36685.55
Aug-Model_8	LCL	21393.33	21351.77	21310.44	21269.34	21228.45	21187.79	21147.33
	Forecast	29371.86	29371.86	29371.86	29371.86	29371.86	29371.86	29371.86
	UCL	34493.87	34583.29	34671.19	34757.66	34842.76	34926.56	35009.12
Sep-Model_9	LCL	24249.85	24160.44	24072.53	23986.06	23900.96	23817.16	23734.61
	Forecast	29187.14	29187.14	29187.14	29187.14	29187.14	29187.14	29187.14
	UCL	36023.38	36162.98	36299.84	36434.11	36565.94	36695.46	36822.78
Oct-Model_10	LCL	22350.90	22211.30	22074.44	21940.16	21808.33	21678.81	21551.49
	Forecast	31484.79	31484.79	31484.79	31484.79	31484.79	31484.79	31484.79
	UCL	37699.48	39717.14	41329.63	42712.88	43943.50	45063.03	46097.04
Nov-Model_11	LCL	25270.09	23252.43	21639.94	20256.69	19026.08	17906.54	16872.53
	Forecast	30157.99	30157.99	30157.99	30157.99	30157.99	30157.99	30157.99
	UCL	35429.75	37613.33	39288.85	40701.39	41945.86	43070.95	44105.58
Dec-Model_12	LCL	24886.23	22702.65	21027.12	19614.58	18370.11	17245.02	16210.39
	Forecast	31398.00	31398.00	31398.00	31398.00	31398.00	31398.00	31398.00
	UCL	37166.61	39556.05	41389.52	42935.22	44297.00	45528.14	46660.30
	LCL	25629.38	23239.95	21406.47	19860.78	18498.99	17267.85	16135.69

Table 10 represents the forecast of the simple model 12 different models were generated from 2019 to 2025 the forecast was done for the gold prices. Figure 2 represents the simple model for the forecast.

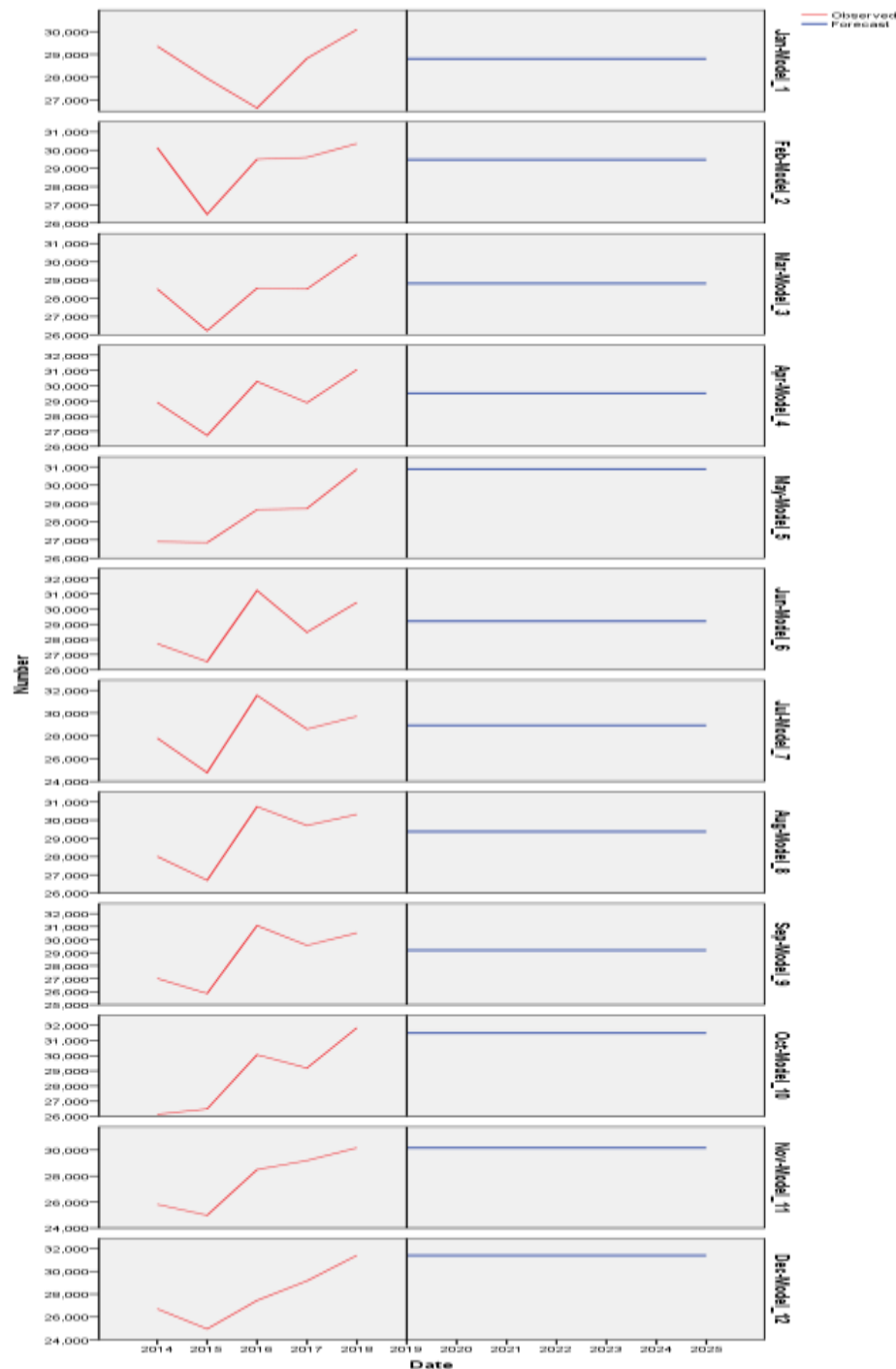


Figure 2: Simple model

V. DISCUSSION

The performance of hybrid of the most influential univariate time series, ARIMA models and predicting daily gold price data series. The data transformation step to address non stationary in variance. The empirical results of past 5 years (2014-2019), current year (2019) and last month (October 2019) gold price data series indicate that the ARIMA(1,1,1) model gave a positive results and effectively improved estimating and forecasting accuracy.

Thus, it suggests that there is no relationship among the expenses for distinct time periods. But even as thinking about the same term, Thus, the findings may have possible reasons that the gold charges are widely suffering from the diverse reasons which include restrained deliver and huge call for in a country like India. Therefore, supply and demand is the principle driving force of gold charges. Other vital factors that have an effect on gold fees are the global fees and the foreign money movements. It directly affects the expenses of the yellow steel. The price jumps up nowadays as compared to the other days and for that reason because of the unstable fee actions the investment opportunities for the buyers are narrowed down. Therefore, bond costs infrequently have an impact at the gold fees whereas the gold charges indirectly affect the bond prices.

Trend analysis was looked in to understand the price movements of the gold prices. The speculators bid up the prices of the asset gold past its intrinsic value and this resulted in plenty of people investing in gold. As the economic crisis hit within the year 2008, traders sought an asset that wouldn't be suffering from the marketplace fluctuations and they started investing in gold. These are the two reasons, the fees of gold improved inside the time-period of 2009-2011.

In 2013, gold expenses fell through 15%, it's the steepest fall inside the ultimate 30 years. Fears of devaluation in Quantitative easing are resulting in investors pulling out their cash and resulted inside the gold bubble burst. In 2014, gold costs remained constant for 12 months and took a bit dip in 2015 due to the growth price. The modern price of gold is 37,350 rupees. And the price fashion forecasted is somewhere along this fee variety. Therefore, this implies that the forecast has been accurate.

VI. CONCLUSION

Gold is a significant exchanged item and forecasting its cost, has significant implications financially as well as monetarily. In spite of the critical number of concentrates on gold and its value, the exact evaluating component in the gold market has not been deciphered. This paper examines the cost of gold by ARIMA model method. It has been indicated that ARIMA model have better outcomes. We have utilized gold value time series and the outcomes appear: In the research paper, the correlation between expenses has been studied. The rate of gold has been forecasted for the prevailing last 5 years and current year, for the investors who are interested in such prices. The different factors affecting each of the expenses have been considered and primarily based our study on it. The regression evaluation that has been performed, it could be noticed that there's no relation among the two expenses. This has additionally been proved in diverse different research papers. But when it has been seemed deeper and placed these two expenses beneath the granger causality take a look at, it can be seen that gold prices did have an effect at the bond fees, but the bond fees don't have an impact on the gold prices. The paper additionally forecasts the charges of gold year 2019 and the easy seasonal model. The paper also reveals that gold prices are laid low with the seasonality and they're repetitive in nature. This have a look at may be used in the destiny, for individuals who are eager on understanding what actually impacts the prices of gold. In the destiny we will take a look at the relationship of the way the economy of different nations have an effect at the prices of gold. During the period of worldwide monetary disaster, stock markets crashed but the gold rate continues to grow in India. The profitability of investing and trading relies upon at the predictability. If the path of the gold marketplace is effectively anticipated, the trader is probably higher guided and earns a safe return. The empirical findings are mainly critical

for coverage makers, hedge fund managers, international portfolio managers and gold exporters. The analysis of effects is also beneficial for investment selection making of investors as well. However, the future studies may be explored by way of the usage of an opportunity method which includes ANN and wavelet evaluation for improve

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