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Predictive Analysis for Gold Pricing in Indian Context

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Abstract

As blockchain technology has been perceived positively by the investors and financial intermediaries, we test it on the Gold trading platform. This research aims to identify the distributed networks need to build the blockchain for gold trading in Indian perspective by using machine learning algorithm. The study concluded that the automated data capturing system must from RBI, BSE, MCX for the national level network; for inter-national network data capturing from World Gold Council is needed. As Indian Gold prices are associated with only US-Dollar, Euro, Canadian Dollar, Swiss Franc, Chinese Renminbi, Thai- baht, Vietnamese dong, Egyptian pound, Korean won and Australian dollar, the predictive algorithm must include these currency prices, while integrating the Indian Gold price.

Keywords: *Gold Pricing, Price behavior, Price integration, integration of Gold prices.*

1. Introduction

The financial supply chain market using blockchain technology is growing at a Compound annual growth rate of 79.6 percent, and it is expected to be USD 7,683.7 million by 2022. The blockchain technology is widely used by Coins.Ph, Attores, Otonomos and Digix corporation in Southeast Asian countries for creating a platform for commodity trading. The blockchain network potentially reduce the middleman for the broad type of transactions and enable commodity traders to transcend conventional market barriers by ensuring timely settlement.

On the other hand, people from China, India, Thailand, and Indonesia love to own and invest in gold. They have conventionally purchased physical gold. In the year 2000, several alternative methods for physical gold trading and digital trading were introduced. They included the digital gold paper contract, ETF and gold savings accounts at the banks. The gold market is volatile and sporadic. Due to changes in tax reforms and changes in money laundering system introduced in India, the demand for the Gold in 2017 dropped to 91.5 metric tonnes as compared to supply of 111 tonnes in a previous year. In India, Gold derivatives option has been introduced by MCX. In international markets, Chicago exchange - CME Group Inc and Britain's Royal Mint have started testing a blockchain-based platform for trading gold. Past research works done in the US, identified the driving factors of gold pricing such as the price of Bitcoin, the de facto reserve currency, the rate of the U.S Dollar, Innovation, public perception and media response. However, the Indian perspective differs from American and European countries.

Digital gold could not be easily transferred into other forms of the asset. However, with blockchain technology, the gold storage system, and the process can be enhanced, and owners will be able to directly transfer their gold to other parties or use it to make payments.

In this context, the present research is motivated with the aim of creating distributed networks for blockchain in estimating the Gold price and thus enable to create a new platform for trading digital gold.

2.Methodology

To enable the blockchain supply network in Gold sourcing pattern, we must link the host network with the different modes of a private and public system. Hence, it is essential to identify private and public data warehouses which provide data for predicting the gold price. The data warehouse providers are listed based on the clients based distributed location. Clients dealing with gold are segmented based on their sourcing pattern from international, national and regional markets. Hence the research has been done in five stages.

- In the first stage, we identify the factors that are influencing the gold supply chain from the past empirical research findings.
- In the second stage, we empirically test the relationship between variables and gold price with econometric modeling.
- In the third stage, machine learning algorithms are established to predict the future price of gold and financial supply chain for each category of clients separately.
- In the fourth stage, a case study is conducted to check the integrity of data flow. We establish goodness of fit for predicting the gold demand gold price.
- In the last stage, we integrate the data warehouse providers who are supplying the value-based data for gold supply chain based on the above steps.

After determining the validity of the model using the case study, we finalize the data warehouse providers who are supplying the value-based prediction for the gold supply chain that enables the blockchain model.

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3 Stage I : Knowledge Gap in Literature in identifying Pricing Factors for Gold

Abke (1980) examined the economic theory of gold price movements in India. The research concluded that the speculative system in the gold market and consumer investment in gold has long been the reasons for price volatility. Dornbusch's (2000) study identified the contagion effect of gold price movements in the cross markets. The research concluded that weak countries' economic fundamentals, macro-similarities, and exposures to financial agents are found to increase the risk of sudden spillovers. The research conducted by Reeve' (2010) explored that the wealth derived from gold markets across the world was distributed widely because of reduced migration costs and low barriers to entry. The research concluded that trade colonization and environmental history are the endogenous factors that increased the world's gold supply. Shahzadi (2012) evaluated the impact of gold prices on Karachi Stock Exchange in Pakistan by using data of five years from 2006 to 2010 and concluded that the effect is equal to the changes in rate. Omag (2012) explored the relationship between gold prices and selected financial indicators in Turkey from January 2002 to December 2011 with a regression model. The results demonstrate that there is a definite relationship between national gold prices, Istanbul Stock Exchange 100 Index and the exchange rate between Turkish Lira and the US Dollar. Chang(2013) explored the inter-relationship among gold prices in five global gold markets, namely London, New York, Japan, Hong Kong and Taiwan. The research found that there was bi-directional causality between the London and New York gold markets. Malliaris (2013) explored the inter-relationships among the price behavior of oil, gold and the euro using time series and neural network methodologies. The findings quoted that the markets for oil, gold, and the euro are efficient but have limited inter-relationships among themselves. Singh (2013) explored the trends in gold prices and its demand between India and China. The research concluded that trends are in unidirectional. Pastpipatkul (2016) analyzed the dependency between the Thailand, Indonesia, and the Philippine (TIP) stock markets and gold markets using dynamic copula with the Markov-switching model with two regimes, namely high dependence and low dependence regimes. The result revealed that the Gold could serve as hedging, or a haven, for TIP stock markets during market downturns and upturns. Bukowski (2016) explored the relationship between Gold with other variables such as US$, EUR exchange rate, log return on S&P 500, Brent crude oil prices, 10-year Treasury bonds. The research proved the relationship exists in trend and not in price discovery.

The present research explores the pricing variables that need to fix the price of the Gold based on the demand trends and to set the automotive price fixing mechanism to enable blockchain network.

Table 1: Factors influencing Gold Price

Past Research Work	*Variables affecting the Price of Gold*
Kannan, R., & Dhal, S. (2008). India's demand for gold: some issues for economic development and macroeconomic policy. Indian Journal of Economics and Business, 7(1), 107.	*Interest rate, Exchange rate, Tax*
Vaidyanathan, A. (1999). Consumption of gold in india: Trends and determinants. Economic and Political Weekly, 471-476. *Kaufmann, T. D., & Winters, R. A. (1989). The price of gold: A simple model. Resources Policy, 15(4), 309-313.* *Sjaastad, L. A. (2008). The price of gold and the exchange rates: Once again. Resources Policy, 33(2), 118-124.*	*Exchange Rate*
Cai, J., Cheung, Y. L., & Wong, M. (2001). What moves the gold market?. Journal of Futures Markets, 21(3), 257-278.	*Consumer Index*
Shafiee, S., & Topal, E. (2010). An overview of global gold market and gold price forecasting. Resources Policy, 35(3), 178-189.	*Inflation*
Parisi, A., Parisi, F., & Díaz, D. (2008). Forecasting gold price changes: Rolling and recursive neural network models. Journal of Multinational financial management, 18(5), 477-487.	*Historical Prices*
Diba, B., & Grossman, H. (1984). Rational bubbles in the price of gold.	*Interest rate*
Bhunia, A., & Mukhuti, S. (2013). The impact of domestic gold price on stock price indices-An empirical study of Indian stock exchanges. Universal Journal of Marketing and Business Research, 2(2), 35-43. *Patel, S. A. (2013). Causal relationship between stock market indices and gold price: Evidence from India. IUP Journal of Applied Finance, 19(1), 99.*	*Capital Market's Index*

Past research work about the factors influencing the gold price movements concluded that Exchange rate, Interest rate, Capital Market's indices, inflation and historical prices of gold influences the price of Gold in the Indian context. Based on the findings of the research, we have included the exchange rate, inflation and interest rate as a first exogenous factor. As all there are reflected in exchange price of the currency, the exchange rate is considered. The historical price of gold is considered as the second factor. We further proved empirically the

relationship between the gold price prevailing in India with other countries with the help of data from World Gold Council in the second stage. The past researchers are also proved the Indian consumers are considering the Gold as the durable consumer product and for investment. These trends reflected by market capitalization of Consumer durable companies. The researchers concluded about the capital market indices are influencing the gold price. Hence, we explore the relationship between BSE indices and Gold prices to find out the index that reflects the price of Gold.

4.Second Stage: Empirical Results of Variables going along with Indian Gold Prices

The liberalization of Indian economy started in 1992. The Gold Prices for a period twenty-five years between 1st April 1992 and 31st March 2017 are collected from World Gold council organization. The monthly prices of Gold price movements are considered for the analysis. Hence 300 months price movements are included in the research. The Gold prices of eighteen countries apart from India are observed. The entire European Union is considered as a single unit based on the Euro value. Table-2 shows the countries and the currencies included in the research.

Table-2: Global Markets of Gold and Currency

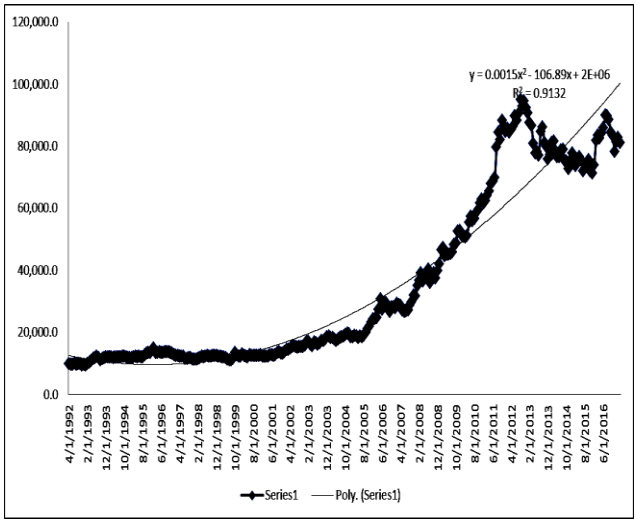
Sl.No	Country& Currency	Sl.No	Country & Currency
1	US , Dollar	10	Indonesian Rupee
2	Euro (European union)	11	UAE Dirham
3	Japanese Yen	12	Thai Baht
4	UK, Pound sterling	13	Vietnamese Dfong
5	Canada, Dollar	14	Egyptian Pound
6	Swiss, Franc	15	Korean Won
7	China, Renmimbi	16	Russia, Ruble
8	Turkey, Lira	17	South Africa, Rand
9	Saudi Arabia, Riyal	18	Australia, Dollar

Gold prices are measured regarding national currency unit per troy ounce of Gold (one troy ounce is 31.1034768 grams).

The interrelationship between the Indian Gold prices and other countries are measured by identifying the co-integration of prices. Unit root test is performed to find out the stationary of Gold price movements in twenty-five years. Augmented Dickey-Fuller test and PP tests are used to identify the order of integration among various share prices. Johansen co-integration technique is used to estimate the number of co-integrating vectors among the mentioned variables. Granger causality between the Gold prices of different countries is identified. After that, Volatility spill-overs between Indian Gold prices with other countries are identified are identified with vector-error correction model.

The price of per troy ounce of gold in India increased by ten times during twenty-five years ending on 31st March 2017 (Source: World Gold Council). However, in case of US, the price of Gold from 1992 to 2017 increased by five times. Exhibit-1 shows the Gold price trend between 1st April 1992 to 2017.

Exhibit -1 Gold Price movements 1991-2017



The Gold prices are moving in a polynomial trend. However, after 2007 it moved up at the exponential level. Table-3 shows the descriptive statistics of the Gold price movements of the nineteen countries.

Table-3 Descriptive Statistics of Global Gold Prices (from April 1992 to March 2017)

Country/ Currency	Mean	Median	Maximum	Minimum	Std. Dev.
US Dollar	710.1	417.1	1771.9	256.1	462.5
Euro	570.7	336.7	1355.4	232.4	349.5
Japanese yen	72665.6	44530.4	151503.9	28313.0	41122.9
Pound sterling	445.9	253.9	1122.3	159.7	305.5
Canadian Dollar	835.7	537.0	1782.3	380.9	461.0
Swiss Franc	782.4	544.1	1638.8	387.1	370.3
Indian Rupee	35429.0	18530.6	95072.2	9502.1	28420.1

Chinese Renminbi	4952.0	3452.5	11321.4	1852.2	2749.3
Turkish Lira	1136.9	584.3	4522.6	2.2	1235.2
Saudi Riyal	2663.0	1564.3	6645.3	960.4	1734.6
Indonesian Rupiah	6630736.0	3908064.0	17642273.0	680891.0	5698761.0
UAE Dirham	2608.0	1532.1	6508.0	940.6	1698.8
Thai baht	23595.6	16521.3	54049.9	8383.0	14511.5
Vietnamese dong	12915409.0	6553658.0	36902806.0	3445595.0	10831351.0
Egyptian pound	4370.0	2497.4	22296.4	875.0	4086.7
Korean won	772093.5	464306.6	1982075.0	260939.2	536830.6
Russian ruble	22621.6	11851.6	92648.5	148.4	23671.8
South African rand	5986.4	3084.2	19370.1	947.4	5363.0
Australian dollar	875.3	573.1	1776.3	389.9	451.4

(Prices are quoted at respected countries' currency)

The relationship between the eighteen countries' Gold prices with Indian prices is measured with correlation coefficient. The correlation coefficient explains the con-current price volatility. A positive correlation indicates that both prices are moving in the same direction. Table – 4 shows the Correlation coefficient between the Indian Gold Prices and eighteen countries' Gold prices.

Table-4: Correlation among Gold Market Prices

Sl.No	Gold Price Correlation with Inter-Country Prices (Per Troy Ounce)	
1	US dollar	0.97
2	Euro	0.99
3	Japanese Yen	0.98
4	Pound Sterling	0.98
5	Canadian Dollar	0.99
6	Swiss Franc	0.96
7	Chinese Renminbi	0.96
8	Turkish lira	0.98
9	Saudi riyal	0.97
10	Indonesian rupiah	0.99
11	UAE dirham	0.97
12	Thai baht	0.98
13	Vietnamese dong	0.99
14	Egyptian pound	0.93
15	Korean won	0.97
16	Russian ruble	0.94
17	South African rand	0.98
18	Australian dollar	0.98

The result of the correlation indicates that the Gold prices of all the eighteen countries have the positive correlation among the Indian Rupees. This shows that the Golden standards and mechanism of fixing the prices of the Gold in the eighteen countries are same as in India. As the World Gold Council norms are followed in all the nineteen countries, the price variation on Global Gold market is having the direct impact on all the nations.

The non-stationarity among the share price movements are studied before studying the order on integration with other countries' prices. If non-stationary variables are regressed, it may lead to ambiguous inferences. The standard Augmented Dickey-Fuller (ADF) test was performed to assess the degree of integration of the prices in different exchanges. Augmented Dickey-Fuller coefficient (Dickey Fuller 1979) critical values were used for the unit root test. Lags length for the ADF unit root test was selected according to Akaike and Schwarz criteria (Verbeek, 2004). At first, unit root test was tested in the model with constant. The null hypothesis of trend stationarity is about the validity of a zero restriction. Testing the null level of trend stationarity involves regressing the series on a constant instead of a trend variable. The null hypothesis that '$\rho = 0$' is tested by ADF test. The lag length for the ADF test is determined by Schwarz Information criteria.

The critical value of ADF test, at 1% level of significance is --3.460453. The calculated value of ADF test (Gold Price of 25 yrs) is -0.061708 As the calculated value is higher than the table value, the null hypothesis is rejected. All the variables used in the empirical analysis have a statistic that exceeds the critical value of the test at the 99% significance level. ADF test signifies that the log price series of Gold is volatile and the prices have the non-stationary trend.

As the Indian Gold Prices are volatile, we wish to find out - whether the Indian Gold prices are dependent on other countries ' Gold Prices. It is important to test for pre co-integration among the variables of each equation to avoid the well-known spurious regression problem (Maddala and Kim, 1998). Since all of the mentioned variables were of the same order of correlation, it was necessary to test for cointegration in the system before fixing regression equation. Under this test, regression is performed to generate residuals which may be thought of as equilibrium pricing errors. It enables to estimate and test the equilibrium relationship among non-stationary series while abstracting from short-term deviations from equilibrium. The results of the Con-integration tests are mentioned in Table – 5.

Table -5: Cointegration of Prices

Sl.No	Country Specific Gold Price (Per Troy Ounce) in Respective Currency	Trace -Test	Max-Eigen Test	Cointegration
1	US Dollar	16.28	13.45	Yes
2	Euro	18.43	18.43	Yes
3	Japanese yen	11.52	11.25	0
4	Pound sterling	11.54	11.54	0
5	Canadian Dollar	18.96	18.95	Yes
6	Swiss Franc	15.65	14.52	Yes
7	Chinese Renminbi	19.625	18.34	Yes
8	Turkish lira	13.94	13.54	0
9	Saudi Riyal	16.32	13.45	0
10	Indonesian rupiah	8.46	8.46	0
11	UAE Dirham	16.30	13.45	0
12	Thai baht	21.26	21.24	Yes
13	Vietnamese dong	19.20	17.90	Yes
14	Egyptian pound	16.11	15.35	Yes
15	Korean won	19.35	16.87	Yes
16	Russian ruble	3.12	2.7	0
17	South African rand	8.22	8.21	0
18	Australian dollar	20.22	20.21	1

The critical values of Trace statistic at 5% level of significance are (Π0)18.39 and (Π1) 3.84. The critical values for Max-Eigen test are (Π0)17.14 and (Π1) 3.84. Both Trace test and Max eigen test are satisfied between the Indian Gold prices and Thailand's Gold price with the lag period of one month. There is a co-integration between the Indian Gold prices with ten countries' currency, i.e., US Dollar, Euro, Canadian Dollar, Swiss Franc, Chinese Renminbi, Thai baht, Vietnamese dong, Egyptian pound, Korean won and Australian dollar. Hence to fix the price of Gold between Indian Gold price with ten countries' currency, we can use the international gold price as supplied by World Gold Council.

Past researchers proved that there is a strong relationship between the Gold prices with the Stock indices. However, it has not been proved with the sector-wise indices. Hence, we explore the relationship between Bombay Stock Exchange indices with the Gold prices. We apply the same procedure used for identifying the relationship between Gold prices and Inter-country prices. The Gold prices and indices for the period from 1st April 2012 to 31st March 2017 are considered. The results are in the table -6.

Table 6: Correlation and Cointegration of Gold Price in India with BSE Indices

Index	Correlation with Gold Price	Co-integration with Gold prices (Lag 2)
BSE - Sensex	0.917	No
BSE Consumer Durables Index	0.955	No
BSE Metal Index	0.729	No
BSE Capital Goods Index	0.929	No
BSE Consumer Discretionary Goods and Services Index	0.927	Yes
BSE FMCG Index	0.933	No
BSE Oil and Gas Index	0.923	No
BSE Realty Index	-0.365	No

The result indicates that even there is a correlation between the Gold prices with seven sector-wise indices, there exist co-integration between Gold price and BSE Consumer Discretionary Goods and Services Index only. Hence to predict the Gold price for investment purpose, BSE's Consumer Discretionary Goods and Services Index can be considered as a basic variable.

5. Stage III :Price Prediction using Machine learning

We apply Supervised learning to predict the future price of the gold based on the five variables. (Output of the previous stages). The ability to predict the current price trend is necessary to the accurate estimation of future prices, not only can determining the pattern over the past period but provide a rough estimate of continued price movement. It can also prove useful in identifying a trend reversal (uptrend to downtrend, or vice versa). We have chosen to use simple linear regression with a least-squares cost function to fit a trendline over the last n days, by determining a line of the form.

$$y = ax + b$$

that minimizes

$$\sum_{i=1}^{n} (ax^{(i)} + b - y^{(i)})^2$$

A rate of change momentum measures the difference between the price on day x and the price n days before. The rate of change (ROC) is essentially normalized momentum; we use the following function.

$$ROC^{n}(x) = \frac{P(x-n)}{P(x) - P(x-n)}$$

We use momentum, and ROC to fit the trends, i.e., ROC > 0 represents an overall uptrend, and ROC < 0 represents a downward trend. We compare the rate of change over varying time periods: for instance, if 0 < ROC5(x) < ROC10(x), or 0 < ROC5(x) < ROC5(x 5), this may signal a weakening and potentially a reversal in the up-trend.

The ratio between ROC calculated over different time intervals (particularly ROCn / ROCm for m > n) is informative because it lends insight into how the change in price (similar to the first derivative of price) is changing over time (related to the second derivative of price).

We use the stochastic oscillator to determine overbought or oversold levels of Gold in a specified market. Overbought means that the price has increased significantly over a short period and it may be artificially high; this means that the underlying asset is overpriced and the market will soon adjust, bringing the price back down. The stochastic oscillator assumes that, in uptrends, prices will close near the upper end of the recent price range, and in downtrends, near the lower end. Adapting this to use the daily price fix rather than close prices, we calculate the oscillator on day x over and n-day period as follows:

$$L_n = \text{lowest price over the past } n \text{ days}$$
$$H_n = \text{highest price over the past } n \text{ days}$$
$$P(x) = \text{price on day } x$$
$$\%K = \frac{P(x) - L_n}{H_n - L_n} \times 100\%$$

In general, %K generates a buy signal if it is less than 20, or a sell signal if it is higher than 80.

Using the SVC model from sci-kit lear, We tried five variants of SVM: with the default RBF (radial basis function) kernel; the linear kernel with l-1 regularization; the linear kernel with l-2 regularization; and the polynomial kernel. We normalize all of the input features by scaling, setting.

$$X_j^{(i)} = \frac{X_j^{(i)} - \text{mean}_j}{\max_j - \min_j}$$

Ultimately, the highest accuracy that we were able to achieve with any kernel with or without normalization was 68.73%. The SVM predicted a positive label for every example. All variants of SVM displayed a strong propensity to favor predicting whichever class occurred more frequently in the training set (i.e., if X contain slightly more positive examples than negative, then Y test would include almost all positive predictions).

The variable identified from the past researches includes past Gold price in international markets, exchange rate, BSE Consumer Discretionary Goods, and Service Index and Regional price of the Gold in transaction place.

6. Case Study – Pricing for Gold Supply from Thailand

A case study for a transaction between Thailand and Bangalore in India has been identified and tested. A Gold Trader from Bangalore (South India) is ordering from a Gold trader from Bangkok in Thailand. The gold price per ounce of Gold must be fixed by a trader in terms Baht. The data of transaction was on 9th March 2017. The settlement date was on 21st March 2017. To validate the data source, we use the SPM tools and GARCH modeling. The accuracy of the estimation is measured with the help GARCH coefficient, R-Square value, Mean absolute error and Mean absolute Percentage error.

We predict the price of Gold in Bangalore using the following variables:

Table 7: Exogeneous Variables

Type of Variable	Name of the Variable	Period	Source Data base (Online Database)	Purpose
Dependent Variable	Gold Price in Bangalore	5 yrs	Jewellers' Association of Bangalore http://www.jab.org.in	The buyer of Gold is from Bangalore
Exogenous Variables	Gold Price in India	5 yrs	Spot Exchange MCX	Gold price derives from National level
Exogenous Variables	Exchange price of Thai Bhat	5yrs	Reserve Bank of India	Exchange rate is one of the influencing factor
Exogenous Variables	Gold Price in Thailand	5yrs	World Gold Council	The seller is from Thailand
Exogenous Variables	BSE Consumer Discretionary Goods	5 yrs	Bombay Stock Exchange	Past research shows that sentimental Values of stock market affects the Gold price

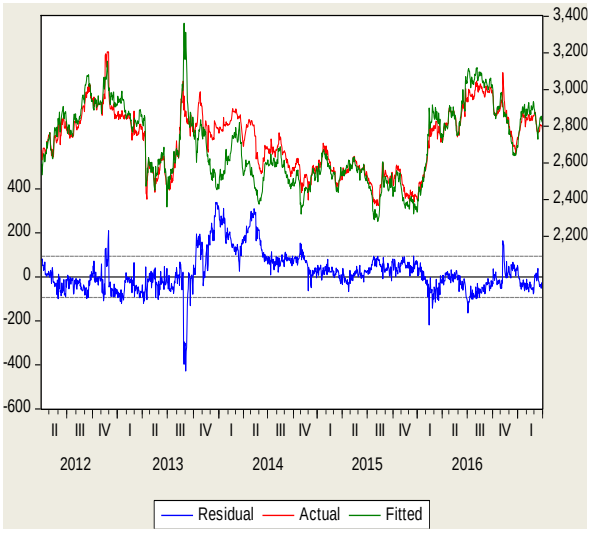
The results of the analysis based on estimation are tabulated as follows.

Table 8: Predictive Analysis

Variable	Coefficient	Std. Error	z-Statistic	Prob.
Gold Price in Indian Market (National)	0.045	0.000	143.270	0.0000
Consumer Discretionary Goods Index	0.931	0.051	18.1992	0.0000
Weighted Exchange Rate of Thailand Bhat on Gold Price	-0.039	0.000	-114.405	0.0000
Variance Equation				
C	3088.0	290.4	10.6312	0.0000
RESID(-1)^2	0.6231	0.097	6.36649	0.0000
GARCH(-1)	-0.1495	0.051	-2.91027	0.0036
R-squared	0.693454			
Akaike info criterion	11.14455			
Sum squared resid	10446384			
Mean Absolute Error	66.11			
Mean Absolute Percentage Error	2.31			

Exhibit-2 shows the predictive analysis' validity by comparing the forecast, actual value and the residual values.

Exhibit 2: Residual Analysis on Prediction

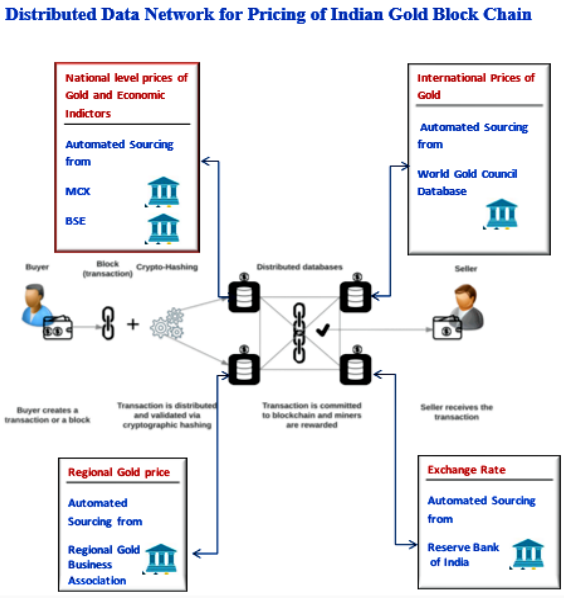


The results of the case study predict the price to be quoted by the exporter from Thailand with the accuracy of 95 percent in the particular transaction. Hence, we conclude that the source of data for the model stands good and the sources can be adapted for distributed networks.

7. Stage IV: Distributed Networks for Blockchain Network

Based on the results of the above stages, we prepare the distributed data networks to need to construct a blockchain for predicting Gold price using Machine language algorithm. Exhibit-3 depicts the distributed ledger data warehouse needed for Gold Price Predictive analysis for blockchain network.

Exhibit 3



As we empirically test the validity of source data, the machine learning prediction can be based on the data warehouse provider. The legal issues and data transferring mode must be addressed to link the blockchain activity. The sourcing algorithm (Data Capturing) must link the distributed ledgers based on the input criteria of the buyer and seller.

Findings and Conclusion

In India, the Gold is used primarily for ornamental values and investment purpose. Hence, while determining the price using the blockchain, it is essential to link the regional prices, national prices and market value of gold investments at the National level. In the National level, distributed ledgers in blockchain have to identify the automated data capturing from RBI for exchange price, BSE for Consumer Discretionary Goods index, MCX for historical prices of Gold and regional Gold associations. If the chain extends to international level, we have to include the currency exchange rate prevailing in the exporter/importers' country, in addition to the regional and national prices. There is a co-integration between the Indian Gold prices with ten countries' currency, i.e., US Dollar, Euro, Canadian Dollar, Swiss Franc, Chinese Renminbi, Thai baht, Vietnamese dong, Egyptian pound,

Korean won and Australian dollar. Therefore, the exchange rate of these currencies proves the goodness of fit in predicting the gold price. Automated machine algorithms must link the regionally distributed ledger for identifying price at the regional level. The semantic web ontology that integrates the buyer and seller will address the predictive pricing using Supervised learning algorithm. The past researchers proved that foreign exchange and capital market indices influence the Gold prices. With the help of case study, we linked the predictive gold pricing with exogenous variables such as exchange prices, index and --price prevailing in a host country. As the results are proved with 95% confidence level, the data from the respective data providers can be validated for fixing the price of the Gold using blockchain technology. The way of integrating the variables with data warehousing will create a transparent system of price determination of gold in India.

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