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STATEMENT OF THE PROBLEM
OBJECTIVES
HYPOTHESIS (ES)
RESEARCH METHODOLOGY
RESULTS & DISCUSSION
FINDINGS
RECOMMENDATIONS/SUGGESTIONS
CONCLUSIONS
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APPENDIX/ANNEXURE

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A STUDY ON CURRENCY FLUCTUATIONS IMPACT ON GOLD PRICE DETERMINATION IN SELECTED COUNTRIES (2005 TO 2015)

V. PRASHANTH KUMAR
ASSOCIATE PROFESSOR
MLR INSTITUTE OF TECHNOLOGY
HYDERABAD

K. SUHRULLEKHA
ASSOCIATE PROFESSOR
MLR INSTITUTE OF TECHNOLOGY
HYDERABAD

ABSTRACT
The present study has been emphasized on high gold imported countries in the world from 2005 to 2015. The project aim of the analysis is to identify the influence of inflation and currencies of the selected countries. The kendels bivariate correlation result reveals that Hong Kong, Korean, Mexico countries gold prices are strongly negative correlation with the international gold prices. The regression weight estimation indicates that the Singapore country currency failed to influence the its gold prices. The inflation of these countries is significantly influencing the gold prices. The vector auto regression predicted the British gold price is expected to go up comparing with other country gold prices. This project study will be useful to the investors of gold.

KEYWORDS
inflation, currency.

JEL CODES
P24, P44, E4.

INTRODUCTION
During the Gold Standard, gold's price depended upon its purchasing power and whenever there are paper currencies, they were measured against gold. However, the World Wars have resulted in paper currency inflation forcing all countries to abandon the Standard. That was when gold lost its role as currency. Then came the Bretton-Woods Accord of 1944, which made the US dollar convertible to gold at a fixed rate and establishing it as the world's reserve currency. The fixed rate of US dollar to gold has allowed the United States to inflate the paper currency without recourse. It was then set by decree by Franklin Roosevelt in 1934 that gold was worth $35 an ounce.

During the Great Depression Era, the US government needed increased spending in order to boost the economy. They did this through creating inflation so people would spend more. To create inflation, the government had to devalue the dollar but devaluing the dollar at the time did not necessarily lead to an increase in spending since gold was still considered as money. Therefore, Roosevelt forcedly declared that it was illegal to own gold in 1933, which made it free for him to print as much paper money as possible. During the time of 1933, the gold price was fixed at $20.67, which meant that $20 gold coin contained 0.9675 ounces of gold. After the declaration was made, citizens were forced to exchange their gold for paper money in dollars at this rate therefore leaving the government with abundance of gold. The next year, Roosevelt announced the gold price at $35 an ounce, which instantaneously devalued the paper dollars. We can see that the devaluing of the dollars will somehow have certain effects on the gold price and the government had full control over its price; whenever the reserve depletes, the government is able to devalue the dollar and vice versa.

Gold in other currencies work closely with how the currencies move in general. Its price in terms of any other currency is easily calculated by multiplying the dollar gold price by the exchange rate of the currency. An inflated currency will usually affect the gold price to go up; so for example, if there was an inflation of the dollar, which means less buying power, the gold price will go up. The gold price is always quoted in US Dollars since this currency has become the reserve currency of the world. This reserve currency came about rising from two reasons – one, it was convertible to gold and two, the dollar is in demand to settle international transactions since the United States holds the world's largest economy.

In the conference where Tun Dr. Mahathir suggested gold to become a currency, he also urged that gold be used to settle international settlement in the first place. Now that predictions are pointing to the weakening of the US Dollar, there are questions on whether the Euro could become the next reserve currency to control the economic situation. The introduction of the euro has made it level up with the dollar especially with the fact that Europe has its advantage of trade surplus as compared to United States' deficit condition.

Already in 2007, several countries have started to convert massive amounts of dollars to euro. We will see in the future that if demand for Euros rise further, the need for dollar will definitely decrease. This probably will end up in the massive increase of gold price but the question whether gold could become the worldwide currency is still unanswered. The emergence of gold to again become one of the important usages in the economic system has been enhanced with the advent of Islamic finance. This is because scholars who oppose the usage of fiat or paper money in today's world are strongly debating that gold should be the currency of the whole system regardless of location. This has been the case even before the coming of Islam, and in today's economic condition, there has been suggestions to go back to gold. One such suggestion was given by the former prime minister, Tun Dr Mahathir in an International Conference held in Kuala Lumpur. With his understanding of the exploitative nature of the current monetary system, he called for a return to the gold dinar so it would benefit more for the Muslims as it did in the times of the Prophet (pbuh). It is believed that with this system, Muslims could 'extricate themselves from the economic oppression and exploitation' (Hosein, 2007).

However, there are scholars who accept the use of paper money as long as it is backed by an asset, preferably gold. Why it is that gold is so much favored among the Islamic scholars? The answer lies within the characteristic of gold, which contains an intrinsic value or has a value in itself if compared to the paper money. The paper money wouldn't have any value if it were not backed by a certain asset since the value that is written on it is obviously not the value of the paper itself. Therefore, gold still wins over paper money in its characteristics. As Muslims, it may be easy to adopt this understanding when we have true faith without demanding any proof from the real economic data to show that gold could actually function well to serve the economy from the Quran and various Hadiths. However, in general, it is hard to persuade people into believing such thing when initially they do not believe the same thing as Muslims do.

Therefore, this study will try to use some relevant data to see how gold is actually performing and how far it could go from here. Many previous studies have delved into the movements of gold prices in connection to various other commodities, stock prices, and also to see which macro-economic variables actually gives bigger impact on gold. Most of them conclude that gold can function as a hedge against the dollar in most cases but none to the knowledge of the author has studied the movement of gold prices in terms of other currencies to see the correlation and volatility through different time frames and frequencies as used here with the wavelet technique. Therefore, this paper tries to show this through the pairing of various currencies in terms of gold price to see which of them tend to lead and lag in different time horizons.

OBJECTIVES OF THE STUDY

1. To study the relationship selected country's gold prices with international gold price.
2. To measure the inflation impact on gold prices of selected countries.
3. To credit the future movement of gold prices with currencies of selected countries.

SCOPE OF THE STUDY

The study as expected the price of 2005 to 2015 the following country currency for consider for the study process
Australian Dollar (AUD) - Australia
British Pound (GBP) - United Kingdom
Canadian Dollar (CAD) - Canada
Hong Kong Dollar (HKD) - Hong Kong
Japanese Yen (JPY) - Japan
South Korean Won (KRW) - South Korea
New Zealand Dollar (NZD) - New Zealand
Singapore Dollar (SGD) - Singapore
US Dollar (USD) - USA
Mexican Peso (MXN) – Mexico

NEED OF THE STUDY

Many previous studies have delved into the movements of gold prices in connection to various other commodities, stock prices, and also to see which macro-economic variables actually gives bigger impact on gold. Most of them conclude that gold can function as a hedge against the dollar in most cases but none to the knowledge of the author has studied the movement of gold prices in terms of other currencies to see the correlation and volatility through different time frames and frequencies as used here with the wavelet technique. Therefore this project tries to show this through the pairing of various currencies in terms of gold price to see which country gold influencing with inflation and currencies, so that the investors of these country's can take inform decision.

RESEARCH AND METHODOLOGY

This study is based on the currencies of different countries and the international gold price.
The source for secondary data are as follows

- Internet
- Magazines
- News papers
- Journals

In this research the following software's and tools were used for analyzing the data they are:

1. E-views Software

EViews (Econometric Views) is a statistical package for Windows, used mainly for time-series oriented econometric analysis. It is developed by Quantitative Micro Software (QMS), now a part of IHS. Version 1.0 was released in March 1994 and replaced MicroTSP. The TSP software and programming language had been originally developed by Robert Hall in 1965. The current version of EViews is 9.0, released in March 2015.

2. SPSS Software

SPSS Statistics is a software package used for statistical analysis. Long produced by SPSS Inc., it was acquired by IBM in 2009. The current versions (2015) are officially named IBM SPSS Statistics. Companion products in the same family are used for survey authoring and deployment (IBM SPSS Data Collection), data mining (IBM SPSS Modeler), text analytics, and collaboration and deployment (batch and automated scoring services) The software name originally stood for Statistical Package for the Social Sciences (SPSS), reflecting the original market, although the software is now popular in other fields as well, including the health sciences and marketing.

Kendall's Tau-b

The Kendall Tau Rank Correlation Coefficient is used to measure the degree of correspondence between sets of rankings where the measures are not equidistant. It is used with non-parametric data
The Kendall coefficient is denoted with the Greek letter tau (τ).
$\tau = (4P / (n * (n - 1))) - 1$
Where P is the number of concordant pairs and is calculated as the sum over all the items, of items ranked after the given item by both rankings.
Kendall is used with two ordinal variables or an ordinal and an interval.
Before computers were commonly available, Spearman correlation was often used as a substitute as it was easier to calculate. Kendall is now often viewed as being a superior metrics.
The measure is sometimes just referred to as 'Kendall's tau'.
The main advantages of using Kendall's tau are as follows:

- The distribution of Kendall's tau has better statistical properties.
- The interpretation of Kendall's tau in terms of the probabilities of observing the agreeable (concordant) and non-agreeable (discordant) pairs is very direct.
- In most of the situations, the interpretations of Kendall's tau and Spearman's rank correlation coefficient are very similar and thus invariably lead to the same inferences.

Bi- variate Correlation

Bi-variate correlation is a measure of the relationship between the two variables; it measures the strength of their relationship, which can range from absolute value 1 to 0. The stronger the relationship, the closer the value is to 1. The relationship can be positive or negative; in positive relationship, as one value increases, another value increases with it. In the negative relationship, as one value increases, the other one decreases.
Pearson's correlation coefficient when applied to a population is commonly represented by the Greek letter ρ (rho) and may be referred to as the population correlation coefficient or the population Pearson correlation coefficient. The formula for ρ is:

$$\rho_{X,Y} = \frac{\operatorname{cov}(X,Y)}{\sigma_X \sigma_Y}$$

where
cov is the covariance,
σ_X is the standard deviation of X.
The Spearman correlation coefficient is defined as the Pearson correlation coefficient between the ranked variables.
For a sample of size n, the n raw scores X_i, Y_i are converted to ranks rgX_i, rgY_i and r_s is computed from:

$$r_s = \rho_{\mathrm{rg}_X,\mathrm{rg}_Y} = \frac{\mathrm{cov}(\mathrm{rg}_X,\mathrm{rg}_Y)}{\sigma_{\mathrm{rg}_X}\sigma_{\mathrm{rg}_Y}}$$

where,

ρ denotes the usual Pearson correlation coefficient, but applied to the rank variables.

cov(rgX, rgY) is the covariance of the rank variables.

$\boldsymbol{\sigma_{rgX}}$ and $\boldsymbol{\sigma_{rgY}}$ are the standard deviations of the rank variables.

GRANGER CAUSALITY TEST

Granger causality test is a statistical hypothesis test for determining whether one time series is useful in forecasting another. A time series X is said to Granger-cause Y if it can be shown, usually through a series of t-tests and F-tests on lagged values of X (and with lagged values of Y also included), that those X values provide statistically significant information about future values of Y.

AUGMENTED DICKEY-FULLER TEST

In statistics and econometrics, an augmented Dickey–Fuller test (ADF) is a test for a unit root in a time series sample. It is an augmented version of the Dickey–Fuller test for a larger and more complicated set of time series models. The augmented Dickey–Fuller (ADF) statistic, used in the test, is a negative number. The more negative it is, the stronger the rejection of the hypothesis that there is a unit root at some level of confidence.

JARQUE-BERA TEST

Jarque-Bera is a test statistic for testing whether the series is normally distributed. The test statistic measures the difference of the skewness and kurtosis of the series with those from the normal distribution. The statistic is computed as:

$$\text{Jarque-Bera} = \frac{N}{6}\left(S^2 + \frac{(K-3)^2}{4}\right)$$

where S is the skewness, and K is the kurtosis.

The Jarque-Bera test is used to check hypothesis about the fact that a given sample S is a sample of normal random variable with unknown mean and dispersion. As a rule, this test is applied before using methods of parametric statistics, which require distribution normality.

Standard Deviation is a measure of dispersion or spread in the series. The standard deviation is given by:

$$s = \sqrt{\left(\sum_{i=1}^{N}(y_i - \bar{y})^2\right) / (N-1)}$$

where N is the number of observations in the current sample and $\bar{y}$ is the mean of the series.

Skewness is a measure of asymmetry of the distribution of the series around its mean. Skewness is computed as:

$$S = \frac{1}{N}\sum_{i=1}^{N}\left(\frac{y_i - \bar{y}}{\hat{\sigma}}\right)^3$$

where $\hat{\sigma}$ is an estimator for the standard deviation that is based on the biased estimator for the variance $(\hat{\sigma} = s\sqrt{(N-1)/N})$. The skewness of a symmetric distribution, such as the normal distribution, is zero. Positive skewness means that the distribution has a long right tail and negative skewness implies that the distribution has a long left tail.

Kurtosis measures the peakedness or flatness of the distribution of the series. Kurtosis is computed as

$$K = \frac{1}{N}\sum_{i=1}^{N}\left(\frac{y_i - \bar{y}}{\hat{\sigma}}\right)^4$$

where $\hat{\sigma}$ is again based on the biased estimator for the variance. The kurtosis of the normal distribution is 3. If the kurtosis exceeds 3, the distribution is peaked (leptokurtic) relative to the normal; if the kurtosis is less than 3, the distribution is flat (platykurtic) relative to the normal.

VECTOR AUTOREGRESSION (VAR) TEST

The Vector Autoregression (VAR) is an econometric model used to capture the linear interdependencies among multiple time series. VAR models generalize the univariate autoregressive model (AR model) by allowing for more than one evolving variable. All variables in a VAR are treated symmetrically in a structural sense (although the estimated quantitative response coefficients will not in general be the same); each variable has an equation explaining its evolution based on its own lags and the lags of the other model variables. VAR modelling does not require as much knowledge about the forces influencing a variable as do structural models with simultaneous equations. The only prior knowledge required is a list of variables, which can be hypothesized to affect each other intertemporally.

LIMITATIONS OF THE STUDY

1. The study had considered only 10 countries, which imports highest gold.
2. The present study had considered only two economic factors (currency and inflation).
3. The short term impacts may not be reflected due the annual average of variables in the study.

REVIEW OF LITERATURE

Gold price movements in selected currencies

(SharifahFairuz Syed Mohamad, INCEIF)

Investment in gold has been in demand for the past few years especially in hedging strategies. At the same time, various calls for gold to go back to its historical function even before the coming of Islam have been popular among Islamic scholars due to its characteristic of having intrinsic value as compared to the fiat money enhancing the argument for those supporting gold as a currency. Many studies have been dedicated to the relationships between gold and various commodities and suggesting gold as a hedge against the dollar. This study intends to see the relationship of selected currencies in the price of gold to see the movements and how gold has been performing in different sectors. The wavelet approach is used to show the different movements of paired currencies (US index-US Gold, US Gold-Euro Gold, US Gold-Ringgit

Gold, and Euro Gold-Pound Gold) in terms of their gold price in different time horizons (time scales). The findings of the study are of benefit to gold investors especially for diversification and investment purposes.

The main research objective of this paper is to see the relationship in terms of lead and lag times of the gold price in two different currencies at a time. This is to test whether it is true that:
1) The US dollars in terms of gold price follows the movement of the Dollar Index inversely
2) The Malaysian Ringgit follows the US Dollars in terms of gold price
3) The Euro follows the US Dollars in terms of gold price
4) The Pound follows the Euro in terms of gold price
Computations on volatility and correlation among the pairs will also derive information on whether there are any investment benefits of trading gold in selected currencies.

CONCLUSIONS

We have shown through the wavelet approach that gold in terms of different currencies move differently in different time horizons. From the correlations in this study, we have found negative relationships between the US Index and US gold price, between the US gold price and Malaysian Ringgit gold price and between the US and Euro gold price. Whereas only between the Euro and Pound gold price, we see a positive correlation that shows these currencies move together, which adheres to intuition. From these findings we can conclude that we cannot generalize that the US index will always influence the US gold price to move up and down, although at some point in time, they do actually look like one is the follower and one is the leader. And from the US-Ringgit relationship in terms of gold prices, we conclude that there are possible diversification strategies to benefit from which is indicated from the negative or low correlation. While for the stronger currencies, there is also room for the Euro to become the next reserve currency if it is true, as the speculators are seeing the down-going of US dollars and at the same time, its price in gold has been moving quite consistently with the US and Pound prices.
In terms of Islamic financial perspective, it can be said from this limited research that gold does have a bright future seeing that it allows for diversification of assets and minimizing risk with the right combination of currencies as for example the US and Ringgit prices of gold. At the same time, if demand for gold were to increase in the next years or so, there will be enhancement on the trading of gold in different currencies and thus could become a currency itself and possibly take over the fiat money era.

DATA ANALYSIS AND INTERPRETATION

OBJECTIVE 1

To study the relationship of selected country's gold prices with international gold price.

TABLE 1

Kendall's tau_b	AUS	BRITISH	CANADA	HONGKONG	JEPAN	KOREA	NEWZEALAND	SINGAPORE	USA	MEXICO	GOLD
AUS	1										
	.										
	132										
BRITISH	.328**	1									
	0	.									
	132	132									
CANADA	.811**	.321**	1								
	0	0	.								
	132	132	132								
HONGKONG	-.712**	-.195**	-.730**	1							
	0	0.002	0	.							
	132	132	132	132							
JEPAN	.650**	.146*	.669**	-.654**	1						
	0	0.013	0	0	.						
	132	132	132	132	132						
KOREA	-.716**	-.256**	-.751**	.818**	-.603**	1					
	0	0	0	0	0	.					
	132	132	132	132	132	132					
NEWZEALAND	.765**	.404**	.710**	-.643**	.548**	-.652**	1				
	0	0	0	0	0	0	.				
	132	132	132	132	132	132	132				
SINGAPORE	.743**	.389**	.832**	-.742**	.655**	-.743**	.723**	1			
	0	0	0	0	0	0	0	.			
	132	132	132	132	132	132	132	132			
USA	1.000**	.328**	.811**	-.712**	.649**	-.717**	.765**	.743**	1		
	0	0	0	0	0	0	0	0	.		
	132	132	132	132	132	132	132	132	132		
MEXICO	-.636**	-.281**	-.679**	.805**	-.587**	.767**	-.549**	-.699**	-.636**	1	
	0	0	0	0	0	0	0	0	0	.	
	132	132	132	132	132	132	132	132	132	132	
GOLD	.678**	0.052	.651**	-.731**	.666**	-.681**	.496**	.584**	.678**	-.655**	1
	0	0.378	0	0	0	0	0	0	0	0	.
	132	132	132	132	132	132	132	132	132	132	132

Interpretation

The above analysis of Kendall's tau-b (τb) correlation coefficient of bi-variate has been applied on select country gold prices. Hong kong korea mexico are the observed strongly negative correlation with gold the rest of the selected country prices are having positive correlation.

OBJECTIVE 2

To measure the inflation impact on gold prices of selected countries

TABLE 2

Model Summary	
Multiple R	0.972
R Square	0.945
Adjusted R Square	0.943
Std. Error of the Estimate	1.59E+04
Log-likelihood Function Value	-777.315

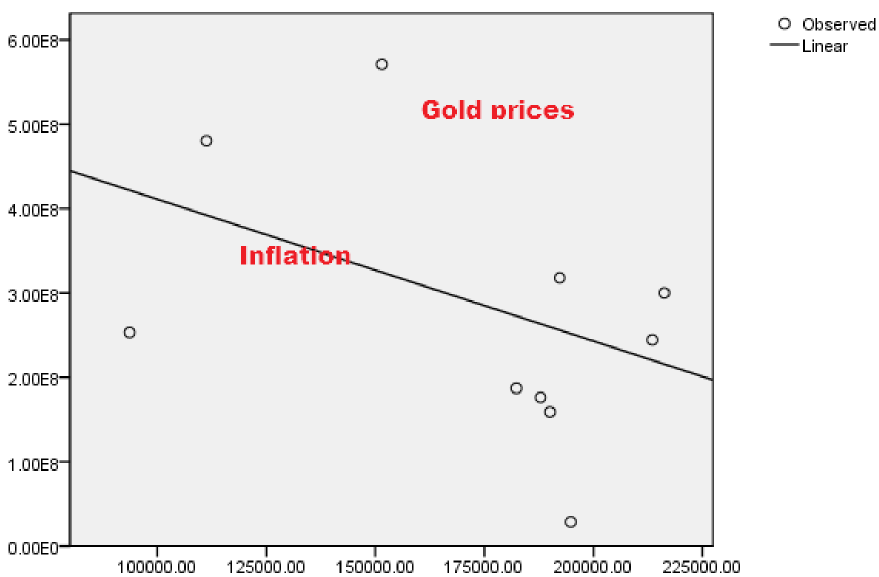
TABLE 3

	Unstandardized Coefficients					
	B	Std. Error	Beta	Std. Error	t	Sig.
(Constant)	1344.321	129.548			10.377	0
AUS	35.154	4.349	0.83	0.103	8.083	0
BRITISH	-15.005	1.283	-0.455	0.039	-11.694	0
CANADA	-19.458	5.53	-0.357	0.101	-3.519	0.001
HONGKONG	-1860.779	253.971	-0.358	0.049	-7.327	0
JEPAN	1014.329	182.905	0.272	0.049	5.546	0
KOREA	-16.442	4.234	-0.418	0.108	-3.883	0
NEWZEALAN	-66.365	3.684	-1.169	0.065	-18.012	0
SINGAPORE	0.081	4.804	0.002	0.096	0.017	0.987
USA	68.759	3.914	1.425	0.081	17.568	0
MEXICO	-591.804	271.934	-0.169	0.078	-2.176	0.031

Interpretation

The above analysis of regression weight estimation result reveals that probability values are observed to be significant which is > 0.05. The R square value is observed to be 94.5% > 60%. All the selected countries gold prices are influenced by the inflation except Singapore country's gold price.

GRAPH 1



Interpretation

The above graph depicts the inflation influence on gold prices of selected countries. The linear graph shows that the trend line of inflation is moving down, almost all countries gold prices influenced by the trend line, the observed values are fallen in scatered form.

OBJECTIVE 3

To predict the future movement of gold prices with currencies of selected countries.

TABLE 4

Gold	a	b	x	y
Aus	1069.945	-573.533	37.76225	-20588
British	1069.945	658.7438	5.043613	4392.394
Canada	1069.945	-958.838	44.44668	-41547.2
Hongkong	1361.68	2515.795	-11809.6	-3E+07
Japanese	1069.945	-645.727	3416.207	-2204867
korean	1758.491	2690.793	-85.9442	-229500
Newzealand	1069.945	-133.62	32.71326	-3301.2
Singapore	1069.945	-210.175	35.42283	-6375.05
Usa	1069.945	-572.713	37.74719	-20548.4
Mexico	1361.68	2419.752	-6537.11	-1.6E+07

Interpretation

The above table depicts the regression equation to predict the future movement of the selected countries gold price. The British gold future is observed to be higher than the current price. The selected nine highest imported countries gold future price is expected to go down side.

FINDINGS

1. The study observed that Hong Kong, Korea, Mexico currencies are strongly negative correlation with gold prices.
2. All the selected country currencies are significantly influencing the gold prices.
3. Singapore currency is not having the influence on its gold price.
4. The vector auto regression result indicates that the British gold price is expected to move up due to currency fluctuations.
5. The study observes that except British gold all the selected countries gold prices are expected to go down in near future.
6. The vector auto regression indicates that Japanese gold price will fall more than other country gold prices. The least effected country gold price will be New Zealand

SUGGESTIONS

1. The study has suggested to the investors of British to buy gold because regression equation predicted the gold price to go upside.
2. The present study emphasized on currency influence on gold price of top imported countries. It has been suggested to the gold investment community not to allocate majority investment in gold; instead, they can shift to other assets to maximize the portfolio returns.
3. Japanese gold price is going to experience lowest fall in gold price, hence the study suggest to the investors to give high priority to allocate in instead of equity investment.
4. The international gold price mainly depends on global economy future movement. The top global gold imported countries may rethink to import gold due to down fall of the prices.
5. The investments in gold will give returns in gloomy economy but if the global economy moves into stronger zone, and then the selected countries gold also will go down. The gold investors of these counties should be cautious.
6. The gold investors are suggested to observe the factors which may influence the currencies of these selected countries, so that they can take the inform decision.

CONCLUSION

The regression weight estimation analysis reveals that inflation is having the influence on the gold prices of the gold imported countries. The VAR model has been applied and found that British gold is expected to go up but rest of the 9 countries gold prices are expected to go down. The gold investors in these countries are advised to be cautious before they take the decision. The present study had considered only two economic factors; hence, there is a further research scope to do research in this area by considering the various factors, which will have the influence on currency and gold as well.

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