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An Empirical Study on Factors Influencing Gold Rate in India

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Abstract

The goal of the study is to identify the factors that consciously affect Indian gold prices. Due to its historical significance as a financial and cultural symbol in India, it is imperative to comprehend the primary factors influencing fluctuations in gold prices. Using a comprehensive methodology, the study combines market-specific and macroeconomic data to analyse the evolution of gold prices. The study begins by analysing earlier studies on the factors influencing the price of gold in order to pinpoint the crucial elements. The study also looks at the unique aspects of the Indian context, including local demand trends, festival seasons, and governmental regulations, inflation, interest rates, global market trends, exchange rate, investor sentiment and speculation as well as import/export rules. Knowing the factors influencing gold prices in India can aid in the forecasting of price fluctuations, the creation of suitable regulations by governments, and the making of educated decisions by investors.

Keywords

Gold bullion market, stock market, exchange rates, gold price, economic factor.

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1. Introduction

Gold is a comparatively dense, shiny yellow metal. In terms of corrosion, gold is remarkably resistant to oxygen and a wide range of other chemicals. Gold is a chemical element with the nuclear number 79 and the sign Au, and the softest and pliable metal known to man is gold which is dense, soft and shiny hence it represents cultures, memories, wealth, beauty and tradition **(Nisarga M & Nagendra Marisetty, 2023).** Gold is the preferred metal in dentistry and medicine due to its biocompatibility, and it has a rich and interesting history in a variety of sectors. It has become important in nanomaterials recently. Gold bullion is used by the government, mining firms, and businesses that deal with gold products as a risk management tool. Indians may not be wealthy, but they invest in gold in one way or another. Gold is a fundamental component of Indian culture since it is regarded as a quick convertible asset with significant potential for growth at any time. **(Indira C M & N. Mukund Sharma, 2024).**

Gold has traditionally been regarded as one of the most valuable metals, and throughout history, the value of various currencies has been set in relation to its purity (a practice known as the gold standard). In particular, jobs that combine these attributes have been associated with gold, which has been employed as a symbol for purity, value, and royalty in international transactions. **(Prerana Baber, Ruturaj Baber & Dr. George Thomas, 2019)**. In the global economy, gold has multiple uses, and its relationship to macroeconomic and financial factors is well-established **(Pierdzioch et al, 2014a, b).** Because of its monetary significance, central banks want to include it in their international reserves **(Gupta et al., 2014).** It can be made into jewelry and has industrial uses. Investors have historically utilized gold as a diversification and portfolio hedge as well as a refuge during periods of severe market instability, political unrest, and extreme economic turbulence **(Baur and Lucey, 2010; Baur and McDermtt, 2010; Lau et al., 2017; O'Connor et al., 2015).**

First, taking a look at some sample studies that forecast gold prices using conventional econometric techniques **(Shafiee and Topal 2010),** we suggest a time series model for monthly gold prices that includes three components: a diffusion component, a leap component, and a long-term reversion component. This model has a smaller root mean squared error (RMSE) than the ARIMA model in a forecasting comparison. **(Aye and others, 2015),** To predict monthly god prices, employ Bayesian model averaging, dynamic model selection, and dynamic model averaging. These models seem to be more effective than a random walk. They discover that financial variables have a better predictive ability than actual economic indicators when they employ them as explanatory variables. Forecasting monthly god price using time series approaches (vector auto regression, ARIMA, ETS, TBATS) Nonetheless, **Hassani et al. (2015)** discover that beating a random walk is challenging. According to **Gangopandhyay et al. (2016),** a vector error correction model performs better than a random walk in a forecasting

comparison of Indian gold prices.

People in India have a particular place in their hearts and thoughts for gold. Gold is a treasured possession and an essential component of Indian homes because of its timeless worth and appeal. The nation has a long-standing fondness for gold, which is seen as a safe haven investment and a sign of riches and prosperity. India is among the largest countries in the world, importers and customers of gold because of its passion for the metal and rich cultural legacy. The gold market in India is impacted by several domestic and global variables. The public, traders, and investors have long been captivated by and concerned by the volatile price of gold.

2. Review of Literature

Nisarga M & Nagendra Marisetty (2023), study identified key factors influencing gold prices in India, such as variations in the price of crude oil, shifts in the BSE Sensex, exchange rates, inflation trends and repo rates. These factors showed complex relationships with gold prices, frequently influenced by periods and market circumstances. As borrowing for investments became more inexpensive due to lower repo rates, a sign of using monetary policy, demand for gold tended to increase, pushing prices higher. **Sailaja, V.N et al. (2022),** investigate the connection between gold prices and different macroeconomic variables in India, showing significant effects of inflation, GDP, stock market indices, crude oil prices, and foreign exchange rates while finding no significant influence from gold demand and budget deficit, highlighting key factors influencing gold prices in the nation. **Pradeep, K. V (2022),** Gold prices significantly changed when India switched from a regulated to a liberalized economy. The prices started to rise as the markets integrated further. This shift also benefited the jewelry industry due to the importation of essential materials and the introduction of mechanization. **Vallabh, P. (2022),** In addition to addressing regulatory concerns, standardized delivery, trade financing considerations, and obstacles faced by traders, this paper sheds light on the worries and practices of gold merchants in India, providing insightful qualitative information for decision-makers, stakeholders and researchers.

Chainani, R. (2022), examines 30 variables, including fundamental, macroeconomic, technical and Intermarket factors and their effects on COMEX and Indian gold prices. The examination of 36 events identifies key predictors, which offer insightful information for models used to anticipate gold prices. **Chiang T (2022),** demonstrates how, in various regional markets, gold protects against market volatility, geopolitical risk, and uncertain economic policy. However, in the Indian market, gold also serves as a money substitute. **Tanin T. et al. (2022),** examine the correlation between the price of gold and oil earlier crises, revealing a tenuous positive relationship and emphasizing the declining predictive power of oil prices on prices of gold, particularly in the context of the COVID-19 pandemic, where gold serves as a safe-haven asset for investors. **Choudhary, P. (2021),** understands the impact of various variables on gold prices; this study examines them. It highlights unexpected results and opposite relationships, particularly regarding India's purchasing power, interest rates, and the lack of correlation with the Sensex and Nifty indexes.

Garg, S. (2021), remarks on the elements that impact investor behaviour when it comes to gold investments. Gold has always been a popular investment choice in India, particularly in the form of jewelry. This study uses factor analysis to examine the many aspects that effect on

investor behaviour in the context of gold investing. **Sharma S et al, (2021),** examine the effects of stock market performance, theUSD to INR exchange rate, and crude oil prices on gold prices in India. It finds significant results, with a negative association with oil prices and a positive relationship with the stock market, including a notable error in 2020. **Zhang et al. (2020),** examine the connection between global oil prices, global gold prices, exchange rates,a nd stock market indices, revealing the long-term negative impact of oil prices on exchange rates as well as the short-term positive impact of gold prices on exchange rates, with implications for monetary and fiscal policies.

Cheng-Feng Wu and Shian-Chang Haung (2018), The unit of measurement for gold values is typically closely related to various resources. Because of the unpredictability of market risk, investors can foresee the future gold worth. As a result, accurate gold price forecasting is required to anticipate market trends. According to **C. Toraman, C. Basarir, and M. F. Bayramoglu (2011),** gold prices generally regress against stock return and the US dollar. Numerous scholars have also looked into the connection between gold prices and other macroeconomic variables. Numerous studies have also been conducted on the correlation between the price of gold and other commodities, particularly crude oil. Nonetheless, it is discovered that the findings of these investigations conflict. The following sections address some of the studies on the variables influencing the price of gold and the many methods used to investigate these links.

3. Significance of Gold in an Indian economy

The most precious metal is a metallic element and is frequently employed as a means of exchange in commerce. However, the significance of gold has completely altered in the modern paradigm. Gold is now considered to be the best investment strategy, or save strategy, in the volatile market. Gold prices are rising and changing dramatically, which has an impact on the economy as a whole. The increase in global gold prices has an effect on domestic gold prices as well. In India, demand for gold has persisted despite the recent steep price increase, in part because of its significance in society and culture as well as its use as a safe haven for funds. In 2012, Misra R and Mohan G. There are initiatives afoot to integrate the gold market with financial markets as the importance of a developed and liberalized gold market for consumers' interests becomes more and more apparent (Reddy, 1997, 2002, Thorat, 1997, Bhattacharya, 2002).

4. Methodology of the study

4.1 Study Objectives

- To distinguish the demographical characteristics of the respondents
- To study the relationship between the factors of gold and gold price.
- To study the impact of various factors on gold prices in India.

The aim of the study was to determine the variables influencing gold prices. The study analyses the factors influencing gold prices in India, such as the BSE Sensex, crude oil, inflation,

currency rates, and repo rates or interest rates, using primary data from 91 respondents. SPSS was used for descriptive statistics, regression and correlation analysis. Correlation analysis will ascertain the correlations between the variables, while descriptive statistics will provide a summary of the dataset. Using regression analysis, the variables' capacity for prediction will be examined. The goal of the study is to offer insightful information to support decisions made using the data analysis.

4.2 Variables

Dependent variable

Gold

The price of gold is the dependent variable in this research. Until recently, gold was used as a benchmark for currency equivalents that were specific to certain historical economic zones or nations. The price of gold fluctuates based on a number of reasons. When there is a global conflict or economic instability, more individuals desire to buy gold, which raises the price. The availability of gold and the level of demand for it both affect its price. These several factors lead the price of gold to swing like a see-saw.

Independent variables

The following are the different independent variables that are thought to have an impact on gold prices in the near term:

BSE Sensex

The BSE Sensex, also referred to as the Sensex, is the primary stock market index in India. It offers an overview of the country's Stock Exchange's (BSE) performance. The Sensex serves as an essential benchmark and offers information on the state and outlook of the Indian financial markets. The movement of the index is affected by its many ownership sectors, which range from technology to banking.

Consumption demand

The nation's culture attaches a high value to "gold," which is utilized as a store of riches and status as well as a necessary element of many rituals. The country's rural population has a deep affection for gold and is realistic about the safety and portability of jewelry as an investment. In more personal life affairs, gold also has a significant influence. Giving gold as a present is a deeply ingrained ritual in Indian society; over half of the nation's annual gold demand comes from weddings.

Gold and inflation

Gold is a tool for hedging against inflation, and its price changes in response to inflation data. Gold usually appreciates in value in tandem with rising living expenses. Because growing inflation reduces the value of currency, people tend to hold money in the form of gold.

Gold and interest rates

According to several industry experts, interest rates and gold generally move in the opposite direction. An increasing yield suggests that a robust economy is anticipated. Inflation is a natural by-product of a robust economy, and gold is a hedge against inflation. Additionally, investors choose fixed income investments when interest rates rise.

Crude Oil Price

The cost of a barrel of conventional crude oil is shown by its spot price. The grade of the oil affects the price and is based on variables like specific gravity, sulfur content, and extraction place. These factors have an impact on its quality and use, which lowers its market value. The level of demand for oil is mostly determined by the state of the global macroeconomic system. Consumer behavior, industrial output, and economic growth all have an impact on oil use. Price fluctuations may also result from supply disruptions and geopolitical issues. Because of its significance as the world's main energy supply, the price of oil is a key indicator of the state of the economy and can have an impact on inflation and overall market stability.

Monsoon

60% of India's gold usage is in the country's rural areas. India's gold demand, which is mostly dependent on the monsoon season, is significantly influenced by rural demand. This is the connection: In order to build assets, farmers that get a productive crop can use their earnings to purchase gold. In the event of a monsoon shortage, farmers typically sell gold to raise money.

Rupee-dollar equation

Though it has little effect on global gold prices, the rupee-dollar equation affects gold rates in India. Given that most gold is imported, its value will probably increase in rupees if the rupee declines compared to the US dollar. Thus, a weakening rupee could reduce interest in gold in this country. But keep in mind that changes in the rupee-dollar exchange rate have no effect on the price of gold denominated in dollars.

Geopolitical factors

In times of geopolitical unrest, gold typically performs well. Gold prices are positively impacted by crises like wars, which lower the valuations of the majority of asset types, yet increase demand for the metal as a safe haven.

Correlation with other asset classes

Some economists contend that gold is an incredibly powerful portfolio diversifier because of its low to negative correlation with all major asset classes. However, gold generally does not exhibit a statistically significant association with other popular asset classes. On the other hand, some contend that there may be an inverse relationship between gold and stocks at times of market stress.

Government Reserves

Along with money, the Reserve Bank of India (like do the central banks of most other nations)

maintains reserves of gold. When the RBI starts purchasing more gold than it is selling, the price of gold rises. This is because there is a shortage of gold due to the market's increased cash flow.

4.3. Limitations of the study

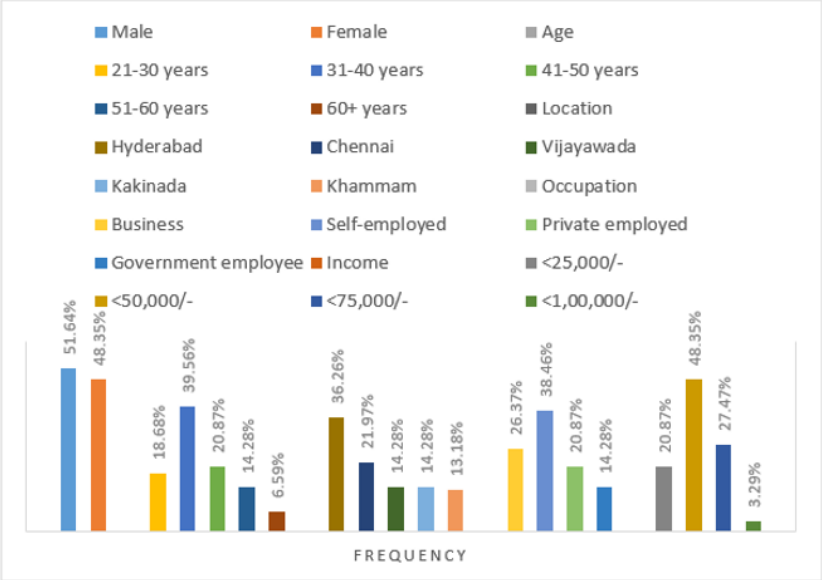
1. Due to time and money constraints the sampling small investors were chosen in India.
2. The primary data was collected through a well-structured questionnaire which wills elf reported by the respondents have its own limitation of subjectivity.

5. Results and discussion

Table 1: Frequency table for demographic parameters of survey responses

Demographic parameters	Frequency
Gender	**91(%)**
Male	94 (51.64%)
Female	88(48.35%)
Age	
21-30 years	34(18.68%)
31-40 years	72(39.56%)
41-50 years	38(20.87%)
51-60 years	26(14.28%)
60+ years	12(6.59%)
Location	
Hyderabad	66(36.26%)
Chennai	40(21.97%)
Vijayawada	26(14.28%)
Kakinada	26(14.28%)
Khammam	24(13.18%)
Occupation	
Business	48(26.37%)
Self-employed	70(38.46%)
Private employed	38(20.87%)
Government employee	26(14.28%)
Income	
<25,000/-	38(20.87%)
<50,000/-	88(48.35%)
<75,000/-	5027.47%)
<1,00,000/-	6(3.29%)

Chart 1: Graph for demographic parameters of survey responses



The provided data shows the demographic distribution of survey respondents across various dimensions: Gender, Age, Location, Occupation and Income. The overwhelming majority of respondents are male (51.64%), compared to female (48.35%). The age range of 31 to 40 years old comprises the majority of the responders (39.56%), the middle range age of respondents between 41-50 years (20.87%), youngest range respondents are between 21-30 years (18.68%), adult range respondents are between 51-60 years (14.28%) and remaining senior citizens are between 60+ years (6.59%). Most of the respondents are (36.26%) contributed from Vijayawada city. 21.97% of respondents are from Guntur, 14.28% of respondents are equally participated from both Rajhmundry and Kakinada and remaining 13.18% of respondents are from Tenali. The occupation of the participants is diverse, with a significant majority holding self-employed (38.46%), business holders (26.37%), private employed (20.87%) and remaining (14.28%). Participants with below 50,000/- (48.3%), less than 75,000/- make up with (27.47%), less than 25,000/- with (20.87%) and remaining less than 1,00,000/- with 3.29%).

Table 2: Descriptive statistics of selected variables

Statistics			
		GF	GP
N	Valid	182	182
	Missing	0	0
Mean		4.3718	4.3974
Std. Error of Mean		.04224	.03598
Std. Deviation		.56990	.48537
Minimum		2.83	2.83
Maximum		5.00	5.00

Table 2 explained that factors of gold mean is 4.37818 and for gold price is 4.3974 i.e., the values for gold price are slightly higher than those for factors of fold. Std. Error of mean for factors of gold is 0.4224 and for gold price is 0.03598. Standard Deviation of factors of gold (0.56990) and for gold price (0.48537) which means gold price are less spread out compared to those for factors of gold. And the minimum value of both factors of gold and gold price equal (2.83). As well maximum value of both gold price and factors of gold equal (5.00).

Table 3: Pearson's Correlation between the variables

Correlations			
		GF	GP
GF	Pearson Correlation	1	.916**
	Sig. (2-tailed)		.000
	Sum of Squares and Cross-products	58.786	45.885
	Covariance	.325	.254
	N	182	182
GP	Pearson Correlation	.916**	1
	Sig. (2-tailed)	.000	
	Sum of Squares and Cross-products	45.885	42.641
	Covariance	.254	.236
	N	182	182

** The significance level of the correlation is 0.01 (2-tailed)

Table 3 states that various factors of gold and gold price have a very strong positive correlation of 0.916**. When considering two-tailed statistical significance, the correlation is 0.01 at this level, indicating a highly reliable association among factors of gold and gold price. And the correlation coefficient of 0.916** suggests that as factors of gold increases, gold price tends to increase as well, and vice versa. Hence, it indicates a strong linear relationship between the two variables. The covariance values also indicate a positive association between factors of gold and gold price with higher values 0.325, 0.254, 0.254 and 0.236 respectively.

Table 4: Model summary showing impact of factors of gold on gold price

Model Summary									
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.916[a]	.840	.839	.19474	.840	944.333	1	180	.000

a. Predictors: (Constant), GF

There is a high positive association (R = 0.916) between the components and the price and quantity of gold. With an R-square of 0.840, the outcome variable's variance accounts for

almost 84% of the total. Even after accounting for the number of predictors, the model's explanatory power is still strong, as evidenced by the adjusted R-square of 0.839. The standard deviation of the observed values from the expected values is 0.19474, which is the standard error. R-square variation between 0 and 0.840. With related degrees of freedom of df1=1 and df2=180, and a very significant p-value of.000, the F change value in this case is 944.333.

Table 5: ANOVA measuring fitness level of factors of gold on gold price

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	35.814	1	35.814	944.333	.000[b]
	Residual	6.827	180	.038		
	Total	42.641	181			

a. Dependent Variable: GP
b. Predictors: (Constant), GF

ANOVA indicates that the regression model accounts for a significant amount of variability in gold price. Specifically, the sum of squares due to regression 35.814 is significantly higher than what would be expected by chance alone. The residual sum of squares 6.827 represents the unexplained variance in gold price after accounting for the effects of the predictor variable. F value is 944.333, indicating a highly significant result.

Table 6: KMO and Bartlett's test for selected variables

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.500
Bartlett's Test of Sphericity	Approx. Chi-Square	328.842
	df	1
	Sig.	.000

A KMO (.500) suggests that the sample is moderately suitable for this study, whereas value of chi-square is 328.842 with 1 df, and the p-value is .000, which means Bartlett's test is significant correlation between factors of gold and gold price

6. Summary of Results

6.1. Demographic result reveals

- The majority of respondents are male (51.64%), with females making up (48.35%) of the total respondents.
- Majority of respondents are between 31-40 years 39.56%.
- Most of the respondents 36.26% are participated from Vijayawada city
- 38.46% sample of respondents with self-employed.
- Majority of the respondents having less than 50,000/- (48.3%) income.

6.2. Descriptive Analysis – Correlation, Regression, ANOVA and KMO Results

- The mean value for gold price variable (4.3974) is slightly higher than the mean value for factors of gold variable (4.3718).
- Standard error of the mean for the factors of gold (0.04224) is higher than that for the gold price (0.03598).
- The standard deviation for the factors of gold (0.56990) is higher than that for the gold price (0.48537).
- Both the minimum (2.83) and maximum (5.00) values are the same for both the factors of gold and gold price.
- The correlation coefficient (0.916*) has a very strong positive correlation between factors of gold and gold price.
- The positive values (0.325, 0.254, 0.254, 0.236) support the notion of a positive association between factors of gold and gold price.
- With a coefficient of determination (R-square) of 0.840, gold-related factors account for almost 84% of the variance in the price of gold.
- The average difference between the observed gold price and the values predicted by the model is represented by the standard error, which stands at 0.19474.
- The sum of squares due to regression is 35.814, which is significantly higher than what would be expected by chance alone.
- The model performance is estimated highly significant based on the F value 944.333, indicating its reliability in predicting gold price based on the included factors.
- The chi0square value of 328.842 with 1 df, and p-value of .000, which indicates that Bartlett's test is significant

Conclusion

This study set out to look into the various factors influencing the price of gold in India. The study offers significant fresh perspectives on the intricate workings of the Indian gold market. First, the study determined the main variables that affect Indian gold prices, including changes in the price of crude oil, fluctuations in the BSE Sensex, interest rates, currency rates, and inflation patterns. These variables revealed intricate correlations with gold prices that were frequently impacted by time and market conditions. The apparent relationship between the price of gold and crude oil demonstrated how closely related these two commodities are to one another. Rising oil prices and rising gold prices have a consistent correlation because they are both considered safe-haven investments.

They finally, they emphasized how changes in the Reserve Bank of India's interest rate have an impact on the price of gold. Lower interest rates made it easier to borrow money for investments, which is a sign that monetary policy is being used. This increased demand for gold led to higher prices. In conclusion, this study provides understanding of the various factors influencing gold prices in India. Governments, financial institutions, investors, and market participants all need to be aware of these facts. With this knowledge, they can make sensible investment decisions, develop appropriate policies, and more precisely forecast price variations. Furthermore, this research contributes to the ongoing discourse surrounding gold as an asset class and its significance for the Indian economy, thereby assisting India in developing a more

vibrant and transparent gold market.

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