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Modeling gold price volatility predictions in the global market

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Abstract

Gold is widely used by investors as a hedge against other financial assets, underscoring its critical importance. Sharp fluctuations in gold prices have highlighted the need to identify and understand the factors influencing these price changes. The gold market is known for its volatility, and accurate predictions about its future can significantly impact decision-making. Understanding the gold price and making correct forecasts can help inform decisions about buying and selling gold in global markets, and determine the most favorable times for transactions and investments. Therefore, it is crucial to accurately predict the gold price from various perspectives. This study aims to model and predict gold price volatility in the global market. The research is applied in nature and utilizes monthly data from 2010 to 2022. We evaluated 35 factors potentially affecting gold price volatility. GARCH models and stochastic volatility approaches were employed to extract gold price volatility, while TVPDMA, TVPDMS, and BMA models were used to identify the most significant variables driving volatility. Results indicate that SV models outperform GARCH models in accurately extracting volatility. Among the TVPDMA, TVPDMS, and BMA models, the BMA model demonstrated superior accuracy. Findings reveal that 12 key variables —including the dollar index, oil prices, gold imports and exports, global interest rates, cryptocurrency index, Relative Strength Index (RSI), Moving Average Convergence Divergence (MACD), Fibonacci Retracement, Average Directional Index (ADX), stock oscillator, and DeMark and Fibonacci Pivot Points— showed the highest likelihood of presence and significance in predicting price volatility. The results suggest that internal factors have a greater impact on gold price volatility than external factors.

Keywords: Gold price Predictions, Oil Price, GARCH, Bayesian Averaging.

JEL Classification: C15, C3, E31, E37, C22.

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1. Introduction

Gold is used by investors as a hedge against (A tool to preserve the money value) other financial assets and is vital in this regard. The extreme fluctuations in its price have doubled the importance of identifying the factors affecting its price changes. The gold market is one of the most turbulent markets. Its prediction can positively influence the decisions made in this regard. It is possible to facilitate the decision-making process of buying and selling gold in the global markets and determine the best time to do transactions and investments in light of knowing the price of gold and correctly predicting it. Thus, the correct prediction of gold price is crucial from several aspects.

2. Theoretical Framework

The forces of supply and demand in the market affect the gold price, like any other commodity. However, many factors influence its supply and demand and its price since it is a very sensitive and strategic commodity. The gold price plays a vital role in monetary and financial systems. Predicting the future trend of gold and other precious metals prices will be effective for investors, financial managers, and central banks worldwide. In addition, the gold treasury is used to manage inflation and strengthen the economic position of countries. Predicting the gold rate is vital in political, economic, commercial, and investment fields. It is considered one of the most volatile and most profitable financial tools. Thus, small changes in its price can give a high percentage of profit or loss to the trader. Prediction and modeling of volatility is a vital issue in policymaking, commodity pricing, resource allocation, and risk management. Additionally, predicting fluctuations is vital in economic markets. Thus, it has been the focus of scholars and brokers for years.

Gold is an essential commodity used for financial purposes and is a part of international reserves in most state banks. It defines the basic role of that bank in the world's economy. Gold is the most common choice for investment among all precious metals. The capability to predict gold price fluctuations with high accuracy is essential for the global economy and commodity markets. Additionally, predicting gold price fluctuations is a serious concern in the financial industry. Small improvements in prediction accuracy can yield huge benefits. Gold and crude oil are strategic resources used extensively in various national economic activities and social security.

3. Methodology

The method of this study is applied. The purpose of the present study is to identify the most important variables affecting the fluctuation of gold prices. This issue was investigated in the present study due to the research gap in modeling this precious metal. In most studies conducted in this field, variables were included in the model based on the researchers' opinions. However, the optimal gold price prediction model was extracted in the present study based on dynamic and selective nonlinear Bayesian models, and the researcher did not apply his personal opinion in determining the variables. This study is one of the exploratory studies. The time horizon of this study is 12 years from 2010 to 2022.

4. Discussion

Investors look for factors that affect gold when they want to invest in it. According to the results, this study presents the significant factors that affect the gold price. Investors must consider all the factors affecting its price before making investment decisions. This issue enhances the investor's knowledge about changes in its price. The results of this study will help investors avoid any possible losses and set the right time to invest in the gold market. Thus, the investor must consider all these factors and monitor their changes. According to the results, SV models are more accurate than GARCH models in extracting fluctuations. According to the results, SV models are more accurate than GARCH models in extracting fluctuations. The BMA model had higher accuracy compared to the TVPDMA and TVPDMS models. According to the results, 12 effective variables including dollar index, oil price, gold import and export, global interest rate, cryptocurrency index, RSI (interest rate strength index), MACD (monthly average convergence divergence differential), Fibonacci retracement, ADX (Average Directional Index), oscillator (stock volatility), Pivot Point DeMark Pivot Point Fibonacci had the highest probability of presence and significant level in predicting price volatility.

5. Conclusion and Suggestions

The results indicate that the internal factors affecting the gold price fluctuations are more effective than the external factors. According to the results, non-linear approaches have a much higher power to predict gold price fluctuations than linear approaches, and investors and policymakers active in this market should monitor the changes in global macro and micro indices and pay more attention to the 12 variables.

6. Ethical Considerations

6.1. Compliance with ethical guidelines

The authors of the article declare that research ethics have been followed in this study.

6.2. Funding

No funding received from public, commercial or not-for-profit agencies.

6.3. Authors' contribution

The authors of the article declare that he has conducted all aspect of this study.

6.4. Conflict of interest

The author declares any conflicts of interest.

6.5. Acknowledgments

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