

FORECASTING GOLD PRICES IN MALAYSIA: A COMPARATIVE ANALYSIS OF SIMPLE EXPONENTIAL SMOOTHING, HOLT'S METHOD AND ARIMA MODEL

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Abstract

Gold plays a vital role in the global economy as a safe-haven asset, widely used for investment, jewellery and as a hedge against inflation and currency fluctuations. In Malaysia, gold price trends are closely watched by investors and analysts due to their sensitivity to market and global events. This study forecasts monthly gold prices in Malaysia using three univariate time series models: Simple Exponential Smoothing (SES), Holt's Method, and ARIMA. Using 122 monthly observations from April 2015 to May 2025, the models' accuracy was compared based on error measures such as RMSE, MAE, MAPE and MASE. Holt's Method outperformed SES and ARIMA (2,1,1) by achieving 91.14% accuracy with the lowest errors especially using a 60:40 training-testing split. The 12-month forecast shows a rising gold price trend from June 2025 to May 2026. The study highlights Holt's effectiveness in capturing linear trends and suggests future research on advanced or hybrid models incorporating external factors like inflation and global events for better accuracy. It also recommends future research to explore more advanced or hybrid forecasting models and incorporate external factors like inflation and global economic events to further improve prediction accuracy.

Keywords: Gold Price Forecasting, Holt's Method, ARIMA, SES, Forecast Accuracy, RMSE, MAPE

1. Introduction

Gold has become a preferred investment asset, especially after the COVID-19 pandemic, due to global uncertainty and rising inflation. In Malaysia, gold prices have fluctuated significantly since 2020 and show an upward trend in recent years. These changes highlight the need for accurate forecasting to support better financial decisions. This study aims to forecast monthly gold prices in Malaysia using three time series models: Simple Exponential Smoothing, Holt's Method, and ARIMA. The objectives are to apply and compare these models, identify the most accurate one, and produce a 12-month forecast using historical data from April 2015 to May 2025.

2. Methodology

This study applied three univariate time series forecasting models: SES, Holt's Linear Trend Method, and ARIMA to predict monthly gold prices in Malaysia. The dataset consisted of 122 monthly observations from April 2015 to May 2025, representing the price per gram of 916 gold in Ringgit Malaysia (RM). The data were sourced from secondary online records. To evaluate the models effectively, the dataset was divided into five different training and testing ratios: 90:10, 80:20, 70:30, 60:40 and 50:50. Gold price data from April 2015 to May 2025 is divided into training and testing sets. Three models, Simple Exponential Smoothing, Holt's method and ARIMA are applied to the training data. The models are evaluated using RMSE, MAE, MAPE and MASE. The best performing model is used to forecast gold prices from June 2025 to May 2026.

3. Results / Findings

The results revealed that among the three forecasting models, Holt's Linear Trend Method consistently produced the most accurate predictions, especially under the 60:40 training-testing data

split. This model recorded the lowest error metrics with a RMSE of 48.62, MAE of 30.28, MAPE of 8.86%, and MASE of 1.36. It also achieved the highest forecast accuracy of 91.14%, outperforming both the ARIMA (2,1,1) and SES models, which had forecast accuracies of 86.12% and 86.04% respectively under the 70:30 split. Based on this finding, Holt's Method was used to generate a 12-month forecast of gold prices from June 2025 to May 2026. The forecast indicated a consistent upward trend in gold prices, with values rising from RM449.38 in June 2025 to RM538.76 by May 2026. These findings demonstrate Holt's Method's ability to capture the linear trend present in Malaysian gold price data and suggest that it is the most suitable approach for short- to medium-term forecasting in this context.

4. Novelty of Research

This research provides a valuable contribution by comparing three fundamental time series models which are SES, Holt's Method, and ARIMA in forecasting monthly gold prices in Malaysia. The study uses actual historical data from April 2015 to May 2025, offering a localised focus that is more relevant to Malaysian investors and policymakers. In contrast to previous studies such as Abidin et al. (2018) which explored only one forecasting method this research examines all three models in detail. It also applies five different data partitioning ratios ranging from ninety percent training to fifty percent training to evaluate the consistency and accuracy of each model. The results clearly show that Holt's Method produced the most accurate forecasts with the lowest error values and the highest accuracy of 91.14% using the 60% training and 40% testing split. The study also includes a 12-month forecast from June 2025 to May 2026 which shows a consistent upward trend in gold prices. This adds practical value by providing insights that can support real financial decision making in the Malaysian context.

5. Conclusion or Future Work

This study concludes that Holt's Method is the most accurate model for forecasting Malaysian gold prices (Ariffin et al., 2024). Future research can try advanced models such as SARIMA, Prophet or LSTM. These models may improve forecasting results. It is also important to include other factors like inflation, currency exchange rates and global events. This can help make the predictions more accurate and reliable.

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