

# Explainable Machine Learning Models for Stock Market Prediction: Evidence from Selected Nigerian Banking Stocks

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## Abstract:

The research is centered on methods to explain machine learning models and leverage them for the prediction of stock prices in the Nigerian financial market. Long-term period data from the three top banks, GTCO (1996–2024), Access Holdings (1998–2024), and Zenith Bank (2004–2024), were used. Two popular models, Random Forest and XGBoost, were designed and tested. The findings point out that XGBoost was able to provide the least prediction errors most of the time, which indicates that it is the most capable of dealing with the non-linear patterns and market volatility situation that is typical of Nigeria. For more transparent predictions, SHAP (SHapley Additive explanations) values were used to pinpoint the factors influencing each model's output. The explainability analysis unveils that the technical indicators of stock performance, like moving averages, recent returns, volatility, and trading volume, were the strongest predictors. In any case, the response from each bank to the signals was quite different: For GTCO, the main driver was trading activity; Access Holdings was influenced more by short-term trends, while Zenith Bank was reliant on market indicators of a wider scope. The differences highlight not only the distinctive behavior of Nigerian banking stocks but also the necessity of using interpretable models. By integrating machine learning with explainability, the research findings serve as accurate and reliable tools for investors, analysts, and policymakers. This work acts as a bridge to the scarce research on understandable AI in African markets and is a transparent framework that can facilitate better investment decisions in emerging economies.

## Keywords:

Explainable Machine Learning, Stock Market Prediction, SHAP Values, XGBoost and Nigerian Banking Stocks.