Stock Predictions for Four Islamic Banks on the Indonesia Stock Exchange Based on ARIMA Analysis

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Abstract — The Indonesia Stock Exchange (IDX) index serves as the main indicator for the Indonesian stock market, holding strategic importance for investors and companies. Four Islamic banks are listed: PT Bank Syariah Indonesia Tbk. (BRIS), PT Bank BTPN Syariah Tbk. (BTPS), PT Bank Panin Dubai Syariah Tbk. (PNBS), and PT Bank Aladin Syariah Tbk. (BANK). This study, using an ARIMA approach with R Programming on daily IDX data until December 2023, examines their trends amidst an uncertain economic outlook in 2024-2025. The findings indicate a bearish trend for these banks. Specifically, BRIS shows a long-term bullish trend but weak signals are present, with price predictions of a maximum of 3,406 and minimum of 1,808. BTPS remains bearish with short bullish signals, predicting a maximum of 2,007 and minimum of 1,772. PNBS and BANK both trend sideways towards bearish, with PNBS predicting a maximum of 61.83 and minimum of 56.03, while BANK's maximum is 1,573 and minimum is 1,327.

Keywords — ARIMA; Data Mining; Indonesia Stock Exchange; Machine Learning; R Programming.

I. INTRODUCTION

The Indonesia Stock Exchange (IDX) index is a crucial benchmark for the Indonesian stock market, making its accurate prediction vital for investors, traders, and companies. By foreseeing future movements of the IDX index, stakeholders can make informed decisions that significantly impact their financial success. While traditional forecasting methods like ARIMA (Autoregressive Integrated Moving Average) have been common, the recent rise of machine learning and data mining techniques offers a compelling and sophisticated alternative. Embracing these modern approaches can enhance prediction accuracy and provide a strategic edge in an increasingly competitive market.

In the growing landscape of Islamic banking, four key players have successfully listed their shares on the Indonesia Stock Exchange (IDX): PT Bank Syariah Indonesia Tbk. (BRIS), PT Bank BTPN Syariah Tbk. (BTPS), PT Bank Panin Dubai Syariah Tbk. (PNBS), and PT Bank Aladin Syariah Tbk. (BANK). As these banks embark on their journey on the IDX, they represent not just new investment opportunities, but also a significant shift toward inclusive finance. While the political climate in 2024-2025 presents challenges and global economic growth remains uncertain, the potential for these Islamic banks to positively influence the market is immense. This study is dedicated to predicting IDX index movements through the ARIMA approach and machine learning in R Programming, specifically analyzing the trends of these four Islamic commercial banks. Join us in uncovering the future of investment that aligns with ethical banking principles.

This innovative study utilizes a powerful blend of ARIMA and machine learning techniques, all implemented through R programming. We will analyze daily IDX index data spanning from January 2010 to December 2022, sourced from Yahoo Finance and securely stored in CSV format. Our first step involves meticulous data cleaning and processing with R to ensure accuracy. The ARIMA model will establish a solid baseline, allowing us to highlight the superior performance of advanced machine learning algorithms. We will deploy a range of cutting-edge techniques, including Random Forest, Support Vector Machines, and Neural Networks, to effectively predict IDX index movements. By employing robust evaluation metrics like Mean Absolute Error (MAE) and Root Mean Squared Error (RMSE), we will uncover which methods deliver the most precise results, offering valuable insights for investors and analysts alike.

This research endeavor strives to create a highly effective and dependable prediction model for the BEI index by integrating ARIMA with advanced machine learning techniques. By doing so, it will unlock new insights into the application of data mining and machine learning for forecasting stock market trends in Indonesia, ultimately enhancing decision-making for investors and stakeholders.

In the past decade, intelligent data mining techniques, particularly neural networks, have revolutionized research in

stock market analysis and prediction. In our fast-paced economy, understanding stock market data is crucial for informed decision-making. Numerous forecasting models are available, including non-linear approaches like neural networks, Generalized Autoregressive Conditional Heteroscedasticity (GARCH), and Autoregressive Conditional Heteroscedasticity (ARCH), as well as linear models such as Autoregressive Integrated Moving Average (ARIMA), Moving Average (MA), and Autoregressive (AR) methods [1].

II. RELATED WORK

This research is dedicated to accurately predicting the value of publicly traded stocks through the powerful combination of SARIMA modeling and XGBoost-based machine learning. The SARIMA model effectively captures seasonality trends in the stock market, enhancing predictive accuracy. Meanwhile, XGBoost stands out as a leading implementation of gradient-boosted decision trees, renowned for its speed and high performance. By analyzing key indicators such as the opening price, adjusted end-of-day price, daily high, daily low, and total trading volume, this approach offers a sophisticated and reliable method for stock prediction [2].

Stock index forecasting is an increasingly vital topic in the financial world. Given that stock index movements are non-linear and influenced by a multitude of internal and external factors, predicting them presents a considerable challenge for researchers. In this paper, we leverage the power of radial basis function neural networks (RBFNN) to analyze data and forecast the Shanghai Stock Exchange stock index effectively. To enhance the precision of our predictions, we integrate the artificial fish swarm algorithm (AFSA) to optimize the RBF method. Furthermore, we refine the K-means clustering algorithm with AFSA during the RBF learning process, significantly boosting forecasting efficiency and accuracy [3].

The growing use of time series data has prompted numerous research and development initiatives in the field of data mining. The extensive number of studies on time series data mining over the past decade can be overwhelming for researchers interested in this area, due to its complexity. This paper provides a comprehensive review of existing research on time series data mining, categorizing it into several key areas: representation and indexing, similarity measures, segmentation, visualization, and mining. Additionally, the paper highlights current research issues in the field [4].

Financial forecasting stands at the intersection of traditional mathematical statistics and cutting-edge data mining technologies, such as machine learning and deep learning, to provide accurate predictions. This paper initiates its exploration with the proven time series model, adept at managing the conditional heteroscedasticity inherent in time series data. By integrating the powerful capabilities of support vector machines (SVM), which are particularly effective in capturing the nonlinear dynamics of financial time series data, we aim to enhance stock market forecasting significantly. In assessing the effectiveness of our approach, we rigorously compare conventional prediction methods with innovative machine learning techniques. This paper develops three robust models: ARIMA-GARCH, SVM, and the combined ARIMA-GARCH-SVM model. By doing so, we demonstrate the potential for improved accuracy and reliability in financial forecasting, making a compelling case for the adoption of these advanced methodologies [5].

Forecasting high-frequency and rapidly fluctuating financial data is a significant challenge in economics and modeling. In this study, we present an innovative hybrid model that combines fractional-order derivatives with deep learning features, specifically using long short-term memory (LSTM) networks, to predict sudden variations in financial markets with greater accuracy. Stock market prices are dynamic, nonlinear, and unpredictable. While several techniques exist for estimating prices, traditional methods—like data mining and statistical approaches—often fall short for effective stock price prediction. In contrast, the autoregressive fractional integrated moving average (ARFIMA) model offers flexibility within long-memory models, while advanced machine learning techniques enhance our hybrid model's capability to extract complex features and capture nonlinear functions, making it a powerful tool for financial forecasting [6].

Data mining and machine learning represent significant advancements in technology that empower us to make accurate predictions and forecasts. One of the most effective forecasting techniques is the Time Series method, which focuses on estimating future inflation values. Time Series is tailored for generating forecasts at specific time intervals, allowing for timely and informed decision-making. The Auto-Regressive Integrated Moving Average (ARIMA) model stands out as a powerful tool for forecasting using time series data, making it an essential asset for anyone looking to enhance their predictive capabilities [7].

This study presents a method that combines insights from financial news and Twitter feeds to improve stock portfolio price predictions using the Multivariate Bayesian Structural Time Series (MBSTS) model. MBSTS is a Bayesian machine learning model that captures correlations among multiple target time series while integrating various predictors. We focus on data from leading online commerce companies, Amazon and eBay, conducting experiments to evaluate how text mining predictors affect stock price predictability.

Additionally, we compare our approach with established models, such as Autoregressive Integrated Moving Average (ARIMA) and Recurrent Neural Networks (RNN) with Long Short-Term Memory (LSTM), assessing their performance based on one-step-ahead cumulative forecast error. This analysis highlights our model's potential as a valuable tool for investors seeking an edge in the market [8].

Machine learning, a key component of artificial intelligence, empowers us to make informed predictions about the future based on prior data. This paper introduces an innovative method for developing models that leverage powerful machine learning algorithms such as linear regression and K-nearest neighbors (KNN), alongside proven statistical models like Auto-ARIMA and Facebook's Prophet (Fbprophet). By showcasing a comparative analysis of these machine learning and statistical approaches, this paper highlights their effectiveness in accurately forecasting cryptocurrency trends, demonstrating their potential for significant impact in this rapidly evolving market [9].

This research delves into the potential of machine learning and deep learning architectures to predict Bitcoin price movements, focusing on short-term trends (up or down) and long-term forecasts of actual prices. The ability to accurately predict market behavior has established itself as a valuable tool in the stock market; thus, this study aims to leverage that success within the cryptocurrency sector. By comparing advanced deep learning models like Long Short-Term Memory (LSTM) with proven machine learning techniques such as Random Forest and ARIMA, we seek to identify the most effective model for delivering superior predictive performance [10].

Over the past decade, we utilized daily derivatives data for training and testing. Our research employs the ARIMA model within a Hadoop framework, leveraging map and reduce processes for effective big data analysis. Our findings reveal crucial trends in price fluctuations, generate time series similarity graphs, and plot temporal data frequencies. The Indian derivatives market holds vast, untapped potential for big data analytics, presenting exciting opportunities for future exploration [11].

Sales forecasting is vital for optimizing revenue and inventory management. This paper introduces a cutting-edge model designed to precisely forecast the most profitable segments at a detailed level. As many retail giants have numerous branches across different locations, achieving effective sales consolidation through conventional data mining becomes increasingly difficult. By leveraging machine learning models, businesses can gain reliable and accurate insights, paving the way for improved decision-making and enhanced profitability [12].

Hybrid modeling techniques for stock price prediction are proving to be transformative, blending various machine learning and deep learning approaches. Our results highlight that the LSTM-based univariate model, which analyzes just one week of historical data to forecast the closing price of Reliance Industries Limited for the upcoming week, stands out as the most precise method available. This effectiveness makes it a powerful tool for investors seeking reliable insights [13].

The American Stock Market, comprising the New York Stock Exchange and the NASDAQ, offers a dynamic yet intricate environment for predicting stock prices. To navigate this complexity effectively, we propose employing an Autoregressive Integrated Moving Average (ARIMA) model. This model stands out for its remarkable ability to process time series data, making it highly effective in forecasting future stock prices. By leveraging ARIMA, we can achieve more accurate predictions, enabling investors to make informed decisions in a competitive market [14].

Effective forecasting of stock market prices relies on advanced techniques and instruments such as artificial neural networks, fuzzy logic, machine learning, Support Vector Machines, ARIMA models, and R programming. To achieve higher precision, we leverage a variety of algorithms, including Naïve Bayes, K-means, genetic algorithms, and data mining methods. By focusing on enhancing the accuracy of stock market predictions, we position ourselves for smarter investments and better financial outcomes [15].

A comprehensive understanding of the data in question is essential, encompassing both its structure and its inherent behavior and characteristics. By utilizing statistical analysis, we can employ a range of methods to delve into and better understand the data's nature. This paper aims to rigorously analyze our time series dataset and convincingly demonstrate that the ARIMA model is a powerful tool for accurately predicting future values of the time series data [16].

Accurate stock price prediction is vital for success in the stock market. While conventional methods like fundamental and technical analysis are popular, they often fall short in providing consistent results. Regression analysis has emerged as a powerful tool for forecasting stock prices. In this paper, we explore several advanced regression techniques that can enhance accuracy and reliability in stock price predictions, making them indispensable for investors aiming to navigate the market effectively [17].

Predictive analytics is a powerful tool that leverages statistical models, data mining techniques, artificial intelligence, and machine learning to uncover valuable insights from data. In today's data-driven business landscape, organizations are overwhelmed by massive volumes of

information generated over time. This reality necessitates the development of innovative methods for forecasting time series data. This research paper showcases an effective approach to predictive analytics for time series data, utilizing real-world datasets to craft a robust predictive model that can drive informed decision-making [18].

III. METHODOLOGY

C. R. Kothari [19] clearly outlines that adhering to these detailed steps is essential for effective procedural guidance in the research process.

A. Formulating The Research Problem

At this crucial stage, the researcher will delve deeper into the significance of the research problem addressing Machine Learning Stock Prediction for four Islamic banking issuers in 2024 on the Indonesia Stock Exchange utilizing R Programming. This study aspires to create a high-accuracy and credible BEI index prediction model through a strategic blend of ARIMA and machine learning methodologies. Furthermore, it aims to provide groundbreaking insights into the application of data mining and machine learning techniques in predicting stock market dynamics in Indonesia, ultimately paving the way for more informed investment decisions.

B. Extensive Literature Survey

The researcher will initiate a comprehensive literature survey, utilizing external data that includes Indonesian economic indicators, political dynamics, and global environmental factors to enhance the prediction model. Moreover, this research sets the stage for a promising continuation by developing a robust trading strategy informed by the findings of the BEI index prediction.

C. Development Of Working Hypotheses

Researchers will enhance their prediction model by integrating external data such as Indonesian economic indicators and global environmental factors. Additionally, this research presents a valuable opportunity to develop a robust trading strategy grounded in the insights gained from predicting the BEI index.

D. Preparing The Research Design

The research design serves as a robust methodology in addressing key research problems. By integrating ARIMA, data mining, and machine learning through R Programming, we aim to significantly enhance predictive accuracy. We will utilize daily IDX index data from January 2010 to December 2022, collected from Yahoo Finance and organized in CSV format. This data will be meticulously cleaned and processed with R Programming to ensure reliability. The ARIMA approach will act as a critical benchmark against which we can measure the performance of various machine learning algorithms. We will implement advanced techniques such as Random Forest, Support Vector Machines, and Neural Networks to forecast IDX index movements effectively. Each method's performance will be rigorously assessed using metrics like Mean Absolute Error (MAE) and Root Mean Squared Error (RMSE), ensuring that our findings are both compelling and credible.

E. Determining Sample Design

Researchers are set to create a highly accurate and accountable model for predicting the BEI index by integrating ARIMA with advanced machine learning techniques. This groundbreaking study promises to shed light on the powerful role of data mining and machine learning in forecasting stock market movements in Indonesia, offering valuable insights for investors and analysts alike.

F. Collecting The Data

Researchers will integrate external variables, including Indonesian economic indicators and global environmental trends, as vital components in the prediction model. This approach enhances the model's accuracy and relevance, ensuring more informed outcomes.

G. Execution Of The Project

Researchers will leverage data mining, machine learning, and R programming to analyze existing secondary and primary data. This innovative approach will enable them to make accurate predictions and develop compelling visualizations that illuminate the future of the Indonesian Stock Exchange.

H. Analysis Of Data

This analysis promises to deliver powerful insights by combining ARIMA, data mining, and machine learning techniques with R programming. We will leverage historical daily BEI index data from January 2010 to December 2022, sourced from Yahoo Finance and meticulously stored in CSV format. After thoroughly cleaning and processing this data in R, we will use the ARIMA approach as a reliable baseline to benchmark the effectiveness of our machine learning models. By applying advanced algorithms such as Random Forest, Support Vector Machines, and Neural Networks, we aim to accurately predict movements in the BEI index, providing valuable forecasts for investors and stakeholders alike.

I. Hypothesis-Testing

Through comprehensive data analysis, researchers are poised to accurately predict the movement of the BEI index by leveraging the ARIMA approach alongside advanced machine learning techniques using R programming. This innovative

combination promises to enhance predictive accuracy and provide valuable insights for investors and stakeholders alike.

J. Generalisations And Interpretation

The researcher will thoroughly analyze and interpret the findings of this study, offering valuable evaluations and actionable recommendations that stem directly from the research.

K. Preparation Of The Report

The researcher is committed to producing a comprehensive and insightful final report for this research project.

IV. RESULTS AND DISCUSSION

The Indonesia Stock Exchange (IDX) Index is the key benchmark for the Indonesian stock market, offering invaluable insights for investors. By leveraging machine learning to predict the stocks of four Islamic banking issuers in 2024, we can uncover strategic opportunities for traders and companies in Indonesia. This approach is especially beneficial for those keen on tracking the performance of Islamic banking issuers listed on the IDX, making it an essential tool for informed decision-making in the evolving financial landscape.

Four Islamic banks have listed their shares on the Indonesia Stock Exchange, solidifying their presence and creating valuable investment opportunities for investors :

- PT. Bank Syariah Indonesia Tbk. (BRIS),
- PT. Bank BTPN Syariah Tbk. (BTPS),
- PT. Bank Panin Dubai Syariah Tbk. (PNBS),
- PT. Bank Aladin Syariah Tbk. (BANK)

Traditional methods like ARIMA (Autoregressive Integrated Moving Average) have long been utilized to predict the IDX index movements. However, as technology advances, machine learning and data mining techniques are emerging as superior, more sophisticated alternatives. This study will harness the power of machine learning through R Programming to deliver enhanced predictive accuracy. We will gather daily IDX index data up until the end of December 2023 from Yahoo Finance and meticulously store it in CSV format. This data will undergo thorough cleaning and processing using advanced machine learning methods in R. To provide a robust framework for evaluation, the ARIMA approach will be used as a baseline for comparison. By implementing a range of cutting-edge machine learning algorithms—including Random Forest, Support Vector Machines, and Neural Networks—we aim to provide unparalleled insights into the future movements of the IDX index.

A. ARIMA Analysis of PT. Bank Syariah Indonesia Tbk. (BRIS)

Fig 1. Trending Analysis of PT. Bank Syariah Indonesia Tbk. (BRIS) for 2024

The analysis of the Moving Average Convergence Divergence (MACD) with parameters (12, 26, 9) provides essential insights into BRIS's market position. Currently, the values stand at:

- MACD: 1.809

- Signal: 1.857

As of November 1, 2023, the latest MACD graphic suggests that the long-term trend for BRIS is indeed bullish. However, it's important to note that the red dotted MACD line has crossed below the white trend line, indicating a potential shift from a bullish stance to a bearish one. This shift, while still appearing weak, indicates a possible sideways movement ahead.

Additionally, the Bollinger Bands reinforce the bullish long-term outlook, although they show a slight curvature that may hint at a mild bearish sentiment.

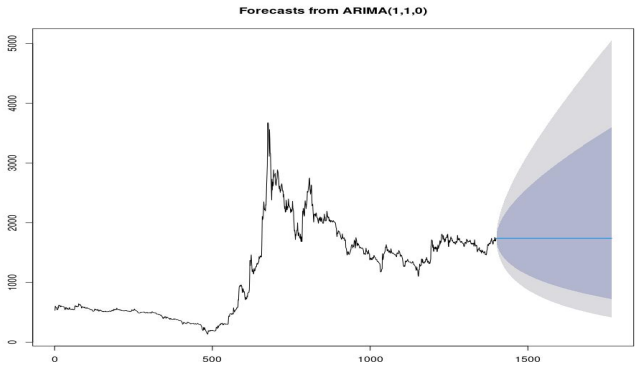

Fig 2. Arima Graphic Analysis of PT. Bank Syariah Indonesia Tbk. (BRIS) for 2024

Looking ahead, the Arima Graphic Prediction for 2024 paints a promising picture. The trend line is projected to stay between the prices of 1400 and 2000, showcasing BRIS's adaptability as it navigates a sideways position while determining its direction in the market—whether up (bullish) or down (bearish).

Delving deeper into the Arima Graphic Prediction, the blue inner area reveals a maximum anticipated price around

2000 and a minimum around 1200. In contrast, the gray outer area presents bold possibilities, forecasting a maximum price of approximately 5000 and a minimum of 500.

The Arima Quantitative Prediction suggests solid potential for growth: the upper price (price_forecast$upper) forecasts a maximum of 2023.406 and a minimum of 1808.025. Similarly, the lower price (price_forecast$lower) shows a maximum of 1673.943 and a minimum of 1487.896. This data underscores BRIS's potential for impressive returns—making it a compelling choice for investors looking to capitalize on future market trends.

B. ARIMA Analysis of PT. Bank BTPN Syariah Tbk. (BTPS)

Fig 3. Trending Analysis of PT. Bank BTPN Syariah Tbk. (BTPS) for 2024

In the latest analysis of the Moving Average Convergence Divergence (MACD) with settings (12, 26, 9) as of November 1, 2023, we find compelling insights:

- MACD: -0.368

- Signal: -1.118

The current MACD graphic reveals that the BPTS long-term trend is still bearish; however, the red dotted MACD line has notably crossed below the white trend line. This intersection indicates a significant shift, suggesting that the bearish long-term trend may soon gain bullish momentum as it approaches the MACD zero line.

While Bollinger Bands also signal a bearish long-term trend, they exhibit a slight upward curve, hinting at growing bullish potential.

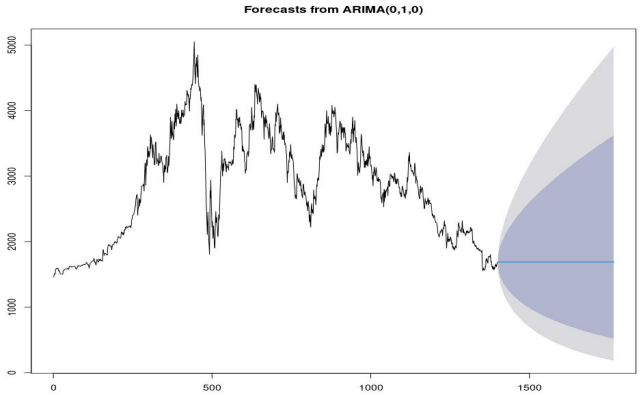

Fig 4. Arima Graphic Analysis of PT. Bank BTPN Syariah Tbk. (BTPS) for 2024

Looking ahead, the ARIMA graphical prediction for 2024 displays a clear blue trend line around the price of 1600, reflecting a sideways trend for BPTS. This means the market may soon choose a direction—either upward/bullish or downward/bearish.

The inner image of the ARIMA prediction (highlighted in blue) presents a maximum possible price of around 3500, alongside a minimum of approximately 500. Meanwhile, the outer image (marked in gray) indicates a broader range with a maximum of roughly 5000 and a minimum of about 250.

For precise planning, the ARIMA quantitative predictions reveal an upper price forecast (price_forecast$upper) with a maximum of 2006.807 and a minimum of 1771.674. On the other hand, the lower price forecast (price_forecast$lower) suggests a maximum of 1610.420 and a minimum of 1402.577.

This analysis clearly demonstrates the potential for a market shift; now is the time to stay informed and consider positioning strategies that align with these emerging trends.

C. ARIMA Analysis of PT. Bank Panin Dubai Syariah Tbk. (PNBS)

Fig 5. Trending Analysis of PT. Bank Panin Dubai Syariah Tbk. (PNBS)

In the Moving Average Convergence Divergence (MACD) analysis using (12, 26, 9), the current values are notable:

- MACD : -1.262

- Signal : -1.343

As of November 1, 2023, the latest MACD graph reveals that PNBS is navigating a long-term sideways trend with a slight bearish inclination. However, the red dotted MACD line has recently crossed above the white trend line, signaling a pivotal moment where the long bearish trend could transition into a short-term bullish trend as it approaches the MACD zero line.

While the Bollinger Bands continue to reflect a prolonged bearish trend, they also highlight the potential for upward movement amidst this sideways activity.

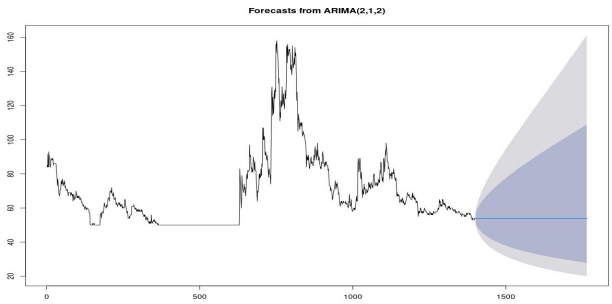

Fig 6. Arima Graphic of PT. Bank Panin Dubai Syariah Tbk. (PNBS)

The Arima graphical prediction for 2024 presents an intriguing perspective: it indicates a straight blue trend line around the price of 50, emphasizing that PNBS is currently in a sideways phase, actively seeking its next directional move—either upwards towards bullish territory or downwards into bearish.

In terms of price estimates, the inner image of the Arima prediction (blue spot) suggests a maximum price near 110 and a minimum around 30. Meanwhile, the outer image (gray spot) forecasts an even broader potential range, with maximum prices reaching approximately 160 and minimums dipping to around 20.

From a quantitative standpoint, Arima's upper price forecast (price_forecast$upper) estimates a maximum of 61.833 and a minimum of 56.029, while the lower price forecast (price_forecast$lower) predicts a maximum of 51.914 and a minimum of 47.153.

In conclusion, this analysis presents an exciting opportunity for prospective investors to carefully watch PNBS as it navigates these critical thresholds and trends.

D. ARIMA Analysis of PT. Bank Aladin Syariah Tbk. (BANK)

Fig 7. Trending Analysis of PT. Bank Aladin Syariah Tbk. (BANK)

In the latest graphical analysis of the Moving Average Convergence Divergence (MACD) with parameters (12, 26, 9), we observe the following key statistics:

- MACD : 1.450

- Signal : 1.359

The MACD chart as of November 1, 2023, reveals that BANK has been on a long-term sideways trend leaning toward bearishness. However, a significant development has occurred: the red dotted MACD line has crossed above the white signal line, indicating a potential reversal to a short bullish trend, albeit still slightly above the MACD zero line.

While Bollinger Bands continue to reflect a long bearish sideways trend, the hints of a fleeting bullish trend cannot be overlooked, signaling an opportunity for investors.

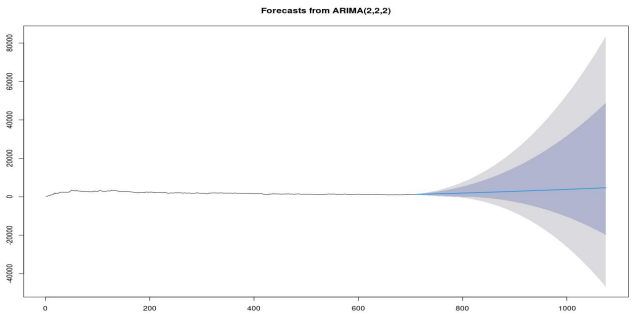

Fig 8. Arima Graphic Analysis of PT. Bank Aladin Syariah Tbk. (BANK)

ARIMA's graphical forecast for 2024 presents a straight blue trend line around a price of 0, suggesting that BANK remains in a sideways position as it seeks its next directional move—whether up (bullish) or down (bearish)—making it a period of potential volatility worth monitoring.

The inner portion of the ARIMA Graphic Prediction (blue spot) indicates a maximum predicted price of approximately 45000 and a minimum predicted price of around -10000. Meanwhile, the outer section (gray spot) forecasts a maximum price of about 80000 and a minimum price around -40000,

providing a range of possible outcomes for investors to consider.

From ARIMA's quantitative analysis:

- The upper prediction (price_forecast$upper) suggests a ceiling of 1573.117 with a floor of 1326.841.

- The lower prediction (price_forecast$lower) shows a maximum of 1181.048 and a minimum of 981.1729.

These insights present valuable data for making informed investment decisions, as BANK navigates a pivotal juncture in its market performance.

V. CONCLUSION AND FUTURE WORK

The Indonesia Stock Exchange (IDX) index is the definitive indicator of the Indonesian stock market, holding substantial value for investors, traders, and companies operating within the country. Within the Islamic banking sector, four key issuers have successfully listed their shares on the IDX: PT Bank Syariah Indonesia Tbk. (BRIS), PT Bank BTPN Syariah Tbk. (BTPS), PT Bank Panin Dubai Syariah Tbk. (PNBS), and PT Bank Aladin Syariah Tbk. (BANK).

As a formidable force in the IDX, Islamic banking is poised to make a significant impact following its listing. However, the upcoming political years of 2024-2025, combined with uncertain predictions for global economic growth, necessitate a thorough examination of the trend directions for these four Islamic commercial banks. In this study, we will employ the ARIMA (Autoregressive Integrated Moving Average) approach, leveraging a machine learning methodology through R programming. The analysis will use daily IDX index data sourced from Yahoo Finance, extending through the end of December 2023.

The findings unequivocally reveal that all four Islamic banks are currently exhibiting bearish trends. Looking ahead to 2024, we anticipate these banks will maintain a sideways trend, consistently oscillating between bullish and bearish conditions. Here's a comprehensive breakdown of the trend analysis for each bank:

- PT Bank Syariah Indonesia Tbk. (BRIS) : The long-term trend remains steadfastly bullish. Even though there are signals suggesting a potential bearish shift, these indications are weak and suggest a sideways trend is more likely. The maximum upper price prediction for 2023 is 3,406, with a minimum of 1,808. The maximum low price prediction stands at 1,673.94, with a minimum of 1,487.90.
- PT Bank BTPN Syariah Tbk. (BTPS) : This bank's long-term trend is firmly bearish; however, it has experienced a shift toward a short-term bullish signal. The maximum upper price prediction is set at 2,006.81, while the minimum is 1,771.67. Predictions indicate a maximum low price of 1,610.42 and a minimum of 1,402.58.
- PT Bank Panin Dubai Syariah Tbk. (PNBS) : The long-term trend is distinctly sideways, trending towards bearishness, although a short-term bullish signal is evident. The maximum upper price prediction is 61.83, and the minimum is 56.03. The maximum low price prediction is 51.91, with a minimum of 47.15.
- PT Bank Aladin Syariah Tbk. (BANK) : Likewise, BANK's long-term trend is sideways, leaning towards bearishness, despite showing potential for a short-term bullish signal. The maximum upper price prediction is 1,573.12, with a minimum of 1,326.84. The maximum low price prediction is set at 1,181.05, while the minimum is 981.17.

This analysis unequivocally highlights the future trajectory of these Islamic banks on the IDX, providing crucial insights for stakeholders in the sector.

VI. ACKNOWLEDGMENTS

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