Analysis And Forecasting of Inflation Rate in Indonesia

Revi Anggreni[1*] , Ayu Wulandari[2], Agung Rizki Putra[3]

1,2,3 Faculty of Economics and Business, University of Bangka Belitung, Indonesia
revianggreni33@gmail.com

Abstract. *This study aims to forecast the inflation rate in Indonesia for the period from January 2025 to December 2027. The analytical method used is SARIMA (Seasonal Autoregressive Integrated Moving Average). The data consist of monthly inflation figures from 34 provinces in Indonesia, obtained from the Central Bureau of Statistics (BPS), covering the period from January 2020 to December 2024. The results show that each region has distinct inflation patterns, leading to varied SARIMA models. Several regions exhibit strong seasonal patterns, particularly at the 12th lag. Based on the analysis, Papua and Maluku tend to have higher monthly inflation rates, while provinces such as DKI Jakarta and West Java show more stable and lower inflation. Monthly comparisons between regions indicate regional imbalances influenced by structural and seasonal factors. The best SARIMA model for each region was used to forecast inflation for the next three years. These forecasts are expected to serve as a foundation for formulating more targeted and effective economic policies to control national inflation.*

Keywords: *Forecasting, SARIMA, Inflation, Indonesia*

1. Introduction

A country is considered to have a good economy if its economic growth is stable and continues to increase. One indicator used to assess a country's economic success is the inflation rate [1]. Inflation is a common problem in the economy that can cause a decline in real income and disrupt macro stability if it continues [2]. Inflation is triggered by increased demand for goods and services (demand-pull), increased production costs (cost-push), and inappropriate fiscal and monetary policies. External factors such as exchange rates, global commodity prices, and supply chain disruptions also contribute to inflation, especially in countries that depend on imports [3]. The impacts include a decline in savings, unproductive investment, and increased production costs that affect other sectors [4]. Indonesia, like other countries, faces the challenges of high inflation and slow economic growth. Keeping inflation stable is key to preventing disruption to the national economy [5]. In the context of the Indonesia Emas 2045 vision, inflation control is prioritized through fiscal and monetary policies and the stabilization of staple commodity prices [6], [7]. Bank Indonesia, as the monetary authority, has a mandate to keep inflation stable and under control [8]. These efforts are reinforced by disinflation strategies, understanding inflation expectations, and controlling the prices of goods that affect purchasing power [9], [10].

Inflation varies significantly between regions in Indonesia due to differences in economic and demographic structures. Therefore, accurate inflation forecasting at the provincial level is needed to produce more targeted and responsive policies to local conditions [11]. Badan Pusat Statistik Indonesia, (2024) data shows that national

inflation rose sharply in 2022 by 5.51 percent, but fell back to 1.57 percent in 2024. The increase was mainly triggered by core inflation from gold jewelry and food commodities, emphasizing the importance of consistent inflation control to maintain price stability and economic growth [13]. Inflation dynamics vary across regions: the more developed western region faces pressure from energy and raw material prices, the central region is prone to seasonal inflation due to bumper harvests, while the eastern region is burdened by high distribution costs. These conditions underscore the need for a decentralized approach to inflation forecasting so that policies are more targeted. Identifying inflation by province is important to prevent negative impacts such as declining purchasing power, economic slowdown, and rising unemployment. The Consumer Price Index (CPI) is used as the main indicator in measuring inflation because it reflects changes in the prices of household goods and services. With monthly publications, the CPI becomes representative time series data for monitoring inflation as well as the basis for formulating more responsive fiscal and monetary policies [3].

2. Research Method

This study analyzes inflation rate forecasts in each province in Indonesia using monthly data from January 2020 to December 2024. The approach used is descriptive research, which aims to explain in a structured manner the conditions, problems, or phenomena related to human life and organizations [14]. The data used in this study is quantitative data, which is data presented in the form of numbers and obtained through a direct measurement or calculation process [15]. This research was conducted in all provinces in Indonesia using CPI (Consumer Price Index) inflation data. Analysis and forecasting were carried out to predict the inflation rate in 34 provinces in Indonesia in the future. This research was conducted in May 2025, using monthly inflation data for the last five years, namely January 2020 to December 2024. The type of data used is quantitative data in the form of monthly inflation data in 34 provinces in Indonesia. Based on the time of collection, this data is categorized as time series data [16]. In this case, the monthly inflation data for all provinces was taken from publications by the Central Statistics Agency (BPS) [17]. From this population, the research sample was taken using purposive sampling, which is the determination of samples based on certain considerations in accordance with the research objectives. The sample used was all monthly inflation data in 34 provinces over a five-year period, resulting in a total of 2,040 observations. This number was obtained from the accumulation of monthly inflation data in 34 provinces over 60 months of observation.

The operational definitions of the variables in this study were established to provide clarity regarding the meaning and measurement methods of the variables studied. The main variable in this study was the inflation rate, which was defined as the percentage change in the Consumer Price Index (CPI) over time. Inflation reflects the general increase in the prices of goods and services in society. This variable is measured using CPI data in each province, with a unit of measurement in the form of a percentage (%) on a ratio scale. Data analysis was carried out using quantitative methods with a forecasting approach using the ARIMA (Autoregressive Integrated Moving Average) and SARIMA (Seasonal Autoregressive Integrated Moving Average) models [18]. Forecasting in this study is the process of estimating future inflation rates based on historical data patterns. In the context of this study,

forecasting is carried out for the medium to long term, namely the period 2025–2027 [19]. After the parameters are obtained, a diagnostic test is performed to ensure that the model meets the white noise residual assumption, namely random and uncorrelated residuals. Diagnostic tests included normality tests, residual independence tests, and LjungBox tests [19].

3. Results And Discussion

3.1 Inflation Rate Forecast Results for Each Province in Indonesia for the Period January 2025 to December 2027

Inflation forecast results in Aceh Province using the SARIMA $(2,0,1)(0,1,1)12$ model show that seasonal patterns recur every year, particularly during Ramadan, Eid al-Fitri, and the end of the year. The results of inflation forecasting in North Sumatra Province using the SARIMA $(2,0,1)(0,1,1)12$ model show that seasonal patterns recur every year, especially during Ramadan, Eid al-Fitri, and the end of the year. The results of inflation forecasting in South Sumatra Province using the SARIMA $(0,0,0)(0,1,1)12$ model show that the increase in inflation in this province was triggered by rising prices of shallots, tomatoes, granulated sugar, air transportation, and gold jewelry. This surge is related to production disruptions caused by El Niño, increased demand during the Christmas and New Year holidays, high global sugar prices, and the upward trend in gold prices on the international market. Inflation forecasting results in West Sumatra Province using the SARIMA $(3,0,0)(0,1,1)12$ model show a seasonal pattern. The increase in inflation was triggered by the distribution costs of rice and tuna due to fuel price increases, while deflation was driven by falling prices of red chili peppers, green chili peppers, and chicken eggs after harvest [20]. The results of inflation forecasting in Bengkulu Province using the SARIMA $(7,0,3)(0,1,0)12$ model show a seasonal pattern. Inflation was mainly triggered by increases in the prices of shallots, tomatoes, and garlic due to extreme weather, while deflation occurred due to a decline in the price of cayenne pepper thanks to abundant supply. The results of inflation forecasting in Riau Province using the SARIMA $(3,0,0)(0,1,1)12$ model show a seasonal pattern. The increase in inflation was triggered by the prices of red chilies, shallots, potatoes, chicken eggs, gold jewelry, and rice, while deflation occurred when food supplies improved and air transportation prices fell [20].

The results of inflation forecasting in the Riau Islands Province using the SARIMA $(0,0,2)(0,1,1)12$ model show a seasonal pattern. Inflation is influenced by increases in the prices of food and beverages, tobacco, and air transportation tariffs, while deflation is driven by declines in the prices of communication, recreation, and education services. Inflation forecasts for Jambi Province using the SARIMA $(0,0,0)(0,1,1)12$ model show a seasonal pattern. Inflation is triggered by the prices of chicken, shallots, rice, tomatoes, jengkol, cayenne pepper, and petai, while deflation occurs when air transportation tariffs fall and food supplies are stable [20]. The results of inflation forecasting in Lampung Province using the SARIMA $(0,0,0)(0,1,1)12$ model show a seasonal pattern. Inflation is triggered by increases in the prices of food, beverages, tobacco, and personal care services [12]. The results of inflation forecasting in the Bangka Belitung Islands Province using the SARIMA $(0,0,0)(0,1,1)12$ model show a seasonal pattern. Inflation is triggered by increases in the prices of chicken, shallots, and fish due to extreme weather and increased

demand for HBKN.

Inflation forecasts for West Kalimantan Province using the SARIMA $(11,0,20)(0,1,1)12$ model show seasonal patterns. Inflation is driven by increases in the prices of personal care, other services, education, clothing, and food and beverages (Statistics, 2024). The results of inflation forecasting in East Kalimantan Province using the SARIMA $(0,0,0)(0,1,1)12$ model show a seasonal pattern. Inflation is triggered by the prices of rice, shallots, tomatoes, and gold jewelry. The results of inflation forecasting in South Kalimantan Province using the SARIMA $(1,0,1)(0,1,1)12$ model show that inflation is driven by increases in the prices of rice, shallots, tomatoes, and gold jewelry. The results of inflation forecasting in Central Kalimantan Province using the SARIMA $(0,0,5)(0,1,1)12$ model show a seasonal pattern. Inflation is driven by increases in personal care and food and beverages, while deflation is triggered by electricity tariff discounts and food supply stabilization. Inflation forecasts for North Kalimantan Province using the SARIMA $(0,0,0)(0,1,1)12$ model show a seasonal pattern. Inflation is driven by increases in food and beverage prices and other services, while deflation occurs when electricity tariffs fall and food supplies stabilize.

Inflation forecasting results in Banten Province using the SARIMA $(2,0,1)(0,1,1)12$ model show a seasonal pattern. Inflation is triggered by electricity tariffs, gold jewelry, tomatoes, shallots, and red chilies, while deflation occurs when commodity supplies are stable. Inflation forecasting results in DKI Jakarta Province using the SARIMA $(1,0,1)(0,1,1)12$ model show a seasonal pattern with a surge in April of 0.16 percent and December of 0.18 percent, as well as a decline in August of -0.23 percent. Inflation is triggered by electricity tariffs and gold prices, while deflation occurs when the prices of household appliances and gold decline. The results of inflation forecasting in West Java Province using the SARIMA $(5,0,0)(0,1,0)12$ model show a seasonal pattern. Inflation is triggered by electricity tariffs, gold jewelry, and the food and beverage group. Inflation forecasts for Central Java Province using the SARIMA $(3,0,0)(0,1,1)12$ model show seasonal patterns. Inflation is triggered by the prices of chicken meat, chicken eggs, rice, cooking oil, and side dishes ahead of Ramadan. The results of inflation forecasting in DI Yogyakarta Province using the SARIMA $(1,0,5)(0,1,0)12$ model show a seasonal pattern. Inflation was triggered by increases in VAT, the maximum retail price of 3 kg LPG, and electricity tariffs.

The results of inflation forecasting in East Java Province show a seasonal inflation pattern with the SARIMA $(1,0,5)(0,1,0)12$ model used to forecast inflation in East Java Province. Inflation was triggered by increases in the prices of rice, cayenne pepper, tomatoes, and shallots, as well as distribution disruptions due to demonstrations by ODOL truck drivers. The results of inflation forecasting in Bali Province show a seasonal inflation pattern with the SARIMA $(0,0,1)(0,1,1)12$ model used to forecast inflation in Bali Province. Inflation was triggered by increases in the prices of rice, ground coffee, pork, cayenne pepper, and green mustard, as well as distribution disruptions due to ODOL actions [21]. The results of inflation forecasting in East Nusa Tenggara Province show a seasonal inflation pattern with the SARIMA $(1,0,3)(0,1,1)12$ model used to forecast inflation in East Nusa Tenggara Province. Inflation was triggered by increases in the prices of cayenne pepper, shallots, rice, and filter kretek cigarettes, mainly due to bad weather and a

surge in demand. The inflation forecast results in West Nusa Tenggara Province show a seasonal inflation pattern with the SARIMA (0,0,3)(0,1,1)12 model used to forecast inflation in West Nusa Tenggara Province. Inflation was triggered by increases in the prices of rice, shallots, cayenne pepper, and cooking oil, as well as distribution disruptions due to bad weather.

The results of inflation forecasting in Gorontalo Province show a seasonal inflation pattern with the SARIMA (0,0,0)(0,1,1)12 model used to forecast inflation in Gorontalo Province. Inflation was triggered by increases in the prices of cayenne pepper, shallots, mackerel, tomatoes, and gold jewelry, mainly due to high rainfall and increased demand ahead of major holidays. The results of inflation forecasting in West Sulawesi Province show a seasonal inflation pattern with the SARIMA (0,0,0)(0,1,1) 12 model used to forecast inflation in West Sulawesi Province. Inflation was triggered by increases in the prices of red chilies, skipjack tuna, rice, and gold jewelry, as well as a surge in electricity tariffs. Inflation forecasts for Central Sulawesi Province show a deflationary trend in October and November. The SARIMA (1,0,1)(0,1,1)12 model was used to fore- cast inflation in Central Sulawesi Province. Inflation was triggered by increases in the prices of tomatoes, rice, cayenne pepper, shallots, mackerel, sweet corn, and gasoline. Inflation forecasts for Southeast Sulawesi Province show a deflationary trend in October and September. The SARIMA (7,0,1)(0,1,1)12 model was used to forecast inflation in Southeast Sulawesi Province. Inflation was triggered by price increases in the personal care and other services, food and beverage/restaurant, and food, beverage, and tobacco groups. The inflation forecast results for North Sulawesi Province show a seasonal inflation pattern with the SARIMA (15,0,0)(0,1,0)12 model used to forecast inflation in North Sulawesi Province. Inflation was triggered by price increases in the food, beverages, and tobacco group, as well as electricity tariffs in the housing group. The inflation forecast results for South Sulawesi Province show a seasonal inflation pattern with the SARIMA (1,0,1)(0,1,1)12 model used to forecast inflation in South Sulawesi Province. Inflation was triggered by increases in the prices of food, beverages, and tobacco, as well as electricity tariffs.

The results of inflation forecasting for North Maluku Province show a seasonal inflation pattern with the SARIMA (0,0,13)(1,1,1)12 model used to forecast inflation in North Maluku Province. Inflation was triggered by increases in the prices of food, beverages, and tobacco, as well as electricity tariffs in the housing group. The inflation forecast results for Maluku Province show a seasonal inflation pattern using the SARIMA (2,0,0)(0,1,0)12 model to forecast inflation in Maluku Province. Inflation was triggered by increases in the prices of food, beverages, and tobacco, as well as electricity tariffs. The inflation forecast results for Papua Province show a seasonal inflation pat- tern with the SARIMA (0,0,1)(0,1,0)12 model used to forecast inflation in Papua Province. Inflation was triggered by increases in the prices of food, beverages, and tobacco, as well as electricity tariffs in the housing group. The results of the inflation forecast for West Papua Province show a seasonal inflation pattern with the SARIMA (0,0,1)(0,1,1)12 model used to forecast inflation in West Papua Province. Inflation was triggered by increases in the prices of food, beverages, and tobacco, as well as electricity tariffs.

3.2 Comparison of Inflation Rate Forecast Results for Each Province in

Indonesia for the Period January 2025 to December 2027

Inflation forecasts for the period January 2025 to December 2027 show consistent seasonal patterns in almost all provinces. This inflation cycle is closely related to religious holidays, long holidays, harvest seasons, and weather conditions that affect food production and distribution. Several provinces, such as Aceh, East Nusa Tenggara, and North Sumatra, are projected to experience inflation spikes in January, May, and December due to increased demand for food commodities, energy, and gold jewelry. Meanwhile, provinces such as Bengkulu, Jambi, and Bangka Belitung are also experiencing similar inflationary pressures influenced by spikes in strategic food prices, import costs, and global price trends. Conversely, the number of provinces show potential for deflation in certain months. South Kalimantan, Central Sulawesi, and Bengkulu are expected to experience a significant decline in inflation when the harvest season produces abundant supplies. West Java, DKI Jakarta, and East Java also recorded a downward trend in inflation during the quiet consumption period after the long holidays. Understanding these patterns is important for local governments and TPIDs in formulating price control strategies and maintaining people's purchasing power.

4. Conclusion

Based on the results of discussions and analysis of monthly inflation fore- casts in 34 provinces in Indonesia for the period January 2025 to December 2027 using the SARIMA model, several conclusions were obtained as follows: 1). The forecast results show that most provinces experience consistent seasonal inflation patterns every year. These increases reflect increased public demand for basic needs shifts in consumption behavior, and supply disruptions that commonly occur during these moments. 2). The highest average inflation during the forecasting period is expected to occur in East Nusa Tenggara, with significant spikes in January and December, driven by price pressures in the food, beverage, and tobacco groups. In contrast, South Kalimantan shows the most prominent deflationary trend, particularly in July and August, due to abundant food supplies from the harvest season. These differences confirm that geographical characteristics, consumption patterns, and interregional logistics distribution greatly influence inflation dynamics. Other provinces such as Aceh, Jambi, and Gorontalo also recorded high inflationary pressures due to global commodity prices, dependence on external supplies, and the expansion of the CPI calculation coverage. Meanwhile, provinces such as Central Sulawesi, Papua, and West Sulawesi experienced several months of low inflation or deflation due to falling prices of fresh fish, seasonal vegetables, and abundant local food stocks.

References

[1]   Y. W. A. Nanlohy and S. B. Loklomin, "Model autoregressive integrated moving average (ARIMA) untuk meramalkan inflasi Indonesia," *Var. J. Stat. Its Appl.*, vol. 5, no. 2, pp. 201–208, 2023.

[2]   Q. He, M. ur Rahman, and C. Xie, "Information overflow between monetary policy transparency and inflation expectations using multivariate stochastic volatility models," *Appl. Math. Sci. Eng.*, vol. 31, no. 1, p. 2253968, 2023.

[3]   J. E. Saputra and W. Febrianti, "Application of Autoregressive Integrated Moving

Average (ARIMA) for Forecasting Inflation Rate in Indonesia," *J. Mat. Stat. dan Komputasi*, vol. 21, no. 2, pp. 382–396, 2025.

[4] P. K. Clark, "Inflation and the productivity decline," *Am. Econ. Rev.*, vol. 72, no. 2, pp. 149–154, 1982.

[5] A. Salim, F. Fadilla, and A. Purnamasari, "Pengaruh inflasi terhadap pertumbuhan ekonomi indonesia," *Ekon. Sharia J. Pemikir. dan Pengemb. Ekon. Syariah*, vol. 7, no. 1, pp. 17–28, 2021.

[6] M. A. Irfan, "URGENCY OF PROVIDING DISABILITY SERVICES IN CILEGON CITY," *Sustain. PUBLIC POLICY BETTER Gov.*, p. 66, 2025.

[7] A. R. Makkulau, M. Nur, and W. Rahmah, "The influence of Risk Profile, Good Coorporate Government, Profitability, and Capital on Company Value in The Banking Sector on The Indonesian Stock Exchange," *Atestasi J. Ilm. Akunt.*, vol. 7, no. 2, pp. 1427–1445, 2024.

[8] A. Yusnitasari, "Peramalan inflasi Indonesia dengan menggunakan metode ARIMA Box-Jenkins," *J. Paradig. Multidispliner*, vol. 1, no. 2, p. 474430, 2020.

[9] Z. Gafurdjan, "Inflation and its effects on consumer behavior and economic policies," *Qo 'Qon Univ. Xabarnomasi*, vol. 10, pp. 3–6, 2024.

[10] S. Nujum and Z. Rahman, "Pengaruh Investasi Dan Inflasi Terhadap Pertumbuhan Ekonomi Di Kota Makassar," *J. Econ. Resour.*, vol. 1, no. 2, pp. 117–129, 2019, doi: 10.33096/jer.v1i2.158.

[11] K. B. Prasasti, E. Murdiyanto, T. D. Yulianti, and W. A. P. M. Wibawa, "The Forecasting Inflation Movements in East Java Province Using the Auto-Regressive Integrated Moving Average (ARIMA) Approach," *Balanc. Econ. Business, Manag. Account. J.*, vol. 22, no. 1, pp. 86–96, 2025.

[12] Badan Pusat Statistik Indonesia, "Inflasi Tahunan (Y-on-Y) 38 Provinsi (2022=100) (Persen). 2024." [Online]. Available: http://bps.go.id/id/statistics-table/2/MjI2MyMy/inflasi-tahunan--y-on-y--38-provinsi--2022-100-.html

[13] L. M. Pokhrel and S. Ghanghas, "The Impact of Inflation on Jewelry Consumers in Nepalgunj: An Exploratory Study," *Voice A Biannu. Biling. J.*, vol. 16, no. 1, pp. 73–84, 2024.

[14] P. F. Carini, "Observation and Description: An Alternative Methodology for the Investigation of Human Phenomena.," 1975.

[15] I. Izzulsyah, Z. Zeleansi, H. Saputri, N. Kholisoh, and R. Amelia, "Pendekatan metode Autoregressive Integrated Moving Average terhadap perkiraan harga bawang merah di Kota Pangkalpinang," in *PROCEEDINGS OF NATIONAL COLLOQUIUM RESEARCH AND COMMUNITY SERVICE*, 2023, pp. 22–26.

[16] U. Sulung and M. Muspawi, "Memahami sumber data penelitian: Primer, sekunder, dan tersier," *Edu Res.*, vol. 5, no. 3, pp. 110–116, 2024.

[17] N. F. Amin, S. Garancang, and K. Abunawas, "Konsep umum populasi dan sampel dalam penelitian," *Pilar*, vol. 14, no. 1, pp. 15–31, 2023.

[18] M. F. Akbar, M. A. Samsuddin, and A. R. Putra, "Ekonometrika: Struktur data, Regresi, Vector Autoregression dan Vector Error Correction Model," 2022, *Dewa Publishing*.

[19] R. Wang and J. Tan, "Exploring the coupling and forecasting of financial development, technological innovation, and economic growth," *Technol. Forecast. Soc. Change*, vol. 163, p. 120466, 2021.

[20] I. Mokeddem, "The impact of inflation on household purchasing power in Europe (2020–2025)," 2025.

[21] D. Lazuardi and B. N. Asiyah, "The Influence of Trade in Services, Inflation, and Foreign Direct Investment on the Sharia Stock Index: A Case Study in Indonesia and Malaysia," *El-Barka J. Islam. Econ. Bus.*, vol. 8, no. 2, pp. 135–156, 2025.