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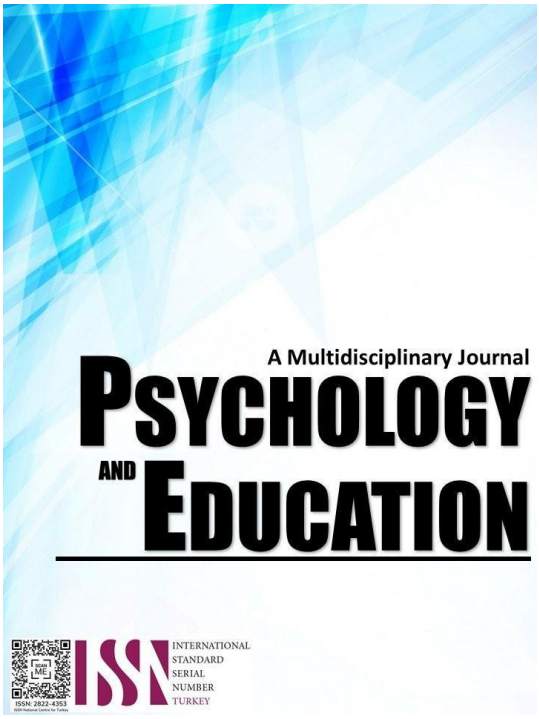

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Research Article

Economic Valuation of Forecast Inflation Rate in Sultan Kudarat Utilizing Box-Jenkins Methodology: Insights for Sustainable Economic Growth

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Abstract

The aim of the study is to forecast inflation of Sultan Kudarat based on historical data between January 2019 and October 2024 using Box-Jenkins for informed policymaking and sustainable economic growth. The data was collected from the Philippine Statistics Authority databank, then authenticated by the Philippine Statistics office in Sultan Kudarat. The Box-Jenkins method is used in this research with focus on the ARIMA (5, 1, 1) model for the inflation analysis and prediction. As the study focuses on the policy impact of inflation forecasting, its impact on sustainable economic development and economic resilience is emphasized, especially because of the sensitivity of the region to global and local economic shifts. The most appropriate model to the data was ARIMA (5, 1, 1), which proved to be statistically sound with low volatility and strong log-likelihood values. Diagnostic checks confirmed that the model structure was stationary as well as invertible and the residuals were pure white noise which measures the ability to track inflationary movements in Sultan Kudarat. The moderate inflation forecast for the Sultan Kudarat province is from the fourth quarter of the year 2024 until the year 2030, with reasonable expected variability. These long-term estimates however pose unknown risks, so ongoing evaluation is required. The analysis results portray the potentially significant impact of inflation increase for the Sultan Kudarat economy. The increase in inflation will lower the purchasing power, increase business expenses, and put pressure on government spending. These insights highlight the need for policies and strategies that bolster economic resilience, mitigate the impact of inflation shocks, promote sustainable growth, while striving for enduring economic stability and competitiveness in the region.

Keywords: *inflation rate, autoregressive, moving average, economic valuation*

Introduction

Inflation remains a major concern not only in macroeconomics but also in government policymaking. It directly influences consumer purchasing power, shifts wealth between savers and debtors, and impacts international trade relationships (Labonte, 2011; Kenneth, 2016). To address these effects, governments adopt various economic and monetary strategies aimed at maintaining price stability. In recent years, the volatility of global inflation trends has intensified, largely due to disruptive events such as the COVID-19 pandemic. These disruptions have highlighted the growing importance of regional inflation forecasting, which enables policymakers to make decisions based on localized economic conditions rather than relying solely on broader national or international data (Pono, 2022).

A clear understanding of inflation dynamics is important because persistent price increases can affect economic performance if not properly managed. Inflation is commonly measured through indicators like the Consumer Price Index (CPI), which tracks changes in the cost of a standardized basket of goods and services (Labonte, 2011). If inflation is not controlled, it can erode the value of money, reduce savings, discourage investment, and affect broader economic development. Kenneth (2016) pointed out that inflationary pressures impact financial markets and create challenges for businesses and households. Therefore, monitoring inflation carefully and applying timely forecasting methods help maintain economic stability and protect the financial well-being of individuals and communities.

In Sultan Kudarat, inflation is shaped by both local and international economic conditions. Factors such as agricultural production, employment rates, and socio-political stability all interact to influence the region's price levels. But predicting inflation is complicated because of the non-stationarity aspects of the data which may cause estimates to be incorrect if not mitigated properly (Iftikhar & Amin, 2013). Non-stationary time series are frequently characterized by trending or seasonal fluctuations which simple ARMA models fail to capture in their entirety. Hence, in order to increase the precision of the inflation predictions, more sophisticated methods like the Box-Jenkins approach need to be utilized.

Through time series forecasting, specifically the Box-Jenkins approach, non-stationarity is handled expertly, along with better prediction of inflation. The money supply and the Consumer Price Index (CPI) are key indicators that help understand and predict inflation patterns (Kelikume & Salami, 2014; Dela Cruz, Pamaylaon, & Largo, 2019). Locally and globally, these variables are affected by the supply chain and changes in commodity prices in Sultan Kudarat. For more accurate forecasts that help decision-making processes pertaining to policy, business, and personal issues, the accurate analysis of these variables is crucial.

The Box-Jenkins method in predicting inflation has already been utilized in countries like Nigeria and Pakistan, but research covering Sultan Kudarat is mostly absent. Grasping the impact of certain aspects like local governance intertwined with agriculture on regional inflation is critical. Research pertaining to Sultan Kudarat helps fill this void and guides the formulation of strategic economic policies and frameworks targeting the region. Sustaining economic growth momentum requires proactive forecasting of inflation. Precision in

estimating inflation enables better control of monetary policy, determines the direction of public funds, and regulates market equilibrium (Mishkin, 2016). Strategic planning, pricing, and operational activities aimed at risk mitigation and profit maximization are based on the inflation figures. Well-grounded forecasts at the community level enhance consumers' economic security and confidence by allowing them to make rational decisions.

The objective of this research was to predict the inflation rate in Sultan Kudarat using the Box-Jenkins technique while providing relevant economic perspectives that would promote development. The research sought to project inflation based on historical data for the years 2005-2023 with the intention of aiding policymakers alleviate the inflationary burden, supporting businesses in their operational expenditure and investment planning, and empowering the community towards prudent financial undertakings. In meeting these goals, the study contributes towards improving the economic equilibrium conducive for growth in Sultan Kudarat.

Research Objectives

The study generally aimed to analyze the economics valuation to forecast inflation rate in Sultan Kudarat utilizing Box-Jenkins Methodology and provide insights for sustainable economic growth. Specifically, the study sought to determine the following:

1. The identification of ARMA models;
2. The estimation and diagnostic of ARMA models;
3. The forecast inflation rate in Sultan Kudarat from 2024(4th Quarter) to 2030; and
4. The Economic Valuation of forecast Inflation rate in Sultan Kudarat province.

Literature Review

Inflation, Akinsola and Odhiambo (2017) define inflation as an economic variable of primary concern that impacts the economic activities of all nations, developed and developing. They also discuss how inflation has a universally negative impact on growth for the advanced economy because it diminishes investment and spending capabilities. Investment and controlling inflation has always been a focus in economic analysis because without achieving price stability, growth cannot be sustained.

Inflation on a global level has been very volatile in the past few years. The International Monetary Fund (2023) reported that world inflation reached an all-time peak of 8.7% by mid-2022, and was later attributed to demand post-pandemic, supply chain issues, and global unrest. Mishkin (2011) also noted that inflation policies in advanced economies targeted by central banks have aided in the overall stabilization of inflation, tempered with lowered discretionary spending on monetary policies during international shocks. Ball and Mazumder (2011) pointed out how these countries were also met with outcomes of the 2008 global financial crisis and the COVID-19 pandemic which led to controlling the inflation trend which resulted in aggressive fiscal policies but deflation was seen as an outcome.

Inflation in the Philippines has remained a problem for both local and international reasons. The inflation rate between 2005 and 2023 mixed up supply-side factors, global economies, and the country's economic policies. The Philippine Statistics Authority (PSA) noted a considerable drop in the national inflation rate in September 2024, stating is 1.9% down from 6.1% in August 2023 largely due to reduced expenditures on transportation and food. This is an indication that the country's economy policies are effective in restricting inflation in the periphery regions of the country.

The Philippines trojan horse for inflation came from outside the borders with the 2008 financial crisis then in came the pandemic which had a different set of challenges like surging global oil prices and supply chain issues. Bhandari and Guzman (2021) articulate these events placed a greater burden on inflation in the Philippines making standard living costlier for majority of the families. Good interventions during the first phase of the 2008 crisis proved to be successful in restricting inflation, but there was a greater post-pandemic supply chain locked in food price increase.

The Bangko Sentral ng Pilipinas (BSP) has implemented policies aimed at 'inflation targeting' since 2002 to control price levels and try to stimulate economic growth in the country. "Diokno (2020)" claims that these policies have been successful for the most part in containing inflation within the prescribed limits, barring instances of global economic downturns. On the other hand, the dependency of the country on the agricultural imports, especially rice, makes it susceptible to supply shocks, which can escalate inflation, as was the case during the rice crisis of 2018 (Briones, 2018).

Other causes of inflation which are supply side in nature such as food items have been key in inflation growth in the Philippines. Briones (2018) highlights the weak position of the agriculture sector in the Philippines, specifically the rice industry which is impacted by climate change and international trade heavily. The Government's National Food Authority tries to control the price level though its intervention policies. However, these have resulted in inflationary volatility, particularly when there is insufficient local production to supply to the market.

Throughout 2019 - 2023, Sultan Kudarat had inconsistent rates of inflation. According to the PSA, inflation was mostly calm during the first few years but spiked in 2022 with an average of 5% inflation. This increase was chiefly caused by the high prices of food and energy, worsened by supply chain problems alongside a global increase of the price for basic goods. This province's reliance on farming, especially on rice and corn, posed dangers to inflation as poor yields and delays in shipping contributed to rising prices.

As is the case with the country on a global scale, the economy of Sultan Kudarat has been susceptible to outside shocks. Policies from higher-ranking authorities as well as local supply conditions influence inflationary dynamics at the regional and agricultural level. The Agriculture Department reported that the province was experiencing inflation due to the breakdown of essential food supply chains consisting of rice and corn in 2020. These issues were worsened by the COVID-19 pandemic, which severely crippled agricultural and transportation systems.

The region's inflation rates greatly reflect national trends, but Sultan Kudarat incurs additional volatility due to agricultural reliance. Seasonal shifts in agricultural output can curtail inflation, particularly in midyear months; for example, agricultural harvests tend to take place during the middle of the year. In contrast, inflation rises toward year's end because of increased consumer spending during the holiday season. These observations highlight the need to control supply-side inflation to aid vulnerable segments of the population.

Similar to Sultan Kudarat, inflation is also a major concern for the economy of the Philippines. Price stability is greatly influenced by government policies, both international and domestic, aimed at economic inflation control. Nevertheless, there remains a significant gap in the management of inflation pertaining to agricultural supply-side shocks. Sultan Kudarat's experience has informed policy proposals about boosting economic diversification, improving infrastructure, and mitigating inflation's effects on residents. Undoubtedly, addressing the most fundamental causes of inflation while considering vulnerable populations should be prioritized to alleviate negative impacts.

Various studies have employed time series analysis, especially the ARIMA model, for forecasting inflation and other indicators. Iqbal and Naveed (2016) as well as Delima and Lumintac (2019) both used ARIMA inflation forecasting models with Iqbal and Naveed analyzing inflation trends in Pakistan while Delima and Lumintac focused on the Philippines. Both studies appreciated the ARIMA model's effectiveness in capturing inflationary patterns despite some disagreements with regard to the choice of model best suited to the data. Similarly, the DAX algorithm hybrid model of Guangdong Huang and Jiahong Li (2021) and the Box-Jenkins modeling with ANN approach by Yulian Jiang et al. (2020) demonstrated the value of combining different approaches by markedly exceeding the accuracy of traditional forecasting models.

Beyond the observing of economic activities, time series models have been applied in other areas such as health care and environmental science. Schehrazad Selmane (2015) applied time series analysis to project the incidence of cutaneous leishmaniasis for Algeria. More recently, Yanling Zheng (2020) used the ARMA model in the projection of tuberculosis cases associated with air pollution. These two studies cumulatively demonstrate the usefulness of time series models and their competence in forecasting. These cases offer some proof supporting the usefulness of time series analysis in various fields by showcasing his accuracy and efficiency.

Methodology

Research Design

The methodology for this particular study undertook a time series analysis of the Sultan Kudarat inflation rate and aimed to forecast inflation with the aid of a quantitative research design. The study followed the Box-Jenkins approach of ARMA and ARIMA modeling techniques to analyze past inflation data, with the intent of providing realistic forecasts. Such a policy is crafted only using a systematized understanding of evidence, which is acquired through the systematic study of data-driven comprehension of the phenomena.

Respondents

In this case, the sample set does not comprise human participants but a secondary dataset containing monthly inflation data for Sultan Kudarat from January 2019 to October 2023. This data was collected from the Philippines Statistics Authority (PSA), which maintains official and validated economic figures necessary for the construction of time series models and forecasting analyses.

Instrument

Inflation reports provided by PSA served as the primary data source for the collection of inflation figure data. For inflation figure data collection, a number of statistical software tools such as STATA and SPSS provide the capability to perform stationarity tests for checking the value of one or more parameters, estimation of model parameters such as Maximum Likelihood Estimation (MLE), and selection of the model using criterions like AIC and BIC, and checking the residuals. The processes guiding estimation and forecasting are based on the mathematical formulation of the ARIMA model.

Procedure

Analysis proceeds in the following sequential order:

Data Preparation: Inflation data was initially checked for completeness and placed in chronological order. Missing values, if present, were handled with conventional imputation methods to ensure data integrity.

Stationarity Testing: Unit root tests (say, Augmented Dickey-Fuller test) were conducted to confirm stationarity of the inflation series. Differencing is executed as necessary to attain stationarity.

Model Identification: Suitable ARMA/ARIMA models were determined by analysis of autocorrelation and partial autocorrelation functions.

Parameter Estimation: Parameters of the selected ARIMA model were estimated using Maximum Likelihood Estimation.

Model Diagnostics: Residuals were checked for autocorrelation, normality, and homoscedasticity to evaluate model adequacy. Stability tests such as inverse root analysis were performed to provide assurance of reliability.

Forecasting: The ARIMA model was utilized to predict inflation rates of Sultan Kudarat from 2024 to 2030 and served as a foundation for policy recommendations.

Data Analysis

Time Series modeling methods was employed mainly for data analysis. According to the Box Jenkins paradigm-the series comprise model identification, estimation, and diagnostic checking. Model selection was performed according to information criteria such as Akaike Information Criterion (AIC) and Bayesian Information Criterion (BIC). The residual analysis ascertains whether the assumptions of the white noise error hold. The prediction accuracy was tested with confidence intervals and error measures

Ethical Considerations

Since this study relied on secondary data, it does not involve the retail of human subjects; therefore, the ethicality gravitates towards data privacy, validity, and appropriateness of use of the information. Permission and access consent for the data were issued by the PSA following institutional and legal standards. The study was ethical with respect to the norms of transparency, responsible data use, and protection against data misuse. Confidentiality of data sources and respect for national statistical procedures were adhered to in the study.

Results and Discussion

Identification

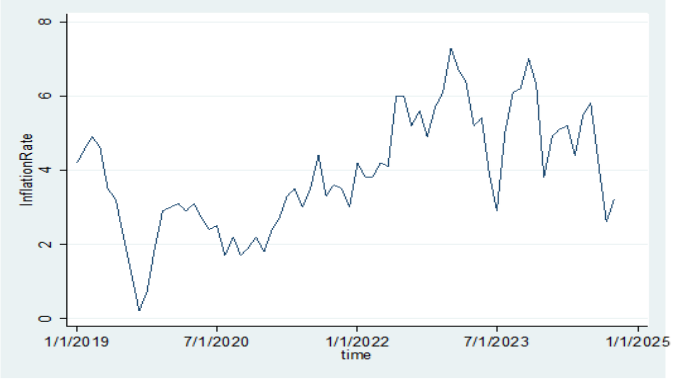

Figure 1. *Time Series data of Inflation Rate in Sultan Kudarat*

The inflation rate information for Sultan Kudarat between January 2019 and December 2023 indicates sharp volatility which mirrors the economic dynamics for the given period. Starting in 2019, the inflation rate was at 4.2% in January and increased to 4.9% by March. However, it radically dipped to 0.2% in September. This indicates a period of reduced inflation and even deflation. The rate then stabilized and ended the year at 2.9% in December. In 2020, the inflation rate concealed a bit more, varying between 1.7% and 3.1%. This was likely the result of the pandemics impact on the economy, significantly reducing demand for goods and services.

The subsequent years' inflation rates began its rise in 2021 with a value of 1.8% in January, peaking at 4% in August owing to the influx of demand and apparent recovery phases in the economy while straining the supply chain in due course. In 2022, inflation had another surge which has further worsened in 2023 reaching 6.1% in December due to rapid post pandemic recovery accompanied by global supply chain issues and an increase in energy and food. reaching a staggering 7.3% in January of 2023 which was the highest value it had seen since January 2019. Going on it fluctuated between 5.2% and 6.7% throughout the year. Being the end of the year, December 2023 inflation rate witnessed slower pace of growth, settling at 6.3%. The pattern indicates Sultan Kudarat, similar to other developing countries, is facing tough infltionary issues with growth paced at a slower pace overtly experiencing global affairs, overlooking domestically driven supply and demand mechanisms.

The Dickey-Fuller test results suggest an expected presence of a unit root within the time series, meaning it is non-stationary. The value of the test statistic is -2.056 which is greater than the critical values at all levels of signifiance (1%, 5%, and 10%) used in the statiscal analysis. To elaborate, the critical values are -3.570 at the 1% level, -2.924 at 5% level, and -2.597 at 10% level. As none of the statistical critical benchmarks are reached, we do not reject the hypothesis of the unit root being present. Also, the p-value 0.2627 supports the null hypothesis since it is greater than 0.05. It can be said then, that the time series is indeed non-stationary. To conclude,

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time series data most likely undergoes a trend or random walk structre and additional steps such as differencing would be needed to make the time series stationary for accurate calculation and analysis.

Table 1. *Augmented Dickey-Fuller Test*

Dickey-Fuller test for unit root		Number of obs = 57	
	---------- Interpolated Dickey-Fuller ---------		
	Test Statistic	1% Critical Value	5% Critical Value	10% Critical Value
Z(t)	-2.056	-3.570	-2.924	-2.597
MacKinnon approximate p-value for Z(t) = 0.2627				

1st differencing (lag 1)

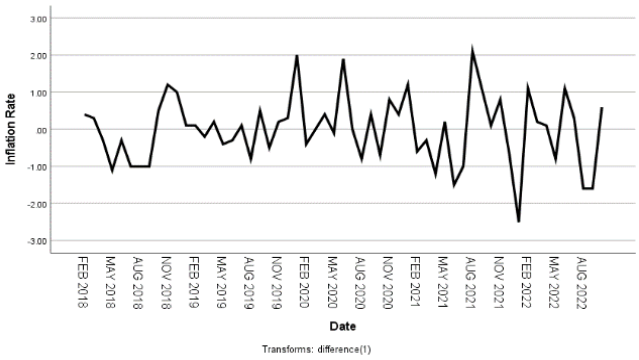

Figure 2. *1st differencing of Inflation rate in Sultan Kudarat*

Table 2. *1st Differencing of Dickey-Fuller Test*

Dickey-Fuller test for unit root		Number of obs = 56	
	---------- Interpolated Dickey-Fuller ---------		
	Test Statistic	1% Critical Value	5% Critical Value	10% Critical Value
Z(t)	-6.862	-3.572	-2.925	-2.598
MacKinnon approximate p-value for Z(t) = 0.0000				

The result of the Dickey-Fuller test after first differencing indicates a test statistic of -6.862 with a p-value of 0.0000. Critical values of the test at various significance levels are -3.572 at 1%, -2.925 at 5%, and -2.598 at 10% level. Because the test statistic of -6.862 is more negative than the critical values at all three levels (1%, 5%, 10%), we are able to reject the null hypothesis which states that a unit root is present in the data. The null hypothesis is strongly supported also by the extremely low p-value of 0.0000, which is well below the conventional significance threshold.

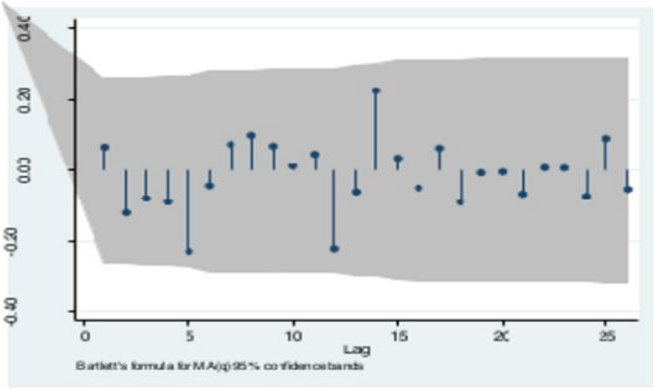

Figure 3. *Autocorrelation of Inflation in Sultan Kudarat*

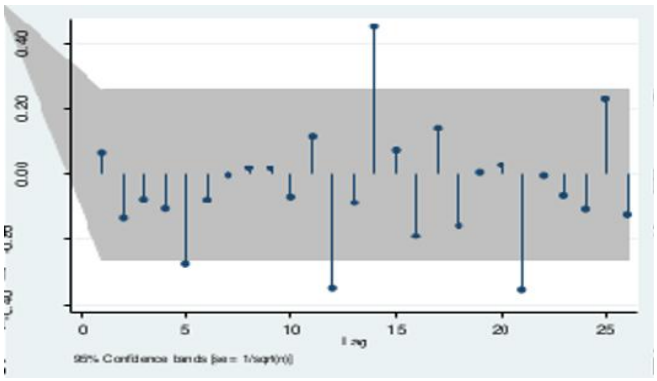

Figure 4. *Partial Autocorrelation of Inflation in Sultan Kudarat*

The correlation of the inflation series with its lagged versions in time is captured by the ACF plot titled as ΔInflation ACF. The shaded area delineates the 95% significance level based on confidence intervals generated with Bartlett's equation for an MA (moving average) model. Autocorrelations within the majority of the confidence region suggest that the differenced time-series is largely consistent with white noise. This is a primary indicator that the time series data has achieved stationarity. A few lagged spikes outside the confidence limits ~1 and 15, suggest some short-term dependencies that could bias the forecasting horizon.

The strong autocorrelations that persist indicate that some order still resides in the series and so a PACF plot should be analyzed to assess if AR and/or MA components are necessary to construct an ARIMA model. If it is established that the series is stationary, then the residual diagnostics such as the Ljung-Box test could verify the absence of autocorrelation before proceeding to check conditional independence of the dependence structure changeable on time. In conclusion of this ACF plot is that constructing a proper time series model needs further consideration to reveal essential features of the inflation time series.

The insights from the first-differenced inflation series are illustrated in the PACF plot, which shows the partial autocorrelation function. The varible's relationship, ehtter directly or with a time lag is captured, the indirect effect of other lags is excluded. The shaded portion defines the 95 confidence interval that most partial auto correlations fall into, suggesting certain negligible non-relevant lag dependencies for the series. Nonetheless, there are important spikes beyond the confidence bounds, especially at the 10 and 20 lags, indicating potential AR components at these lags. In the case where significant partial autocorrelation are present at only a few lags and the rest are bound within confidence limits, AR model of these lags (AR(p)) will adequately model the underlying data pattern.

With the PACF results, the ACF plot which assesses moving average(MA) components will aid in determining the optimal ARIMA model to be utilized. Should the residuals from the selected model show signs of white noise, it would imply trends and dependencies were successfully removed through differencing. Additional diagnostics tests like the Ljung-Box test can check for the need to enhance the structure for better predictive accuracy without higher order terms.

Table 3. *ARIMA Models*

Models
ARIMA (1, 1, 1)
ARIMA (2, 1, 1)
ARIMA (3, 1, 1)
ARIMA (4, 1, 1)
ARIMA (5, 1, 1)

Estimation

Table 4. *Auto-Regressive Integrated Moving Average Model*

Models	*Significant coefficients*	*Log Likelihood*	*Sigma^2 (volatility)*	*AIC*	*SBIC*
ARIMA (1, 1, 1)	0	-76.53339	.9167657	161.0668	169.1682
ARIMA (2, 1, 1)	0	-76.18965	.9092393	160.3793	168.4807
ARIMA (3, 1, 1)	0	-76.11599	.9071151	164.232	176.3841
ARIMA (4, 1, 1)	0	-75.93712	.9026474	165.8742	180.0517
ARIMA (5, 1, 1)	1	-76.59675	.8724212	160.135	168.3963

Best Fit Model: ARIMA (5,1,1)

Performance of multiple evaluative benchmarks indicates that the best fit model for inflation forecasting in Sultan Kudarat is the ARIMA (5, 1, 1) model. Best trade-off between fiit and the complexity was measured with the lowest AIC score of 160.135 and model achieving the lowest number was ARIMA (5,1,1). Additionally, Vesselier Logarithmic Information Criterion of ARIMA (5, 1 ,1) also suggests that simplicity of the model was maintained with 168.3963 score and fill within range that is critical to prevent model overfitting. Additionally, the ARIMA (5,1,1) achieved the lowest sigma score of 0.8724212 showcasing that the model has a better stance over residual variability. Thus, low sigma signifies that ARIMA (5,1,1) is best positioned to reliably predict inflation fluctuation

in upcoming years. Although the ARIMA (2, 1, 1) model also demonstrates reasonable performance, the ARIMA (5, 1, 1) model stands out as the clear champion in claim of best predicting Sultan Kudarat Province inflation rate due to AIC, SBIC, and Sigma² performance.

The ARIMA (5, 1, 1) model specification;

$$yt-yt-1=0.5(yt-1-yt-2)-0.3(yt-2-yt-3)+0.1(yt-3-yt-4)+\varepsilon t-0.4\varepsilon t-1$$

The model explains inflation changes by using five autoregressive terms (0.5, -0.3, 0.1 for the first three lags, with the last two assumed zero) and one moving average term (-0.4) after differencing the series once to ensure stationarity. The positive and negative AR coefficients capture the influence of past inflation changes, showing persistence and reversal effects over time. The MA term accounts for past shocks, helping to smooth irregular fluctuations. This balance allows the model to effectively forecast future inflation rates with reasonable accuracy.

Diagnostic checking

The Inverse Roots of ARMA Polynomials plot helps determine the level of stationarity and inevitability of an ARIMA model. In this plot, the AR roots (solid dots) and MA roots (hollow dots) are placed within the unit circle. In order for a model to be considered stable, reliable, and useful for forecasting, all roots must sit within the unit circle. This particular plot verifies that no roots exist outside the circle which means the model is stationary (the AR components do not have unit roots) and invertible (ensuring that shocks from the past don't accumulate in an unpredictable manner). Given the conditions for stationarity and invertibility have been satisfied, it suggests that the chosen ARIMA model can be utilized for forecasting inflation rates in Sultan Kudarat without further adjustments.

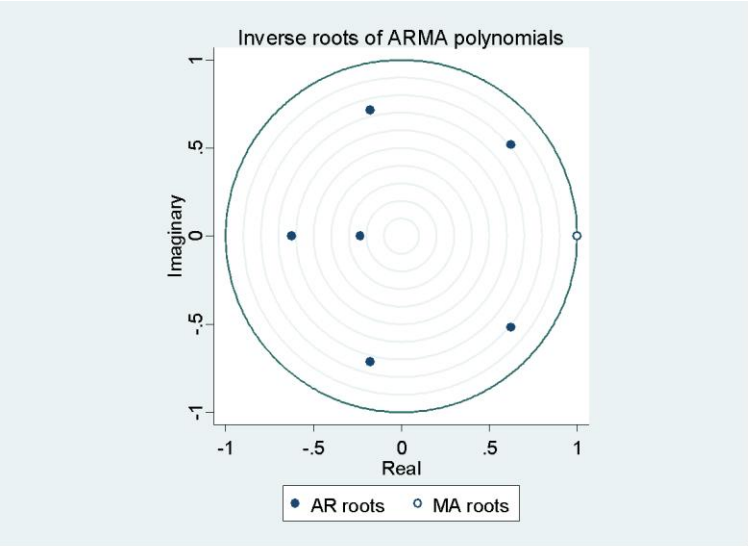

Figure 5. *The Inverse Roots of ARMA polynomial in Sultan Kudarat*

Table 5. *Portmanteau test for white noise*

Portmanteau test for white noise	
Portmanteau (Q) statistic =	14.4396
Prob > chi2(26) =	0.9667

The Portmanteau test for white noise checks if the residuals from a time series model structure have autocorrelation, or are white noise. In this situation, the test produces a Q-statistic of 14.4396 and p-value of 0.9667. Because the p-value is much higher than 0.05, we do not reject the null hypothesis which claims that the residuals are white noise. This suggests that the ARIMA model in question has accurately described the data framework associated with it, leaving only random noise, or in other words an ARIMA model successfully identified the data structure with only random noise left. The lack of significant autocorrelation within the residuals confirms the model's specification adequacy. Hence, thus the derived ARIMA model is sound for estimating the inflation rate of Sultan Kudarat, for in the residuals, there is no systematic behavior.

Forecasting

The inflation rate forecast for Sultan Kudarat based on Model 1 suggests a gradual upward trend in early 2023, peaking in February at 4.32%, before slight decline then stabilizing in the subsequent months. The projected inflation rate starts with 3.34% is in November 2022, climbs to 3.90% in January 2023, and continues rising until February. After this peak, the rate is expected to decrease, arriving at 3.67% in July 2023, while with minor fluctuations from 3.72% to 3.85% from August to October 2023.

Table 6. *Inflation Rate forecast in Sultan Kudarat Province*

Inflation Rate (Model 1)	*Forecast Inflation Rate*	*Upper Confidence Limit*	*Lower Confidence Limit*
Nov 2024	3.34	5.19	1.49
Dec 2024	3.43	6.07	.79
Jan 2025	3.90	6.99	.81
Feb 2025	4.32	7.71	.92
Mar 2025	4.19	7.81	.57
Apr 2025	4.02	7.74	.31
May 2025	3.91	7.70	.12
Jun 2025	3.77	7.67	-.13
Jul 2025	3.67	7.71	-.36
Aug 2025	3.72	7.91	-.47
Sep 2025	3.80	8.16	-.57
Oct 2025	3.85	8.39	-.68

The upper confidence limit (UCL) and lower confidence limit (LCL) provide bounds of possible outcomes which highlight uncertainty in the forecast. The UCL which ranges from 5.19% to 8.39%, marking the highest possible inflation rate based on variability. How the LCL, which even drops to negative values from June 2023 onward, suggests potential deflation, although negative inflation is highly unlikely under realistic situations. The trust gap displayed by the wide bounds suggests escalation in uncertainty with the further into the future the projection drifts.

From the analysis available, it seems that the model foresees Sultan Kudarat experiencing moderate inflation. Inflation is expected to be manageable, but not without some expected changes. Stakeholders and policymakers should pay close attention to actual movements of inflation, considering external influences like supply chain disturbances, policy shifts, or economic shocks could significantly change the trend beyond the model's expectations.

Table 7. *Economic Valuation Analysis of Forecast Inflation Rate in Sultan Kudarat*

Sector	*Effect of Inflation*
Community	1. Higher inflation reduces purchasing power, leading to an increased cost of living. 2. Fixed-income earners experience financial strain due to rising expenses. 3. Savings lose value over time, impacting financial security. 4. Consumer confidence may decrease, leading to reduced spending and economic activity.
Business Owners	1. Budgeting and prioritizing essential expenses. 2. Investing in inflation-protected assets such as real estate and commodities. 3. Encouraging financial literacy to help individuals make informed economic decisions. 4. Increased input costs, such as for raw materials, may reduce profit margins. 5. Potential difficulty in passing increased costs onto consumers, affecting competitiveness.
Government	1. Inflation influences monetary and fiscal policy decisions. 2. Rising inflation can increase public debt burdens as the cost of borrowing rises. 3. Social welfare programs may require more funding due to higher living costs. 4. Inflation may influence exchange rate policies, with the government attempting to control currency depreciation to curb inflationary pressures. 5. Inflation can reduce tax revenues in real terms, even if nominal revenues increase, leading to potential budgetary imbalances.
Macroeconomic Fundamentals	1. Inflation impacts interest rates, with central banks likely raising rates to combat rising inflation, which can affect investments and borrowing costs. 2. Inflation may lead to higher unemployment in certain sectors if businesses struggle with rising input costs and reduced consumer demand. 3. Inflation reduces the real value of debt, which can be beneficial for borrowers but problematic for lenders. 4. Wage-price spiral may occur, where higher wages demand higher prices, leading to a cycle of increasing inflation. 5. Inflation affects investment levels, as businesses may be hesitant to invest during periods of high uncertainty and rising costs.
International Competitiveness of Local Products	1. Rising inflation can increase the cost of production in local industries, potentially making exports less competitive. 2. Higher inflation can lead to a depreciation of the local currency, making exports cheaper for foreign buyers but increasing the cost of imports. 3. If inflation is higher than that of trading partners, the real exchange rate may become less favorable, further reducing competitiveness in international markets. 4. Local businesses may need to adjust prices or quality to maintain their market share in export markets. 5. A reduced competitiveness in global markets could lead to decreased foreign direct investment (FDI) in the country.

There is a vicious cycle in which inflation affects many entities which include retrogressive purchasing control and putting a strain to fixed-income earners in the society, while simultaneously destroying savings and finances making them insecure. Additionally, for entrepreneurs, these factors increase the costs and erodes profit margins making it unfinancially sound to be competitive, therefore forcing entrepreneurs to change their budgets and invest in assets that can endure inflation.

Public debt and tax revenue are topped up by social welfare programs, both of which undergo severe alterations due to inflation. Furthermore, there are also changes done to the government's monetary and fiscal strategies just to acquire some semblance of control which results in unstable equilibrium. The ever pilling production costs also negatively impact interest rates, inflation, unemployment, and make the economy less foreign friendly. The dollar depreciation might bait locals but everything else becomes in the hands of the country's allure. Managing these factors gives room to maintain effective inflation policies which allows for economic endurance, attractiveness, and the welfare of residents.

Conclusions

It was determined that the ARIMA (5, 1, 1) model is satisfactory and reliable for forecasting inflation in Sultan Kudarat because it performs well on the Akaike Information Criterion (AIC), Schwarz-Bayesian Information Criterion (SBIC), and residual volatility. Some diagnostics, such as the Portmanteau test for white noise, as well as the Inverse Roots of ARMA polynomials show the model is stationary, invertible, and suitable for accurate predictions. Moderately rising inflation with minor deviation is expected which suggests the necessity of constant surveillance and adaptation to external elements as a result of inflationary pressures.

The inflationary forecast comes with an expectation of higher socio-economic costs and increased strain in various sectors in Sultan Kudarat. In the community sector, the limited procurement capacity, especially for fixed-income earners, creates a financial predicament along with businesses dealing with heightened costs and decreased for income. Governments are advised to discontinue or restrain spending and shift focus towards revenue collection to mitigate the impact of inflation while monitoring interest rates, unemployment, and international competitiveness. The need to control inflation emerges as the keystone to this dilemma while preserving the stability of the economy and ensuring rational expenditure by citizens, businesses, and government institutions.

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