ISSN: 1391-8796
Proceedings of 11th Ruhuna International Science & Technology Conference
University of Ruhuna, Matara, Sri Lanka
January 24, 2024

Exploring monthly births in Sri Lanka

Perera W.T.C., Kulasekara S.M.D.K.A., Jayasinghe A.D.K.C.D., Prasangika K.D.*

Department of Mathematics, University of Ruhuna, Matara, Sri Lanka.

Monthly births are important to a country as they directly influence its population and demographic structure, economy, and healthcare system. As Sri Lanka is a developing country, analyzing monthly births can be introduced as a major aspect of resource management. The number of monthly births during 2012 (January) – 2021 (December) was obtained from the Registrar General's Department of Sri Lanka. There has been no attempt to access the forecasting monthly birth count so far. The main objective of the study was to fit a suitable model and forecast future monthly births. We observed that there is a trend and seasonality. By the ADF test (p-value<0.01), the first difference of the series is stationary. We fitted seasonal Autoregressive Integrated Moving Average (SARIMA) and Holt-Winters methods and did a comparison based on the residuals to find the best model. According to the results, the best-fitted model was selected based on Root Mean Squared Error (RMSE), Mean Absolute Error (MAE), Mean Absolute Percentage Error (MAPE), and the Mean Absolute Scaled Error (MASE). By the comparison of accuracy measures in SARIMA and Holt-Winters methods, SARIMA is given the best accuracy. By ACF and QQ plots, forecasting errors are uncorrelated, normally distributed, and independent by the Ljung-Box test (p-value = 0.709). Then we conclude that SARIMA (4,1,1) (2,0,0) [12] was the best model for forecasting monthly births in Sri Lanka.

Keywords: Monthly Births, SARIMA, Holt-Winter's, prediction, forecasting

*Corresponding author: prasangi@maths.ruh.ac.lk