

Bayesian and Frequentist Approach to Time Series Forecasting with Application to Kenya's GDP Per Capita.

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Abstract

Real GDP per capita is an important indicator of a country's or regional economic activity and is often used by decision makers in the development of economic policies. Expectations about future GDP per capita can be a primary determinant of investments, employment, wages, profits and stock market activities. This study employed both the frequentist and the Bayesian approaches to Kenya's GDP per capita time series data for the period between 1980-2017 as obtained from the World Bank data portal. The autoregressive integrated moving average (ARIMA) and the state space models were fitted. Results of this study showed that the local linear trend model and the ARIMA (1,2,1) model are appropriate for forecasting the GDP per capita but the former outperforms the latter. The local linear trend model was used to perform a 3-step ahead forecast and the forecasted value was found to be U.S \$ 1717.694, U.S \$ 1844.446 and U.S \$ 1971.198 for 2018, 2019 and 2020 respectively. The findings of this study showed that the state space models, which utilize the Bayesian approach, outperform the ARIMA models which use the frequentist approach in time series forecasting.

Keywords: ARIMA Model, State Space Model, Kalman Filter, Kalman Smoother, GDP per Capita, Forecast