

For this project, I forecasted the total coffee spending in Italy using time series data. Based on past values and trends, the model shows that coffee spending in Italy will continue to increase over the next five years. The forecast gives us an estimate of how much Italy will likely spend if the current trend continues. This is useful for companies or policymakers who want to understand future demand and spending behavior.

I used the ARIMA function in R to build the time series model. This function helps automatically choose the best ARIMA model based on the data. The model selected was ARIMA(0,2,0), which means it needed to be differenced twice to remove the trend and make it stable. I looked at several accuracy metrics: RMSE was 49.85, and MAPE was 8.47%, which are both acceptable. The model also had low AIC and BIC scores (87.4 and 87.48), meaning it fits the data well compared to other models. Even though there was some bias in the residuals, the model still gave a solid forecast.

The data I used included Italy's coffee spending and other information like daily and yearly consumption. I created a time series of total coffee spending for the past 10 years. I explored the data visually and used an ACF plot to check for autocorrelation. The ACF showed a strong trend at the beginning, which confirmed that the data was not stationary until I differenced it. After applying ARIMA, the residuals had no strong autocorrelation, meaning the model captured most of the pattern in the data.

One limitation is that the residuals from the ARIMA model were not perfectly centered around zero, which means there may still be some bias. The model might be slightly overestimating in some years. If I did this again, I would try comparing other models like ETS or maybe even machine learning models like Random Forest (with more data). I would also explore if external factors, like economic trends or weather, affect coffee spending and could improve the forecast. Still, ARIMA gave reliable results for this project, and I'd recommend it for short-term forecasting.