



TIME SERIES FORECASTING

FOR NON SEASONAL DATA

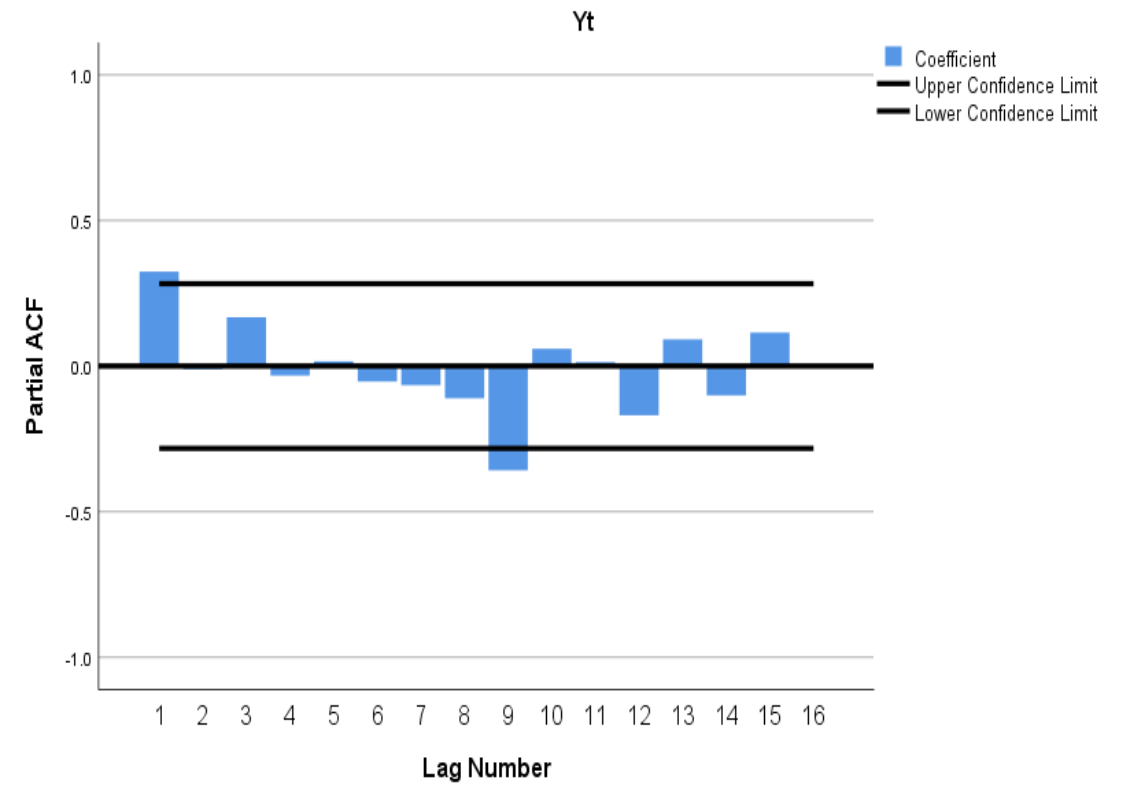
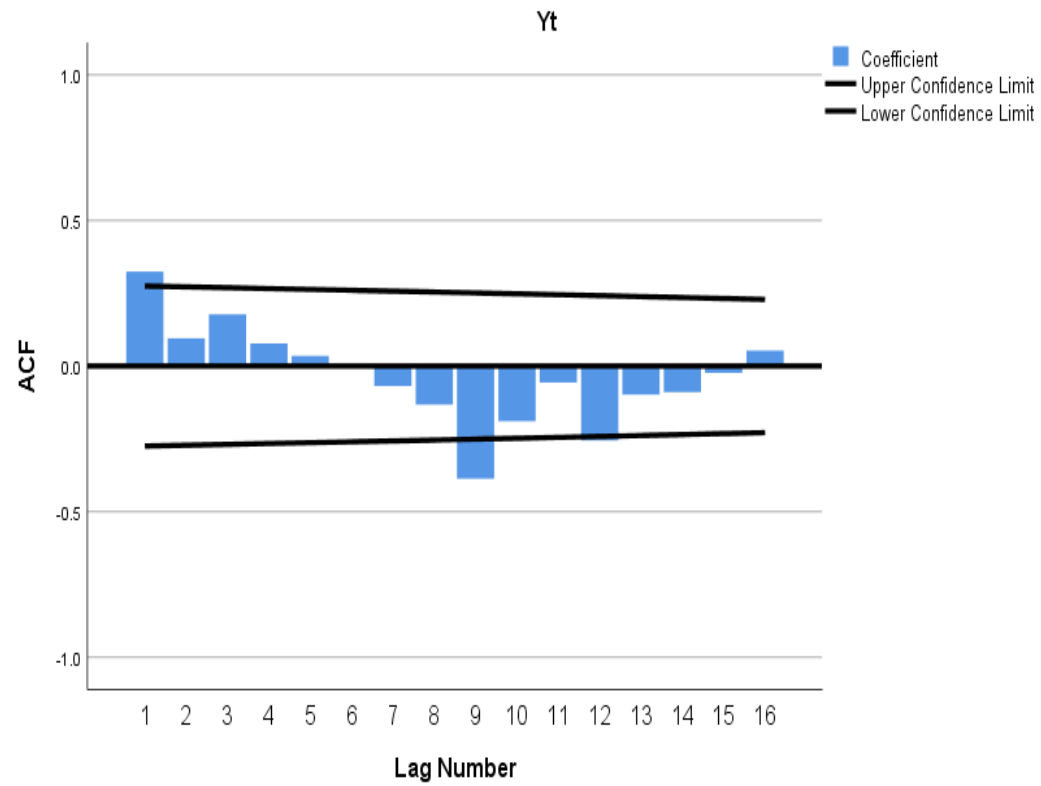
SELECTION OF DIFFERENT MODELS

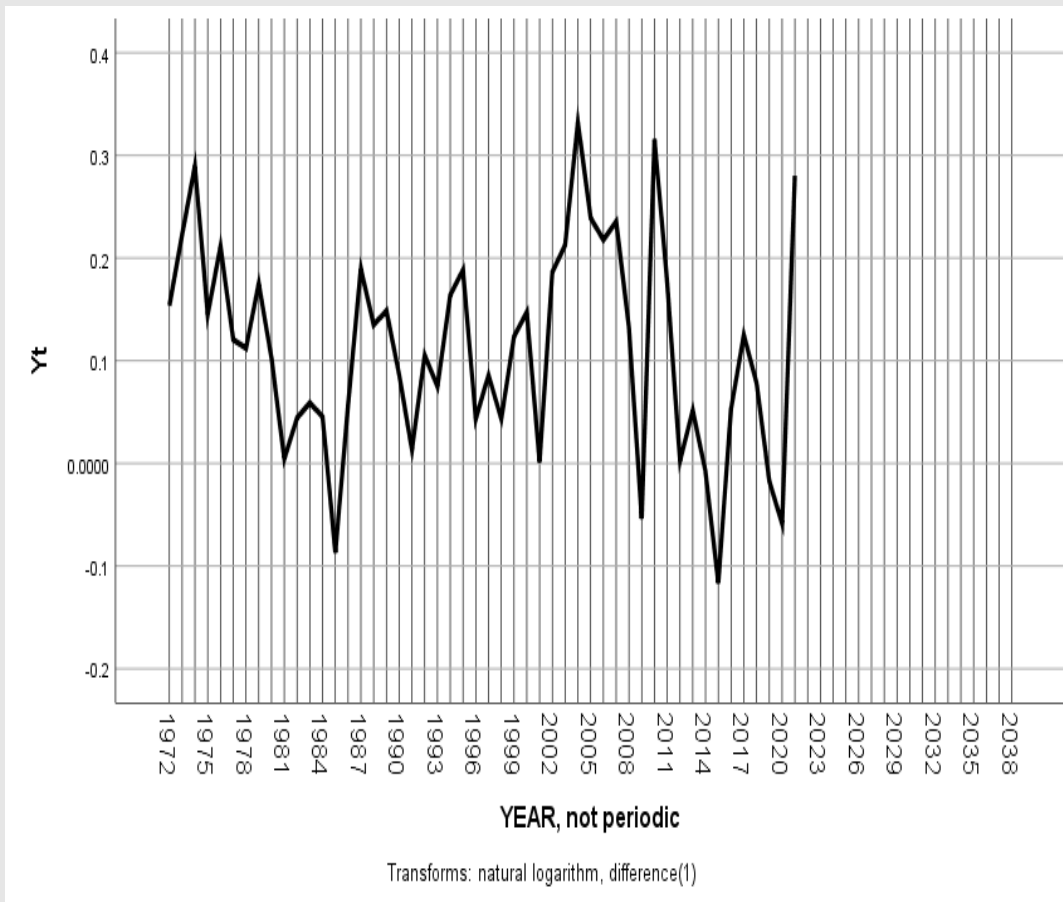
1.Exponential smoothing

- As linear trend is pronounced in log transformation, we choose **holt's linear trend** method.

2.ARIMA

(So,we decided to take $p=1$ and $q=1$)



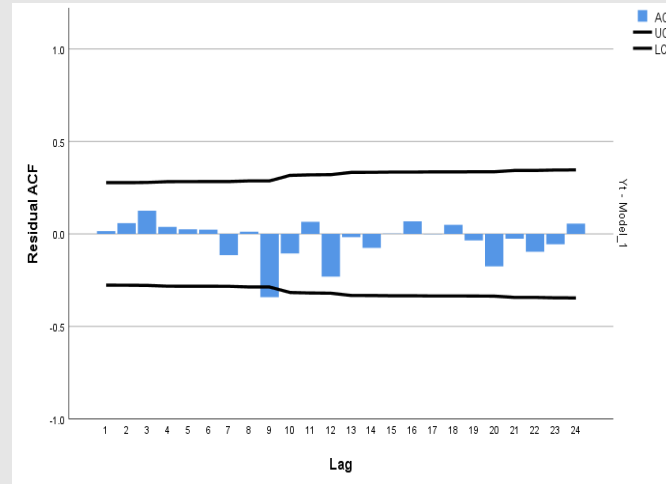
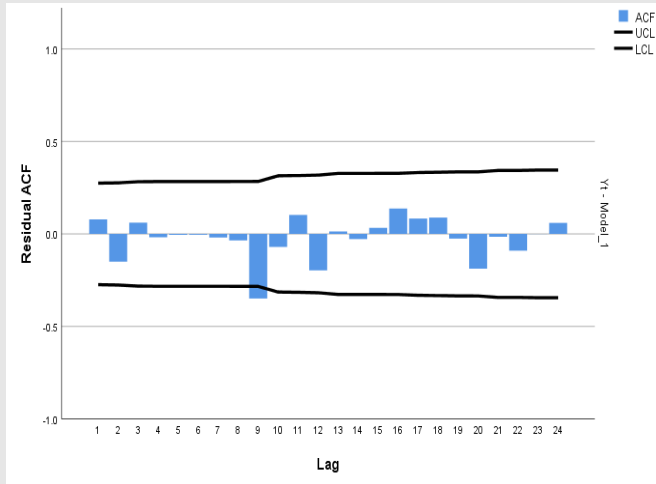


Data is stationary when we use first difference in logs.

So, we choose ARIMA(1,1,1) with natural log transformation.

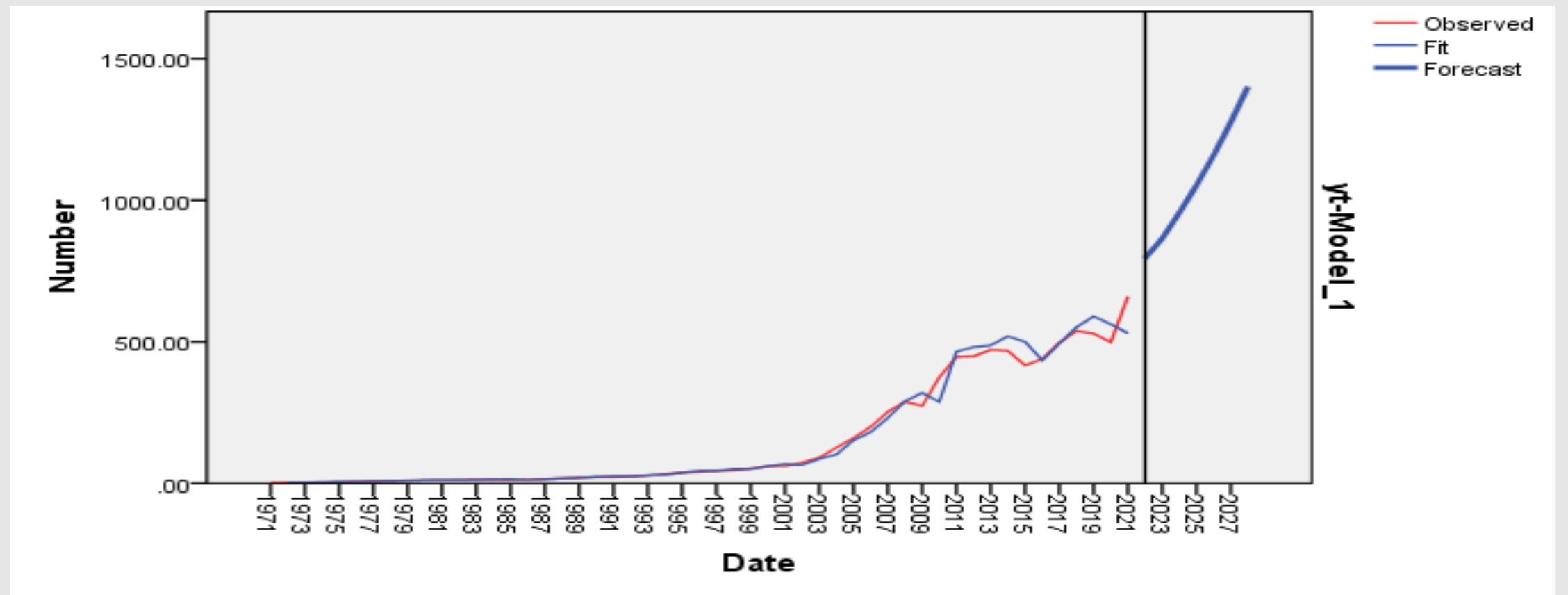
Comparing different models

(We choose the arima model to forecaste as it have more R-square and less MAE and RMSE.)



Methods	R-square	MAE	RMSE
1.Holt's linear trend	0.96	16.91	36.02
2.ARIMA(1,1,1)	0.98	14.71	32.17

FORECASTING BY ARIMA MODEL



FOR SEASONAL DATA

- **About the data**
- We have taken 4 years average monthly stock price data of a sugarcane company, **Dharampur Sugar Mills**.
- **Data reference:** <https://www.nseindia.com/get-quotes/equity?symbol=DHAMPURSUG>
- **What is Stock Price?** The term stock price refers to the current price that a share of stock is trading for on the market.
- The stock price is **affected by many factors** such as supply and demand political upheaval, interest rates, current events, exchange rate fluctuations, natural calamities and much more.

Data exploration



- Data don't have pronounced trend.
- The impact of Covid pandemic can be seen from march 2020
- The sharp fall in 2022 is may be due to overvaluation blast and there may be other reasons.
- There are no outliers in the data, so no data cleaning is required.

SELECTION OF DIFFERENT MODELS

1.Exponential Smoothing

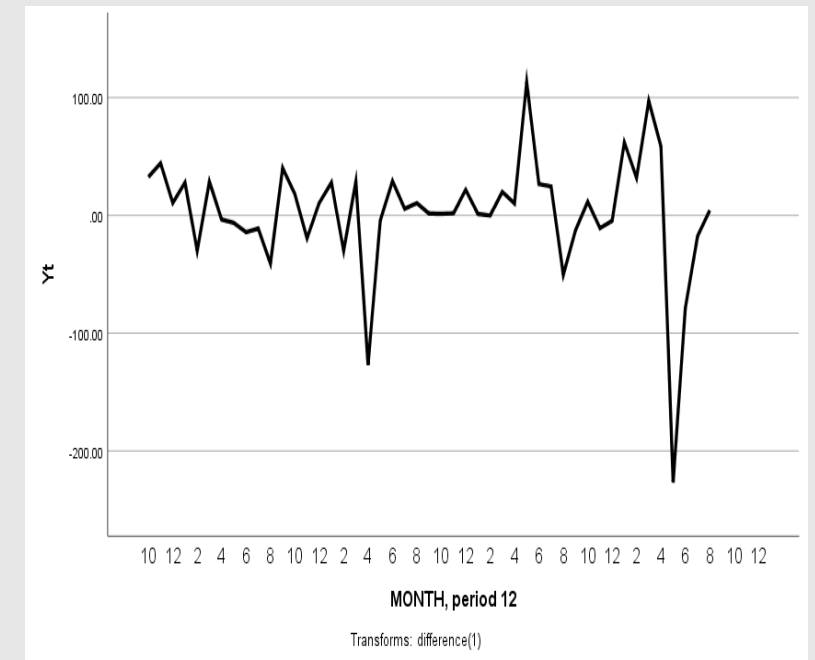
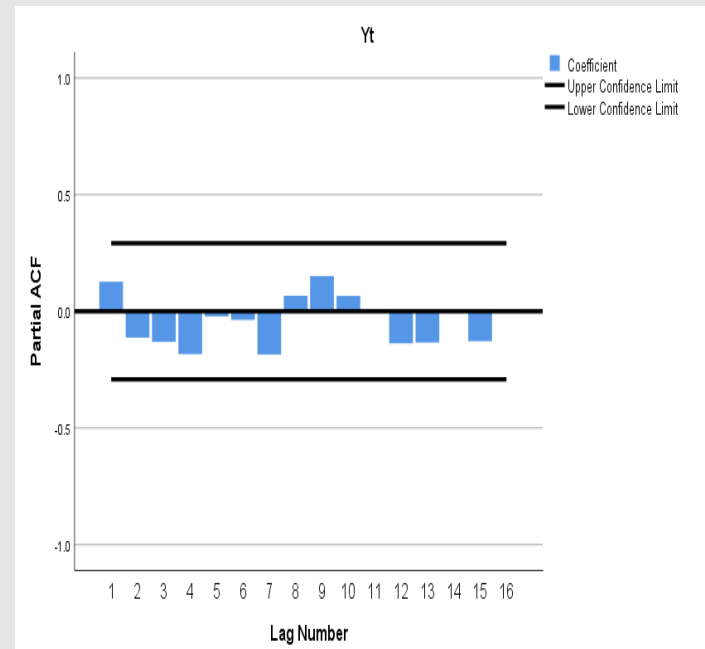
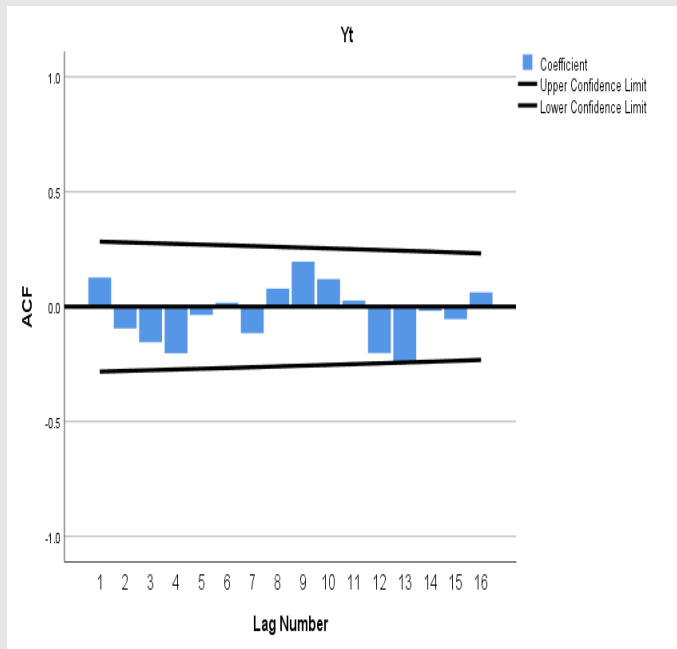
- Since data don't have pronounced trend and have seasonality we use **simple exponential method**.

2.ARIMA

So, we decided to take $p=0$ and $q=0$

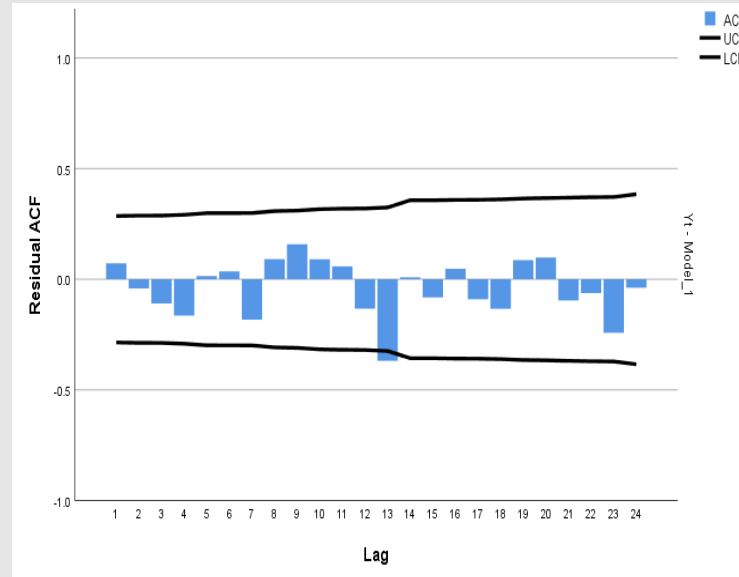
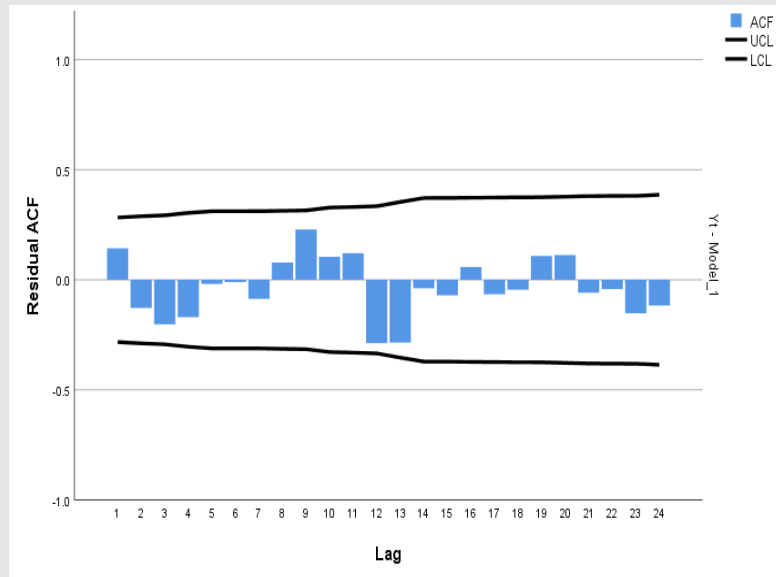
Data is stationary when we use first differencing.

So, we choose ARIMA(0,1,0).



Comparing different models

(We choose the simple exponential model over ARIMA to forecast as it have more R-square and less MAE and RMSE.



Models	R-square	MAE	RMSE
1.Simple seasonal	0.745	29.83	48.15
2.ARIMA(0,1,0)	0.67	31.85	54.62

FORECASTING BY EXPONENTIAL MODEL

(We choose the simple exponential model over ARIMA to forecaste as it have more R-square and less MAE and RMSE.)

