ECON 427: Final Exam

Chart

Description automatically generated

Figure 1

Figure 1 shows the total residential construction spending (in millions of dollars) from July 2009 to September 2020. The graph seems like following an upward trend which means that over the years the total residential construction spending has increased with some sort of seasonal variation. The graph doesn’t look mean stationary, but it looks variance stationary over the years as the magnitude is not changing much.

1. The order of the ARMA model and its coefficients:

Table

Description automatically generated with medium confidence

Figure 2

1. The order of the non-seasonal ARIMA model and the coefficients:

Text

Description automatically generated

Figure 3

1. The order of the seasonal ARIMA model and the coefficients:

Graphical user interface, text, application

Description automatically generated

Figure 4

1. Residuals of the ARMA model (AIC = 2462.426)

Chart

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Figure 5.1

Residuals of the Non-seasonal ARIMA model (AIC = 2422.924)

Chart

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Figure 5.2

Residuals of the Seasonal ARIMA model (AIC = 1984.27)

Chart

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Figure 5.3

Looking at Figures 5.1,5.2, and 5.3, it looks like Figure 5.3 is the best model as all the lags are between the dotted lines in the correlogram and also there is no other lag that seems like it is about to cross the dotted line and prove there is any sort of autocorrelation. Also, the AIC of the last model is the smallest. The correlograms of Figure 5.1 and 5.2 proves that the graph is autocorrelated at lag 1 and also the AIC is also not the lowest for either of the models.

1. Forecast

Chart, line chart, histogram

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Figure 6

1. ardlDLM function:

Table

Description automatically generated

Figure 7

1. Forecast

Chart, line chart

Description automatically generated

Figure 8

1. VARselect function:

Text, table

Description automatically generated

Figure 9

1. ARIMA model

Text, letter

Description automatically generated

Figure 10.1

GARCH model

Text

Description automatically generated

Figure 10.2