HE3022

Homework 1

Exercise 2 and Exercise 3 from Chapter 2, section 2.10 of the online text.

For the homework, please write the codes as below, followed by generated results or graphs and then if required answer the question. Marks will be benchmarked vis-à-vis the best answers in terms of clarity, detail and completeness.

2. Download the file `tute1.csv` from the book website, open it in Excel (or some other spreadsheet application), and review its contents. You should find four columns of information. Columns B through D each contain a quarterly series, labelled Sales, AdBudget and GDP. Sales contains the quarterly sales for a small company over the period 1981-2005. AdBudget is the advertising budget and GDP is the gross domestic product. All series have been adjusted for inflation.

Import the dataset into R Studio global environment as discussed in Lecture 1 (Using R). In doing so, please make sure you set the correct working directory from the pull down directory "session"

There is an alternative way to import the data set from the website but you need the correct https address:

tute1 <- read.csv("https://OTexts.org/fpp2/extrafiles/tute1.csv", header=TRUE)

#View(tute1)

a. You can read the data into R with the following script:

Type in the R studio console:

```
tute1 <- read.csv("tute1.csv", header=TRUE)
View(tute1)
```

b. Convert the data to time series

```
mytimeseries <- ts(tute1[,-1], start=1981, frequency=4)
```

(The `[,-1]` removes the first column which contains the quarters as we don't need them now.)

c. Construct time series plots of each of the three series

```
library(fpp2)
autoplot(mytimeseries, facets=TRUE)
```

Remember to call on the package fpp2 when you begin a new session either by typing

```
library(fpp2)
```

or checking on fpp2 in the lower right window of R-Studio

The graph will appear on the lower right window of R-Studio. Use “export” to save the graph as pdf or as an image and then copy the graph in word.

Check what happens when you don’t include `facets=TRUE`.

Exercise 3 of Chapter 2 of the online text. Follow the instructions as above in importing the dataset and in exporting the resulting graphs

3. Download some monthly Australian retail data from the book website. These represent retail sales in various categories for different Australian states, and are stored in a MS-Excel file.

To read the excel file, you need the packages “readxl” “XLConnect.” If the packages are not in packages listed in your R-Studio, please install it. Make sure that you check “install dependencies”

Then check “readxl” and “XLConnect” in under packages on the lower window of R-Studio.

a. You can read the data into R with the following script:

```
retaildata <- readxl::read_excel("retail.xlsx", skip=1)
```

The second argument (`skip=1`) is required because the Excel sheet has two header rows.

If the above code does not work, please check and install the package “XLConnect”

b. Select one of the time series as follows (but replace the column name with your own chosen column):

In the example below, the authors choose “`A3349873A`”.

You may choose a different series.

```
myts <- ts(retaildata[,"A3349873A"],
  frequency=12, start=c(1982,4))
```

c. Explore your chosen retail time series using the following functions:

`autoplot()`, `ggseasonplot()`, `ggsubseriesplot()`, `ggAcf()`

Can you spot any seasonality, cyclicity and trend? What do you learn about the series?