STAT650_FINAL

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Data Import and Source

Data Source is prepared by Andrée, B. P. J. and got from Kaggle. we can access data from following website.

URL : https://www.kaggle.com/datasets/anshtanwar/monthly-food-price-estimates/data

```
library(pacman)
pacman::p_load(funModeling,tidyverse,ggplot2,forecast,repr)
df <- read.csv('data/WLD_RTFP_country_2023-10-02.csv')
```

Column Level Description & Summary Statistics

```
df <- df %>% filter( country=="Somalia")
metadata <- funModeling::df_status(df, print_results = FALSE)
knitr::kable(metadata)
```

variable	q_zeros	p_zeros	q_na	p_na	q_inf	p_inf	type	unique
Open	0	0	0	0.00	0	0	numeric	67
High	0	0	0	0.00	0	0	numeric	72
Low	0	0	0	0.00	0	0	numeric	71
Close	0	0	0	0.00	0	0	numeric	70
Inflation	0	0	12	5.94	0	0	numeric	185
country	0	0	0	0.00	0	0	character	1
ISO3	0	0	0	0.00	0	0	character	1
date	0	0	0	0.00	0	0	character	202

This data set includes Global Food Price Estimates and Inflation by Product, Market, and Country. It includes food price estimates and is intended to help gain insight into price

developments beyond what can be formally measured by traditional methods. The data set provides new opportunities to investigate local price dynamics in areas where populations are sensitive to localized price shocks and where traditional data are not available.

Our interest is to predict the inflation rate in Somalia in the future with the data provided.

Predictor of Interest : Inflation (represents the rate of inflation)

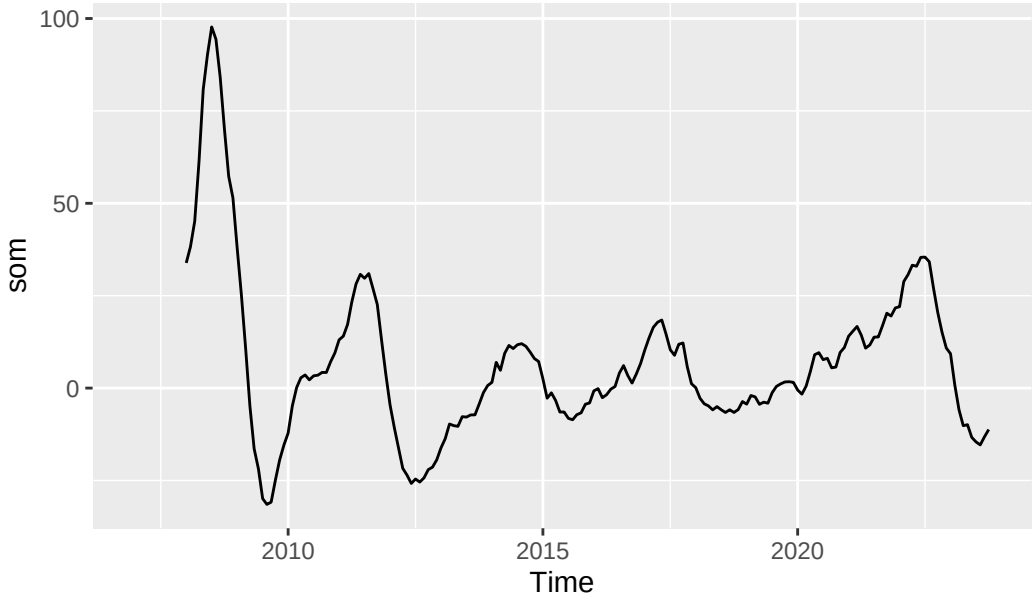
Data Visualization

```
#create a time series object
som <- ts(data=df$Inflation , start= 2007,frequency =12)
som
```

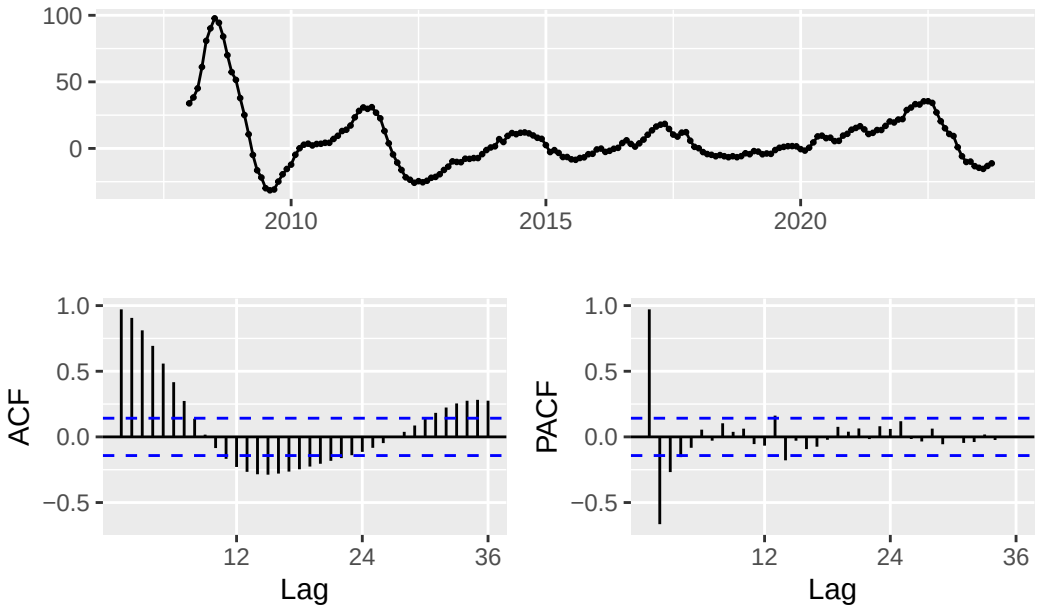
```
        Jan    Feb    Mar    Apr    May    Jun    Jul    Aug    Sep    Oct
2007     NA     NA     NA     NA     NA     NA     NA     NA     NA     NA
2008  33.86  38.28  45.13  61.17  80.80  90.19  97.72  94.38  84.06  70.03
2009  37.84  25.09  10.59  -4.89 -16.43 -21.85 -29.91 -31.47 -30.87 -24.89
2010 -12.18  -4.78   0.14   2.79   3.55   2.22   3.32   3.48   4.24   4.22
2011  13.05  14.05  17.21  23.34  28.20  30.78  29.71  30.99  26.84  22.60
2012  -4.56 -10.66 -16.22 -21.72 -23.55 -25.80 -24.61 -25.43 -24.30 -22.07
2013 -16.19 -13.69  -9.72 -10.16 -10.35  -7.74  -7.85  -7.26  -7.25  -4.30
2014   1.55   6.96   4.81   9.41  11.54  10.69  11.72  12.02  11.30   9.74
2015   2.49  -2.74  -1.29  -3.36  -6.48  -6.46  -8.19  -8.57  -7.20  -6.70
2016  -0.76  -0.15  -2.61  -1.80  -0.29   0.43   4.04   6.09   3.39   1.36
2017  10.30  13.57  16.43  17.81  18.42  14.62  10.39   8.87  11.86  12.20
2018   0.12  -2.75  -4.25  -4.83  -5.89  -5.01  -5.88  -6.60  -5.87  -6.60
2019  -4.35  -2.01  -2.39  -4.40  -3.81  -4.09  -1.23   0.45   1.14   1.66
2020  -0.54  -1.64   0.54   4.53   9.04   9.58   7.70   8.05   5.48   5.68
2021  14.05  15.39  16.67  14.28  10.81  11.68  13.79  13.83  16.94  20.26
2022  22.02  28.84  30.70  33.25  32.97  35.38  35.44  34.19  27.01  20.43
2023   9.30   0.90  -5.87 -10.18  -9.90 -13.33 -14.56 -15.38 -13.18 -11.22
        Nov    Dec
2007     NA     NA
2008  57.32  51.46
2009 -19.44 -15.43
2010   7.10   9.49
2011  13.03   3.82
2012 -21.40 -19.41
2013  -1.23   0.69
2014   7.99   7.19
2015  -4.36  -4.03
```

```
2016   3.80   6.62
2017   5.79   1.16
2018  -5.81  -3.64
2019   1.72   1.55
2020   9.62  10.97
2021  19.49  21.69
2022  15.13  10.85
2023
```

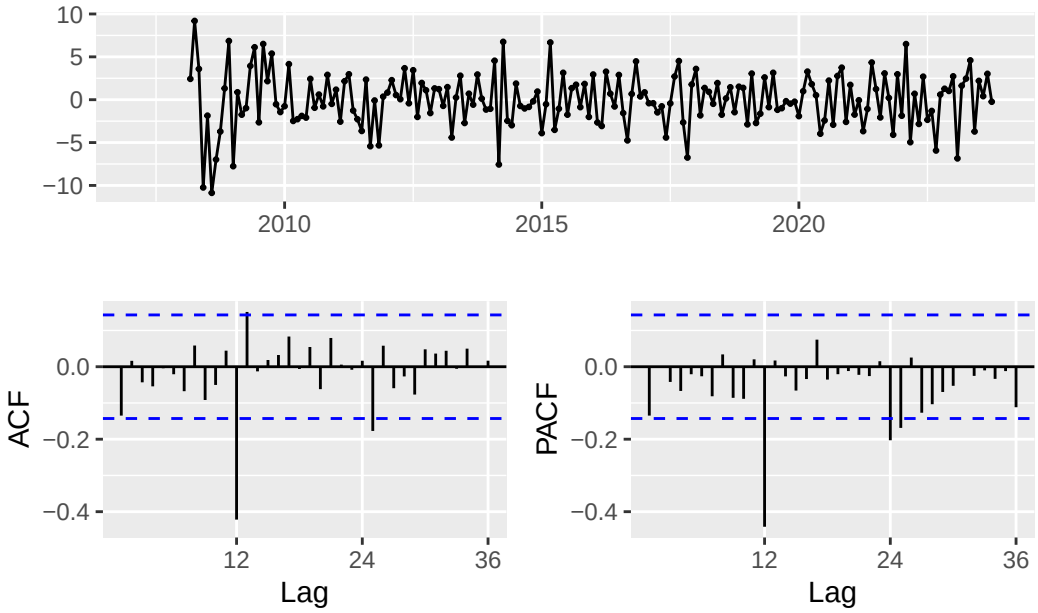
```r
options(repr.plot.width=15, repr.plot.height = 5)

#overview of the data
autoplot(som)
```



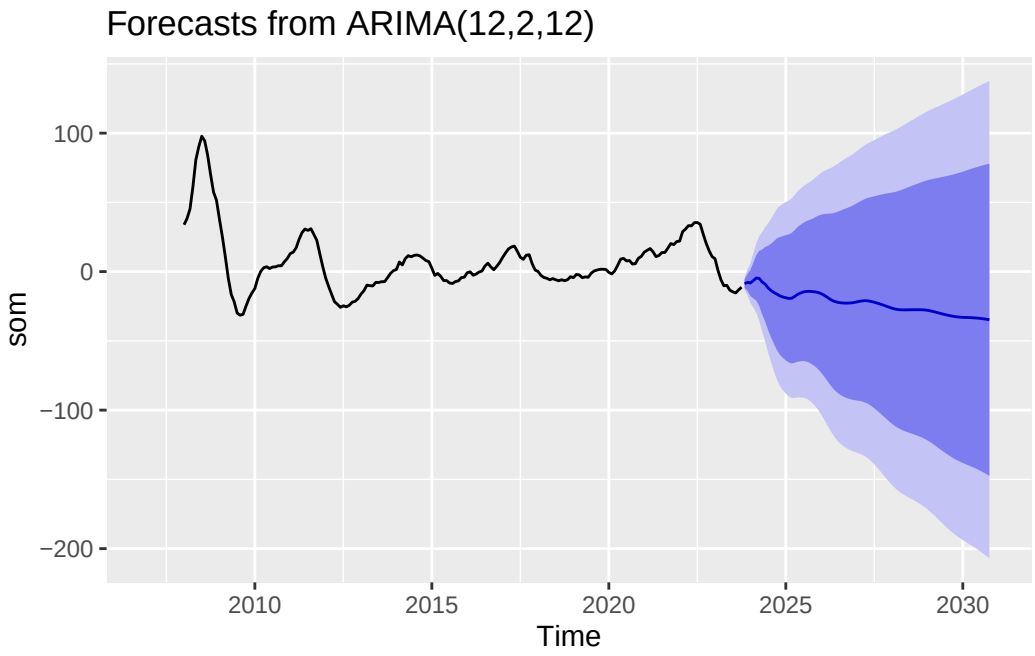

```r
#Auto Correlation and Partial Auto Correlation
ggtsdisplay(som)
```




```
# view the second difference
ggtsdisplay(diff(diff(som)))
```



```
#forecast
Arima(som, order=c(12,2,12)) %>% forecast(7*12)%>% autoplot()
```



ACF plot shows the relation till lag 12 (p =12)

Pacf plot shows the relation till lag 13 (q= 12)

From the above ARIMA plot, we can see that inflation rate of food in Somalia is decreasing in near future.