

Rob J Hyndman
George Athanasopoulos

FORECASTING

PRINCIPLES AND PRACTICE

A comprehensive introduction to the latest forecasting methods using R. Learn to improve your forecast accuracy using dozens of real data examples.



3RD EDITION

 **OTexts**
Open Texts Publishing

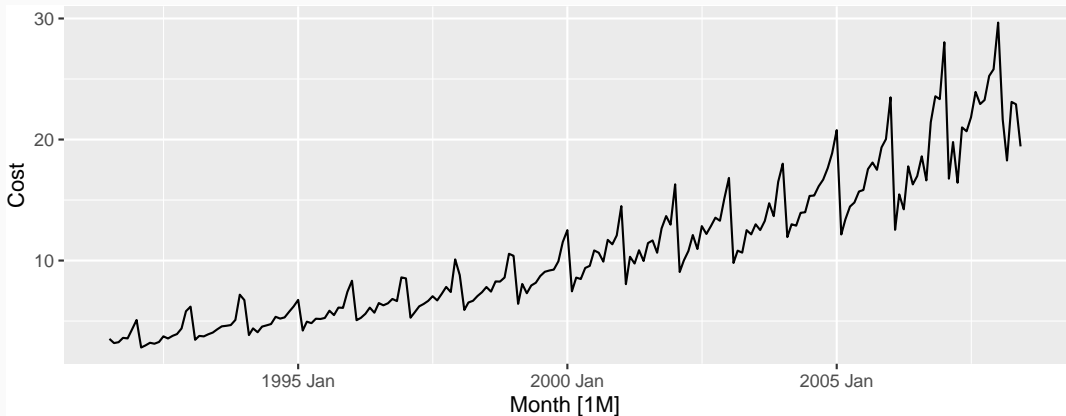
2. Time series graphics

2.4 Seasonal plots

OTexts.org/fpp3/

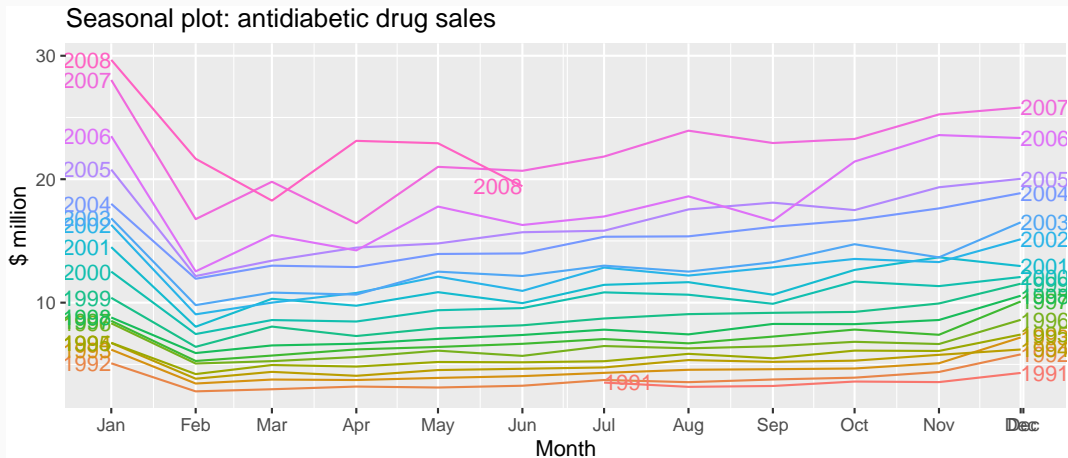
Reminder: a10 time plot

```
a10 |>  
autoplot(Cost)
```



Seasonal plots

```
a10 |> gg_season(Cost, labels = "both") +  
  labs(y = "$ million", title = "Seasonal plot: antidiabetic drug sales")
```



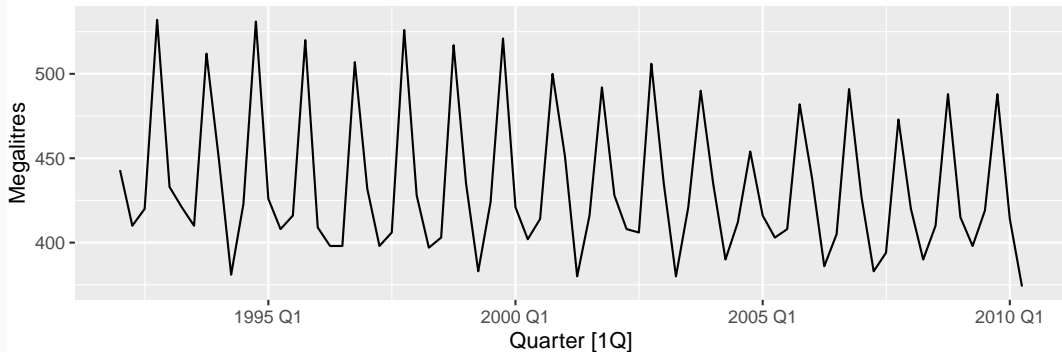
Seasonal plots

- Data plotted against the individual “seasons” in which the data were observed. (In this case a “season” is a month.)
- Something like a time plot except that the data from each season are overlapped.
- Enables the underlying seasonal pattern to be seen more clearly, and also allows any substantial departures from the seasonal pattern to be easily identified.
- In R: `gg_season()`

Quarterly Australian Beer Production

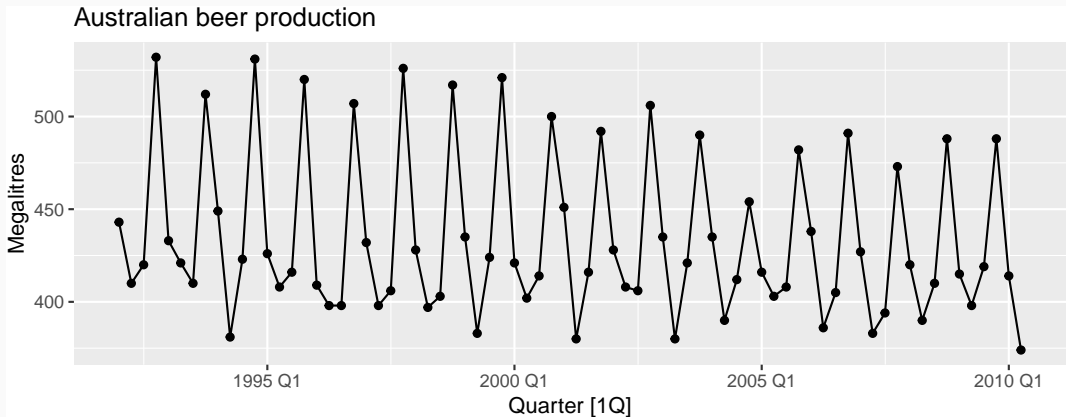
```
beer <- aus_production |>  
  select(Quarter, Beer) |> filter(year(Quarter) >= 1992)  
beer |> autoplot(Beer) +  
  labs(title = "Australian beer production", y = "Megalitres")
```

Australian beer production



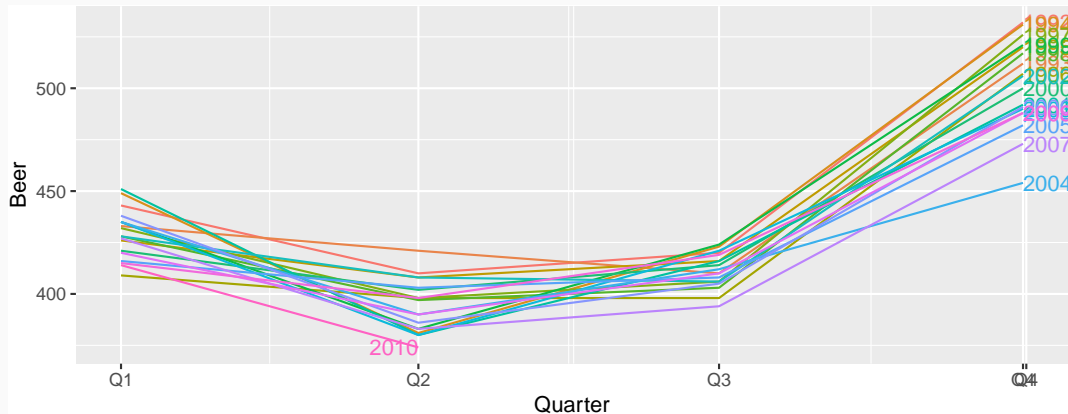
Quarterly Australian Beer Production

```
beer |> autoplot(Beer) + geom_point() +  
  labs(title = "Australian beer production", y = "Megalitres")
```



Quarterly Australian Beer Production

```
beer |> gg_season(Beer, labels = "right")
```



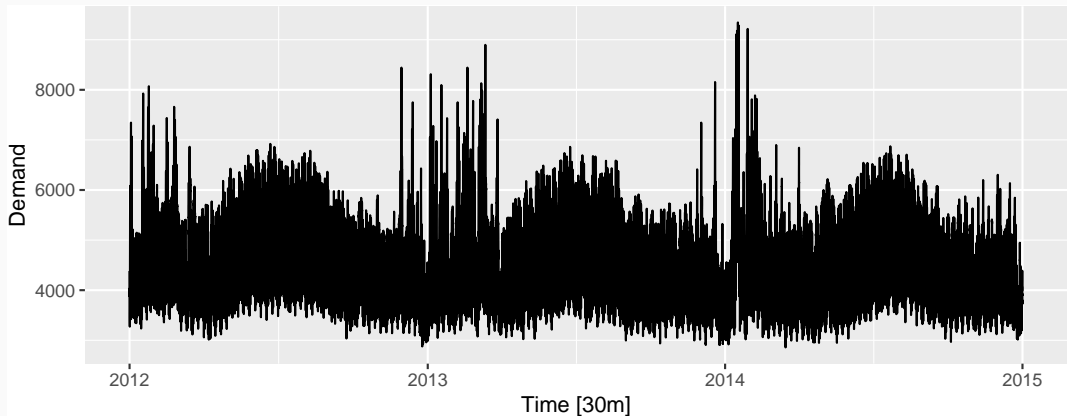
Multiple seasonal periods

```
vic_elec
```

```
## # A tsibble: 52,608 x 5 [30m] <Australia/Melbourne>
##   Time                Demand Temperature Date        Holiday
##   <dtm>                <dbl>         <dbl> <date>      <lgl>
## 1 2012-01-01 00:00:00  4383.          21.4 2012-01-01 TRUE
## 2 2012-01-01 00:30:00  4263.          21.0 2012-01-01 TRUE
## 3 2012-01-01 01:00:00  4049.          20.7 2012-01-01 TRUE
## 4 2012-01-01 01:30:00  3878.          20.6 2012-01-01 TRUE
## 5 2012-01-01 02:00:00  4036.          20.4 2012-01-01 TRUE
## 6 2012-01-01 02:30:00  3866.          20.2 2012-01-01 TRUE
## 7 2012-01-01 03:00:00  3694.          20.1 2012-01-01 TRUE
## 8 2012-01-01 03:30:00  3562.          19.6 2012-01-01 TRUE
## 9 2012-01-01 04:00:00  3433.          19.1 2012-01-01 TRUE
## 10 2012-01-01 04:30:00  3359.          19.0 2012-01-01 TRUE
## # i 52,598 more rows
```

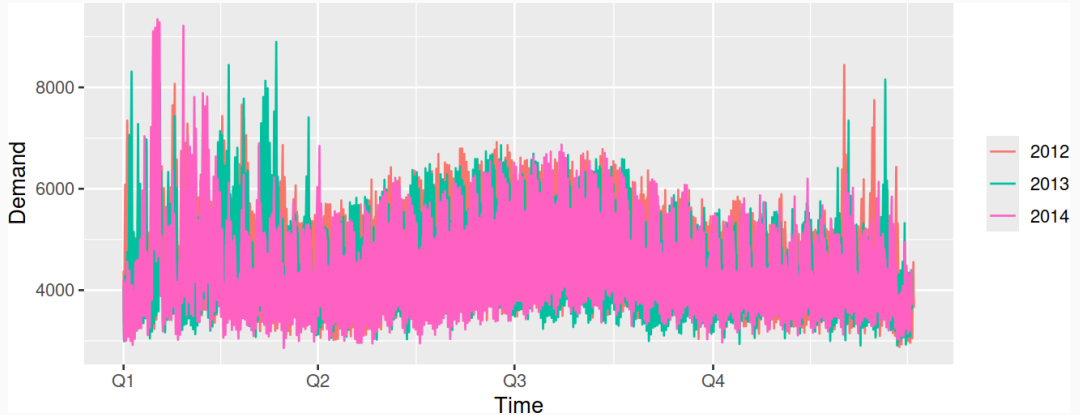

Multiple seasonal periods

```
vic_elec |> autoplot()
```



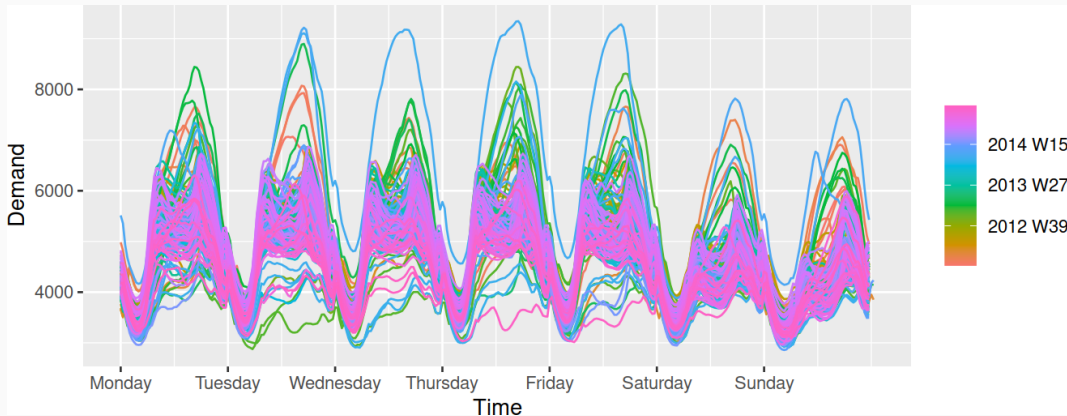
Multiple seasonal periods

```
vic_elec |> gg_season(Demand)
```



Multiple seasonal periods

```
vic_elec |> gg_season(Demand, period = "week")
```



Multiple seasonal periods

```
vic_elec |> gg_season(Demand, period = "day")
```

