Retail Forecasting Project

ETC3550

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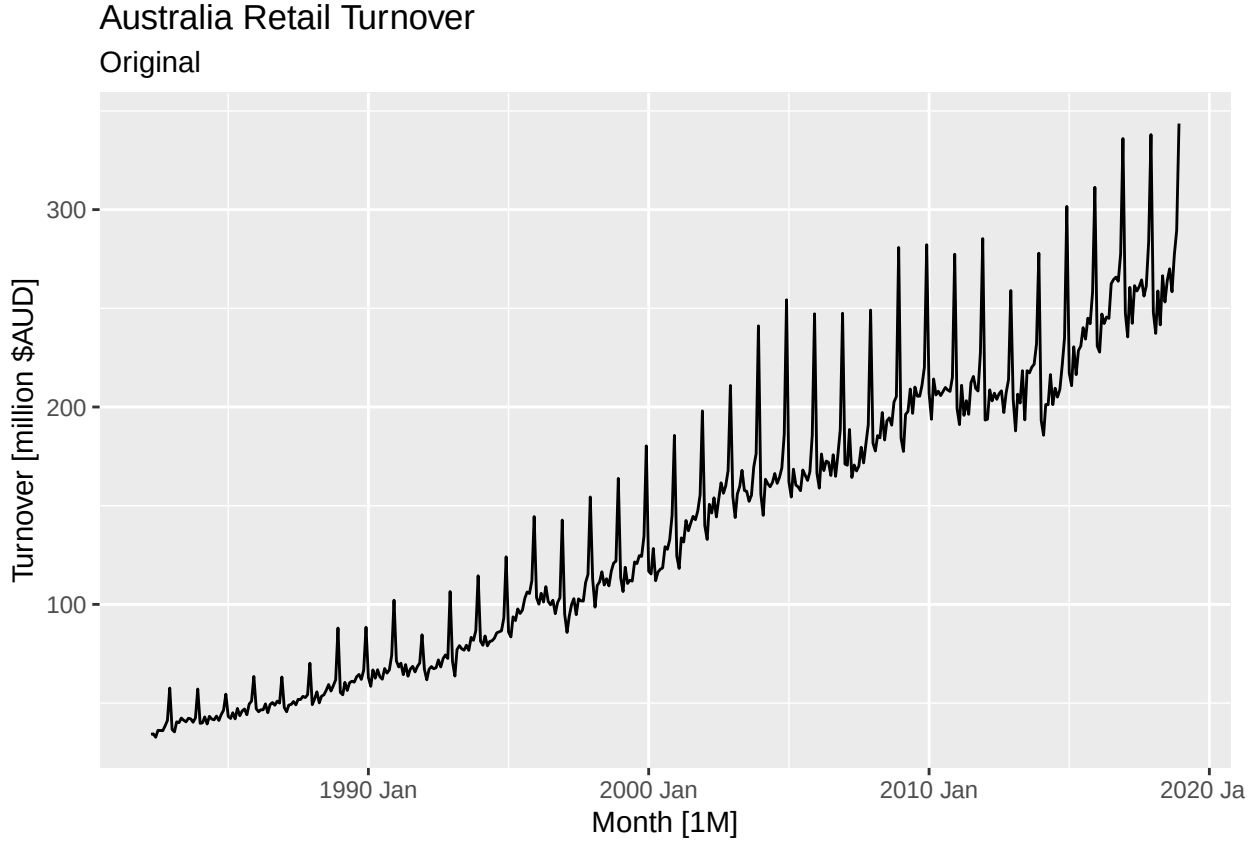
Statistical features of Australian Retail

Table 1: A few rows of the dataset, Other Retailing in South Australia

State	Industry	Series ID	Month	Turnover
South Australia	Other retailing	A3349433W	1982 Apr	34.2
South Australia	Other retailing	A3349433W	1982 May	34.4
South Australia	Other retailing	A3349433W	1982 Jun	32.7
South Australia	Other retailing	A3349433W	1982 Jul	36.2
South Australia	Other retailing	A3349433W	1982 Aug	36.1
South Australia	Other retailing	A3349433W	1982 Sep	36.0

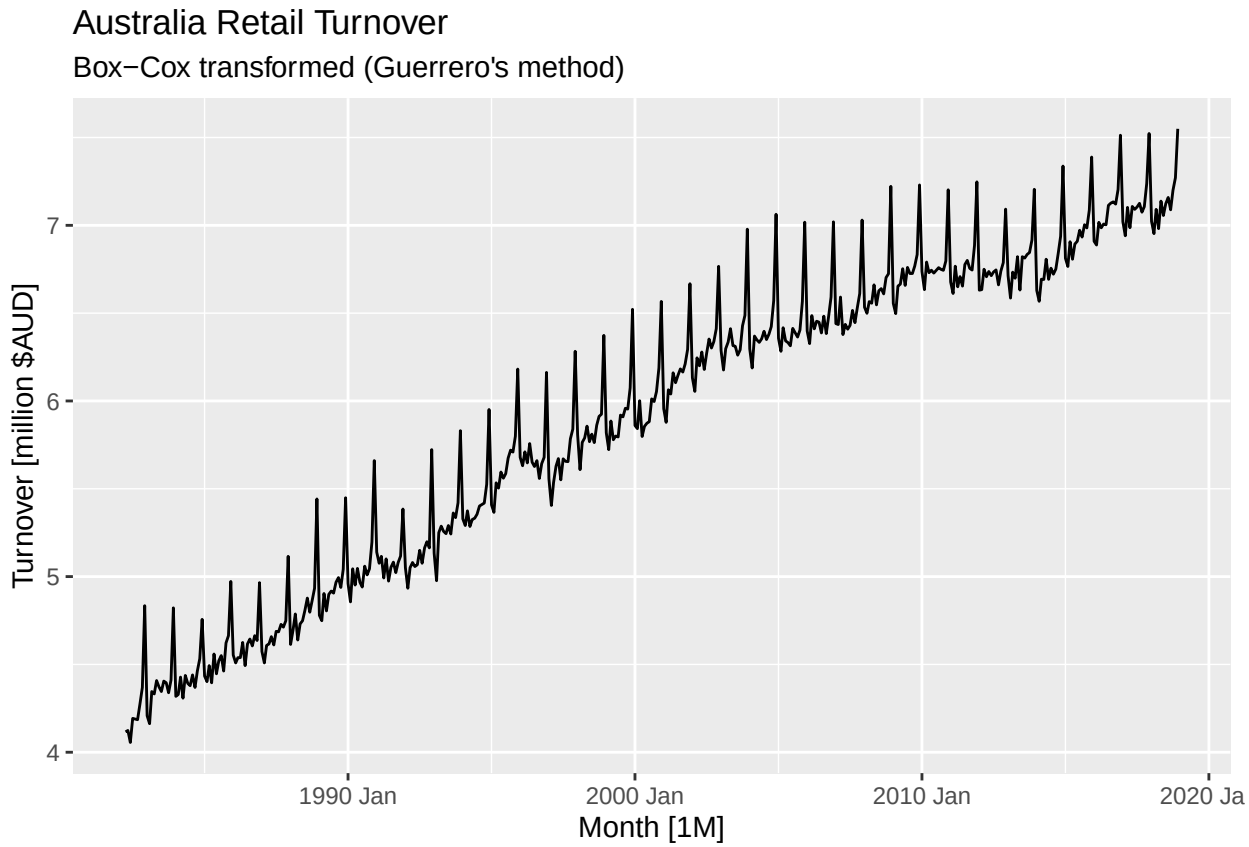


Plotting the original dataset, we can see a general trend upwards. The dataset also has a seasonal pattern which during the early 1980 - 1990, was relatively small compared to later years where the spike grows to large proportions.

Transformations and Differencings

```
lambda <- myseries %>%
    features(Turnover, features = guerrero) %>%
    pull(lambda_guerrero)

myseries %>% autoplot(box_cox(Turnover, lambda)) +
    labs(
        title = "Australia Retail Turnover",
        subtitle = "Box-Cox transformed (Guerrero's method)"
    ) +
    ylab("Turnover [million $AUD]")
```




```
fit <- myseries %>%
    model(
        Original = ETS(Turnover),
        Transformed = ETS(box_cox(Turnover, lambda))
    )

fit %>%
    select(mable_vars(fit)) %>%
```

```
    glance()
```

```
## # A tibble: 2 x 9
##   .model       sigma2 log_lik   AIC  AICc   BIC      MSE     AMSE    MAE
##   <chr>         <dbl>   <dbl> <dbl> <dbl> <dbl>    <dbl>    <dbl>  <dbl>
## 1 Original    0.00129 -1971.  3977. 3978. 4046. 29.7     36.0     0.0281
## 2 Transformed 0.00292   -47.7  129.  131.  199.  0.00281  0.00340 0.0422
```

```
myseries %>% features(Turnover, unitroot_kpss)
```

```
## # A tibble: 1 x 4
##   State           Industry        kpss_stat kpss_pvalue
##   <chr>           <chr>               <dbl>       <dbl>
## 1 South Australia Other retailing      7.38        0.01
```

```
myseries %>% features(Turnover, unitroot_ndiffs)
```

```
## # A tibble: 1 x 3
##   State           Industry        ndiffs
##   <chr>           <chr>            <int>
## 1 South Australia Other retailing      1
```

```
myseries %>% features(Turnover, unitroot_nsdiffs)
```

```
## # A tibble: 1 x 3
##   State           Industry        nsdiffs
##   <chr>           <chr>             <int>
## 1 South Australia Other retailing       1
```