Calendars

2024-10-07

```
library(rjd3toolkit)
```

```
##
## Attaching package: 'rjd3toolkit'
```

```
## The following objects are masked from 'package:stats':
##
##     aggregate, mad
```

```
library(rjd3tramoseats)
library(rjd3providers)
data<-file.path(rprojroot::find_root(rprojroot::is_rstudio_project ), 'Data')
set_spreadsheet_paths(data)
xs<-spreadsheet_data("Belgium_XM.xlsx", 1)$series
ms<-spreadsheet_data("Belgium_XM.xlsx", 2)$series
s<-ABS$X0.2.20.10.M
```

Calendars

Trading days

```
td_raw<-td(s=s, contrasts=FALSE)
colnames(td_raw)<-c("Sundays", "Mondays", "Tuesdays", "Wednesdays", "Thursdays", "Fridays", "Saturdays")
print(window(td_raw, start=c(2000,1), end=c(2001,12)))
```

```
##          Sundays Mondays Tuesdays Wednesdays Thursdays Fridays Saturdays
## Jan 2000       5       5        4          4         4       4         5
## Feb 2000       4       4        5          4         4       4         4
## Mar 2000       4       4        4          5         5       5         4
## Apr 2000       5       4        4          4         4       4         5
## May 2000       4       5        5          5         4       4         4
## Jun 2000       4       4        4          4         5       5         4
## Jul 2000       5       5        4          4         4       4         5
## Aug 2000       4       4        5          5         5       4         4
## Sep 2000       4       4        4          4         4       5         5
## Oct 2000       5       5        5          4         4       4         4
## Nov 2000       4       4        4          5         5       4         4
## Dec 2000       5       4        4          4         4       5         5
## Jan 2001       4       5        5          5         4       4         4
## Feb 2001       4       4        4          4         4       4         4
## Mar 2001       4       4        4          4         5       5         5
## Apr 2001       5       5        4          4         4       4         4
## May 2001       4       4        5          5         5       4         4
## Jun 2001       4       4        4          4         4       5         5
## Jul 2001       5       5        5          4         4       4         4
## Aug 2001       4       4        4          5         5       5         4
```

```
## Sep 2001       5       4       4       4       4       4       5
## Oct 2001       4       5       5       5       4       4       4
## Nov 2001       4       4       4       4       5       5       4
## Dec 2001       5       5       4       4       4       4       5
```

```r
model1<-sarima_estimate(log(s), order=c(0,1,1), seasonal=list(order=c(0,1,1), period=12), xreg = td_raw
print(model1)
```

```
## SARIMA model: (0,1,1) (0,1,1) [12]
##
## Coefficients
##   theta(1) btheta(1)
##    -0.6351   -0.6487
##
## Regression model:
##     Sundays     Mondays   Tuesdays Wednesdays   Thursdays    Fridays  Saturdays
##     0.01990     0.02856    0.03207    0.03278     0.03914    0.03843    0.03365
##
## For a more detailed output, use the 'summary()' function.
```

```r
cat("\nAverage effect:", mean(model1$b), "\n\n")
```

```
##
## Average effect: 0.03207658
```

```r
lp<-lp_variable(s=s, type = "LengthOfPeriod")
td2<-cbind(td_raw[,-1]-td_raw[,1], lp)
colnames(td2)<-c("Mondays", "Tuesdays", "Wednesdays", "Thursdays", "Fridays", "Saturdays", "lp")
print(window(td2, start=c(2000,1), end=c(2001,12)))
```

```
##          Mondays Tuesdays Wednesdays Thursdays Fridays Saturdays      lp
## Jan 2000       0       -1         -1        -1      -1         0  0.5625
## Feb 2000       0        1          0         0       0         0 -1.4375
## Mar 2000       0        0          1         1       1         0  0.5625
## Apr 2000      -1       -1         -1        -1      -1         0 -0.4375
## May 2000       1        1          1         0       0         0  0.5625
## Jun 2000       0        0          0         1       1         0 -0.4375
## Jul 2000       0       -1         -1        -1      -1         0  0.5625
## Aug 2000       0        1          1         1       0         0  0.5625
## Sep 2000       0        0          0         0       1         1 -0.4375
## Oct 2000       0        0         -1        -1      -1        -1  0.5625
## Nov 2000       0        0          1         1       0         0 -0.4375
## Dec 2000      -1       -1         -1        -1       0         0  0.5625
## Jan 2001       1        1          1         0       0         0  0.5625
## Feb 2001       0        0          0         0       0         0 -2.4375
## Mar 2001       0        0          0         1       1         1  0.5625
## Apr 2001       0       -1         -1        -1      -1        -1 -0.4375
## May 2001       0        1          1         1       0         0  0.5625
## Jun 2001       0        0          0         0       1         1 -0.4375
## Jul 2001       0        0         -1        -1      -1        -1  0.5625
## Aug 2001       0        0          1         1       1         0  0.5625
## Sep 2001      -1       -1         -1        -1      -1         0 -0.4375
## Oct 2001       1        1          1         0       0         0  0.5625
## Nov 2001       0        0          0         1       1         0 -0.4375
## Dec 2001       0       -1         -1        -1      -1         0  0.5625
```

```r
model2<-sarima_estimate(log(s), order=c(0,1,1), seasonal=list(order=c(0,1,1), period=12), xreg = td2)
print(model2)
```

```
## SARIMA model: (0,1,1) (0,1,1) [12]
##
## Coefficients
##  theta(1) btheta(1)
##   -0.6351   -0.6487
##
## Regression model:
##     Mondays   Tuesdays Wednesdays  Thursdays    Fridays  Saturdays         lp
## -3.515e-03 -6.452e-06  7.017e-04  7.066e-03  6.358e-03  1.569e-03  3.208e-02
##
## For a more detailed output, use the 'summary()' function.
```

```r
print(model1$b[-1]-model2$b[-7])
```

```
##     Mondays   Tuesdays Wednesdays  Thursdays    Fridays  Saturdays
## 0.03207658 0.03207658 0.03207658 0.03207658 0.03207658 0.03207658
```

```r
print(-sum(model2$b[1:6]))
```

```
## [1] -0.01217378
```

```r
lp<-lp_variable(s=s, type = "LeapYear")
td3<-cbind(td_raw[,-5]-td_raw[,5], lp)
colnames(td3)<-c("Sundays", "Mondays", "Tuesdays", "Wednesdays", "Fridays", "Saturdays", "lp")
print(window(td3, start=c(2000,1), end=c(2001,12)))
```

```
##          Sundays Mondays Tuesdays Wednesdays Fridays Saturdays    lp
## Jan 2000       1       1        0          0       0         1  0.00
## Feb 2000       0       0        1          0       0         0  0.75
## Mar 2000      -1      -1       -1          0       0        -1  0.00
## Apr 2000       1       0        0          0       0         1  0.00
## May 2000       0       1        1          1       0         0  0.00
## Jun 2000      -1      -1       -1         -1       0        -1  0.00
## Jul 2000       1       1        0          0       0         1  0.00
## Aug 2000      -1      -1        0          0      -1        -1  0.00
## Sep 2000       0       0        0          0       1         1  0.00
## Oct 2000       1       1        1          0       0         0  0.00
## Nov 2000      -1      -1       -1          0      -1        -1  0.00
## Dec 2000       1       0        0          0       1         1  0.00
## Jan 2001       0       1        1          1       0         0  0.00
## Feb 2001       0       0        0          0       0         0 -0.25
## Mar 2001      -1      -1       -1         -1       0         0  0.00
## Apr 2001       1       1        0          0       0         0  0.00
## May 2001      -1      -1        0          0      -1        -1  0.00
## Jun 2001       0       0        0          0       1         1  0.00
## Jul 2001       1       1        1          0       0         0  0.00
## Aug 2001      -1      -1       -1          0       0        -1  0.00
## Sep 2001       1       0        0          0       0         1  0.00
## Oct 2001       0       1        1          1       0         0  0.00
## Nov 2001      -1      -1       -1         -1       0        -1  0.00
## Dec 2001       1       1        0          0       0         1  0.00
```

```r
model3<-sarima_estimate(log(s), order=c(0,1,1), seasonal=list(order=c(0,1,1), period=12), xreg = td3)
print(model3)
```

```
## SARIMA model: (0,1,1) (0,1,1) [12]
##
## Coefficients
##  theta(1) btheta(1)
##   -0.6351   -0.6487
##
## Regression model:
##    Sundays    Mondays   Tuesdays Wednesdays    Fridays  Saturdays         lp
## -1.217e-02 -3.515e-03 -6.452e-06  7.017e-04  6.358e-03  1.569e-03  3.208e-02
##
## For a more detailed output, use the 'summary()' function.
```

```r
print(model1$b-mean(model1$b))
```

```
##       Sundays        Mondays       Tuesdays     Wednesdays      Thursdays
## -1.217378e-02 -3.514939e-03 -6.451643e-06  7.016572e-04  7.065837e-03
##       Fridays      Saturdays
##  6.358293e-03  1.569382e-03
```

```r
print(model2$b)
```

```
##       Mondays       Tuesdays     Wednesdays      Thursdays        Fridays
## -3.514939e-03 -6.451643e-06  7.016572e-04  7.065837e-03  6.358293e-03
##     Saturdays             lp
##  1.569382e-03  3.207658e-02
```

```r
print(model3$b)
```

```
##       Sundays        Mondays       Tuesdays     Wednesdays        Fridays
## -1.217378e-02 -3.514939e-03 -6.451639e-06  7.016572e-04  6.358293e-03
##     Saturdays             lp
##  1.569382e-03  3.207658e-02
```

```r
print(-sum(model3$b[1:6]))
```

```
## [1] 0.007065837
```