MFE R Programming Workshop

Week 2

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Introduction

Questions

Any questions before we start?

Basic Plotting

- `example(plot)`
- `example(hist)`

Dates

Lubridate

- Base R dates are annoying to say the least
- Use a package!

```
# install.packages("lubridate")
library(lubridate)
```

```
##
## Attaching package: 'lubridate'

## The following object is masked from 'package:base':
##
##     date
```

Parse a date

- Lubridate accepts lots of formats

```
ymd("20110604")
```

```
## [1] "2011-06-04"
```

```
mdy("06-04-2011")
```

```
## [1] "2011-06-04"
```

```
dmy("04/06/2011")
```

```
## [1] "2011-06-04"
```

Parse a date and time

```
ymd_hms("2011-06-04 12:00:00", tz = "Pacific/Auckland")
```

```
## [1] "2011-06-04 12:00:00 NZST"
```

Extraction

```
arrive <- ymd_hms("2011-06-04 12:00:00")
second(arrive)
```

```
## [1] 0
```

```
second(arrive) <- 25
arrive
```

```
## [1] "2011-06-04 12:00:25 UTC"
```

Intervals

```
arrive <- ymd_hms("2011-06-04 12:00:00")
leave <- ymd_hms("2011-08-10 14:00:00")
interval(arrive, leave)
```

```
## [1] 2011-06-04 12:00:00 UTC--2011-08-10 14:00:00 UTC
```

Arithmetic

```
mydate <- ymd("20130130")
mydate + days(2)
```

```
## [1] "2013-02-01"
```

```
mydate + months(5)
```

```
## [1] "2013-06-30"
```

Arithmetic

```
mydate <- ymd("20130130")
mydate + days(1:5)
```

```
## [1] "2013-01-31" "2013-02-01" "2013-02-02" "2013-02-03"
```

End of (next) month

```
jan31 <- ymd("2013-01-31")
jan31 + months(1)
```

```
## [1] NA
```

```
ceiling_date(jan31, "month") - days(1)
```

```
## [1] "2013-01-31"
```

```
floor_date(jan31, "month") + months(2) - days(1)
```

```
## [1] "2013-02-28"
```

Time series with XTS

xts

- xts is a package for ordered data in R
- xts objects can be treated like data frames much of the time
- but, they have other featuers

```
# install.packages("xts")
library(xts)
```

```
## Loading required package: zoo

## Warning: package 'zoo' was built under R version 3.3.1

##
## Attaching package: 'zoo'

## The following objects are masked from 'package:base':
##
##     as.Date, as.Date.numeric
```

Data from quantmod

- quantmod allows you to download stock data into xts objects

```
library(quantmod)
```

```
## Warning: package 'quantmod' was built under R version 3.
```

```
## Loading required package: TTR
```

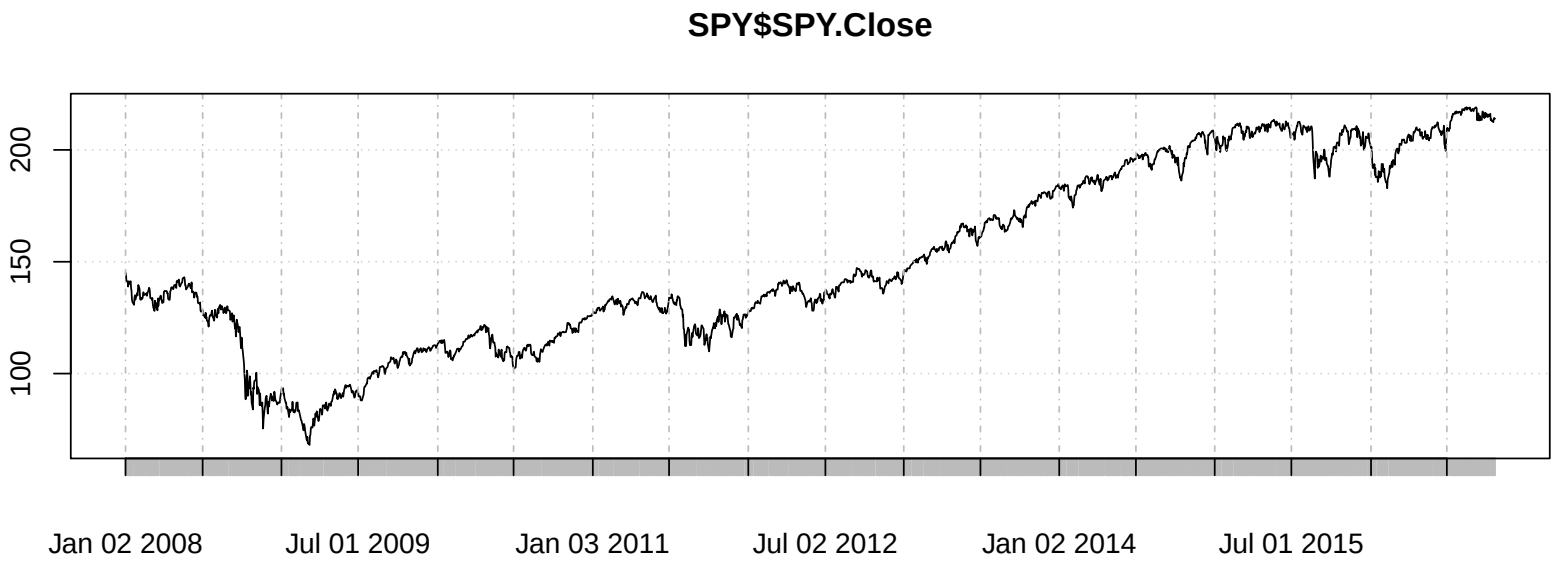
```
## Version 0.4-0 included new data defaults. See ?getSymbol
```

```
getSymbols("SPY", src="google",
           from = "2008-01-01")
```

```
##     As of 0.4-0, 'getSymbols' uses env=parent.frame() an
##  auto.assign=TRUE by default.
##
##  This  behavior  will be  phased out in 0.5-0  when the
##  default to use auto.assign=FALSE. getOption("getSymbols
##  getOptions("getSymbols.auto.assign") are now checked fo
```

Plot

```
plot(SPY$SPY.Close)
```



Subset

```
dim(SPY)
```

```
## [1] 2217    5
```

```
mysub <- SPY['2010-01/2010-12-31']
dim(mysub)
```

```
## [1] 252   5
```

Switch period

- get end of month observations

```
eom <- to.period(SPY,'months')
```

```
## Warning in to.period(SPY, "months"): missing values remo
```

```
head(eom,3)
```

```
##            SPY.Open SPY.High SPY.Low SPY.Close SPY.Volu
## 2008-01-31   146.53   146.99  126.00     137.37  7489280
## 2008-02-29   137.94   139.61  131.73     133.82 10482305
## 2008-03-31   133.14   135.81  126.07     131.89 10433451
```

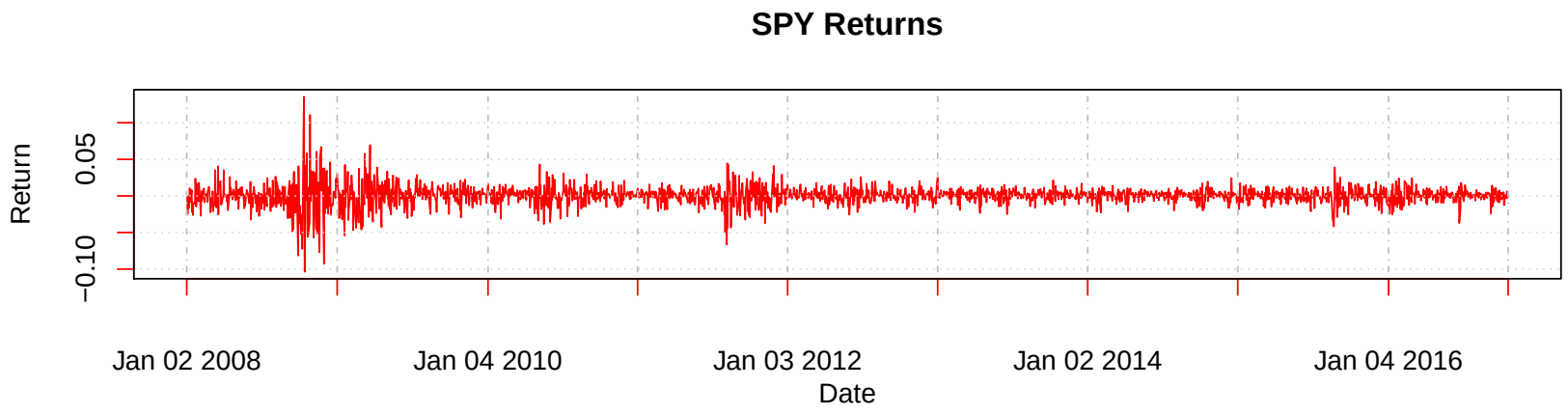
Differencing

```
SPY$ret <- diff(log(SPY$SPY.Close), lag=1)
head(SPY$ret)
```

```
##                          ret
## 2008-01-02                NA
## 2008-01-03 -0.0004831085
## 2008-01-04 -0.0248117002
## 2008-01-07 -0.0008495576
## 2008-01-08 -0.0162802596
## 2008-01-09  0.0104555521
```

Another Plot

```
plot(SPY$ret, main = "SPY Returns",
       col = "red", xlab = "Date", ylab = "Return",
       major.ticks='years',
       minor.ticks=FALSE)
```



Getting help

- As usual, read the manuals and vignettes for help
- Google: “cran xts”