Final Project

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Loading Data + Cleaning

```
## Goals:
# Cleaning up data, making it easier to read.
# **ALso need to filter out any NA's.**

data <- read.csv("all_stocks_5yr.csv")

summary(data)
```

```
##          date             open              high              low         
##  2017-12-05:   505   Min.   :   1.62   Min.   :   1.69   Min.   :   1.50  
##  2017-12-06:   505   1st Qu.:  40.22   1st Qu.:  40.62   1st Qu.:  39.83  
##  2017-12-07:   505   Median :  62.59   Median :  63.15   Median :  62.02  
##  2017-12-08:   505   Mean   :  83.02   Mean   :  83.78   Mean   :  82.26  
##  2017-12-11:   505   3rd Qu.:  94.37   3rd Qu.:  95.18   3rd Qu.:  93.54  
##  2017-12-12:   505   Max.   :2044.00   Max.   :2067.99   Max.   :2035.11  
##  (Other)   :616010   NA's   :11        NA's   :8         NA's   :8        
##      close              volume             Name         
##  Min.   :   1.59   Min.   :        0   A      :  1259  
##  1st Qu.:  40.24   1st Qu.:  1070320   AAL    :  1259  
##  Median :  62.62   Median :  2082094   AAP    :  1259  
##  Mean   :  83.04   Mean   :  4321823   AAPL   :  1259  
##  3rd Qu.:  94.41   3rd Qu.:  4284509   ABBV   :  1259  
##  Max.   :2049.00   Max.   :618237630   ABC    :  1259  
##                                        (Other):611486
```

```
str(data)
```

```
## 'data.frame':    619040 obs. of  7 variables:
##  $ date  : Factor w/ 1259 levels "2013-02-08","2013-02-11",..: 1 2 3 4 5 6 7 8 9 10 ...
##  $ open  : num  15.1 14.9 14.4 14.3 14.9 ...
##  $ high  : num  15.1 15 14.5 14.9 15 ...
##  $ low   : num  14.6 14.3 14.1 14.2 13.2 ...
##  $ close : num  14.8 14.5 14.3 14.7 14 ...
##  $ volume: int  8407500 8882000 8126000 10259500 31879900 15628000 11354400 14725200 11922100 607140
##  $ Name  : Factor w/ 505 levels "A","AAL","AAP",..: 2 2 2 2 2 2 2 2 2 2 ...
```

```
SP_data <- data %>%
  select(Name,date,open,low,high,close, volume)
# Changing the order of the columns
```

Ommiting NA rows vs replacing them with 0

```r
SP_data <- na.omit(SP_data)
#SP_data[is.na(SP_data)] <- 0

# Omitting rows with NA values in order to make calculations error free, vs setting them to 0.

summary(SP_data)
```

```
##       Name                date             open              low         
##  A      :  1259   2017-12-05:   505   Min.   :   1.62   Min.   :   1.50  
##  AAL    :  1259   2017-12-06:   505   1st Qu.:  40.22   1st Qu.:  39.83  
##  AAP    :  1259   2017-12-07:   505   Median :  62.59   Median :  62.02  
##  AAPL   :  1259   2017-12-08:   505   Mean   :  83.02   Mean   :  82.26  
##  ABBV   :  1259   2017-12-11:   505   3rd Qu.:  94.37   3rd Qu.:  93.54  
##  ABC    :  1259   2017-12-12:   505   Max.   :2044.00   Max.   :2035.11  
##  (Other):611475   (Other)   :615999                                      
##       high              close              volume         
##  Min.   :   1.69   Min.   :   1.59   Min.   :      101  
##  1st Qu.:  40.62   1st Qu.:  40.24   1st Qu.:  1070351  
##  Median :  63.15   Median :  62.62   Median :  2082165  
##  Mean   :  83.78   Mean   :  83.04   Mean   :  4321892  
##  3rd Qu.:  95.18   3rd Qu.:  94.41   3rd Qu.:  4284550  
##  Max.   :2067.99   Max.   :2049.00   Max.   :618237630  
##
```

Changing date column from a factro to date

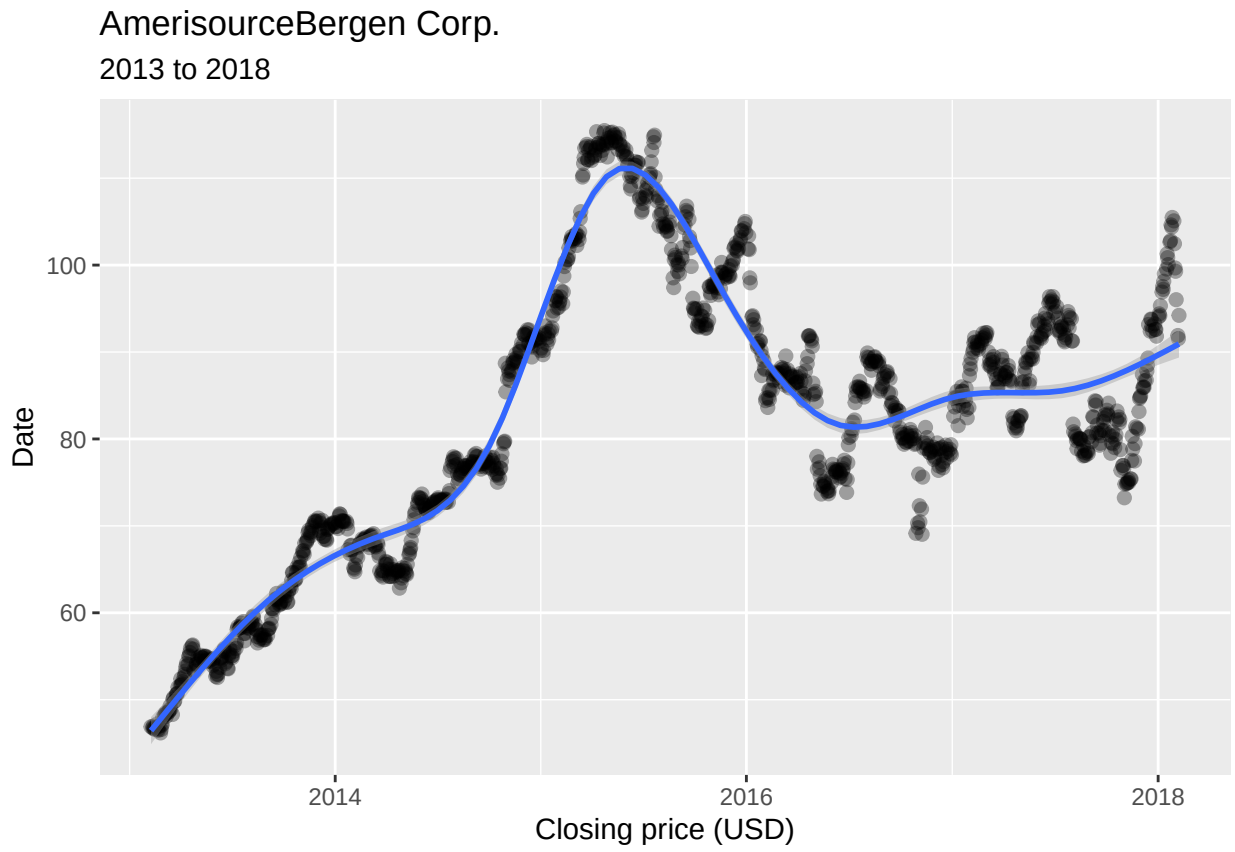
```r
# Making the "date" column usable.

SP_data$Date <- as.Date(SP_data$date, format = "%Y-%m-%d")
SP_data$date <- NULL
# Changing the date column format into a new variable, and deleting the previous one

summary(SP_data)
```

```
##       Name             open              low               high        
##  A      :  1259   Min.   :   1.62   Min.   :   1.50   Min.   :   1.69  
##  AAL    :  1259   1st Qu.:  40.22   1st Qu.:  39.83   1st Qu.:  40.62  
##  AAP    :  1259   Median :  62.59   Median :  62.02   Median :  63.15  
##  AAPL   :  1259   Mean   :  83.02   Mean   :  82.26   Mean   :  83.78  
##  ABBV   :  1259   3rd Qu.:  94.37   3rd Qu.:  93.54   3rd Qu.:  95.18  
##  ABC    :  1259   Max.   :2044.00   Max.   :2035.11   Max.   :2067.99  
##  (Other):611475                                                        
##      close              volume              Date         
##  Min.   :   1.59   Min.   :      101   Min.   :2013-02-08  
##  1st Qu.:  40.24   1st Qu.:  1070351   1st Qu.:2014-05-20  
##  Median :  62.62   Median :  2082165   Median :2015-08-21  
##  Mean   :  83.04   Mean   :  4321892   Mean   :2015-08-18  
##  3rd Qu.:  94.41   3rd Qu.:  4284550   3rd Qu.:2016-11-15  
##  Max.   :2049.00   Max.   :618237630   Max.   :2018-02-07  
##
```

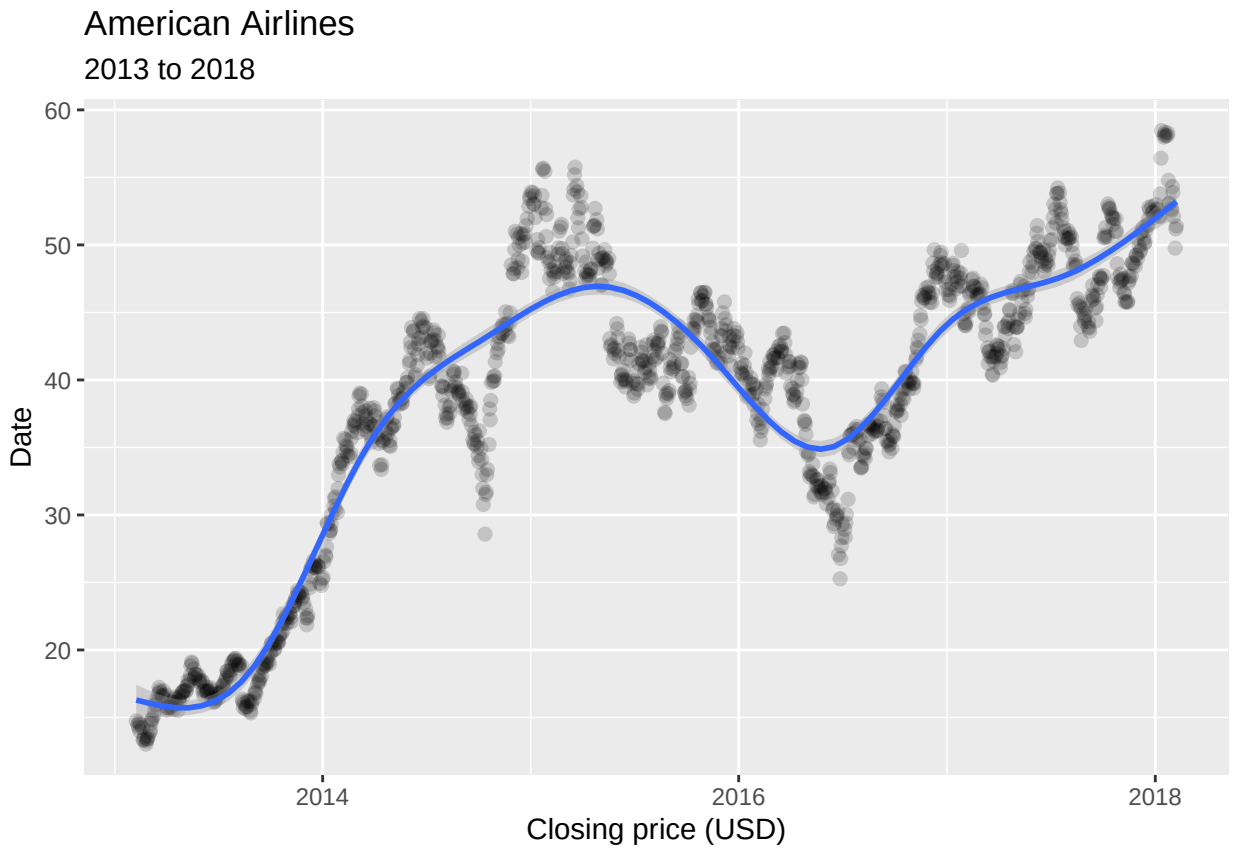
```r
## Goals
# Figuring out how to categorize the data into 500 indivivual companies, manually or via
# automation/funtion.

SP_data %>%
  group_by(Name) %>%
  select(Name) %>%
  unique()
```

```
## # A tibble: 505 x 1
## # Groups:   Name [505]
##    Name
##    <fct>
##  1 AAL
##  2 AAPL
##  3 AAP
##  4 ABBV
##  5 ABC
##  6 ABT
##  7 ACN
##  8 ADBE
##  9 ADI
## 10 ADM
## # ... with 495 more rows
```

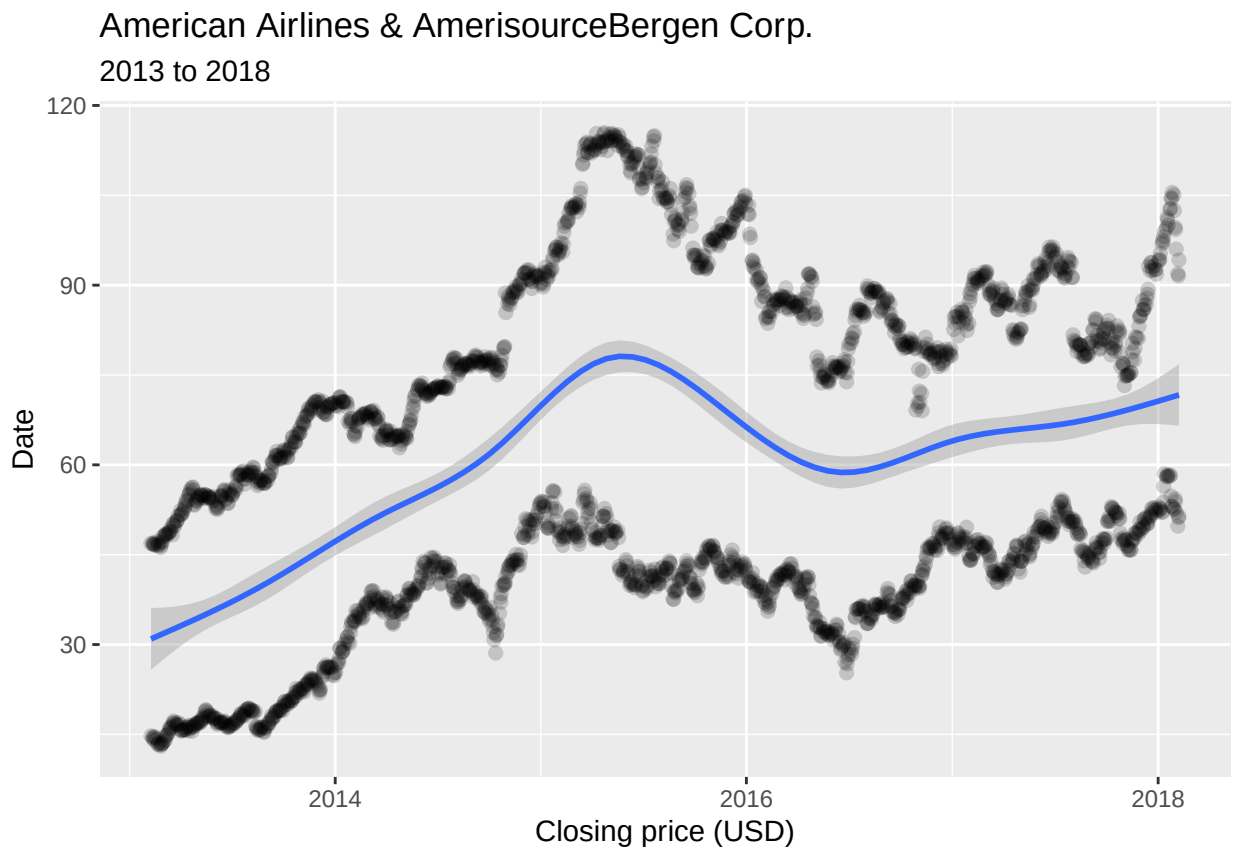
```r
# Listing all of the unique companies included in data set.

ABC <- ggplot(filter(SP_data, Name %in% c("ABC")), aes(x = Date, y = close)) + geom_point(alpha = (1/3)
                          subtitle = "2013 to 2018",
                          y = "Date",
                          x = "Closing price (USD)")

ABC
```




```
AAL <- ggplot(filter(SP_data, Name %in% c("AAL")), aes(x = Date, y = close)) + geom_point(alpha = (1/6)
                          subtitle = "2013 to 2018",
                          y = "Date",
                          x = "Closing price (USD)")

AAL
```



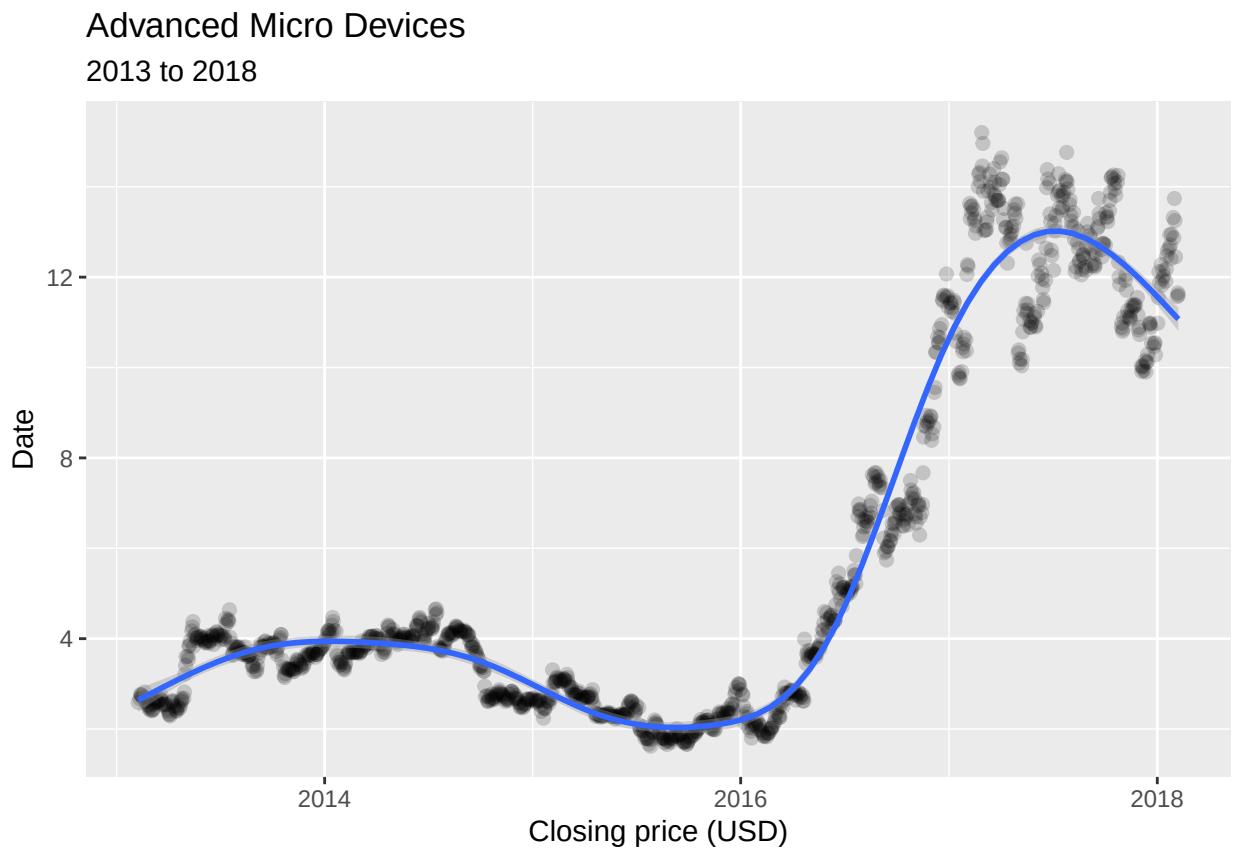

```
AAL_ABC <- ggplot(filter(SP_data, Name %in% c("AAL","ABC")), aes(x = Date, y = close)) + geom_point(alp
                          subtitle = "2013 to 2018",
                          y = "Date",
                          x = "Closing price (USD)")

AAL_ABC
```



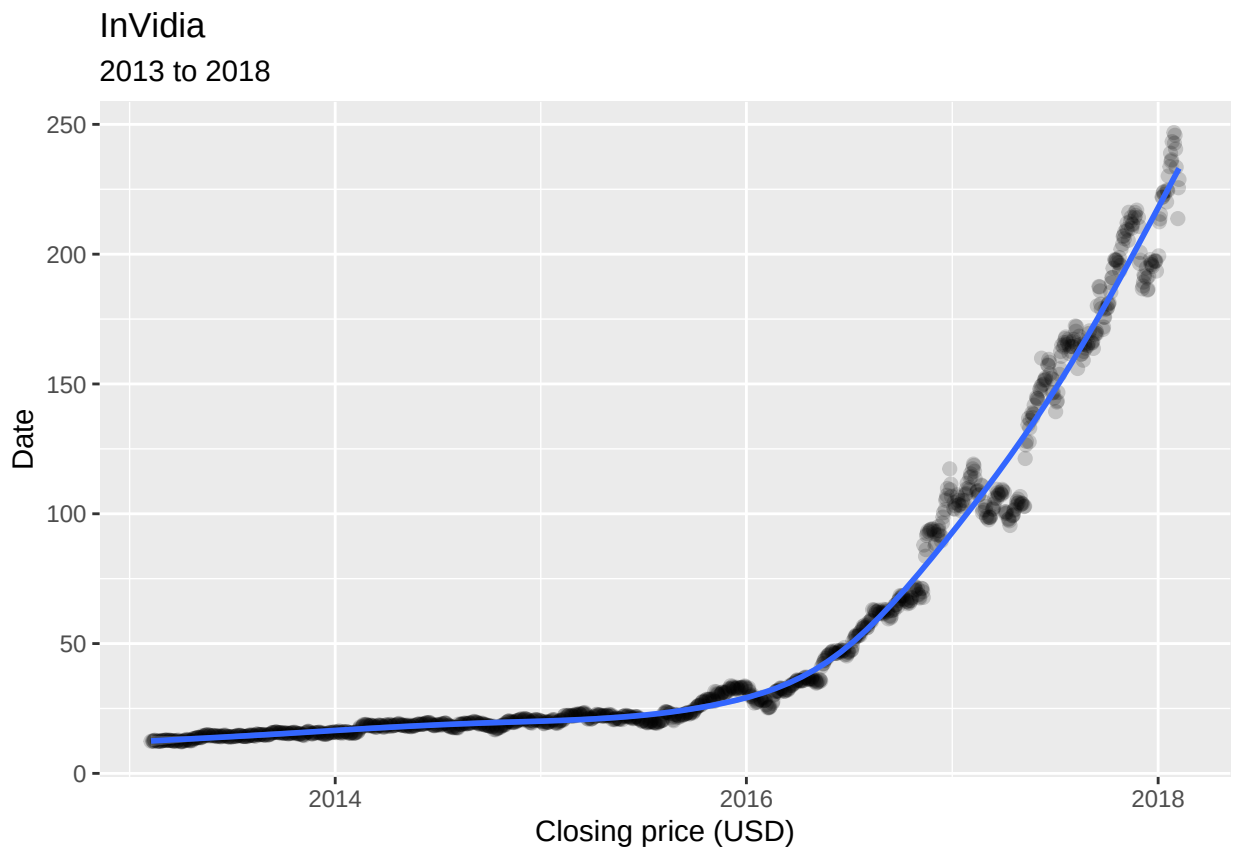

```
#summary(SP_data)
```

#Top S&P 500 Stocks * Categorized by competitors and similar industries

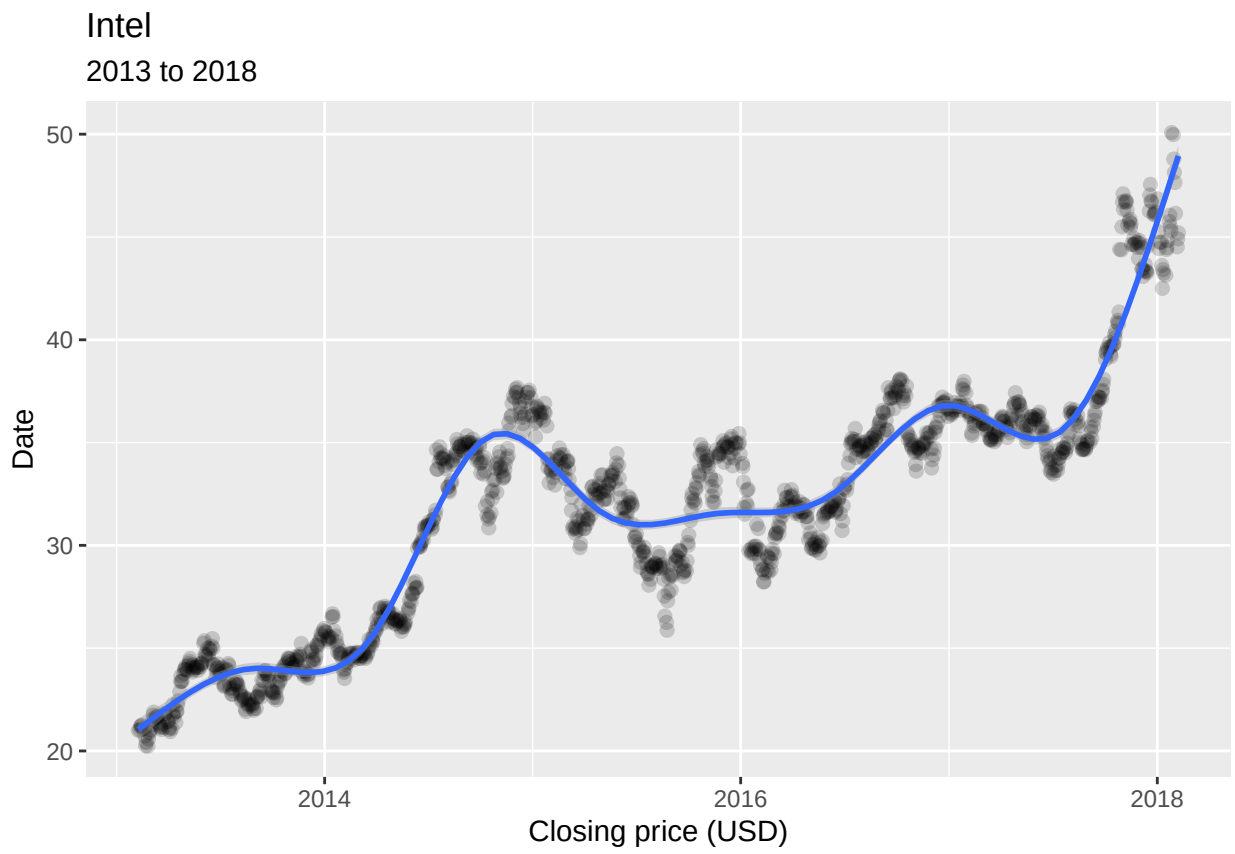
```
AMD <- ggplot(filter(SP_data, Name %in% c("AMD")), aes(x = Date, y = close)) + geom_point(alpha = (1/6)
                          subtitle = "2013 to 2018",
                          y = "Date",
                          x = "Closing price (USD)")

AMD
```




```
NVDA <- ggplot(filter(SP_data, Name %in% c("NVDA")), aes(x = Date, y = close)) + geom_point(alpha = (1/
                        subtitle = "2013 to 2018",
                        y = "Date",
                        x = "Closing price (USD)")

NVDA
```

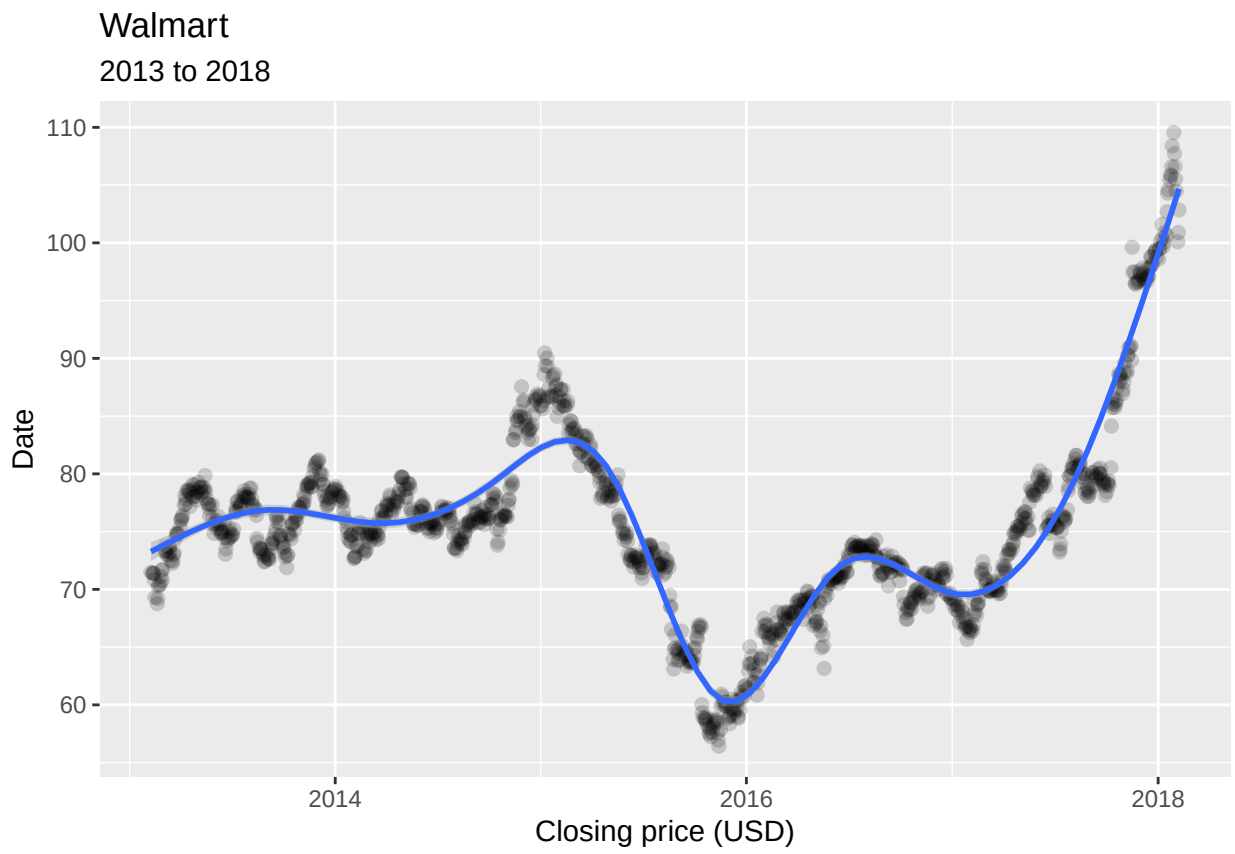



```
INTC <- ggplot(filter(SP_data, Name %in% c("INTC")), aes(x = Date, y = close)) + geom_point(alpha = (1/
                        subtitle = "2013 to 2018",
                        y = "Date",
                        x = "Closing price (USD)")

INTC
```



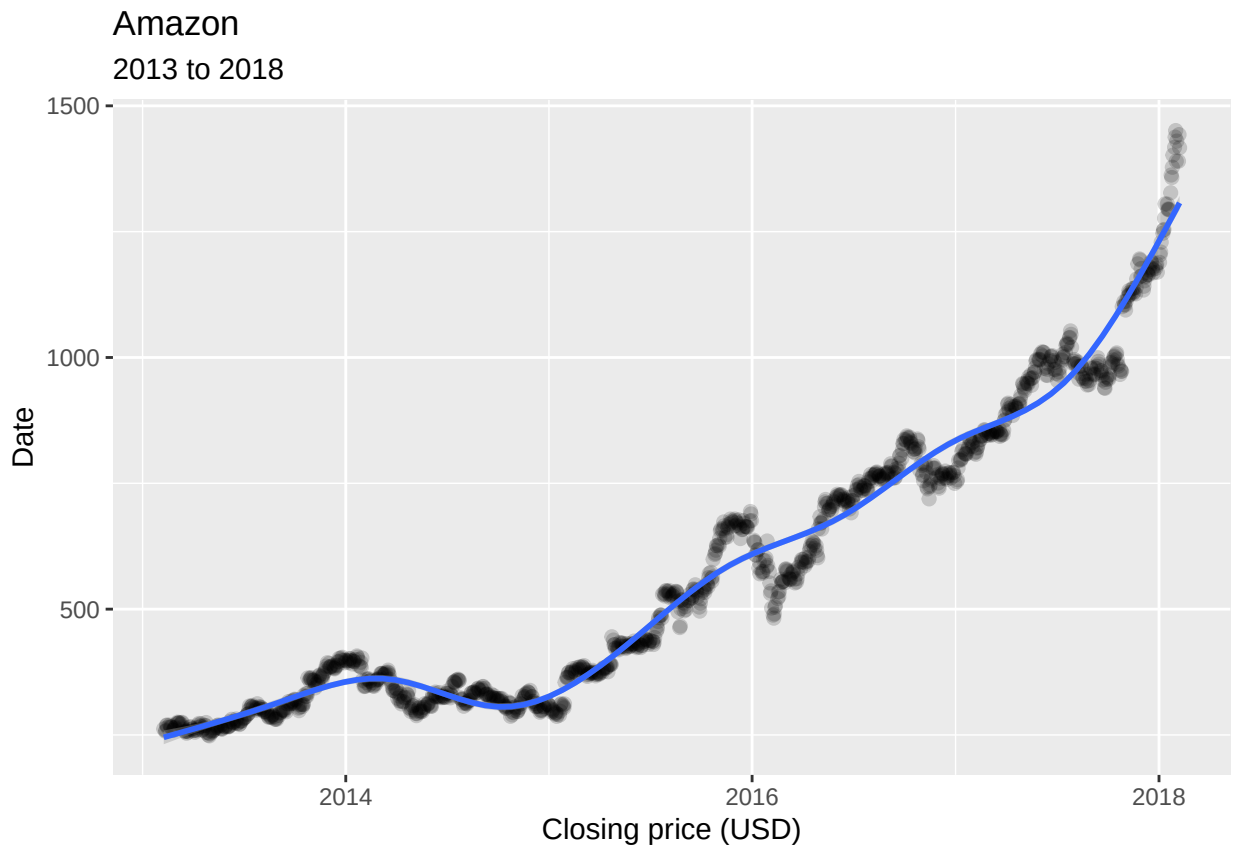

```
WMT <- ggplot(filter(SP_data, Name %in% c("WMT")), aes(x = Date, y = close)) + geom_point(alpha = (1/6)
                          subtitle = "2013 to 2018",
                          y = "Date",
                          x = "Closing price (USD)")

WMT
```

```
## `geom_smooth()` using method = 'gam' and formula 'y ~ s(x, bs = "cs")'
```



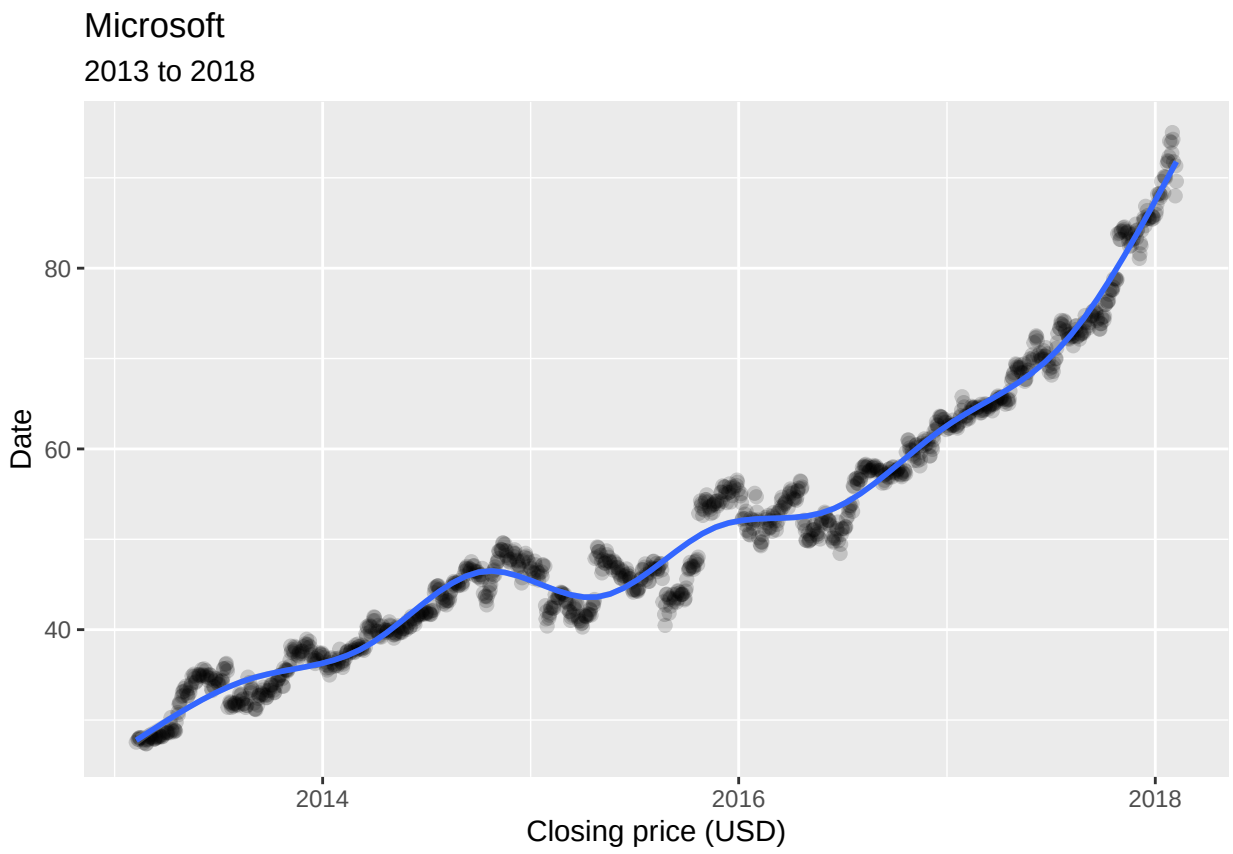

```
AMZN <- ggplot(filter(SP_data, Name %in% c("AMZN")), aes(x = Date, y = close)) + geom_point(alpha = (1/
                        subtitle = "2013 to 2018",
                        y = "Date",
                        x = "Closing price (USD)")

AMZN
```

```
## `geom_smooth()` using method = 'gam' and formula 'y ~ s(x, bs = "cs")'
```



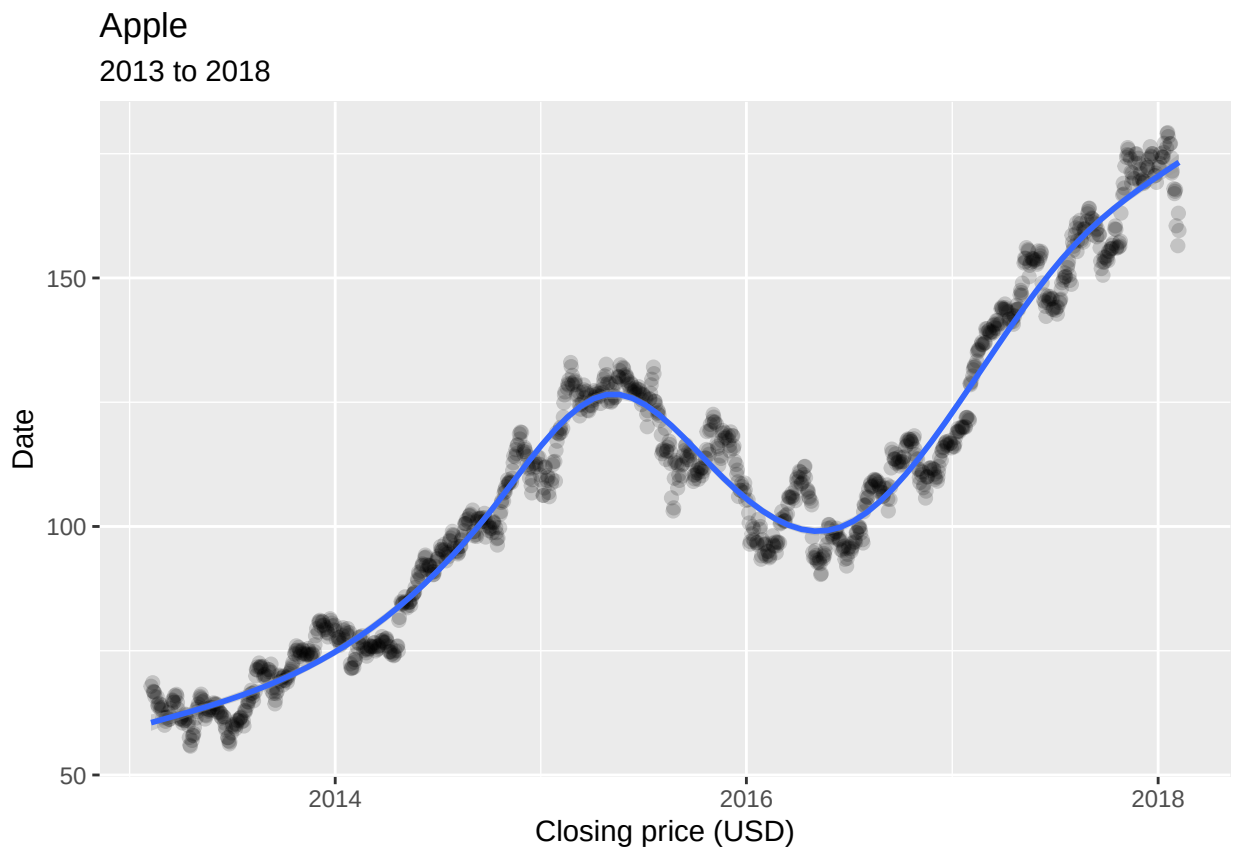

```
MSFT <- ggplot(filter(SP_data, Name %in% c("MSFT")), aes(x = Date, y = close)) + geom_point(alpha = (1/
                          subtitle = "2013 to 2018",
                          y = "Date",
                          x = "Closing price (USD)")

MSFT
```

```
## `geom_smooth()` using method = 'gam' and formula 'y ~ s(x, bs = "cs")'
```




```
AAPL <- ggplot(filter(SP_data, Name %in% c("AAPL")), aes(x = Date, y = close)) + geom_point(alpha = (1/
                        subtitle = "2013 to 2018",
                        y = "Date",
                        x = "Closing price (USD)")

AAPL
```

```
## `geom_smooth()` using method = 'gam' and formula 'y ~ s(x, bs = "cs")'
```

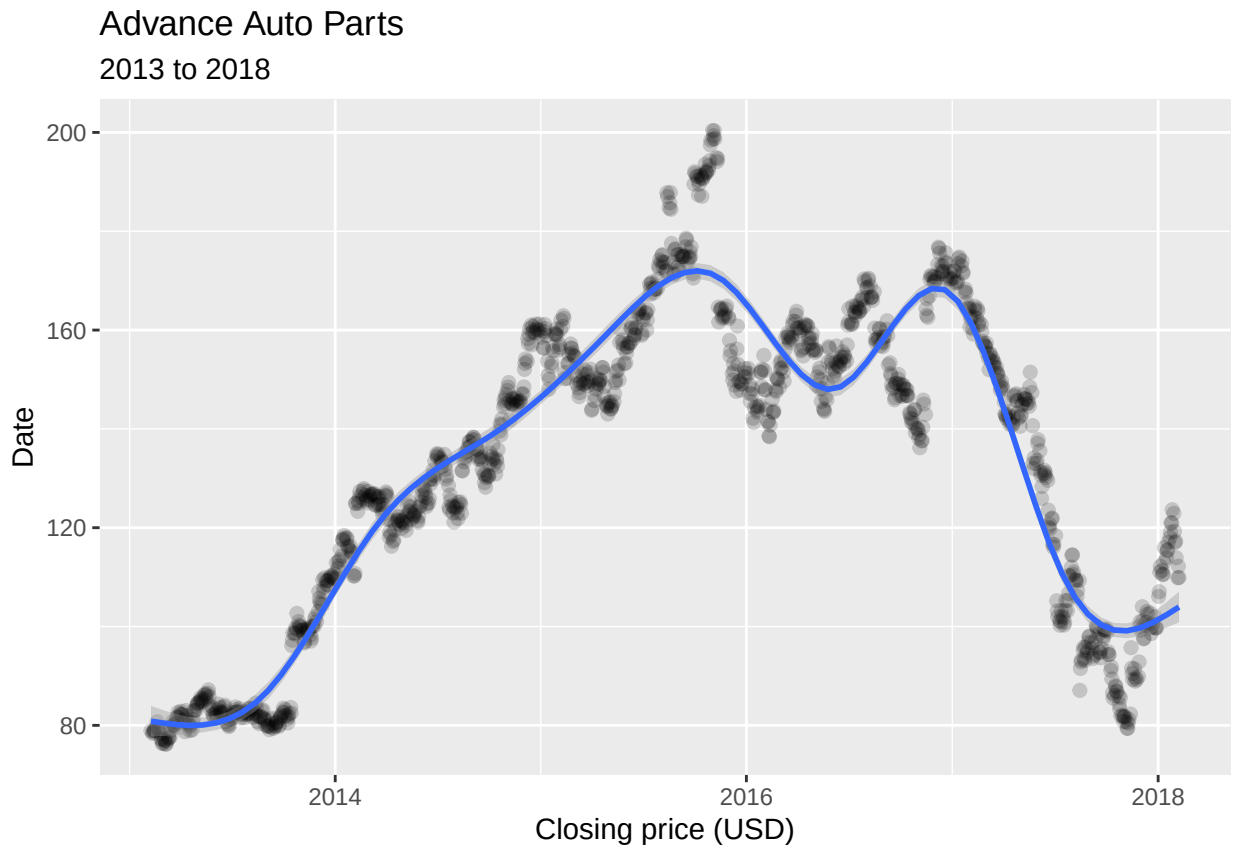



```
TRIP <- ggplot(filter(SP_data, Name %in% c("TRIP")), aes(x = Date, y = close)) + geom_point(alpha = (1/
                        subtitle = "2013 to 2018",
                        y = "Date",
                        x = "Closing price (USD)")

TRIP
```

```
## `geom_smooth()` using method = 'gam' and formula 'y ~ s(x, bs = "cs")'
```

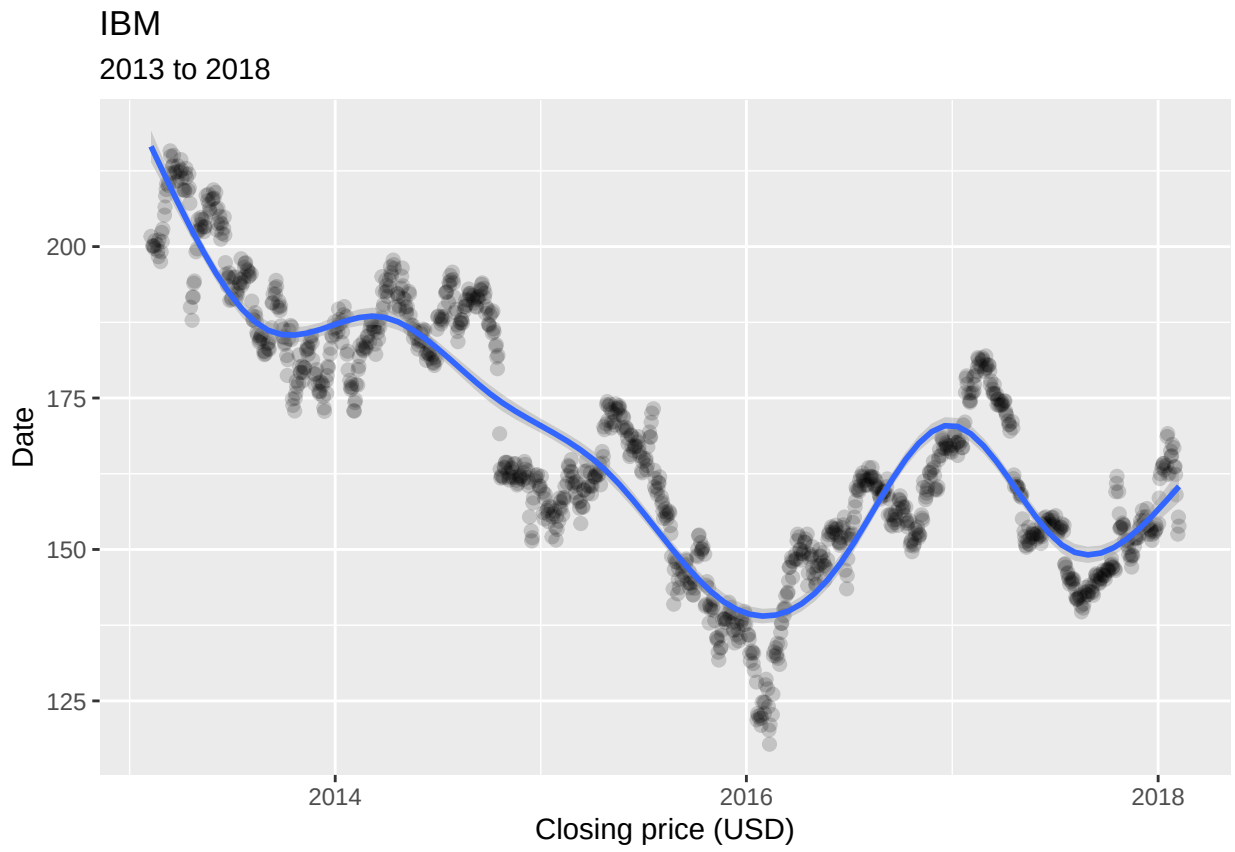

```
AAP <- ggplot(filter(SP_data, Name %in% c("AAP")), aes(x = Date, y = close)) + geom_point(alpha = (1/6)
                          subtitle = "2013 to 2018",
                          y = "Date",
                          x = "Closing price (USD)")

AAP
```

```
## `geom_smooth()` using method = 'gam' and formula 'y ~ s(x, bs = "cs")'
```



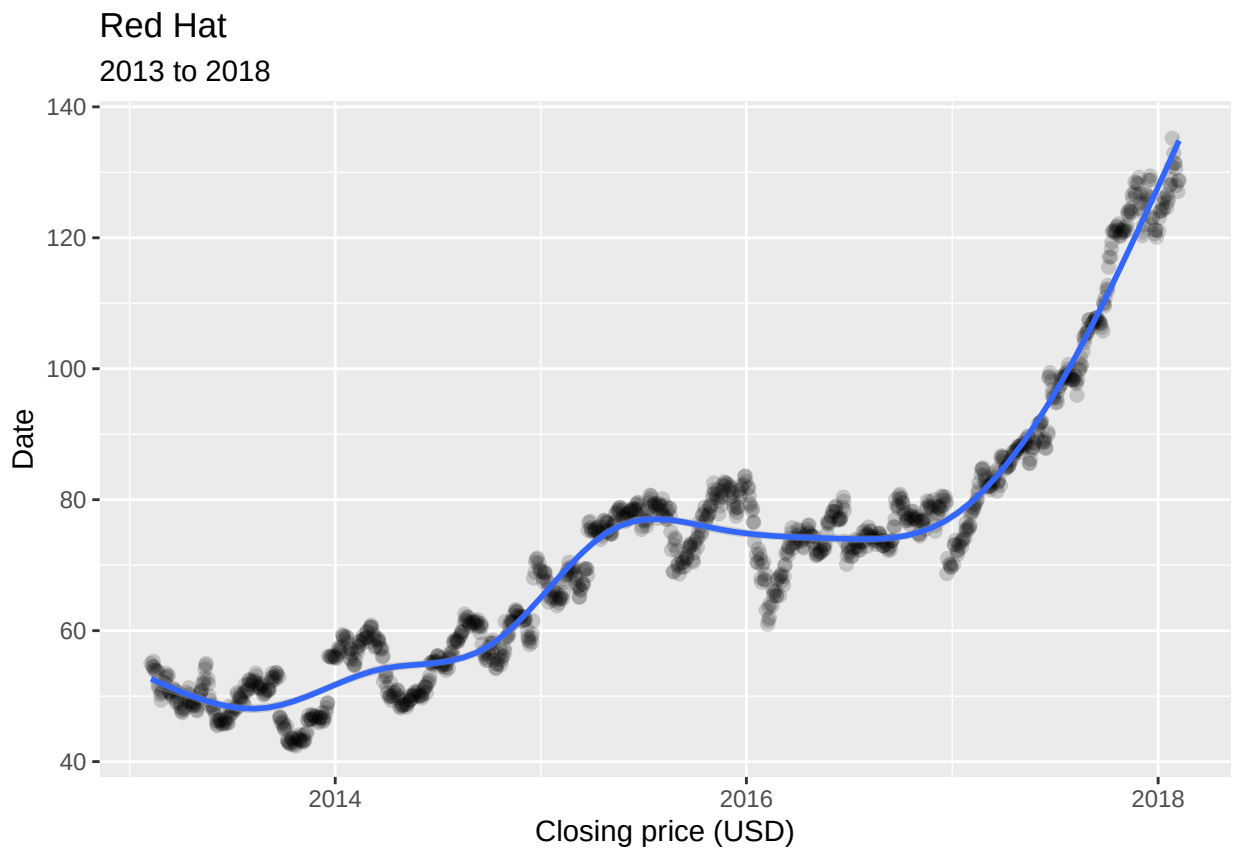

```
IBM <- ggplot(filter(SP_data, Name %in% c("IBM")), aes(x = Date, y = close)) + geom_point(alpha = (1/6)
                        subtitle = "2013 to 2018",
                        y = "Date",
                        x = "Closing price (USD)")

IBM
```

```
## `geom_smooth()` using method = 'gam' and formula 'y ~ s(x, bs = "cs")'
```



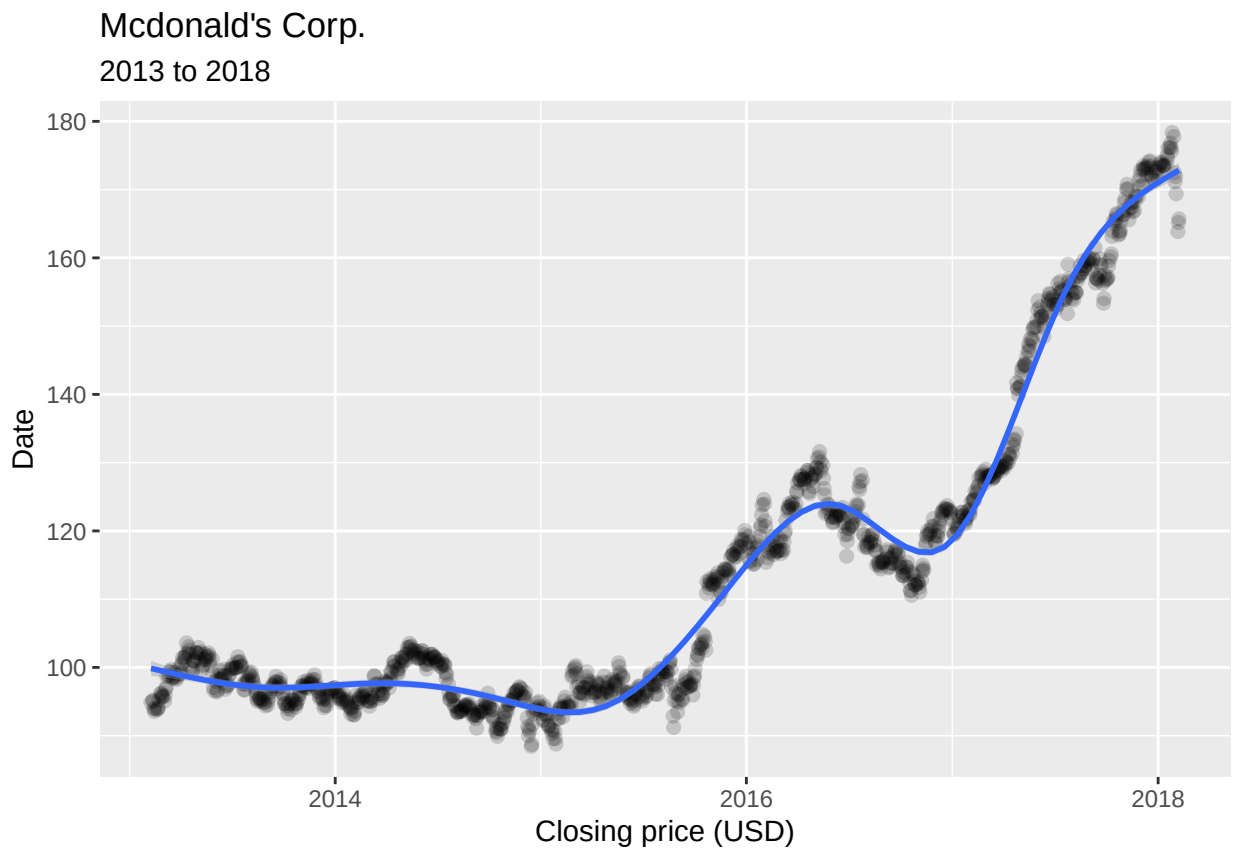

```
RHT <- ggplot(filter(SP_data, Name %in% c("RHT")), aes(x = Date, y = close)) + geom_point(alpha = (1/6)
                          subtitle = "2013 to 2018",
                          y = "Date",
                          x = "Closing price (USD)")

RHT
```

```
## `geom_smooth()` using method = 'gam' and formula 'y ~ s(x, bs = "cs")'
```



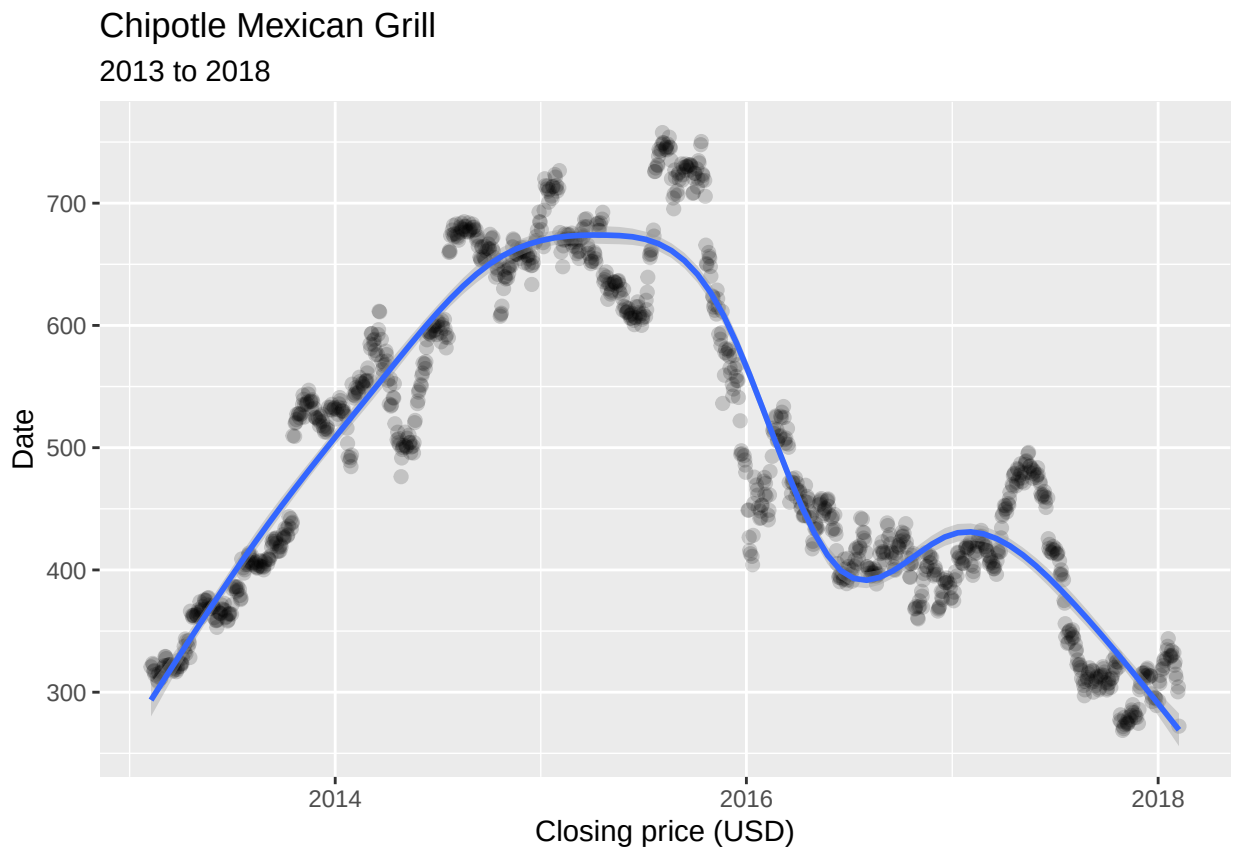

```
MCD <- ggplot(filter(SP_data, Name %in% c("MCD")), aes(x = Date, y = close)) + geom_point(alpha = (1/6)
                        subtitle = "2013 to 2018",
                        y = "Date",
                        x = "Closing price (USD)")

MCD
```

```
## `geom_smooth()` using method = 'gam' and formula 'y ~ s(x, bs = "cs")'
```



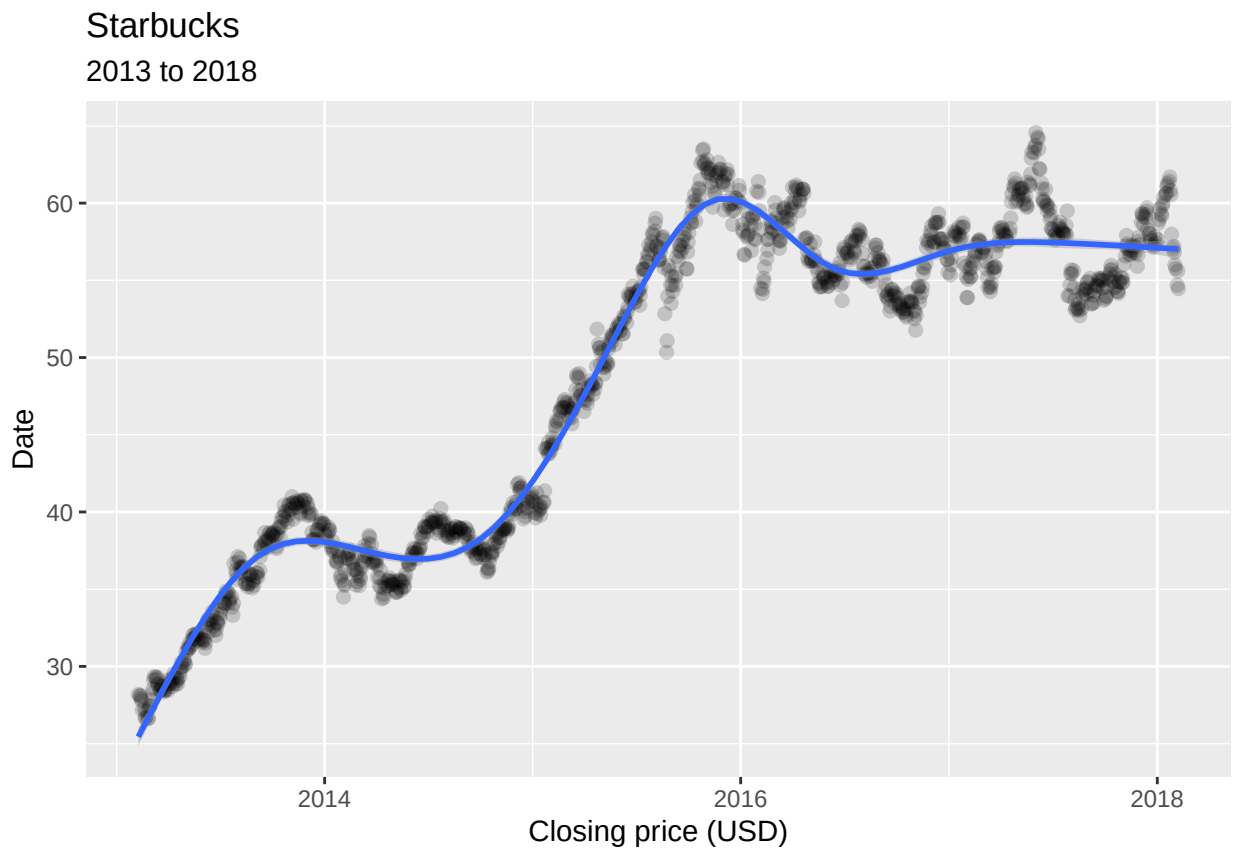

```
CMG <- ggplot(filter(SP_data, Name %in% c("CMG")), aes(x = Date, y = close)) + geom_point(alpha = (1/6)
                          subtitle = "2013 to 2018",
                          y = "Date",
                          x = "Closing price (USD)")

CMG
```

```
## `geom_smooth()` using method = 'gam' and formula 'y ~ s(x, bs = "cs")'
```



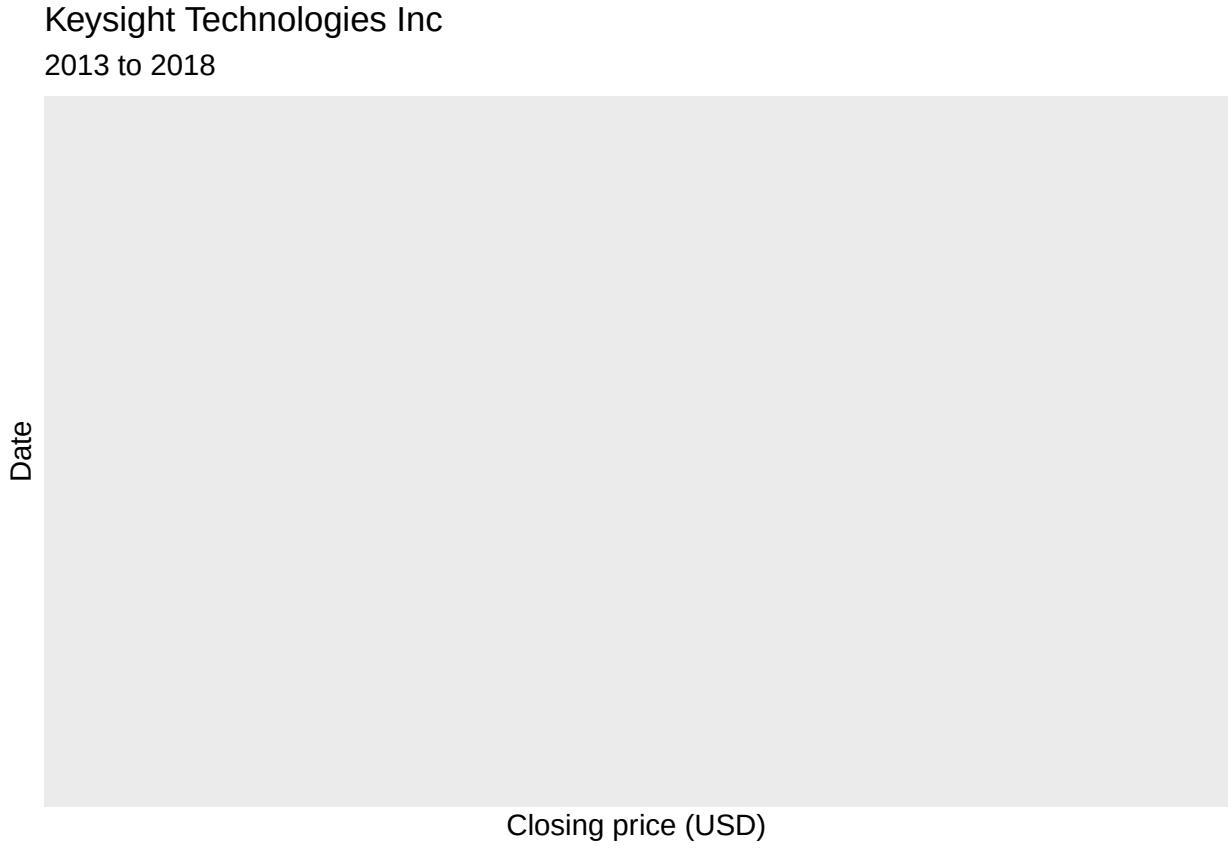

```
SBUX <- ggplot(filter(SP_data, Name %in% c("SBUX")), aes(x = Date, y = close)) + geom_point(alpha = (1/
                          subtitle = "2013 to 2018",
                          y = "Date",
                          x = "Closing price (USD)")

SBUX
```

```
## `geom_smooth()` using method = 'gam' and formula 'y ~ s(x, bs = "cs")'
```



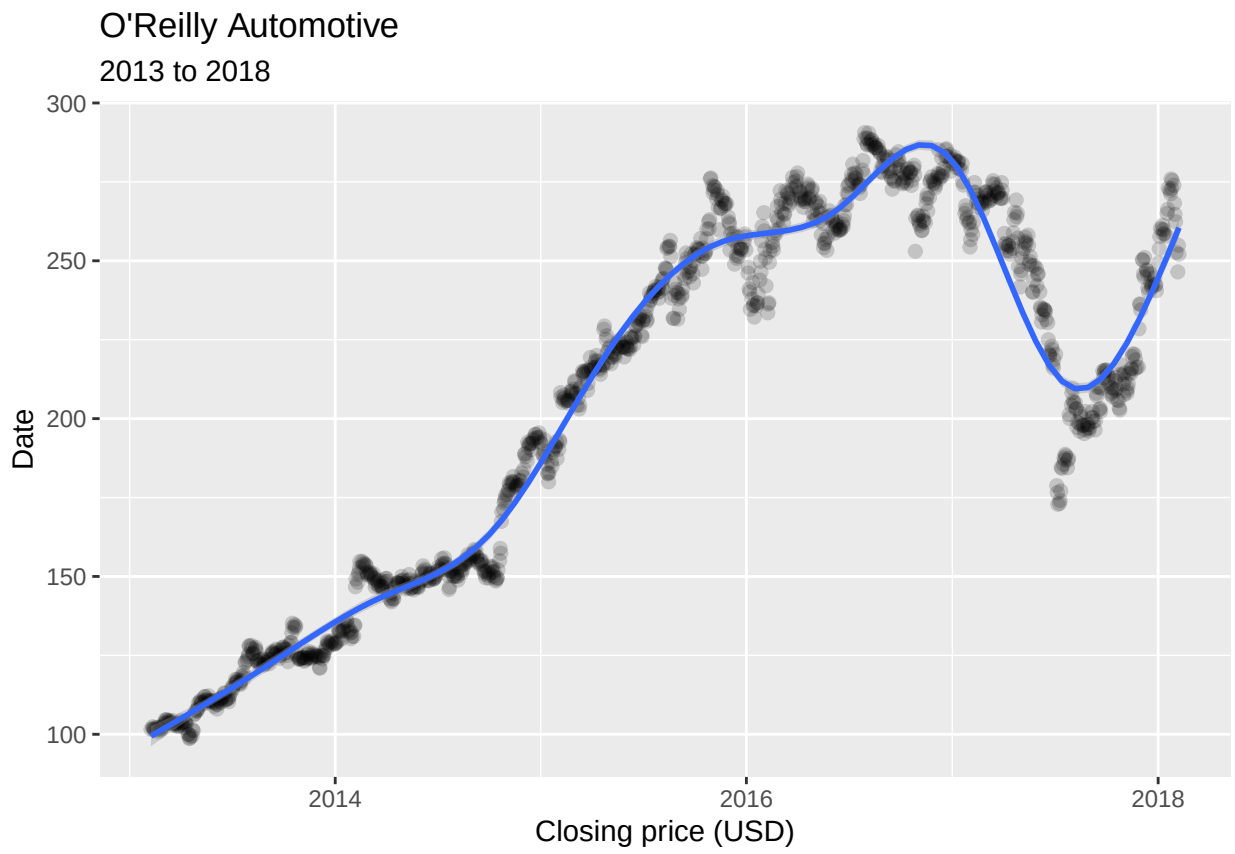

```
WEN <- ggplot(filter(SP_data, Name %in% c("WEN")), aes(x = Date, y = close)) + geom_point(alpha = (1/6)
                          subtitle = "2013 to 2018",
                          y = "Date",
                          x = "Closing price (USD)")

WEN
```


```
KEYS <- ggplot(filter(SP_data, Name %in% c("KEYS")), aes(x = Date, y = close)) + geom_point(alpha = (1/
                          subtitle = "2013 to 2018",
                          y = "Date",
                          x = "Closing price (USD)")

KEYS
```



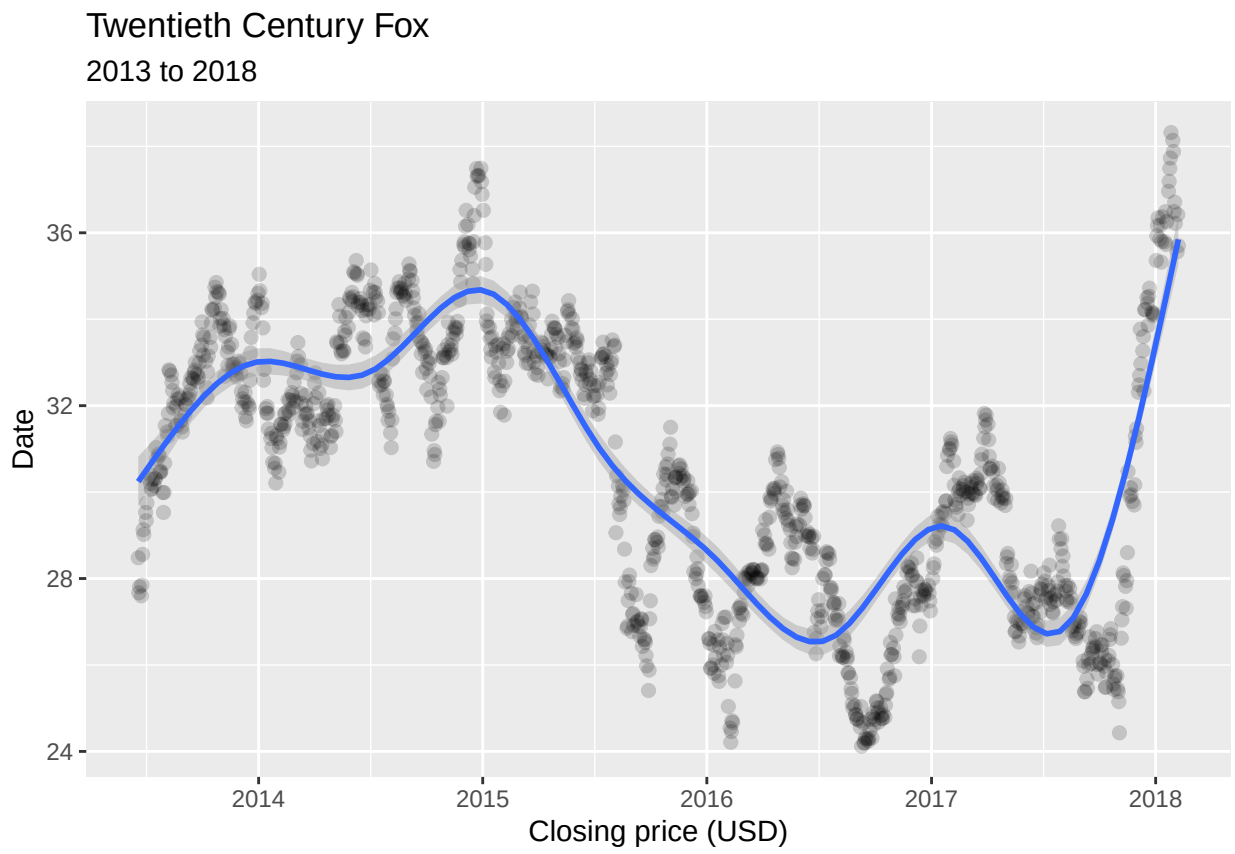

```
ORLY<- ggplot(filter(SP_data, Name %in% c("ORLY")), aes(x = Date, y = close)) + geom_point(alpha = (1/6)
                          subtitle = "2013 to 2018",
                          y = "Date",
                          x = "Closing price (USD)")

ORLY
```

```
## `geom_smooth()` using method = 'gam' and formula 'y ~ s(x, bs = "cs")'
```



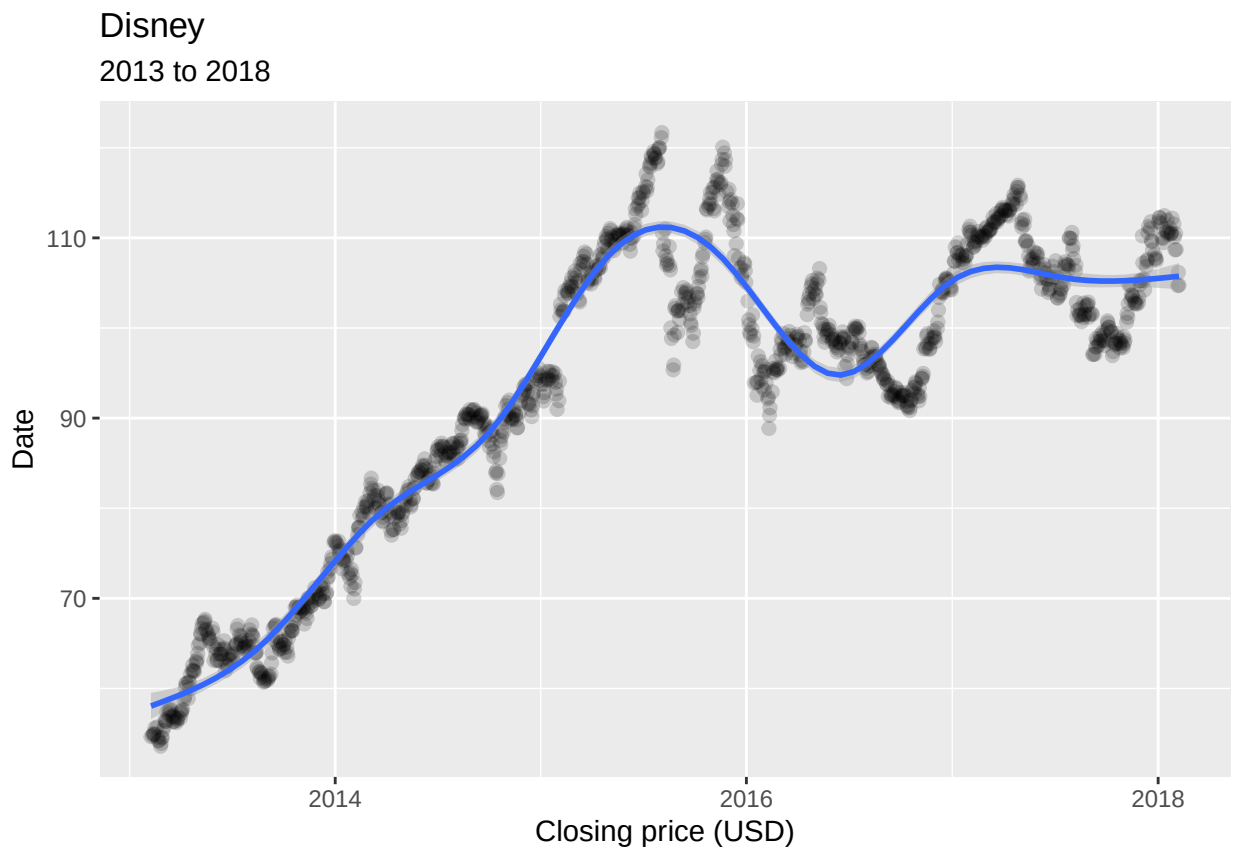

```
FOX <- ggplot(filter(SP_data, Name %in% c("FOX")), aes(x = Date, y = close)) + geom_point(alpha = (1/6)
                        subtitle = "2013 to 2018",
                        y = "Date",
                        x = "Closing price (USD)")

FOX
```

```
## `geom_smooth()` using method = 'gam' and formula 'y ~ s(x, bs = "cs")'
```

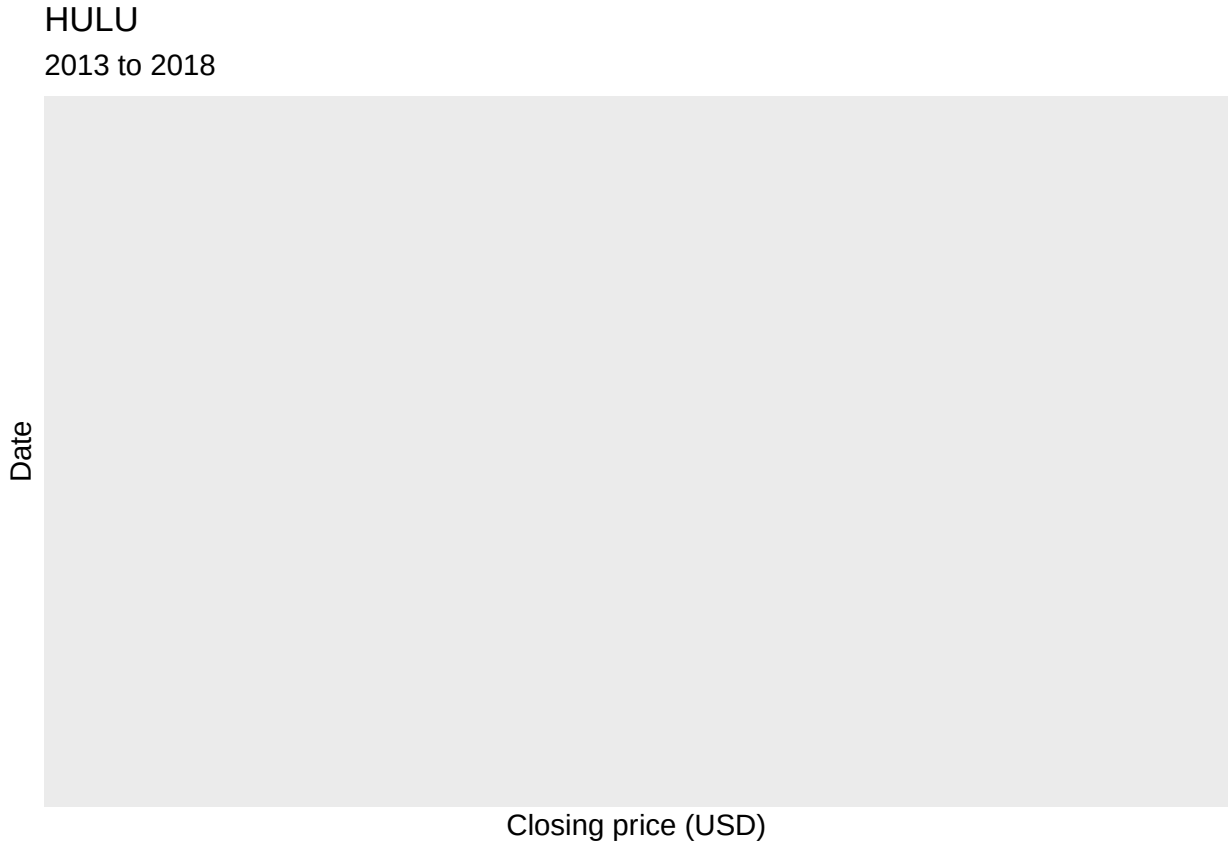



```
DIS <- ggplot(filter(SP_data, Name %in% c("DIS")), aes(x = Date, y = close)) + geom_point(alpha = (1/6)
                        subtitle = "2013 to 2018",
                        y = "Date",
                        x = "Closing price (USD)")

DIS
```

```
## `geom_smooth()` using method = 'gam' and formula 'y ~ s(x, bs = "cs")'
```

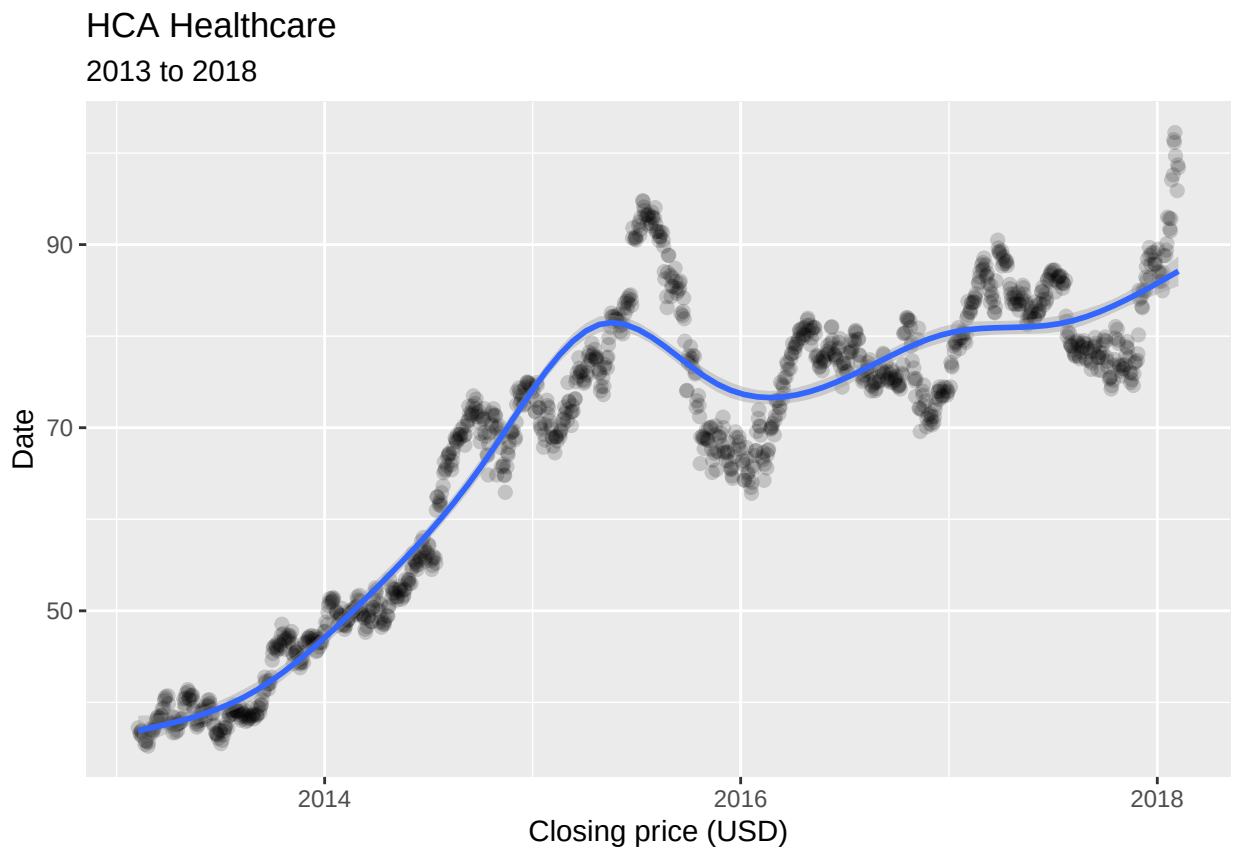



```
HULU <- ggplot(filter(SP_data, Name %in% c("HULU")), aes(x = Date, y = close)) + geom_point(alpha = (1/
                          subtitle = "2013 to 2018",
                          y = "Date",
                          x = "Closing price (USD)")

HULU
```



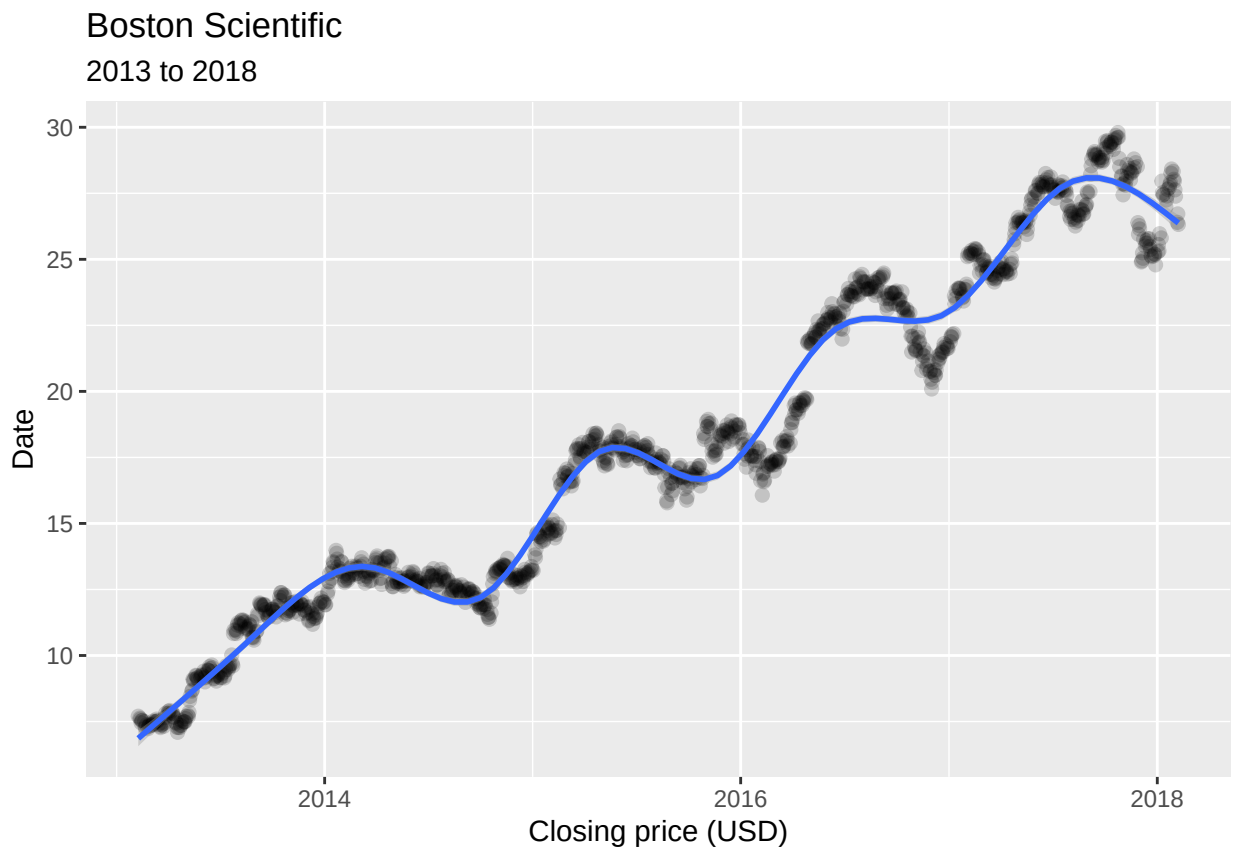

```
HCA <- ggplot(filter(SP_data, Name %in% c("HCA")), aes(x = Date, y = close)) + geom_point(alpha = (1/6)
                          subtitle = "2013 to 2018",
                          y = "Date",
                          x = "Closing price (USD)")

HCA
```

```
## `geom_smooth()` using method = 'gam' and formula 'y ~ s(x, bs = "cs")'
```



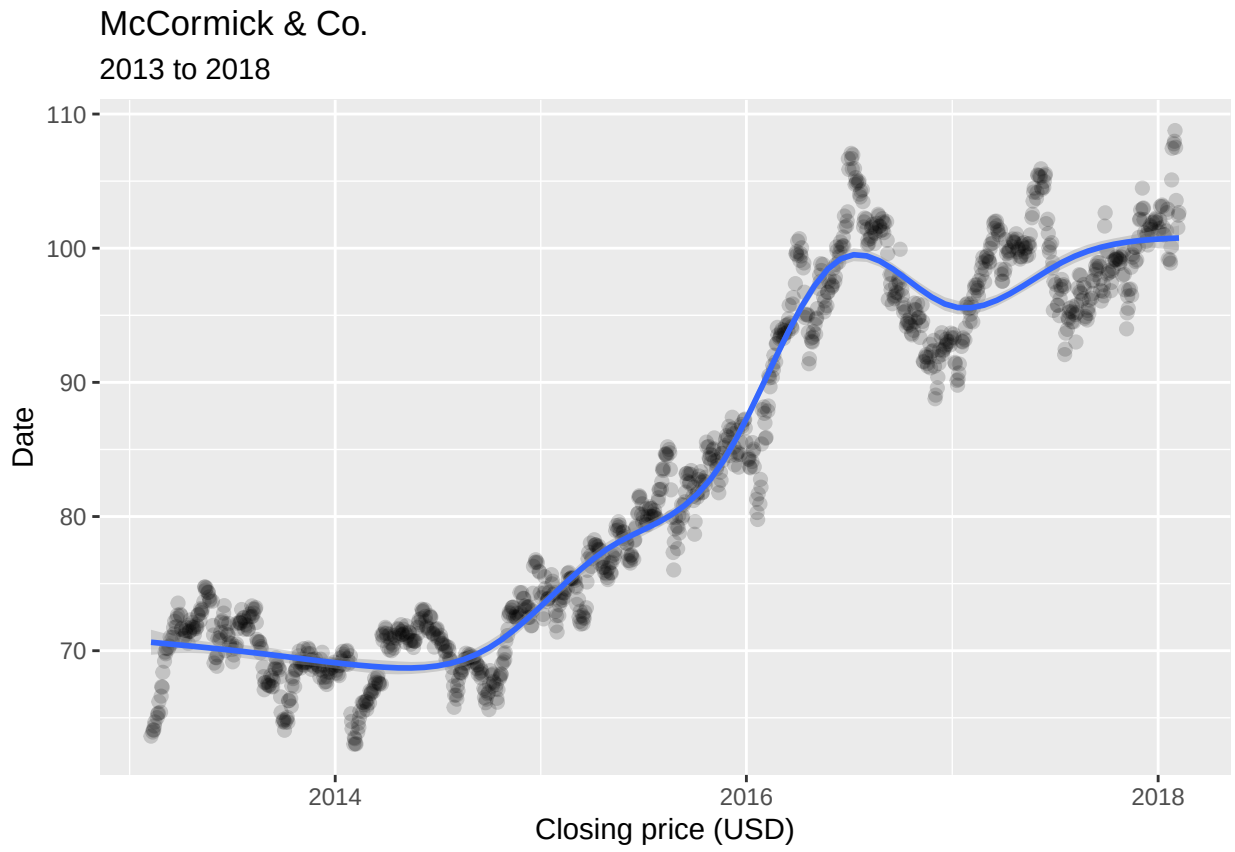

```
BSX <- ggplot(filter(SP_data, Name %in% c("BSX")), aes(x = Date, y = close)) + geom_point(alpha = (1/6)
                        subtitle = "2013 to 2018",
                        y = "Date",
                        x = "Closing price (USD)")

BSX
```

```
## `geom_smooth()` using method = 'gam' and formula 'y ~ s(x, bs = "cs")'
```




```
MKC <- ggplot(filter(SP_data, Name %in% c("MKC")), aes(x = Date, y = close)) + geom_point(alpha = (1/6)
                        subtitle = "2013 to 2018",
                        y = "Date",
                        x = "Closing price (USD)")

MKC
```

```
## `geom_smooth()` using method = 'gam' and formula 'y ~ s(x, bs = "cs")'
```

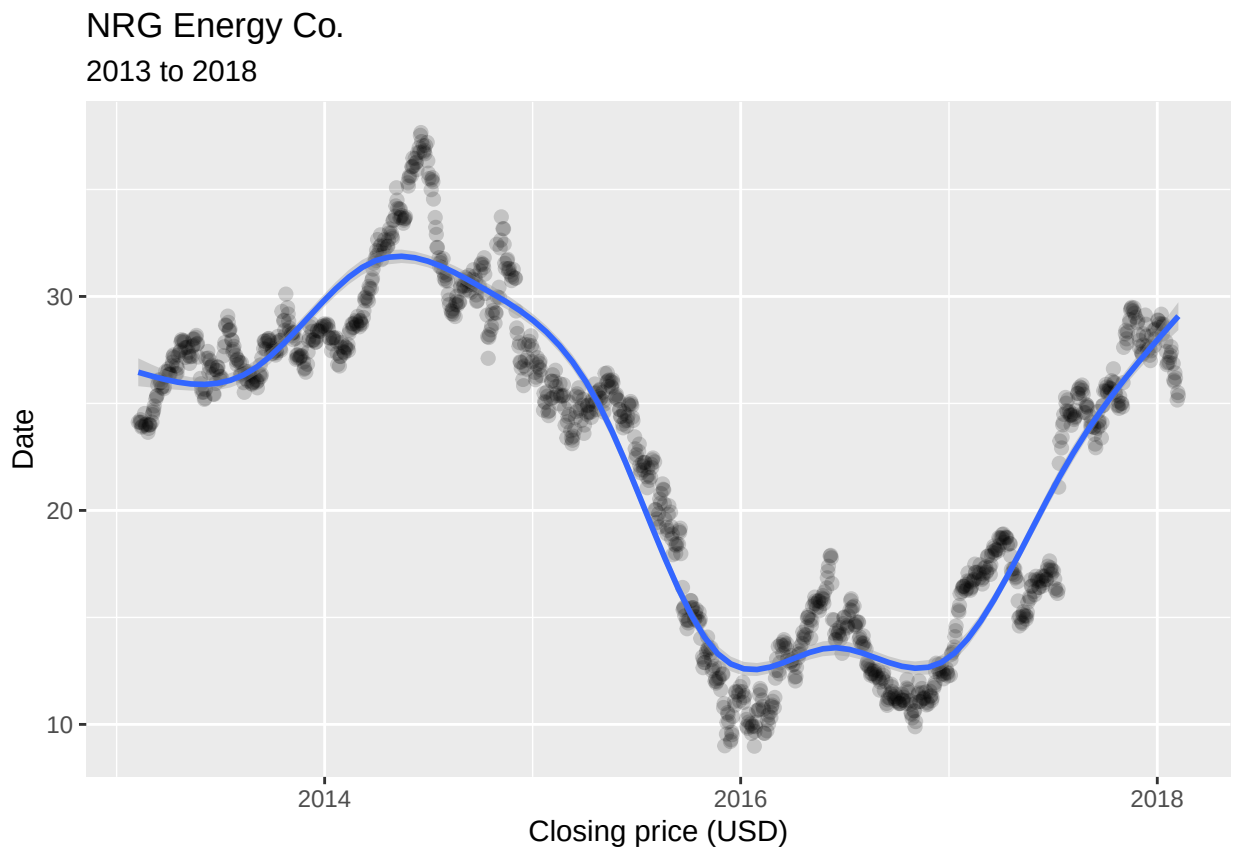



```
ILMN <- ggplot(filter(SP_data, Name %in% c("ILMN")), aes(x = Date, y = close)) + geom_point(alpha = (1/
                        subtitle = "2013 to 2018",
                        y = "Date",
                        x = "Closing price (USD)")

ILMN
```

```
## `geom_smooth()` using method = 'gam' and formula 'y ~ s(x, bs = "cs")'
```

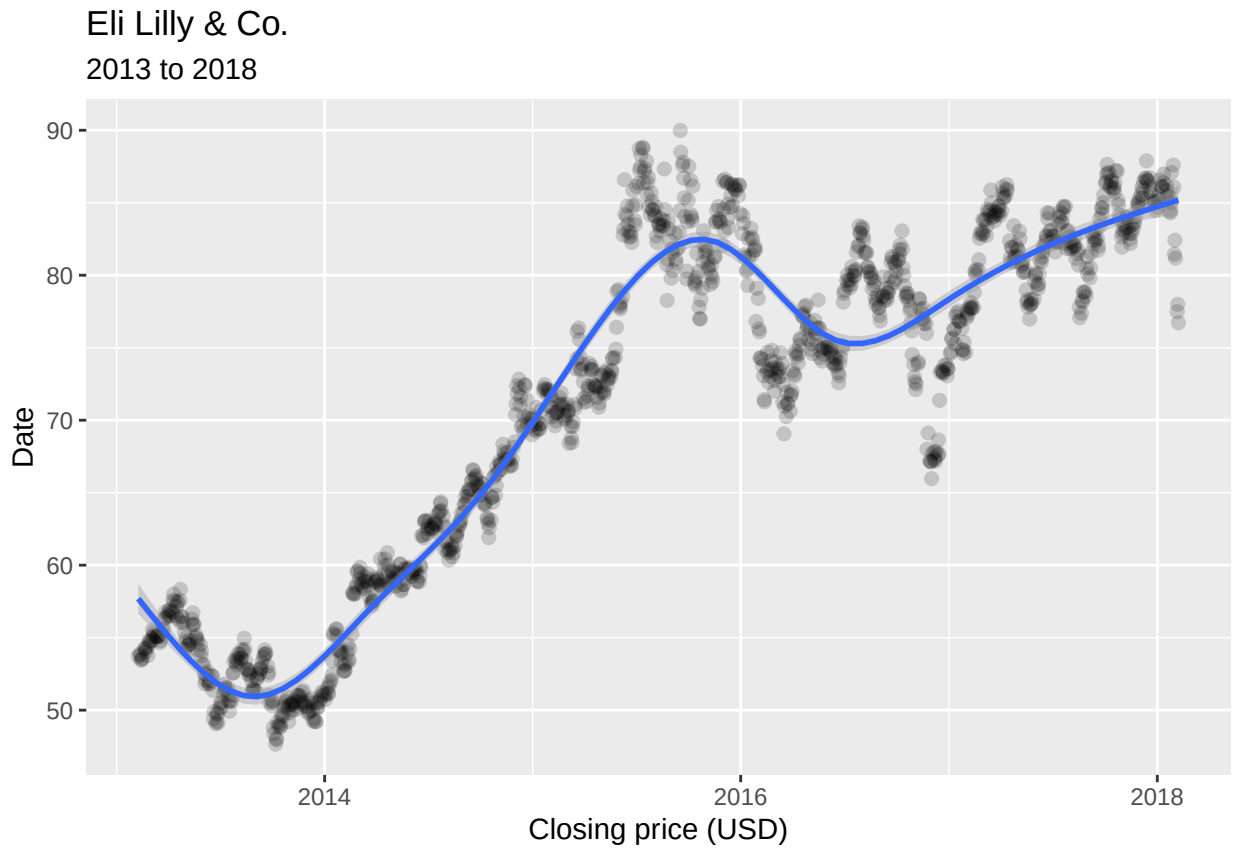

```
NRG <- ggplot(filter(SP_data, Name %in% c("NRG")), aes(x = Date, y = close)) + geom_point(alpha = (1/6)
                        subtitle = "2013 to 2018",
                        y = "Date",
                        x = "Closing price (USD)")

NRG
```

```
## `geom_smooth()` using method = 'gam' and formula 'y ~ s(x, bs = "cs")'
```



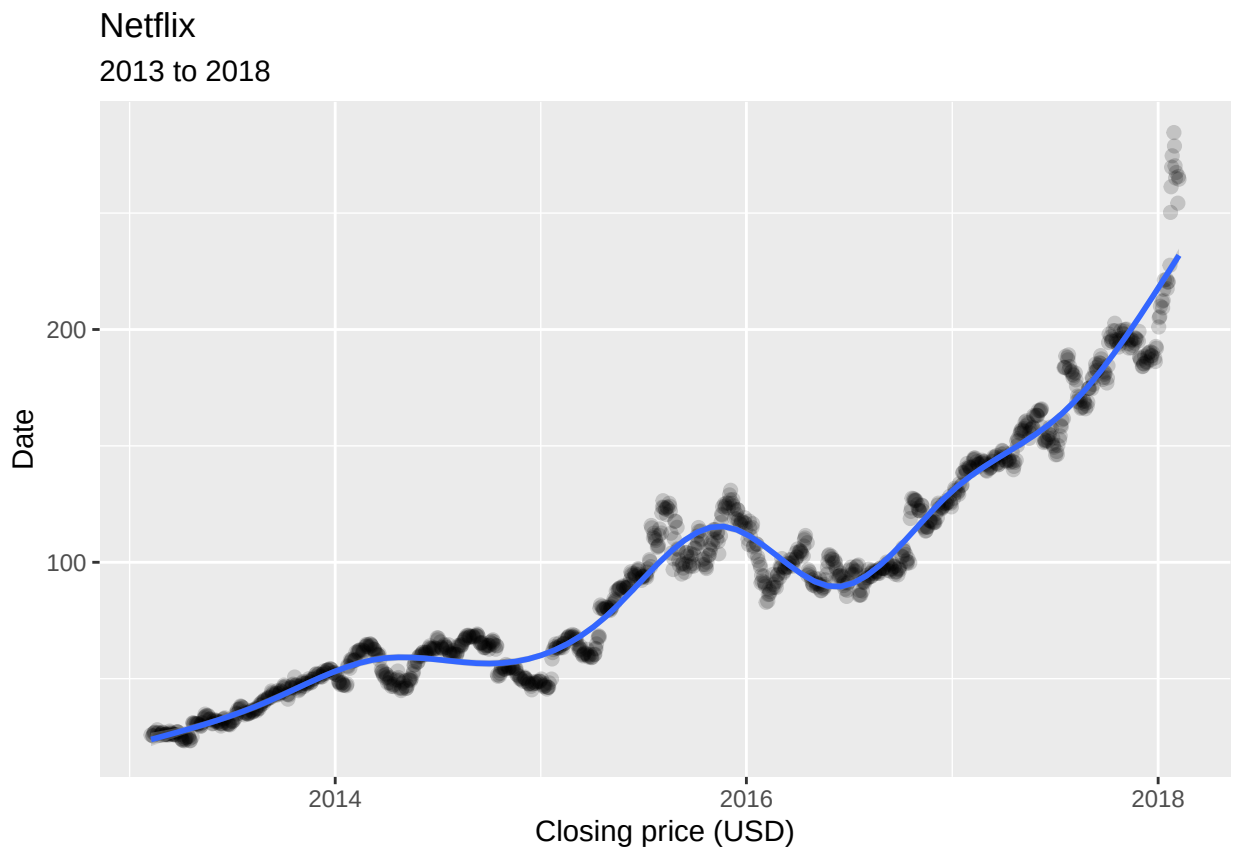

```
LLY <- ggplot(filter(SP_data, Name %in% c("LLY")), aes(x = Date, y = close)) + geom_point(alpha = (1/6)
                          subtitle = "2013 to 2018",
                          y = "Date",
                          x = "Closing price (USD)")

LLY
```

```
## `geom_smooth()` using method = 'gam' and formula 'y ~ s(x, bs = "cs")'
```



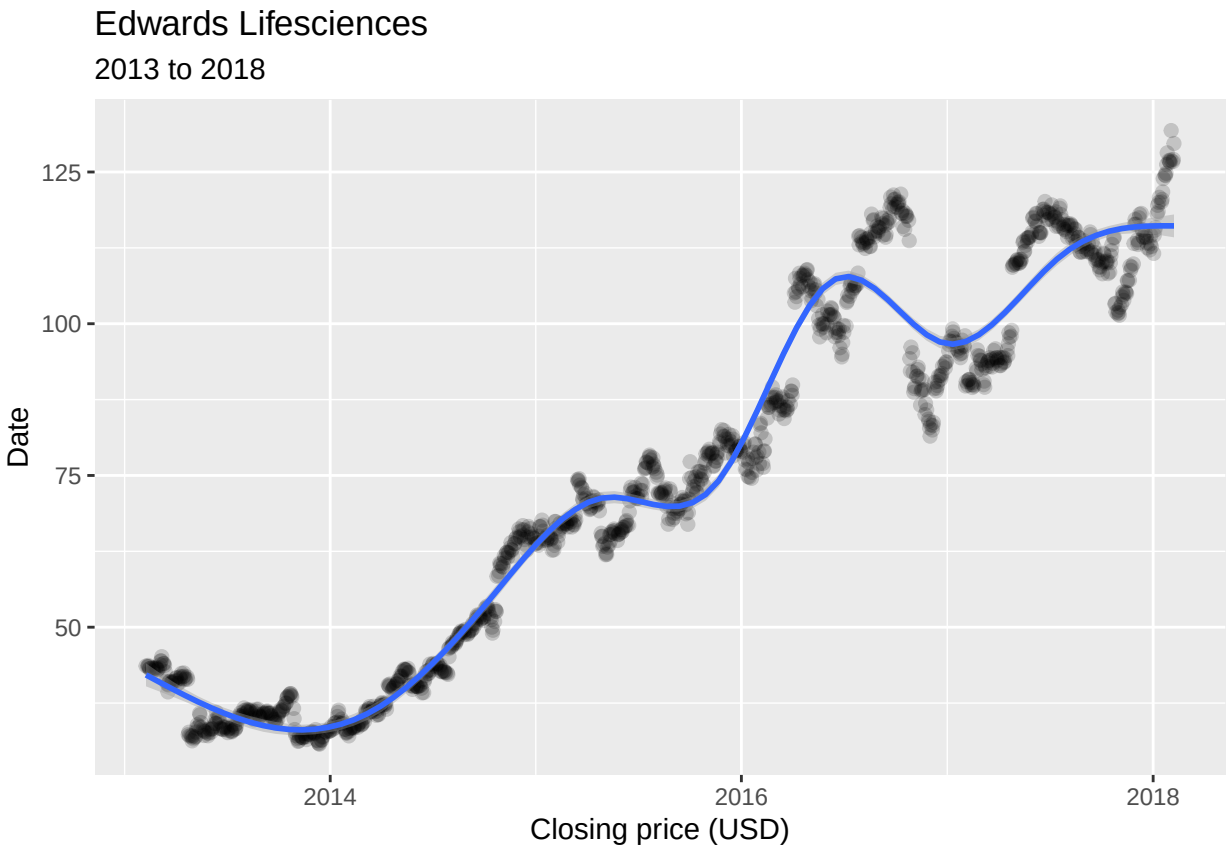

```
NFLX <- ggplot(filter(SP_data, Name %in% c("NFLX")), aes(x = Date, y = close)) + geom_point(alpha = (1/
                        subtitle = "2013 to 2018",
                        y = "Date",
                        x = "Closing price (USD)")

NFLX
```

```
## `geom_smooth()` using method = 'gam' and formula 'y ~ s(x, bs = "cs")'
```



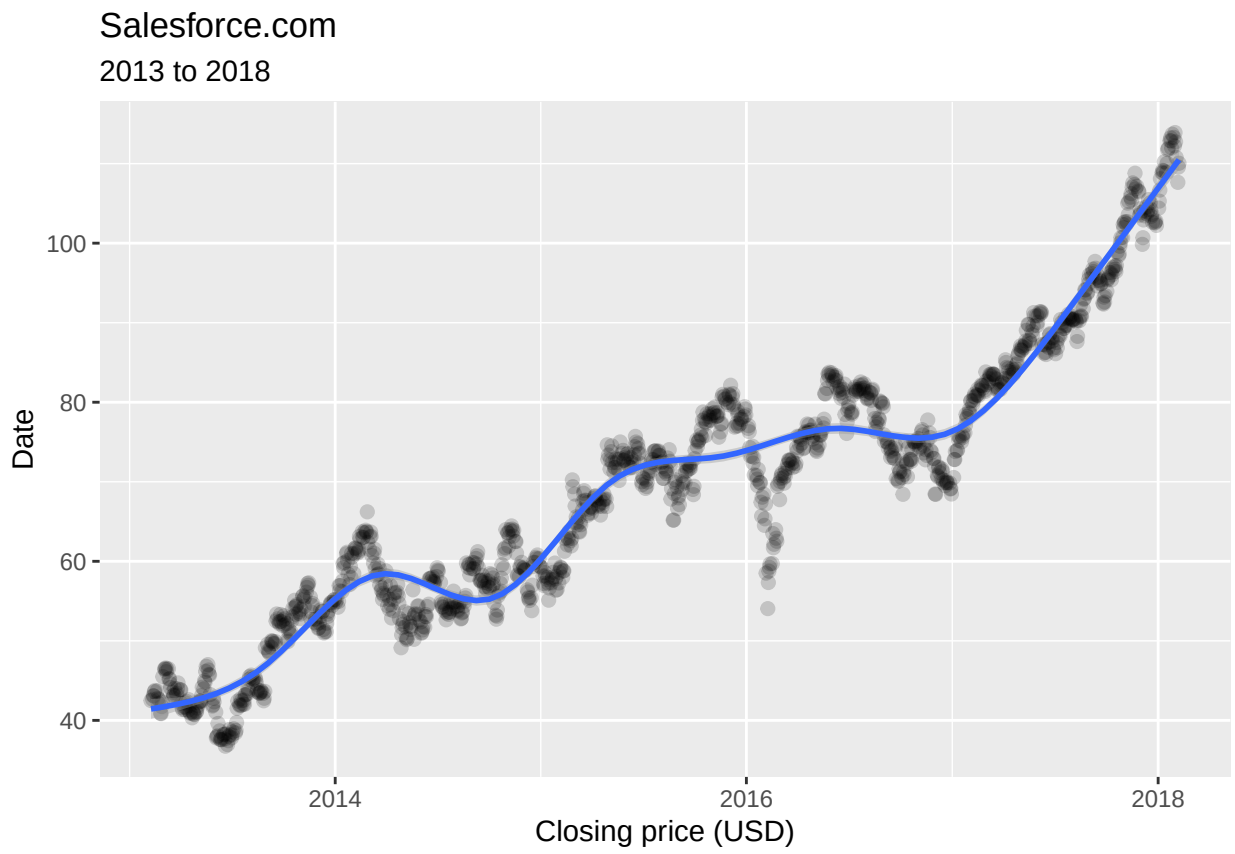

```
EW <- ggplot(filter(SP_data, Name %in% c("EW")), aes(x = Date, y = close)) + geom_point(alpha = (1/6), s
                        subtitle = "2013 to 2018",
                        y = "Date",
                        x = "Closing price (USD)")

EW
```

```
## `geom_smooth()` using method = 'gam' and formula 'y ~ s(x, bs = "cs")'
```



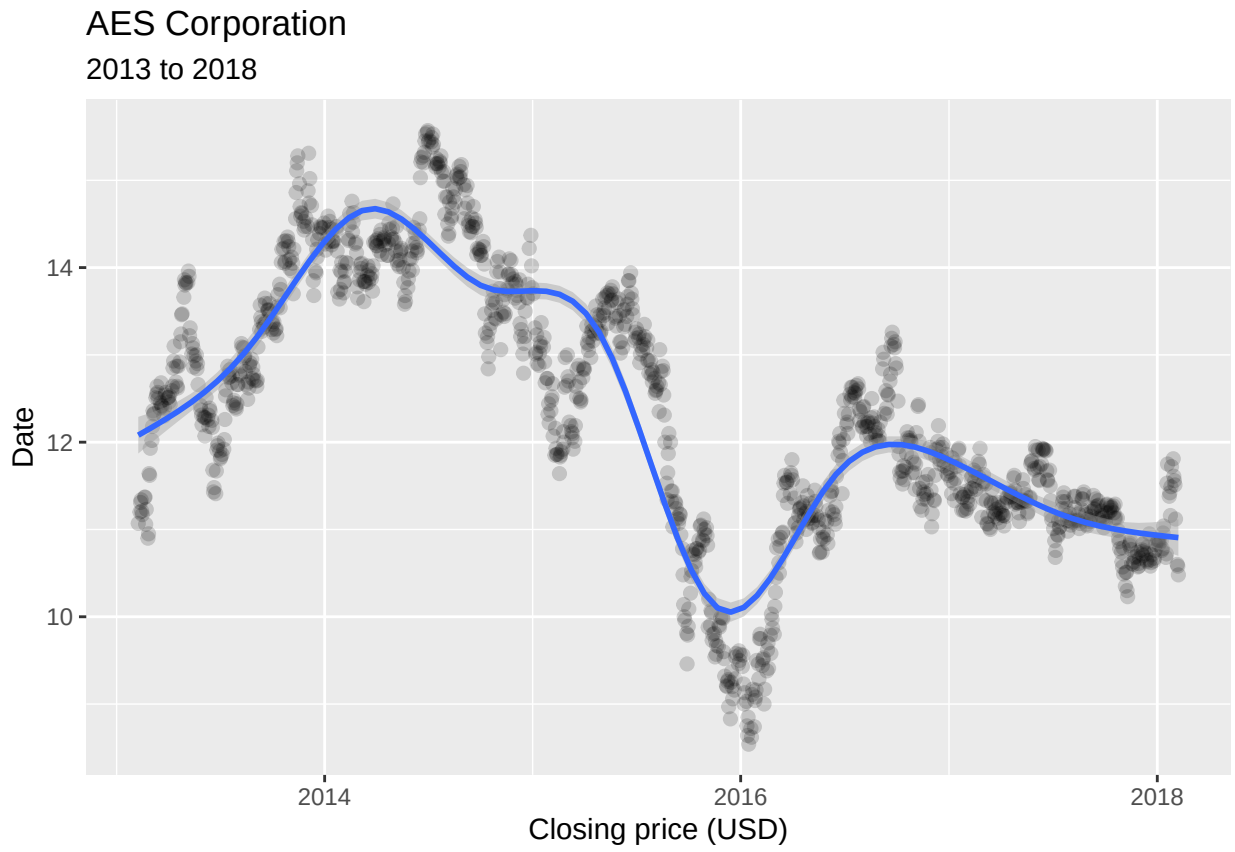

```
CRM <- ggplot(filter(SP_data, Name %in% c("CRM")), aes(x = Date, y = close)) + geom_point(alpha = (1/6)
                          subtitle = "2013 to 2018",
                          y = "Date",
                          x = "Closing price (USD)")

CRM
```

```
## `geom_smooth()` using method = 'gam' and formula 'y ~ s(x, bs = "cs")'
```




```
AES <- ggplot(filter(SP_data, Name %in% c("AES")), aes(x = Date, y = close)) + geom_point(alpha = (1/6)
                        subtitle = "2013 to 2018",
                        y = "Date",
                        x = "Closing price (USD)")

AES
```

```
## `geom_smooth()` using method = 'gam' and formula 'y ~ s(x, bs = "cs")'
```

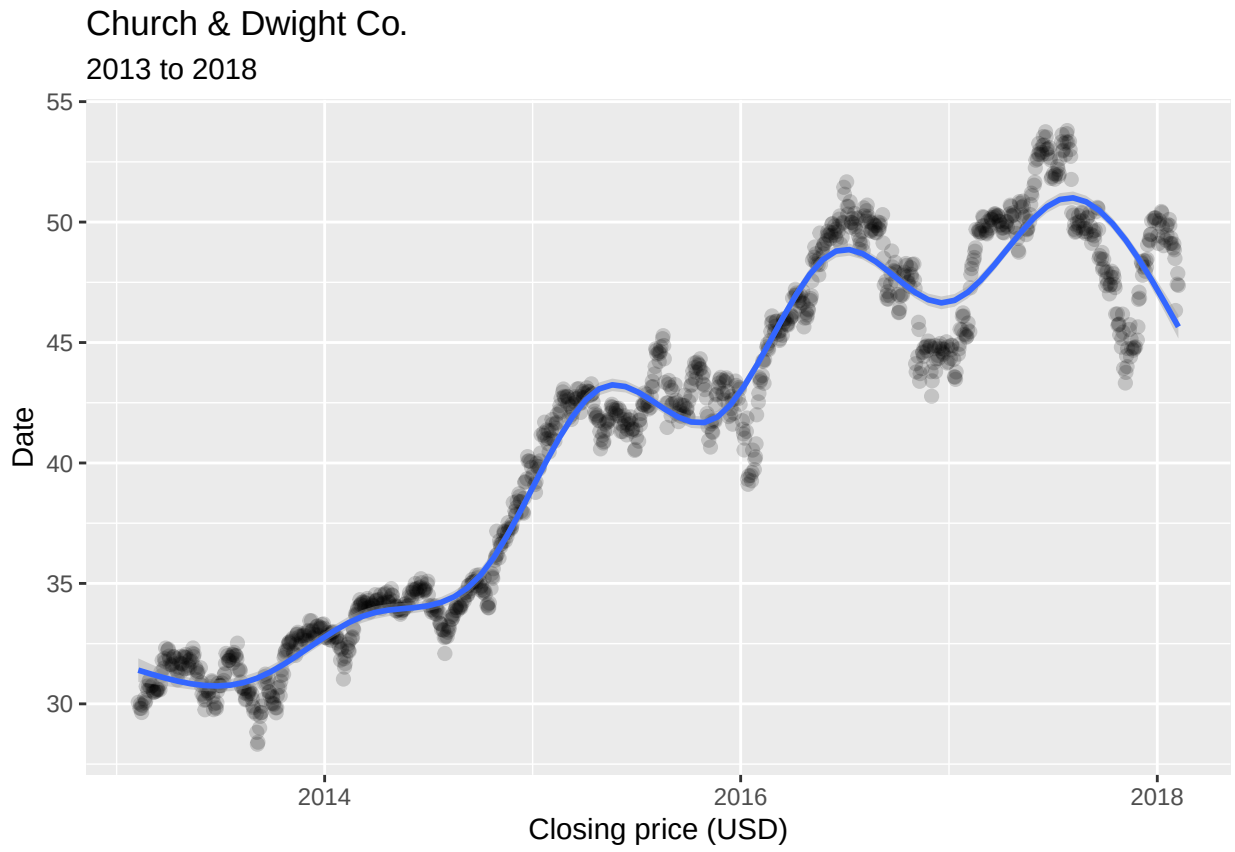



```
RMD <- ggplot(filter(SP_data, Name %in% c("RMD")), aes(x = Date, y = close)) + geom_point(alpha = (1/6)
                        subtitle = "2013 to 2018",
                        y = "Date",
                        x = "Closing price (USD)")

RMD
```

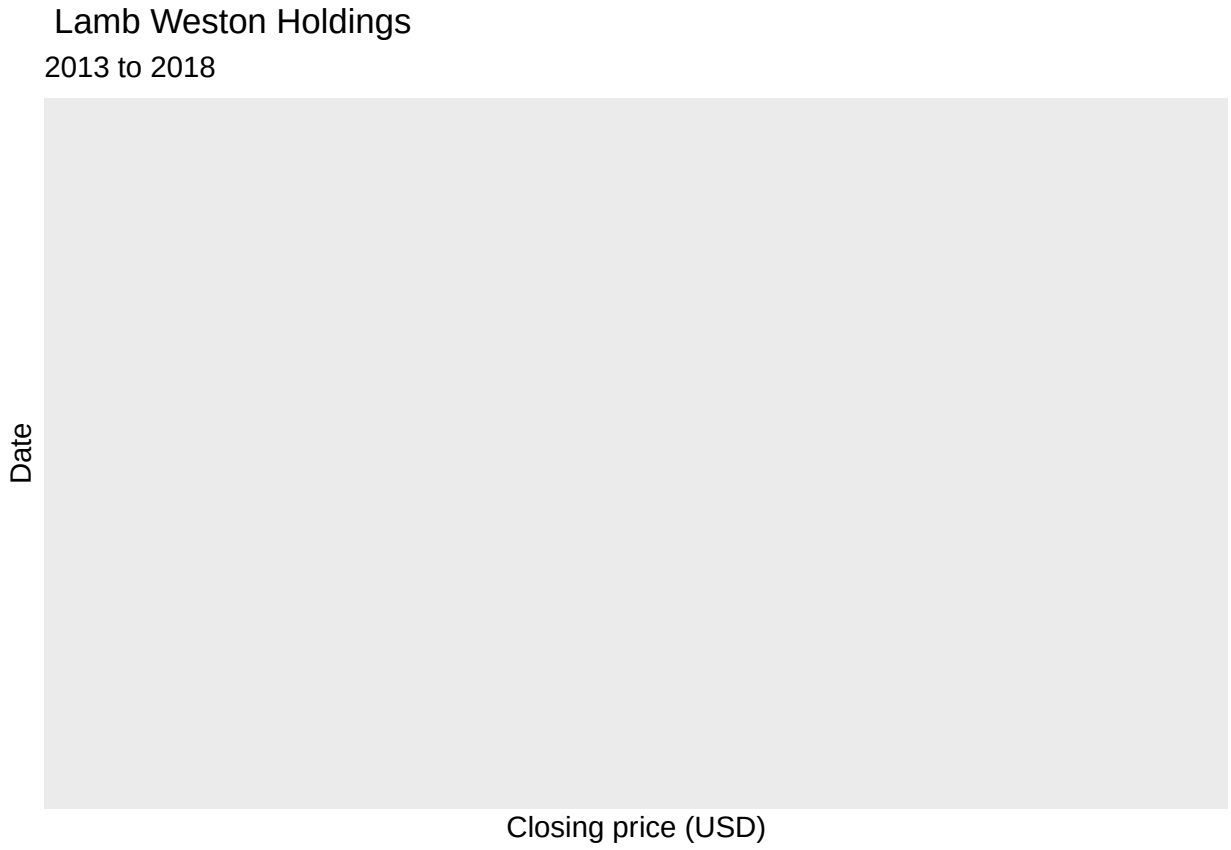
```
## `geom_smooth()` using method = 'gam' and formula 'y ~ s(x, bs = "cs")'
```


```
CHD <- ggplot(filter(SP_data, Name %in% c("CHD")), aes(x = Date, y = close)) + geom_point(alpha = (1/6)
                        subtitle = "2013 to 2018",
                        y = "Date",
                        x = "Closing price (USD)")

CHD
```

```
## `geom_smooth()` using method = 'gam' and formula 'y ~ s(x, bs = "cs")'
```

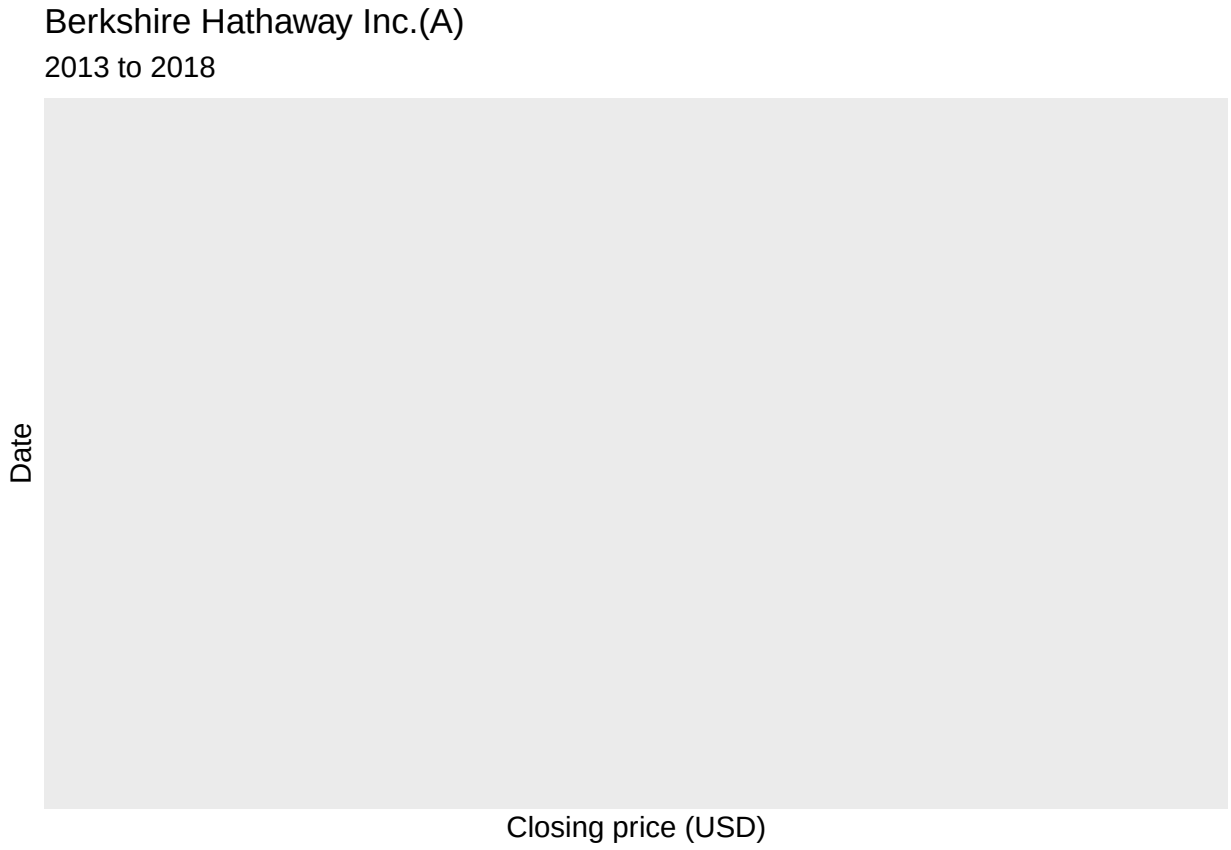



```
LW <- ggplot(filter(SP_data, Name %in% c("LW")), aes(x = Date, y = close)) + geom_point(alpha = (1/6), s
                          subtitle = "2013 to 2018",
                          y = "Date",
                          x = "Closing price (USD)")

LW
```



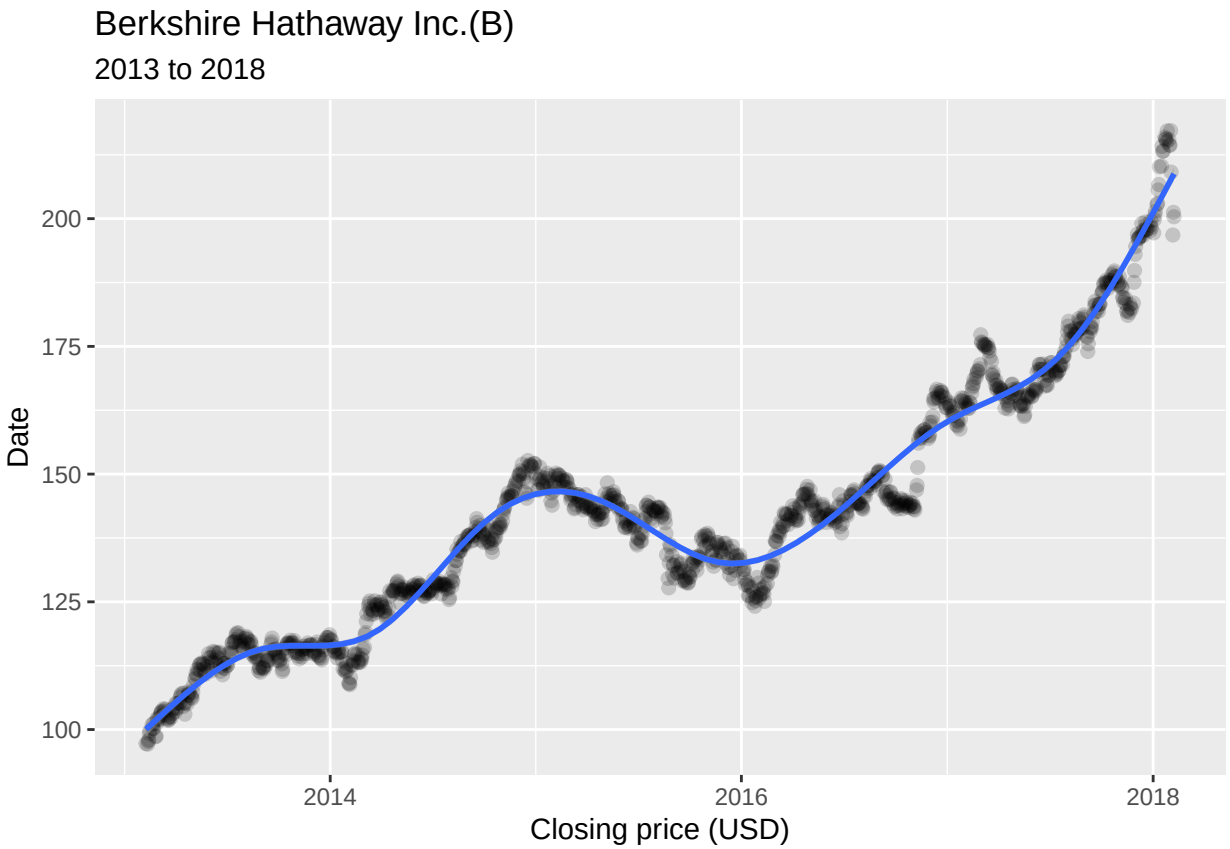

```
VRNS <- ggplot(filter(SP_data, Name %in% c("VRNS")), aes(x = Date, y = close)) + geom_point(alpha = (1/
                          subtitle = "2013 to 2018",
                          y = "Date",
                          x = "Closing price (USD)")

VRNS
```


```
BRK.A <- ggplot(filter(SP_data, Name %in% c("BRK.A")), aes(x = Date, y = close)) + geom_point(alpha = (
                          subtitle = "2013 to 2018",
                          y = "Date",
                          x = "Closing price (USD)")

BRK.A
```




```
BRK.B <- ggplot(filter(SP_data, Name %in% c("BRK.B")), aes(x = Date, y = close)) + geom_point(alpha = (
                        subtitle = "2013 to 2018",
                        y = "Date",
                        x = "Closing price (USD)")

BRK.B
```

```
## `geom_smooth()` using method = 'gam' and formula 'y ~ s(x, bs = "cs")'
```


Berkshire Hathaway Inc.(B)
2013 to 2018
200
175
150
125
100
Date
2014
2016
2018
Closing price (USD)