



ASSIGNMENT 1

INF361

Financial Trading Systems

Submitted To:

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Financial Trading
Systems

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Assignment 1

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Introduction

This report is written for the 1st assignment of the Financial Trading Systems course 2018 at the Bond University. During the first weeks, we learned how to use the Blotter Framework in R to implement a trading strategy, backtest the approach on a set of instruments (stock, futures, etc.) and visualize meaningful results which give insights about the strategy. Moreover, we learned how to compare the strategy to another alternative investment (e.g., a buy and hold strategy). The results of the assignment, the chosen trading idea, implementation, analysis and results are summarized in the following report.

Trading Idea

Smash Day by Larry Williams

The trading idea which is used for this report is based on the Smash Day strategy introduced by Larry Williams in his book “Long-Term Secrets to short-term trading” 2012. The basic theoretical foundation is set by the concept of autocorrelation. There are two autocorrelation principles which can be empirically observed. The positive autocorrelation which describes the fact that if we see an upward movement, it is more likely to observe an upward movement in the future. The same is valid for a negative trend. However, the negative autocorrelation can be observed on short-term time periods. We can expect a price to bounce up again after a sharp down movement and vice versa. Larry William’s Smash Day pattern is based on the observation of this autocorrelation behavior. A Smash Day pattern is initialized when we observe a closing price which is lower than the previous day’s low price. This pattern looks like a breakout to the downside. If the very next day the price moves opposite the Smash Day and trades above the high of the Smash Day this is according to Williams a buy signal. Williams explains this buy signal with a feeling of hurt felt by the public as a result of an unfulfilled breakout. The public would want to get back on track, and the price responds with a reversal. The exact opposite is true for a Sell Setup. The Smash Day is set up when we observe a close above the previous day’s high. The sell signal is initiated when the price reverses immediately the next day and falls below the smash day’s low.

Own variation of the Smash Day trading strategy

In addition to the Smash Day pattern, I have incorporated another rule for the buy signal and two additional components for the sell signal. I want to make sure that I only enter long when we observe a longlasting upward trend. To do this, buy orders are only executed when the current price is above the exponential moving average of the last 400 days. After that, the Smash Day pattern is checked. For the sell, I incorporated two more conditions before checking whether we see a Smash Day (Sell) pattern. The first is that a maximum holding period can be set to make sure that a position is not open for too long. The second sell case is when the price falls below the 400-day exponential moving average. If both conditions are not matched a check for the smash day pattern is performed. If we observe it, we sell the current position.

These variations are incorporated to reduce the risk of falling prices.

Implementation of the trading idea

Part A: Initialization

Step 1: General Setup

The environment has to be cleared to ensure a reproducible setup. Moreover, the blotter library and the INF361Course library are loaded.

```
# Clear Environment
rm(list=ls())

# Loading libraries
library(blotter)
library(INFT361Course)
```

Step 2: Setting the Variables

The variables set in the next section can be adjusted to test the strategy with different parameters. The critical variables which should be adjusted to test the strategy are: daterange, emaPeriod, maxHoldingPeriod, instrumentlist and BuyHoldInstrument.

```
# Set values:
startCapital <- 1e+6
transactionCost <- -20
daterange <- '2000::2018'
emaPeriod <- 400
maxHoldingPeriod <- 4

InstrumentDirectory <- "~/Desktop/R/DownloadedData/DAX/"
instrumentlist <- c("CON.csv", "DB1.csv", "IFX.csv", "MRK.csv", "WDI.csv")
BuyHoldDirectory <- "~/Desktop/R/DownloadedData/DAX/"
BuyHoldInstrument <- "DAXEX.csv"

currency("EUR")
Sys.setenv(TZ="UTC")
initdate <- '1999-12-31'
startdate <- '2000-01-01'
enddate <- '2018-12-31'
portfolioname <- "Smash Day"
accountname <- portfolioname
```

Step 3: Presetup for plotting graphs

Theme setup for plotting the graphs in the visualization is performed here to ensure that the theme is available later, when it is needed and used.

```
# Settings for graph
myTheme <- chart_theme()
myTheme$col$up.col <- 'lightblue'
myTheme$col$dn.col <- 'brown'
myTheme$col$dn.border <- 'lightgray'
myTheme$col$up.border <- 'lightgray'

# Concatenate string for EMA with input parameter
addEMAString <- paste("add_EMA(n=",emaPeriod,")",sep = "")
```

Step 4: Initializing the portfolio

The portfolio and account are initialized.

```
# Clear portfolio and Account
suppressWarnings(rm("account.Smash Day", "portfolio.Smash Day",
                     "account.buyhold", "portfolio.buyhold",
                     pos=.blotter))

# Initialize Portfolio and Account
initPortf(portfolioname,
          instrumentlist,
          initDate=initdate,
          currency="EUR")

initAcct(accountname,
          portfolios=portfolioname,
          initDate=initdate,
          initEq=startCapital,
          currency="EUR")
```

Part B: Bar by bar processing

Step 1: Go through the data bar by bar

In this step the bar by bar processing is implemented. Therefore, a for loop is used to go through the instrumentlist. For each instrument in the list the data is loaded and the exponential moving average is added to the data. Furthermore, another for loop is used to go through the dates bar by bar. In this step the chosen strategy is applied.

```
for (instrument in instrumentlist) {
  LoadCourseFile(InstrumentDirectory, instrument, debugme = TRUE, dates = daterange)

  # Initialize the instrument
  stock(instrument, currency = "EUR")

  # Load the XTS file
  symbol <- get(instrument)

  # Calculate the Exponential Moving Average
  ema <- EMA(symbol$Close, n=emaPeriod)

  # Merge the xts file with the Exponential Moving Average
  symbol <- merge(symbol, ema)
  assign(instrument, symbol)

  # Starting to go bar by bar through using a "for loop"
  for (i in (emaPeriod + 1):(nrow(symbol) - 1)) {
    # Dates
    CurrentDate <- time(symbol[i])
    TomorrowDate <- time(symbol[i + 1])

    # Today's variables
    CloseToday <- as.numeric(symbol[i, "Close"])
    EMA_today <- as.numeric(symbol[i, "EMA"])
    LowToday <- as.numeric(symbol[i, "Low"])
    HighToday <- as.numeric(symbol[i, "High"])
```

```

# Yesterday's variables
LowYesterday <- as.numeric(symbol[i - 1, "Low"])
HighYesterday <- as.numeric(symbol[i - 1, "High"])

# Tomorrow's variables
OpenTomorrow <- as.numeric(symbol[i + 1, "Open"])
LowTomorrow <- as.numeric(symbol[i + 1, "Low"])
HighTomorrow <- as.numeric(symbol[i + 1, "High"])

# Config
Equity <- getEndEq(accountname, CurrentDate)
Position <-
  getPosQty(portfolioname, Symbol = instrument, Date = CurrentDate)

# Check whether we have a position
if (Position == 0) {
  # Start checking BUY rules

  # Check whether we have a Smash Day (Buy).
  # Smash Day (Buy) is when Todays Close is below Yesterdays Low.
  if (CloseToday < LowYesterday) {
    # Smash Day (Buy)

    #Check whether todays close is above today's EMA
    if (CloseToday > EMA_today) {

      # BUY RULE: If today was a smash day place a STOP BUY order
      # at todays high price for the next day.
      # (Buy tomorrow for 'price >= todays high')

      #####
      # Simulate STOP BUY order:
      #####

      # Option 1 to check: Check whether the open price tomorrow
      # is above today's high and add the transaction tomorrow at
      # tomorrow's open price.

      # Option 2 to check: Check whether today's high was lower
      # than tomorrow's high and add the transaction tomorrow
      # at today's high price

      # Check Option 1
      if (OpenTomorrow > HighToday) {
        # Don't trade at the day before the last day
        if (CurrentDate != time(symbol[nrow(symbol) - 1])) {
          # Calculate the buy quantity
          BuyQuantity <- as.numeric(trunc(Equity / OpenTomorrow))
          # Add transaction
          addTxn(
            portfolioname,
            Symbol = instrument,
            TxnDate = TomorrowDate ,

```

```

        TxnPrice = OpenTomorrow,
        TxnQty = BuyQuantity,
        TxnFees = transactionCost
    )
    # Store the bar at which we placed the transaction
    BuyBar <- i
}

} else {
    # Check Option 2
    if (HighToday < HighTomorrow) {
        # Don't trade at the day before the last day
        if (CurrentDate != time(symbol[nrow(symbol) - 1])) {
            # Calculate the buy quantity
            BuyQuantity <- as.numeric(trunc(Equity / HighToday))
            # Add transaction
            addTxn(
                portfolioname,
                Symbol = instrument,
                TxnDate = TomorrowDate ,
                TxnPrice = HighToday,
                TxnQty = BuyQuantity,
                TxnFees = transactionCost
            )
            # Store the bar at which we placed the transaction
            BuyBar <- i
        }
    }
}
}

} else {
    # We already have a position

    # Check the sell rules in the following order and sell at the
    # first condition which is satisfied.

#####
# SELL rules:
#####

# Rule 1: Sell if we hold the position longer than the specified
# maximum holding period

# Rule 2: Sell at tomorrow's opening price if the close price
# today falls below the EMA

# Rule 3: Sell if we meet the Smash Day (Sell) requirements.
# Today's close must be higher than yesterday's high

# Rule 4: If no sell rule can be applied and we reach the
# second last day. Sell at the last day.

```

```

# Check Rule 1:
if ((i - BuyBar) > maxHoldingPeriod) {
    # Place the sell transaction at todays close price
    addTxn(
        portfolioname,
        Symbol = instrument,
        TxnDate = CurrentDate,
        TxnPrice = as.numeric(symbol[i, "Close"]),
        TxnQty = -Position,
        TxnFees = transactionCost
    )

} else {
    # Check Rule 2:
    if (as.numeric(symbol[i, "Close"]) < EMA_today) {
        # Place the sell transaction at tomorrow's open price
        addTxn(
            portfolioname,
            Symbol = instrument,
            TxnDate = time(symbol[i + 1]),
            TxnPrice = OpenTomorrow,
            TxnQty = -Position,
            TxnFees = transactionCost
        )

    } else {
        # Check Rule 3:

        # Sell Rule 3: If today is a Smash Day (Sell) place an order tomorrow at todays
        # low price.

        # Simulate this behaviour:

        # Option 1 to check: Check whether the open price tomorrow is below today's
        # low and add the transaction tomorrow at tomorrow's open price.

        # Option 2 to check: Check whether today's low was larger than tomorrow's
        # low and add the transaction tomorrow at today's low price.

        # Check for Smash Day (Sell)
        if (CloseToday > HighYesterday) {
            # Check for Option 1
            if (OpenTomorrow < LowToday) {
                # Add Sell transaction tomorrow at tomorrow's open price
                addTxn(
                    portfolioname,
                    Symbol = instrument,
                    TxnDate = time(symbol[i + 1]),
                    TxnPrice = OpenTomorrow,
                    TxnQty = -Position,
                    TxnFees = transactionCost
                )
            }
        }
    }
}

```

```

    } else {
      # Check for Option 2
      if (LowToday > LowTomorrow) {
        # Add Sell transaction tomorrow at today's low price
        addTxn(
          portfolioname,
          Symbol = instrument,
          TxnDate = time(symbol[i + 1]),
          TxnPrice = LowToday,
          TxnQty = -Position,
          TxnFees = transactionCost
        )
      }
    }
  } else {
    # Check Rule 4
    if (i == nrow(symbol) - 1) {
      # Add Sell transaction for the last day at the close price
      addTxn(
        portfolioname,
        Symbol = instrument,
        TxnDate = time(symbol[i + 1]),
        TxnPrice = as.numeric(symbol[i, "Close"]),
        TxnQty = -Position,
        TxnFees = transactionCost
      )
    }
  }
}

updatePortf(portfolioname, Symbols = instrument, Dates = CurrentDate)
updateAcct(accountname, Dates = CurrentDate)
updateEndEq(accountname, CurrentDate)

} # End Bar-by-bar processing
} # End for loop for multiple instruments

```

Step 2: System Check

In order to make sure that the system works as designed, the plots of some chosen transactions are printed in the following section. The plots for the first, third and the 5th last transaction are plotted for every instrument in the instrumentlist. The plots can be checked manually and by this it can be ensured that the transactions were performed as expected.

```

# Loop through all instruments in the instrumentlist
for (instrument in instrumentlist){
  rm(daterange_check)
  daterange_check <- c()
  transactionsInstrument <- getTxns(Portfolio=portfolioname,Symbol=instrument)

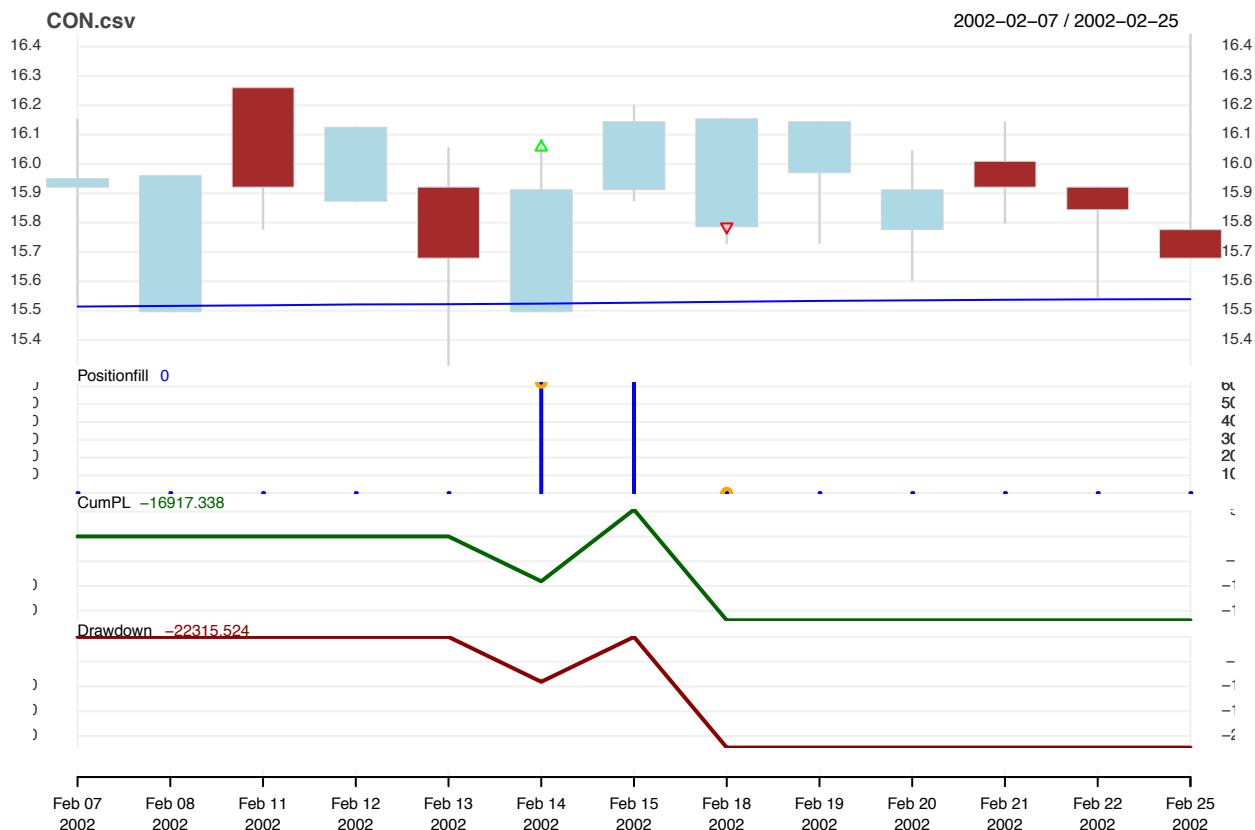
  # Create a list of transactions to check
  for (i in

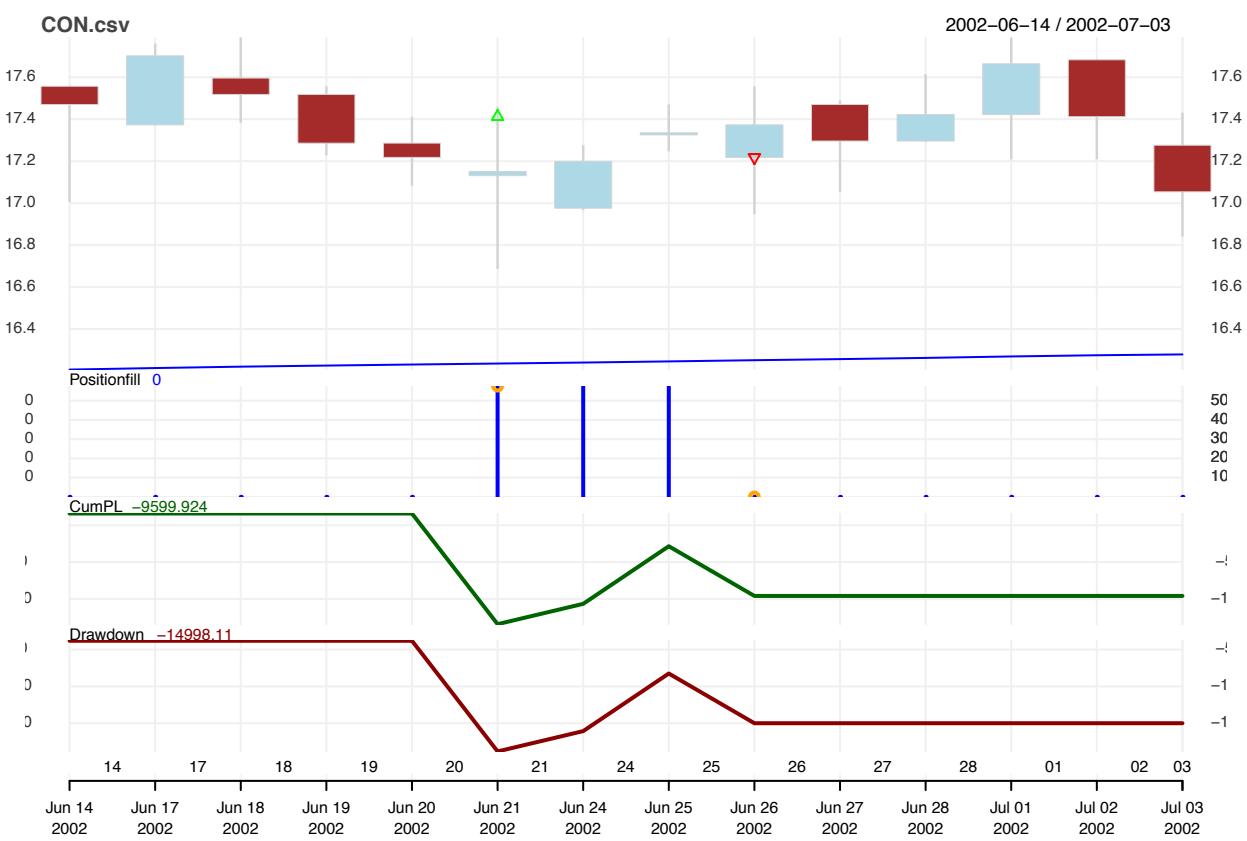
```

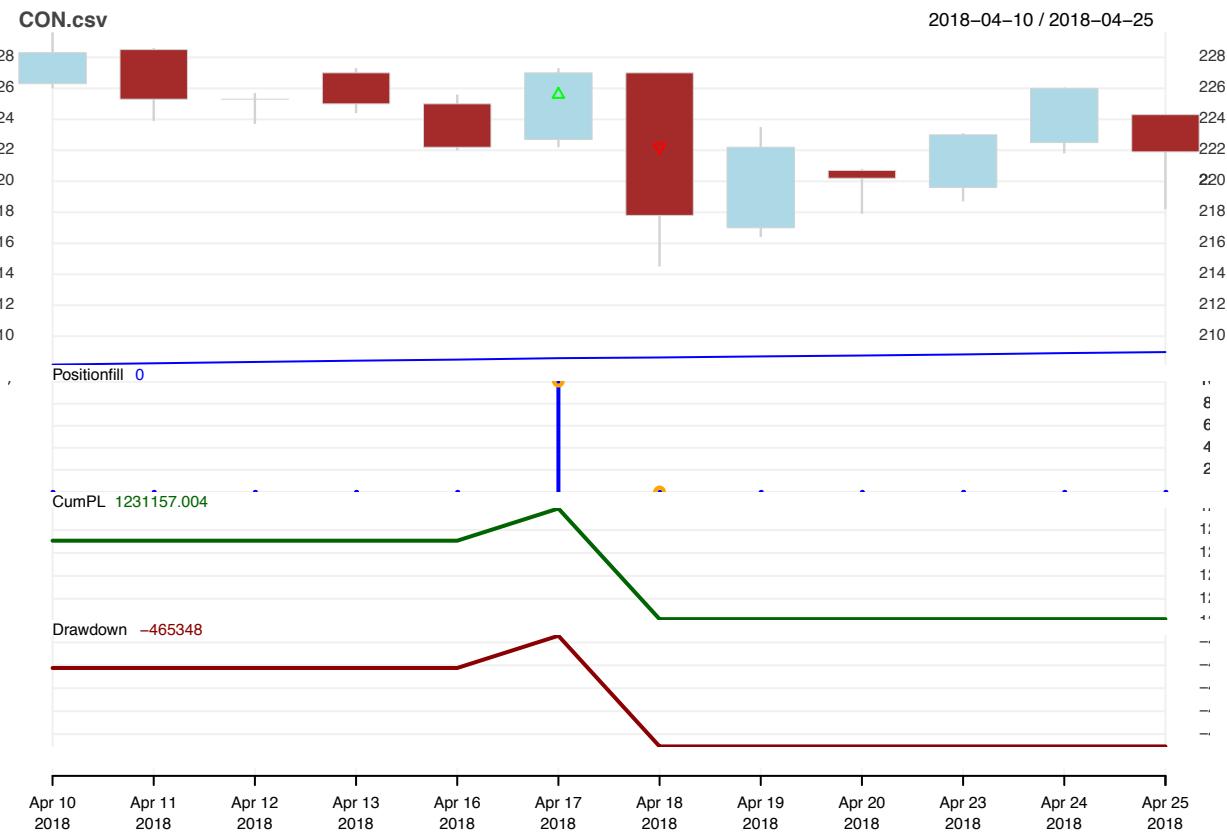
```

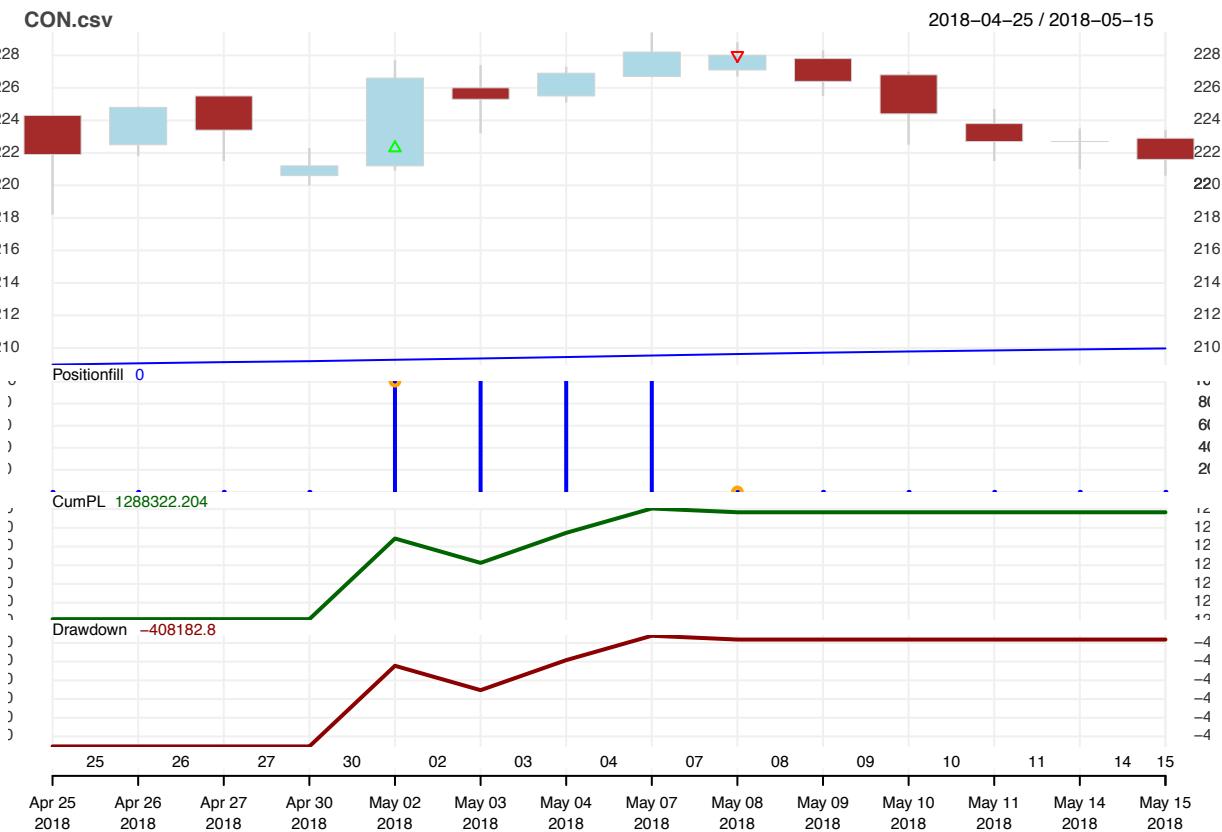
c(2,6, (nrow(transactionsInstrument)-7), (nrow(transactionsInstrument)-5))) {
from <- as.Date(index(transactionsInstrument[i,1]))-7
to <- as.Date(index(transactionsInstrument[i+1,1]))+7
daterange_check <- c(daterange_check, paste(from, "::", to, sep = ""))
}
# Plot the transactions and check them manually
for (daterange_check_i in daterange_check){
  print(chart.Posn(portfolioname,
                    Symbol=instrument,
                    type='candlesticks',
                    theme=myTheme,
                    subset=daterange_check_i,
                    TA=addEMAStrong))
}
}

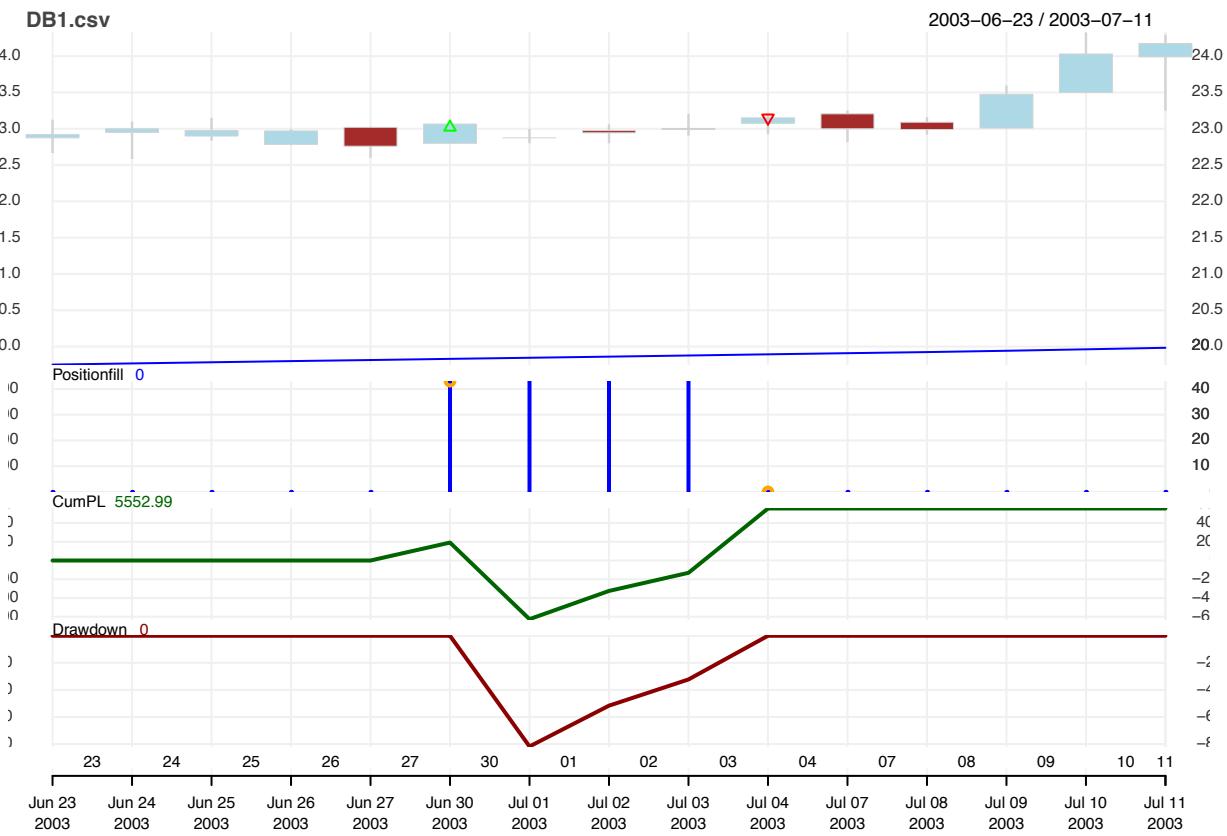
```

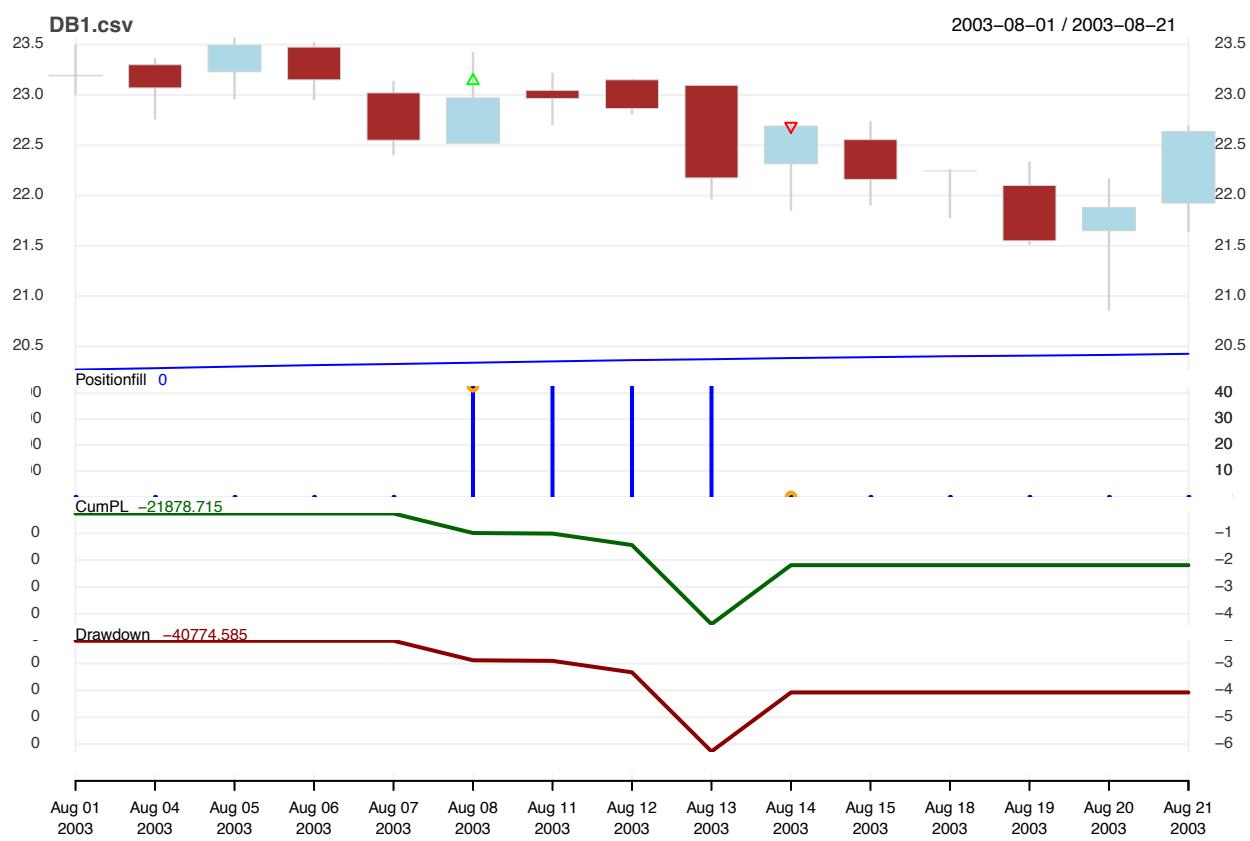


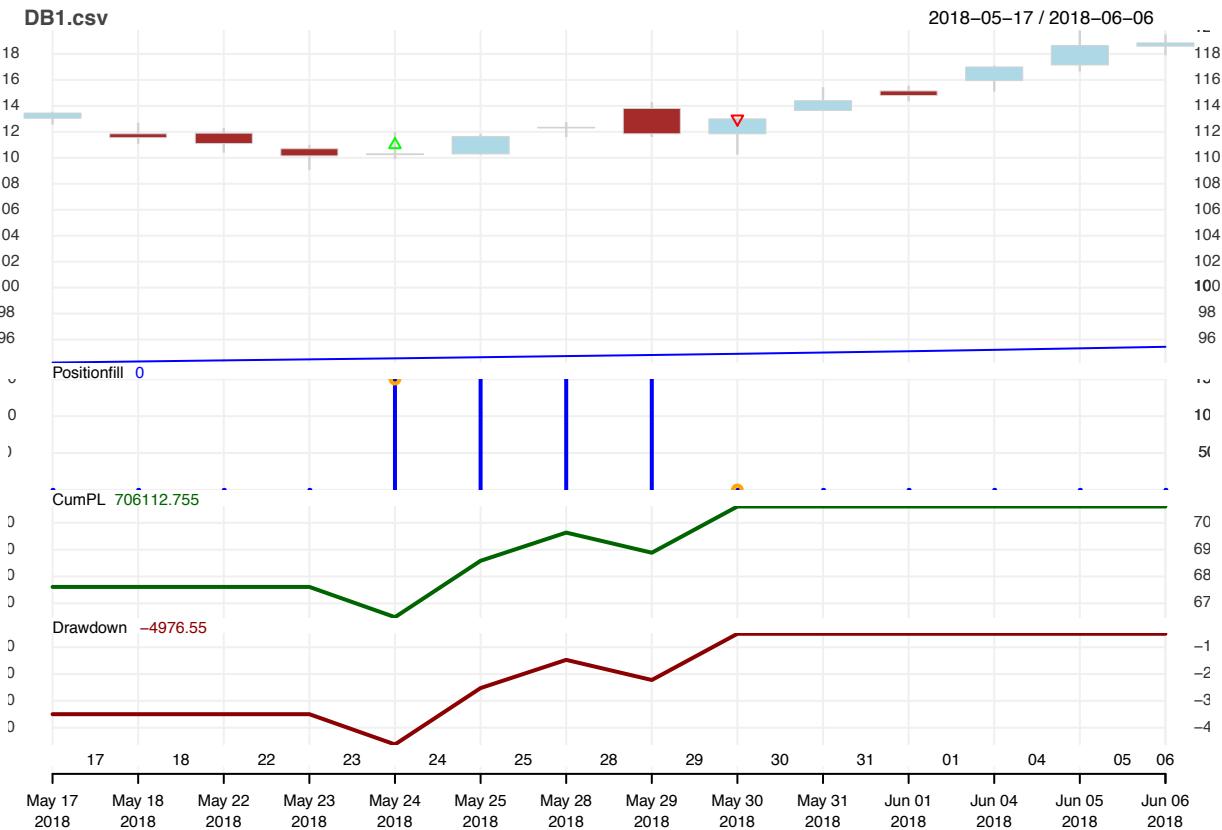


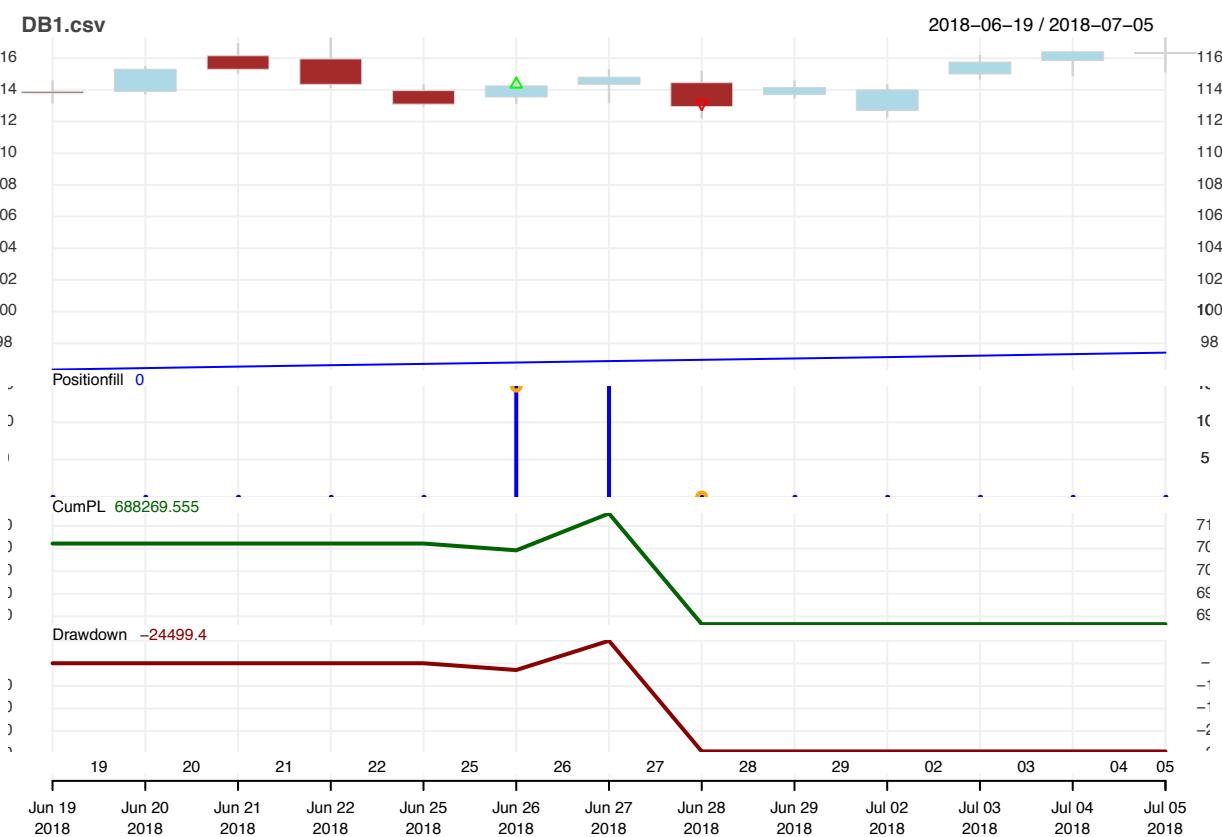


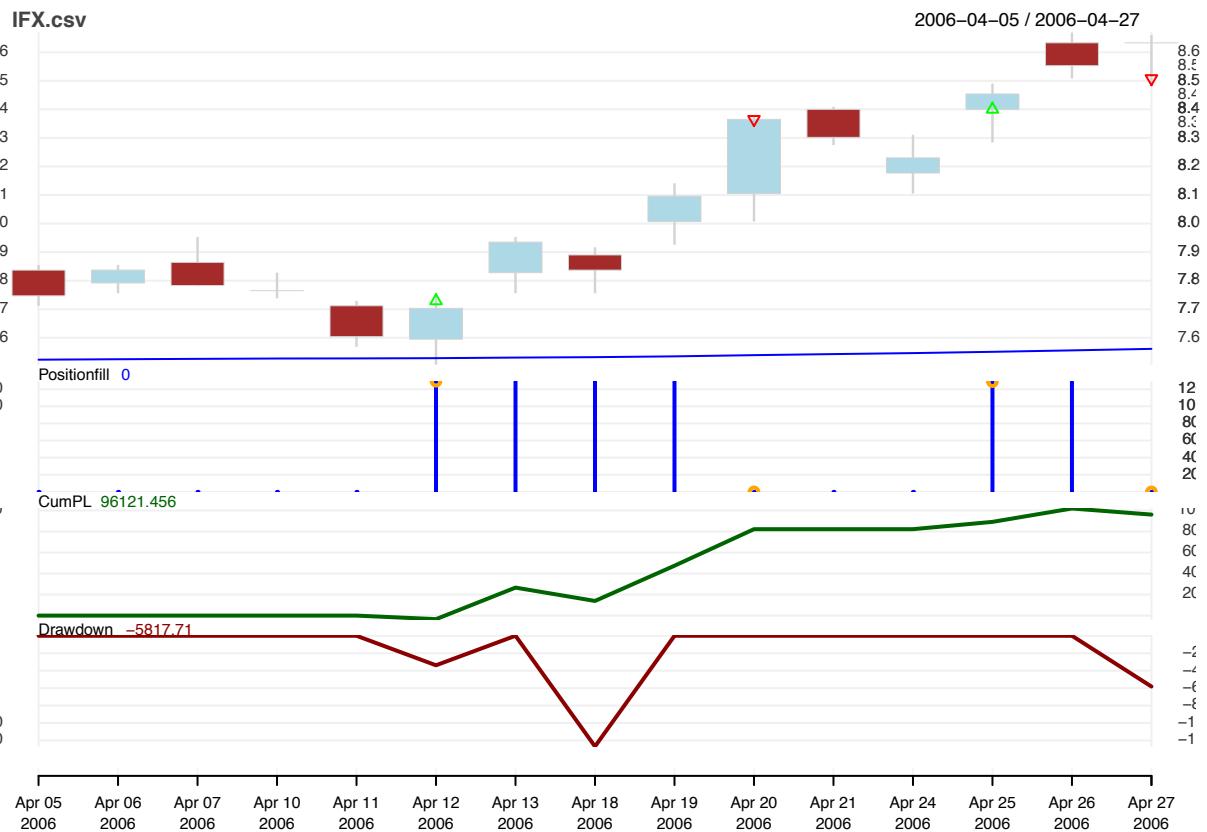


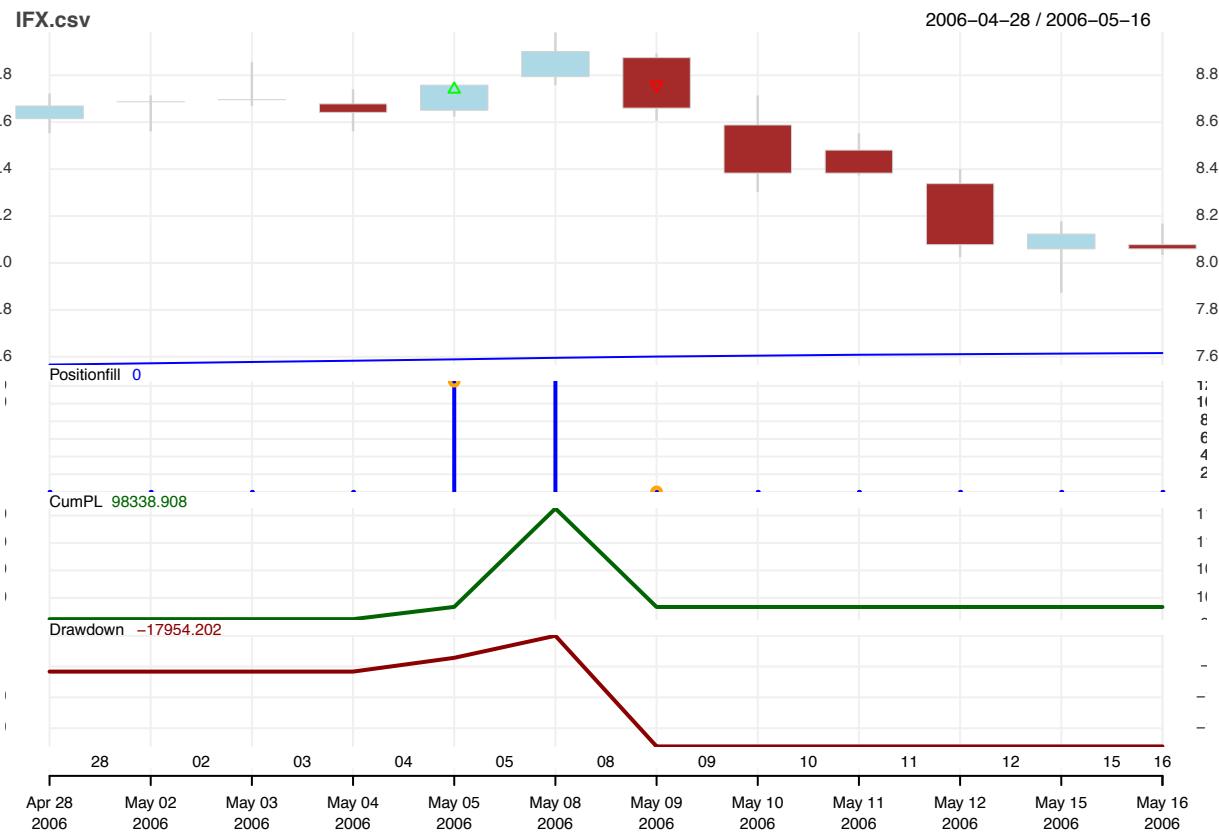


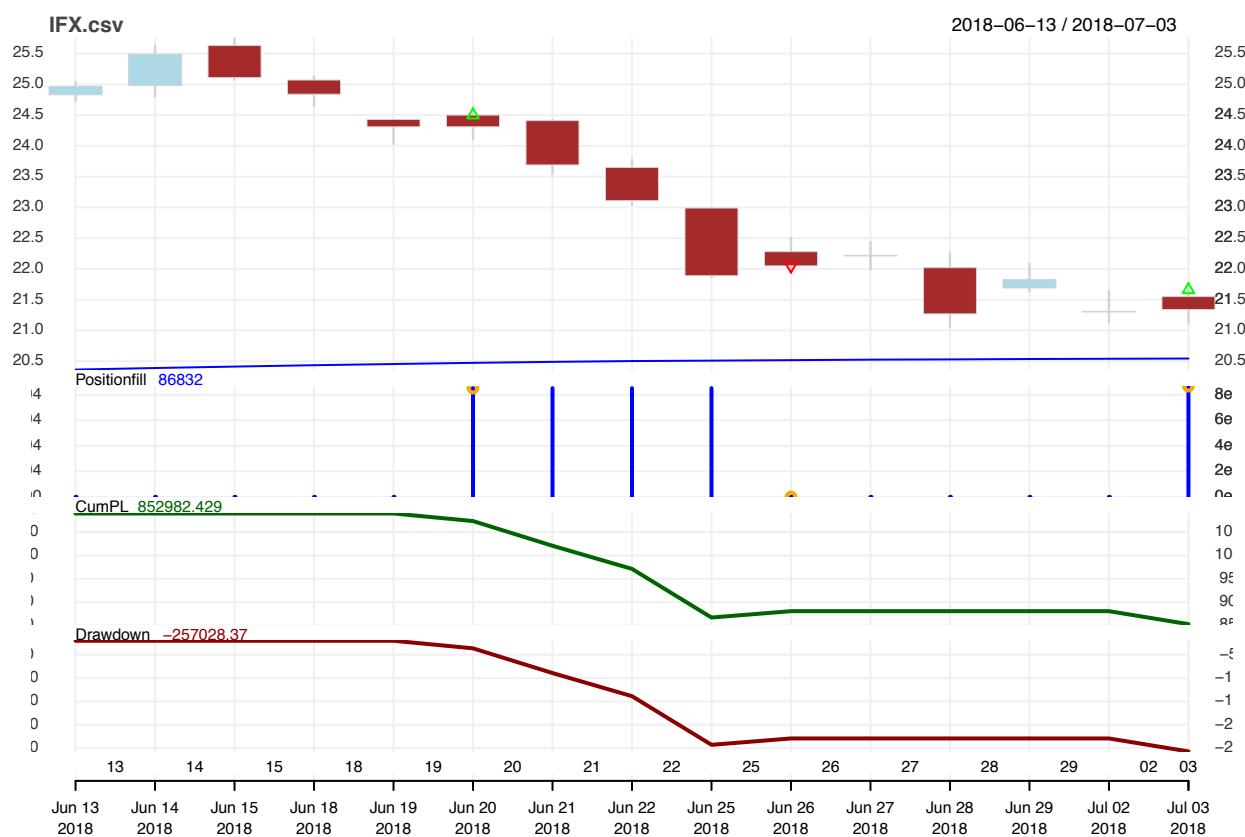


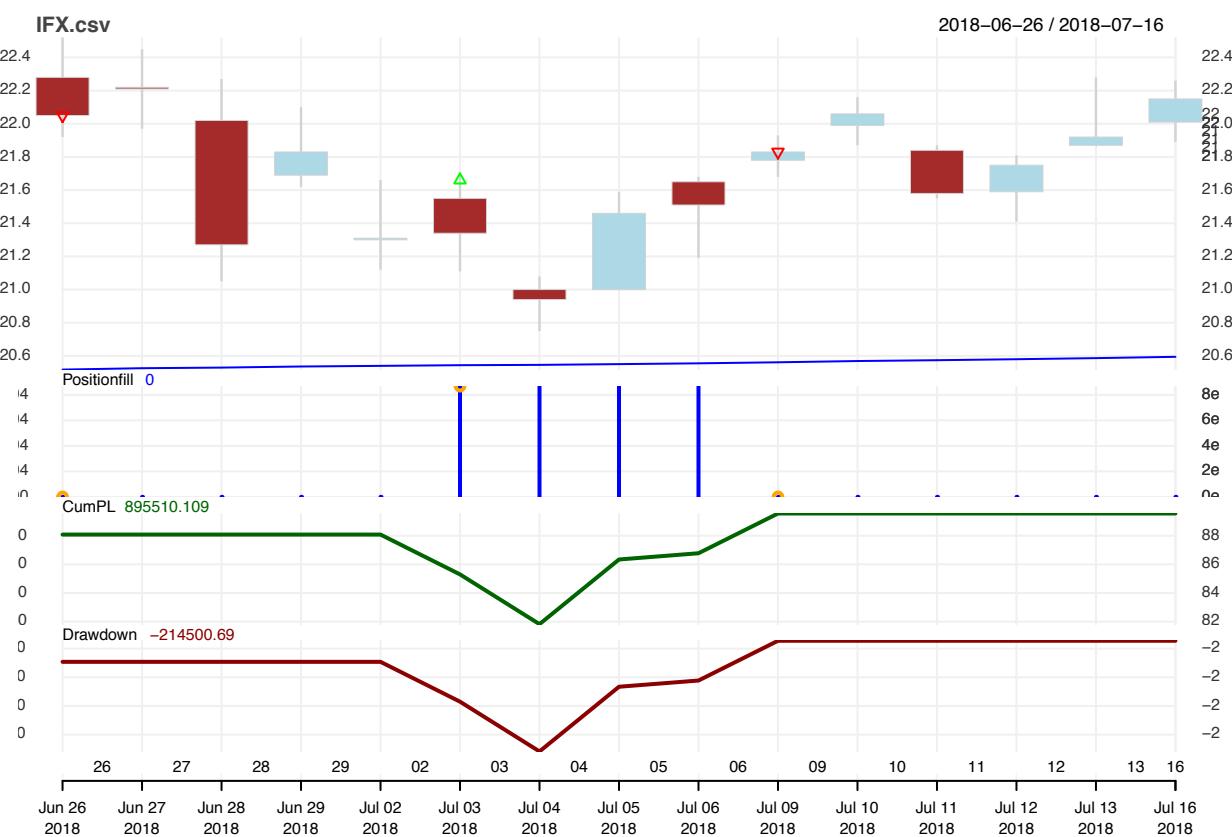


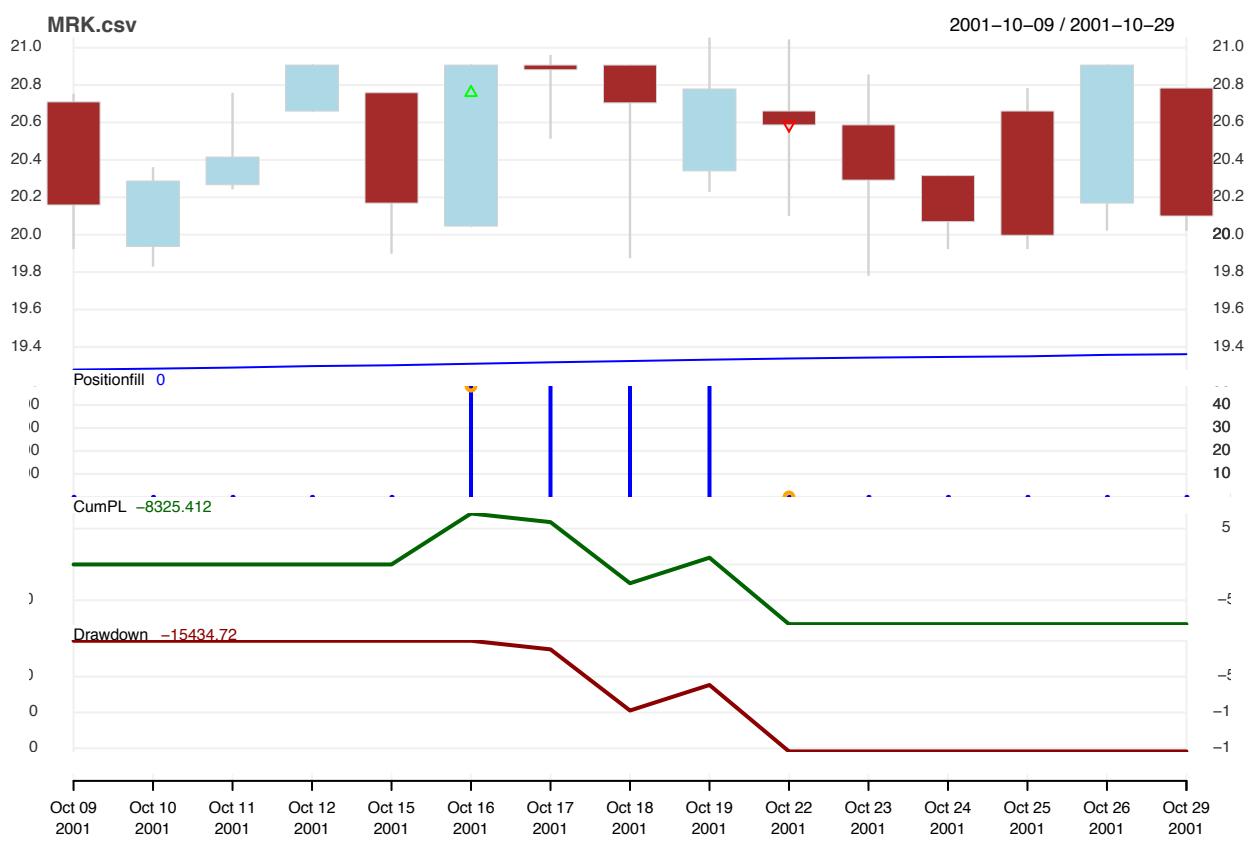


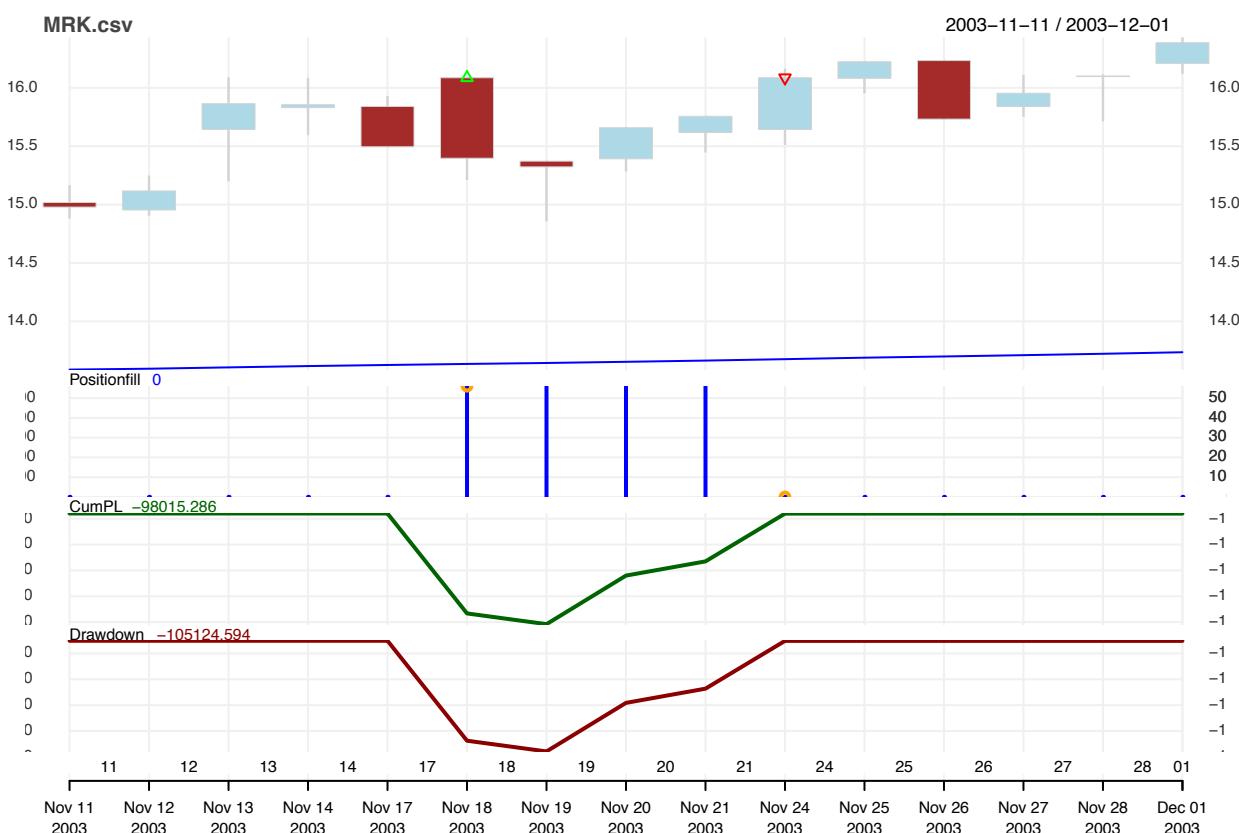


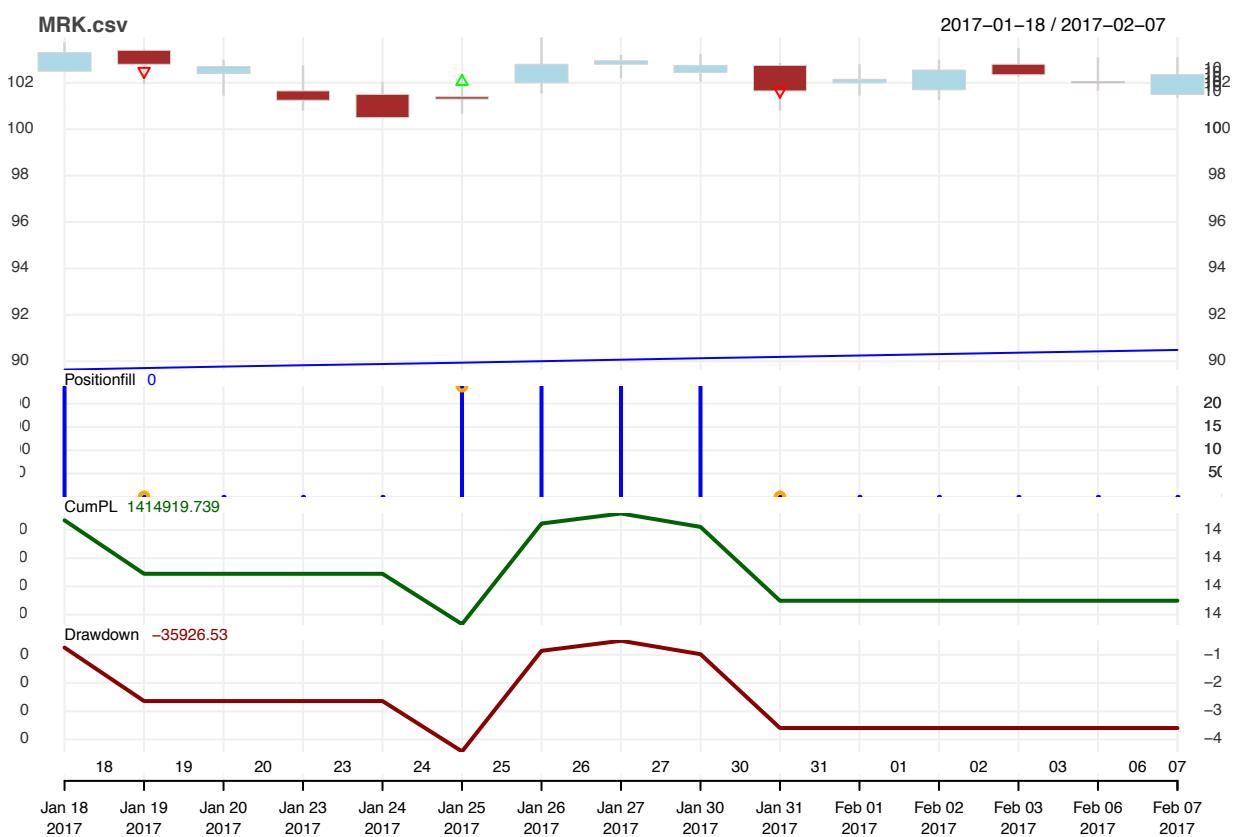


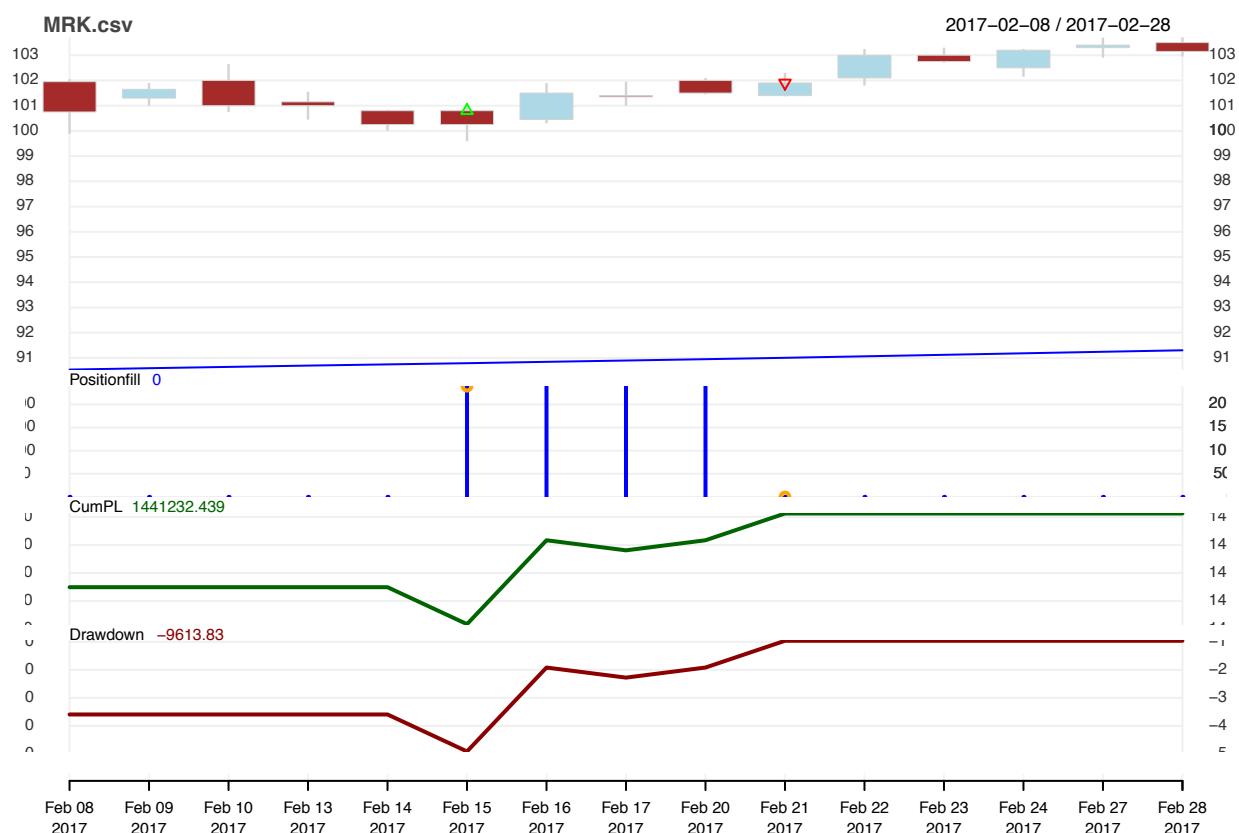


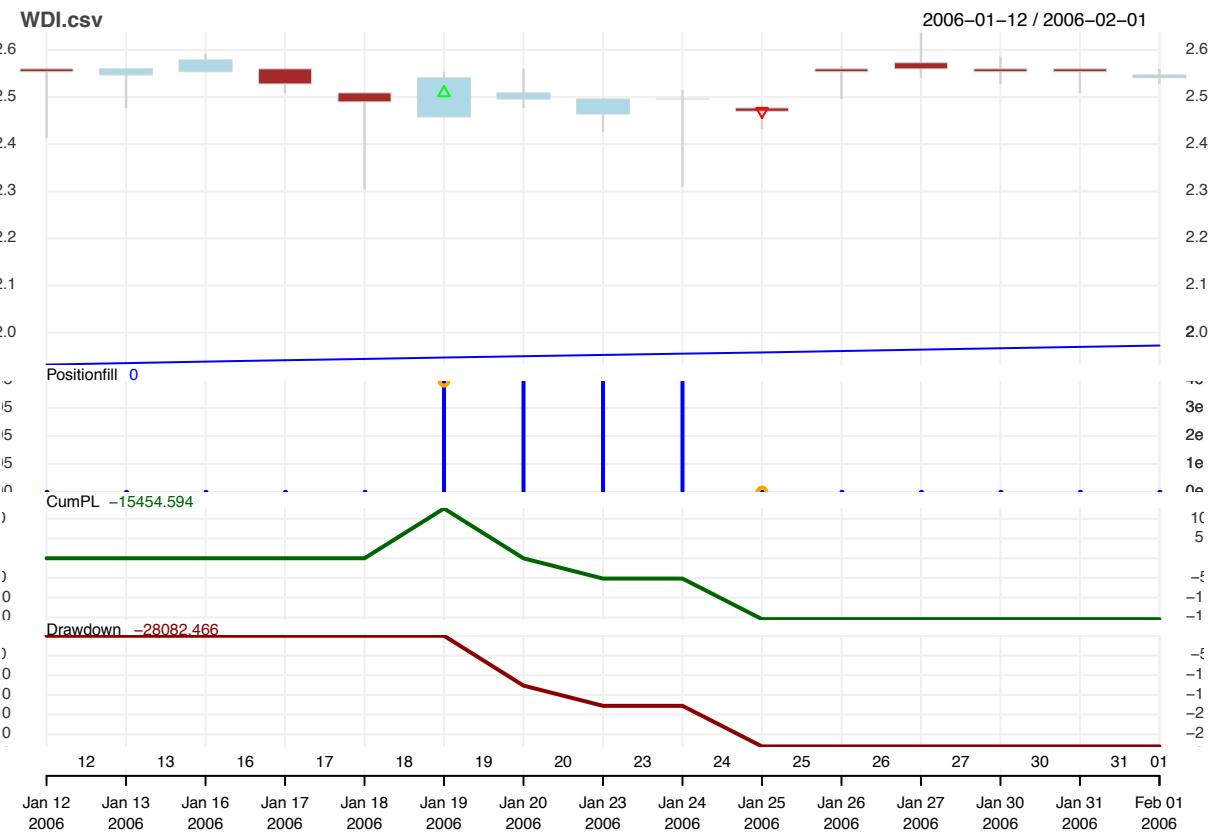




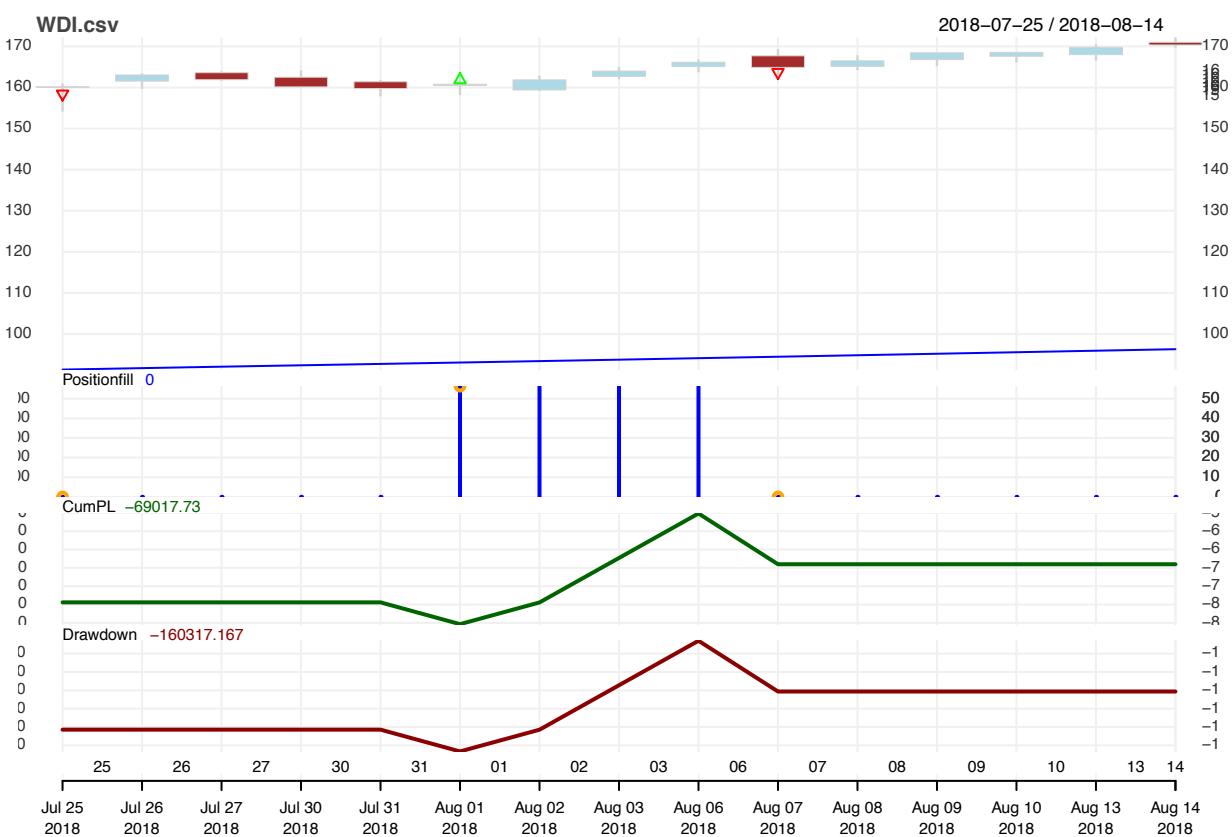


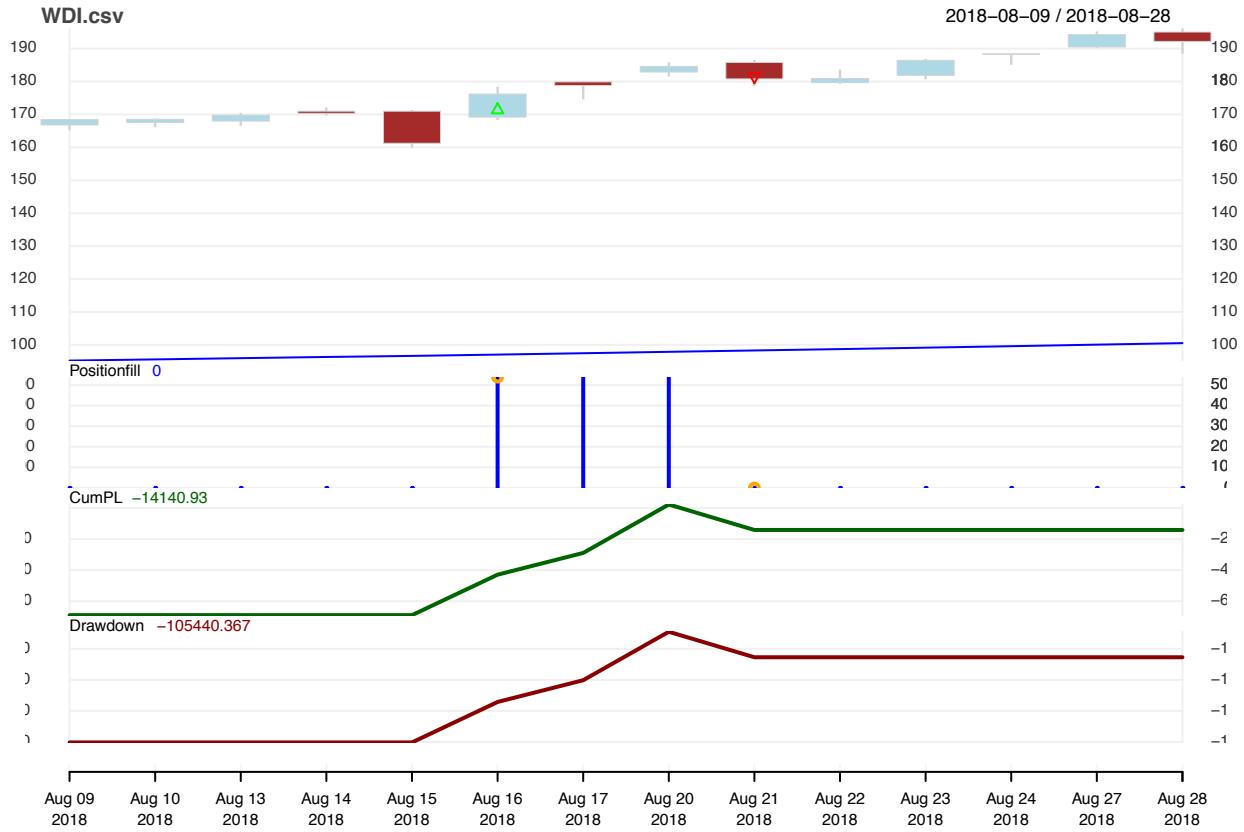












The plots of the chosen transactions show that the system works as designed. As a variety of transactions is plotted across many different instruments, we observe all possible patterns. The buy orders are all performed correctly after observing a Smash Day pattern. The sell orders do work as expected. The maximum holding period is applied and sell orders are placed after a maximum holding period of 4 days. Price drops below the EMA line lead to a sell transaction and also the smash day pattern can be observed which leads to a sell transaction.

Part C: Analysis and Reporting

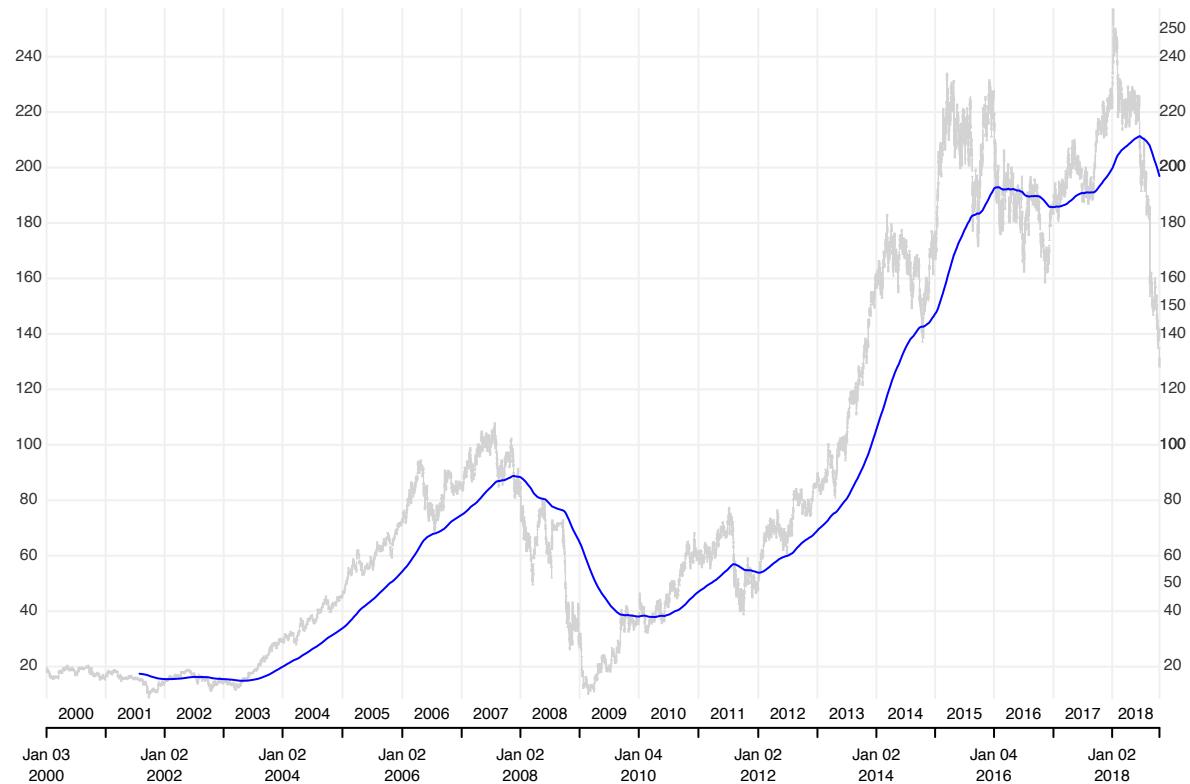
Step 1: Visualize original data

The following section shows plots of the instruments with the EMA line which indicates the general trend of the stock exponentially smoothed for the last 400 days. This plots can be used to get a first impression of the long term trend of the instrument and to see which general behaviour of the price movement can be observed.

```
for (instrument in instrumentlist){
  chart <- get(instrument)
  print(chart_Series(x=chart, name=instrument,
                     theme=myTheme,
                     subset=daterange,
                     TA="add_TA((chart$EMA), on=1, type='l', col='blue')"))
}
```

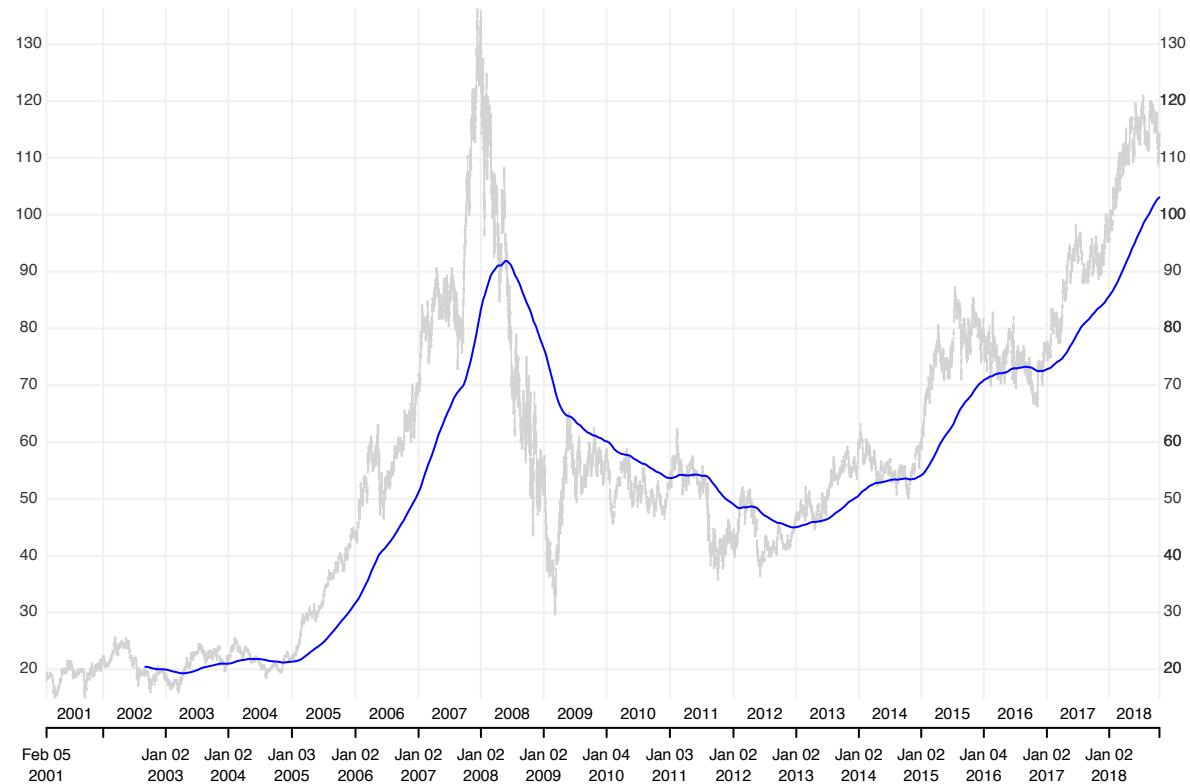
CON.csv

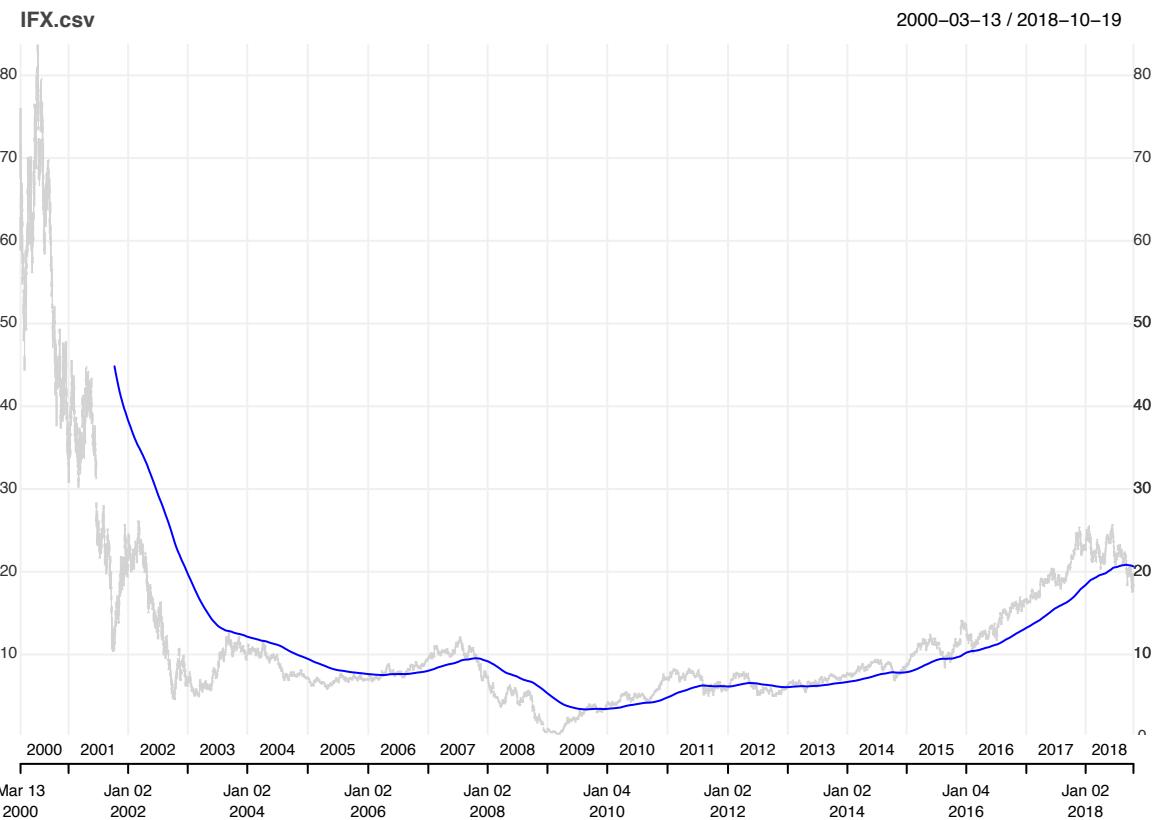
2000–01–03 / 2018–10–19



DB1.csv

2001–02–05 / 2018–10–19

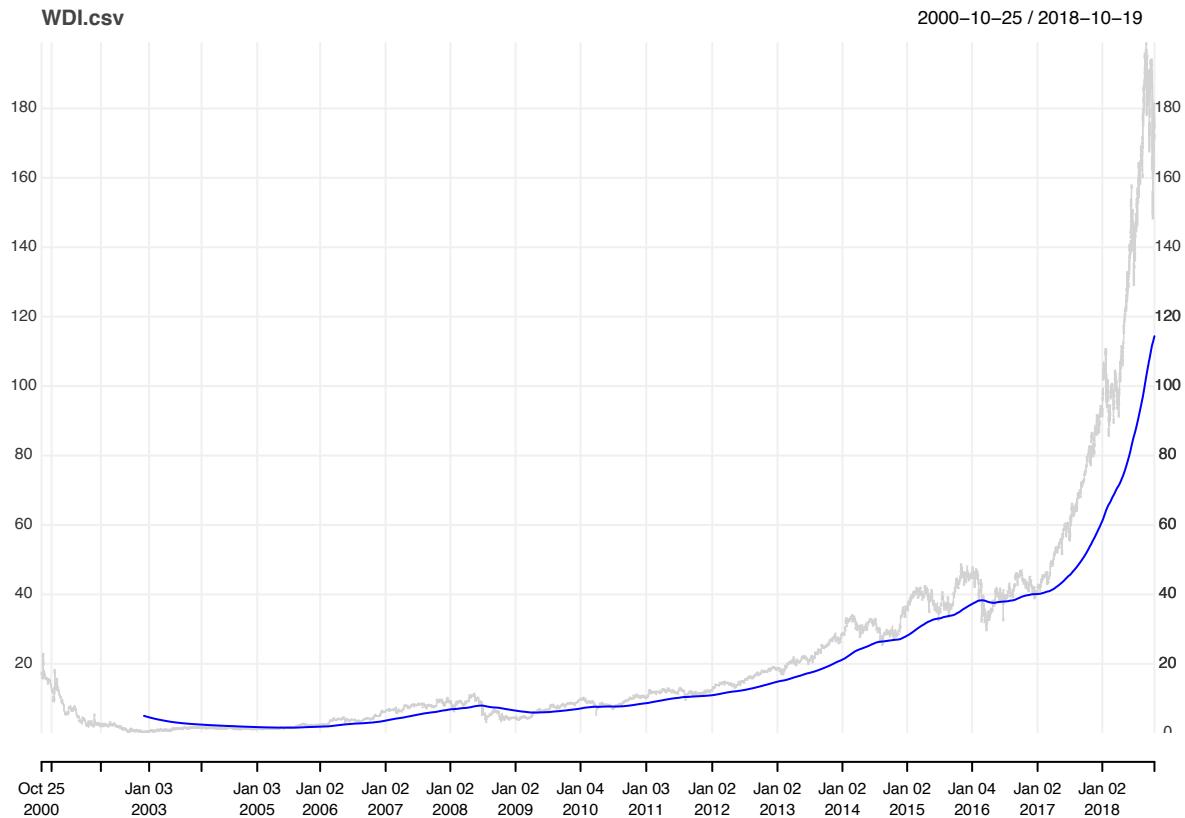




MRK.csv

2000–01–03 / 2018–10–19





Step 2: All transactions performed by the trading system

The following table can be used to get a better overview of the transactions performed and the exact details like the quantity, price and value per transaction. The table can be used to compare certain trades, make sure that the trades were executed as expected and use it as a reference, when looking for trades of a specific instrument at a specific time.

```

for (instrument in instrumentlist){
  print(sprintf("Transactions for the instrument: %s", instrument))
  txns <- getTxns(Portfolio = portfolioname, Symbol = instrument)
  txns.pr <- txns[,c(1,2,4,6)]
  colnames(txns.pr) <- c("Quantity", "Price", "Value", "Net realized Profit")
  print(txns.pr)
  writeLines("")}
}

## [1] "Transactions for the instrument: CON.csv"
##          Quantity     Price      Value Net realized Profit
## 1999-12-31       0    0.000      0.0        0.000
## 2002-02-14   62278  16.057  999997.8      -20.000
## 2002-02-18   -62278  15.786 -983120.5     -16897.338
## 2002-04-30    54902  17.906  983075.2      -20.000
## 2002-05-07   -54902  18.244 -1001632.1     18536.876
## 2002-06-21    57523  17.412  1001590.5      -20.000
## 2002-06-26   -57523  17.218 -990431.0     -11179.462
## 2003-06-11    55400  17.877  990385.8      -20.000
## 2003-06-17   -55400  17.809 -986618.6     -3787.200

```

## 2003-07-18	52139	18.922	986574.2	-20.000
## 2003-07-24	-52139	19.019	-991631.6	5037.483
## 2003-08-13	48031	20.645	991600.0	-20.000
## 2003-08-18	-48031	21.206	-1018545.4	26925.391
## 2003-09-11	44589	22.842	1018501.9	-20.000
## 2003-09-17	-44589	23.229	-1035757.9	17235.943
## 2003-11-07	37105	27.913	1035711.9	-20.000
## 2003-11-11	-37105	28.068	-1041463.1	5731.275
## 2003-12-01	36475	28.552	1041434.2	-20.000
## 2003-12-02	-36475	28.233	-1029798.7	-11655.525
## 2004-02-09	34544	29.810	1029756.6	-20.000
## 2004-02-13	-34544	31.349	-1082919.9	53143.216
## 2004-03-25	37332	29.007	1082889.3	-20.000
## 2004-03-30	-37332	29.278	-1093006.3	10096.972
## 2004-04-08	34095	32.056	1092949.3	-20.000
## 2004-04-16	-34095	34.330	-1170481.3	77512.030
## 2004-05-26	33827	34.601	1170448.0	-20.000
## 2004-06-01	-33827	35.434	-1198625.9	28157.891
## 2004-06-02	33673	36.082	1214989.2	-20.000
## 2004-06-08	-33673	36.837	-1240412.3	25403.115
## 2004-06-15	33018	37.069	1223944.2	-20.000
## 2004-06-17	-33018	37.040	-1222986.7	-977.522
## 2004-08-02	31409	38.937	1222972.2	-20.000
## 2004-08-06	-31409	39.528	-1241535.0	18542.719
## 2004-08-23	31171	39.828	1241478.6	-20.000
## 2004-08-27	-31171	41.192	-1283995.8	42497.244
## 2004-09-09	29959	42.857	1283952.9	-20.000
## 2004-09-15	-29959	43.448	-1301658.6	17685.769
## 2004-10-15	31815	40.912	1301615.3	-20.000
## 2004-10-21	-31815	40.854	-1299770.0	-1865.270
## 2004-10-26	32081	40.515	1299761.7	-20.000
## 2004-10-29	-32081	41.618	-1335147.1	35365.343
## 2004-11-01	32006	42.054	1345980.3	-20.000
## 2004-11-03	-32006	42.054	-1345980.3	-20.000
## 2004-11-17	31228	42.751	1335028.2	-20.000
## 2004-11-23	-31228	42.848	-1338057.3	3009.116
## 2004-12-09	30132	44.406	1338041.6	-20.000
## 2004-12-15	-30132	45.045	-1357295.9	19234.348
## 2005-01-31	26916	50.426	1357266.2	-20.000
## 2005-02-03	-26916	51.887	-1396590.5	39304.276
## 2005-02-11	25771	54.191	1396556.3	-20.000
## 2005-02-15	-25771	54.017	-1392072.1	-4504.154
## 2005-03-18	24887	55.933	1392004.6	-20.000
## 2005-03-24	-24887	55.604	-1383816.7	-8207.823
## 2005-03-31	25039	55.265	1383780.3	-20.000
## 2005-04-06	-25039	61.711	-1545181.7	161381.394
## 2005-04-19	26431	58.459	1545129.8	-20.000
## 2005-04-25	-26431	57.346	-1515712.1	-29437.703
## 2005-04-28	27065	56.001	1515667.1	-20.000
## 2005-05-04	-27065	55.846	-1511472.0	-4215.075
## 2005-05-10	28011	53.959	1511445.5	-20.000
## 2005-05-13	-28011	53.378	-1495171.2	-16294.391
## 2005-06-08	26675	56.049	1495107.1	-20.000
## 2005-06-14	-26675	55.314	-1475500.9	-19626.125

## 2005-06-28	25764	57.269	1475478.5	-20.000
## 2005-07-04	-25764	57.888	-1491426.4	15927.916
## 2005-08-10	23655	63.047	1491376.8	-20.000
## 2005-08-16	-23655	62.466	-1477633.2	-13763.555
## 2005-09-01	23611	62.582	1477623.6	-20.000
## 2005-09-02	-23611	62.118	-1466668.1	-10975.504
## 2005-09-30	21961	66.783	1466621.5	-20.000
## 2005-10-06	-21961	66.551	-1461526.5	-5114.952
## 2005-10-10	21742	67.218	1461453.8	-20.000
## 2005-10-14	-21742	65.515	-1424427.1	-37046.626
## 2005-10-24	23250	61.266	1424434.5	-20.000
## 2005-10-28	-23250	60.221	-1400138.2	-24316.250
## 2005-12-09	19762	70.848	1400098.2	-20.000
## 2005-12-15	-19762	71.942	-1421717.8	21599.628
## 2006-01-19	19171	74.158	1421683.0	-20.000
## 2006-01-25	-19171	73.587	-1410736.4	-10966.641
## 2006-03-20	16471	85.647	1410691.7	-20.000
## 2006-03-24	-16471	86.527	-1425186.2	14474.480
## 2006-04-19	15694	90.805	1425093.7	-20.000
## 2006-04-24	-15694	92.073	-1444993.7	19879.992
## 2006-05-08	15798	91.464	1444948.3	-20.000
## 2006-05-12	-15798	86.344	-1364062.5	-80905.760
## 2006-05-23	16571	82.317	1364075.0	-20.000
## 2006-05-29	-16571	84.659	-1402884.3	38789.282
## 2006-06-09	18231	76.946	1402802.5	-20.000
## 2006-06-15	-18231	76.849	-1401034.1	-1788.407
## 2006-06-29	18613	75.271	1401019.1	-20.000
## 2006-07-05	-18613	77.565	-1443717.3	42678.222
## 2006-07-19	20495	70.441	1443688.3	-20.000
## 2006-07-21	-20495	71.584	-1467114.1	23405.785
## 2006-09-27	16749	87.592	1467078.4	-20.000
## 2006-10-03	-16749	87.437	-1464482.3	-2616.095
## 2006-10-18	16375	89.431	1464432.6	-20.000
## 2006-10-24	-16375	89.528	-1466021.0	1568.375
## 2006-11-02	17271	84.882	1465997.0	-20.000
## 2006-11-08	-17271	82.840	-1430729.6	-35287.382
## 2006-11-20	16857	84.872	1430687.3	-20.000
## 2006-11-24	-16857	86.334	-1455332.2	24624.934
## 2006-11-29	17411	83.585	1455298.4	-20.000
## 2006-11-30	-17411	83.256	-1449570.2	-5748.219
## 2006-12-27	16941	85.560	1449472.0	-20.000
## 2007-01-03	-16941	85.772	-1453063.5	3571.492
## 2007-01-09	17158	84.688	1453076.7	-20.000
## 2007-01-10	-17158	83.856	-1438801.2	-14295.456
## 2007-01-24	15830	90.883	1438677.9	-20.000
## 2007-01-30	-15830	88.792	-1405577.4	-33120.530
## 2007-02-22	14322	98.142	1405589.7	-20.000
## 2007-02-28	-14322	91.280	-1307312.2	-98297.564
## 2007-03-06	14525	90.002	1307279.1	-20.000
## 2007-03-12	-14525	91.580	-1330199.5	22900.450
## 2007-03-15	14972	88.841	1330127.5	-20.000
## 2007-03-21	-14972	89.789	-1344320.9	14173.456
## 2007-03-29	14356	93.641	1344310.2	-20.000
## 2007-03-30	-14356	93.525	-1342644.9	-1685.296

## 2007-05-14	13312	100.852	1342541.8	-20.000
## 2007-05-15	-13312	99.884	-1329655.8	-12906.016
## 2007-05-25	13198	100.745	1329632.5	-20.000
## 2007-06-01	-13198	103.078	-1360423.4	30770.934
## 2007-06-14	13694	99.342	1360389.3	-20.000
## 2007-06-20	-13694	101.771	-1393652.1	33242.726
## 2007-07-19	13459	103.543	1393585.2	-20.000
## 2007-07-25	-13459	105.014	-1413383.4	19778.189
## 2007-08-13	15565	90.805	1413379.8	-20.000
## 2007-08-17	-15565	86.043	-1339259.3	-74140.530
## 2007-08-30	14848	90.196	1339230.2	-20.000
## 2007-09-05	-14848	93.061	-1381769.7	42519.520
## 2007-09-26	14638	94.396	1381768.6	-20.000
## 2007-10-02	-14638	96.380	-1410810.4	29021.792
## 2007-10-09	14574	96.796	1410704.9	-20.000
## 2007-10-15	-14574	95.354	-1389689.2	-21035.708
## 2007-10-17	14565	95.412	1389675.8	-20.000
## 2007-10-23	-14565	94.290	-1373333.9	-16361.930
## 2007-11-09	14203	96.690	1373288.1	-20.000
## 2007-11-15	-14203	90.263	-1282005.4	-91302.681
## 2010-01-13	30200	42.450	1281990.0	-20.000
## 2010-01-19	-30200	42.200	-1274440.0	-7570.000
## 2010-04-20	31662	40.250	1274395.5	-20.000
## 2010-04-26	-31662	43.235	-1368906.6	94491.070
## 2010-05-10	34265	39.950	1368886.8	-20.000
## 2010-05-14	-34265	43.000	-1473395.0	104488.250
## 2010-06-28	32792	44.930	1473344.6	-20.000
## 2010-07-02	-32792	43.310	-1420221.5	-53143.040
## 2010-07-08	31990	44.395	1420196.1	-20.000
## 2010-07-14	-31990	48.900	-1564311.0	144094.950
## 2010-08-05	30872	50.670	1564284.2	-20.000
## 2010-08-11	-30872	47.055	-1452682.0	-111622.280
## 2010-08-23	30907	47.000	1452629.0	-20.000
## 2010-08-27	-30907	47.390	-1464682.7	12033.730
## 2010-09-08	28735	50.970	1464622.9	-20.000
## 2010-09-14	-28735	54.830	-1575540.1	110897.100
## 2010-10-29	25132	62.690	1575525.1	-20.000
## 2010-11-02	-25132	62.500	-1570750.0	-4795.080
## 2010-11-12	26882	58.430	1570715.3	-20.000
## 2010-11-18	-26882	60.020	-1613457.6	42722.380
## 2011-02-01	27281	59.140	1613398.3	-20.000
## 2011-02-07	-27281	59.000	-1609579.0	-3839.340
## 2011-02-25	27327	58.900	1609560.3	-20.000
## 2011-03-02	-27327	60.700	-1658748.9	49168.600
## 2011-03-16	27980	59.280	1658654.4	-20.000
## 2011-03-22	-27980	59.020	-1651379.6	-7294.800
## 2011-04-13	27313	60.460	1651344.0	-20.000
## 2011-04-19	-27313	61.670	-1684392.7	33028.730
## 2011-05-06	25448	66.190	1684403.1	-20.000
## 2011-05-12	-25448	67.460	-1716722.1	32298.960
## 2011-05-24	25160	68.230	1716666.8	-20.000
## 2011-05-30	-25160	70.090	-1763464.4	46777.600
## 2011-06-03	24992	70.560	1763435.5	-20.000
## 2011-06-09	-24992	70.120	-1752439.0	-11016.480

## 2011-06-24	25575	68.520	1752399.0	-20.000
## 2011-06-30	-25575	72.450	-1852908.8	100489.750
## 2011-08-04	28492	65.030	1852834.8	-20.000
## 2011-08-09	-28492	53.000	-1510076.0	-342778.760
## 2012-02-13	22528	67.030	1510051.8	-20.000
## 2012-02-16	-22528	66.220	-1491804.2	-18267.680
## 2012-02-23	21424	69.630	1491753.1	-20.000
## 2012-02-29	-21424	68.330	-1463901.9	-27871.200
## 2012-03-30	20726	70.630	1463877.4	-20.000
## 2012-04-05	-20726	70.870	-1468851.6	4954.240
## 2012-04-24	21464	68.430	1468781.5	-20.000
## 2012-04-30	-21464	73.220	-1571594.1	102792.560
## 2012-05-21	23519	66.820	1571539.6	-20.000
## 2012-05-23	-23519	67.400	-1585180.6	13621.020
## 2012-06-05	24952	63.530	1585200.6	-20.000
## 2012-06-11	-24952	67.490	-1684010.5	98789.920
## 2012-06-27	27204	61.900	1683927.6	-20.000
## 2012-07-03	-27204	69.160	-1881428.6	197481.040
## 2012-07-10	27318	68.870	1881390.7	-20.000
## 2012-07-16	-27318	71.440	-1951597.9	70187.260
## 2012-08-16	23852	81.820	1951570.6	-20.000
## 2012-08-22	-23852	82.500	-1967790.0	16199.360
## 2012-11-14	25898	75.980	1967730.0	-20.000
## 2012-11-20	-25898	78.670	-2037395.7	69645.620
## 2012-12-14	23710	85.930	2037400.3	-20.000
## 2012-12-20	-23710	85.760	-2033369.6	-4050.700
## 2013-01-14	23687	85.840	2033292.1	-20.000
## 2013-01-18	-23687	84.400	-1999182.8	-34129.280
## 2013-02-25	22462	89.000	1999118.0	-20.000
## 2013-03-01	-22462	89.200	-2003610.4	4472.400
## 2013-03-12	20656	97.000	2003632.0	-20.000
## 2013-03-18	-20656	98.040	-2025114.2	21462.240
## 2013-04-10	22606	89.580	2025045.5	-20.000
## 2013-04-16	-22606	85.890	-1941629.3	-83436.140
## 2013-04-19	23227	83.590	1941544.9	-20.000
## 2013-04-25	-23227	89.550	-2079977.8	138412.920
## 2013-05-17	21331	97.510	2079985.8	-20.000
## 2013-05-23	-21331	99.270	-2117528.4	37522.560
## 2013-06-14	21069	100.500	2117434.5	-20.000
## 2013-06-20	-21069	97.860	-2061812.3	-55642.160
## 2013-07-24	17630	116.950	2061828.5	-20.000
## 2013-07-30	-17630	119.050	-2098851.5	37003.000
## 2013-08-29	18054	116.250	2098777.5	-20.000
## 2013-09-04	-18054	119.100	-2150231.4	51433.900
## 2013-09-16	16931	127.000	2150237.0	-20.000
## 2013-09-17	-16931	122.400	-2072354.4	-77902.600
## 2013-09-18	17411	123.450	2149388.0	-20.000
## 2013-09-20	-17411	124.650	-2170281.1	20873.200
## 2013-09-27	16573	126.300	2093169.9	-20.000
## 2013-09-30	-16573	125.850	-2085712.0	-7477.850
## 2013-10-01	16749	126.500	2118748.5	-20.000
## 2013-10-02	-16749	125.550	-2102836.9	-15931.550
## 2013-10-30	15638	132.350	2069689.3	-20.000
## 2013-11-05	-15638	136.050	-2127549.9	57840.600

## 2013-11-07	15433	137.850	2127439.0	-20.000
## 2013-11-13	-15433	145.450	-2244729.8	117270.800
## 2013-12-04	14557	154.200	2244689.4	-20.000
## 2013-12-10	-14557	153.850	-2239594.4	-5114.950
## 2013-12-16	14696	152.400	2239670.4	-20.000
## 2013-12-20	-14696	159.200	-2339603.2	99912.800
## 2014-01-06	14718	158.950	2339426.1	-20.000
## 2014-01-10	-14718	158.100	-2326915.8	-12530.300
## 2014-01-28	14607	159.300	2326895.1	-20.000
## 2014-02-03	-14607	157.300	-2297681.1	-29234.000
## 2014-02-06	14729	156.000	2297724.0	-20.000
## 2014-02-12	-14729	165.000	-2430285.0	132541.000
## 2014-03-04	14080	172.600	2430208.0	-20.000
## 2014-03-10	-14080	172.000	-2421760.0	-8468.000
## 2014-03-17	14527	166.700	2421650.9	-20.000
## 2014-03-21	-14527	170.750	-2480485.2	58814.350
## 2014-04-16	14871	166.800	2480482.8	-20.000
## 2014-04-24	-14871	174.300	-2592015.3	111512.500
## 2014-05-06	15549	166.700	2592018.3	-20.000
## 2014-05-07	-15549	165.500	-2573359.5	-18678.800
## 2014-06-04	14849	173.300	2573331.7	-20.000
## 2014-06-10	-14849	174.350	-2588923.1	15571.450
## 2014-06-26	15211	170.200	2588912.2	-20.000
## 2014-07-02	-15211	172.200	-2619334.2	30402.000
## 2014-07-16	15531	168.650	2619303.1	-20.000
## 2014-07-22	-15531	165.400	-2568827.4	-50495.750
## 2014-08-18	16258	158.000	2568764.0	-20.000
## 2014-08-22	-16258	163.300	-2654931.4	86147.400
## 2014-09-17	16312	162.750	2654778.0	-20.000
## 2014-09-23	-16312	153.650	-2506338.8	-148459.200
## 2014-10-01	16495	151.950	2506415.2	-20.000
## 2014-10-08	-16495	142.050	-2343114.8	-163320.500
## 2014-12-10	13481	173.800	2342997.8	-20.000
## 2014-12-16	-13481	169.250	-2281659.2	-61358.550
## 2015-04-15	10040	227.250	2281590.0	-20.000
## 2015-04-21	-10040	225.500	-2264020.0	-17590.000
## 2015-05-07	10835	208.950	2263973.2	-20.000
## 2015-05-13	-10835	210.100	-2276433.5	12440.250
## 2015-06-03	10657	213.600	2276335.2	-20.000
## 2015-06-09	-10657	205.300	-2187882.1	-88473.100
## 2015-06-16	10466	209.050	2187917.3	-20.000
## 2015-06-22	-10466	218.150	-2283157.9	95220.600
## 2015-06-25	10418	219.150	2283104.7	-20.000
## 2015-06-29	-10418	209.300	-2180487.4	-102637.300
## 2015-07-09	10458	208.500	2180493.0	-20.000
## 2015-07-14	-10458	211.300	-2209775.4	29262.400
## 2015-07-16	10374	213.000	2209662.0	-20.000
## 2015-07-22	-10374	216.450	-2245452.3	35770.300
## 2015-09-02	11986	187.350	2245577.1	-20.000
## 2015-09-04	-11986	187.200	-2243779.2	-1817.900
## 2015-11-13	10390	215.950	2243720.5	-20.000
## 2015-11-19	-10390	221.000	-2296190.0	52449.500
## 2015-11-25	10371	221.400	2296139.4	-20.000
## 2015-12-01	-10371	226.350	-2347475.9	51316.450

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## 2015-12-15 10852 216.300 2347287.6 -20.000
## 2015-12-18 -10852 221.400 -2402632.8 55325.200
## 2015-12-21 10872 222.750 2421738.0 -20.000
## 2015-12-28 -10872 223.150 -2426086.8 4328.800
## 2015-12-29 10747 226.350 2432583.4 -20.000
## 2015-12-30 -10747 224.600 -2413776.2 -18827.250
## 2016-01-05 10900 219.100 2388190.0 -20.000
## 2016-01-11 -10900 201.300 -2194170.0 -194040.000
## 2017-03-10 11413 192.250 2194149.2 -20.000
## 2017-03-16 -11413 197.550 -2254638.1 60468.900
## 2017-03-23 11609 194.200 2254467.8 -20.000
## 2017-03-27 -11609 196.350 -2279427.1 24939.350
## 2017-05-23 11251 202.600 2279452.6 -20.000
## 2017-05-29 -11251 198.800 -2236698.8 -42773.800
## 2017-06-28 11517 194.200 2236601.4 -20.000
## 2017-06-30 -11517 189.100 -2177864.7 -58756.700
## 2017-09-14 10792 201.800 2177825.6 -20.000
## 2017-09-20 -10792 208.850 -2253909.2 76063.600
## 2017-10-10 10415 216.400 2253806.0 -20.000
## 2017-10-16 -10415 214.750 -2236621.2 -17204.750
## 2017-11-07 10030 223.000 2236690.0 -20.000
## 2017-11-13 -10030 216.150 -2167984.5 -68725.500
## 2017-11-24 10081 215.050 2167919.1 -20.000
## 2017-11-30 -10081 223.750 -2255623.8 87684.700
## 2018-01-03 9976 226.100 2255573.6 -20.000
## 2018-01-09 -9976 251.300 -2506968.8 251375.200
## 2018-01-16 10300 243.400 2507020.0 -20.000
## 2018-01-22 -10300 247.900 -2553370.0 46330.000
## 2018-01-31 10417 245.100 2553206.7 -20.000
## 2018-02-06 -10417 227.700 -2371950.9 -181275.800
## 2018-03-05 10821 219.200 2371963.2 -20.000
## 2018-03-07 -10821 218.600 -2365470.6 -6512.600
## 2018-03-20 10631 222.500 2365397.5 -20.000
## 2018-03-26 -10631 215.400 -2289917.4 -75500.100
## 2018-04-05 10273 222.900 2289851.7 -20.000
## 2018-04-06 -10273 220.500 -2265196.5 -24675.200
## 2018-04-17 10041 225.600 2265249.6 -20.000
## 2018-04-18 -10041 222.200 -2231110.2 -34159.400
## 2018-05-02 10036 222.300 2231002.8 -20.000
## 2018-05-08 -10036 228.000 -2288208.0 57185.200
## 2018-05-25 10266 222.900 2288291.4 -20.000
## 2018-05-31 -10266 217.100 -2228748.6 -59562.800
## 2018-06-11 10030 222.200 2228666.0 -20.000
## 2018-06-15 -10030 225.200 -2258756.0 30070.000
##
## [1] "Transactions for the instrument: DB1.csv"
##      Quantity Price      Value Net realized Profit
## 1999-12-31      0 0.000      0.0      0.000
## 2003-06-30    43023 23.020  990389.5     -20.000
## 2003-07-04   -43023 23.150 -995982.4     5572.990
## 2003-07-24    41759 23.850  995952.2     -20.000
## 2003-07-30   -41759 23.655 -987809.1    -8163.005
## 2003-08-08    42686 23.140  987754.0     -20.000
## 2003-08-14   -42686 22.690 -968545.3    -19228.700

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## 2003-09-03	43814	22.105	968508.5	-20.000
## 2003-09-09	-43814	22.905	-1003559.7	35031.200
## 2003-09-12	44601	22.500	1003522.5	-20.000
## 2003-09-18	-44601	22.750	-1014672.8	11130.250
## 2003-10-01	45520	22.290	1014640.8	-20.000
## 2003-10-07	-45520	22.905	-1042635.6	27974.800
## 2003-10-23	46523	22.410	1042580.4	-20.000
## 2003-10-29	-46523	23.495	-1093057.9	50457.455
## 2004-01-06	49537	22.065	1093033.9	-20.000
## 2004-01-12	-49537	22.475	-1113344.1	20290.170
## 2004-01-26	46876	23.750	1113305.0	-20.000
## 2004-01-30	-46876	23.875	-1119164.5	5839.500
## 2004-02-05	45725	24.475	1119119.4	-20.000
## 2004-02-11	-45725	24.885	-1137866.6	18727.250
## 2004-03-12	48833	23.300	1137808.9	-20.000
## 2004-03-18	-48833	22.750	-1110950.8	-26878.150
## 2004-04-13	46087	24.105	1110927.1	-20.000
## 2004-04-19	-46087	23.535	-1084657.5	-26289.590
## 2004-12-08	47623	22.775	1084613.8	-20.000
## 2004-12-14	-47623	21.940	-1044848.6	-39785.205
## 2004-12-30	47223	22.125	1044808.9	-20.000
## 2005-01-03	-47223	22.025	-1040086.6	-4742.300
## 2005-01-17	46765	22.240	1040053.6	-20.000
## 2005-01-20	-46765	22.800	-1066242.0	26168.400
## 2005-01-21	46774	22.995	1075568.1	-20.000
## 2005-01-27	-46774	23.600	-1103866.4	28278.270
## 2005-03-09	38301	28.575	1094451.1	-20.000
## 2005-03-15	-38301	29.090	-1114176.1	19705.015
## 2005-03-31	37999	29.320	1114130.7	-20.000
## 2005-04-06	-37999	28.710	-1090951.3	-23199.390
## 2005-05-18	37106	29.400	1090916.4	-20.000
## 2005-05-24	-37106	29.585	-1097781.0	6844.610
## 2005-06-21	35133	31.245	1097730.6	-20.000
## 2005-06-27	-35133	31.315	-1100189.9	2439.310
## 2005-07-15	31591	34.825	1100156.6	-20.000
## 2005-07-21	-31591	34.660	-1094944.1	-5232.515
## 2005-09-16	28836	37.970	1094902.9	-20.000
## 2005-09-19	-28836	37.365	-1077457.1	-17465.780
## 2005-10-10	27142	39.695	1077401.7	-20.000
## 2005-10-14	-27142	39.000	-1058538.0	-18883.690
## 2005-10-20	27750	38.145	1058523.8	-20.000
## 2005-10-26	-27750	38.485	-1067958.8	9415.000
## 2005-12-14	24451	43.675	1067897.4	-20.000
## 2005-12-20	-24451	44.230	-1081467.7	13550.305
## 2006-01-02	24918	43.400	1081441.2	-20.000
## 2006-01-06	-24918	43.390	-1081192.0	-269.180
## 2006-01-11	25070	43.125	1081143.8	-20.000
## 2006-01-17	-25070	45.650	-1144445.5	63281.750
## 2006-02-13	22911	49.950	1144404.4	-20.000
## 2006-02-17	-22911	53.070	-1215886.8	71462.320
## 2006-02-24	22833	53.250	1215857.2	-20.000
## 2006-03-02	-22833	52.280	-1193709.2	-22168.010
## 2006-04-06	20586	57.985	1193679.2	-20.000
## 2006-04-12	-20586	56.240	-1157756.6	-35942.570

## 2006-05-11	19154	60.440	1157667.8	-20.000
## 2006-05-17	-19154	54.735	-1048394.2	-109293.570
## 2006-05-19	18903	55.460	1048360.4	-20.000
## 2006-05-25	-18903	48.875	-923884.1	-124496.255
## 2006-06-07	18411	50.180	923864.0	-20.000
## 2006-06-12	-18411	49.150	-904900.7	-18983.330
## 2006-07-18	17206	52.590	904863.5	-20.000
## 2006-07-24	-17206	53.885	-927145.3	22261.770
## 2006-08-02	16582	55.910	927099.6	-20.000
## 2006-08-08	-16582	55.900	-926933.8	-185.820
## 2006-08-11	16589	55.875	926910.4	-20.000
## 2006-08-17	-16589	58.955	-978004.5	51074.120
## 2006-10-18	15358	63.675	977920.6	-20.000
## 2006-10-24	-15358	64.540	-991205.3	13264.670
## 2007-01-08	14114	70.225	991155.6	-20.000
## 2007-01-10	-14114	70.310	-992355.3	1179.690
## 2007-01-24	12012	82.610	992311.3	-20.000
## 2007-01-30	-12012	80.275	-964263.3	-28068.020
## 2007-03-01	12648	76.240	964283.5	-20.000
## 2007-03-05	-12648	76.500	-967572.0	3268.480
## 2007-03-15	12369	78.220	967503.2	-20.000
## 2007-03-21	-12369	83.545	-1033368.1	65844.925
## 2007-03-29	12173	84.885	1033305.1	-20.000
## 2007-04-04	-12173	86.125	-1048399.6	15074.520
## 2007-04-20	11846	88.500	1048371.0	-20.000
## 2007-04-26	-11846	86.700	-1027048.2	-21342.800
## 2007-06-11	12244	83.880	1027026.7	-20.000
## 2007-06-12	-12244	82.750	-1013191.0	-13855.720
## 2007-06-28	12407	81.660	1013155.6	-20.000
## 2007-07-04	-12407	86.260	-1070227.8	57052.200
## 2007-07-19	12102	88.430	1070179.9	-20.000
## 2007-07-25	-12102	87.230	-1055657.5	-14542.400
## 2007-07-30	12491	84.510	1055614.4	-20.000
## 2007-08-01	-12491	80.500	-1005525.5	-50108.910
## 2007-08-17	13006	77.310	1005493.9	-20.000
## 2007-08-23	-13006	81.370	-1058298.2	52784.360
## 2007-09-11	13657	77.490	1058280.9	-20.000
## 2007-09-17	-13657	82.370	-1124927.1	66626.160
## 2007-11-01	10108	111.280	1124818.2	-20.000
## 2007-11-07	-10108	117.620	-1188903.0	64064.720
## 2007-11-16	10018	118.670	1188836.1	-20.000
## 2007-11-22	-10018	116.190	-1163991.4	-24864.640
## 2007-12-12	9058	128.500	1163953.0	-20.000
## 2007-12-18	-9058	126.590	-1146652.2	-17320.780
## 2008-01-08	9717	118.000	1146606.0	-20.000
## 2008-01-14	-9717	126.690	-1231046.7	84420.730
## 2008-02-08	11005	111.860	1231019.3	-20.000
## 2008-02-13	-11005	117.150	-1289235.8	58196.450
## 2008-02-18	10812	119.240	1289222.9	-20.000
## 2008-02-22	-10812	114.840	-1241650.1	-47592.800
## 2008-03-14	11826	104.990	1241611.7	-20.000
## 2008-03-20	-11826	97.850	-1157174.1	-84457.640
## 2008-04-11	12155	95.200	1157156.0	-20.000
## 2008-04-17	-12155	89.500	-1087872.5	-69303.500

## 2008-04-30	11664	93.260	10877784.6	-20.000
## 2008-05-06	-11664	100.250	-1169316.0	81511.360
## 2011-01-21	20689	56.520	1169342.3	-20.000
## 2011-01-27	-20689	56.850	-1176169.7	6807.370
## 2011-02-25	21017	55.960	1176111.3	-20.000
## 2011-03-03	-21017	55.870	-1174219.8	-1911.530
## 2011-05-04	20819	56.400	1174191.6	-20.000
## 2011-05-10	-20819	57.000	-1186683.0	12471.400
## 2011-05-16	21346	55.590	1186624.1	-20.000
## 2011-05-18	-21346	54.190	-1156739.7	-29904.400
## 2011-05-24	21197	54.570	1156720.3	-20.000
## 2011-05-25	-21197	54.090	-1146545.7	-10194.560
## 2012-02-24	22708	50.490	1146526.9	-20.000
## 2012-02-29	-22708	50.590	-1148797.7	2250.800
## 2013-01-02	24535	46.820	1148728.7	-20.000
## 2013-01-08	-24535	47.090	-1155353.2	6604.450
## 2013-01-23	24343	47.460	1155318.8	-20.000
## 2013-01-29	-24343	49.650	-1208629.9	53291.170
## 2013-03-14	23918	50.530	1208576.5	-20.000
## 2013-03-18	-23918	50.840	-1215991.1	7394.580
## 2013-03-25	24705	49.220	1215980.1	-20.000
## 2013-04-02	-24705	48.600	-1200663.0	-15337.100
## 2013-06-14	24775	48.460	1200596.5	-20.000
## 2013-06-17	-24775	48.360	-1198119.0	-2497.500
## 2013-06-21	24529	48.845	1198119.0	-20.000
## 2013-06-27	-24529	49.810	-1221789.5	23650.485
## 2013-07-04	23918	51.080	1221731.4	-20.000
## 2013-07-05	-23918	50.300	-1203075.4	-18676.040
## 2013-07-25	22299	53.950	1203031.1	-20.000
## 2013-07-26	-22299	53.320	-1188982.7	-14068.370
## 2013-08-08	21280	55.870	1188913.6	-20.000
## 2013-08-14	-21280	54.170	-1152737.6	-36196.000
## 2013-09-16	21039	54.790	1152726.8	-20.000
## 2013-09-17	-21039	54.410	-1144732.0	-8014.820
## 2013-09-30	20647	55.440	1144669.7	-20.000
## 2013-10-04	-20647	56.300	-1162426.1	17736.420
## 2013-10-10	20717	56.110	1162430.9	-20.000
## 2013-10-16	-20717	57.760	-1196613.9	34163.050
## 2013-10-30	20970	57.060	1196548.2	-20.000
## 2013-11-05	-20970	54.770	-1148526.9	-48041.300
## 2013-11-14	20882	55.000	1148510.0	-20.000
## 2013-11-15	-20882	54.550	-1139113.1	-9416.900
## 2013-12-06	20520	55.510	1139065.2	-20.000
## 2013-12-12	-20520	54.240	-1113004.8	-26080.400
## 2013-12-16	20406	54.540	1112943.2	-20.000
## 2013-12-18	-20406	55.390	-1130288.3	17325.100
## 2014-01-08	18989	59.520	1130225.3	-20.000
## 2014-01-13	-18989	61.490	-1167633.6	37388.330
## 2014-01-21	19319	60.440	1167640.4	-20.000
## 2014-01-27	-19319	56.530	-1092103.1	-75557.290
## 2014-02-21	18497	59.040	1092062.9	-20.000
## 2014-02-27	-18497	58.530	-1082629.4	-9453.470
## 2014-03-04	18575	58.280	1082551.0	-20.000
## 2014-03-10	-18575	56.920	-1057289.0	-25282.000

## 2014-05-08	19539	54.110	1057255.3	-20.000
## 2014-05-14	-19539	55.800	-1090276.2	33000.910
## 2014-05-19	20360	53.550	1090278.0	-20.000
## 2014-05-23	-20360	54.100	-1101476.0	11178.000
## 2014-06-04	19860	55.460	1101435.6	-20.000
## 2014-06-10	-19860	55.400	-1100244.0	-1211.600
## 2014-09-01	20154	54.590	1100206.9	-20.000
## 2014-09-04	-20154	55.140	-1111291.6	11064.700
## 2014-09-08	20098	55.290	1111218.4	-20.000
## 2014-09-12	-20098	54.350	-1092326.3	-18912.120
## 2014-11-04	20075	54.410	1092280.8	-20.000
## 2014-11-10	-20075	55.550	-1115166.2	22865.500
## 2014-12-16	19516	57.140	1115144.2	-20.000
## 2014-12-22	-19516	59.790	-1166861.6	51697.400
## 2015-01-07	19538	59.720	1166809.4	-20.000
## 2015-01-13	-19538	62.700	-1225032.6	58203.240
## 2015-02-10	17821	68.740	1225015.5	-20.000
## 2015-02-16	-17821	69.970	-1246935.4	21899.830
## 2015-03-10	17436	71.510	1246848.4	-20.000
## 2015-03-16	-17436	75.020	-1308048.7	61180.360
## 2015-03-27	17510	74.700	1307997.0	-20.000
## 2015-04-02	-17510	76.760	-1344067.6	36050.600
## 2015-04-09	17433	77.100	1344084.3	-20.000
## 2015-04-15	-17433	78.500	-1368490.5	24386.200
## 2015-05-15	18751	72.980	1368448.0	-20.000
## 2015-05-21	-18751	74.200	-1391324.2	22856.220
## 2015-06-10	19142	72.680	1391240.6	-20.000
## 2015-06-12	-19142	72.530	-1388369.3	-2891.300
## 2015-07-07	17930	77.430	1388319.9	-20.000
## 2015-07-13	-17930	83.320	-1493927.6	105587.700
## 2015-07-23	17473	85.500	1493941.5	-20.000
## 2015-07-29	-17473	82.390	-1439600.5	-54361.030
## 2015-08-13	17538	82.080	1439519.0	-20.000
## 2015-08-17	-17538	82.620	-1448989.6	9450.520
## 2015-08-25	19276	75.170	1448976.9	-20.000
## 2015-08-28	-19276	79.130	-1525309.9	76312.960
## 2015-09-02	19341	78.860	1525231.3	-20.000
## 2015-09-04	-19341	79.940	-1546119.5	20868.280
## 2015-09-30	20290	76.200	1546098.0	-20.000
## 2015-10-02	-20290	77.710	-1576735.9	30617.900
## 2015-11-04	18928	83.300	1576702.4	-20.000
## 2015-11-10	-18928	81.970	-1551528.2	-25194.240
## 2015-11-17	19058	81.410	1551511.8	-20.000
## 2015-11-18	-19058	80.920	-1542173.4	-9358.420
## 2015-11-19	19029	81.610	1552956.7	-20.000
## 2015-11-20	-19029	81.400	-1548960.6	-4016.090
## 2015-12-02	18830	81.680	1538034.4	-20.000
## 2015-12-08	-18830	79.720	-1501127.6	-36926.800
## 2016-01-08	19838	75.670	1501141.5	-20.000
## 2016-01-14	-19838	76.400	-1515623.2	14461.740
## 2016-01-21	20384	74.350	1515550.4	-20.000
## 2016-01-26	-20384	75.870	-1546534.1	30963.680
## 2016-01-27	20169	77.820	1569551.6	-20.000
## 2016-01-28	-20169	77.200	-1557046.8	-12524.780

## 2016-02-22	20336	75.430	1533944.5	-20.000
## 2016-02-24	-20336	75.790	-1541265.4	7300.960
## 2016-03-01	19808	77.810	1541260.5	-20.000
## 2016-03-07	-19808	75.310	-1491740.5	-49540.000
## 2016-03-09	19773	75.440	1491675.1	-20.000
## 2016-03-15	-19773	75.330	-1489500.1	-2195.030
## 2016-05-09	19786	75.280	1489490.1	-20.000
## 2016-05-12	-19786	74.340	-1470891.2	-18618.840
## 2016-05-13	19919	75.900	1511852.1	-20.000
## 2016-05-20	-19919	76.660	-1526990.5	15118.440
## 2016-06-01	18574	80.000	1485920.0	-20.000
## 2016-06-07	-18574	79.190	-1470875.1	-15064.940
## 2016-07-01	19825	74.190	1470816.8	-20.000
## 2016-07-05	-19825	71.810	-1423633.2	-47203.500
## 2017-01-06	18610	76.500	1423665.0	-20.000
## 2017-01-12	-18610	75.960	-1413615.6	-10069.400
## 2017-01-18	18541	76.240	1413565.8	-20.000
## 2017-01-24	-18541	79.120	-1466963.9	53378.080
## 2017-02-09	18182	80.680	1466923.8	-20.000
## 2017-02-15	-18182	81.600	-1483651.2	16707.440
## 2017-02-28	18475	80.300	1483542.5	-20.000
## 2017-03-06	-18475	78.880	-1457308.0	-26254.500
## 2017-03-23	18000	80.960	1457280.0	-20.000
## 2017-03-27	-18000	80.140	-1442520.0	-14780.000
## 2017-04-18	16777	85.980	1442486.5	-20.000
## 2017-04-24	-16777	86.370	-1449029.5	6523.030
## 2017-06-02	15606	92.850	1449017.1	-20.000
## 2017-06-09	-15606	92.770	-1447768.6	-1268.480
## 2017-06-13	15643	92.550	1447759.6	-20.000
## 2017-06-19	-15643	97.300	-1522063.9	74284.250
## 2017-07-25	16427	92.650	1521961.6	-20.000
## 2017-07-31	-16427	88.410	-1452311.1	-69670.480
## 2017-08-14	16353	88.810	1452309.9	-20.000
## 2017-08-18	-16353	89.440	-1462612.3	10282.390
## 2017-08-30	16395	89.210	1462597.9	-20.000
## 2017-09-01	-16395	89.010	-1459319.0	-3299.000
## 2017-11-01	16122	90.510	1459202.2	-20.000
## 2017-11-07	-16122	90.410	-1457590.0	-1632.200
## 2017-11-24	15793	92.290	1457536.0	-20.000
## 2017-11-30	-15793	95.250	-1504283.2	46727.280
## 2017-12-04	15780	95.330	1504307.4	-20.000
## 2017-12-08	-15780	99.020	-1562535.6	58208.200
## 2018-01-03	16165	96.660	1562508.9	-20.000
## 2018-01-09	-16165	98.800	-1597102.0	34573.100
## 2018-01-16	16132	99.000	1597068.0	-20.000
## 2018-01-22	-16132	98.920	-1595777.4	-1310.560
## 2018-02-05	15485	103.050	1595729.2	-20.000
## 2018-02-08	-15485	102.150	-1581792.8	-13956.500
## 2018-02-21	14845	106.550	1581734.8	-20.000
## 2018-02-27	-14845	108.600	-1612167.0	30412.250
## 2018-03-05	15073	106.950	1612057.4	-20.000
## 2018-03-09	-15073	109.900	-1656522.7	44445.350
## 2018-03-20	15142	109.400	1656534.8	-20.000
## 2018-03-26	-15142	107.400	-1626250.8	-30304.000

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## 2018-04-26    14611 111.300 1626204.3      -20.000
## 2018-05-03   -14611 115.500 -1687570.5     61346.200
## 2018-05-15    14498 116.400 1687567.2      -20.000
## 2018-05-16   -14498 114.950 -1666545.1     -21042.100
## 2018-05-24    15013 111.000 1666443.0      -20.000
## 2018-05-30   -15013 113.000 -1696469.0     30006.000
## 2018-06-26    14836 114.350 1696496.6      -20.000
## 2018-06-28   -14836 113.150 -1678693.4     -17823.200
## 2018-07-24    14310 117.300 1678563.0      -20.000
## 2018-07-30   -14310 112.900 -1615599.0     -62984.000
## 2018-08-13    14329 112.750 1615594.8      -20.000
## 2018-08-17   -14329 111.800 -1601982.2     -13632.550
##
## [1] "Transactions for the instrument: IFX.csv"
##          Quantity Price      Value Net realized Profit
## 1999-12-31       0 0.000      0.0      0.000
## 2006-04-12    129382 7.729 999993.5      -20.000
## 2006-04-20   -129382 8.365 -1082280.4     82266.952
## 2006-04-25    128838 8.400 1082239.2      -20.000
## 2006-04-27   -128838 8.508 -1096153.7     13894.504
## 2006-05-05    125414 8.740 1096118.4      -20.000
## 2006-05-09   -125414 8.758 -1098375.8     2237.452
## 2006-05-23    139206 7.890 1098335.3      -20.000
## 2006-05-29   -139206 7.962 -1108358.2     10002.832
## 2006-06-29    142732 7.765 1108314.0      -20.000
## 2006-07-05   -142732 7.792 -1112167.7     3833.764
## 2006-08-22    141098 7.882 1112134.4      -20.000
## 2006-08-28   -141098 8.078 -1139789.6     27635.208
## 2006-09-06    139231 8.186 1139745.0      -20.000
## 2006-09-12   -139231 8.660 -1205740.5     65975.494
## 2006-11-17    138507 8.705 1205703.4      -20.000
## 2006-11-23   -138507 8.857 -1226756.5     21033.064
## 2006-11-29    141948 8.642 1226714.6      -20.000
## 2006-12-05   -141948 8.866 -1258511.0     31776.352
## 2006-12-20    135523 9.286 1258466.6      -20.000
## 2006-12-28   -135523 9.447 -1280285.8     21799.203
## 2007-01-22    130451 9.814 1280246.1      -20.000
## 2007-01-26   -130451 9.921 -1294204.4     13938.257
## 2007-02-07    131628 9.832 1294166.5      -20.000
## 2007-02-13   -131628 10.825 -1424873.1     130686.604
## 2007-03-08    140322 10.154 1424829.6      -20.000
## 2007-03-14   -140322 9.921 -1392134.6     -32715.026
## 2007-04-24    135788 10.252 1392098.6      -20.000
## 2007-04-30   -135788 10.252 -1392098.6      -20.000
## 2007-05-04    137216 10.145 1392056.3      -20.000
## 2007-05-10   -137216 10.029 -1376139.3     -15937.056
## 2007-05-15    137955 9.975 1376101.1      -20.000
## 2007-05-21   -137955 9.859 -1360098.3     -16022.780
## 2007-06-28    123194 11.040 1360061.8      -20.000
## 2007-07-04   -123194 11.388 -1402933.3     42851.512
## 2007-07-19    118798 11.809 1402885.6      -20.000
## 2007-07-25   -118798 11.227 -1333745.1     -69160.436
## 2007-07-27    118510 11.254 1333711.5      -20.000
## 2007-08-02   -118510 10.619 -1258457.7     -75273.850

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## 2007-08-08	123181	10.216	1258417.1	-20.000
## 2007-08-14	-123181	9.984	-1229839.1	-28597.992
## 2007-08-17	125541	9.796	1229799.6	-20.000
## 2007-08-23	-125541	9.868	-1238838.6	9018.952
## 2009-09-03	342210	3.620	1238800.2	-20.000
## 2009-09-09	-342210	3.845	-1315797.4	76977.250
## 2009-09-15	333949	3.940	1315759.1	-20.000
## 2009-09-21	-333949	3.595	-1200546.7	-115232.405
## 2009-10-05	323587	3.710	1200507.8	-20.000
## 2009-10-09	-323587	3.780	-1223158.9	22631.090
## 2009-10-23	336021	3.640	1223116.4	-20.000
## 2009-10-27	-336021	3.405	-1144151.5	-78984.935
## 2010-01-08	273973	4.176	1144111.2	-20.000
## 2010-01-11	-273973	4.116	-1127672.9	-16458.380
## 2010-01-13	276381	4.080	1127634.5	-20.000
## 2010-01-19	-276381	4.017	-1110222.5	-17432.003
## 2010-01-28	282561	3.929	1110182.2	-20.000
## 2010-02-03	-282561	4.208	-1189016.7	78814.519
## 2010-03-16	265396	4.480	1188974.1	-20.000
## 2010-03-18	-265396	4.490	-1191628.0	2633.960
## 2010-03-19	264395	4.525	1196387.4	-20.000
## 2010-03-25	-264395	4.800	-1269096.0	72688.625
## 2010-04-20	243924	5.183	1264258.1	-20.000
## 2010-04-22	-243924	5.301	-1293041.1	28763.032
## 2010-04-23	242617	5.429	1317167.7	-20.000
## 2010-04-27	-242617	5.430	-1317410.3	222.617
## 2010-05-10	266695	4.849	1293204.1	-20.000
## 2010-05-11	-266695	4.824	-1286536.7	-6687.375
## 2010-05-17	246976	5.209	1286498.0	-20.000
## 2010-05-21	-246976	4.706	-1162269.1	-124248.928
## 2010-05-26	261175	4.450	1162228.8	-20.000
## 2010-06-01	-261175	4.465	-1166146.4	3897.625
## 2010-07-21	233221	5.000	1166105.0	-20.000
## 2010-07-27	-233221	5.049	-1177532.8	11407.829
## 2010-09-01	265321	4.438	1177494.6	-20.000
## 2010-09-03	-265321	4.518	-1198720.3	21205.680
## 2010-09-09	278892	4.298	1198677.8	-20.000
## 2010-09-15	-278892	4.452	-1241627.2	42929.368
## 2010-10-05	242972	5.110	1241586.9	-20.000
## 2010-10-11	-242972	5.292	-1285807.8	44200.904
## 2010-10-20	231670	5.550	1285768.5	-20.000
## 2010-10-26	-231670	5.850	-1355269.5	69481.000
## 2010-11-24	209431	6.471	1355228.0	-20.000
## 2010-11-30	-209431	6.846	-1433764.6	78516.625
## 2010-12-16	201962	7.099	1433728.2	-20.000
## 2010-12-22	-201962	7.250	-1464224.5	30476.262
## 2011-01-03	208395	7.026	1464183.3	-20.000
## 2011-01-07	-208395	7.034	-1465850.4	1647.160
## 2011-01-11	208064	7.045	1465810.9	-20.000
## 2011-01-13	-208064	7.160	-1489738.2	23907.360
## 2011-01-25	203122	7.334	1489696.7	-20.000
## 2011-01-31	-203122	7.721	-1568305.0	78588.214
## 2011-02-21	194961	8.044	1568266.3	-20.000
## 2011-02-25	-194961	7.777	-1516211.7	-52074.587

##	2011-03-03	193143	7.850	1516172.6	-20.000
##	2011-03-09	-193143	7.482	-1445095.9	-71096.624
##	2011-03-16	203328	7.107	1445052.1	-20.000
##	2011-03-22	-203328	7.140	-1451761.9	6689.824
##	2011-03-30	201070	7.220	1451725.4	-20.000
##	2011-04-05	-201070	7.750	-1558292.5	106547.100
##	2011-04-15	221060	7.049	1558251.9	-20.000
##	2011-04-21	-221060	7.416	-1639381.0	81109.020
##	2011-05-24	206622	7.934	1639338.9	-20.000
##	2011-05-30	-206622	7.852	-1622395.9	-16963.004
##	2011-06-10	212073	7.650	1622358.5	-20.000
##	2011-06-15	-212073	7.515	-1593728.6	-28649.855
##	2011-07-19	219637	7.256	1593686.1	-20.000
##	2011-07-25	-219637	7.263	-1595223.5	1517.459
##	2012-02-10	210446	7.580	1595180.7	-20.000
##	2012-02-16	-210446	7.312	-1538781.2	-56419.528
##	2012-02-23	200619	7.670	1538747.7	-20.000
##	2012-02-29	-200619	7.591	-1522898.8	-15868.901
##	2012-03-02	200139	7.609	1522857.7	-20.000
##	2012-03-05	-200139	7.530	-1507046.7	-15830.981
##	2012-03-15	197873	7.616	1507000.8	-20.000
##	2012-03-21	-197873	7.375	-1459313.4	-47707.393
##	2013-01-02	230534	6.330	1459280.2	-20.000
##	2013-01-07	-230534	6.400	-1475417.6	16117.380
##	2013-01-09	228033	6.470	1475373.5	-20.000
##	2013-01-15	-228033	6.642	-1514595.2	39201.676
##	2013-01-23	224146	6.757	1514554.5	-20.000
##	2013-01-29	-224146	6.498	-1456500.7	-58073.814
##	2013-01-31	219446	6.637	1456463.1	-20.000
##	2013-02-04	-219446	6.700	-1470288.2	13805.098
##	2013-02-15	230410	6.381	1470246.2	-20.000
##	2013-02-21	-230410	6.561	-1511720.0	41453.800
##	2013-02-22	231833	6.627	1536357.3	-20.000
##	2013-02-28	-231833	6.561	-1521056.3	-15320.978
##	2013-03-08	225454	6.637	1496338.2	-20.000
##	2013-03-14	-225454	6.559	-1478752.8	-17605.412
##	2013-03-19	226727	6.522	1478713.5	-20.000
##	2013-03-25	-226727	6.249	-1416817.0	-61916.471
##	2013-06-04	216302	6.550	1416778.1	-20.000
##	2013-06-05	-216302	6.540	-1414615.1	-2183.020
##	2013-07-04	221339	6.391	1414577.5	-20.000
##	2013-07-10	-221339	6.628	-1467034.9	52437.343
##	2013-07-17	210020	6.985	1466989.7	-20.000
##	2013-07-19	-210020	7.055	-1481691.1	14681.400
##	2013-07-22	210906	7.093	1495956.3	-20.000
##	2013-07-26	-210906	6.991	-1474443.8	-21532.412
##	2013-08-29	214469	6.808	1460105.0	-20.000
##	2013-09-04	-214469	7.165	-1536670.4	76545.433
##	2013-09-16	204611	7.510	1536628.6	-20.000
##	2013-09-17	-204611	7.452	-1524761.2	-11887.438
##	2013-10-01	203133	7.506	1524716.3	-20.000
##	2013-10-07	-203133	7.297	-1482261.5	-42474.797
##	2013-10-10	202739	7.311	1482224.8	-20.000
##	2013-10-14	-202739	7.302	-1480400.2	-1844.651

##	2013-10-15	204901	7.400	1516267.4	-20.000
##	2013-10-21	-204901	7.290	-1493728.3	-22559.110
##	2014-01-08	188587	7.730	1457777.5	-20.000
##	2014-01-14	-188587	7.430	-1401201.4	-56596.100
##	2014-02-05	187547	7.471	1401163.6	-20.000
##	2014-02-11	-187547	7.723	-1448425.5	47241.844
##	2014-02-21	186961	7.747	1448386.9	-20.000
##	2014-02-27	-186961	8.003	-1496248.9	47842.016
##	2014-03-04	185634	8.060	1496210.0	-20.000
##	2014-03-10	-185634	8.346	-1549301.4	53071.324
##	2014-03-17	193682	7.999	1549262.3	-20.000
##	2014-03-20	-193682	8.260	-1599813.3	50531.002
##	2014-04-09	189121	8.459	1599774.5	-20.000
##	2014-04-10	-189121	8.433	-1594857.4	-4937.146
##	2014-04-24	189363	8.422	1594815.2	-20.000
##	2014-04-25	-189363	8.323	-1576068.2	-18766.937
##	2014-04-29	185415	8.500	1576027.5	-20.000
##	2014-04-30	-185415	8.482	-1572690.0	-3357.470
##	2014-05-06	190647	8.249	1572647.1	-20.000
##	2014-05-12	-190647	8.789	-1675596.5	102929.380
##	2014-05-19	194606	8.610	1675557.7	-20.000
##	2014-05-23	-194606	8.646	-1682563.5	6985.816
##	2014-06-04	186367	9.028	1682521.3	-20.000
##	2014-06-09	-186367	9.106	-1697057.9	14516.626
##	2014-07-16	190462	8.910	1697016.4	-20.000
##	2014-07-22	-190462	9.333	-1777581.8	80545.426
##	2014-07-29	198011	8.977	1777544.7	-20.000
##	2014-08-04	-198011	8.214	-1626462.4	-151102.393
##	2014-08-21	186645	8.714	1626424.5	-20.000
##	2014-08-26	-186645	8.783	-1639303.0	12858.505
##	2014-09-17	185542	8.835	1639263.6	-20.000
##	2014-09-23	-185542	8.682	-1610875.6	-28407.926
##	2014-11-26	198110	8.131	1610832.4	-20.000
##	2014-12-02	-198110	7.890	-1563087.9	-47764.510
##	2014-12-10	182301	8.574	1563048.8	-20.000
##	2014-12-16	-182301	8.323	-1517291.2	-45777.551
##	2015-02-03	152075	9.977	1517252.3	-20.000
##	2015-02-04	-152075	9.915	-1507823.6	-9448.650
##	2015-02-18	150252	10.035	1507778.8	-20.000
##	2015-02-24	-150252	10.375	-1558864.5	51065.680
##	2015-03-27	143671	10.850	1558830.3	-20.000
##	2015-04-02	-143671	11.195	-1608396.8	49546.495
##	2015-05-04	149684	10.745	1608354.6	-20.000
##	2015-05-08	-149684	11.400	-1706397.6	98023.020
##	2015-05-27	144914	11.775	1706362.4	-20.000
##	2015-06-02	-144914	11.885	-1722302.9	15920.540
##	2015-06-19	150088	11.475	1722259.8	-20.000
##	2015-06-25	-150088	11.870	-1781544.6	59264.760
##	2015-08-05	175431	10.155	1781501.8	-20.000
##	2015-08-11	-175431	9.853	-1728521.6	-53000.162
##	2015-08-13	176592	9.788	1728482.5	-20.000
##	2015-08-19	-176592	9.337	-1648839.5	-79662.992
##	2015-09-14	168193	9.803	1648796.0	-20.000
##	2015-09-17	-168193	10.145	-1706318.0	57502.006

## 2015-10-14	160970	10.600	1706282.0	-20.000
## 2015-10-20	-160970	11.035	-1776303.9	70001.950
## 2015-12-04	126695	14.020	1776263.9	-20.000
## 2015-12-10	-126695	13.435	-1702147.3	-74136.575
## 2015-12-15	126363	13.470	1702109.6	-20.000
## 2015-12-18	-126363	13.320	-1683155.2	-18974.450
## 2016-01-05	127267	13.225	1683106.1	-20.000
## 2016-01-11	-127267	12.000	-1527204.0	-155922.075
## 2016-02-04	130083	11.740	1527174.4	-20.000
## 2016-02-10	-130083	10.500	-1365871.5	-161322.920
## 2016-03-09	119915	11.390	1365831.9	-20.000
## 2016-03-15	-119915	11.885	-1425189.8	59337.925
## 2016-04-25	112526	12.665	1425141.8	-20.000
## 2016-04-29	-112526	12.585	-1416139.7	-9022.080
## 2016-06-15	111724	12.675	1416101.7	-20.000
## 2016-06-21	-111724	13.085	-1461908.5	45786.840
## 2016-07-14	107333	13.620	1461875.5	-20.000
## 2016-07-19	-107333	13.770	-1477975.4	16079.950
## 2016-09-27	95597	15.460	1477929.6	-20.000
## 2016-10-04	-95597	15.985	-1528118.0	50168.425
## 2016-10-14	97237	15.715	1528079.5	-20.000
## 2016-10-20	-97237	15.990	-1554819.6	26720.175
## 2016-10-21	96905	16.180	1567922.9	-20.000
## 2016-10-27	-96905	16.280	-1577613.4	9670.500
## 2016-11-18	98640	15.860	1564430.4	-20.000
## 2016-11-23	-98640	16.050	-1583172.0	18721.600
## 2016-12-15	99038	15.985	1583122.4	-20.000
## 2016-12-21	-99038	16.640	-1647992.3	64849.890
## 2016-12-30	98887	16.665	1647951.9	-20.000
## 2017-01-05	-98887	16.275	-1609385.9	-38585.930
## 2017-01-24	98071	16.410	1609345.1	-20.000
## 2017-01-27	-98071	16.915	-1658871.0	49505.855
## 2017-02-01	96613	17.170	1658845.2	-20.000
## 2017-02-07	-96613	17.500	-1690727.5	31862.290
## 2017-02-10	98986	17.080	1690680.9	-20.000
## 2017-02-16	-98986	17.255	-1708003.4	17302.550
## 2017-03-01	100086	17.065	1707967.6	-20.000
## 2017-03-07	-100086	16.925	-1693955.6	-14032.040
## 2017-03-23	98857	17.135	1693914.7	-20.000
## 2017-03-29	-98857	19.030	-1881248.7	187314.015
## 2017-06-13	94628	19.880	1881204.6	-20.000
## 2017-06-19	-94628	20.020	-1894452.6	13227.920
## 2017-06-29	98667	19.200	1894406.4	-20.000
## 2017-07-05	-98667	18.660	-1841126.2	-53300.180
## 2017-07-19	95691	19.240	1841094.8	-20.000
## 2017-07-25	-95691	18.400	-1760714.4	-80400.440
## 2017-08-04	93777	18.775	1760663.2	-20.000
## 2017-08-10	-93777	19.100	-1791140.7	30457.525
## 2017-08-14	93677	19.120	1791104.2	-20.000
## 2017-08-15	-93677	19.040	-1783610.1	-7514.160
## 2017-08-22	94644	18.845	1783566.2	-20.000
## 2017-08-28	-94644	19.220	-1819057.7	35471.500
## 2018-01-02	78593	23.145	1819035.0	-20.000
## 2018-01-08	-78593	24.690	-1940461.2	121406.185

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## 2018-01-18    79200 24.500  1940400.0      -20.000
## 2018-01-24   -79200 23.980 -1899216.0     -41204.000
## 2018-03-05    87966 21.590  1899185.9      -20.000
## 2018-03-07   -87966 22.220 -1954604.5     55398.580
## 2018-03-26    87925 22.230  1954572.8      -20.000
## 2018-03-28   -87925 21.820 -1918523.5     -36069.250
## 2018-04-23    89690 21.390  1918469.1      -20.000
## 2018-04-27   -89690 21.550 -1932819.5    14330.400
## 2018-05-02    89522 21.590  1932780.0      -20.000
## 2018-05-08   -89522 23.570 -2110033.5    177233.560
## 2018-05-24    87661 24.070  2110000.3      -20.000
## 2018-05-30   -87661 23.840 -2089838.2     -20182.030
## 2018-06-20    85298 24.500  2089801.0      -20.000
## 2018-06-26   -85298 22.050 -1880820.9     -209000.100
## 2018-07-03    86832 21.660  1880781.1      -20.000
## 2018-07-09   -86832 21.830 -1895542.6    14741.440
## 2018-07-31    82954 22.850  1895498.9      -20.000
## 2018-08-06   -82954 22.280 -1848215.1    -47303.780
## 2018-08-20    86363 21.400  1848168.2      -20.000
## 2018-08-22   -86363 21.260 -1836077.4     -12110.820
##
## [1] "Transactions for the instrument: MRK.csv"
##           Quantity  Price   Value Net realized Profit
## 1999-12-31        0 0.000    0.0      0.000
## 2001-10-16     48171 20.759 999981.8     -20.000
## 2001-10-22    -48171 20.587 -991696.4    -8305.412
## 2003-06-02     66973 14.807 991669.2     -20.000
## 2003-06-04    -66973 13.469 -902059.3    -89629.874
## 2003-11-18     56075 16.086 902022.4     -20.000
## 2003-11-24    -56075 16.086 -902022.4     -20.000
## 2003-12-18     56261 16.032 901976.4     -20.000
## 2003-12-29    -56261 16.317 -918010.7    16014.385
## 2004-01-08     54726 16.774 917973.9     -20.000
## 2004-01-14    -54726 16.420 -898600.9    -19393.004
## 2004-02-13     47445 18.939 898560.9     -20.000
## 2004-02-19    -47445 18.437 -874743.5    -23837.390
## 2004-03-30     47179 18.540 874698.7     -20.000
## 2004-04-05    -47179 20.484 -966414.6    91695.976
## 2004-05-11     45685 21.153 966374.8     -20.000
## 2004-05-17    -45685 21.251 -970851.9    4457.130
## 2004-07-08     43203 22.471 970814.6     -20.000
## 2004-07-12    -43203 23.174 -1001186.3    30351.709
## 2004-07-28     44369 22.564 1001142.1     -20.000
## 2004-08-03    -44369 23.037 -1022128.7    20966.537
## 2004-08-10     44596 22.919 1022095.7     -20.000
## 2004-08-16    -44596 21.989 -980621.4    -41494.280
## 2004-09-24     45458 21.571 980574.5     -20.000
## 2004-09-30    -45458 22.648 -1029532.8    48938.266
## 2004-10-21     46209 22.279 1029490.3     -20.000
## 2004-10-27    -46209 21.394 -988595.3    -40914.965
## 2004-11-25     46251 21.374 988568.9     -20.000
## 2004-11-26    -46251 21.231 -981955.0    -6633.893
## 2005-01-14     40736 24.104 981900.5     -20.000
## 2005-01-20    -40736 25.181 -1025773.2    43852.672

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## 2005-02-14	40410	25.383	1025727.0	-20.000
## 2005-02-18	-40410	27.424	-1108203.8	82456.810
## 2005-02-24	39921	27.759	1108167.0	-20.000
## 2005-03-02	-39921	28.335	-1131161.5	22974.496
## 2005-03-15	39441	28.679	1131128.4	-20.000
## 2005-03-16	-39441	28.098	-1108213.2	-22935.221
## 2005-03-31	40818	27.149	1108167.9	-20.000
## 2005-04-06	-40818	30.046	-1226417.6	118229.746
## 2005-04-14	40877	30.002	1226391.8	-20.000
## 2005-04-20	-40877	30.819	-1259788.3	33376.509
## 2005-05-04	42681	29.515	1259729.7	-20.000
## 2005-05-10	-42681	30.991	-1322726.9	62977.156
## 2005-05-26	42680	30.991	1322695.9	-20.000
## 2005-05-30	-42680	30.868	-1317446.2	-5269.640
## 2005-06-13	42009	31.360	1317402.2	-20.000
## 2005-06-14	-42009	30.942	-1299842.5	-17579.762
## 2005-08-16	36724	35.394	1299809.3	-20.000
## 2005-08-22	-36724	35.094	-1288792.1	-11037.200
## 2005-08-30	37755	34.134	1288729.2	-20.000
## 2005-09-05	-37755	34.597	-1306209.7	17460.565
## 2005-10-31	39279	33.254	1306183.9	-20.000
## 2005-11-03	-39279	34.110	-1339806.7	33602.824
## 2005-12-22	38802	34.528	1339755.5	-20.000
## 2005-12-29	-38802	34.365	-1333430.7	-6344.726
## 2006-04-03	34053	39.157	1333413.3	-20.000
## 2006-04-07	-34053	37.863	-1289348.7	-44084.582
## 2006-04-11	34087	37.824	1289306.7	-20.000
## 2006-04-19	-34087	38.370	-1307918.2	18591.502
## 2006-05-02	31393	41.661	1307863.8	-20.000
## 2006-05-08	-31393	42.826	-1344436.6	36552.845
## 2006-05-19	33268	40.411	1344393.1	-20.000
## 2006-05-25	-33268	39.324	-1308230.8	-36182.316
## 2006-06-09	36241	36.097	1308191.4	-20.000
## 2006-06-12	-36241	35.207	-1275936.9	-32274.490
## 2006-09-06	33728	37.829	1275896.5	-20.000
## 2006-09-11	-33728	36.751	-1239537.7	-36378.784
## 2006-09-22	33374	37.140	1239510.4	-20.000
## 2006-09-28	-33374	40.214	-1342102.0	102571.676
## 2006-10-18	34171	39.275	1342066.0	-20.000
## 2006-10-24	-34171	40.042	-1368275.2	26189.157
## 2006-11-13	32908	41.577	1368215.9	-20.000
## 2006-11-17	-32908	42.236	-1389902.3	21666.372
## 2006-11-29	34314	40.505	1389888.6	-20.000
## 2006-12-05	-34314	40.396	-1386148.3	-3760.226
## 2006-12-18	34213	40.514	1386105.5	-20.000
## 2006-12-19	-34213	40.165	-1374165.1	-11960.337
## 2007-01-12	32041	42.886	1374110.3	-20.000
## 2007-01-18	-32041	43.269	-1386382.0	12251.703
## 2007-03-15	29750	46.600	1386350.0	-20.000
## 2007-03-21	-29750	46.720	-1389920.0	3550.000
## 2007-03-29	28660	48.495	1389866.7	-20.000
## 2007-04-04	-28660	49.735	-1425405.1	35518.400
## 2007-04-13	28883	49.350	1425376.1	-20.000
## 2007-04-19	-28883	47.760	-1379452.1	-45943.970

## 2007-05-02	27783	49.650	1379425.9	-20.000
## 2007-05-08	-27783	49.120	-1364701.0	-14744.990
## 2007-05-31	27041	50.465	1364624.1	-20.000
## 2007-06-06	-27041	51.340	-1388284.9	23640.875
## 2007-06-13	26834	51.735	1388257.0	-20.000
## 2007-06-19	-26834	51.255	-1375376.7	-12900.320
## 2007-07-31	30164	45.595	1375327.6	-20.000
## 2007-08-06	-30164	47.600	-1435806.4	60458.820
## 2007-08-13	30725	46.730	1435779.2	-20.000
## 2007-08-17	-30725	46.150	-1417958.8	-17840.500
## 2007-08-27	30767	46.085	1417897.2	-20.000
## 2007-08-31	-30767	47.070	-1448202.7	30285.495
## 2007-09-11	30014	48.250	1448175.5	-20.000
## 2007-09-17	-30014	48.790	-1464383.1	16187.560
## 2007-12-18	32940	44.455	1464347.7	-20.000
## 2007-12-27	-32940	44.000	-1449360.0	-15007.700
## 2008-04-29	31728	45.680	1449335.0	-20.000
## 2008-05-06	-31728	44.855	-1423159.4	-26195.600
## 2008-05-13	32417	43.900	1423106.3	-20.000
## 2008-05-19	-32417	44.045	-1427806.8	4680.465
## 2010-08-09	41028	34.800	1427774.4	-20.000
## 2010-08-13	-41028	33.900	-1390849.2	-36945.200
## 2010-08-23	41009	33.915	1390820.2	-20.000
## 2010-08-27	-41009	34.500	-1414810.5	23970.265
## 2011-04-26	41067	34.450	1414758.2	-20.000
## 2011-05-02	-41067	36.005	-1478617.3	63839.185
## 2011-05-06	39779	37.170	1478585.4	-20.000
## 2011-05-12	-39779	38.865	-1546010.8	67405.405
## 2011-05-24	41447	37.300	1545973.1	-20.000
## 2011-05-30	-41447	37.815	-1567318.3	21325.205
## 2011-06-23	42165	37.170	1567273.1	-20.000
## 2011-06-29	-42165	37.660	-1587933.9	20640.850
## 2011-07-13	41459	38.300	1587879.7	-20.000
## 2011-07-19	-41459	37.985	-1574820.1	-13079.585
## 2011-07-28	42011	37.485	1574782.3	-20.000
## 2011-08-03	-42011	35.680	-1498952.5	-75849.855
## 2011-11-02	44092	33.995	1498907.5	-20.000
## 2011-11-07	-44092	35.750	-1576289.0	77361.460
## 2011-11-22	44863	35.135	1576261.5	-20.000
## 2011-11-28	-44863	35.520	-1593533.8	17252.255
## 2011-12-13	43449	36.675	1593492.1	-20.000
## 2011-12-16	-43449	36.830	-1600226.7	6714.595
## 2011-12-20	42900	37.300	1600170.0	-20.000
## 2011-12-27	-42900	37.900	-1625910.0	25720.000
## 2012-01-10	41732	38.960	1625878.7	-20.000
## 2012-01-16	-41732	37.855	-1579764.9	-46133.860
## 2012-04-12	38530	41.000	1579730.0	-20.000
## 2012-04-13	-38530	40.485	-1559887.1	-19862.950
## 2012-05-21	41381	37.695	1559856.8	-20.000
## 2012-05-25	-41381	37.500	-1551787.5	-8089.295
## 2012-06-11	41019	37.830	1551748.8	-20.000
## 2012-06-15	-41019	38.085	-1562208.6	10439.845
## 2012-07-13	39887	39.165	1562174.4	-20.000
## 2012-07-19	-39887	41.250	-1645338.8	83144.395

## 2012-08-03	40227	40.900	1645284.3	-20.000
## 2012-08-09	-40227	40.570	-1632009.4	-13294.910
## 2012-08-23	36391	44.845	1631954.4	-20.000
## 2012-08-29	-36391	45.005	-1637777.0	5802.560
## 2012-10-09	33159	49.390	1637723.0	-20.000
## 2012-10-15	-33159	49.270	-1633743.9	-3999.080
## 2012-10-25	33389	48.930	1633723.8	-20.000
## 2012-10-31	-33389	49.300	-1646077.7	12333.930
## 2012-12-05	31977	51.475	1646016.1	-20.000
## 2012-12-11	-31977	52.475	-1677993.1	31957.000
## 2012-12-20	33493	50.100	1677999.3	-20.000
## 2012-12-27	-33493	49.725	-1665439.4	-12579.875
## 2012-12-28	33895	49.850	1689665.8	-20.000
## 2013-01-07	-33895	49.910	-1691699.4	2013.700
## 2013-01-16	32919	50.650	1667347.3	-20.000
## 2013-01-22	-32919	49.640	-1634099.2	-33268.190
## 2013-01-31	32057	50.975	1634105.6	-20.000
## 2013-02-04	-32057	51.225	-1642119.8	7994.250
## 2013-02-11	33254	49.380	1642082.5	-20.000
## 2013-02-15	-33254	51.675	-1718400.4	76297.930
## 2013-03-07	30630	56.100	1718343.0	-20.000
## 2013-03-13	-30630	56.725	-1737486.8	19123.750
## 2013-03-26	30138	57.650	1737455.7	-20.000
## 2013-04-03	-30138	59.850	-1803759.3	66283.600
## 2013-05-16	30124	59.875	1803674.5	-20.000
## 2013-05-21	-30124	59.400	-1789365.6	-14328.900
## 2013-05-31	29071	61.550	1789320.0	-20.000
## 2013-06-06	-29071	60.375	-1755161.6	-34178.425
## 2013-06-14	28714	61.125	1755143.2	-20.000
## 2013-06-20	-28714	61.550	-1767346.7	12183.450
## 2013-06-26	30340	58.250	1767305.0	-20.000
## 2013-06-28	-30340	58.825	-1784750.5	17425.500
## 2013-07-04	30482	58.550	1784721.1	-20.000
## 2013-07-05	-30482	58.200	-1774052.4	-10688.700
## 2013-07-17	29916	59.300	1774018.8	-20.000
## 2013-07-23	-29916	60.500	-1809918.0	35879.200
## 2013-09-13	32305	56.025	1809887.6	-20.000
## 2013-09-19	-32305	56.800	-1834924.0	25016.375
## 2013-10-08	32375	56.675	1834853.1	-20.000
## 2013-10-14	-32375	57.600	-1864800.0	29926.875
## 2013-11-14	29836	62.500	1864750.0	-20.000
## 2013-11-20	-29836	62.500	-1864750.0	-20.000
## 2013-12-05	29681	62.825	1864708.8	-20.000
## 2013-12-11	-29681	62.250	-1847642.2	-17086.575
## 2014-01-03	28305	65.275	1847608.9	-20.000
## 2014-01-09	-28305	65.225	-1846193.6	-1435.250
## 2014-01-14	28272	65.300	1846161.6	-20.000
## 2014-01-20	-28272	65.975	-1865245.2	19063.600
## 2014-02-06	32256	57.825	1865203.2	-20.000
## 2014-02-12	-32256	60.550	-1953100.8	87877.600
## 2014-03-04	31337	62.325	1953078.5	-20.000
## 2014-03-10	-31337	59.350	-1859850.9	-93247.575
## 2014-03-25	30804	60.375	1859791.5	-20.000
## 2014-03-31	-30804	61.125	-1882894.5	23083.000

## 2014-04-03	31032	60.675	1882866.6	-20.000
## 2014-04-09	-31032	58.400	-1812268.8	-70617.800
## 2014-04-14	31367	57.775	1812228.4	-20.000
## 2014-04-15	-31367	56.525	-1773019.7	-39228.750
## 2014-05-05	29354	60.400	1772981.6	-20.000
## 2014-05-09	-29354	61.275	-1798666.3	25664.750
## 2014-05-16	28917	62.200	1798637.4	-20.000
## 2014-05-22	-28917	62.675	-1812373.0	13715.575
## 2014-06-04	28574	63.425	1812305.9	-20.000
## 2014-06-10	-28574	64.325	-1838022.6	25696.600
## 2014-07-17	28382	64.760	1838018.3	-20.000
## 2014-07-18	-28382	64.120	-1819853.8	-18184.480
## 2014-08-05	28244	64.430	1819760.9	-20.000
## 2014-08-06	-28244	63.510	-1793776.4	-26004.480
## 2014-08-11	28550	62.830	1793796.5	-20.000
## 2014-08-15	-28550	64.100	-1830055.0	36238.500
## 2014-10-17	26789	68.310	1829956.6	-20.000
## 2014-10-23	-26789	71.280	-1909519.9	79543.330
## 2014-11-04	26491	72.080	1909471.3	-20.000
## 2014-11-10	-26491	71.880	-1904173.1	-5318.200
## 2014-11-13	26421	72.070	1904161.5	-20.000
## 2014-11-19	-26421	77.110	-2037323.3	133141.840
## 2014-12-16	26301	77.460	2037275.5	-20.000
## 2014-12-22	-26301	79.640	-2094611.6	57316.180
## 2015-03-24	20005	104.700	2094523.5	-20.000
## 2015-03-25	-20005	103.900	-2078519.5	-16024.000
## 2015-03-27	20141	103.200	2078551.2	-20.000
## 2015-04-02	-20141	105.650	-2127896.6	49325.450
## 2015-04-15	19187	110.900	2127838.3	-20.000
## 2015-04-21	-19187	106.500	-2043415.5	-84442.800
## 2015-06-10	21979	92.970	2043387.6	-20.000
## 2015-06-12	-21979	93.090	-2046025.1	2617.480
## 2015-06-16	22181	92.240	2045975.4	-20.000
## 2015-06-22	-22181	94.070	-2086566.7	40571.230
## 2015-07-07	22846	91.330	2086525.2	-20.000
## 2015-07-13	-22846	94.710	-2163744.7	77199.480
## 2015-09-02	25719	84.130	2163739.5	-20.000
## 2015-09-04	-25719	84.260	-2167082.9	3323.470
## 2015-09-08	25588	84.690	2167047.7	-20.000
## 2015-09-14	-25588	83.050	-2125083.4	-41984.320
## 2015-11-16	22891	92.830	2124971.5	-20.000
## 2015-11-20	-22891	95.470	-2185403.8	60412.240
## 2015-11-25	23192	94.230	2185382.2	-20.000
## 2015-12-01	-23192	96.170	-2230374.6	44972.480
## 2015-12-11	24968	89.330	2230391.4	-20.000
## 2015-12-17	-24968	89.010	-2222401.7	-8009.760
## 2015-12-21	24945	89.090	2222350.1	-20.000
## 2015-12-28	-24945	87.950	-2193912.8	-28457.300
## 2016-06-17	25342	86.570	2193856.9	-20.000
## 2016-06-23	-25342	90.090	-2283060.8	89183.840
## 2016-07-26	23265	98.130	2282994.4	-20.000
## 2016-08-01	-23265	99.480	-2314402.2	31387.750
## 2016-08-15	23244	99.570	2314405.1	-20.000
## 2016-08-19	-23244	96.840	-2250949.0	-63476.120

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## 2016-09-01    23726  94.870  2250885.6      -20.000
## 2016-09-07   -23726  96.300  -2284813.8     33908.180
## 2016-10-14    23755  96.180  2284755.9      -20.000
## 2016-10-20   -23755  99.250  -2357683.8     72907.850
## 2016-10-27    24549  96.040  2357686.0      -20.000
## 2016-10-28   -24549  94.430  -2318162.1    -39543.890
## 2016-11-07    25139  92.210  2318067.2      -20.000
## 2016-11-11   -25139  94.870  -2384936.9     66849.740
## 2016-12-27    23969  99.500  2384915.5      -20.000
## 2017-01-02   -23969  101.250  -2426861.2    41925.750
## 2017-01-13    23653  102.600  2426797.8      -20.000
## 2017-01-19   -23653  102.500  -2424432.5    -2385.300
## 2017-01-25    23757  102.050  2424401.9      -20.000
## 2017-01-31   -23757  101.650  -2414899.1    -9522.800
## 2017-02-15    23957  100.800  2414865.6      -20.000
## 2017-02-21   -23957  101.900  -2441218.3    26332.700
## 2017-04-24    23417  104.250  2441222.2      -20.000
## 2017-04-28   -23417  107.800  -2524352.6    83110.350
## 2017-07-10    24531  102.900  2524239.9      -20.000
## 2017-07-14   -24531  103.300  -2534052.3     9792.400
##
## [1] "Transactions for the instrument: WDI.csv"
##           Quantity  Price  Value Net realized Profit
## 1999-12-31        0  0.000    0.0       0.000
## 2006-01-19     395246  2.509  991672.2      -20.000
## 2006-01-25    -395246  2.470  -976257.6    -15434.594
## 2006-02-15     354731  2.752  976219.7      -20.000
## 2006-02-20    -354731  2.931  -1039716.6    63476.849
## 2006-08-04     292701  3.552  1039674.0      -20.000
## 2006-08-10    -292701  3.264  -955376.1    -84317.888
## 2006-10-12     230535  4.144  955337.0      -20.000
## 2006-10-18    -230535  4.128  -951648.5    -3708.560
## 2007-01-24    140937  6.752  951606.6      -20.000
## 2007-01-26   -140937  6.880  -969646.6    18019.936
## 2007-02-09    141755  6.840  969604.2      -20.000
## 2007-02-15   -141755  6.792  -962800.0    -6824.240
## 2007-03-01    147302  6.536  962765.9      -20.000
## 2007-03-07   -147302  6.200  -913272.4    -49513.472
## 2007-03-15    139382  6.552  913230.9      -20.000
## 2007-03-16   -139382  6.360  -886469.5    -26781.344
## 2007-03-29    137815  6.432  886426.1      -20.000
## 2007-04-04   -137815  6.992  -963602.5    77156.400
## 2007-05-04    122404  7.872  963564.3      -20.000
## 2007-05-10   -122404  7.360  -900893.4    -62690.848
## 2007-05-14    123744  7.280  900856.3      -20.000
## 2007-05-18   -123744  7.552  -934514.7    33638.368
## 2007-06-07    112750  8.288  934472.0      -20.000
## 2007-06-12   -112750  8.176  -921844.0    -12648.000
## 2007-06-22    113972  8.088  921805.5      -20.000
## 2007-06-25   -113972  7.952  -906305.3    -15520.192
## 2007-06-26    115679  8.000  925432.0      -20.000
## 2007-07-02   -115679  8.136  -941164.3    15712.344
## 2007-07-09    110176  8.368  921952.8      -20.000
## 2007-07-13   -110176  8.224  -906087.4    -15885.344

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##	2007-08-07	108587	8.344	906049.9	-20.000
##	2007-08-13	-108587	7.800	-846978.6	-59091.328
##	2007-08-27	103084	8.216	846938.1	-20.000
##	2007-08-31	-103084	8.120	-837042.1	-9916.064
##	2007-09-11	104625	8.000	837000.0	-20.000
##	2007-09-17	-104625	7.592	-794313.0	-42707.000
##	2007-10-23	85296	9.312	794276.4	-20.000
##	2007-10-29	-85296	9.280	-791546.9	-2749.472
##	2007-12-18	84490	9.368	791502.3	-20.000
##	2007-12-27	-84490	9.240	-780687.6	-10834.720
##	2008-01-17	97193	8.032	780654.2	-20.000
##	2008-01-23	-97193	7.208	-700567.1	-80107.032
##	2008-03-11	82609	8.480	700524.3	-20.000
##	2008-03-17	-82609	7.968	-658228.5	-42315.808
##	2008-03-25	77325	8.512	658190.4	-20.000
##	2008-03-31	-77325	8.880	-686646.0	28435.600
##	2008-04-11	73292	9.368	686599.5	-20.000
##	2008-04-17	-73292	10.208	-748164.7	61545.280
##	2008-05-12	67521	11.080	748132.7	-20.000
##	2008-05-15	-67521	11.248	-759476.2	11323.528
##	2008-06-20	83786	9.064	759436.3	-20.000
##	2008-06-26	-83786	6.200	-519473.2	-239983.104
##	2009-05-18	78702	6.600	519433.2	-20.000
##	2009-05-20	-78702	6.700	-527303.4	7850.200
##	2009-05-29	82385	6.400	527264.0	-20.000
##	2009-06-04	-82385	6.550	-539621.8	12337.750
##	2009-06-18	80775	6.680	539577.0	-20.000
##	2009-06-24	-80775	6.810	-550077.8	10480.750
##	2009-07-27	67572	8.140	550036.1	-20.000
##	2009-07-31	-67572	8.010	-541251.7	-8804.360
##	2009-10-05	69121	7.830	541217.4	-20.000
##	2009-10-09	-69121	8.100	-559880.1	18642.670
##	2009-10-14	67450	8.300	559835.0	-20.000
##	2009-10-20	-67450	8.610	-580744.5	20889.500
##	2009-10-29	68641	8.460	580702.9	-20.000
##	2009-11-04	-68641	8.570	-588253.4	7530.510
##	2009-11-27	68797	8.550	588214.4	-20.000
##	2009-12-02	-68797	8.490	-584086.5	-4147.820
##	2010-01-08	59294	9.850	584045.9	-20.000
##	2010-01-12	-59294	9.990	-592347.1	8281.160
##	2010-01-13	59145	10.100	597364.5	-20.000
##	2010-01-19	-59145	10.250	-606236.2	8851.750
##	2010-02-08	66808	8.998	601138.4	-20.000
##	2010-02-12	-66808	9.000	-601272.0	113.616
##	2010-02-22	65709	9.150	601237.3	-20.000
##	2010-02-26	-65709	8.831	-580276.2	-20981.171
##	2010-03-16	64406	9.009	580233.7	-20.000
##	2010-03-22	-64406	8.020	-516536.1	-63717.534
##	2010-04-29	61495	8.399	516496.5	-20.000
##	2010-05-05	-61495	8.420	-517787.9	1271.395
##	2010-05-10	62080	8.340	517747.2	-20.000
##	2010-05-11	-62080	8.250	-512160.0	-5607.200
##	2010-05-26	64103	7.989	512118.9	-20.000
##	2010-06-01	-64103	8.320	-533337.0	21198.093

## 2010-06-08	65275	8.170	533296.8	-20.000
## 2010-06-14	-65275	8.010	-522852.8	-10464.000
## 2010-06-16	65352	8.000	522816.0	-20.000
## 2010-06-17	-65352	7.760	-507131.5	-15704.480
## 2010-10-06	50009	10.140	507091.3	-20.000
## 2010-10-12	-50009	9.829	-491538.5	-15572.799
## 2010-11-18	46720	10.520	491494.4	-20.000
## 2010-11-24	-46720	10.380	-484953.6	-6560.800
## 2010-12-09	44900	10.800	484920.0	-20.000
## 2010-12-15	-44900	10.375	-465837.5	-19102.500
## 2010-12-22	44745	10.410	465795.5	-20.000
## 2010-12-29	-44745	10.130	-453266.9	-12548.600
## 2011-01-06	43205	10.490	453220.5	-20.000
## 2011-01-10	-43205	10.450	-451492.2	-1748.200
## 2011-02-24	38735	11.655	451456.4	-20.000
## 2011-03-02	-38735	11.930	-462108.5	10632.125
## 2011-04-27	37264	12.400	462073.6	-20.000
## 2011-05-03	-37264	12.350	-460210.4	-1883.200
## 2011-06-09	38915	11.825	460169.9	-20.000
## 2011-06-10	-38915	11.600	-451414.0	-8775.875
## 2011-07-13	35569	12.690	451370.6	-20.000
## 2011-07-15	-35569	12.605	-448347.2	-3043.365
## 2011-07-20	36403	12.315	448302.9	-20.000
## 2011-07-21	-36403	12.155	-442478.5	-5844.480
## 2011-08-17	39806	11.115	442443.7	-20.000
## 2011-08-23	-39806	11.370	-452594.2	10130.530
## 2011-09-13	40515	11.170	452552.5	-20.000
## 2011-09-19	-40515	11.425	-462883.9	10311.325
## 2011-10-04	40300	11.485	462845.5	-20.000
## 2011-10-10	-40300	11.500	-463450.0	584.500
## 2011-11-16	39726	11.665	463403.8	-20.000
## 2011-11-21	-39726	11.950	-474725.7	11301.910
## 2011-11-24	40365	11.760	474692.4	-20.000
## 2011-11-30	-40365	12.280	-495682.2	20969.800
## 2011-12-13	41166	12.040	495638.6	-20.000
## 2011-12-19	-41166	12.055	-496256.1	597.490
## 2012-01-12	37578	13.205	496217.5	-20.000
## 2012-01-13	-37578	13.070	-491144.5	-5093.030
## 2012-02-08	35600	13.795	491102.0	-20.000
## 2012-02-14	-35600	14.520	-516912.0	25790.000
## 2012-03-30	36145	14.300	516873.5	-20.000
## 2012-04-03	-36145	14.220	-513981.9	-2911.600
## 2012-04-05	35990	14.280	513937.2	-20.000
## 2012-04-13	-35990	14.350	-516456.5	2499.300
## 2012-05-21	37422	13.800	516423.6	-20.000
## 2012-05-23	-37422	13.795	-516236.5	-207.110
## 2012-07-10	33036	15.625	516187.5	-20.000
## 2012-07-16	-33036	16.000	-528576.0	12368.500
## 2012-08-03	33096	15.970	528543.1	-20.000
## 2012-08-09	-33096	16.030	-530528.9	1965.760
## 2012-08-14	32645	16.250	530481.2	-20.000
## 2012-08-20	-32645	16.615	-542396.7	11895.425
## 2012-08-31	31875	17.015	542353.1	-20.000
## 2012-09-06	-31875	17.320	-552075.0	9701.875

## 2012-09-27	32105	17.195	552045.5	-20.000
## 2012-10-03	-32105	17.980	-577247.9	25182.425
## 2012-10-24	32657	17.675	577212.5	-20.000
## 2012-10-30	-32657	17.785	-580804.7	3572.270
## 2012-12-27	31589	18.385	580763.8	-20.000
## 2013-01-04	-31589	18.705	-590872.2	10088.480
## 2013-01-08	31444	18.790	590832.8	-20.000
## 2013-01-14	-31444	18.400	-578569.6	-12283.160
## 2013-02-05	33220	17.415	578526.3	-20.000
## 2013-02-11	-33220	18.255	-606431.1	27884.800
## 2013-02-22	31748	19.100	606386.8	-20.000
## 2013-02-26	-31748	19.600	-622260.8	15854.000
## 2013-02-27	31891	19.895	634471.4	-20.000
## 2013-03-05	-31891	20.385	-650098.0	15606.590
## 2013-04-17	31906	19.990	637800.9	-20.000
## 2013-04-22	-31906	20.730	-661411.4	23590.440
## 2013-04-29	31759	20.825	661381.2	-20.000
## 2013-05-06	-31759	20.280	-644072.5	-17328.655
## 2013-05-24	29549	21.795	644020.5	-20.000
## 2013-05-30	-29549	22.250	-657465.2	13424.795
## 2013-08-05	28240	23.280	657427.2	-20.000
## 2013-08-09	-28240	22.725	-641754.0	-15693.200
## 2013-08-29	27660	23.200	641712.0	-20.000
## 2013-09-04	-27660	25.000	-691500.0	49768.000
## 2013-10-10	27111	25.505	691466.1	-20.000
## 2013-10-16	-27111	26.430	-716543.7	25057.675
## 2013-11-25	26459	27.080	716509.7	-20.000
## 2013-11-29	-26459	27.545	-728813.2	12283.435
## 2014-01-10	25226	28.890	728779.1	-20.000
## 2014-01-16	-25226	30.250	-763086.5	34287.360
## 2014-03-11	23007	33.165	763027.2	-20.000
## 2014-03-12	-23007	32.845	-755664.9	-7382.240
## 2014-03-17	24273	31.130	755618.5	-20.000
## 2014-03-21	-24273	31.115	-755254.4	-384.095
## 2014-04-09	25908	29.150	755218.2	-20.000
## 2014-04-15	-25908	28.600	-740968.8	-14269.400
## 2014-04-29	24567	30.160	740940.7	-20.000
## 2014-05-05	-24567	30.090	-739221.0	-1739.690
## 2014-06-12	22536	32.800	739180.8	-20.000
## 2014-06-13	-22536	32.365	-729377.6	-9823.160
## 2014-06-17	22587	32.290	729334.2	-20.000
## 2014-06-23	-22587	31.160	-703810.9	-25543.310
## 2014-07-29	23052	30.530	703777.6	-20.000
## 2014-07-30	-23052	29.880	-688793.8	-15003.800
## 2014-09-10	23787	28.955	688752.6	-20.000
## 2014-09-16	-23787	28.560	-679356.7	-9415.865
## 2014-10-06	23027	29.500	679296.5	-20.000
## 2014-10-10	-23027	29.030	-668473.8	-10842.690
## 2014-10-17	23691	28.215	668441.6	-20.000
## 2014-10-23	-23691	29.145	-690474.2	22012.630
## 2014-10-31	24120	28.625	690435.0	-20.000
## 2014-11-06	-24120	28.645	-690917.4	462.400
## 2014-11-13	23231	29.740	690889.9	-20.000
## 2014-11-19	-23231	30.570	-710171.7	19261.730

## 2015-01-07	19800	35.865	710127.0	-20.000
## 2015-01-13	-19800	37.875	-749925.0	39778.000
## 2015-02-03	18846	39.790	749882.3	-20.000
## 2015-02-06	-18846	40.255	-758645.7	8743.390
## 2015-02-10	18696	40.575	758590.2	-20.000
## 2015-02-16	-18696	40.495	-757094.5	-1515.680
## 2015-03-27	19099	39.640	757084.4	-20.000
## 2015-04-02	-19099	39.640	-757084.4	-20.000
## 2015-04-09	18862	40.135	757026.4	-20.000
## 2015-04-15	-18862	41.560	-783904.7	26858.350
## 2015-04-20	19121	40.995	783865.4	-20.000
## 2015-04-22	-19121	40.900	-782048.9	-1836.495
## 2015-08-13	21573	36.250	782021.2	-20.000
## 2015-08-19	-21573	39.000	-841347.0	59305.750
## 2015-08-25	23259	36.170	841278.0	-20.000
## 2015-08-26	-23259	35.835	-833486.3	-7811.765
## 2015-08-27	23493	36.835	865364.7	-20.000
## 2015-09-01	-23493	36.365	-854322.9	-11061.710
## 2015-09-07	22522	36.515	822390.8	-20.000
## 2015-09-11	-22522	36.890	-830836.6	8425.750
## 2015-09-23	20544	40.440	830799.4	-20.000
## 2015-09-29	-20544	41.480	-852165.1	21345.760
## 2015-12-02	17752	48.000	852096.0	-20.000
## 2015-12-03	-17752	46.655	-828219.6	-23896.440
## 2015-12-07	18138	45.660	828181.1	-20.000
## 2015-12-08	-18138	45.350	-822558.3	-5642.780
## 2016-01-05	17934	45.865	822542.9	-20.000
## 2016-01-11	-17934	45.225	-811065.2	-11497.760
## 2016-02-10	19880	40.795	811004.6	-20.000
## 2016-02-11	-19880	39.850	-792218.0	-18806.600
## 2016-06-15	20365	38.900	792198.5	-20.000
## 2016-06-16	-20365	38.415	-782321.5	-9897.025
## 2016-06-17	20328	38.940	791572.3	-20.000
## 2016-06-21	-20328	39.610	-805192.1	13599.760
## 2016-07-07	20565	38.700	795865.5	-20.000
## 2016-07-12	-20565	39.300	-808204.5	12319.000
## 2016-07-18	20356	39.700	808133.2	-20.000
## 2016-07-22	-20356	41.000	-834596.0	26442.800
## 2016-09-13	18389	45.385	834584.8	-20.000
## 2016-09-19	-18389	44.925	-826125.8	-8478.940
## 2016-09-28	17811	46.380	826074.2	-20.000
## 2016-10-05	-17811	46.050	-820196.5	-5897.630
## 2016-10-14	18657	43.960	820161.7	-20.000
## 2016-10-20	-18657	43.770	-816616.9	-3564.830
## 2016-11-03	19507	41.860	816563.0	-20.000
## 2016-11-09	-19507	42.980	-838410.9	21827.840
## 2017-01-09	19680	42.600	838368.0	-20.000
## 2017-01-10	-19680	42.300	-832464.0	-5924.000
## 2017-01-16	19939	41.750	832453.2	-20.000
## 2017-01-20	-19939	43.875	-874823.6	42350.375
## 2017-04-12	16341	53.530	874733.7	-20.000
## 2017-04-20	-16341	52.620	-859863.4	-14890.310
## 2017-06-22	14248	60.350	859866.8	-20.000
## 2017-06-28	-14248	56.730	-808289.0	-51597.760

## 2017-07-20	12627	64.010	808254.3	-20.000
## 2017-07-21	-12627	63.300	-799289.1	-8985.170
## 2017-08-02	12277	65.100	799232.7	-20.000
## 2017-08-08	-12277	66.320	-814210.6	14957.940
## 2017-08-30	11740	69.350	814169.0	-20.000
## 2017-09-05	-11740	71.570	-840231.8	26042.800
## 2017-11-09	10063	83.490	840159.9	-20.000
## 2017-11-15	-10063	83.400	-839254.2	-925.670
## 2017-11-16	9994	84.310	842594.1	-20.000
## 2017-11-22	-9994	87.410	-873575.5	30961.400
## 2018-01-11	8307	104.750	870158.2	-20.000
## 2018-01-17	-8307	105.150	-873481.1	3302.800
## 2018-02-07	9558	91.380	873410.0	-20.000
## 2018-02-08	-9558	90.360	-863660.9	-9769.160
## 2018-02-14	9327	92.600	863680.2	-20.000
## 2018-02-19	-9327	97.800	-912180.6	48480.400
## 2018-03-05	9710	93.940	912157.4	-20.000
## 2018-03-07	-9710	94.140	-914099.4	1922.000
## 2018-03-20	9059	100.900	914053.1	-20.000
## 2018-03-26	-9059	94.300	-854263.7	-59809.400
## 2018-03-29	8976	95.160	854156.2	-20.000
## 2018-04-03	-8976	94.220	-845718.7	-8457.440
## 2018-04-04	9050	95.140	861017.0	-20.000
## 2018-04-10	-9050	102.650	-928982.5	67945.500
## 2018-04-26	8363	109.250	913657.8	-20.000
## 2018-05-03	-8363	117.000	-978471.0	64793.250
## 2018-06-20	6678	146.500	978327.0	-20.000
## 2018-06-21	-6678	145.600	-972316.8	-6030.200
## 2018-06-26	6610	147.100	972331.0	-20.000
## 2018-07-02	-6610	135.750	-897307.5	-75043.500
## 2018-07-20	5757	155.850	897228.4	-20.000
## 2018-07-25	-5757	158.450	-912196.6	14948.200
## 2018-08-01	5636	161.850	912186.6	-20.000
## 2018-08-07	-5636	163.700	-922613.2	10406.600
## 2018-08-16	5384	171.350	922548.4	-20.000
## 2018-08-21	-5384	181.550	-977465.2	54896.800
## 2018-09-14	5172	189.000	977508.0	-20.000
## 2018-09-20	-5172	176.200	-911306.4	-66221.600
## 2018-09-28	4774	190.850	911117.9	-20.000
## 2018-10-02	-4774	188.000	-897512.0	-13625.900

Step 3: Visualize all transactions, profit and drawdown

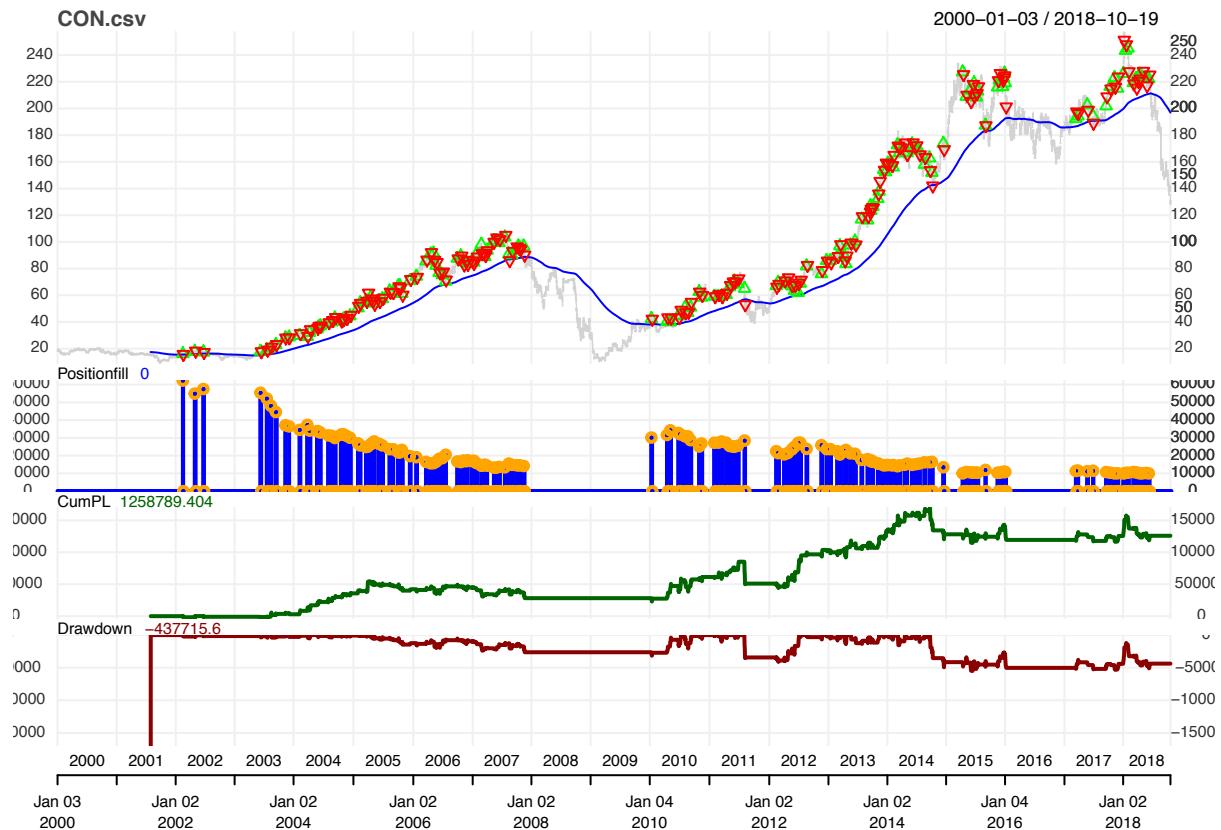
The following graphs show the combined view of the performance of the Smash Day trading system. It visualizes the trades (buy-transactions are visualized in green and sell-transactions are visualized in red). Moreover, the size of the blue squares indicates the size of the position (height) and the holding duration of the position (width). The green line shows the cumulative net profit curve, while the red line indicates the drawdown on each day compared to the last reached high. The first look on the graph shows us, that trades are only performed above the EMA line. Moreover, we see the cumulative profit / loss and drawdowns. The time series can be used for further investigation of the strategy.

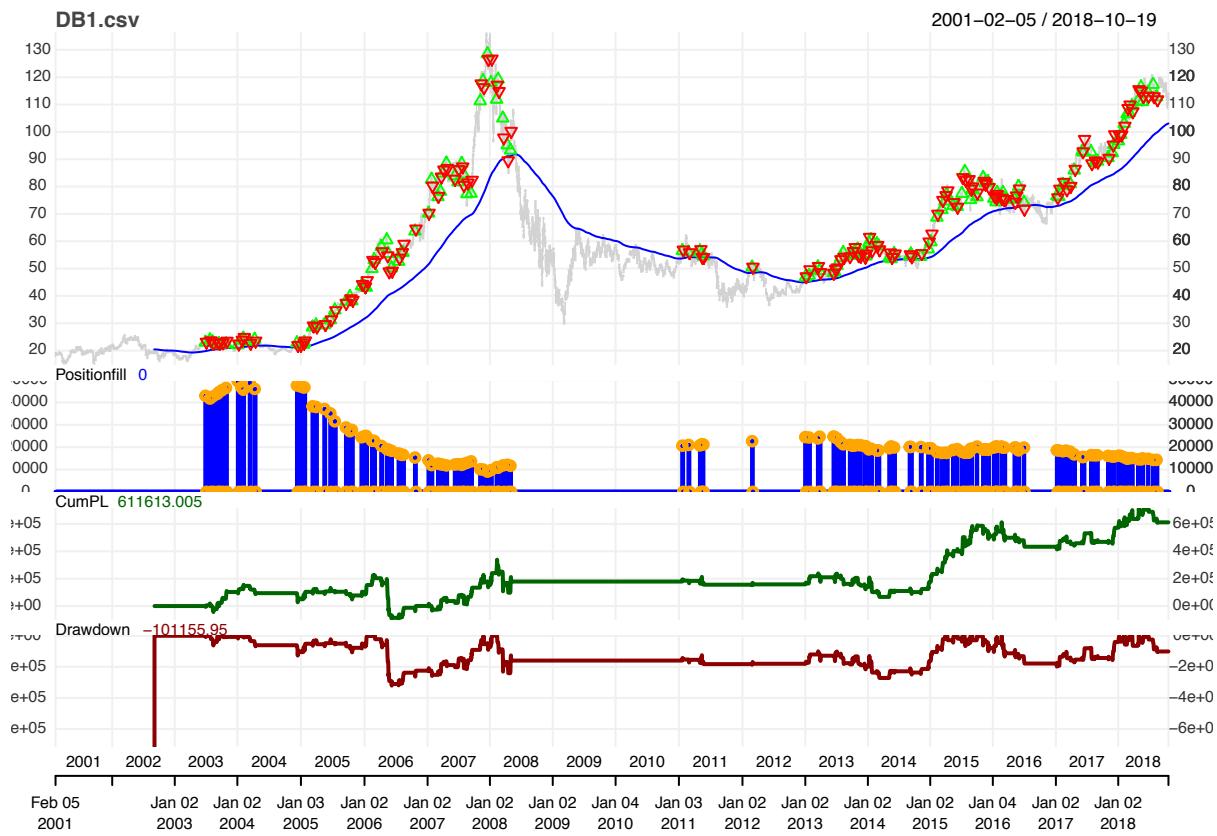
```
# Plot graph with indicators for transaction
for (instrument in instrumentlist){
  chart.Posn(portfolioname,
    Symbol=instrument,
```

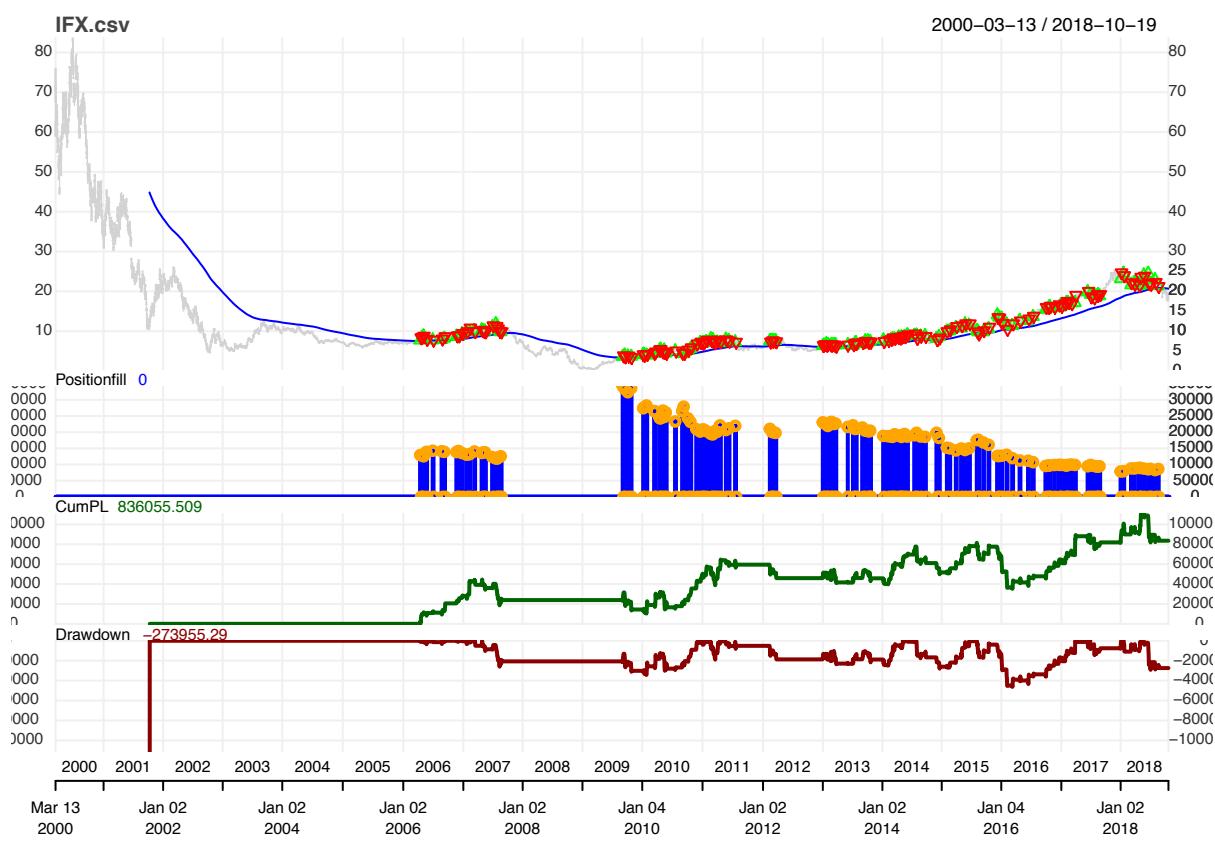
```

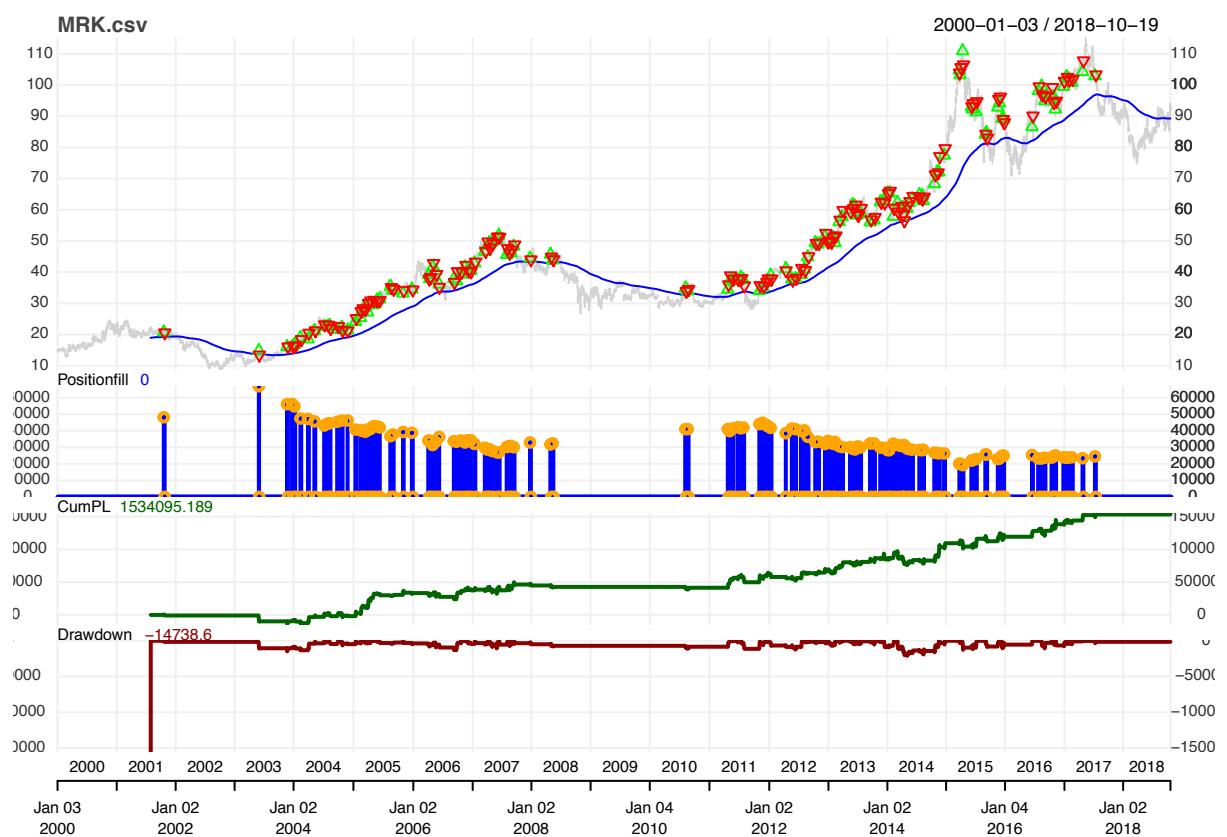
        type='candlesticks',
        theme=myTheme,
        subset=daterange,
        TA=addEMAStrong)
}

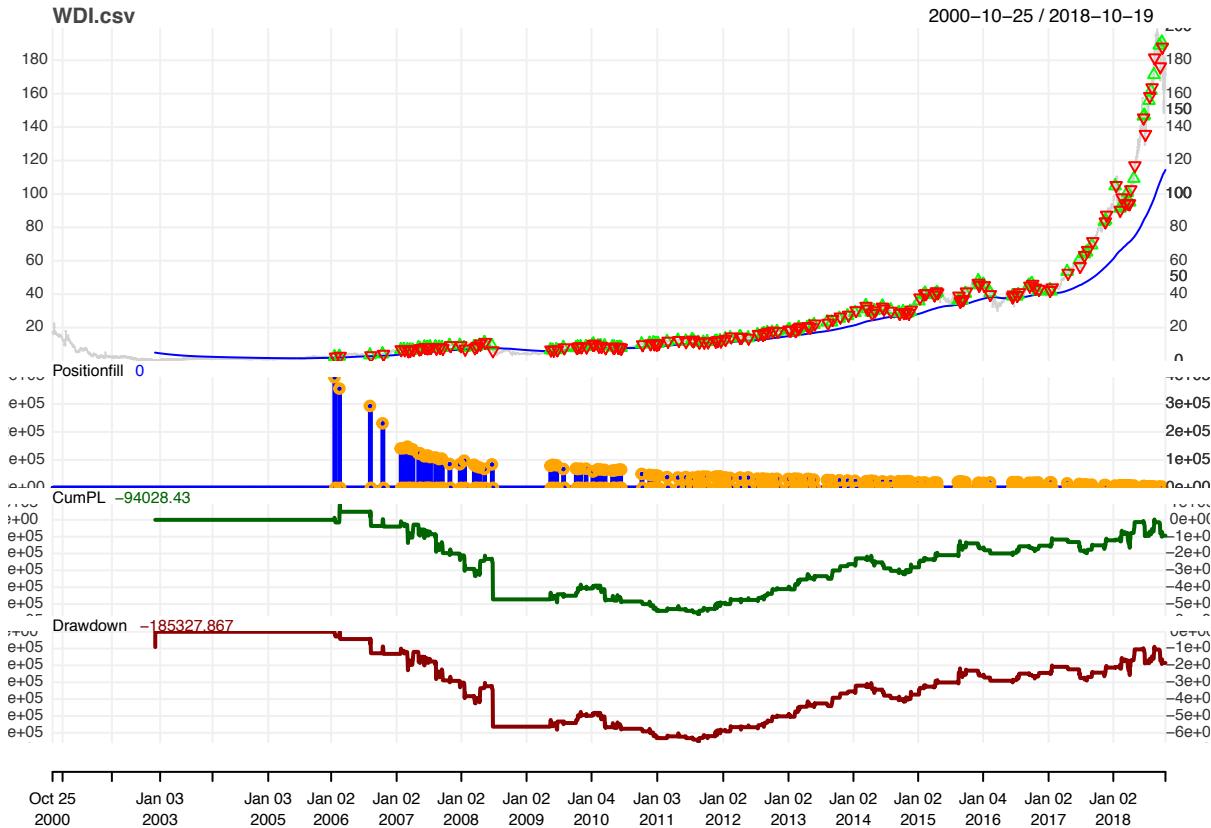
```











Step 4: Performance Statistics

To analyze the results of our strategy appropriately we need to create some statistical measures which indicates how well the strategy performs. The following table summarizes some important trading statistics for all instruments. This statistic is just an excerpt of the available statistics which can be calculated and displayed. It is printed here as it can be assumed that they are interesting for investors to rate the trading strategy.

```
library(PerformanceAnalytics)
# Get returns for the account
rets <- PortfReturns(Account=accountname)
rownames(rets) <- NULL
tstats <- tradeStats(Portfolio=portfolioname, Symbols=instrumentlist)
for (i in 1:nrow(tstats)) {
  trades.tab <- cbind(
    c("Trades", "Win Percent", "Loss Percent", "W/L Ratio"),
    c(tstats[i, "Num.Trades"],
      round(tstats[i, "Percent.Positive"], 2),
      round(tstats[i, "Percent.Negative"], 2),
      round((tstats[i, "Percent.Positive"] / tstats[i, "Percent.Negative"]), 2)))
  trades1 <- trades.tab
  rownames(trades1) <- c("Trades",
    "Win Percent",
    "Loss Percent",
    "W/L Ratio")
  trades1 <- trades1[, 2]
```

```

print(row.names(tstats[i,]))
print(trades1)
writeLines("")

## [1] "CON.csv"
##      Trades Win Percent Loss Percent      W/L Ratio
##      "161"    "53.42"     "45.96"      "1.16"
##
## [1] "DB1.csv"
##      Trades Win Percent Loss Percent      W/L Ratio
##      "144"    "51.39"     "48.61"      "1.06"
##
## [1] "IFX.csv"
##      Trades Win Percent Loss Percent      W/L Ratio
##      "137"    "57.66"     "41.61"      "1.39"
##
## [1] "MRK.csv"
##      Trades Win Percent Loss Percent      W/L Ratio
##      "133"    "57.89"     "40.6"       "1.43"
##
## [1] "WDI.csv"
##      Trades Win Percent Loss Percent      W/L Ratio
##      "143"    "48.25"     "51.05"      "0.95"

```

Step 5: Portfolio statistics for all instruments

The following statistics are broken down for each instrument. The cumulative return, annualized return and the sharp ratio. Moreover, some risk metrics are also shown to make sure that both, the return and the risk can be evaluated.

```

## Performance Metrics

##                                     CON        DB1        IFX        MRK
## Cumulative Return      1.50344313 0.62912057 0.81438008 2.96207267
## Annualized Return      0.05425406 0.02849676 0.03489417 0.08249175
## Annualized Sharp Ratio 0.27422155 0.23947173 0.20936197 0.61055987
## Calmar Ratio          0.11852273 0.10111824 0.09046856 0.42114076
##                                     WDI
## Cumulative Return      -0.17294079
## Annualized Return      -0.01087249
## Annualized Sharp Ratio -0.10583818
## Calmar Ratio          -0.02116969

## Risk Metrics

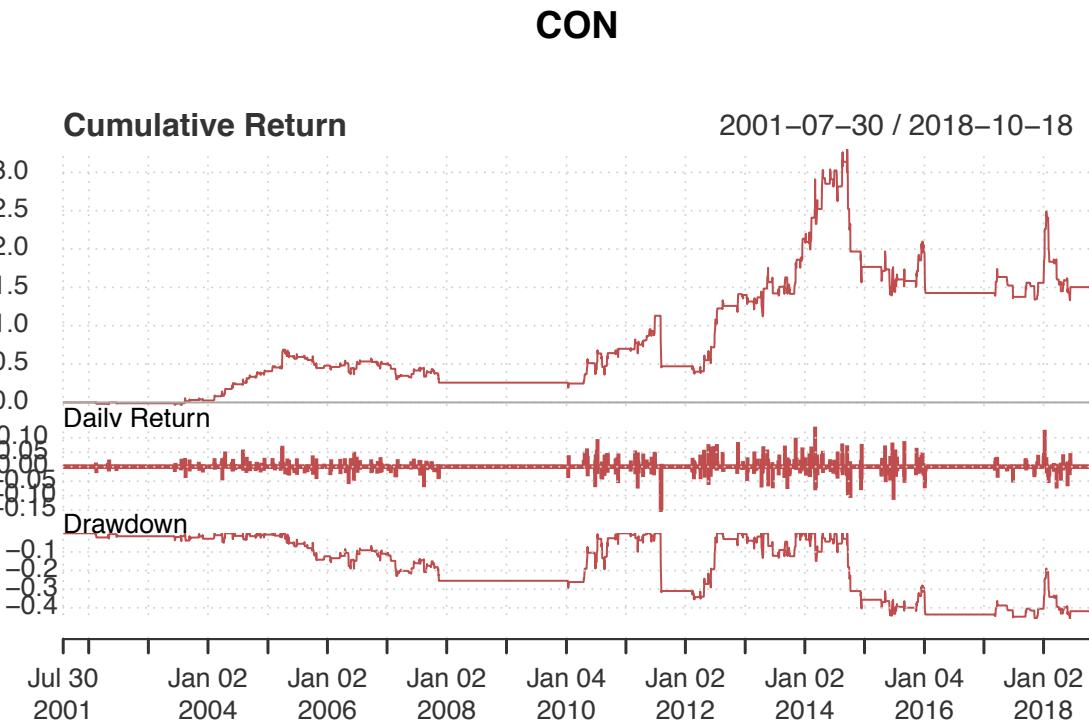
##                                     CON        DB1        IFX        MRK
## Annualized StdDev  0.197847560 0.11899843 0.166669079 0.135108374
## Max Drawdown       0.457752417 0.28181619 0.385704904 0.195876912
## Value-at-Risk       -0.009680258 -0.00509477 -0.007047275 -0.003704127
## Conditional VaR    -0.030418025 -0.01784863 -0.025935541 -0.019273435
##                                     WDI
## Annualized StdDev  0.102727533
## Max Drawdown       0.513587835
## Value-at-Risk       -0.003806944
## Conditional VaR    -0.014288509

```

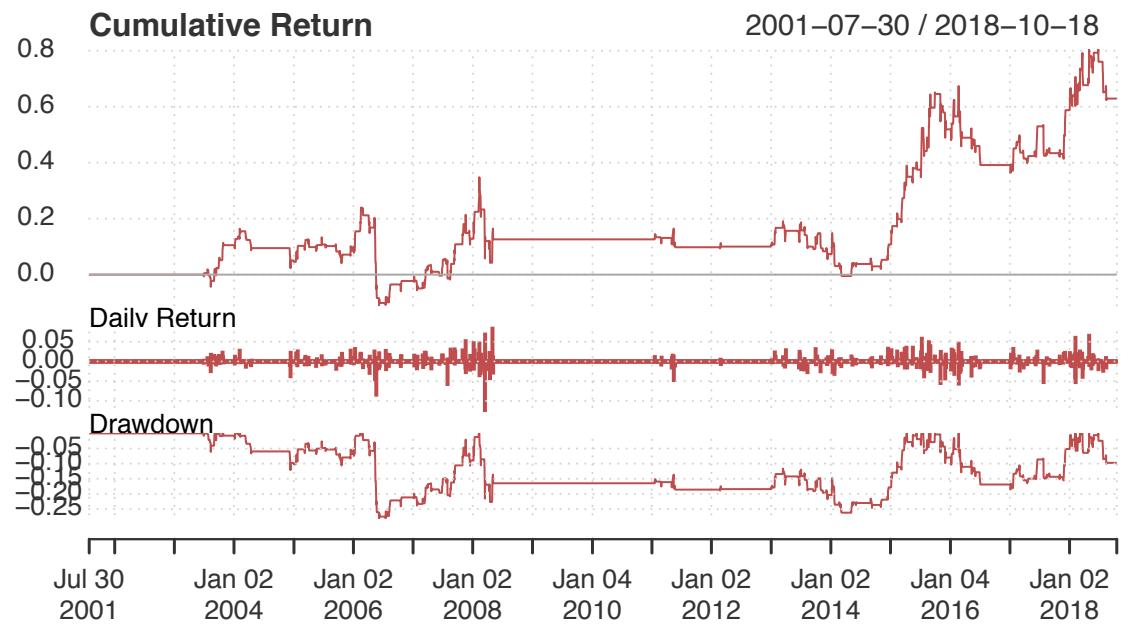
Step 6: Visualize returns of the trading strategy for every instrument

After performing the strategy, we have full access to the returns for each and every instrument which was tested. The following plots visualize the cumulative return, the daily return and the drawdown for each instrument. This allows a good first overview of the performance of the strategy for the instruments used.

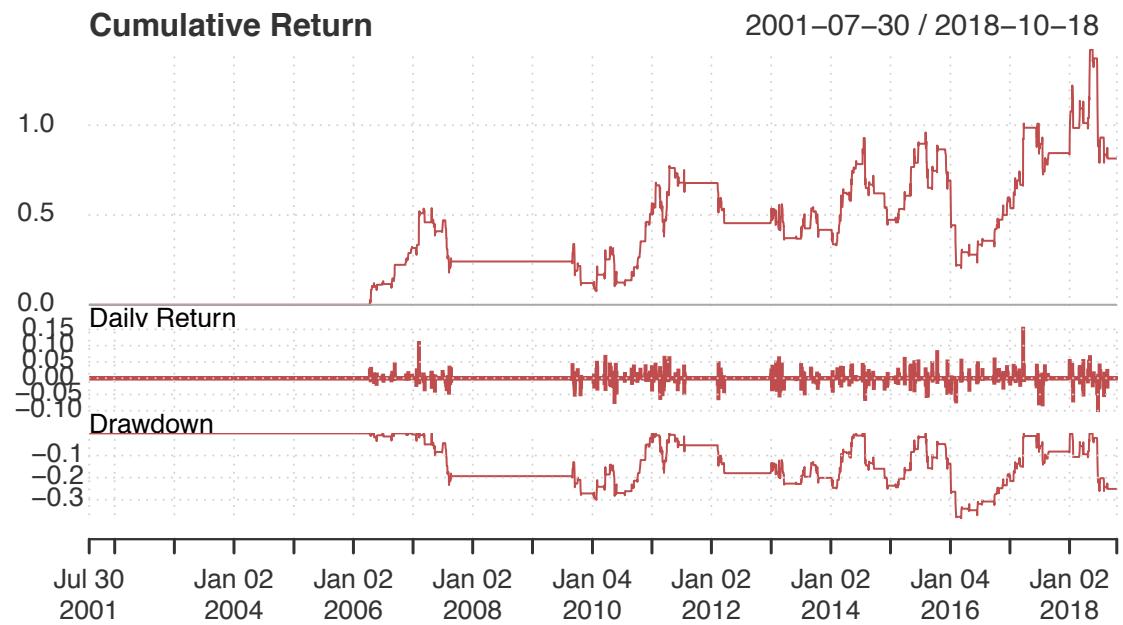
```
for (i in 1:ncol(rets)){
  charts.PerformanceSummary(rets[,i],
    colorset=rainbow12equal,
    lwd=1,
    main=substr(colnames(rets[,i]),1,3))
}
```



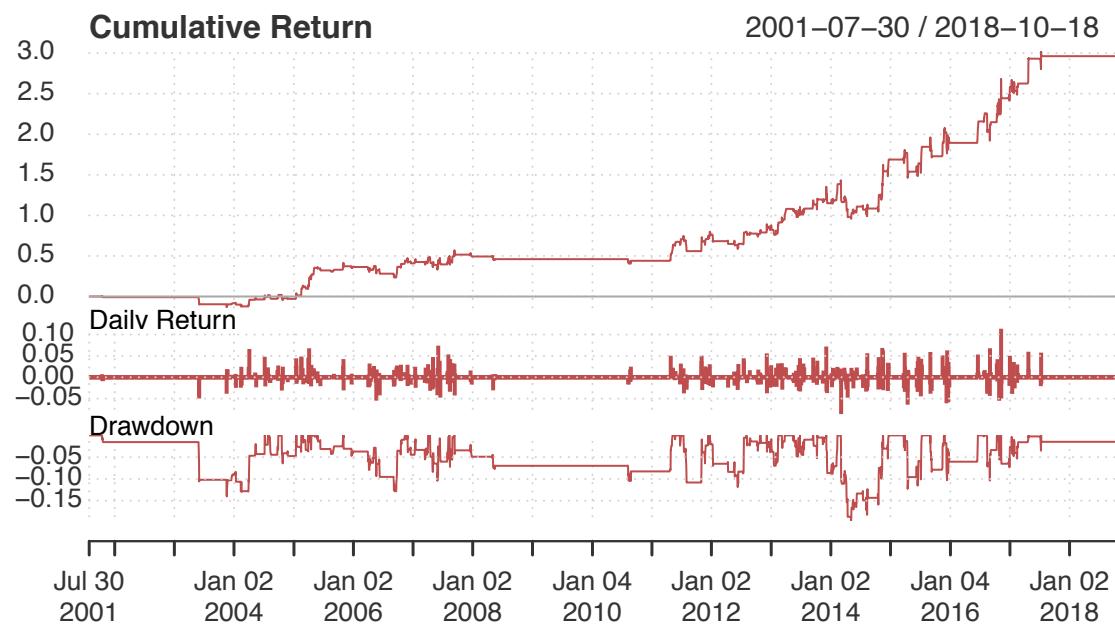
DB1



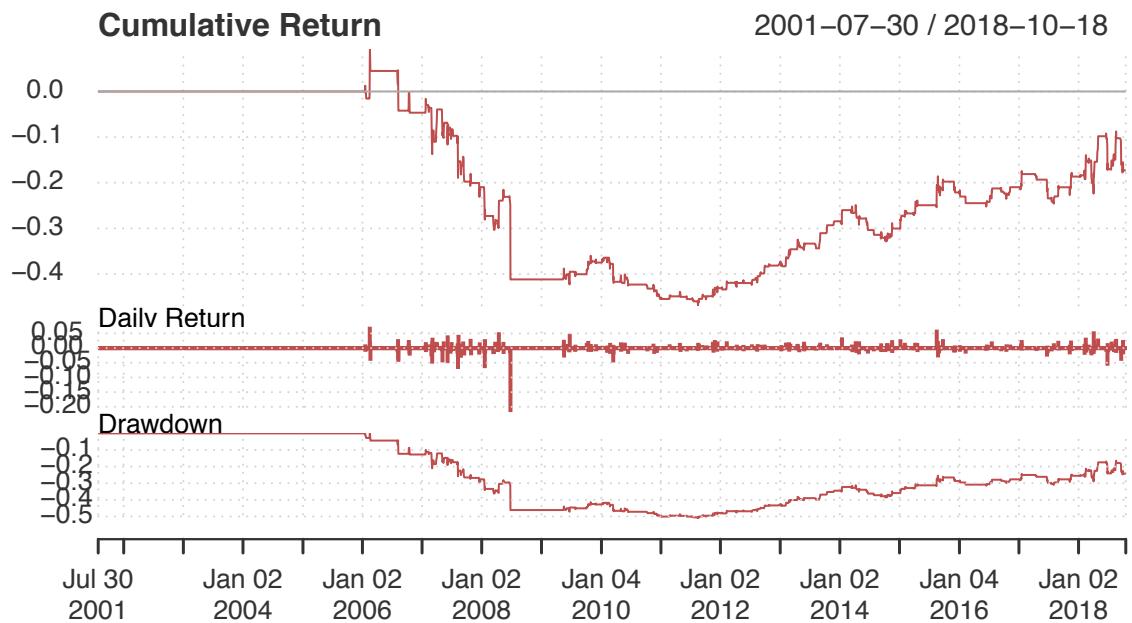
IFX



MRK



WDI



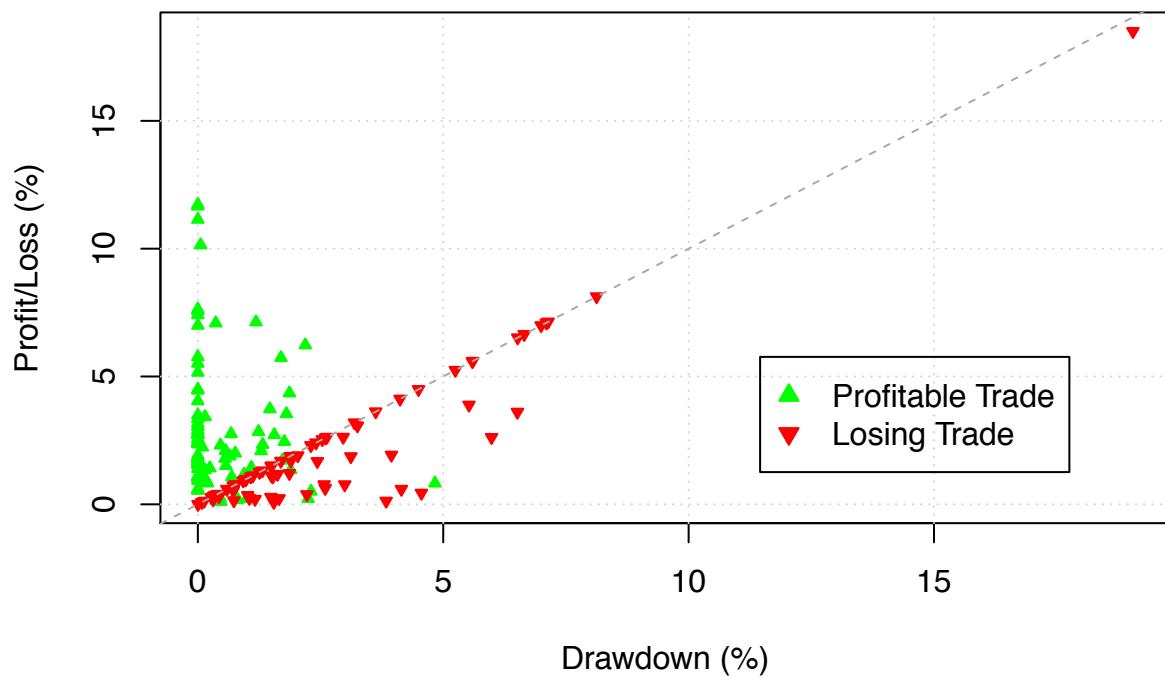
Step 7: Could we have performed better or even worse? MAE / MFE

The efficiency of a strategy is also dependent on the question whether we could have performed better or worse. This can be shown with the maximum adverse excursion and the maximum favorable excursion. The Maximum Adverse excursion shows how much we could have lost at most during the trade, while the maximum favorable excursion shows how much we could have earned more than we did. In the MFE case we want all trades to be as close to the diagonal line as possible. Every movement to the bottom right sight can be interpreted as a not realized opportunity to earn higher returns.

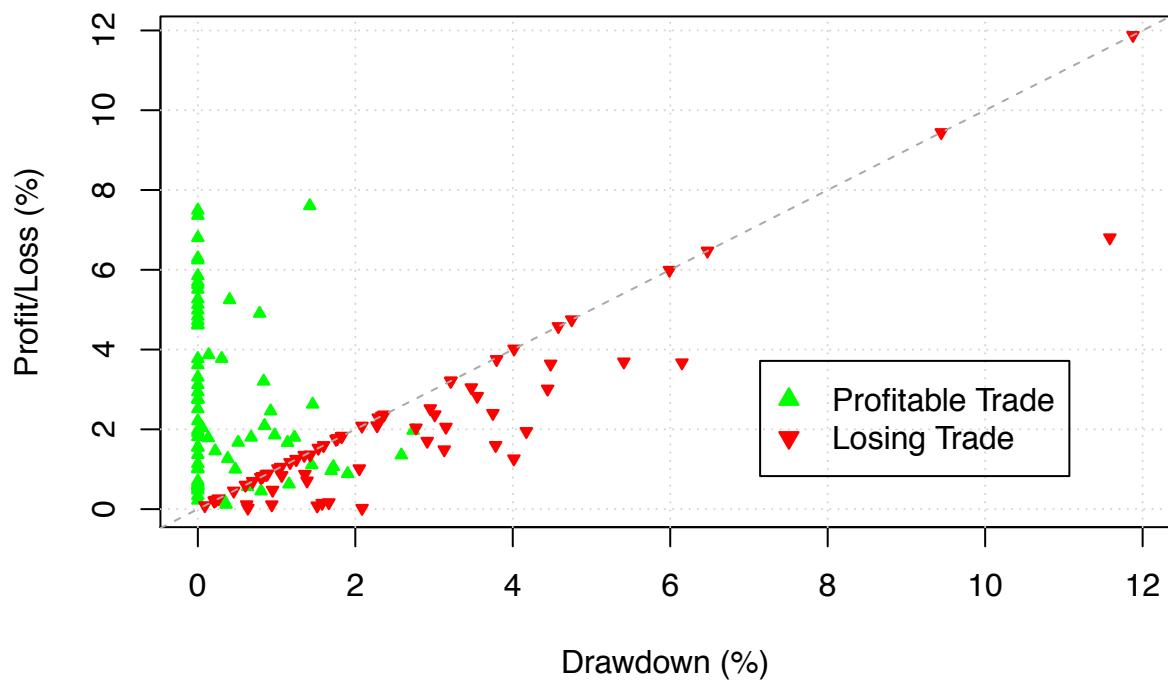
MAE

```
for (instrument in instrumentlist){
  chart.ME(portfolioname, instrument, type="MAE", scale="percent")
}
```

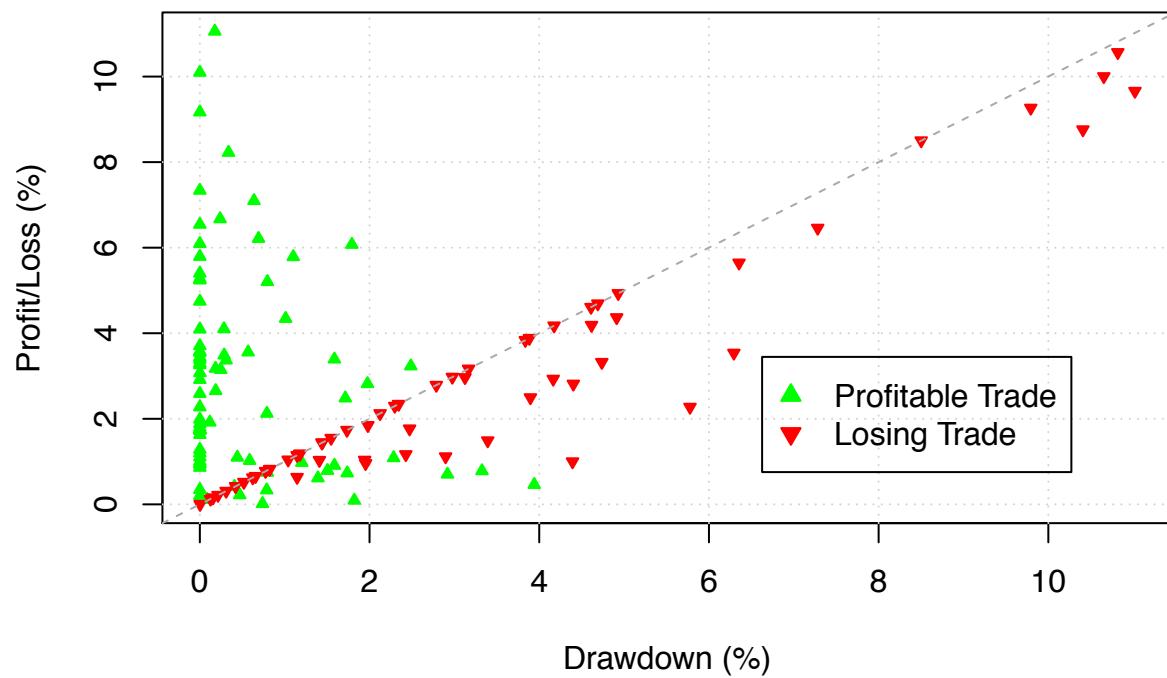
CON.csv Maximum Adverse Excursion (MAE)



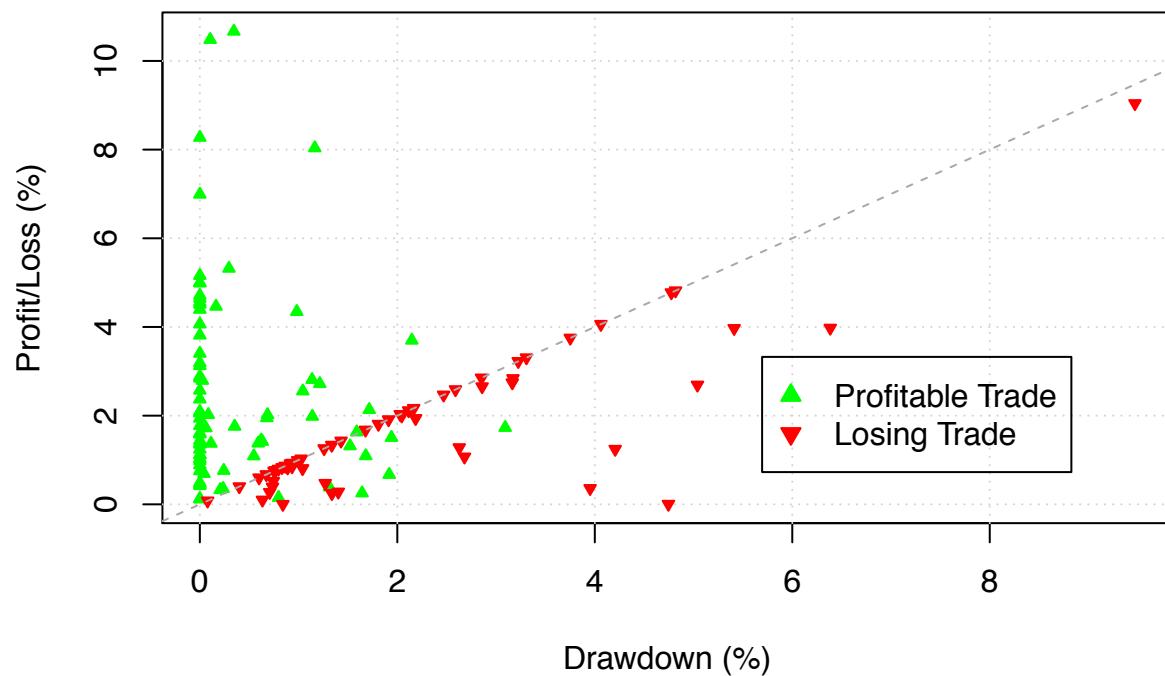
DB1.csv Maximum Adverse Excursion (MAE)



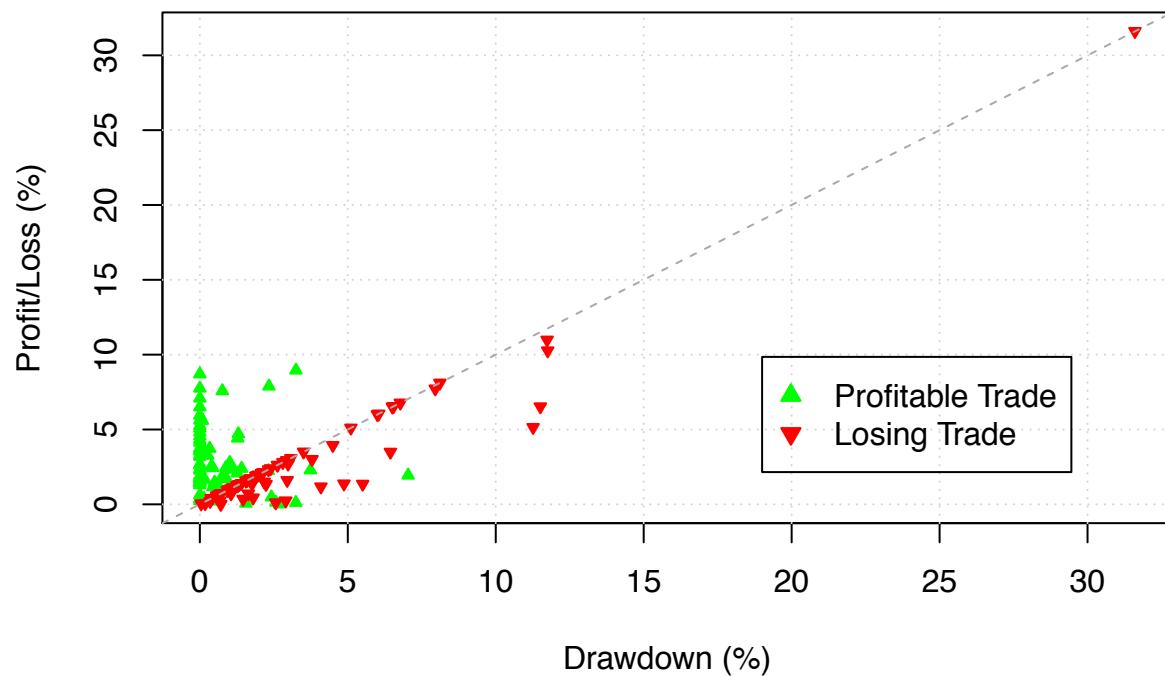
IFX.csv Maximum Adverse Excursion (MAE)



MRK.csv Maximum Adverse Excursion (MAE)



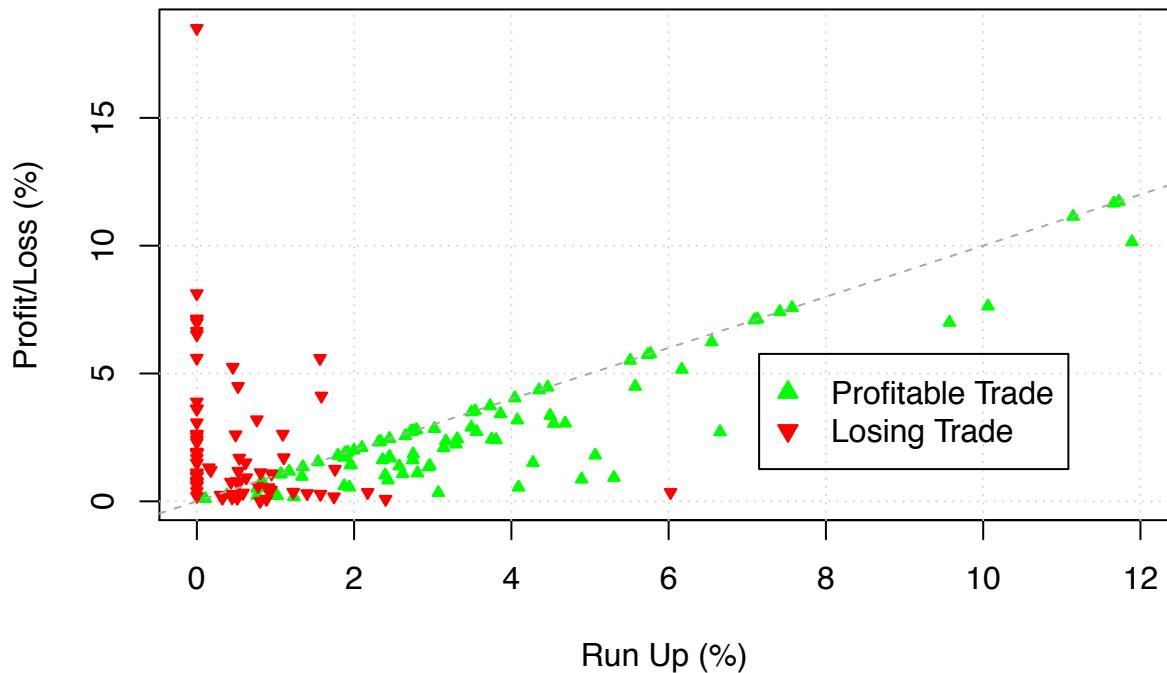
WDI.csv Maximum Adverse Excursion (MAE)



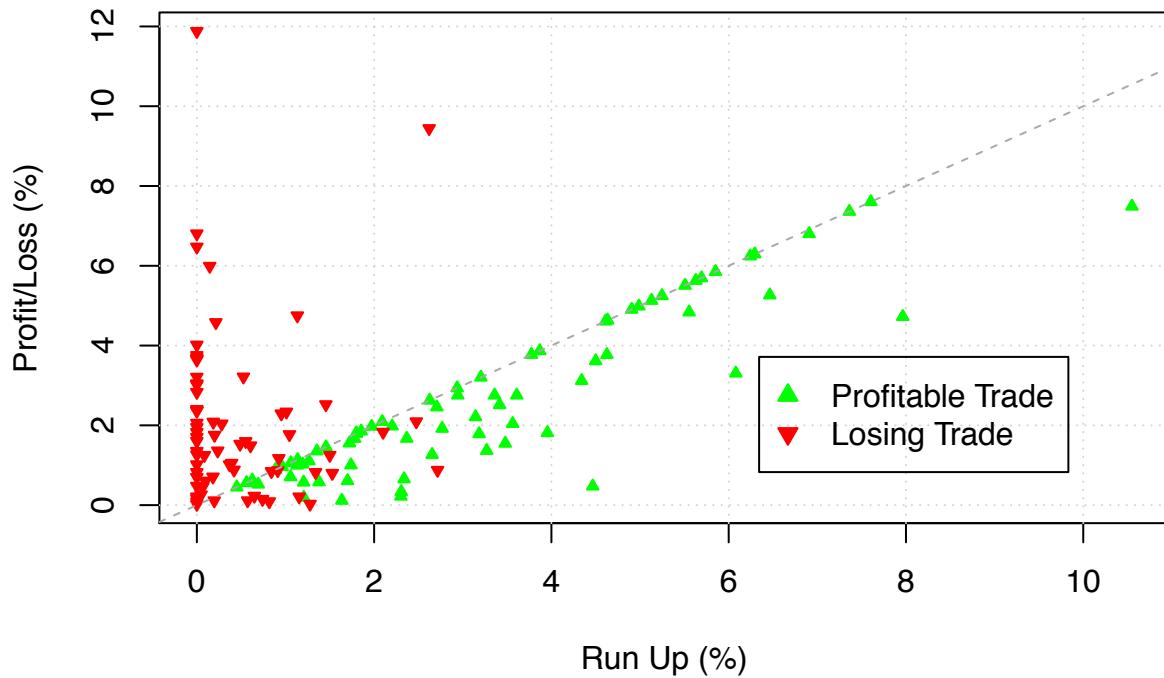
MFE

```
for (instrument in instrumentlist){  
  chart.ME(portfolioname, instrument, type="MFE", scale="percent")  
}
```

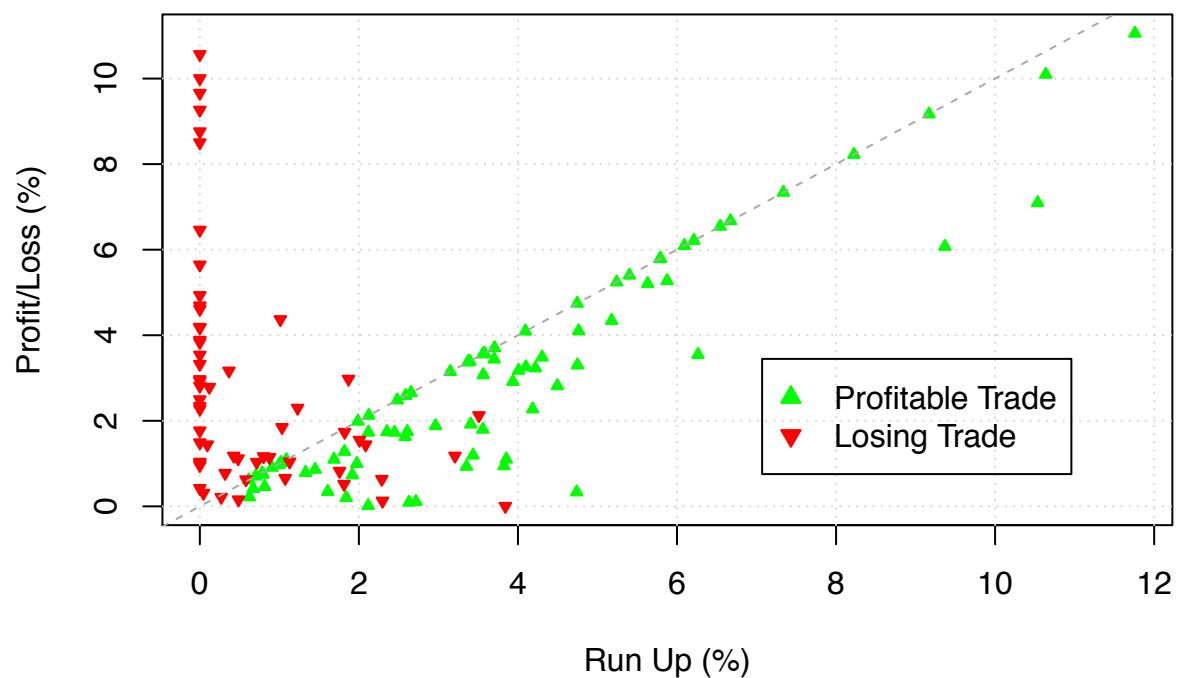
CON.csv Maximum Favourable Excursion (MFE)



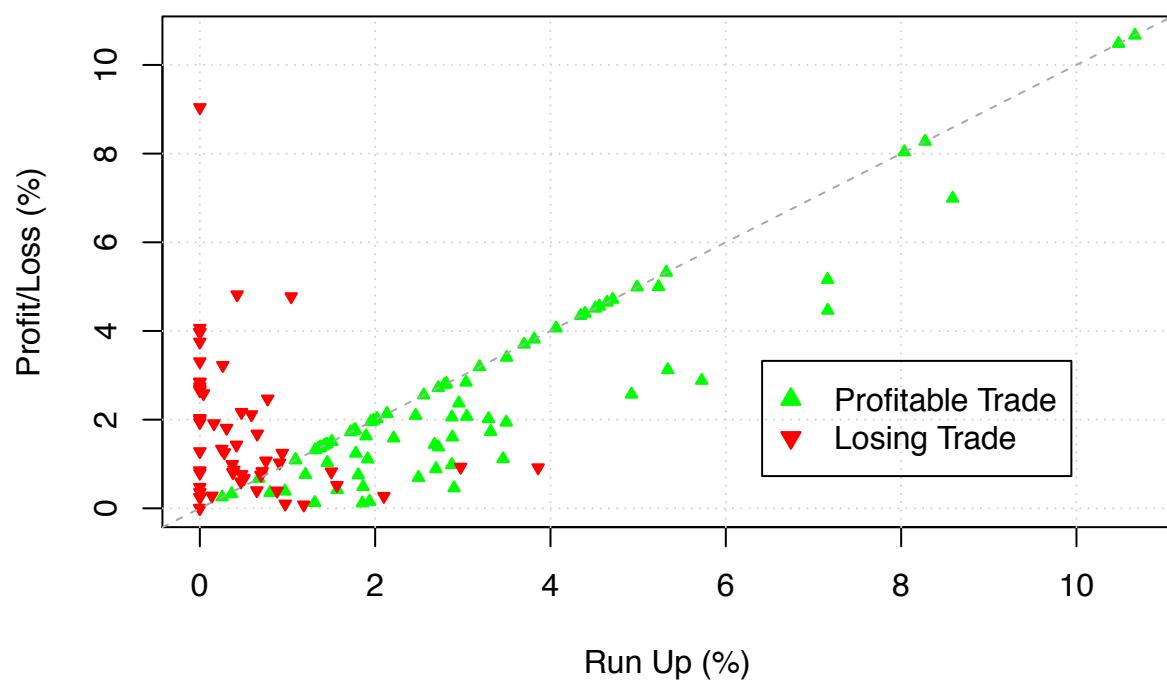
DB1.csv Maximum Favourable Excursion (MFE)



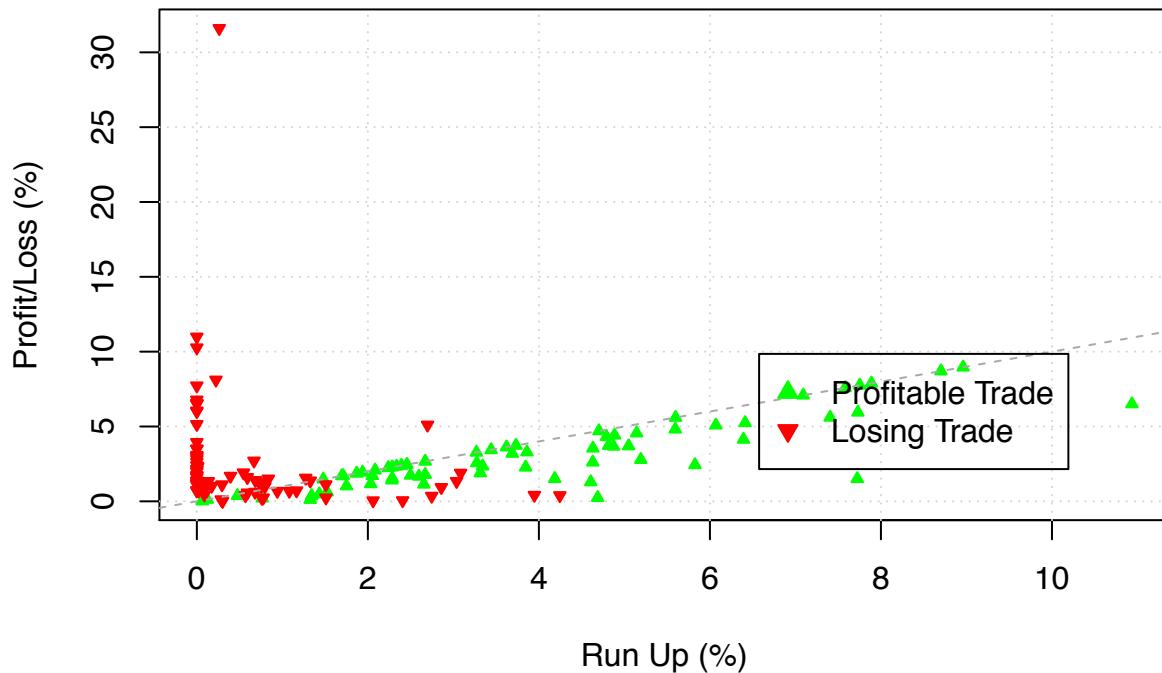
IFX.csv Maximum Favourable Excursion (MFE)



MRK.csv Maximum Favourable Excursion (MFE)



WDI.csv Maximum Favourable Excursion (MFE)



Compare with Buy and Hold Strategy

After having analyzed the strategy extensively, a comparison to another strategy should be made to evaluate the performance based on a benchmark which could have been an alternative investment. In this case a simple buy and hold strategy is used. At the first date of the trading period we place a buy order and sell our position at the last day of the selected period. In order to do this, we create a new Portfolio and a new Account. As stocks from the DAX (German Stocks Market Index) are used in the strategy, the buy and hold strategy is performed on an DAX ETF.

Step 1: Perform the Buy and Hold Strategy

```
# Any objects, in case there was a buyhold
# portfolio initialized before are removed
suppressWarnings(try(rm(list=c("account.buyhold",
                               "portfolio.buyhold"),
                           pos=.blotter)))

# The Buy and hold instrument is loaded
LoadCourseFile(BuyHoldDirectory,BuyHoldInstrument,debugme=TRUE,dates=daterange)
# The Buy and hold instrument is initialized
stock(BuyHoldInstrument,currency="EUR")

BuyHoldSymbol<-get(BuyHoldInstrument)

# The portfolio and account "buyhold" is initialized
initPortf("buyhold",
```

```

        BuyHoldInstrument,
        initDate=initdate,
        currency="EUR")
initAcct("buyhold",
        portfolios="buyhold",
        initDate=initdate,
        initEq=startCapital,
        currency="EUR")

# The first date of the defined daterange is selected
currentdate <- first(time(BuyHoldSymbol))

# Add 400 days, to start after the EMA period of the Smash Day
# strategy was calculated to better compare the performance of the strategies.
currentdate = as.Date(currentdate)+400

# The close price at this date is selected
closeprice <- as.numeric(Cl(BuyHoldSymbol[currentdate,]))

# Calculate the unitsize we can buy with our startingcapital
unitsize <- as.numeric(trunc(startCapital/closeprice))

# Place the transaction for the instrument at the first date
addTxn("buyhold",
       Symbol=BuyHoldInstrument,
       TxnDate=currentdate,
       TxnPrice=closeprice,
       TxnQty=unitsize,
       TxnFees=transactionCost)

# Select the last date of the daterange period
lastdate <-last(time(BuyHoldSymbol))

# Select the price at the last date
lastprice <- as.numeric(Cl(BuyHoldSymbol[lastdate,]))

# Sell the position at the last date of the daterange
addTxn("buyhold",
       Symbol=BuyHoldInstrument,
       TxnDate=lastdate,
       TxnPrice=lastprice,
       TxnQty=-unitsize,
       TxnFees=transactionCost)

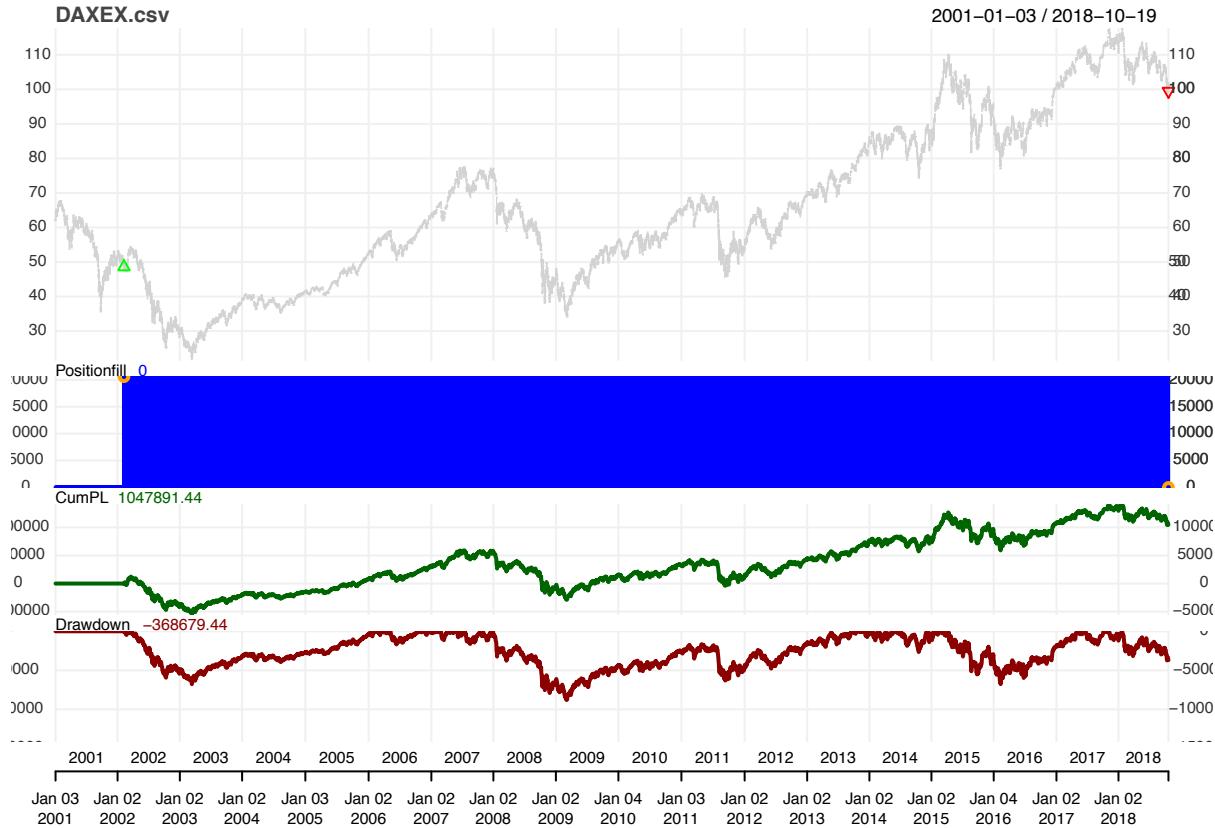
# update portfolio and account
updatePortf(Portfolio="buyhold")
updateAcct(name="buyhold")
updateEndEq(Account="buyhold")

```

Step 2: Visualize the Buy and Hold strategy

When visualizing the strategy in the same way we visualized the Smash Day strategy, we can see that we hold the position from the first until the last date. The cumulative profits are visualized by the green line.

```
chart.Posn("buyhold",Symbol=BuyHoldInstrument, theme=myTheme)
```

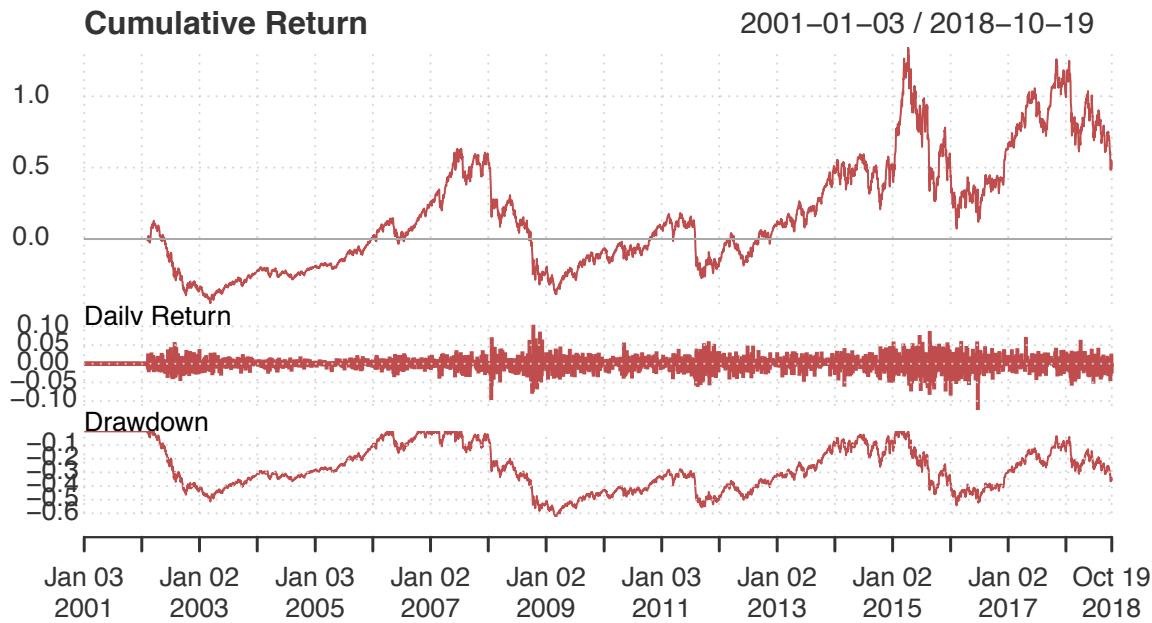


Step 3: Compare the returns of the trading strategy with the buy and hold strategy

In order to compare the results of both strategies, we calculate the returns for the buy and hold strategy and combine them with the returns of the trading strategy which were calculated before. Then the cumulative return, the daily return and the drawdown is plotted to visualize the performance of the buy and hold strategy.

```
rets.bh <- PortfReturns(Account='buyhold')
returns <- cbind(rets,rets.bh)
colnames(returns) <- substr(colnames(returns),1,3)
charts.PerformanceSummary(rets.bh,
                          colorset=rainbow12equal,
                          lwd=1,
                          main=substr(colnames(rets.bh),1,3))
```

DAX



In order to compare the performance between the strategy investment in one of the stocks and the alternative buy and hold strategy of the DAX ETF, the following graphs visualize the relative performance between each of the stocks used and the DAX ETF. Before that, more statistics are printed. These statistics compare information about the returns of the five instruments and the buy and hold strategy. Furthermore, annualized statistics are provided for the returns, standard deviation and the sharpe ration. These information can be used in order to form first assumptions when comparing the strategies.

The Return versus Risk Graph plots the five instruments and the DAX buy and hold instrument and visualizes the performance of the strategies versus the risk which was taken. This is the first visualization of a direct comparison of the strategies.

In order to better see the direct comparison of the instruments used and the alternative investment in the DAX ETF with a buy and hold strategy, relative performance plots are printed for each instrument and its relative performance compared to the DAX ETF.

```
table.stats(returns)
```

	CON	DB1	IFX	MRK	WDI
## Observations	4377.0000	4377.0000	4377.0000	4377.0000	4377.0000
## NAs	146.0000	146.0000	146.0000	146.0000	146.0000
## Minimum	-0.1564	-0.1283	-0.1041	-0.0862	-0.2179
## Quartile 1	0.0000	0.0000	0.0000	0.0000	0.0000
## Median	0.0000	0.0000	0.0000	0.0000	0.0000
## Arithmetic Mean	0.0003	0.0001	0.0002	0.0004	0.0000
## Geometric Mean	0.0002	0.0001	0.0001	0.0003	0.0000
## Quartile 3	0.0000	0.0000	0.0000	0.0000	0.0000
## Maximum	0.1387	0.0882	0.1582	0.1136	0.0727
## SE Mean	0.0002	0.0001	0.0002	0.0001	0.0001

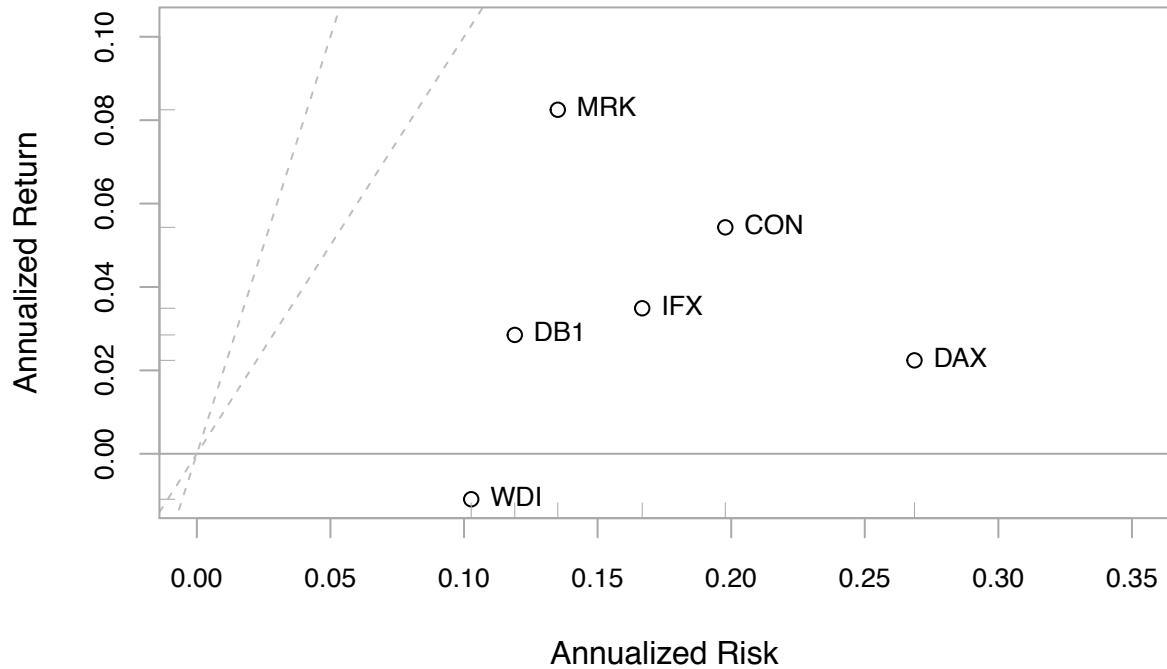
```

## LCL Mean (0.95) -0.0001 -0.0001 -0.0001 0.0001 -0.0002
## UCL Mean (0.95) 0.0007 0.0004 0.0005 0.0006 0.0002
## Variance 0.0002 0.0001 0.0001 0.0001 0.0000
## Stdev 0.0125 0.0075 0.0105 0.0085 0.0065
## Skewness -0.0879 -0.6912 0.7996 1.6842 -8.8079
## Kurtosis 34.6977 49.7264 34.6633 30.9399 318.8268
## DAX
## Observations 4523.0000
## NAs 0.0000
## Minimum -0.1241
## Quartile 1 -0.0074
## Median 0.0000
## Arithmetic Mean 0.0002
## Geometric Mean 0.0001
## Quartile 3 0.0086
## Maximum 0.1046
## SE Mean 0.0003
## LCL Mean (0.95) -0.0003
## UCL Mean (0.95) 0.0007
## Variance 0.0003
## Stdev 0.0169
## Skewness -0.2609
## Kurtosis 3.4867



```

Return versus Risk



```
for (i in colnames(returns[,-which(names(returns) == "DAX")])){  
  
  print(chart.RelativePerformance(returns[,i],returns[, "DAX"] ,  
    colorset=c("red","blue"),  
    lwd=1,  
    legend.loc="topleft"))  
}
```

Relative Performance

2001-07-30 / 2018-10-18



Relative Performance

2001-07-30 / 2018-10-18



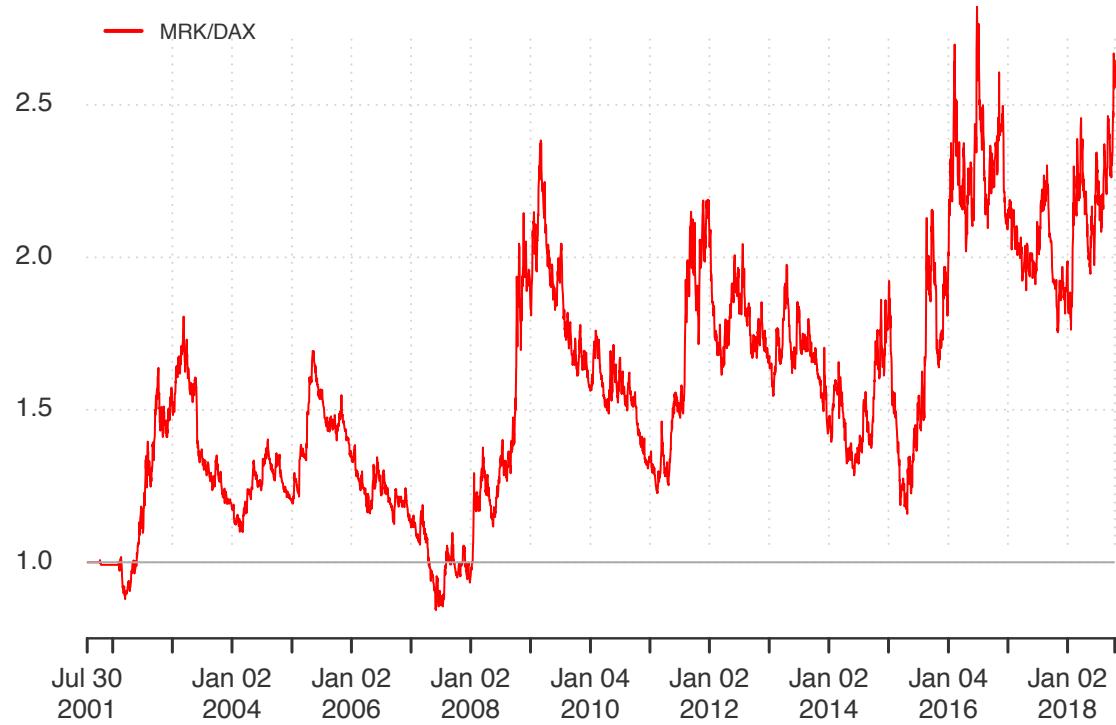
Relative Performance

2001-07-30 / 2018-10-18



Relative Performance

2001-07-30 / 2018-10-18



Relative Performance

2001-07-30 / 2018-10-18



To compare the Smash Day strategy even better to the alternative buy and hold strategy, the following plots visualize the cumulative returns of the strategy including the performance of the DAX. Moreover, it can be used to compare the drawdown of the strategy and the DAX.

```
returns.con <- returns[,c(1,6)]
returns.db1 <- returns[,c(2,6)]
returns.ifx <- returns[,c(3,6)]
returns.mrk <- returns[,c(4,6)]
returns.wdi <- returns[,c(5,6)]

charts.PerformanceSummary(returns.con,
                         colorset=rainbow12equal,
                         lwd=1)
```

CON Performance



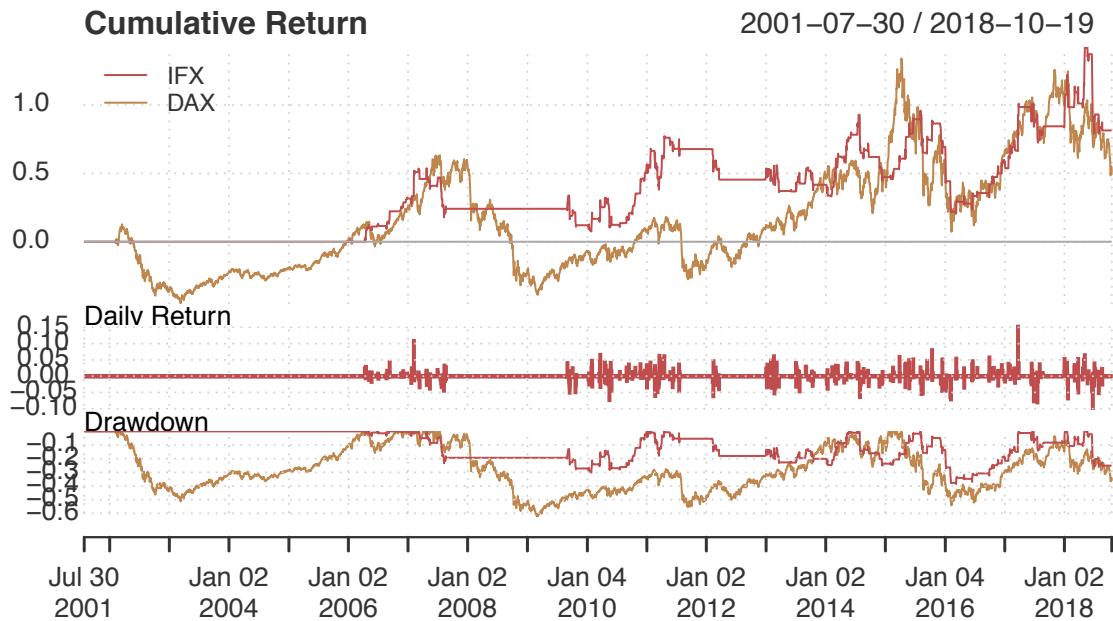
```
charts.PerformanceSummary(returns.db1,
  colorset=rainbow12equal,
  lwd=1)
```

DB1 Performance



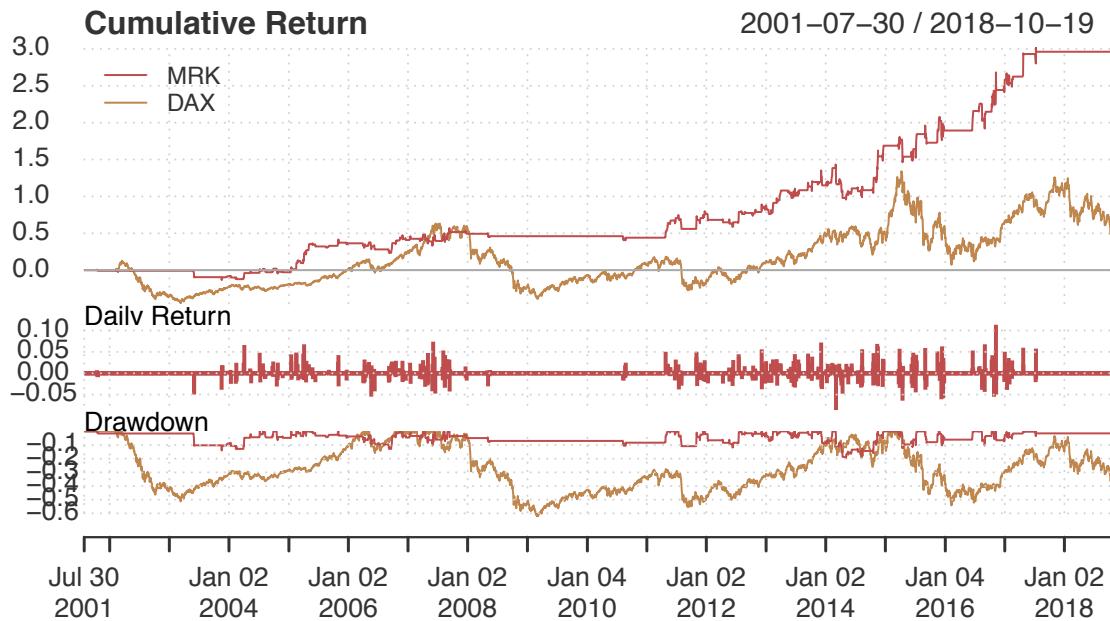
```
charts.PerformanceSummary(returns.ifx,
  colorset=rainbow12equal,
  lwd=1)
```

IFX Performance



```
charts.PerformanceSummary(returns.mrk,
                          colorset=rainbow12equal,
                          lwd=1)
```

MRK Performance



```
charts.PerformanceSummary(returns.wdi,
  colorset=rainbow12equal,
  lwd=1)
```

WDI Performance



Calculations and visualizations based on returns

As we have the returns of the instruments available, we can perform calculations and visualizations based on the returns of the strategies. The following section contains graphs of the returns, the equity curve and a histogram of the simple returns. Moreover, the histogram graph has an overlay with a randomly created normal distribution in order to compare the distribution of the returns with a normal distribution. As expected the returns are not normally distributed. We can observe fat tails, which means that large negative and large positive returns can be observed more often than expected and the excess kurtosis is visible.

Returns, Equity Curve and return distribution

```

for (i in 1:length(instrumentlist)){
  # Plot the Returns of each instrument
  print(plot(rets[,i], lwd = 1, main = paste("Returns of ",
                                              substr(colnames(rets[,i]),1,3),
                                              sep="")))
  
  # Plot the equity curve of each instrument
  equityCurve <- cumprod(1 + rets[,i])
  print(plot(equityCurve, lwd = 1,
            main = paste("Equity curve of ",
                         substr(colnames(rets[,i]),1,3),
                         sep="")))
  
  # Plot the Histogram of the returns to see the return
  # distribution and compare with a random distribution.
}

```

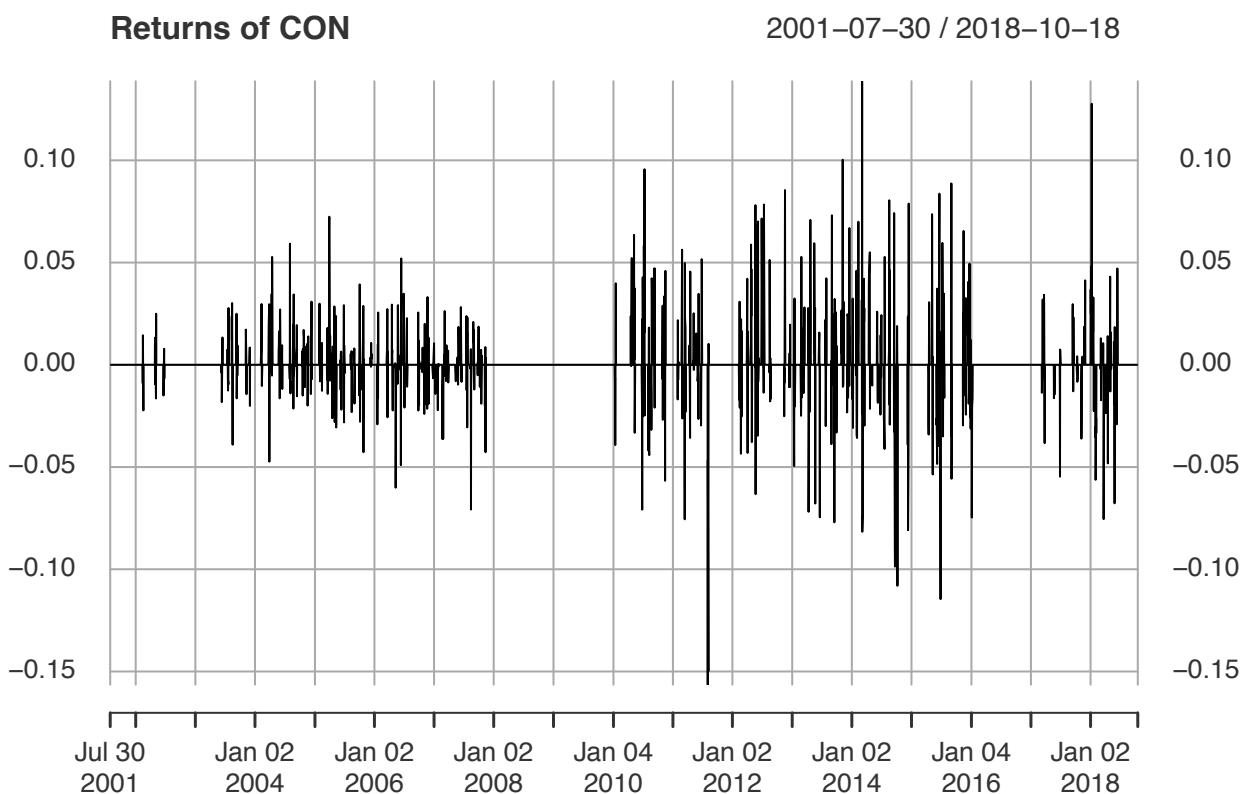
```

set.seed(123)
random_dist <- rnorm(length(rets[,i]),
                      mean=mean(rets[,i]),
                      sd=sd(rets[,i]))

# make them into an "index-matching" time series - just for plotting
random_dist_stats <- xts(random_dist,index(rets))

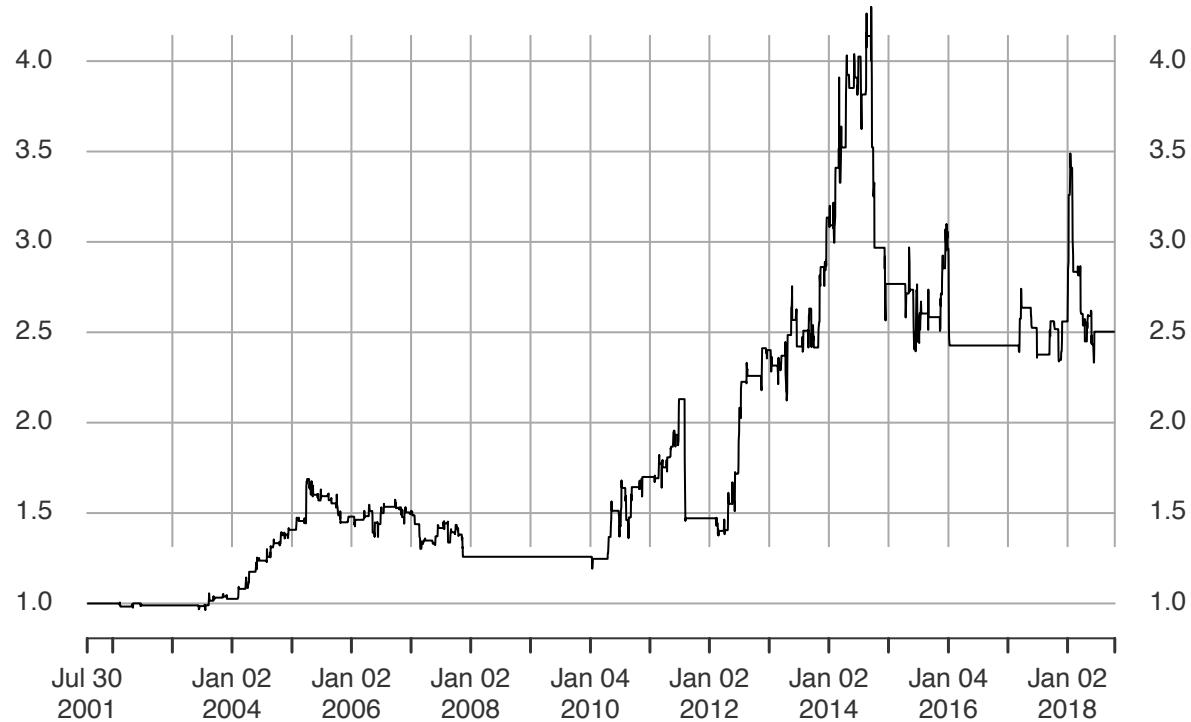
random_dist_stats_density <- density(random_dist_stats)
hist(rets[,i],probability=TRUE,breaks=100,main=paste("Histogram of Simple Returns of ",substr(colnames(rets),1,4)))
points(random_dist_stats_density,type="l")
}

```

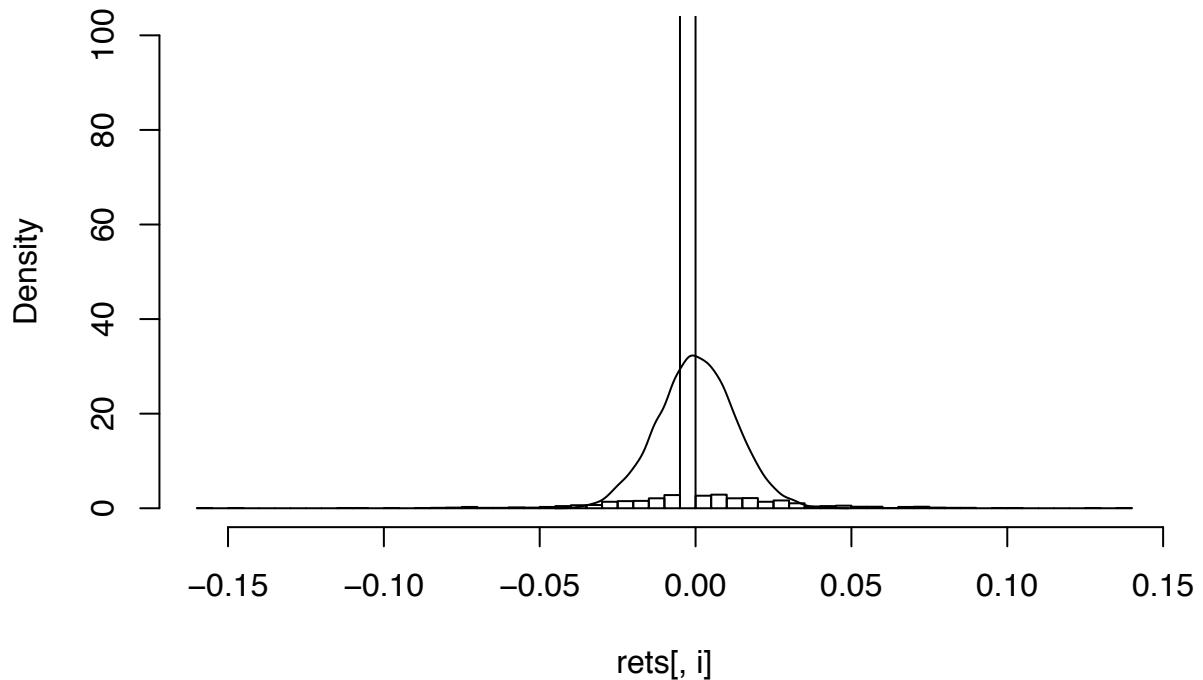


Equity curve of CON

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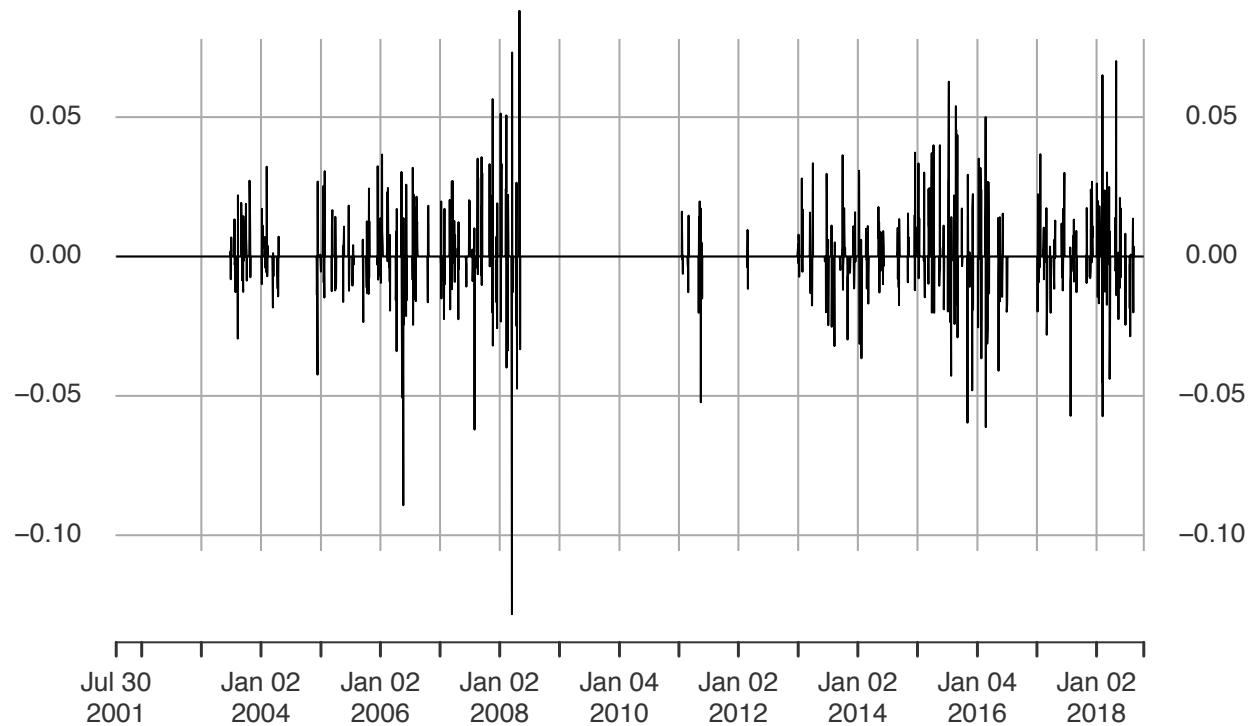


Histogram of Simple Returns of CON



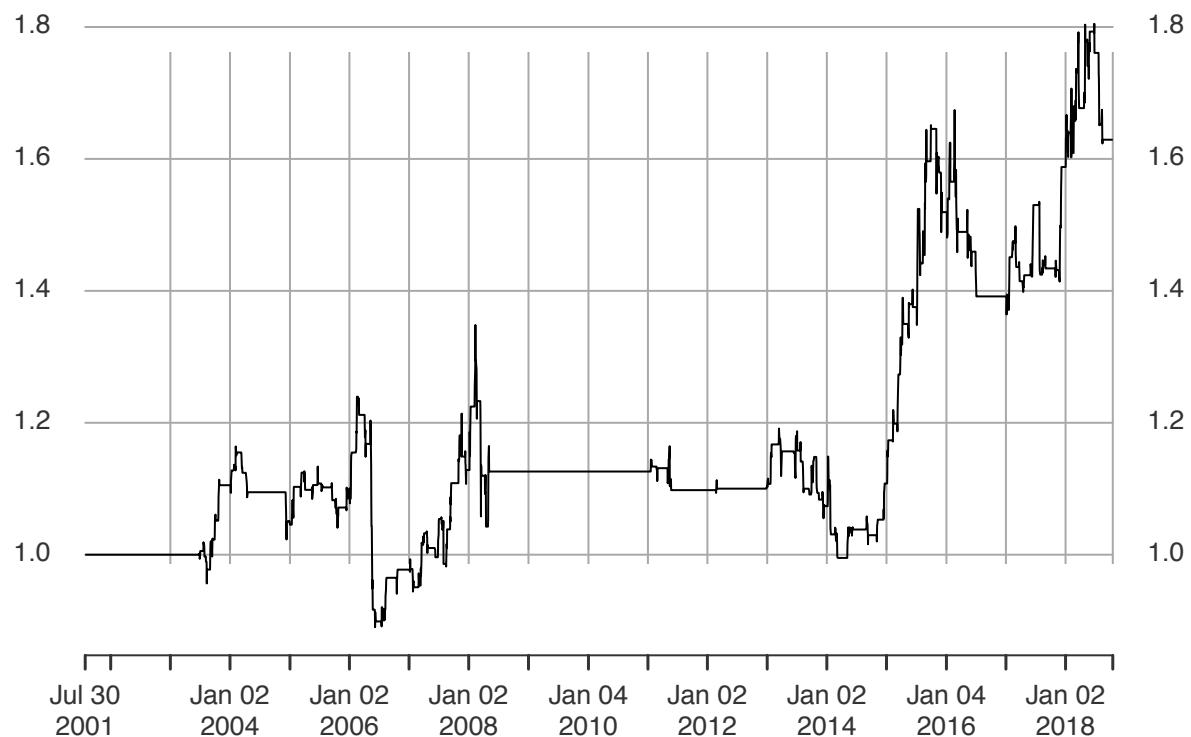
Returns of DB1

2001-07-30 / 2018-10-18

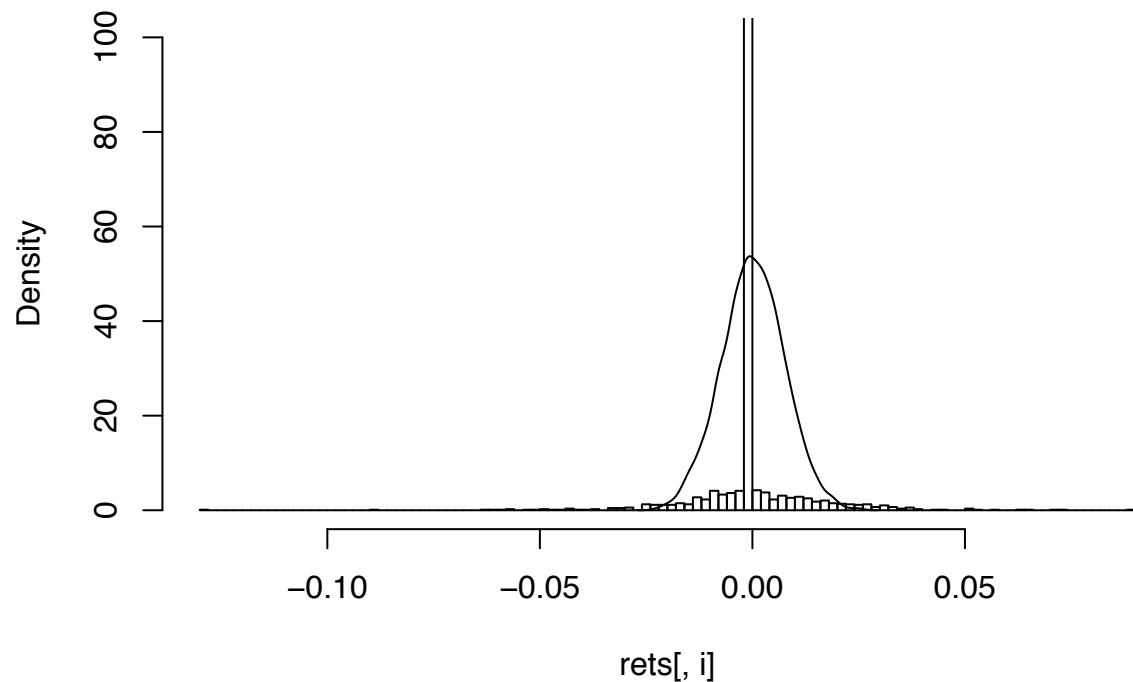


Equity curve of DB1

2001-07-30 / 2018-10-18

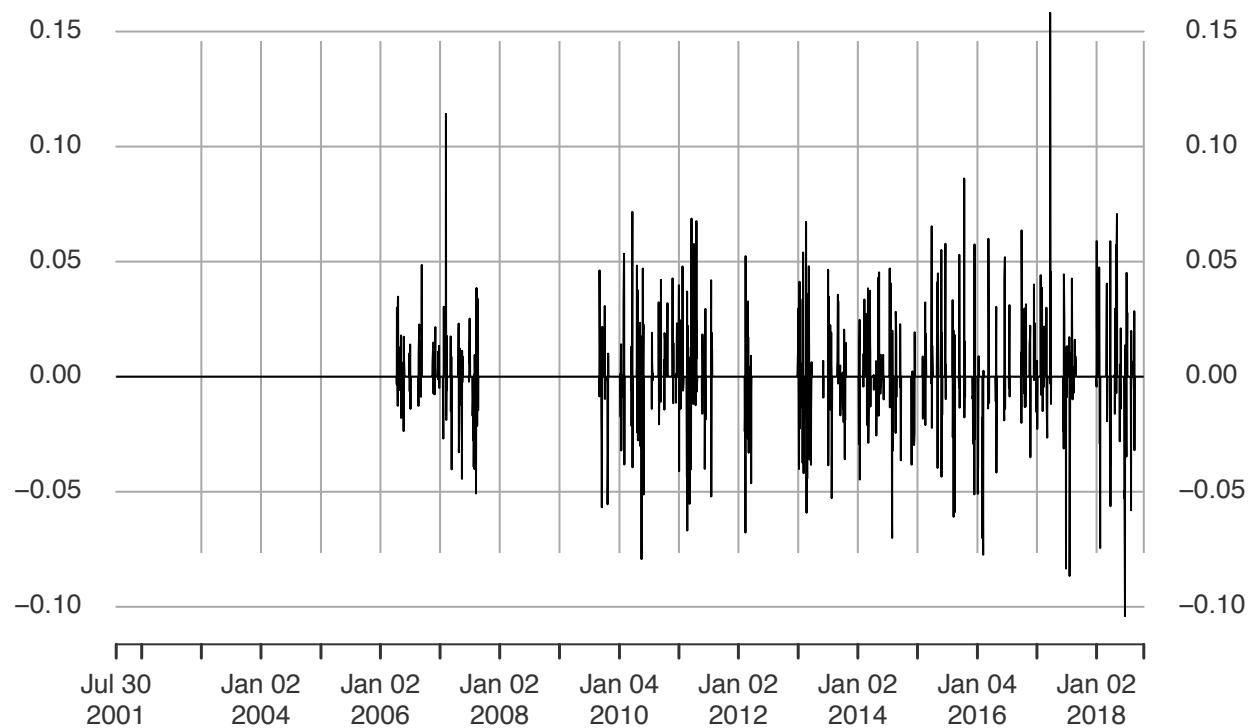


Histogram of Simple Returns of DB1



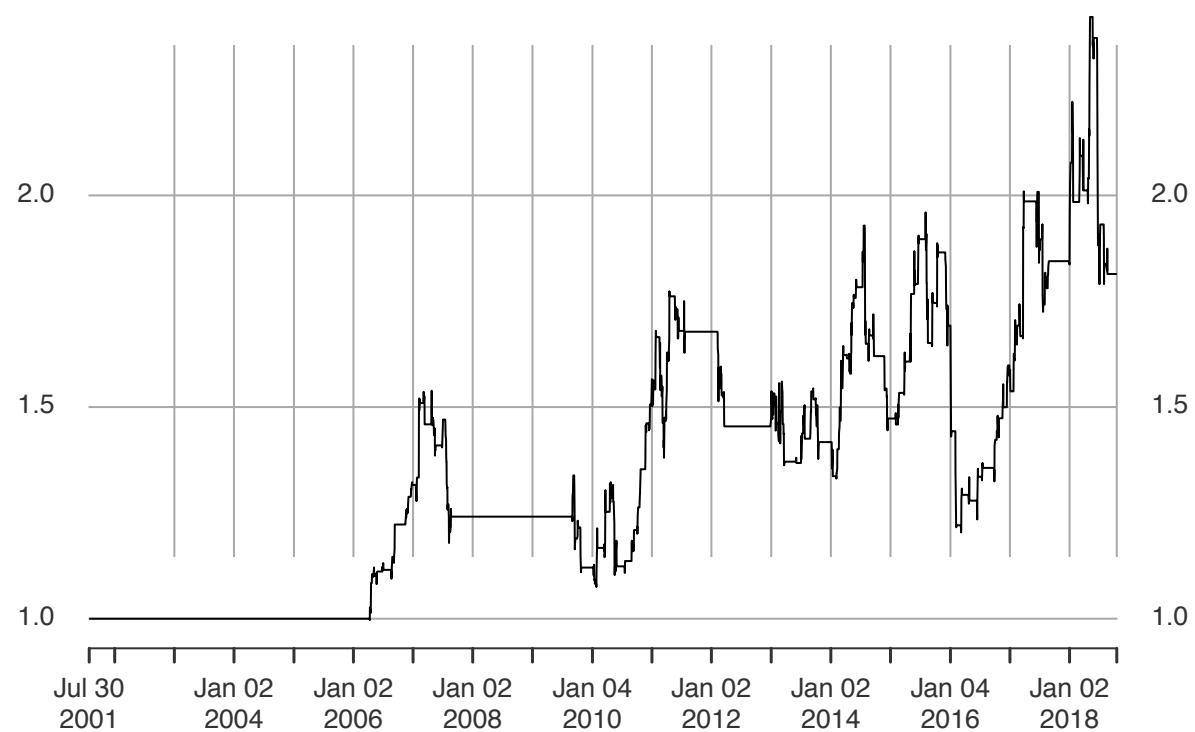
Returns of IFX

2001-07-30 / 2018-10-18

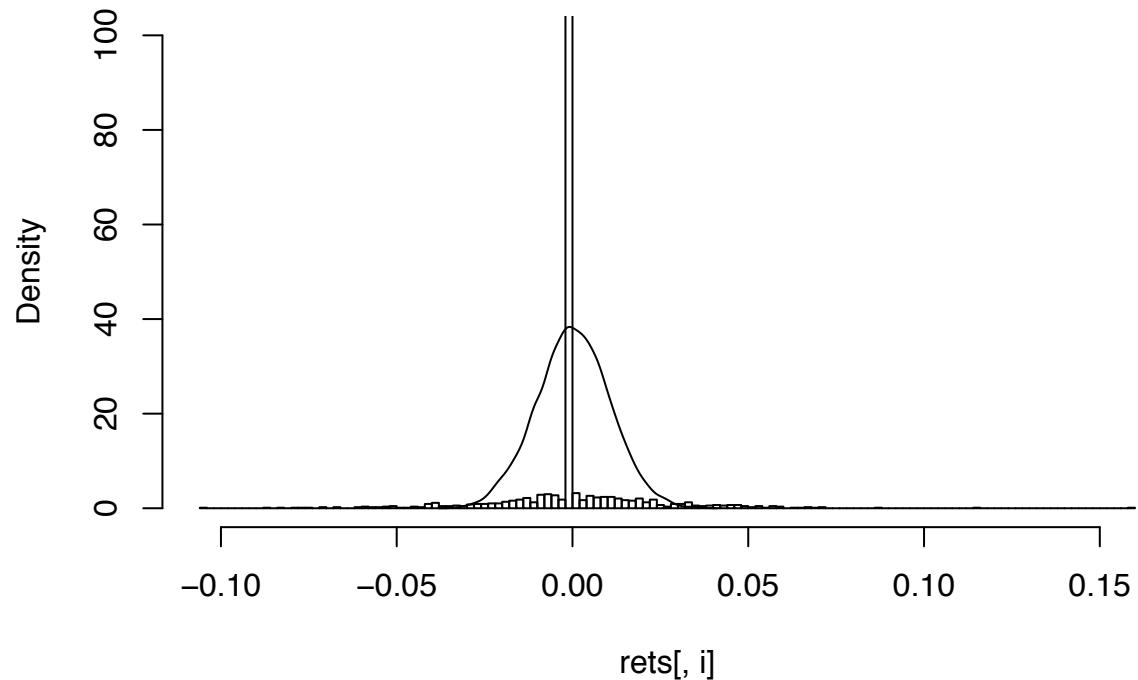


Equity curve of IFX

2001-07-30 / 2018-10-18

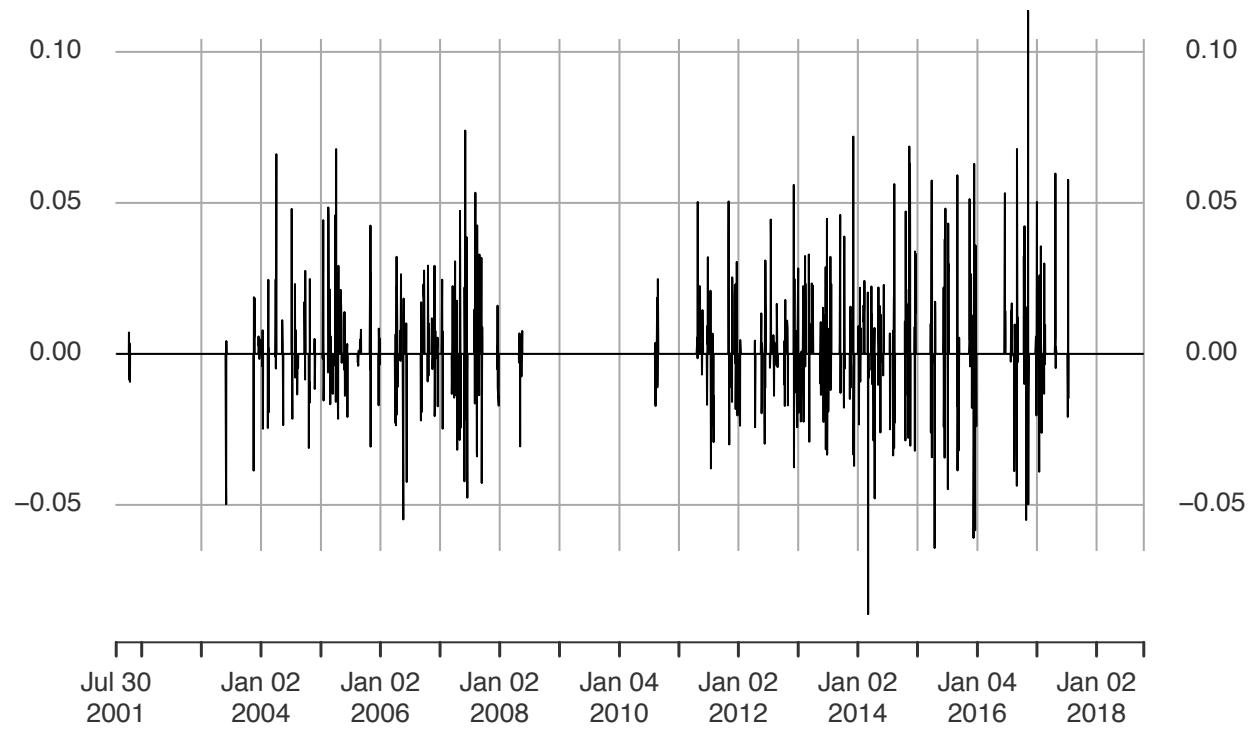


Histogram of Simple Returns of IFX



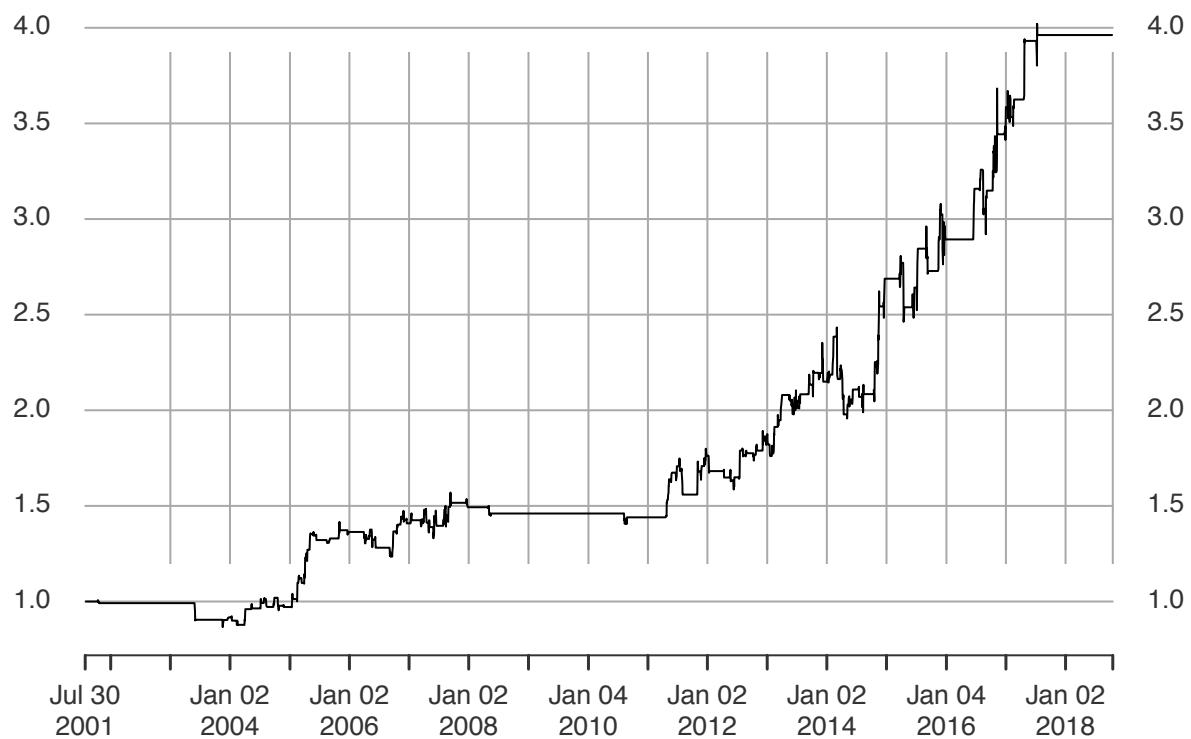
Returns of MRK

2001-07-30 / 2018-10-18

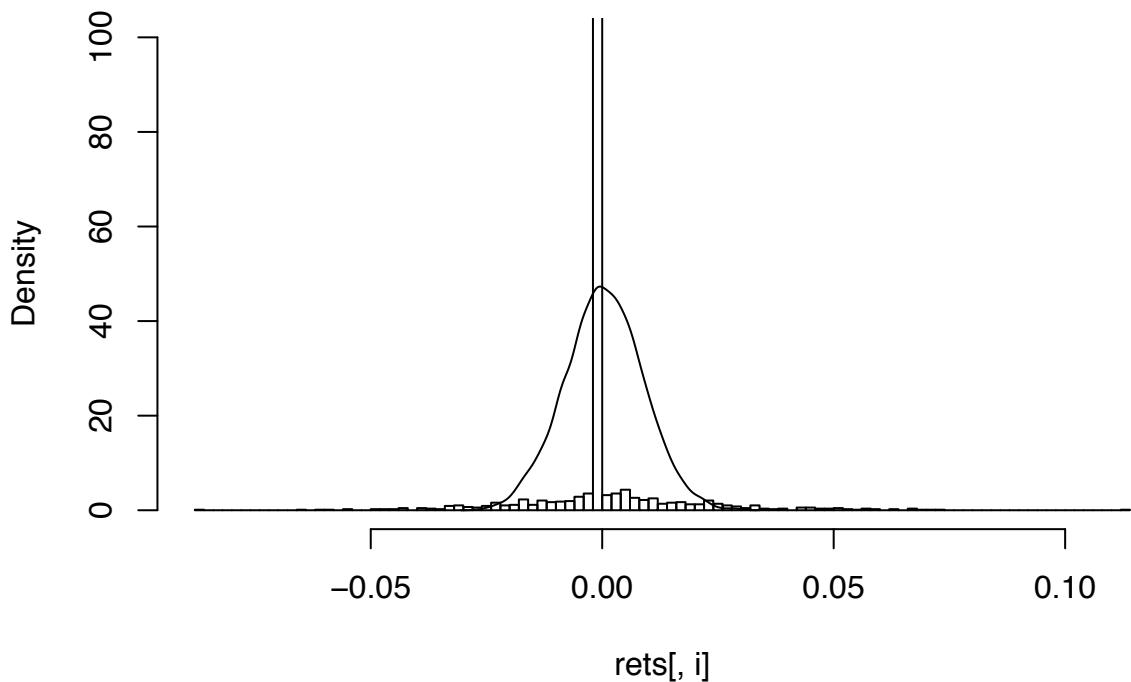


Equity curve of MRK

2001-07-30 / 2018-10-18

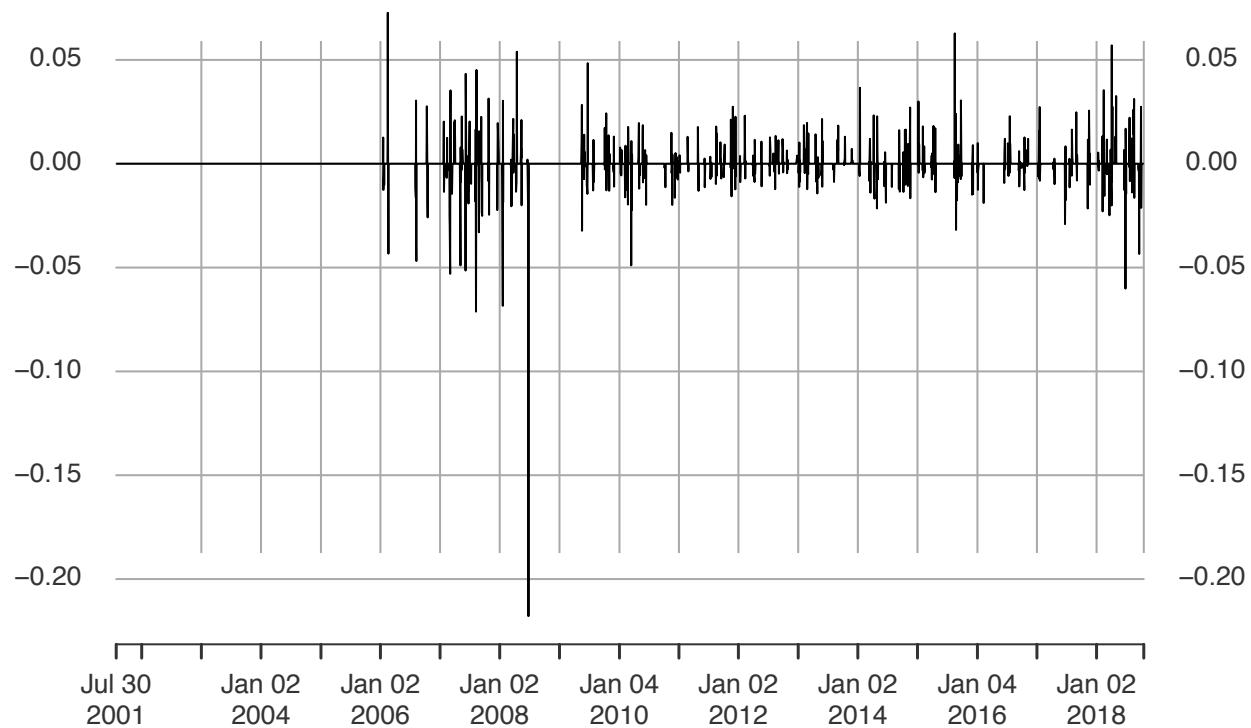


Histogram of Simple Returns of MRK



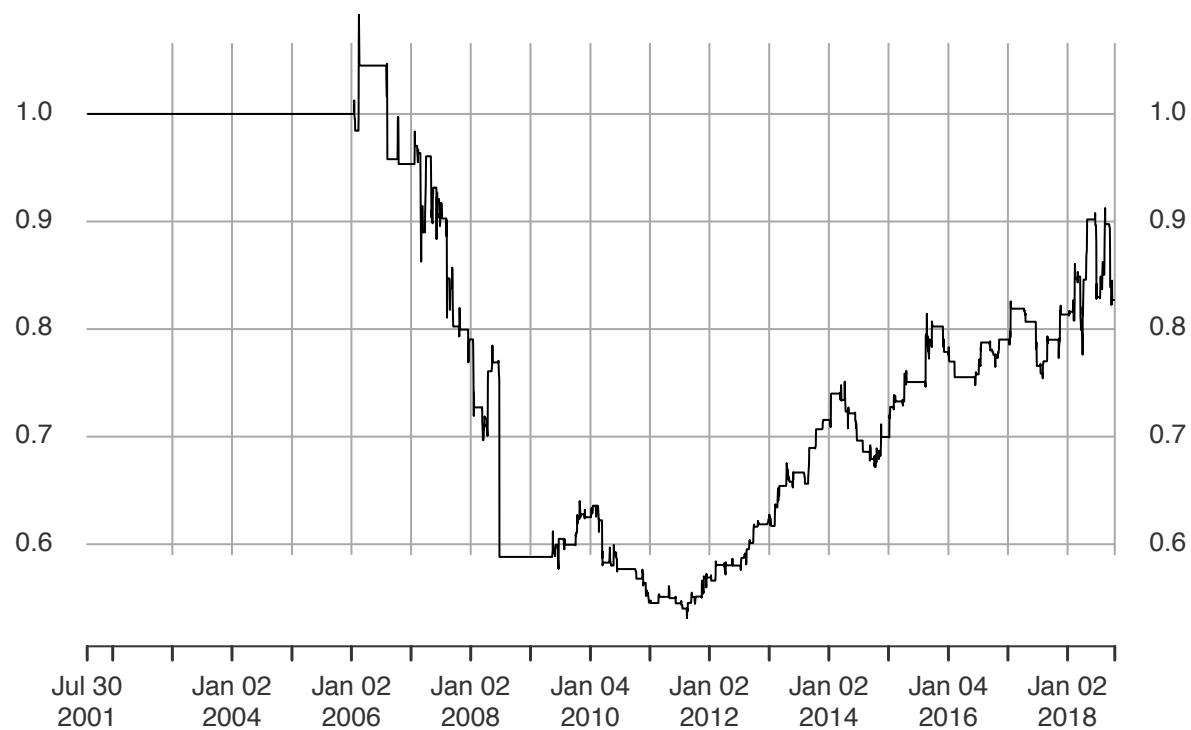
Returns of WDI

2001-07-30 / 2018-10-18

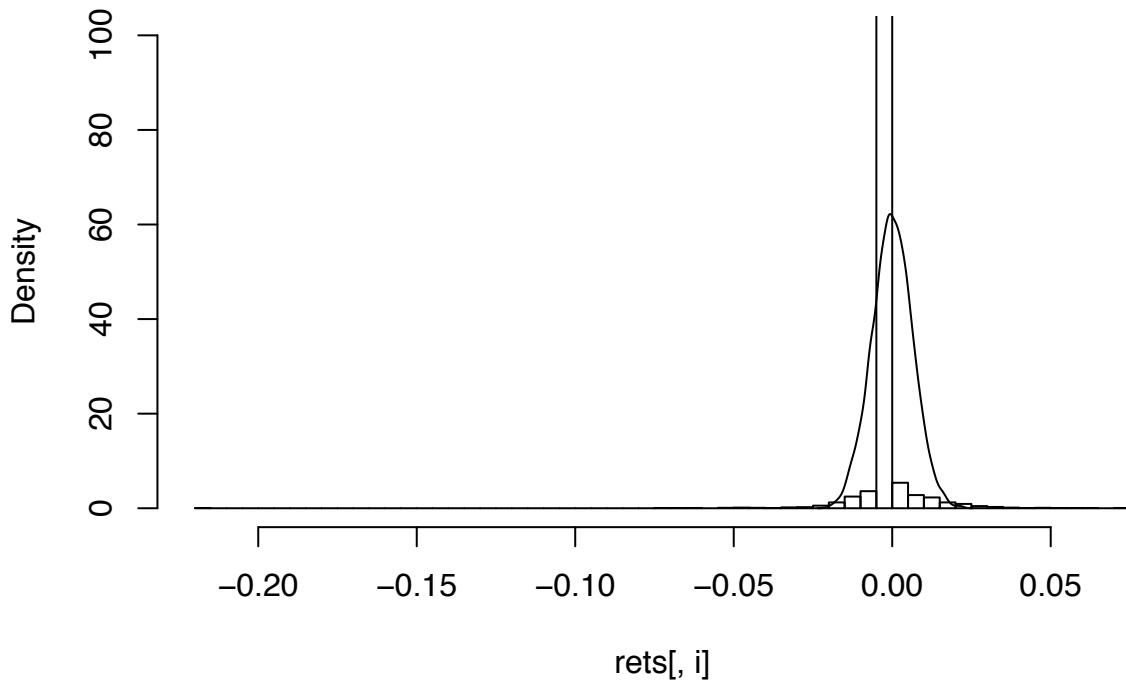


Equity curve of WDI

2001-07-30 / 2018-10-18



Histogram of Simple Returns of WDI



Value at Risk

The historical “Value at Risk” measures the risk of loss for investments. More specifically, it describes the maximum amount we would expect to lose per day with a confidence level of 99%, given an investment of 10000. This metric could be used to show potential investors the risk which is associated with their investment. Based on the following results, an investor could decide whether the risk is appropriate compared to the expected returns which were shown in the previous sections.

```
Investment <- 10000
probs <- 0.01
print(sprintf("Investment: %s", Investment))

## [1] "Investment: 10000"
writeLines("")

print(sprintf("Confidence Level: %s", (1-probs)))

## [1] "Confidence Level: 0.99"
writeLines("")

for (i in 1:length(instrumentlist)) {
  quantile(rets[,i])
  (discreteRQ <- quantile(rets[,i], probs=probs))
  loss <- Investment * discreteRQ
  print(sprintf("Given a %s investment in %s we would expect a maximum loss of %s per day.",
              Investment,
              substr(colnames(rets[,i]), 1, 3),
```

```

    round(loss,2)*-1))
}

## [1] "Given a 10000 investment in CON we would expect a maximum loss of 399.32 per day."
## [1] "Given a 10000 investment in DB1 we would expect a maximum loss of 237.56 per day."
## [1] "Given a 10000 investment in IFX we would expect a maximum loss of 394.24 per day."
## [1] "Given a 10000 investment in MRK we would expect a maximum loss of 291.27 per day."
## [1] "Given a 10000 investment in WDI we would expect a maximum loss of 183.06 per day."

```

Conclusion and Suggestions

Larry William's Smash Day strategy, as it was introduced in the first section, is based on the idea of the reversal. When talking about the reversal effect, the statistical foundation is the negative autocorrelation. The report guided the reader through all relevant stages of the process for implementing a trading strategy with the Blotter R Framework. The chosen strategy performed quite well and annualized returns between -1 % and 8.2 %, which is quite impressive compared to the DAX which had an annualized return of 2.24 %. Moreover, the five used instruments have shown a much lower annualized risk than the DAX. Thus, this strategy performed for four out of the five tested instruments better than the DAX while having a lower risk than the DAX over the time horizon of the last 18 years. The strategy is based on a 400 days exponential moving average. This is necessary to enter the market long only in long-term upward trends. This was tested before with a 200 days exponential moving average, which leads to worse performance. Thus, it seems to be important, that the upward trends are longlasting. The implementation of the maximum holding period was also very crucial. After testing the strategy without this, large drawdowns were observed as the Smash Day Sell Signal was triggered way too late. Longer holding periods of 20 - 40 days haven't improved the performance, while shorter holding periods improved the performance significantly. Further improvements could include short trades which could be used during periods of down-trends, making the strategy even more flexible to react to different market situations. We can see that four of the five tested instruments had a Trades Win / Lose Ration larger than 1 with approximately eight trades per year. What can be seen from the simulation of the buy and hold strategy is, that the moment when to place the buy order is very crucial. The DAX lost from 2000 to 2003 about 60 %, which means that it is necessary to compare the two strategies wisely. In the last section of the report, the returns show classical significant characteristics like volatility clusters and the typical distribution with an excess kurtosis and fat tails.

Overall, I would suggest testing the strategy on more instruments across different markets to clarify whether there are other effects responsible for the positive returns. As the strategy is based on a behavioral bias, we can expect the strategy to work also in the future.