Log-Returns Report & Monte Carlo Sim

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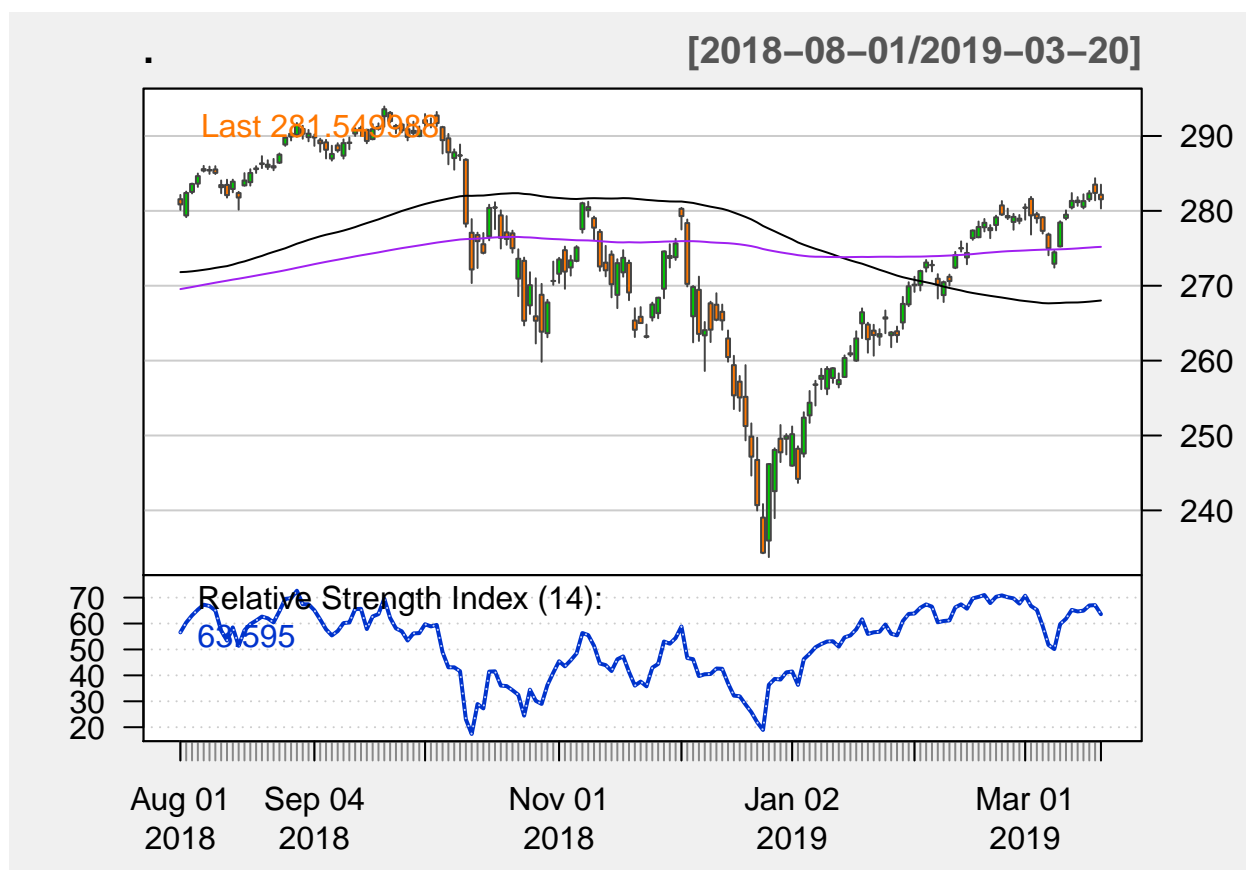
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Overview

```
getSymbols(
  "SPY",
  src = "yahoo",
  auto.assign = TRUE,
  from = "2017-01-01",
  to = Sys.Date()
  )
```

```
## [1] "SPY"
```

```
  SPY %>%
  chartSeries(
  TA = "addSMA(n = 100, col = 'black');
  addSMA(n=200, col = 'purple');
  addRSI();",
  subset = "2018-08-01::",
  theme = "white",
  major.ticks = "months"
  )
```
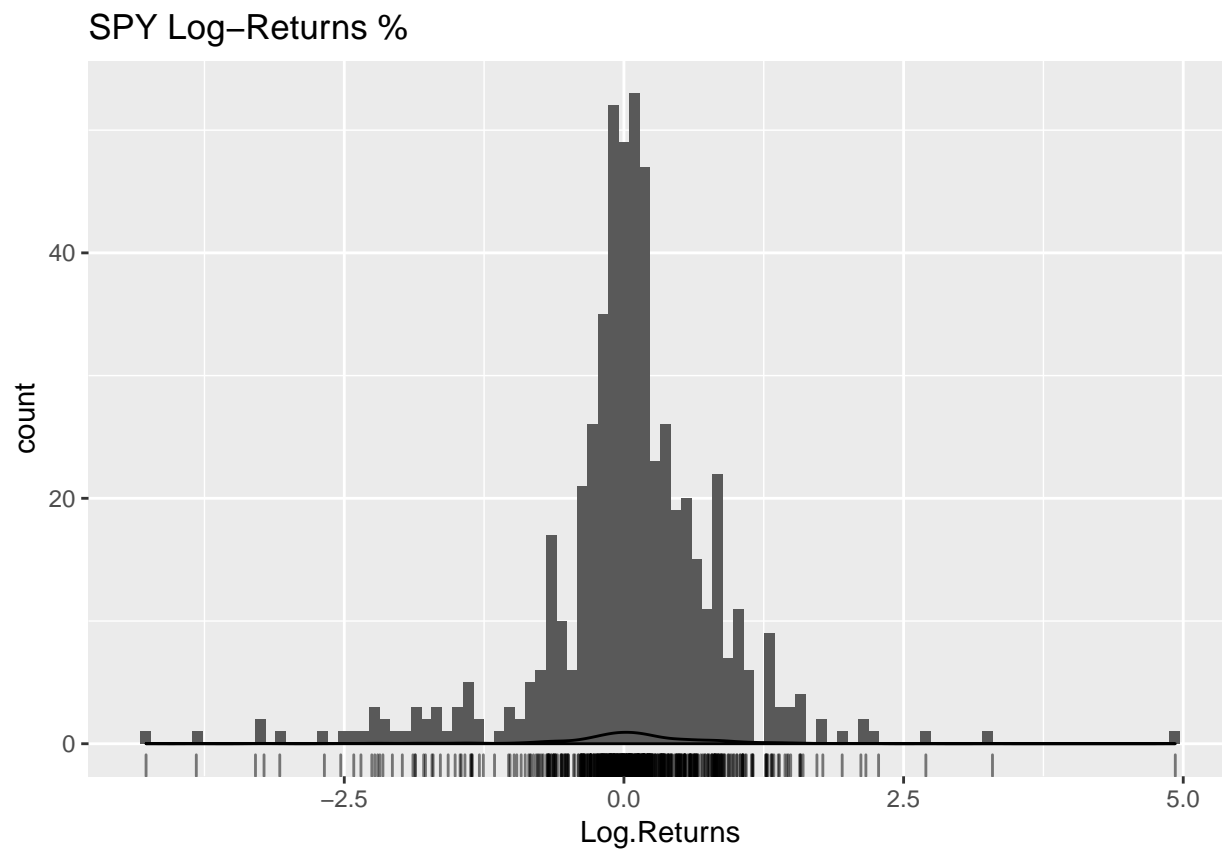
Calculate the log returns of "SPY". Latest observations:

```
##            daily.returns
## 2019-03-13         0.007
## 2019-03-14        -0.001
## 2019-03-15         0.005
## 2019-03-18         0.004
## 2019-03-19         0.000
## 2019-03-20        -0.003
```

First Observations:

```
##            daily.returns
## 2017-01-03         0.000
## 2017-01-04         0.006
## 2017-01-05        -0.001
## 2017-01-06         0.004
## 2017-01-09        -0.003
## 2017-01-10         0.000
```

SPY Log−Returns %

Quantiles:

```
##   0.5%   2.5%    25%    50%    75%  97.5%  99.5%
## -0.032 -0.021 -0.002  0.001  0.004  0.015  0.024
```

Mean and Std.Dev:

```
## [1] "Mean log return:"          "0.00048"
## [3] "Std.Dev of log returns:" "0.0082"
```
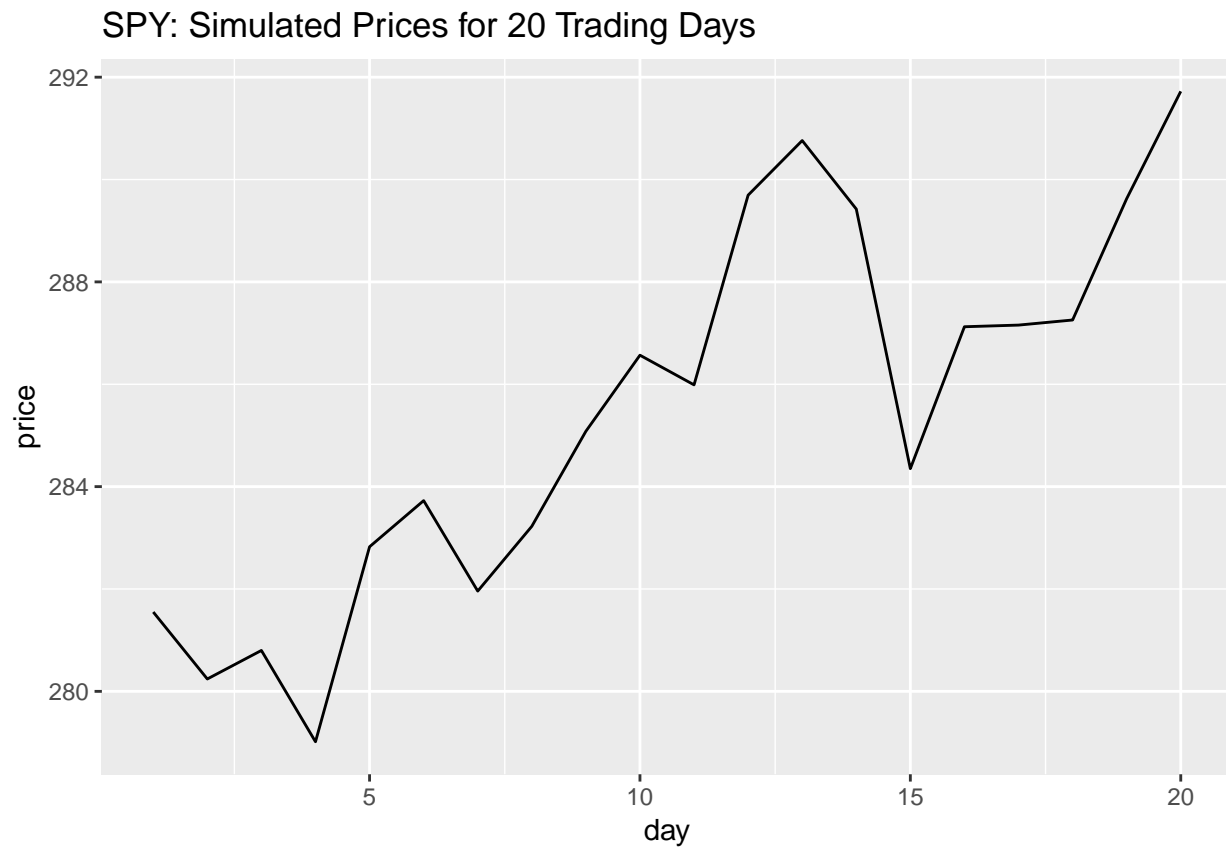
Average daily percent return:

```
## [1] 0.048
```

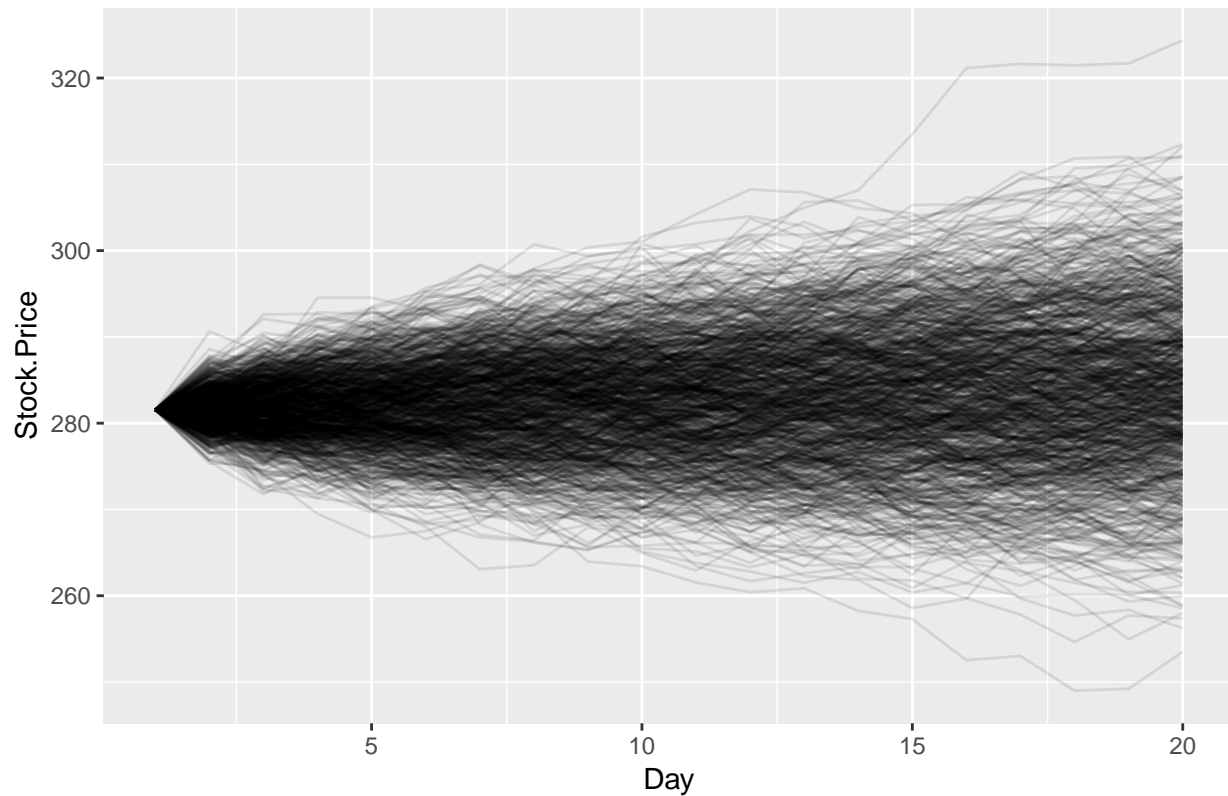**Simulations**

Random-Walk simulation (252 days):

```
## [1] 281.55
```

SPY: Simulated Prices for 20 Trading Days

Monte-Carlo analysis:

```
N <- 20 # number of days to simulate
M <- 1000 # number of monte carlo simulations
```

SPY: 1000 Monte Carlo Simulations for Prices Over 20 Trading Days

Boundaries:

```
## [1] "Starting Price: " "281.55"
```

```
##   0.5%   2.5%     25%     50%     75%  97.5%  99.5%
## 258.80 265.00 277.94 283.90 290.38 303.21 308.67
```

Median Monte-Carlo simulation price:

```
## [1] 283.9
```

CAGR Comparison:

```
## [1] "SPY CAGR %: " "0.96"
```

```
## [1] "Simulation CAGR %: " "0.84"
```