

Financial Data Analysis Tutorial

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Data

Raw Data

```
#market prices (loads and names them automatically)
```

```
#S&P500
```

```
data_loader(symbol="SPY")
```

```
#STOXX50
```

```
data_loader(symbol="VGK")
```

```
#CSI 300 (China)
```

```
data_loader(symbol="ASHR")
```

Quick Analysis

SPY April 2nd 2025

```
#extract a particular day
```

```
SPY_25_04_02 = day_selector(raw_SPY,2025,04,02) #april 2nd 2025
```

```
#let's plot it
```

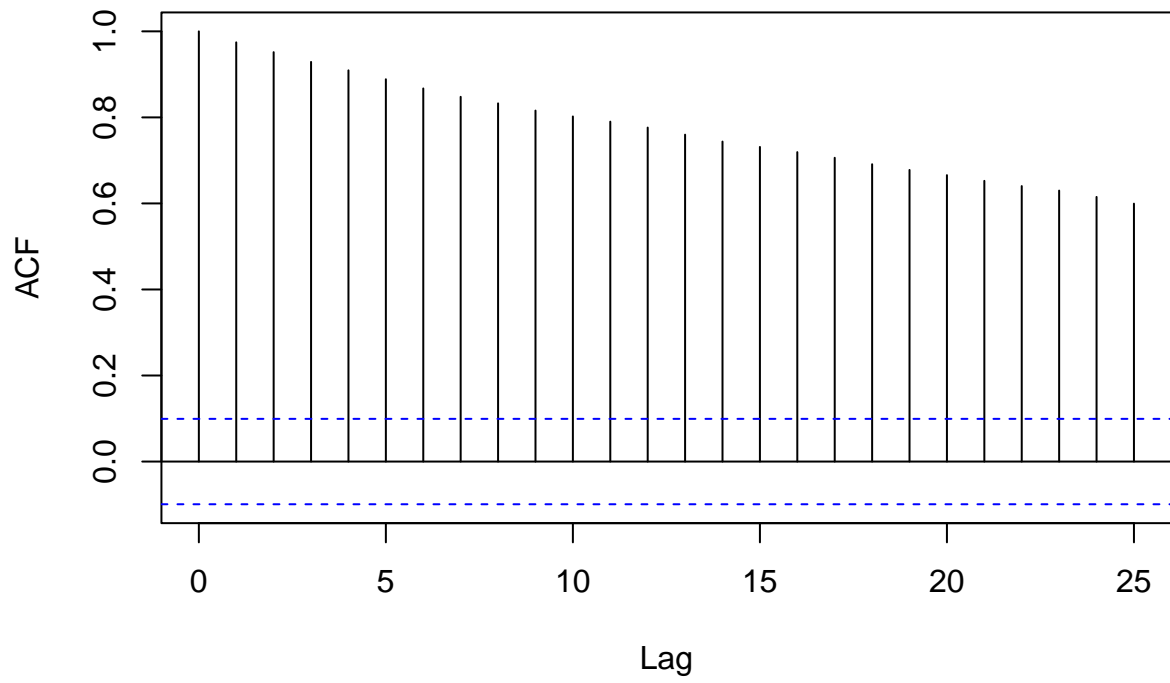
```
price_plotter_day(SPY_25_04_02,"SPY Price on April 2nd 2025")
```

SPY Price on April 2nd 2025

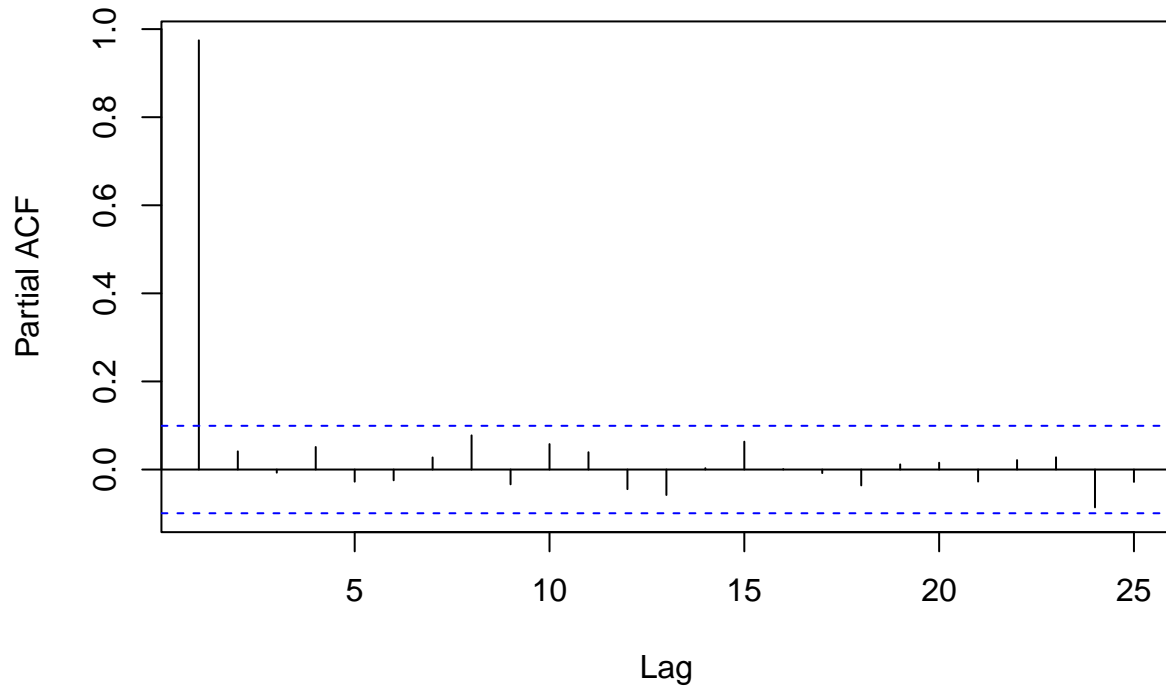


```
#quickly test some ARMA specifications  
quick_arma(SPY_25_04_02,1,0,0) #checking AR1,AR2,AR3
```

Series data\$close



Series data\$close



```
## AR Estimations
##
##      AR-1      AR-2      AR-3
##
##      ar1      0.9975      0.9728      1.4609
##              (0.0030)    (0.0514)    (NaN)
##      intercept 561.0971   561.3655   562.5635
##              (3.2897)    (3.4352)    (22.1897)
##      ar2                0.0249      0.0770
##                  (0.0515)    (0.0013)
##      ar3                -0.5386
##                  (0.0007)
##
##      nobs      390      390      390
##      sigma     0.2854    0.2853    0.3414
##      logLik    -67.0847  -66.9808  -135.4359
##      AIC       140.1693  141.9615  280.8718
##      BIC       152.0678  157.8261  300.7025
##      nobs.1    390.0000  390.0000  390.0000
##
##      *** p < 0.001; ** p < 0.01; * p <
##      0.05.
```

```
##              AR-1 Residuals  AR-2 Residuals  AR-3 Residuals
##
##      (Intercept)          0.0302 *          0.0291 *          -0.0051
##                      (0.0145)          (0.0145)          (0.0171)
##      REG1res_lagged      -0.0476
##                      (0.0510)
##      REG2res_lagged
##                      -0.0217
##                      (0.0511)
##      REG3res_lagged
##                      -0.1733 ***
##                      (0.0503)
##
##      N                  389                  389                  389
##      R2                  0.0022                  0.0005                  0.0297
##
##      *** p < 0.001; ** p < 0.01; * p < 0.05.
##
## Column names: names, AR-1 Residuals, AR-2 Residuals, AR-3 Residuals
```

```
#quick_arma(SPY_25_04_02,2,0,0) #checking AR2,AR3,AR4

#extract a particular month
SPY_24_09 = month_selector(raw_SPY,2024,09) #november 2024

#extract a particular year
SPY_24 = year_selector(raw_SPY,2024) #2024
```

Realised Volatility

Computations

```
#avg per day for each month of any dataset
vol_SPY_daily = r.vol_daily(raw_SPY,merge=F)
head(vol_SPY_daily)
```

timestamp	r_vol_d
2019-01-02	4.76e-07
2019-01-03	6.03e-07
2019-01-04	3.84e-07
2019-01-07	2.57e-07
2019-01-08	2.09e-07
2019-01-09	2.16e-07

```

#can then filter out years, months, or days
vol_24d = year_selector(vol_SPY_daily,2024)
vol_24_08d = month_selector(vol_SPY_daily,2024,08)
vol_24_11_04d = day_selector(vol_SPY_daily,2024,11,04) #scalar

#avg per hour for each day of each month of any dataset
vol_SPY_hourly = r.vol_hourly(raw_SPY,merge=F)
head(vol_SPY_hourly)

```

timestamp	r_vol_h
2019-01-02 09:00:00	5.59e-07
2019-01-02 10:00:00	6.51e-07
2019-01-02 11:00:00	5.83e-07
2019-01-02 12:00:00	2.98e-07
2019-01-02 13:00:00	2.94e-07
2019-01-02 14:00:00	3.17e-07

```

#can then filter out years, months, or days
vol_24h = year_selector(vol_SPY_hourly,2024)
vol_24_08h = month_selector(vol_SPY_hourly,2024,08)
vol_24_11_04h = day_selector(vol_SPY_hourly,2024,11,04) #vector

```

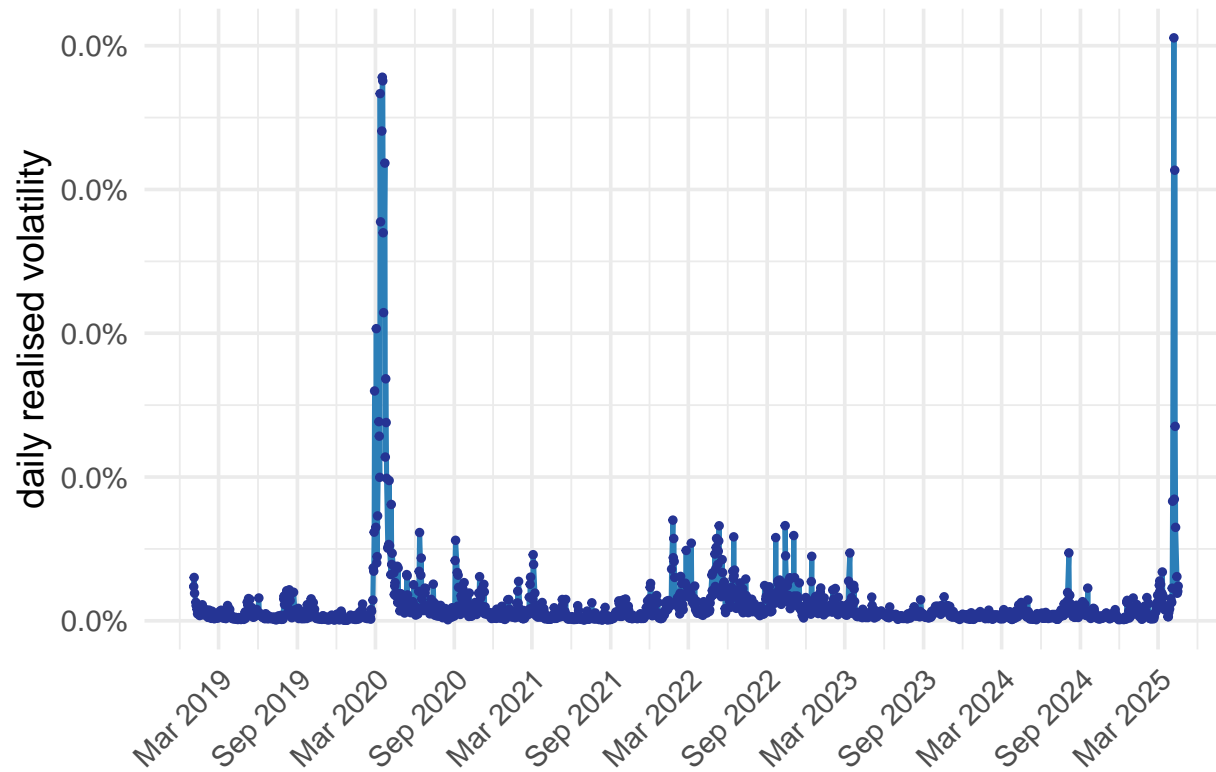
Plots

```

#avg per day volatility all time
dvol_plotter(vol_SPY_daily,breaks="yearly",
             title="Realised Volatility - SPY")

```

Realised Volatility – SPY



```
#hourly volatility all time  
hvol_plotter(vol_SPY_hourly,breaks="yearly",  
             title="Realised Volatility - SPY")
```


Realised Volatility – SPY

