

Financial Data Analysis

Contents

Data	2
Raw Data	2
Quick Analysis	2
SPY April 2nd 2025	2
Realised Volatility	6

Data

Raw Data

```
#political shocks
raw_truths <- read.csv(here("data/political_data", "trump_all_truths.csv"))
raw_tweets <- read.csv(here("data/political_data", "tweets.csv"))

#market prices
raw_ONEQ <- read.csv(here("data/market_data", "ONEQ.csv")) #USA
raw_SMI <- read.csv(here("data/market_data", "SMI.csv")) #CH
raw_VTHR <- read.csv(here("data/market_data", "VTHR.csv")) #USA
raw_VTI <- read.csv(here("data/market_data", "VTI.csv")) #USA
raw_DAX <- read.csv(here("data/market_data", "DAX.csv")) #DE
raw_ASHR <- read.csv(here("data/market_data", "ASHR.csv")) #CHINA
data_loader(year=2021,months=1:6,symbol="SPY")
#data_loader(year=2024,months=1:12,symbol="SPY")
data_loader(year=2025,months=1:4,symbol="SPY")
data_loader(year=2024,months=1:12,symbol="VGK") #EU
data_loader(year=2025,months=1:4,symbol="VGK")
data_loader(year=2025,months=1:2,symbol="ASHR")

data_loader2(year=2024,months=1:12,"SPY")
```

Quick Analysis

SPY April 2nd 2025

```
#extract a particular day
day_SPY_0402 = day_selector(raw_SPY_2025_04,2025,04,02) #april 2nd 2025

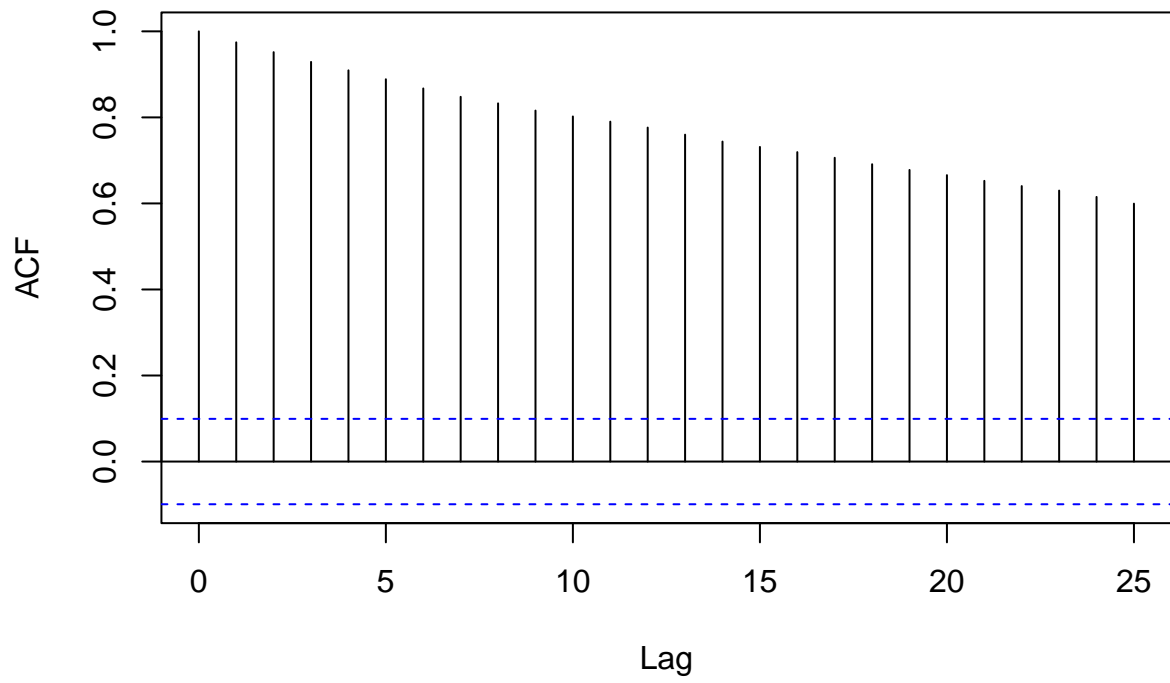
#let's plot it
day_plotter(day_SPY_0402,"SPY Price on April 2nd 2025")
```

SPY Price on April 2nd 2025

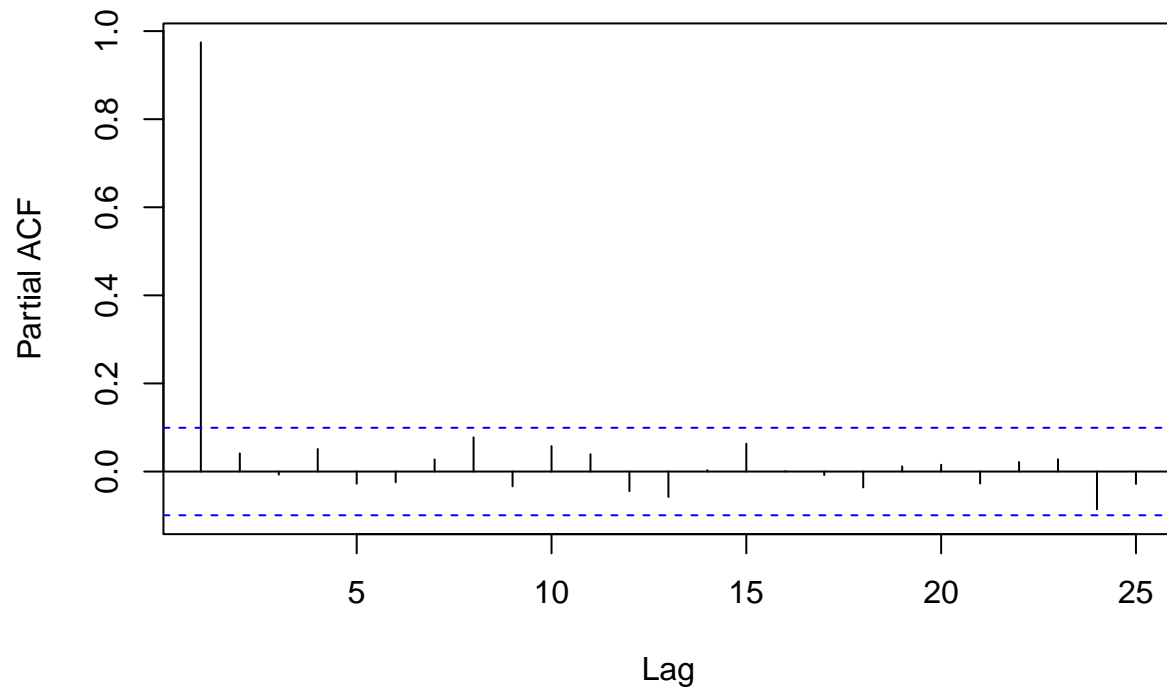


```
#quickly test some ARMA specifications  
quick_arma(day_SPY_0402,1,0,0) #checking AR1,AR2,AR3
```

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.
##
## Column names: names, AR-1, AR-2, AR-3
##           Checking Residuals
##
```

```
##              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(day_SPY_0402,2,0,0) #checking AR2,AR3,AR4
```

Realised Volatility

```
#for a particular day (outputs scalar)
r.vol(day_SPY_0402)
```

```
## [1] 0.08152862
```

```
#for a month (outputs vector of each day's realised volatility)
r.vol_month(raw_SPY_2025_04)
```

```
## [1] 0.07851997 0.08152862 0.13381914 0.44172333 2.05732267 0.43592888
## [7] 1.67344102 0.73881997 0.36128756 0.17859522 0.11181995
```

```
#for each day in each month of one year
r.vol_year(raw_SPY_2024)
```

```
##           [,1]      [,2]      [,3]      [,4]      [,5]      [,6]
## [1,]      NA 0.021143900 0.011284204 0.01039484 0.073471057      NA
## [2,] 0.012415812 0.026401852      NA 0.01106034 0.032803729      NA
## [3,] 0.020250868      NA      NA 0.01569628 0.028870802 0.029894320
## [4,] 0.013558265      NA 0.007255057 0.03713616      NA 0.027115784
## [5,] 0.020836134 0.015481985 0.019712747 0.03546997      NA 0.010274598
## [6,]      NA 0.015688934 0.040378114      NA 0.006682677 0.011012847
## [7,]      NA 0.015511707 0.013316025      NA 0.010045139 0.022338203
## [8,] 0.011702214 0.007324744 0.032537414 0.01546303 0.008217314      NA
## [9,] 0.013565561 0.005462019      NA 0.02976630 0.007987699      NA
## [10,] 0.011226764      NA      NA 0.05831688 0.011167486 0.010134506
## [11,] 0.028957726      NA 0.019373235 0.02815141      NA 0.012942579
## [12,] 0.018413433 0.008574647 0.026763865 0.03218925      NA 0.034261802
```

```

## [13,]      NA 0.019252004 0.015805393      NA 0.005709164 0.017524376
## [14,]      NA 0.019557301 0.027563491      NA 0.010022021 0.014908185
## [15,]      NA 0.012794836 0.025976894 0.05147409 0.008722512      NA
## [16,] 0.023132659 0.019873140      NA 0.06475655 0.010891813      NA
## [17,] 0.013333943      NA      NA 0.05262046 0.006561694 0.013768102
## [18,] 0.016934856      NA 0.011360510 0.03811009      NA 0.009728472
## [19,] 0.016387994      NA 0.013312919 0.05071581      NA      NA
## [20,]      NA 0.020211411 0.033814023      NA 0.006391525 0.024980110
## [21,]      NA 0.017481851 0.010547097      NA 0.004268227 0.017829988
## [22,] 0.011262476 0.014535184 0.008975325 0.02394531 0.014486274      NA
## [23,] 0.006962253 0.017206658      NA 0.02321498 0.027692195      NA
## [24,] 0.015067410      NA      NA 0.02149434 0.015690968 0.018464188
## [25,] 0.014599715      NA 0.005104990 0.02784299      NA 0.012014496
## [26,] 0.011253195 0.010144772 0.005631855 0.01896832      NA 0.015186078
## [27,]      NA 0.007235280 0.010236955      NA      NA 0.016284111
## [28,]      NA 0.008065767 0.009858483      NA 0.013165048 0.026323009
## [29,] 0.010753872 0.019767203      NA 0.01370803 0.013628710      NA
## [30,] 0.007483591      NA      NA 0.02300110 0.013521575      NA
## [31,] 0.034980298      NA      NA      NA 0.022734872      NA
##      [,7]      [,8]      [,9]      [,10]      [,11]      [,12]
## [1,] 0.024277365 0.08118317      NA 0.056233921 0.034067683      NA
## [2,] 0.014109760 0.11141425      NA 0.025023994      NA 0.007057617
## [3,] 0.026727482      NA 0.03554182 0.053038734      NA 0.007357840
## [4,]      NA      NA 0.06306683 0.039590995 0.028184648 0.007290868
## [5,] 0.010014673 0.25271880 0.04483728      NA 0.023820010 0.008227533
## [6,]      NA 0.09794829 0.07865960      NA 0.030504596 0.009179047
## [7,]      NA 0.09774069      NA 0.023672077 0.016381866      NA
## [8,] 0.006640538 0.06704930      NA 0.017974316 0.009823421      NA
## [9,] 0.007550356 0.05574313 0.02596162 0.012909441      NA 0.011937257
## [10,] 0.006680875      NA 0.03080083 0.020067051      NA 0.010900085
## [11,] 0.029091124      NA 0.06853948 0.013463507 0.013616677 0.006175591
## [12,] 0.020804270 0.04435560 0.04630338      NA 0.017243694 0.013346317
## [13,]      NA 0.02453407 0.02524256      NA 0.027147887 0.017938639
## [14,]      NA 0.02887814      NA 0.008339548 0.032959293      NA
## [15,] 0.025983981 0.01767380      NA 0.019469876 0.031111389      NA
## [16,] 0.018021355 0.01808247 0.02271454 0.010670427      NA 0.008383432
## [17,] 0.024554978      NA 0.03173591 0.023053029      NA 0.011695146
## [18,] 0.046885352      NA 0.14493815 0.010288253 0.017144319 0.090883909
## [19,] 0.038526683 0.01496351 0.03160202      NA 0.028431226 0.098734280
## [20,]      NA 0.01550493 0.02320854      NA 0.038609709 0.085187673
## [21,]      NA 0.03219310      NA 0.014695319 0.054226501      NA
## [22,] 0.031365368 0.04686951      NA 0.011858962 0.034440282      NA
## [23,] 0.022507886 0.06811768 0.01822570 0.020819306      NA 0.047487339
## [24,] 0.023376791      NA 0.01616798 0.018362657      NA 0.013891701
## [25,] 0.069171155      NA 0.01071128 0.025115688 0.023451588      NA
## [26,] 0.054778597 0.02239555 0.01843709      NA 0.014858419 0.020061213
## [27,]      NA 0.01471526 0.01466890      NA 0.013608355 0.059920090
## [28,]      NA 0.02758580      NA 0.016578544      NA      NA
## [29,] 0.033572140 0.04919462      NA 0.017842154 0.005804139      NA
## [30,] 0.041303625 0.03523880 0.02055323 0.018900435      NA 0.059037359
## [31,] 0.063912209      NA      NA 0.035515594      NA 0.064453573

```

```

#for each hour in a day (outputs a vector of each hour's realised volatility)
r.vol_hour(day_SPY_0402)

```

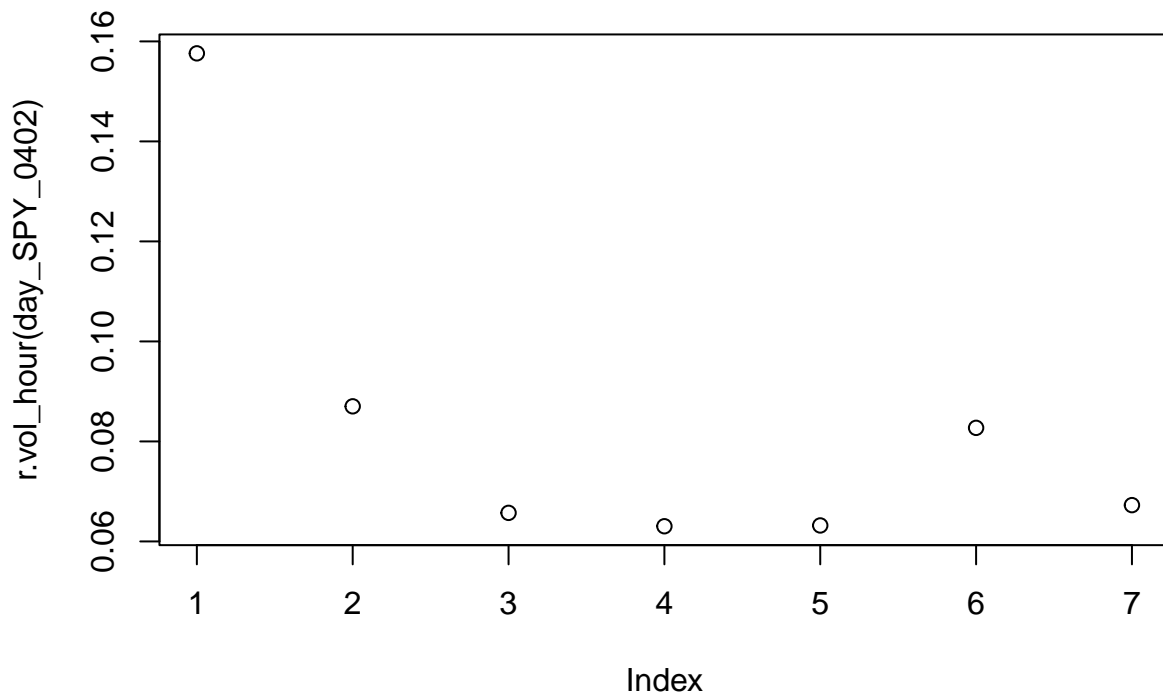
```
## [1] 0.15760939 0.08701794 0.06571201 0.06303564 0.06319524 0.08271313 0.06726031
```

```
#for each hour in a day for each day in a month (outputs a matrix)
month_hour = r.vol_month_hour(raw_SPY_2025_04)
huxtable(data.frame(month_hour))
```

	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	X11
	0.141	0.158	0.278	0.812	1.35	0.578	1.27	0.825	0.812	0.353	0.178
	0.13	0.087	0.148	0.445	7.3	0.278	0.526	0.492	0.625	0.205	0.222
	0.0766	0.0657	0.137	0.815	2.38	0.29	0.401	0.288	0.314	0.165	0.131
	0.0657	0.063	0.16	0.319	0.531	0.452	0.189	0.958	0.256	0.222	0.0745
	0.0492	0.0632	0.0927	0.284	0.918	0.439	7.33	1.12	0.355	0.182	0.0878
	0.0596	0.0827	0.0745	0.216	0.582	0.496	1.22	0.72	0.153	0.0414	0.0669
	0.0613	0.0673	0.112	0.419	0.6	0.61	0.618	0.796	0.17	0.137	0.0517

```
#plots
```

```
#hours in a day
plot(r.vol_hour(day_SPY_0402))
```




```
#days in a month  
plot(r.vol_month(raw_SPY_2025_04))
```

