

Financial Data Analysis

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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_months(year=2025,months=1:2,symbol="ASHR")

#SP500
data_loader(year=2021,months=1:6,"SPY")
data_loader(year=2024,months=1:12,"SPY")
data_loader(year=2025,months=1:4,"SPY")

#STOXX50
data_loader(year=2024,months=1:12,"VGK")
data_loader(year=2025,months=1:4,"VGK")
```

Quick Analysis

SPY April 2nd 2025

```
#extract a particular day
SPY_25_04_02 = day_selector(raw_SPY_2025,2025,04,02) #april 2nd 2025

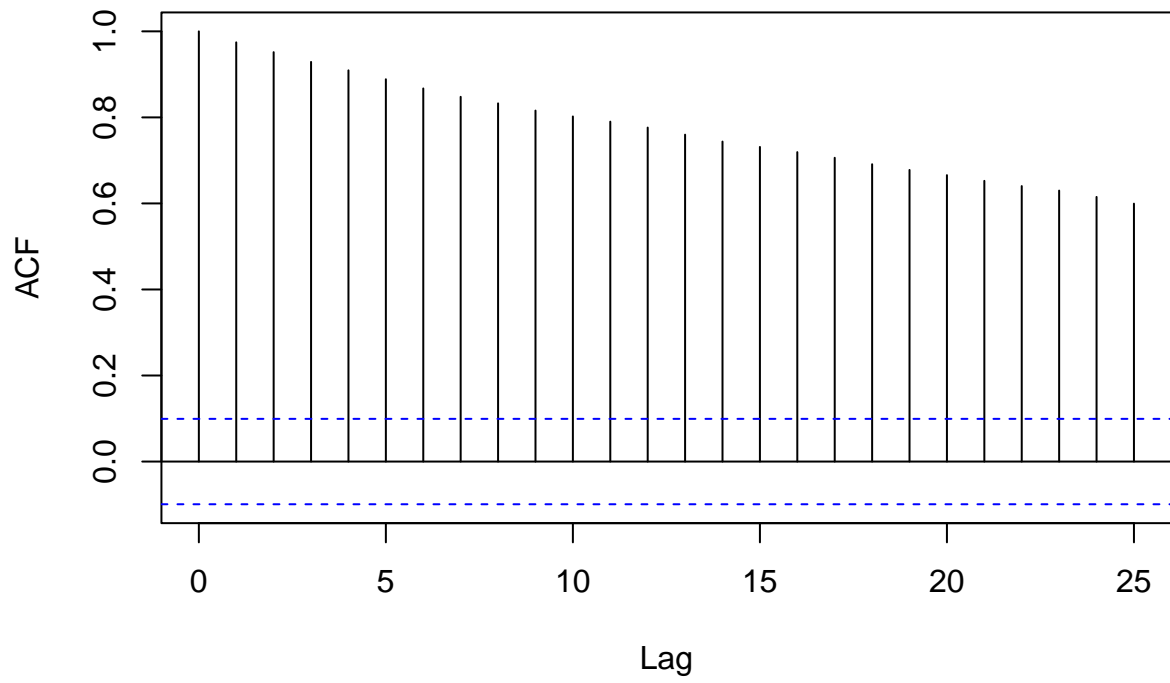
#let's plot it
day_plotter(SPY_25_04_02,"SPY Price on April 2nd 2025")
```

SPY Price on April 2nd 2025

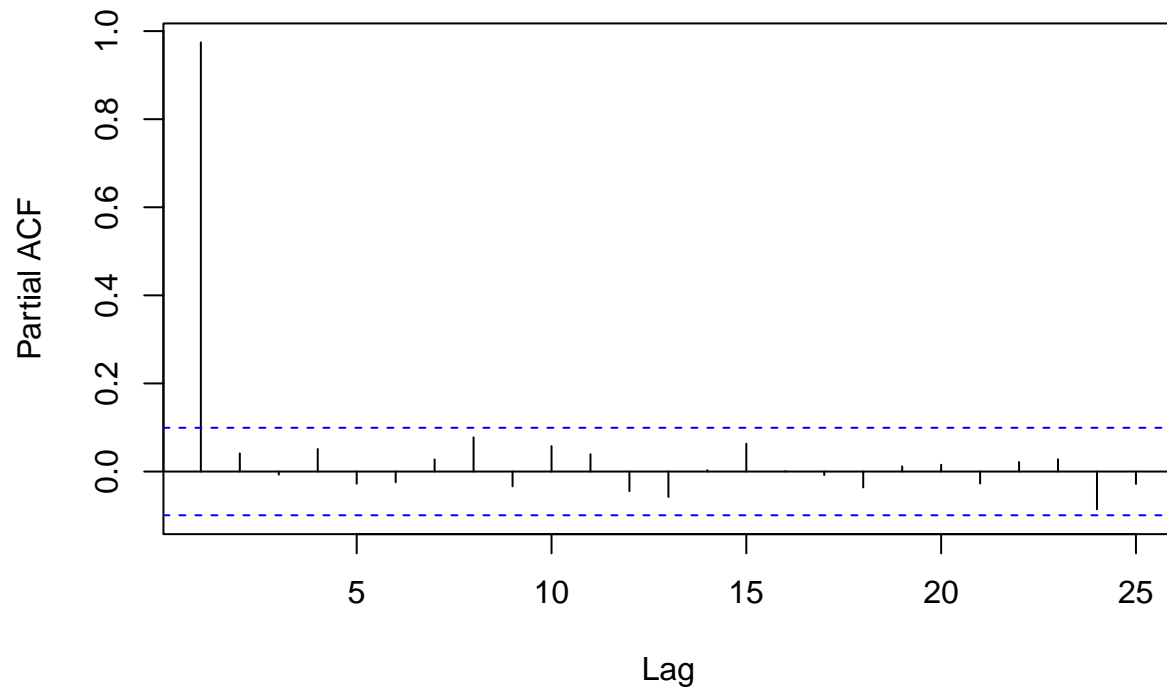


```
#quickly test some ARMA specifications  
quick_arma(SPY_25_04_02,1,0,0) #checking AR1,AR2,AR3
```

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.
##
## 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(SPY_25_04_02,2,0,0) #checking AR2,AR3,AR4
#extract a particular month
SPY_24_09 = month_selector(raw_SPY_2024,2024,09) #november 2024
```

Realised Volatility

```
#for a particular day (outputs scalar)
r.vol_day(SPY_25_04_02)
```

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

```
#for a month (outputs vector of each day's realised volatility)
r.vol_month(SPY_24_09)
```

```
## [1] 0.03554182 0.06306683 0.04483728 0.07865960 0.02596162 0.03080083
## [7] 0.06853948 0.04630338 0.02524256 0.02271454 0.03173591 0.14493815
## [13] 0.03160202 0.02320854 0.01822570 0.01616798 0.01071128 0.01843709
## [19] 0.01466890 0.02055323
```

```
#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_day_hour(SPY_25_04_02)
```

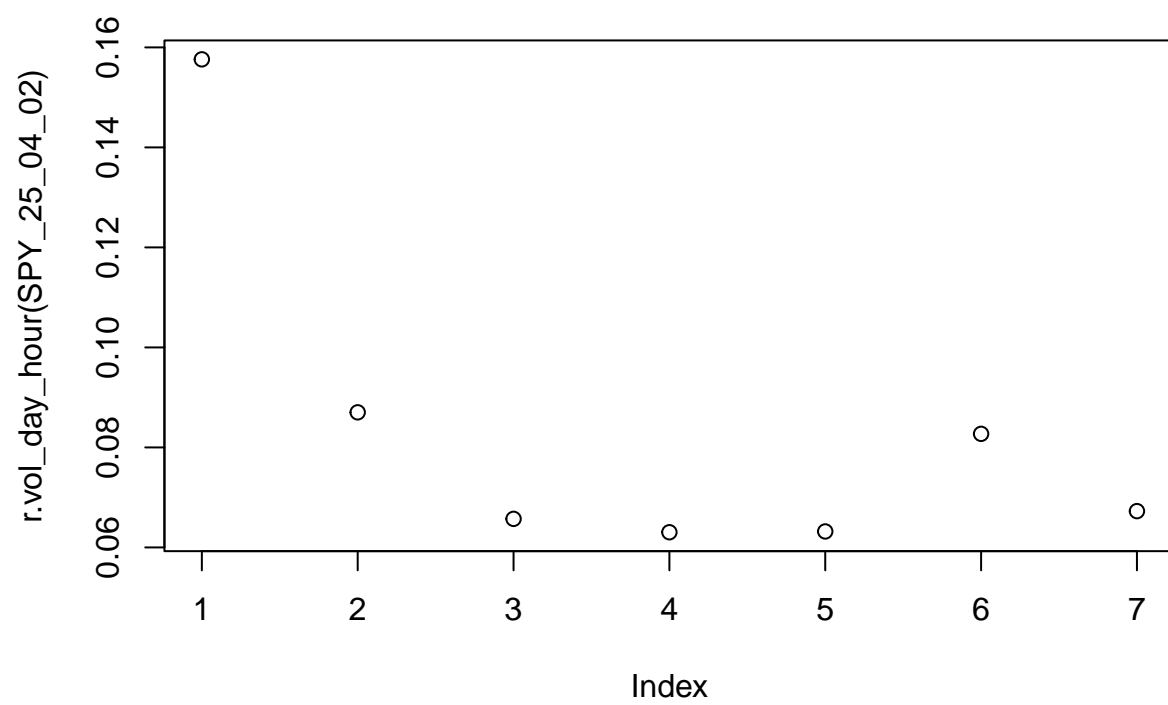
```
## [1] 0.15760939 0.08701794 0.06571201 0.06303564 0.06319524 0.08271313 0.06726031
```

```
#for each hour in a day for each day in a month (outputs a matrix)
month_hour = r.vol_month_hour(SPY_24_09)
huxtable(data.frame(month_hour))
```

X5	X6	X7	X8	X9	X10	X11	X12	X13	X14	X15	X16	X17
0.0296	0.0304	0.121	0.0735	0.0232	0.0419	0.0384	0.0141	0.075	0.0243	0.0624	0.0155	0.020
0.0398	0.0607	0.106	0.0779	0.0539	0.0585	0.0284	0.026	0.0428	0.0253	0.0296	0.0349	0.01
0.0256	0.0486	0.0732	0.0547	0.0178	0.0179	0.0181	0.0168	0.0319	0.0315	0.013	0.0132	0.009
0.0124	0.0302	0.0683	0.0275	0.0133	0.0199	0.0471	0.00939	0.0124	0.0112	0.0225	0.00894	0.007
0.0219	0.0189	0.0408	0.0135	0.0093	0.00948	0.0376	0.0152	0.0117	0.013	0.0111	0.00717	0.014
0.0194	0.0147	0.0452	0.0745	0.0279	0.0104	0.035	0.333	0.0253	0.0237	0.00372	0.0118	0.007
0.0367	0.0135	0.0431	0.0191	0.0117	0.00985	0.022	0.259	0.0451	0.0332	0.00712	0.00932	0.007

```
#plots

#hours in a day
plot(r.vol_day_hour(SPY_25_04_02))
```

```
#days in a month  
plot(r.vol_month(SPY_24_09))
```

