Final_VAR

Contents

```r
y = cbind(Vdata$dummy, Vdata$SPY_vol)
colnames(y)[1:2] <- c("dummy", "vol")
est.VAR <- VAR(y,p=6)

#extract results
mod_vol = est.VAR$varresult$vol
f = formula(mod_vol)
d = model.frame(mod_vol)
lm_clean = lm(f, data= d)

#apply Newey-West
nw_vcov = NeweyWest(lm_clean, lag=6)
nw_se = sqrt(diag(nw_vcov))

#t-stats
coef = coef(lm_clean)
t_stat = coef/nw_se

#recalculate p-values
robust = 2*(1-pt(abs(t_stat), df = df.residual(lm_clean)))

#table
screenreg(lm_clean, override.se = nw_se, override.pvalues = robust, digits = 6)
```

```
##
## ============================
##             Model 1
## ----------------------------
## dummy.l1       0.000083
##               (0.000201)
## vol.l1         0.344511 ***
##               (0.103790)
## dummy.l2      -0.000473 ***
##               (0.000071)
## vol.l2         0.023714
##               (0.042739)
## dummy.l3      -0.000804 ***
##               (0.000088)
## vol.l3         0.082941 ***
##               (0.007496)
## dummy.l4      -0.000546 ***
##               (0.000088)
## vol.l4         0.096948
##               (0.059298)
## dummy.l5      -0.000579 ***
##               (0.000147)
## vol.l5         0.022887 ***
##               (0.006876)
## dummy.l6      -0.000099
##               (0.000101)
## vol.l6         0.164034 ***
##               (0.047379)
## const          0.008726 ***
```

```
##               (0.001609)
## --------------------------
## R^2            0.325745
## Adj. R^2       0.325306
## Num. obs.  19965
## ==========================
## *** p < 0.001; ** p < 0.01; * p < 0.05
```

N

```
y2 = cbind(Vdata$N, Vdata$SPY_vol)
colnames(y2)[1:2] <- c("N", "vol")
est.VAR2 <- VAR(y2,p=6)

#extract results
mod_vol2 = est.VAR2$varresult$vol
f2 = formula(mod_vol2)
d2 = model.frame(mod_vol2)
lm_clean2 = lm(f2, data= d2)

#apply Newey-West
nw_vcov2 = NeweyWest(lm_clean2, lag=6)
nw_se2 = sqrt(diag(nw_vcov2))

#t-stats
coef2 = coef(lm_clean2)
t_stat2 = coef2/nw_se2

#recalculate p-values
robust2 = 2*(1-pt(abs(t_stat2), df = df.residual(lm_clean2)))

#table
screenreg(lm_clean2, override.se = nw_se2, override.pvalues = robust2, digits = 6)
```

```
##
## ============================
##            Model 1
## ----------------------------
## N.l1           0.000045
##               (0.000037)
## vol.l1         0.345011 ***
##               (0.104492)
## N.l2          -0.000116 ***
##               (0.000023)
## vol.l2         0.023575
##               (0.043816)
## N.l3          -0.000213 ***
##               (0.000028)
## vol.l3         0.082525 ***
##               (0.008145)
## N.l4          -0.000147 ***
##               (0.000021)
```

```
## vol.l4          0.096739
##                (0.060827)
## N.l5           -0.000119 **
##                (0.000041)
## vol.l5          0.022593 **
##                (0.006952)
## N.l6            0.000000
##                (0.000028)
## vol.l6          0.164442 ***
##                (0.049763)
## const           0.007587 ***
##                (0.001578)
## ---------------------------
## R^2             0.325324
## Adj. R^2        0.324885
## Num. obs.  19965
## ===========================
## *** p < 0.001; ** p < 0.01; * p < 0.05
```

Tariff

```
y3 = cbind(Vdata$tariff, Vdata$SPY_vol)
colnames(y3)[1:2] <- c("tariff", "vol")
est.VAR3 <- VAR(y3,p=6)

#extract results
mod_vol3 = est.VAR3$varresult$vol
f3 = formula(mod_vol3)
d3 = model.frame(mod_vol3)
lm_clean3 = lm(f3, data= d3)

#apply Newey-West
nw_vcov3 = NeweyWest(lm_clean3, lag=6)
nw_se3 = sqrt(diag(nw_vcov3))

#t-stats
coef3 = coef(lm_clean3)
t_stat3 = coef3/nw_se3

#recalculate p-values
robust3 = 2*(1-pt(abs(t_stat3), df = df.residual(lm_clean3)))

#table
screenreg(lm_clean3, override.se = nw_se3, override.pvalues = robust3, digits = 6)
```

```
##
## ===========================
##            Model 1
## ---------------------------
## tariff.l1       0.019718
##                (0.018964)
## vol.l1          0.342081 ***
```

```
##                (0.098665)
## tariff.l2       0.005269
##                (0.004124)
## vol.l2          0.027464
##                (0.039912)
## tariff.l3      -0.007797
##                (0.005183)
## vol.l3          0.075380 ***
##                (0.011695)
## tariff.l4       0.002275
##                (0.002454)
## vol.l4          0.088777
##                (0.063948)
## tariff.l5      -0.001145
##                (0.002634)
## vol.l5          0.026049 ***
##                (0.006815)
## tariff.l6      -0.002750
##                (0.002450)
## vol.l6          0.167546 ***
##                (0.049876)
## const           0.005770 ***
##                (0.001405)
## ---------------------------
## R^2             0.331931
## Adj. R^2        0.331496
## Num. obs.  19965
## ===========================
## *** p < 0.001; ** p < 0.01; * p < 0.05
```

Trade

```
y4 = cbind(Vdata$trade, Vdata$SPY_vol)
colnames(y4)[1:2] <- c("trade", "vol")
est.VAR4 <- VAR(y4,p=6)

#extract results
mod_vol4 = est.VAR4$varresult$vol
f4 = formula(mod_vol4)
d4 = model.frame(mod_vol4)
lm_clean4 = lm(f4, data= d4)

#apply Newey-West
nw_vcov4 = NeweyWest(lm_clean4, lag=6)
nw_se4 = sqrt(diag(nw_vcov4))

#t-stats
coef4 = coef(lm_clean4)
t_stat4 = coef4/nw_se4

#recalculate p-values
robust4 = 2*(1-pt(abs(t_stat4), df = df.residual(lm_clean4)))
```

```r
#table
screenreg(lm_clean4, override.se = nw_se4, override.pvalues = robust4, digits = 6)
```

```
##
## ============================
##             Model 1
## ----------------------------
## trade.l1       0.003399
##               (0.003747)
## vol.l1         0.346107 ***
##               (0.101918)
## trade.l2       0.005600
##               (0.004809)
## vol.l2         0.022949
##               (0.041538)
## trade.l3      -0.003904 *
##               (0.001726)
## vol.l3         0.081148 ***
##               (0.008258)
## trade.l4       0.000725
##               (0.003458)
## vol.l4         0.095797
##               (0.057082)
## trade.l5      -0.002363
##               (0.001901)
## vol.l5         0.023502 **
##               (0.007162)
## trade.l6      -0.001543
##               (0.001228)
## vol.l6         0.165323 ***
##               (0.049319)
## const          0.005939 ***
##               (0.001536)
## ----------------------------
## R^2            0.325134
## Adj. R^2       0.324695
## Num. obs.  19965
## ============================
## *** p < 0.001; ** p < 0.01; * p < 0.05
```

China

```r
ychina = cbind(Vdata$china, Vdata$SPY_vol)
colnames(ychina)[1:2] <- c("china", "vol")
est.VARchina <- VAR(ychina,p=6)

#extract results
mod_volchina = est.VARchina$varresult$vol
fchina = formula(mod_volchina)
dchina = model.frame(mod_volchina)
lm_cleanchina = lm(fchina, data= dchina)
```

```r
#apply Newey-West
nw_vcovchina = NeweyWest(lm_cleanchina, lag=6)
nw_sechina = sqrt(diag(nw_vcovchina))

#t-stats
coefchina = coef(lm_cleanchina)
t_statchina = coefchina/nw_sechina

#recalculate p-values
robustchina = 2*(1-pt(abs(t_statchina), df = df.residual(lm_cleanchina)))

#table
screenreg(lm_cleanchina, override.se = nw_sechina, override.pvalues = robustchina, digits = 6)
```

```
##
## ============================
##             Model 1
## ----------------------------
## china.l1       0.006729
##               (0.006694)
## vol.l1         0.344512 ***
##               (0.097994)
## china.l2       0.002778
##               (0.004067)
## vol.l2         0.024149
##               (0.043585)
## china.l3      -0.004652 *
##               (0.002066)
## vol.l3         0.081646 ***
##               (0.009192)
## china.l4      -0.002442 *
##               (0.001084)
## vol.l4         0.094919
##               (0.058821)
## china.l5      -0.000607
##               (0.000970)
## vol.l5         0.022961 **
##               (0.007678)
## china.l6       0.000596
##               (0.000981)
## vol.l6         0.166695 **
##               (0.054194)
## const          0.005857 ***
##               (0.001612)
## ----------------------------
## R^2            0.326344
## Adj. R^2       0.325905
## Num. obs.  19965
## ============================
## *** p < 0.001; ** p < 0.01; * p < 0.05
```

mean_day_filtered <- Vdata %>% mutate(day = as.Date(timestamp), year = year(day), month = month(day)) %>% filter(!(year == 2025 & month %in% c(4, 5))) %>% # exclut avril et mai 2025

group_by(day) %>% summarise(mean_vol_day = mean(SPY_vol, na.rm = TRUE))

mean(mean_day_filtered$mean_vol_day)

```
dt_t = d %>%
    rename(X.l1 = dummy.l1,
    X.l2 = dummy.l2,
    X.l3 = dummy.l3,
    X.l4 = dummy.l4,
    X.l5 = dummy.l5,
    X.l6 = dummy.l6)


f_t <- as.formula("y ~ -1 + vol.l1 + vol.l2 + vol.l3 + vol.l4 + vol.l5 + vol.l6 +
                          X.l1 + X.l2 + X.l3 + X.l4 + X.l5 + X.l6 + const")
model <- lm(f_t, data = dt_t)

dt_t2 = d2 %>%
    rename(X.l1 = N.l1,
    X.l2 = N.l2,
    X.l3 = N.l3,
    X.l4 = N.l4,
    X.l5 = N.l5,
    X.l6 = N.l6)



f_t2 <- as.formula("y ~ -1 + vol.l1 + vol.l2 + vol.l3 + vol.l4 + vol.l5 + vol.l6 +
                          X.l1 + X.l2 + X.l3 + X.l4 + X.l5 + X.l6 + const")
model2 <- lm(f_t2, data = dt_t2)


dt_t3 = d3 %>%
    rename(X.l1 = tariff.l1,
    X.l2 = tariff.l2,
    X.l3 = tariff.l3,
    X.l4 = tariff.l4,
    X.l5 = tariff.l5,
    X.l6 = tariff.l6)



f_t3 <- as.formula("y ~ -1 + vol.l1 + vol.l2 + vol.l3 + vol.l4 + vol.l5 + vol.l6 +
                          X.l1 + X.l2 + X.l3 + X.l4 + X.l5 + X.l6 + const")
model3 <- lm(f_t3, data = dt_t3)


dt_t4 = d4 %>%
    rename(X.l1 = trade.l1,
    X.l2 = trade.l2,
    X.l3 = trade.l3,
    X.l4 = trade.l4,
    X.l5 = trade.l5,
    X.l6 = trade.l6)
```

```r
f_t4 <- as.formula("y ~ -1 + vol.l1 + vol.l2 + vol.l3 + vol.l4 + vol.l5 + vol.l6 +
                        X.l1 + X.l2 + X.l3 + X.l4 + X.l5 + X.l6 + const")
model4 <- lm(f_t4, data = dt_t4)

dt_tchina = dchina %>%
    rename(X.l1 = china.l1,
    X.l2 = china.l2,
    X.l3 = china.l3,
    X.l4 = china.l4,
    X.l5 = china.l5,
    X.l6 = china.l6)



f_tchina <- as.formula("y ~ -1 + vol.l1 + vol.l2 + vol.l3 + vol.l4 + vol.l5 + vol.l6 +
                        X.l1 + X.l2 + X.l3 + X.l4 + X.l5 + X.l6 + const")
modelchina <- lm(f_tchina, data = dt_tchina)


nw_se_t <- sqrt(diag(sandwich::NeweyWest(model, lag = 6, prewhite = FALSE)))
nw_se2_t <- sqrt(diag(sandwich::NeweyWest(model2, lag = 6, prewhite = FALSE)))
nw_se3_t <- sqrt(diag(sandwich::NeweyWest(model3, lag = 6, prewhite = FALSE)))
nw_se4_t <- sqrt(diag(sandwich::NeweyWest(model4, lag = 6, prewhite = FALSE)))
nw_sechina_t <- sqrt(diag(sandwich::NeweyWest(modelchina, lag = 6, prewhite = FALSE)))


robust_t <- 2 * (1-pt(abs(coef(model) / nw_se_t), df = df.residual(model)))
robust2_t <- 2 * (1-pt(abs(coef(model2) / nw_se2_t), df = df.residual(model2)))
robust3_t <- 2 * (1-pt(abs(coef(model3) / nw_se3_t), df = df.residual(model3)))
robust4_t <- 2 * (1-pt(abs(coef(model4) / nw_se4_t), df = df.residual(model4)))
robustchina_t <- 2 * (1-pt(abs(coef(modelchina) / nw_sechina_t), df = df.residual(modelchina)))



nw_se_t       <- nw_se_t[names(coef(model))]
robust_t      <- robust_t[names(coef(model))]
nw_se2_t      <- nw_se2_t[names(coef(model2))]
robust2_t     <- robust2_t[names(coef(model2))]
nw_se3_t      <- nw_se3_t[names(coef(model3))]
robust3_t     <- robust3_t[names(coef(model3))]
nw_se4_t      <- nw_se4_t[names(coef(model4))]
robust4_t     <- robust4_t[names(coef(model4))]
nw_sechina_t  <- nw_sechina_t[names(coef(modelchina))]
robustchina_t <- robustchina_t[names(coef(modelchina))]



# Créer la liste des modèles
models_list <- list(model, model2, model3, model4, modelchina)
```

```r
# Créer la liste des SE robustes
robust_ses <- list(nw_se_t, nw_se2_t, nw_se3_t, nw_se4_t, nw_sechina_t)

# Créer la liste des p-values
robust_pvals <- list(robust_t, robust2_t, robust3_t, robust4_t, robustchina_t)

# Nom des variables (affichées dans le tableau)
custom_names <- list(
  "vol.l1" = "$AHV_{t-1}$",
  "vol.l2" = "$AHV_{t-2}$",
  "vol.l3" = "$AHV_{t-3}$",
  "vol.l4" = "$AHV_{t-4}$",
  "vol.l5" = "$AHV_{t-5}$",
  "vol.l6" = "$AHV_{t-6}$",
  "X.l1" = "$X_{t-1}$",
  "X.l2" = "$X_{t-2}$",
  "X.l3" = "$X_{t-3}$",
  "X.l4" = "$X_{t-4}$",
  "X.l5" = "$X_{t-5}$",
  "X.l6" = "$X_{t-6}$",
  "const" = "Constant"
)

# Générer le tableau
table_texreg <- texreg(
  l = models_list,
  override.se = robust_ses,
  custom.coef.map = custom_names,
  override.pvalues = robust_pvals,
  custom.model.names = c("TweetDummy", "TweetCount", "Tariff", "Trade", "China"),
  caption = "VAR Models of Average Hourly Volatility",
  label = "tab:VAR_Second_Term",
  caption.above = TRUE,
  digits = 6,
  custom.gof.rows = list("Shock (IRF)" = c(0.0041713, 0.003061, 0.001189, 0.000215, 0.001937))
)



# Afficher dans le Viewer
table_texreg
```

```r
# First and Second Mandate

#first term
Vdata_f = filter(data,between(timestamp, as.Date('2017-01-20'), as.Date('2021-01-20')))

#second term
Vdata_s = filter(data,between(timestamp, as.Date('2025-01-20'), as.Date('2025-05-07')))
```

Table 1: VAR Models of Average Hourly Volatility

	TweetDummy	TweetCount	Tariff	Trade	China
AHV_{t-1}	0.344511^{***}	0.345011^{***}	0.342081^{***}	0.346107^{***}	0.344512^{***}
	(0.103329)	(0.103473)	(0.100397)	(0.103007)	(0.102386)
AHV_{t-2}	0.023714	0.023575	0.027464	0.022949	0.024149
	(0.047239)	(0.047379)	(0.042571)	(0.047267)	(0.046561)
AHV_{t-3}	0.082941^{***}	0.082525^{***}	0.075380^{***}	0.081148^{***}	0.081646^{***}
	(0.010963)	(0.011004)	(0.013612)	(0.011336)	(0.011026)
AHV_{t-4}	0.096948	0.096739	0.088777	0.095797	0.094919
	(0.065612)	(0.065614)	(0.068856)	(0.064948)	(0.066347)
AHV_{t-5}	0.022887	0.022593	0.026049^{*}	0.023502	0.022961
	(0.012328)	(0.012316)	(0.011859)	(0.012242)	(0.012546)
AHV_{t-6}	0.164034^{**}	0.164442^{**}	0.167546^{**}	0.165323^{**}	0.166695^{**}
	(0.061085)	(0.061129)	(0.060128)	(0.061328)	(0.061192)
X_{t-1}	0.000083	0.000045	0.019718	0.003399	0.006729
	(0.000231)	(0.000040)	(0.019004)	(0.004067)	(0.006313)
X_{t-2}	-0.000473^{***}	-0.000116^{***}	0.005269	0.005600	0.002778
	(0.000087)	(0.000024)	(0.004162)	(0.005050)	(0.003938)
X_{t-3}	-0.000804^{***}	-0.000213^{***}	−0.007797	-0.003904^{*}	-0.004652^{*}
	(0.000093)	(0.000028)	(0.005041)	(0.001717)	(0.001998)
X_{t-4}	-0.000546^{***}	-0.000147^{***}	0.002275	0.000725	-0.002442^{*}
	(0.000101)	(0.000023)	(0.002654)	(0.003504)	(0.001044)
X_{t-5}	-0.000579^{***}	-0.000119^{**}	−0.001145	−0.002363	−0.000607
	(0.000146)	(0.000041)	(0.002728)	(0.001717)	(0.000993)
X_{t-6}	−0.000099	0.000000	−0.002750	−0.001543	0.000596
	(0.000117)	(0.000033)	(0.002441)	(0.001170)	(0.000973)
Constant	0.008726^{***}	0.007587^{***}	0.005770^{***}	0.005939^{***}	0.005857^{**}
	(0.001825)	(0.001707)	(0.001695)	(0.001706)	(0.001806)
Shock (IRF)	0.004171	0.003061	0.001189	0.000215	0.001937
R^2	0.325745	0.325324	0.331931	0.325134	0.326344
Adj. R^2	0.325306	0.324885	0.331496	0.324695	0.325905
Num. obs.	19965	19965	19965	19965	19965

$^{***}p < 0.001$; $^{**}p < 0.01$; $^{*}p < 0.05$

First Term

Dummy

```
y_f_d = cbind(Vdata_f$dummy, Vdata_f$SPY_vol)
colnames(y_f_d)[1:2] <- c("dummy", "vol")
est.VAR_f_d <- VAR(y_f_d,p=6)

#extract results
mod_vol_f_d = est.VAR_f_d$varresult$vol
f_f_d = formula(mod_vol_f_d)
d_f_d = model.frame(mod_vol_f_d)
lm_clean_f_d = lm(f_f_d, data= d_f_d)

#apply Newey-West
nw_vcov_f_d = NeweyWest(lm_clean_f_d, lag=6)
nw_se_f_d = sqrt(diag(nw_vcov_f_d))

#t-stats
coef_f_d = coef(lm_clean_f_d)
t_stat_f_d = coef_f_d/nw_se_f_d

#recalculate p-values
robust_f_d = 2*(1-pt(abs(t_stat_f_d), df = df.residual(lm_clean_f_d)))
```

```
y_f_n = cbind(Vdata_f$N, Vdata_f$SPY_vol)
colnames(y_f_n)[1:2] <- c("N", "vol")
est.VAR_f_n <- VAR(y_f_n,p=6)

#extract results
mod_vol_f_n = est.VAR_f_n$varresult$vol
f_f_n = formula(mod_vol_f_n)
d_f_n = model.frame(mod_vol_f_n)
lm_clean_f_n = lm(f_f_n, data= d_f_n)

#apply Newey-West
nw_vcov_f_n = NeweyWest(lm_clean_f_n, lag=6)
nw_se_f_n = sqrt(diag(nw_vcov_f_n))

#t-stats
coef_f_n = coef(lm_clean_f_n)
t_stat_f_n = coef_f_n/nw_se_f_n

#recalculate p-values
robust_f_n = 2*(1-pt(abs(t_stat_f_n), df = df.residual(lm_clean_f_n)))
```

```
y_f_ta = cbind(Vdata_f$tariff, Vdata_f$SPY_vol)
colnames(y_f_ta)[1:2] <- c("tariff", "vol")
est.VAR_f_ta <- VAR(y_f_ta,p=6)

#extract results
mod_vol_f_ta = est.VAR_f_ta$varresult$vol
```

```
f_f_ta = formula(mod_vol_f_ta)
d_f_ta = model.frame(mod_vol_f_ta)
lm_clean_f_ta = lm(f_f_ta, data= d_f_ta)

#apply Newey-West
nw_vcov_f_ta = NeweyWest(lm_clean_f_ta, lag=6)
nw_se_f_ta = sqrt(diag(nw_vcov_f_ta))

#t-stats
coef_f_ta = coef(lm_clean_f_ta)
t_stat_f_ta = coef_f_ta/nw_se_f_ta

#recalculate p-values
robust_f_ta = 2*(1-pt(abs(t_stat_f_ta), df = df.residual(lm_clean_f_ta)))
```

```
y_f_tr = cbind(Vdata_f$trade, Vdata_f$SPY_vol)
colnames(y_f_tr)[1:2] <- c("trade", "vol")
est.VAR_f_tr <- VAR(y_f_tr,p=6)

#extract results
mod_vol_f_tr = est.VAR_f_tr$varresult$vol
f_f_tr = formula(mod_vol_f_tr)
d_f_tr = model.frame(mod_vol_f_tr)
lm_clean_f_tr = lm(f_f_tr, data= d_f_tr)

#apply Newey-West
nw_vcov_f_tr = NeweyWest(lm_clean_f_tr, lag=6)
nw_se_f_tr = sqrt(diag(nw_vcov_f_tr))

#t-stats
coef_f_tr = coef(lm_clean_f_tr)
t_stat_f_tr = coef_f_tr/nw_se_f_tr

#recalculate p-values
robust_f_tr = 2*(1-pt(abs(t_stat_f_tr), df = df.residual(lm_clean_f_tr)))
```

```
y_f_ch = cbind(Vdata_f$china, Vdata_f$SPY_vol)
colnames(y_f_ch)[1:2] <- c("china", "vol")
est.VAR_f_ch <- VAR(y_f_ch,p=6)

#extract results
mod_vol_f_ch = est.VAR_f_ch$varresult$vol
f_f_ch = formula(mod_vol_f_ch)
d_f_ch = model.frame(mod_vol_f_ch)
lm_clean_f_ch = lm(f_f_ch, data= d_f_ch)

#apply Newey-West
nw_vcov_f_ch = NeweyWest(lm_clean_f_ch, lag=6)
nw_se_f_ch = sqrt(diag(nw_vcov_f_ch))

#t-stats
coef_f_ch = coef(lm_clean_f_ch)
t_stat_f_ch = coef_f_ch/nw_se_f_ch
```

```
#recalculate p-values
robust_f_ch = 2*(1-pt(abs(t_stat_f_ch), df = df.residual(lm_clean_f_ch)))
```

```
y_s_d = cbind(Vdata_s$dummy, Vdata_s$SPY_vol)
colnames(y_s_d)[1:2] <- c("dummy", "vol")
est.VAR_s_d <- VAR(y_s_d,p=6)

#extract results
mod_vol_s_d = est.VAR_s_d$varresult$vol
f_s_d = formula(mod_vol_s_d)
d_s_d = model.frame(mod_vol_s_d)
lm_clean_s_d = lm(f_s_d, data= d_s_d)

#apply Newey-West
nw_vcov_s_d = NeweyWest(lm_clean_s_d, lag=6)
nw_se_s_d = sqrt(diag(nw_vcov_s_d))

#t-stats
coef_s_d = coef(lm_clean_s_d)
t_stat_s_d = coef_s_d/nw_se_s_d

#recalculate p-values
robust_s_d = 2*(1-pt(abs(t_stat_s_d), df = df.residual(lm_clean_s_d)))
```

```
y_s_n = cbind(Vdata_s$N, Vdata_s$SPY_vol)
colnames(y_s_n)[1:2] <- c("N", "vol")
est.VAR_s_n <- VAR(y_s_n,p=6)

#extract results
mod_vol_s_n = est.VAR_s_n$varresult$vol
f_s_n = formula(mod_vol_s_n)
d_s_n = model.frame(mod_vol_s_n)
lm_clean_s_n = lm(f_s_n, data= d_s_n)

#apply Newey-West
nw_vcov_s_n = NeweyWest(lm_clean_s_n, lag=6)
nw_se_s_n = sqrt(diag(nw_vcov_s_n))

#t-stats
coef_s_n = coef(lm_clean_s_n)
t_stat_s_n = coef_s_n/nw_se_s_n

#recalculate p-values
robust_s_n = 2*(1-pt(abs(t_stat_s_n), df = df.residual(lm_clean_s_n)))
```

```
y_s_ta = cbind(Vdata_s$tariff, Vdata_s$SPY_vol)
colnames(y_s_ta)[1:2] <- c("tariff", "vol")
est.VAR_s_ta <- VAR(y_s_ta,p=6)

#extract results
mod_vol_s_ta = est.VAR_s_ta$varresult$vol
f_s_ta = formula(mod_vol_s_ta)
```

```
d_s_ta = model.frame(mod_vol_s_ta)
lm_clean_s_ta = lm(f_s_ta, data= d_s_ta)

#apply Newey-West
nw_vcov_s_ta = NeweyWest(lm_clean_s_ta, lag=6)
nw_se_s_ta = sqrt(diag(nw_vcov_s_ta))

#t-stats
coef_s_ta = coef(lm_clean_s_ta)
t_stat_s_ta = coef_s_ta/nw_se_s_ta

#recalculate p-values
robust_s_ta = 2*(1-pt(abs(t_stat_s_ta), df = df.residual(lm_clean_s_ta)))
```

```
y_s_tr = cbind(Vdata_s$trade, Vdata_s$SPY_vol)
colnames(y_s_tr)[1:2] <- c("trade", "vol")
est.VAR_s_tr <- VAR(y_s_tr,p=6)

#extract results
mod_vol_s_tr = est.VAR_s_tr$varresult$vol
f_s_tr = formula(mod_vol_s_tr)
d_s_tr = model.frame(mod_vol_s_tr)
lm_clean_s_tr = lm(f_s_tr, data= d_s_tr)

#apply Newey-West
nw_vcov_s_tr = NeweyWest(lm_clean_s_tr, lag=6)
nw_se_s_tr = sqrt(diag(nw_vcov_s_tr))

#t-stats
coef_s_tr = coef(lm_clean_s_tr)
t_stat_s_tr = coef_s_tr/nw_se_s_tr

#recalculate p-values
robust_s_tr = 2*(1-pt(abs(t_stat_s_tr), df = df.residual(lm_clean_s_tr)))
```

```
y_s_ch = cbind(Vdata_s$china, Vdata_s$SPY_vol)
colnames(y_s_ch)[1:2] <- c("china", "vol")
est.VAR_s_ch <- VAR(y_s_ch,p=6)

#extract results
mod_vol_s_ch = est.VAR_s_ch$varresult$vol
f_s_ch = formula(mod_vol_s_ch)
d_s_ch = model.frame(mod_vol_s_ch)
lm_clean_s_ch = lm(f_s_ch, data= d_s_ch)

#apply Newey-West
nw_vcov_s_ch = NeweyWest(lm_clean_s_ch, lag=6)
nw_se_s_ch = sqrt(diag(nw_vcov_s_ch))

#t-stats
coef_s_ch = coef(lm_clean_s_ch)
t_stat_s_ch = coef_s_ch/nw_se_s_ch
```

```
#recalculate p-values
robust_s_ch = 2*(1-pt(abs(t_stat_s_ch), df = df.residual(lm_clean_s_ch)))
```

```
#first

d_f_d_t = d_f_d %>%
    rename(X.l1 = dummy.l1,
    X.l2 = dummy.l2,
    X.l3 = dummy.l3,
    X.l4 = dummy.l4,
    X.l5 = dummy.l5,
    X.l6 = dummy.l6)

f_t_f_d <- as.formula("y ~ -1 + vol.l1 + vol.l2 + vol.l3 + vol.l4 + vol.l5 + vol.l6 +
                          X.l1 + X.l2 + X.l3 + X.l4 + X.l5 + X.l6 + const")
model_f_d <- lm(f_t_f_d, data = d_f_d_t)

d_f_n_t = d_f_n %>%
    rename(X.l1 = N.l1,
    X.l2 = N.l2,
    X.l3 = N.l3,
    X.l4 = N.l4,
    X.l5 = N.l5,
    X.l6 = N.l6)

f_t_f_n <- as.formula("y ~ -1 + vol.l1 + vol.l2 + vol.l3 + vol.l4 + vol.l5 + vol.l6 +
                          X.l1 + X.l2 + X.l3 + X.l4 + X.l5 + X.l6 + const")
model_f_n <- lm(f_t_f_n, data = d_f_n_t)

d_f_ta_t = d_f_ta %>%
    rename(X.l1 = tariff.l1,
    X.l2 = tariff.l2,
    X.l3 = tariff.l3,
    X.l4 = tariff.l4,
    X.l5 = tariff.l5,
    X.l6 = tariff.l6)

f_t_f_ta <- as.formula("y ~ -1 + vol.l1 + vol.l2 + vol.l3 + vol.l4 + vol.l5 + vol.l6 +
                          X.l1 + X.l2 + X.l3 + X.l4 + X.l5 + X.l6 + const")
model_f_ta <- lm(f_t_f_ta, data = d_f_ta_t)


d_f_tr_t = d_f_tr %>%
    rename(X.l1 = trade.l1,
    X.l2 = trade.l2,
    X.l3 = trade.l3,
    X.l4 = trade.l4,
    X.l5 = trade.l5,
    X.l6 = trade.l6)

f_t_f_tr <- as.formula("y ~ -1 + vol.l1 + vol.l2 + vol.l3 + vol.l4 + vol.l5 + vol.l6 +
                          X.l1 + X.l2 + X.l3 + X.l4 + X.l5 + X.l6 + const")
model_f_tr <- lm(f_t_f_tr, data = d_f_tr_t)
```

```r
d_f_ch_t = d_f_ch %>%
    rename(X.l1 = china.l1,
    X.l2 = china.l2,
    X.l3 = china.l3,
    X.l4 = china.l4,
    X.l5 = china.l5,
    X.l6 = china.l6)

f_t_f_ch <- as.formula("y ~ -1 + vol.l1 + vol.l2 + vol.l3 + vol.l4 + vol.l5 + vol.l6 +
                        X.l1 + X.l2 + X.l3 + X.l4 + X.l5 + X.l6 + const")
model_f_ch <- lm(f_t_f_ch, data = d_f_ch_t)




nw_se_f_d_t <- sqrt(diag(sandwich::NeweyWest(model_f_d, lag = 6, prewhite = FALSE)))
nw_se_f_n_t <- sqrt(diag(sandwich::NeweyWest(model_f_n, lag = 6, prewhite = FALSE)))
nw_se_f_ta_t <- sqrt(diag(sandwich::NeweyWest(model_f_ta, lag = 6, prewhite = FALSE)))
nw_se_f_tr_t <- sqrt(diag(sandwich::NeweyWest(model_f_tr, lag = 6, prewhite = FALSE)))
nw_se_f_china_t <- sqrt(diag(sandwich::NeweyWest(model_f_ch, lag = 6, prewhite = FALSE)))


robust_f_d_t <- 2 * (1-pt(abs(coef(model_f_d) / nw_se_f_d_t), df = df.residual(model_f_d)))
robust_f_n_t <- 2 * (1-pt(abs(coef(model_f_n) / nw_se_f_n_t), df = df.residual(model_f_n)))
robust_f_ta_t <- 2 * (1-pt(abs(coef(model_f_ta) / nw_se_f_ta_t), df = df.residual(model_f_ta)))
robust_f_tr_t <- 2 * (1-pt(abs(coef(model_f_tr) / nw_se_f_tr_t), df = df.residual(model_f_tr)))
robust_f_ch_t <- 2 * (1-pt(abs(coef(model_f_ch) / nw_se_f_china_t), df = df.residual(model_f_ch)))


nw_se_f_d_t <- nw_se_f_d_t[names(coef(model_f_d))]
robust_f_d_t <- robust_f_d_t[names(coef(model_f_d))]


# Listes modèles, SE robustes et p-values robustes pour first
models_list_f <- list(model_f_d, model_f_n, model_f_ta, model_f_tr, model_f_ch)
robust_ses_f <- list(nw_se_f_d_t, nw_se_f_n_t, nw_se_f_ta_t, nw_se_f_tr_t, nw_se_f_china_t)
robust_pvals_f <- list(robust_f_d_t, robust_f_n_t, robust_f_ta_t, robust_f_tr_t, robust_f_ch_t)

# Noms personnalisés des coefficients
custom_names <- list(
  "vol.l1" = "$AHV_{t-1}$",
  "vol.l2" = "$AHV_{t-2}$",
  "vol.l3" = "$AHV_{t-3}$",
  "vol.l4" = "$AHV_{t-4}$",
  "vol.l5" = "$AHV_{t-5}$",
  "vol.l6" = "$AHV_{t-6}$",
  "X.l1" = "$X_{t-1}$",
  "X.l2" = "$X_{t-2}$",
  "X.l3" = "$X_{t-3}$",
  "X.l4" = "$X_{t-4}$",
  "X.l5" = "$X_{t-5}$",
  "X.l6" = "$X_{t-6}$",
```

```
  "const" = "Constant"
)

# Générer tableau texreg pour first
table_texreg_f <- texreg(
  l = models_list_f,
  override.se = robust_ses_f,
  override.pvalues = robust_pvals_f,
  custom.model.names = c("TweetDummy", "TweetCount", "Tariff", "Trade", "China"),
  custom.coef.map = custom_names,
  caption = "First-Term VAR Models of Average Hourly Volatility",
  label = "tab:VAR_First_Term",
  caption.above = TRUE,
  digits = 6,
  custom.gof.rows = list("Shock (IRF)" = c(0.002919, 0.002236, 0.000484, 0.000702, 0.000904)),
  star.cutoffs = c(0.001, 0.01, 0.05)
)

# Afficher le tableau
table_texreg_f
```

```
#second


d_s_d_t = d_s_d %>%
    rename(X.l1 = dummy.l1,
    X.l2 = dummy.l2,
    X.l3 = dummy.l3,
    X.l4 = dummy.l4,
    X.l5 = dummy.l5,
    X.l6 = dummy.l6)

f_t_s_d <- as.formula("y ~ -1 + vol.l1 + vol.l2 + vol.l3 + vol.l4 + vol.l5 + vol.l6 +
                          X.l1 + X.l2 + X.l3 + X.l4 + X.l5 + X.l6 + const")
model_s_d <- lm(f_t_s_d, data = d_s_d_t)


d_s_n_t = d_s_n %>%
    rename(X.l1 = N.l1,
    X.l2 = N.l2,
    X.l3 = N.l3,
    X.l4 = N.l4,
    X.l5 = N.l5,
    X.l6 = N.l6)

f_t_s_n <- as.formula("y ~ -1 + vol.l1 + vol.l2 + vol.l3 + vol.l4 + vol.l5 + vol.l6 +
                          X.l1 + X.l2 + X.l3 + X.l4 + X.l5 + X.l6 + const")
model_s_n <- lm(f_t_s_n, data = d_s_n_t)


d_s_ta_t = d_s_ta %>%
    rename(X.l1 = tariff.l1,
    X.l2 = tariff.l2,
```

Table 2: First-Term VAR Models of Average Hourly Volatility

	TweetDummy	TweetCount	Tariff	Trade	China
AHV_{t-1}	0.541944^{***}	0.542426^{***}	0.543570^{***}	0.543958^{***}	0.543471^{***}
	(0.080972)	(0.080477)	(0.079273)	(0.079048)	(0.079428)
AHV_{t-2}	-0.113920^{**}	-0.113855^{**}	-0.115106^{**}	-0.115566^{**}	-0.115002^{**}
	(0.040758)	(0.040843)	(0.041031)	(0.040968)	(0.040995)
AHV_{t-3}	0.058050	0.057592	0.053635	0.053636	0.054382
	(0.030414)	(0.030474)	(0.030529)	(0.030534)	(0.030495)
AHV_{t-4}	0.188383	0.187417	0.184183	0.184102	0.184610
	(0.118235)	(0.117967)	(0.117238)	(0.117118)	(0.117369)
AHV_{t-5}	−0.088758	−0.089704	−0.091496	−0.091655	−0.091848
	(0.079651)	(0.079584)	(0.079702)	(0.079683)	(0.079634)
AHV_{t-6}	0.336662^{***}	0.337701^{***}	0.343373^{***}	0.343466^{***}	0.343184^{***}
	(0.048176)	(0.048104)	(0.047473)	(0.047512)	(0.047665)
X_{t-1}	-0.000478^{***}	-0.000163^{**}	−0.000454	-0.001838^{**}	−0.000352
	(0.000140)	(0.000057)	(0.000353)	(0.000702)	(0.000385)
X_{t-2}	-0.000184^{**}	-0.000063^{*}	−0.000289	0.000221	−0.000048
	(0.000070)	(0.000030)	(0.000271)	(0.000513)	(0.000233)
X_{t-3}	-0.000693^{***}	-0.000263^{***}	-0.001007^{***}	-0.000949^{**}	-0.001412^{***}
	(0.000153)	(0.000062)	(0.000267)	(0.000308)	(0.000359)
X_{t-4}	-0.000564^{***}	-0.000208^{***}	−0.000274	−0.000612	−0.000202
	(0.000159)	(0.000062)	(0.000392)	(0.000411)	(0.000452)
X_{t-5}	-0.000435^{***}	-0.000125^{**}	−0.000468	−0.000605	−0.000057
	(0.000118)	(0.000046)	(0.000274)	(0.000361)	(0.000354)
X_{t-6}	0.000118	0.000099^{*}	0.000240	−0.000121	0.000275
	(0.000122)	(0.000049)	(0.000344)	(0.000395)	(0.000371)
Constant	0.004020^{***}	0.003079^{***}	0.001510^{***}	0.001657^{***}	0.001593^{***}
	(0.000661)	(0.000520)	(0.000353)	(0.000371)	(0.000343)
Shock (IRF)	0.002919	0.002236	0.000484	0.000702	0.000904
R^2	0.687909	0.687236	0.685341	0.685489	0.685533
Adj. R^2	0.687331	0.686657	0.684758	0.684907	0.684951
Num. obs.	7036	7036	7036	7036	7036

$^{***}p < 0.001$; $^{**}p < 0.01$; $^{*}p < 0.05$

```
    X.13 = tariff.l3,
    X.14 = tariff.l4,
    X.15 = tariff.l5,
    X.16 = tariff.l6)

f_t_s_ta <- as.formula("y ~ -1 + vol.l1 + vol.l2 + vol.l3 + vol.l4 + vol.l5 + vol.l6 +
                        X.l1 + X.l2 + X.l3 + X.l4 + X.l5 + X.l6 + const")
model_s_ta <- lm(f_t_s_ta, data = d_s_ta_t)


d_s_tr_t = d_s_tr %>%
    rename(X.l1 = trade.l1,
    X.l2 = trade.l2,
    X.l3 = trade.l3,
    X.l4 = trade.l4,
    X.l5 = trade.l5,
    X.l6 = trade.l6)


f_t_s_tr <- as.formula("y ~ -1 + vol.l1 + vol.l2 + vol.l3 + vol.l4 + vol.l5 + vol.l6 +
                        X.l1 + X.l2 + X.l3 + X.l4 + X.l5 + X.l6 + const")
model_s_tr <- lm(f_t_s_tr, data = d_s_tr_t)


d_s_ch_t = d_s_ch %>%
    rename(X.l1 = china.l1,
    X.l2 = china.l2,
    X.l3 = china.l3,
    X.l4 = china.l4,
    X.l5 = china.l5,
    X.l6 = china.l6)

f_t_s_ch <- as.formula("y ~ -1 + vol.l1 + vol.l2 + vol.l3 + vol.l4 + vol.l5 + vol.l6 +
                        X.l1 + X.l2 + X.l3 + X.l4 + X.l5 + X.l6 + const")
model_s_ch <- lm(f_t_s_ch, data = d_s_ch_t)


nw_se_s_d_t <- sqrt(diag(sandwich::NeweyWest(model_s_d, lag = 6, prewhite = FALSE)))
nw_se_s_n_t <- sqrt(diag(sandwich::NeweyWest(model_s_n, lag = 6, prewhite = FALSE)))
nw_se_s_ta_t <- sqrt(diag(sandwich::NeweyWest(model_s_ta, lag = 6, prewhite = FALSE)))
nw_se_s_tr_t <- sqrt(diag(sandwich::NeweyWest(model_s_tr, lag = 6, prewhite = FALSE)))
nw_se_s_china_t <- sqrt(diag(sandwich::NeweyWest(model_s_ch, lag = 6, prewhite = FALSE)))


robust_s_d_t <- 2 * (1-pt(abs(coef(model_s_d) / nw_se_s_d_t), df = df.residual(model_s_d)))
robust_s_n_t <- 2 * (1-pt(abs(coef(model_s_n) / nw_se_s_n_t), df = df.residual(model_s_n)))
robust_s_ta_t <- 2 * (1-pt(abs(coef(model_s_ta) / nw_se_s_ta_t), df = df.residual(model_s_ta)))
robust_s_tr_t <- 2 * (1-pt(abs(coef(model_s_tr) / nw_se_s_tr_t), df = df.residual(model_s_tr)))
robust_s_ch_t <- 2 * (1-pt(abs(coef(model_s_ch) / nw_se_s_china_t), df = df.residual(model_s_ch)))

nw_se_s_d_t <- nw_se_s_d_t[names(coef(model_s_d))]
robust_s_d_t <- robust_s_d_t[names(coef(model_s_d))]
```

```r
# Listes modèles, SE robustes et p-values robustes pour second
models_list_s <- list(model_s_d, model_s_n, model_s_ta, model_s_tr, model_s_ch)
robust_ses_s <- list(nw_se_s_d_t, nw_se_s_n_t, nw_se_s_ta_t, nw_se_s_tr_t, nw_se_s_china_t)
robust_pvals_s <- list(robust_s_d_t, robust_s_n_t, robust_s_ta_t, robust_s_tr_t, robust_s_ch_t)

# Générer tableau texreg pour second
table_texreg_s <- texreg(
  l = models_list_s,
  override.se = robust_ses_s,
  override.pvalues = robust_pvals_s,
  custom.model.names = c("TweetDummy", "TweetCount", "Tariff", "Trade", "China"),
  custom.coef.map = custom_names,
  caption = "Second-Term VAR Models of Average Hourly Volatility",
  label = "tab:VAR_Second_Term",
  caption.above = TRUE,
  digits = 6,
  custom.gof.rows = list("Shock (IRF)" = c(0.016739, 0.015714, 0.011582, -0.004131, 0.015569)),
  star.cutoffs = c(0.05, 0.01, 0.001)
)



# Afficher le tableau
table_texreg_s
```

Table 3: Second-Term VAR Models of Average Hourly Volatility

	TweetDummy	TweetCount	Tariff	Trade	China
AHV_{t-1}	0.299398**	0.299350**	0.294752**	0.301160**	0.274419***
	(0.112417)	(0.114098)	(0.108853)	(0.111015)	(0.081386)
AHV_{t-2}	0.015406	0.013567	0.020667	0.011769	0.031670
	(0.045643)	(0.046702)	(0.039243)	(0.045795)	(0.031719)
AHV_{t-3}	0.076169***	0.076851***	0.068749***	0.072284***	0.052697
	(0.010099)	(0.010266)	(0.016672)	(0.015313)	(0.033941)
AHV_{t-4}	0.084229	0.085108	0.074401	0.080544	0.035573
	(0.073259)	(0.073217)	(0.080381)	(0.069965)	(0.107841)
AHV_{t-5}	0.013424	0.010406	0.015342	0.017631	0.005467
	(0.009477)	(0.009620)	(0.009167)	(0.011320)	(0.031442)
AHV_{t-6}	0.126612*	0.126324*	0.132056*	0.124277*	0.150909*
	(0.058486)	(0.057687)	(0.057043)	(0.057466)	(0.059264)
X_{t-1}	0.006569	0.000947	0.027028	0.020463	0.154584
	(0.010877)	(0.001389)	(0.029078)	(0.031549)	(0.140076)
X_{t-2}	−0.003222**	−0.000736	0.008588	0.047163	0.099315
	(0.001221)	(0.000535)	(0.007247)	(0.041734)	(0.097425)
X_{t-3}	−0.005538**	−0.001637*	−0.010306	−0.026631	−0.047690
	(0.001707)	(0.000726)	(0.007507)	(0.021408)	(0.028342)
X_{t-4}	0.002474	0.000136	0.002002	0.019925	−0.020669
	(0.005119)	(0.000924)	(0.003272)	(0.031241)	(0.013733)
X_{t-5}	−0.008527*	−0.001651	−0.002649	−0.012965	−0.004470
	(0.004029)	(0.001070)	(0.004407)	(0.014516)	(0.020539)
X_{t-6}	−0.003594	−0.000627	−0.004279	−0.011100	0.008027
	(0.003213)	(0.000745)	(0.003857)	(0.010029)	(0.024100)
Constant	0.072524**	0.068423***	0.049265**	0.052127***	0.044027*
	(0.023894)	(0.020607)	(0.015173)	(0.013712)	(0.018061)
Shock (IRF)	0.016739	0.015714	0.011582	−0.004131	0.015569
R^2	0.244117	0.240788	0.251263	0.244406	0.285165
Adj. R^2	0.224424	0.221009	0.231757	0.224721	0.266543
Num. obs.	512	512	512	512	512

$^{***}p < 0.001$; $^{**}p < 0.01$; $^{*}p < 0.05$