

```

clear

set excelxslxlargefile on

import excel using EventStudyDataThesis.xlsx, firstrow

**----- Control Firm (C) Approach -----**

gen window6 = 1 if Date >= 242 & Date <=254
gen window3 = 1 if Date >= 245 & Date <=251
gen window2 = 1 if Date >=246 & Date <=250
gen window1 = 1 if Date >= 247 & Date <=249

gen AR = OF_return - C_return

bysort Date: egen AAR = mean(AR)
sort OF_id Date

** ----- T-test ----- **

* -6:+6
bysort OF_id: egen CAR6 = sum(AR) if window6==1
reg CAR6 if Date ==248

* -3:+3
bysort OF_id: egen CAR3 = sum(AR) if window3 ==1
reg CAR3 if Date ==248

* -1:+1
bysort OF_id: egen CAR1 = sum(AR) if window1==1
reg CAR1 if Date == 248

** ----- Checking for External Factors ----- **

* -6:+6
reg CAR6 OF_out if Date ==248

* -3:+3
reg CAR3 OF_out if Date ==248

* -1:+1
reg CAR1 OF_out if Date ==248

** ----- Robustness Check ----- **

```

```

gen windowp = .
forvalues i = 1(6)100 {
quietly replace windowp = 0 if Date >= 215 & Date <= 304
quietly replace windowp = 1 if Date >= 215+`i' & Date <= 216+`i'
quietly bysort OF_id: egen CAR = sum(AR) if windowp ==1
quietly reg CAR if Date == 216+`i'
estimates table, star
drop CAR
}
** model biased by cross-correlation

** EQUALLY WEIGHTED **
**----- Fama-French Estimation -----**

gen OF_ExcessR = OF_return - Rf
gen C_ExcessR = C_return - Rf
gen est_window =1 if Date <=240

gen OF_predR = .
gen OF_rmse = .
forvalues i = 1(1)664 {
quietly reg OF_ExcessR MktRf SMB HML if OF_id == `i' & est_window ==1
quietly predict p if OF_id == `i'
quietly replace OF_predR = p if OF_id == `i'
quietly replace OF_rmse = e(rmse) if OF_id == `i'
drop p
}

gen C_predR = .
gen C_rmse = .
forvalues i = 1(1)664 {
quietly reg C_ExcessR MktRf SMB HML if C_id == `i' & est_window ==1
quietly predict p if C_id == `i'
quietly replace C_predR = p if C_id == `i'
quietly replace C_rmse = e(rmse) if C_id == `i'
drop p
}

**----- Standard Errors ----- **

** One day SE
** OF
gen OF_rmse2 = OF_rmse^2
gen OF_rmse2b = OF_rmse2 if Date ==1
egen OF_rmse2sum = sum(OF_rmse2b)
gen OF_SE = sqrt(OF_rmse2sum / (664^2))

```

** Control

```
gen C_rmse2 = C_rmse^2
gen C_rmse2b = C_rmse2 if Date ==1
egen C_rmse2sum = sum(C_rmse2b)
gen C_SE = sqrt(C_rmse2sum / (664^2))
```

----- MacKinlay - AAR and CAAR -----

```
gen OF_AR = OF_ExcessR - OF_predR
gen C_AR = C_ExcessR - C_predR
```

```
bysort Date: egen OF_AAR = mean(OF_AR)
bysort Date: egen C_AAR = mean(C_AR)
sort OF_id Date
```

*Day 0 = Date==248

* -6:+6

```
gen OF_CAAR6 = .
gen C_CAAR6 = .
gen rollingwindow = .
forvalues i = 1/13 {
  quietly replace rollingwindow = 1 if Date ==241+`i'
  quietly bysort OF_id: replace OF_CAAR6 = sum(OF_AAR) if rollingwindow ==1
  quietly bysort C_id: replace C_CAAR6 = sum(C_AAR) if rollingwindow ==1
}
```

* -3:+3

```
gen OF_CAAR3 = .
gen C_CAAR3 = .
replace rollingwindow = .
forvalues i = 1/7 {
  quietly replace rollingwindow = 1 if Date ==244+`i'
  quietly bysort OF_id: replace OF_CAAR3 = sum(OF_AAR) if rollingwindow ==1
  quietly bysort C_id: replace C_CAAR3 = sum(C_AAR) if rollingwindow ==1
}
```

* -1:+1

```

gen OF_CAAR1 = .
gen C_CAAR1 = .
replace rollingwindow = .
forvalues i = 1/3 {
quietly replace rollingwindow = 1 if Date ==246+`i'
quietly bysort OF_id: replace OF_CAAR1 = sum(OF_AAR) if rollingwindow ==1
quietly bysort C_id: replace C_CAAR1 = sum(C_AAR) if rollingwindow ==1
}

```

```
* -30+30
```

```

gen OF_CAAR20 = .
gen C_CAAR20 = .
replace rollingwindow = .
forvalues i = 1/41 {
quietly replace rollingwindow = 1 if Date ==227+`i'
quietly bysort OF_id: replace OF_CAAR20 = sum(OF_AAR) if rollingwindow ==1
quietly bysort C_id: replace C_CAAR20 = sum(C_AAR) if rollingwindow ==1
}

```

```
** ----- Mackinlay test of significance -----**
```

```
** OF
```

```
* -6:+6
```

```
egen OF_SE6 = sum(OF_SE) if OF_CAAR6 != . & OF_id == 1
gen OF_tstat6 = OF_CAAR6 / OF_SE6 if Date == 254 & OF_id ==1
```

```
* -3:+3
```

```
egen OF_SE3 = sum(OF_SE) if OF_CAAR3 != . & OF_id == 1
gen OF_tstat3 = OF_CAAR3 / OF_SE3 if Date == 251 & OF_id ==1
```

```
* -1:+1
```

```
egen OF_SE1 = sum(OF_SE) if OF_CAAR1 != . & OF_id == 1
gen OF_tstat1 = OF_CAAR1 / OF_SE1 if Date == 249 & OF_id ==1
```

```
** Control
```

```
* -6:+6
```

```
egen C_SE6 = sum(C_SE) if C_CAAR6 != . & C_id == 1
gen C_tstat6 = C_CAAR6 / C_SE6 if Date == 254 & C_id ==1
```

```
* -3:+3
```

```

egen C_SE3 = sum(C_SE) if C_CAAR3 != . & C_id == 1
gen C_tstat3 = C_CAAR3 / C_SE3 if Date == 251 & C_id ==1

* -1:+1
egen C_SE1 = sum(C_SE) if C_CAAR1 != . & C_id == 1
gen C_tstat1 = C_CAAR1 / C_SE1 if Date == 249 & C_id ==1

** ----- BMP test ----- **

** Oil Fund

gen OF_SAR = OF_AR / OF_rmse
bysort Date: egen OF_SAAR = mean(OF_SAR)
sort OF_id Date

* -6:+6
bysort OF_id: egen OF_SCAR = sum(OF_SAR) if window6 ==1
bysort OF_id: egen OF_SCAAR = sum(OF_SAAR) if window6 ==1

egen OF_SCAAR_diff = sum((OF_SCAR - OF_SCAAR)^2) if Date ==248
gen OF_SCAAR_var = OF_SCAAR_diff / (664-1)
gen OF_SCAAR_dev = sqrt(OF_SCAAR_var)

gen OF_bmp6 = sqrt(664) * (OF_SCAAR / OF_SCAAR_dev)

* -3:+3
bysort OF_id: egen OF_SCAR3 = sum(OF_SAR) if window3 ==1
bysort OF_id: egen OF_SCAAR3 = sum(OF_SAAR) if window3 ==1

egen OF_SCAAR3_diff = sum((OF_SCAR3 - OF_SCAAR3)^2) if Date ==248
gen OF_SCAAR3_var = OF_SCAAR3_diff / (664-1)
gen OF_SCAAR3_dev = sqrt(OF_SCAAR3_var)

gen OF_bmp3 = sqrt(664) * (OF_SCAAR3 / OF_SCAAR3_dev)

* -1:+1
bysort OF_id: egen OF_SCAR1 = sum(OF_SAR) if window1 ==1
bysort OF_id: egen OF_SCAAR1 = sum(OF_SAAR) if window1 ==1

egen OF_SCAAR1_diff = sum((OF_SCAR1 - OF_SCAAR1)^2) if Date ==248
gen OF_SCAAR1_var = OF_SCAAR1_diff / (664-1)
gen OF_SCAAR1_dev = sqrt(OF_SCAAR1_var)

gen OF_bmp1 = sqrt(664) * (OF_SCAAR1 / OF_SCAAR1_dev)

** Control

```

```

gen C_SAR = C_AR / C_rmse
bysort Date: egen C_SAAR = mean(C_SAR)
sort C_id Date

* -6:+6
bysort C_id: egen C_SCAR = sum(C_SAR) if window6 ==1
bysort C_id: egen C_SCAAR = sum(C_SAAR) if window6 ==1

egen C_SCAAR_diff = sum((C_SCAR - C_SCAAR)^2) if Date ==248
gen C_SCAAR_var = C_SCAAR_diff / (664-1)
gen C_SCAAR_dev = sqrt(C_SCAAR_var)

gen C_bmp6 = sqrt(664) * (C_SCAAR / C_SCAAR_dev)

* -3:+3
bysort C_id: egen C_SCAR3 = sum(C_SAR) if window3 ==1
bysort C_id: egen C_SCAAR3 = sum(C_SAAR) if window3 ==1

egen C_SCAAR3_diff = sum((C_SCAR3 - C_SCAAR3)^2) if Date ==248
gen C_SCAAR3_var = C_SCAAR3_diff / (664-1)
gen C_SCAAR3_dev = sqrt(C_SCAAR3_var)

gen C_bmp3 = sqrt(664) * (C_SCAAR3 / C_SCAAR3_dev)

* -1:+1
bysort C_id: egen C_SCAR1 = sum(C_SAR) if window1 ==1
bysort C_id: egen C_SCAAR1 = sum(C_SAAR) if window1 ==1

egen C_SCAAR1_diff = sum((C_SCAR1 - C_SCAAR1)^2) if Date ==248
gen C_SCAAR1_var = C_SCAAR1_diff / (664-1)
gen C_SCAAR1_dev = sqrt(C_SCAAR1_var)

gen C_bmp1 = sqrt(664) * (C_SCAAR1 / C_SCAAR1_dev)

** ----- BMP Kolari Pynnönen

* r = mean sample cross-correlation of residuals in est_window
gen OF_r = 0.119918448197221

gen OF_BMP_r = sqrt((1-OF_r)/(1+(664-1)*OF_r))

gen OF_bmp6_KP = OF_bmp6 * OF_BMP_r
gen OF_bmp3_KP = OF_bmp3 * OF_BMP_r
gen OF_bmp1_KP = OF_bmp1 * OF_BMP_r

```

* Control

gen C_r = 0.10457925076691

gen C_BMPr = sqrt((1-C_r)/(1+(664-1)*C_r))

gen C_bmp6_KP = C_bmp6 * C_BMPr

gen C_bmp3_KP = C_bmp3 * C_BMPr

gen C_bmp1_KP = C_bmp1 * C_BMPr

** ----- Skewness ----- **

signrank OF_AR = C_AR if window1 ==1

```
**VALUE-WEIGHTED AVERAGES
```

```
clear
```

```
set excelxslxlargefile on
```

```
import excel using EventStudyDataThesis.xlsx, firstrow
```

```
gen window6 = 1 if Date >= 242 & Date <=254
```

```
gen window3 = 1 if Date >= 245 & Date <=251
```

```
gen window1 = 1 if Date >= 247 & Date <=249
```

```
**----- Fama-French Estimation -----**
```

```
gen OF_ExcessR = OF_return - Rf
```

```
gen C_ExcessR = C_return - Rf
```

```
gen est_window =1 if Date <=240
```

```
gen OF_predR = .
```

```
gen OF_rmse = .
```

```
forvalues i = 1(1)664 {
```

```
quietly reg OF_ExcessR MktRf SMB HML if OF_id == `i' & est_window ==1
```

```
quietly predict p if OF_id == `i'
```

```
quietly replace OF_predR = p if OF_id==`i'
```

```
quietly replace OF_rmse = e(rmse) if OF_id == `i'
```

```
drop p
```

```
}
```

```
gen C_predR = .
```

```
gen C_rmse = .
```

```
forvalues i = 1(1)664 {
```

```
quietly reg C_ExcessR MktRf SMB HML if C_id == `i' & est_window ==1
```

```
quietly predict p if C_id == `i'
```

```
quietly replace C_predR = p if C_id==`i'
```

```
quietly replace C_rmse = e(rmse) if C_id == `i'
```

```
drop p
```

```
}
```

```
**----- Standard Errors ----- **
```

```
** One day SE
```

```
** OF
```

```
gen OF_rmse2 = OF_rmse^2
```

```
gen OF_rmse2b = OF_rmse2 if Date ==1
```

```
egen OF_rmse2sum = sum(OF_rmse2b)
```

```
gen OF_SE = sqrt(OF_rmse2sum / (664^2))
```


** Control

```
gen C_rmse2 = C_rmse^2
gen C_rmse2b = C_rmse2 if Date ==1
egen C_rmse2sum = sum(C_rmse2b)
gen C_SE = sqrt(C_rmse2sum / (664^2))
```

----- MacKinlay - AAR and CAAR -----

```
gen OF_AR = OF_ExcessR - OF_predR
gen C_AR = C_ExcessR - C_predR
```

```
bysort Date: egen OF_AAR = sum(OF_AR*OF_MV_prc)
bysort Date: egen C_AAR = sum(C_AR*OF_MV_prc)
sort OF_id Date
```

*Day 0 = Date==248

* -6:+6

```
gen OF_CAAR6 = .
gen C_CAAR6 = .
gen rollingwindow = .
forvalues i = 1/13 {
  quietly replace rollingwindow = 1 if Date ==241+`i'
  quietly bysort OF_id: replace OF_CAAR6 = sum(OF_AAR) if rollingwindow ==1
  quietly bysort C_id: replace C_CAAR6 = sum(C_AAR) if rollingwindow ==1
}
```

* -3:+3

```
gen OF_CAAR3 = .
gen C_CAAR3 = .
replace rollingwindow = .
forvalues i = 1/7 {
  quietly replace rollingwindow = 1 if Date ==244+`i'
  quietly bysort OF_id: replace OF_CAAR3 = sum(OF_AAR) if rollingwindow ==1
  quietly bysort C_id: replace C_CAAR3 = sum(C_AAR) if rollingwindow ==1
}
```

* -1:+1

```

gen OF_CAAR1 = .
gen C_CAAR1 = .
replace rollingwindow = .
forvalues i = 1/3 {
quietly replace rollingwindow = 1 if Date == 246 + `i'
quietly bysort OF_id: replace OF_CAAR1 = sum(OF_AAR) if rollingwindow == 1
quietly bysort C_id: replace C_CAAR1 = sum(C_AAR) if rollingwindow == 1
}

```

```
* -30+30
```

```

gen OF_CAAR20 = .
gen C_CAAR20 = .
replace rollingwindow = .
forvalues i = 1/41 {
quietly replace rollingwindow = 1 if Date == 227 + `i'
quietly bysort OF_id: replace OF_CAAR20 = sum(OF_AAR) if rollingwindow == 1
quietly bysort C_id: replace C_CAAR20 = sum(C_AAR) if rollingwindow == 1
}

```

```
** ----- Mackinlay test of significance -----**
```

```
** OF
```

```
* -6:+6
```

```
egen OF_SE6 = sum(OF_SE) if OF_CAAR6 != . & OF_id == 1
gen OF_tstat6 = OF_CAAR6 / OF_SE6 if Date == 254 & OF_id == 1
```

```
* -3:+3
```

```
egen OF_SE3 = sum(OF_SE) if OF_CAAR3 != . & OF_id == 1
gen OF_tstat3 = OF_CAAR3 / OF_SE3 if Date == 251 & OF_id == 1
```

```
* -1:+1
```

```
egen OF_SE1 = sum(OF_SE) if OF_CAAR1 != . & OF_id == 1
gen OF_tstat1 = OF_CAAR1 / OF_SE1 if Date == 249 & OF_id == 1
```

```
** Control
```

```
* -6:+6
```

```
egen C_SE6 = sum(C_SE) if C_CAAR6 != . & C_id == 1
gen C_tstat6 = C_CAAR6 / C_SE6 if Date == 254 & C_id == 1
```

```
* -3:+3
```

```

egen C_SE3 = sum(C_SE) if C_CAAR3 != . & C_id == 1
gen C_tstat3 = C_CAAR3 / C_SE3 if Date == 251 & C_id ==1

* -1:+1
egen C_SE1 = sum(C_SE) if C_CAAR1 != . & C_id == 1
gen C_tstat1 = C_CAAR1 / C_SE1 if Date == 249 & C_id ==1

** ----- BMP test ----- **

** Oil Fund

gen OF_SAR = OF_AR / OF_rmse
bysort Date: egen OF_SAAR = sum(OF_SAR*OF_MV_prc)
sort OF_id Date

* -6:+6
bysort OF_id: egen OF_SCAR = sum(OF_SAR) if window6 ==1
bysort OF_id: egen OF_SCAAR = sum(OF_SAAR) if window6 ==1

egen OF_SCAAR_diff = sum((OF_SCAR - OF_SCAAR)^2) if Date ==248
gen OF_SCAAR_var = OF_SCAAR_diff / (664-1)
gen OF_SCAAR_dev = sqrt(OF_SCAAR_var)

gen OF_bmp6 = sqrt(664) * (OF_SCAAR / OF_SCAAR_dev)

* -3:+3
bysort OF_id: egen OF_SCAR3 = sum(OF_SAR) if window3 ==1
bysort OF_id: egen OF_SCAAR3 = sum(OF_SAAR) if window3 ==1

egen OF_SCAAR3_diff = sum((OF_SCAR3 - OF_SCAAR3)^2) if Date ==248
gen OF_SCAAR3_var = OF_SCAAR3_diff / (664-1)
gen OF_SCAAR3_dev = sqrt(OF_SCAAR3_var)

gen OF_bmp3 = sqrt(664) * (OF_SCAAR3 / OF_SCAAR3_dev)

* -1:+1
bysort OF_id: egen OF_SCAR1 = sum(OF_SAR) if window1 ==1
bysort OF_id: egen OF_SCAAR1 = sum(OF_SAAR) if window1 ==1

egen OF_SCAAR1_diff = sum((OF_SCAR1 - OF_SCAAR1)^2) if Date ==248
gen OF_SCAAR1_var = OF_SCAAR1_diff / (664-1)
gen OF_SCAAR1_dev = sqrt(OF_SCAAR1_var)

gen OF_bmp1 = sqrt(664) * (OF_SCAAR1 / OF_SCAAR1_dev)

** Control

```

```

gen C_SAR = C_AR / C_rmse
bysort Date: egen C_SAAR = sum(C_SAR*OF_MV_prc)
sort C_id Date

* -6:+6
bysort C_id: egen C_SCAR = sum(C_SAR) if window6 ==1
bysort C_id: egen C_SCAAR = sum(C_SAAR) if window6 ==1

egen C_SCAAR_diff = sum((C_SCAR - C_SCAAR)^2) if Date ==248
gen C_SCAAR_var = C_SCAAR_diff / (664-1)
gen C_SCAAR_dev = sqrt(C_SCAAR_var)

gen C_bmp6 = sqrt(664) * (C_SCAAR / C_SCAAR_dev)

* -3:+3
bysort C_id: egen C_SCAR3 = sum(C_SAR) if window3 ==1
bysort C_id: egen C_SCAAR3 = sum(C_SAAR) if window3 ==1

egen C_SCAAR3_diff = sum((C_SCAR3 - C_SCAAR3)^2) if Date ==248
gen C_SCAAR3_var = C_SCAAR3_diff / (664-1)
gen C_SCAAR3_dev = sqrt(C_SCAAR3_var)

gen C_bmp3 = sqrt(664) * (C_SCAAR3 / C_SCAAR3_dev)

* -1:+1
bysort C_id: egen C_SCAR1 = sum(C_SAR) if window1 ==1
bysort C_id: egen C_SCAAR1 = sum(C_SAAR) if window1 ==1

egen C_SCAAR1_diff = sum((C_SCAR1 - C_SCAAR1)^2) if Date ==248
gen C_SCAAR1_var = C_SCAAR1_diff / (664-1)
gen C_SCAAR1_dev = sqrt(C_SCAAR1_var)

gen C_bmp1 = sqrt(664) * (C_SCAAR1 / C_SCAAR1_dev)

** ----- BMP Kolari Pynnönen

* r = mean sample cross-correlation of residuals in est_window
gen OF_r = 0.0885931647086792

gen OF_BMP_r = sqrt((1-OF_r)/(1+(664-1)*OF_r))

gen OF_bmp6_KP = OF_bmp6 * OF_BMP_r
gen OF_bmp3_KP = OF_bmp3 * OF_BMP_r
gen OF_bmp1_KP = OF_bmp1 * OF_BMP_r

```

* Control

gen C_r = 0.112741720375221

gen C_BMPr = sqrt((1-C_r)/(1+(664-1)*C_r))

gen C_bmp6_KP = C_bmp6 * C_BMPr

gen C_bmp3_KP = C_bmp3 * C_BMPr

gen C_bmp1_KP = C_bmp1 * C_BMPr