# MCF Regressions

Peter Prlleshi

2024-01-24

```
setwd(dirname(rstudioapi::getSourceEditorContext()$path))
path<-dirname(rstudioapi::getSourceEditorContext()$path)

Core <- read.csv("./Statement_SPX_matched.csv")
Core$Date <- as.Date(Core$Date, format = "%d/%m/%Y") # converting the date column
FilterDates<-c(Core$Date)
Core<- Core[,-5]

#################################################################################
Fed_Futures <- read_excel("./FED_FORWARDS.xlsx")
Fed_Futures$Date <- as.Date(Fed_Futures$Date, format="%Y-%m-%d %H:%M:%S")

Fed_Futures<- Fed_Futures %>%
  mutate(Date = as.Date(Date)) %>%
  complete(Date = seq.Date(min(Date), max(Date), by="day"))

Fed_Futures<-na.locf(Fed_Futures, fromLast = FALSE)
Fed_Futures<- Fed_Futures[Fed_Futures$Date %in% FilterDates,]

#########################################################################################

IR <- read.csv("./DFF.csv")
IR$Date <- as.Date(IR$DATE, format = "%Y-%m-%d") # converting the date column

IR<- IR %>%
  mutate(Date = as.Date(Date)) %>%
  complete(Date = seq.Date(min(Date), max(Date), by="day"))

IR <-na.locf(IR, fromLast = FALSE)
IR <- IR[IR$Date %in% FilterDates,][,-1]

#########################################################################

SPX_DE <- read_excel("./SPX_DE.xlsx")

SPX_DE$Date <- as.Date(SPX_DE$Date, format="%Y-%m-%d %H:%M:%S")

SPX_DE<- SPX_DE %>%
  mutate(Date = as.Date(Date)) %>%
  complete(Date = seq.Date(min(Date), max(Date), by="day"))

SPX_DE<-na.locf(SPX_DE, fromLast = FALSE)
```

```r
SPX_DE<- SPX_DE[SPX_DE$Date %in% FilterDates,]

##############################################################################
SPX_price <- read.csv("./HistoricalPrices.csv", header = TRUE)
SPX_price <- SPX_price[,c(1,5)]# choosing only the closing price each day

SPX_price$Date<-as.Date(SPX_price$Date, format = "%m/%d/%y")# converting the date column

SPX_price<-na.locf(SPX_price, fromLast = FALSE)

SPX_return <- SPX_price %>%
  arrange(Date) %>% # Make sure the data is sorted by date in ascending order
  mutate(Daily_Return = log(Close) - log(lag(Close)))

days_in_year <- 252
# Calculate rolling 3-year average return
SPX_return$Rolling_3Y_Avg_Return <- rollapply(SPX_return$Daily_Return,
                                              width = 3 * days_in_year,
                                              FUN = mean,
                                              by.column = TRUE,
                                              fill = NA,
                                              align = 'right')


SPX_return$abnormal_returns<-SPX_return$Daily_Return-SPX_return$Rolling_3Y_Avg_Return

SPX_return$lagged_return<- lag(SPX_return$Daily_Return)

SPX_return<- SPX_return %>%
  mutate(Date = as.Date(Date)) %>%
  complete(Date = seq.Date(min(Date), max(Date), by="day"))

SPX_return<- SPX_return[SPX_return$Date %in% FilterDates,]

######################################## SURPRISES ############################

IR_Lead <- read.csv("./DFF.csv")
IR_Lead$Date <- as.Date(IR_Lead$DATE, format = "%Y-%m-%d") # converting the date column
IR_Lead$DFF<- lead(IR_Lead$DFF)

IR_Lead<- IR_Lead %>%
  mutate(Date = as.Date(Date)) %>%
  complete(Date = seq.Date(min(Date), max(Date), by="day"))

IR_Lead <-na.locf(IR_Lead, fromLast = FALSE)
IR_Lead <- IR_Lead[IR_Lead$Date %in% FilterDates,][,-1]

IR_Surprises<- IR_Lead$DFF-Fed_Futures$FORWARD

##############################################################################################
########################### CONSTRUCTION OF CORE DATASET FOR REGRESSIONS #############
##############################################################################################
```

```
Core$return <- SPX_return$Daily_Return
Core$lagged_return <- as.numeric(SPX_return$lagged_return)
Core$abnormal_return <- as.numeric(SPX_return$abnormal_returns)
Core$IR<- IR_Lead$DFF
Core$Surprise<-IR_Surprises
Core$debt_equity<- SPX_DE$Net_Debt_Share
```

```
simple_tone <- lm(abnormal_return ~ Tone, data = Core)
simple_unc <- lm(abnormal_return ~ Unc, data = Core)
simple_con <- lm(abnormal_return ~ Con, data = Core)
interactions_tone<-lm(abnormal_return~Tone*debt_equity + IR + lagged_return + Surprise*debt_equity + del
interactions_unc<-lm(abnormal_return~Unc*debt_equity + IR + lagged_return + Surprise*debt_equity + debt_
interactions_con<-lm(abnormal_return~Con*debt_equity + IR + lagged_return + Surprise*debt_equity + debt_

stargazer(simple_tone, simple_tone, simple_unc,
          column.labels = c("Tone", "Unc", "Con"), header = FALSE)
```

Table 1:

| | *Dependent variable:* | | |
|---|---|---|---|
| | abnormal_return | | |
| | Tone | Unc | Con |
| | (1) | (2) | (3) |
| Tone | 0.013 | 0.013 | |
| | (0.010) | (0.010) | |
| Unc | | | 0.009 |
| | | | (0.018) |
| Constant | −0.002 | −0.002 | 0.001 |
| | (0.002) | (0.002) | (0.002) |
| Observations | 76 | 76 | 76 |
| $R^2$ | 0.023 | 0.023 | 0.003 |
| Adjusted $R^2$ | 0.010 | 0.010 | −0.010 |
| Residual Std. Error (df = 74) | 0.010 | 0.010 | 0.010 |
| F Statistic (df = 1; 74) | 1.774 | 1.774 | 0.259 |
| *Note:* | | | *p<0.1; **p<0.05; ***p<0.01 |

```
stargazer(interactions_tone, interactions_unc, interactions_con,
          column.labels = c("Tone", "Unc", "Con"), header = F)
```

```
trial_tone<-lm(abnormal_return~Tone + IR + lagged_return + Surprise + debt_equity, data=Core)
trial_unc<-lm(abnormal_return~Unc + IR + lagged_return + Surprise + debt_equity, data=Core)
trial_con<-lm(abnormal_return~Con + IR + lagged_return + Surprise + debt_equity, data=Core)

stargazer(simple_tone, simple_con, simple_unc,
          column.labels = c("Tone", "Unc", "Con"), header = F)
```

Table 2:

| | *Dependent variable:* | | |
|---|---|---|---|
| | abnormal_return | | |
| | Tone | Unc | Con |
| | (1) | (2) | (3) |
| Tone | 0.082 | | |
| | (0.053) | | |
| Unc | | −0.038 | |
| | | (0.112) | |
| Con | | | 0.060 |
| | | | (0.139) |
| debt_equity | 0.0001 | 0.00002 | 0.00002 |
| | (0.00004) | (0.00002) | (0.00002) |
| IR | −0.001 | −0.0001 | 0.0001 |
| | (0.002) | (0.002) | (0.001) |
| lagged_return | −0.154 | −0.077 | −0.121 |
| | (0.158) | (0.160) | (0.157) |
| Surprise | 0.305*** | 0.255** | 0.233** |
| | (0.102) | (0.101) | (0.104) |
| Tone:debt_equity | −0.0001 | | |
| | (0.0002) | | |
| Unc:debt_equity | | 0.0001 | |
| | | (0.0003) | |
| Con:debt_equity | | | 0.0001 |
| | | | (0.0005) |
| debt_equity:Surprise | −0.001*** | −0.001** | −0.0005** |
| | (0.0002) | (0.0002) | (0.0002) |
| Constant | −0.032** | −0.006 | −0.008 |
| | (0.015) | (0.008) | (0.007) |
| Observations | 76 | 76 | 76 |
| $R^2$ | 0.205 | 0.134 | 0.193 |
| Adjusted $R^2$ | 0.123 | 0.045 | 0.110 |
| Residual Std. Error (df = 68) | 0.010 | 0.010 | 0.010 |
| F Statistic (df = 7; 68) | 2.500** | 1.500 | 2.321** |
| *Note:* | | | *p<0.1; **p<0.05; ***p<0.01 |

Table 3:

| | *Dependent variable:* | | |
|---|---|---|---|
| | abnormal_return | | |
| | Tone | Unc | Con |
| | (1) | (2) | (3) |
| Tone | 0.013 | | |
| | (0.010) | | |
| Con | | 0.066** | |
| | | (0.033) | |
| Unc | | | 0.009 |
| | | | (0.018) |
| Constant | −0.002 | −0.001 | 0.001 |
| | (0.002) | (0.001) | (0.002) |
| Observations | 76 | 76 | 76 |
| $R^2$ | 0.023 | 0.051 | 0.003 |
| Adjusted $R^2$ | 0.010 | 0.039 | −0.010 |
| Residual Std. Error (df = 74) | 0.010 | 0.010 | 0.010 |
| F Statistic (df = 1; 74) | 1.774 | 4.006** | 0.259 |
| *Note:* | *p<0.1; **p<0.05; ***p<0.01 | | |

```
stargazer(trial_tone, trial_unc, trial_con,
          column.labels = c("Tone", "Unc", "Con"), header = F)
```

Table 4:

| | *Dependent variable:* | | |
|---|---|---|---|
| | abnormal_return | | |
| | Tone | Unc | Con |
| | (1) | (2) | (3) |
| Tone | 0.032** | | |
| | (0.015) | | |
| Unc | | 0.020 | |
| | | (0.024) | |
| Con | | | 0.100** |
| | | | (0.040) |
| IR | −0.0003 | −0.001 | −0.0005 |
| | (0.001) | (0.001) | (0.001) |
| lagged_return | −0.057 | −0.023 | −0.078 |
| | (0.159) | (0.162) | (0.158) |
| Surprise | 0.022** | 0.022* | 0.021** |
| | (0.011) | (0.012) | (0.011) |
| debt_equity | 0.00003 | 0.00001 | 0.00002 |
| | (0.00002) | (0.00002) | (0.00002) |
| Constant | −0.016** | −0.001 | −0.007 |
| | (0.008) | (0.006) | (0.006) |
| Observations | 76 | 76 | 76 |
| $R^2$ | 0.113 | 0.061 | 0.130 |
| Adjusted $R^2$ | 0.050 | −0.006 | 0.068 |
| Residual Std. Error (df = 70) | 0.010 | 0.010 | 0.010 |
| F Statistic (df = 5; 70) | 1.792 | 0.904 | 2.088* |
| *Note:* | | | *p<0.1; **p<0.05; ***p<0.01 |