NotesS5

Andrew Wang

2024-02-02

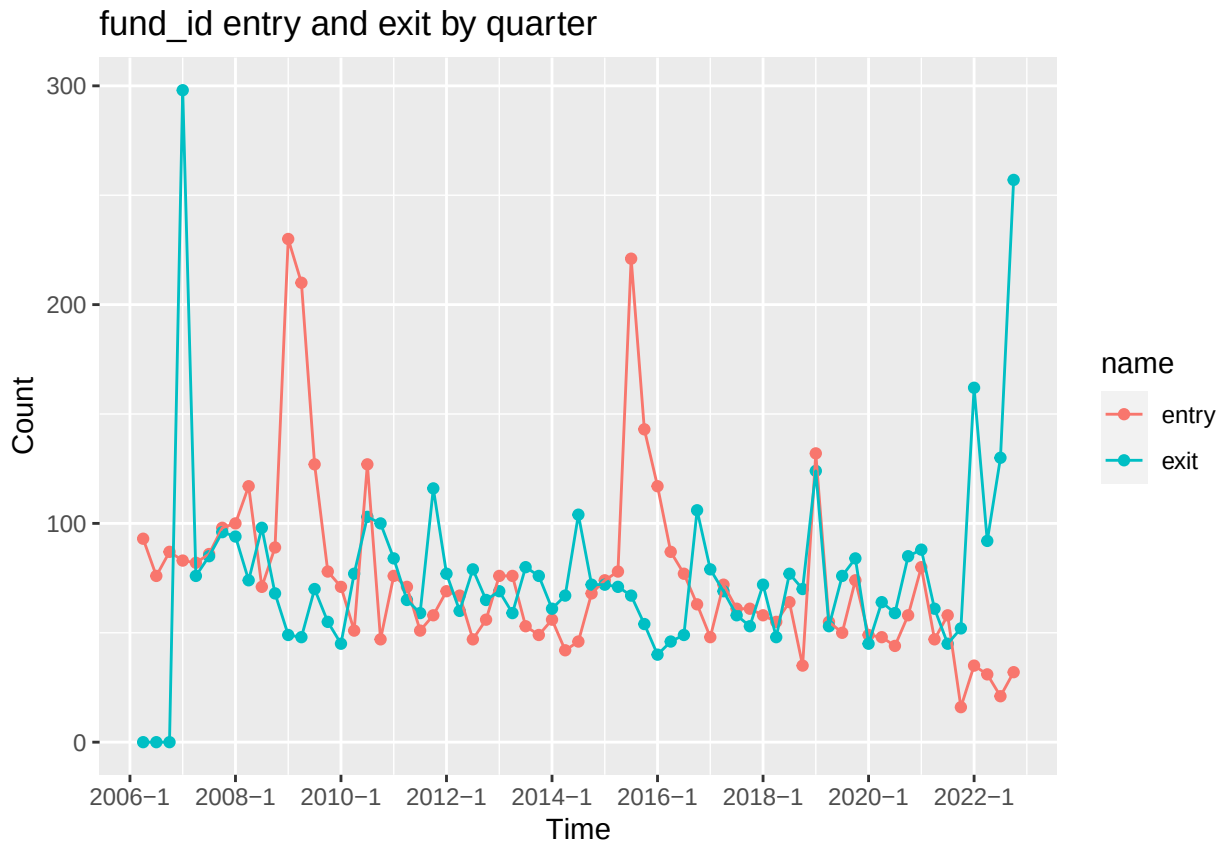
Summary

The first generated graphic shows entry and exit for various insurance funds, and the second graphic shows entry and exit for various brokers. A few notes are as follows:

Note that we have adjusted the methodology slightly, and calculate exit has having traded in the last 8 quarters, but not in the last four. Also note that this means our exit data cannot be defined until two years from start (we need 8 quarters of data to accurately define an exit)

```
#Add all pairwise combinations of rows
dates <- unique(df$Time)
fund_ids <- unique(df$fund_id)
pairs <- expand.grid(Time = dates, fund_id = fund_ids, stringsAsFactors = F)
pairs$quartVol <- 0

df <- rbind(df, pairs)
df <- df %>% group_by(Time, fund_id) %>% transmute(
  quartVol = sum(quartVol)
) %>% as.data.frame %>% unique()
df <- df %>%
  group_by(fund_id) %>%
  arrange(Time) %>%
  mutate(
    act4q = lag(quartVol, 4) + lag(quartVol, 3) + lag(quartVol, 2) + lag(quartVol, 1),
    act2q = lag(quartVol, 2) + lag(quartVol, 1),
    act8q = lag(quartVol, 4) + lag(quartVol, 3) + lag(quartVol, 2) + lag(quartVol, 1) +
      lag(quartVol, 8) + lag(quartVol, 7) + lag(quartVol, 6) + lag(quartVol, 5)
  )

df$act4q <- ifelse(df$Time < as.POSIXct("2005-12-31"), 0, df$act4q)
df$act8q <- ifelse(df$Time < as.POSIXct("2006-12-31"), 0, df$act8q)
df$act2q <- ifelse(df$Time < as.POSIXct("2005-06-06"), 0, df$act2q)

#aggregate to count entrants and exits
df$entry <- ifelse(df$quartVol != 0 & df$act4q == 0, 1, 0)
df$exit <- ifelse(df$act8q > 0 & df$act4q == 0, 1, 0)

df <- df %>%
  group_by(fund_id) %>%
  arrange(Time) %>% mutate(
  exit = ifelse(lag(exit) == 1 & exit == 1, 0, exit)
)
```

```r
out <- df %>% group_by(Time) %>% transmute(
  entry = sum(entry),
  exit = sum(exit)
) %>% as.data.frame() %>% unique()
out <- out %>% filter(Time >= as.POSIXct("2006-01-01"))
out$Time <- as.yearqtr(out$Time)

out2 <- out %>%
  pivot_longer(c(entry, exit))
fundPlot <- ggplot(out2, aes(Time, value, color = name)) + geom_point() + geom_line() + scale_x_yearqtr
fundPlot
```




```r
setwd("C:/Users/hyper/OneDrive/Documents/GitHub/Insurance-Corporate-Bonds")
df <- readRDS('insurers_transactions.rds')
brokers <- read.csv('brokers.csv')

#Basic filtering conducted on the read-in data
df <- df[df$trade_cost > 0, ]
df$quarter <- quarters(df$report_date)
df$year <- year(df$report_date)
df$Time <- as.yearqtr(paste(df$year, df$quarter))
df$trns_amount <- abs(df$trns_amount)

###---------------------------------[Step 5]-----------------------------------###
df <- df %>% group_by(Time, brok_id) %>% transmute(
```

```
  quartVol = sum(trns_amount)
) %>% as.data.frame %>% unique()
df$Time <- as.POSIXct(df$Time)

#Add all pairwise combinations of rows
dates <- unique(df$Time)
brok_ids <- unique(df$brok_id)
pairs <- expand.grid(Time = dates, brok_id = brok_ids, stringsAsFactors = F)
pairs$quartVol <- 0

df <- rbind(df, pairs)
df <- df %>% group_by(Time, brok_id) %>% transmute(
  quartVol = sum(quartVol)
) %>% as.data.frame %>% unique()
remove(pairs)
remove(dates)
remove(brok_ids)
remove(brokers)
gc()
```

```
##            used  (Mb) gc trigger   (Mb)  max used   (Mb)
## Ncells  1140387  61.0  125274852 6690.4 183124672 9780.0
## Vcells 19018632 145.2  677194466 5166.6 845775861 6452.8
```

```
df <- df %>%
  group_by(brok_id) %>%
  arrange(Time) %>%
  mutate(
    act4q = lag(quartVol, 4) + lag(quartVol, 3) + lag(quartVol, 2) + lag(quartVol, 1),
    act2q = lag(quartVol, 2) + lag(quartVol, 1),
    act8q = lag(quartVol, 4) + lag(quartVol, 3) + lag(quartVol, 2) + lag(quartVol, 1) +
      lag(quartVol, 8) + lag(quartVol, 7) + lag(quartVol, 6) + lag(quartVol, 5)
  )

df$act4q <- ifelse(df$Time < as.POSIXct("2005-12-31"), 0, df$act4q)
df$act8q <- ifelse(df$Time < as.POSIXct("2006-12-31"), 0, df$act8q)
df$act2q <- ifelse(df$Time < as.POSIXct("2005-06-06"), 0, df$act2q)

#aggregate to count entrants and exits
df$entry <- ifelse(df$quartVol != 0 & df$act4q == 0, 1, 0)
df$exit <- ifelse(df$act8q > 0 & df$act4q == 0, 1, 0)

df <- df %>%
  group_by(brok_id) %>%
  arrange(Time) %>% mutate(
  exit = ifelse(lag(exit) == 1 & exit == 1, 0, exit)
)

out <- df %>% group_by(Time) %>% transmute(
  entry = sum(entry),
  exit = sum(exit)
) %>% as.data.frame() %>% unique()
out <- out %>% filter(Time >= as.POSIXct("2006-01-01"))
```

```
out$Time <- as.yearqtr(out$Time)

out2 <- out %>%
  pivot_longer(c(entry, exit))

brokPlot <- ggplot(out2, aes(Time, value, color = name)) + geom_point() + geom_line() + scale_x_yearqtr
brokPlot
```