

Homework 2, by Somesh Srivastava, Jan 26, 2017

Executive Summary

The purpose of the report is to study stock performance in terms of excess return when they are paying dividends. Stock price appears to incorporate the gain expected from next dividend once the dividend is declared and hence we can observe an upward movement in excess stock return (One day holding period return of the stock which is inclusive of dividend - S&P 500 value weighted return on the same day) before ex-dividend date. Stock price decreases roughly by the dividend paid, post ex-dividend date and hence the excess stock return shows a downward movement post ex-dividend date.

Details

Following table shows the sequence of dates around ordinary dividend distribution event -

<u>Declaration Date</u>	<u>Ex dividend date</u>	<u>Record Date</u>	<u>Payable Date</u>
The declaration date, also known as the announcement date is the date when a company's board of directors announces a dividend distribution.	The ex-dividend date is set according to the rules of the stock exchange on which the stock is traded. The ex-dividend date is typically set for one-two business days prior to the record date	The record date when you must be on the company's books as a shareholder to receive the dividend	The payment date is the date when dividend checks are mailed out or credited to investor accounts

To understand the excess return behaviour of stock 20 days before and after ex-dividend date, S&P500 dividend paying stocks data from 1-Jan-2010 to 31-Dec-2015 has been pulled from CRSP. As obvious from the graph, stock return drops post ex-dividend date which is in compliance with no arbitrage principle. Details of data used are given in the "Table and Figures" section.

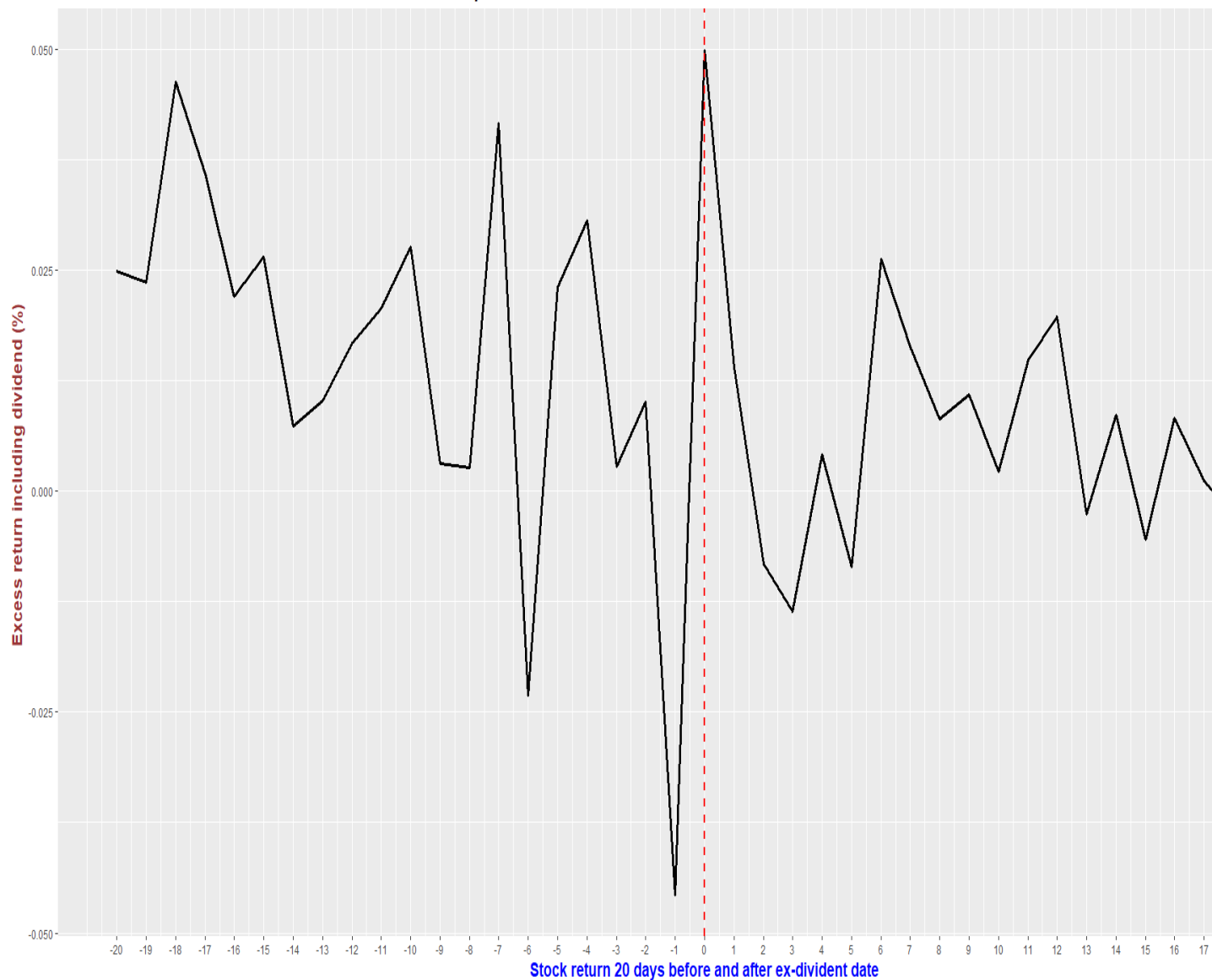
Tables and Figures

Tables Used from CRSP:

<u>Data</u>	<u>File</u>	<u>Variable</u>	<u>Type</u>	<u>Description</u>
Daily Stock Return Data	crspq.ds	ret	NUM	Holding Period Return (return with dividends)
		Date	DATE	Selected by default
		permno	NUM	CRSP Permanent Company Number (selected by default)
Daily S&P 500 Return	CRSPQ.DSP500	caldt	DATE	Trading dates
		vwret	NUM	S&P500 daily return
Stock listed on S&P500	DSP500LIST	PERMNO	NUM	CRSP Permanent Number
Dividend events	crspq.dse	distcd	NUM	Distribution Code=1 for ordinary dividend
		permno	NUM	CRSP Permanent Issue Number
		exdt	DATE	Ex dividend date

Result and Graphs

Stocks performance in terms of excess rates of return around ex-dividend date



Graph shows the excess stock return behaviour before and after 20 days of ex-dividend date. As obvious in the graph holding period drops after ex-dividend date.

Computer Code

```
## Loading required libraries

if (!require("RJDBC")) install.packages("RJDBC")
if (!require("rJava")) install.packages("rJava")
if (!require("data.table")) install.packages("data.table")
if (!require("xts")) install.packages("xts")

##### wrds connection #####
# ---- INPUTS ---- #
username <- "somesesh"
password <- '{SAS002}940343080D2FB6A03BBDBBBD587730081C6A411D'
# local path to the sas files
sasPath <- "D:/wrds_drivers/SAS-JDBC-Drivers"
# ---- CODE ---- #
library(rJava)
options(java.parameters = '-Xmx4g')
library(RJDBC)
sasCore <- paste0(sasPath, "/sas.core.jar")
sasDriver <- paste0(sasPath, "/sas.intrnet.javatools.jar")
.jaddClassPath(c(sasCore, sasDriver))
driver <- RJDBC::JDBC(
  "com.sas.net.sharenet.ShareNetDriver",
  sasDriver, identifier.quote = "")
wrds <- RJDBC::dbConnect(driver,
  "jdbc:sharenet://wrds-cloud.wharton.upenn.edu:8551/",
  username, password)
```

```
##Load Daily S&P500 return data
sql <- "SELECT caldt, vwret from CRSPQ.DSP500"
res <- dbSendQuery(wrds, sql)
dbHasCompleted(res) #check that this is true
dsp500 <- as.data.table(fetch(res, n = -1))
dbClearResult(res) # free up memory

##Loading stock dividend events file
sql <- "select e.date, e.permno, e.ticker, e.distcd from CRSPQ.DSE e inner join CRSPQ.DSP500LIST l on e.permno = l.permno where year(e.date) >= 2010 an
res <- dbSendQuery(wrds, sql)
dbHasCompleted(res) #check that this is true
divEvent <- as.data.table(fetch(res, n = -1))
dbClearResult(res) # free up memory
divEvent$DATE <- as.Date(divEvent$DATE)

##Loading daily stock return data
sql <- "select d.date, d.permno, d.ret, d.retx from CRSPQ.DSF d inner join CRSPQ.DSP500LIST l on d.permno = l.permno where year(d.date) >= 2010 and yea
res <- dbSendQuery(wrds, sql)
dbHasCompleted(res) #check that this is true
dsf <- as.data.table(fetch(res, n = -1))
dbClearResult(res) # free up memory
dsf$DATE <- as.Date(dsf$DATE)

cpdsp500 <- dsp500
cpdivEvent <- unique(divEvent)
cpdsf <- unique(dsf)

#analysisData <- data.table(DATE=list(), Days=list(), PERMNO=list(), RET=list(), RETX=list(), SnP500=list())
analysisData <- data.table()

for(i in 1:nrow(cpdivEvent)){
  stockdailyRet <- cpdsf[cpdsf$PERMNO==cpdivEvent$PERMNO[i]]
  rownum <- which(stockdailyRet$DATE==cpdivEvent$DATE[i])

  cat(i, " and ", rownum, "\n")
  if( length(rownum)>0 && rownum-20 >= 1 && rownum+20 <= nrow(stockdailyRet) ) {
    j = rownum-20
    k = rownum+20
    temp <- stockdailyRet[j:k]
    temp$days <- seq(-20, 20, 1)
    analysisData <- rbind(analysisData, temp)
  }
}

cpanalysisData <- analysisData
cpanalysisData <- merge(cpanalysisData, cpdsp500, by.x = "DATE", by.y = "caldt")

cpanalysisData$excess <- cpanalysisData$RET-cpanalysisData$vwretd
average41Data <- cpanalysisData[, mean(excess)*100, by="days"]

ggplot()+geom_line(data = average41Data, aes(x=average41Data$days, y=average41Data$V1), size=1.2)+
  geom_vline(xintercept=0.0, linetype = "dashed", colour = "red", size=1)+
  scale_x_continuous(breaks = seq(-20, 20, 1))+
  labs(x = "Stock return 20 days before and after ex-divident date",y="Excess return including dividend (%) ",colour="Labels",title="Stocks performance
  theme(plot.title = element_text(color="Black", size=16, face="bold.italic", hjust=0.5),
        axis.title.x = element_text(color="blue", size=14, face="bold"),
        axis.title.y = element_text(color="#993333", size=14, face="bold"))
```

References

- [Wharton Research Data Services \(WRDS\)](#) CRSP data taken on Jan 21, 2018.
- [Investopedia.com](#) Brief detail about important dividend dates.