Mini-Project 3
Dogs of the Dow
Group 5
Dobelman
STAT 486 - Market Models

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1 Introduction to the Strategy

The Dogs of the Dow is an investing strategy that usually outperforms the Dow Jones Industrial Average (Dow). The strategy is to annually invest in the ten stocks in the Dow that have the highest dividend yield. The dividend yield is equal to the dividend paid per share for a stock divided by the current share price. Stocks in the Dow are known to not change their dividends based on how the stock is trading over the year. So by investing in the ten highest yielding stocks, you are likely investing at the point which the company is trading at a discount and will most likely increase its stock price faster than a low yield company.

The strategy started to become popular by the late 1980's when John Slatter reported in the Wall Street Journal that the ten highest dividend yielding Dow stocks beat the Dow from 1973 to 1988. Books by O'Higgins and Downes in 1991 and Knowles and Petty in 1992 continued the study. They confirmed Slatters results and showed the Dogs of the Dow strategy outperformed the Dow as far back as 1957[1].

This lead financial institutions such as Merrill Lynch to implement the Dogs of the Dow into an investment strategy called the Unit Investment Trust (UIT). The positive aspect of the UIT was its low cost of maintenance since it was such a simple strategy. All they had to do was pick the ten highest yielding Dow stocks from the year before and liquidate them at years end. Then the investor could choose to take the money or reinvest in the next ten Dogs of the Dow. If the investor chose to reinvest, they would rebalance by investing ten percent of the portfolio in each of the ten stocks[2].

But problems have risen within the Dogs of the Dow strategy. First, in the mid 1990's the strategy began to fail as high yield stocks began to increase in share price during the first three months, but then would shoot down after. So investors who planned to hold the stock for the entire year were unable to receive the gains they expected. Secondly, during the recession the Dogs of the Dow did even worse than the Dow dropping 38.8% compared to the Dow falling 31.93%. Also the Dogs recovered worse than the Dow by coming back 17.8% compared to the Dows comeback of 26.46%. This was because some of the big companies began cutting or reducing their yearly dividends[3].

2 Procedure and Conclusions

First, we pulled data for all stocks from the CRSP/Compustat Merged dataset with variables including the company name, dividends per share, and closing price per share from 1979 to 2012. Next, we subsetted this data to isolate the companies included in the DJIA between 1980 and 2012 and calculated dividend yield and yearly returns manually. We also accounted for stocks exiting and entering the Dow by not including them until the year they were added. Finally, we wrote a two functions that, given the year as input, will calculate the return on an equal-weight Dogs of the Dow portfolio and the return on an equal-weight portfolio of ten random stocks in the Dow and created vectors to store the values of the functions from 1980 to 2012.

While the Dogs portfolio outperformed the market and the random portfolio most of the time, we don't think it is statistically significant due to the small sample size. It would be interesting to repeat over more years. Also I should mention that differences in our calculated Dogs of the Down return and actual returns may be due to a faulty constituent list, or could possibly be a problem with how we account for a Dog exiting the Dow.

[1] D.L. Domian et al
[2] D.L. Domian et al
[3] Laing

3 Performance Tables

	Year	SP MW Div	Dogs Returns	10 Random Returns
1	1980	0.33	0.16	0.15
2	1981	-0.05	-0.19	-0.13
3	1982	0.22	0.15	0.28
4	1983	0.22	0.37	0.08
5	1984	0.07	-0.05	-0.09
6	1985	0.32	0.22	0.06
7	1986	0.18	0.14	-0.05
8	1987	0.05	-0.01	-0.16
9	1988	0.17	0.15	0.00
10	1989	0.31	0.03	-0.07
11	1990	-0.03	-0.15	-0.11
12	1991	0.31	0.31	0.09
13	1992	0.08	0.03	-0.17
14	1993	0.10	0.24	0.08
15	1994	0.01	-0.02	-0.09
16	1995	0.38	0.28	0.16
17	1996	0.23	0.27	0.17
18	1997	0.34	-0.11	0.04
19	1998	0.29	0.05	0.01
20	1999	0.21	-0.04	-0.12
21	2000	-0.08	-0.02	-0.01
22	2001	-0.12	-0.12	-0.04
23	2002	-0.22	-0.12	-0.15
24	2003	0.29	0.24	0.29
25	2004	0.11	0.03	-0.05
26	2005	0.05	-0.08	-0.02
27	2006	0.16	0.26	0.20
28	2007	0.06	-0.04	0.01
29	2008	-0.36	-0.46	-0.34
30	2009	0.26	0.04	0.23
31	2010	0.15	0.16	0.08
32	2011	0.02	0.11	0.52

	Type	Dogs of the Dow	10 Random	SP MW Div
1	Total Return	3.626	1.564	29.982
2	CAGR	1.041	1.014	1.112

4 Code

```
#######################################################
### Mini Project 3 - Dogs of the Dow               ##
##  Connor Barnhill, Brian Graff, Frank Portman   ##
#######################################################


## Load Libraries
library(ggplot2)
library(plyr)
library(lubridate)
library(xtable)

## Load the .csv data from WRDS/COMPUSTAT
dogs.data <- read.csv("data.csv", stringsAsFactors = F)

## Remove identical rows
dogs.data <- unique(dogs.data)

## Make permnos column a character
dogs.data$lpermno <- as.character(dogs.data$lpermno)



##
## Load DJIA constituents homework
##
constituents <- read.csv2("dogsdates.csv", stringsAsFactors = F)
constituents$PERMNO <- as.character(constituents$PERMNO)

## Create directory of DOW stock PERMNOs
permnos <- constituents$PERMNO

## Pull only stocks that have been in the DOW
dogs.data <- subset(dogs.data, lpermno %in% permnos)

## Calculate yearly dividend yields
dogs.data <- mutate(dogs.data, divYield = dvpsx_c/prcc_c)

## Remove stocks that weren't in the DOW for specific years
## If a stock joined during a year, don't include it for that year
## If a stock left during a year, include it for that year

dogs.data$marker <- FALSE

for(i in 1:length(constituents$Start)) {
```

```
  x <- constituents$PERMNO[i]
  y <- constituents$Start[i]

  w <- which(dogs.data$fyear == y & dogs.data$lpermno == x)

  dogs.data$marker[w] <- TRUE

}


for(i in 1:length(permnos)) {

  x <- permnos[i]
  y <- which(constituents$PERMNO == x)
  start <- constituents$Start[y]
  end <- constituents$End[y]

  w <- which(dogs.data$lpermno == x & dogs.data$fyear < start)
  z <- which(dogs.data$lpermno == x & dogs.data$fyear > end)

  remove <- c(w, z)
  remove <- unique(remove)

  if(length(remove) >= 1) {

  dogs.data <- dogs.data[-remove, ]

  }
}

## Now calculate yearly returns by dividing closing price by last years close

dogs.data$return <- NA

for(i in 2:length(dogs.data$prcc_c)) {

  dogs.data$return[i] <- dogs.data$prcc_c[i] / dogs.data$prcc_c[i - 1]

}

dogs.data$return <- dogs.data$return - 1

## Now we write a function, that given the year as input will calculate the
## return on a Dogs of the Dow portfolio assuming equal weights

dogs.return <- function(year) {

  x <- subset(dogs.data, fyear == year - 1)
```

```
  x <- x[order(x$divYield, decreasing = TRUE), ]
  y <- x[1:10, ]
  pn <- y$lpermno

  z <- subset(dogs.data, (lpermno %in% pn & fyear == year) & marker == FALSE)

  avg <- mean(z$return)
  avg <- round(avg, 3)

  return(avg)

}

## Now we write a function, that given the year as input will calculate the
## return on 10 random stocks in the Dow for that year

random.return <- function(year) {

  x <- subset(dogs.data, fyear == year & marker == FALSE)
  y <- length(x$divYield)

  random <- sample(1:y, 10)

  avg <- mean(x$return[random])
  avg <- round(avg, 3)

  return(avg)

}

## Create vectors to store our Dogs of the Dow and 10-random portfolio
## returns from 1980 to 2011

dogs <- c()
random <- c()

for(i in 1980:2011) {

  dogs[i - 1979] <- dogs.return(i)
  random[i - 1979] <- random.return(i)

}

## Load .csv to fill in
dogsofthedow <- read.csv("dogsofthedow.csv")

dogsofthedow$DogReturns <- NA
dogsofthedow$TenRandomReturns <- NA
```

```
for(i in 1:32) {

dogsofthedow$DogReturns[i] <- dogs[i]
dogsofthedow$TenRandomReturns[i] <- random[i]

}

dogsofthedow <- dogsofthedow[-33, ]

colnames(dogsofthedow) <- c("Year", "SP MW Div", "Dogs Returns",
                            "10 Random Returns")

xtable(dogsofthedow)


### Calculate total return over 32 years and CAGR
total <- prod(1+dogsofthedow$"Dogs Returns")
cagr <- total^(1/32)
total.random <- prod(1+dogsofthedow$"10 Random Returns")
cagr.random <- total.random^(1/32)
total.sp <- prod(1+dogsofthedow$"SP MW Div")
cagr.sp <- total.sp^(1/32)

tm <- matrix(nrow = 2, ncol = 4)
tm[1, 1] <- "Total Return"
tm[1, 2] <- round(total, 3)
tm[2, 1] <- "CAGR"
tm[2, 2] <- round(cagr, 3)
tm[1, 3] <- round(total.random, 3)
tm[1, 4] <- round(total.sp, 3)
tm[2, 3] <- round(cagr.random, 3)
tm[2, 4] <- round(cagr.sp, 3)


tm <- as.data.frame(tm)
colnames(tm) <- c("Type", "Dogs of the Dow", "10 Random", "SP MW Div")
xtable(tm)
```