C183 - Project 3

```
data <- read.table("http://www.stat.ucla.edu/~nchristo/statistics_c183_c283/statc183c283_5stocks.txt", h
head(data)
```

```
##       date    P1    P2    P3    P4    P5
## 1 20031231 41.00 53.40 22.97 24.83 42.14
## 2 20031128 36.20 42.78 21.74 25.63 38.39
## 3 20031031 36.58 42.67 22.31 25.00 38.49
## 4 20030930 36.60 40.93 19.36 23.54 34.33
## 5 20030829 37.70 41.10 19.93 22.42 37.39
## 6 20030731 35.58 37.43 21.17 23.01 33.12
```

```
#Returns
r1 <- (data$P1[-length(data$P1)]-data$P1[-1])/data$P1[-1]
r2 <- (data$P2[-length(data$P2)]-data$P2[-1])/data$P2[-1]
r3 <- (data$P3[-length(data$P3)]-data$P3[-1])/data$P3[-1]
r4 <- (data$P4[-length(data$P4)]-data$P4[-1])/data$P4[-1]
r5 <- (data$P5[-length(data$P5)]-data$P5[-1])/data$P5[-1]

#Means & Variance-covariance matrix
x <- as.data.frame(cbind(r1,r2,r3,r4,r5))

colMeans(x)
```

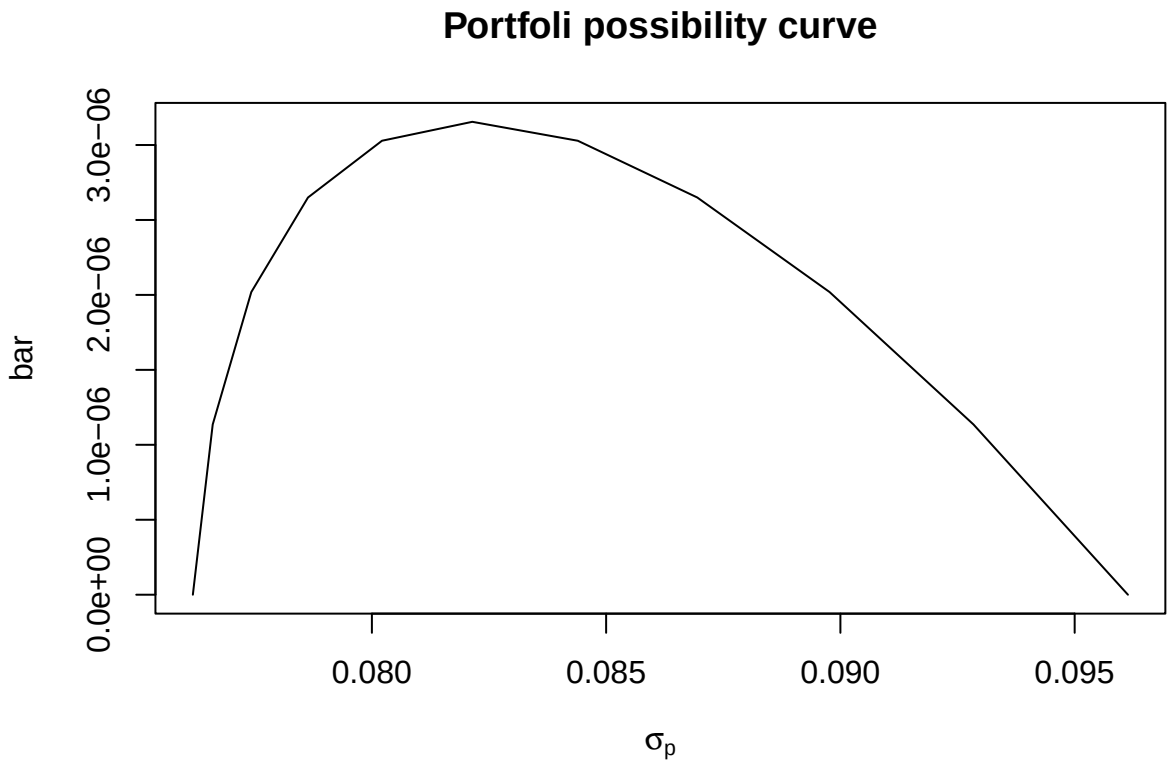
```
##           r1           r2           r3           r4           r5
## 0.0027625075 0.0035831363 0.0066229478 0.0004543727 0.0045679106
```

```
cov(x)
```

```
##             r1          r2          r3          r4          r5
## r1 0.005803160 0.001389264 0.001666854 0.000789581 0.001351044
## r2 0.001389264 0.009458804 0.003944643 0.002281200 0.002578939
## r3 0.001666854 0.003944643 0.016293581 0.002863584 0.001469964
## r4 0.000789581 0.002281200 0.002863584 0.009595202 0.003210827
## r5 0.001351044 0.002578939 0.001469964 0.003210827 0.009242440
```

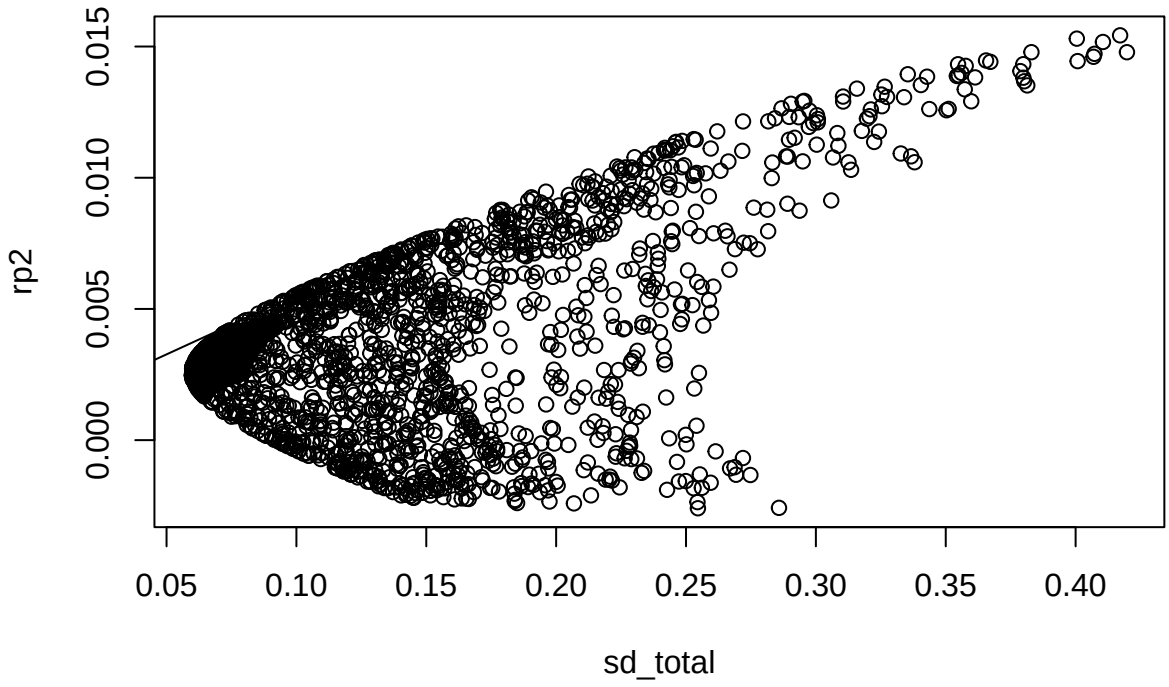
```
#P1 & P5; Composition; Expected Return and Standard deviation

pm1 <- (var(r5)-cov(r1,r5))/(var(r1)+var(r5)-2*cov(r1,r5))
pm2 <- 1-pm1

rbar <- pm1*mean(r1)+pm2*mean(r5)
var_p <- pm1^2*var(r1)+pm2^2*var(r5)+2*pm1*pm2*cov(r1,r5)
sd <- var_p^0.5
```

```
#
z <- 1 - seq(0,1,0.1)
rb <- seq(0,1,0.1)*mean(r1) * z *mean(r5)
vp <- (seq(0,1,0.1))^2 * var(r1) + z * var(r5) + 2 * seq(0,1,0.1) * z *cov(r1,r5)
sdp <- vp^0.5

plot(sdp,rb, type = "l",
     xlab=expression(sigma[p]),
     ylab=expression(bar),
     main = "Portfoli possibility curve")

#Identify the efficient frontier:
ef <- as.data.frame(cbind(sdp,rb))
points(ef[ef$rb>rbar,], col="red", type="l")
```




```
#XOM MCD BA

a <- read.table("http://www.stat.ucla.edu/~nchristo/datac183c283/statc183c283_abc.txt", header=T)

sd_total <- (a$a^2 * var(r1) + a$b^2 * var(r4) + a$c^2 * var(r5) + 2 * a$a * a$b *cov(r1,r4) + 2 * a$a *

rp2 <- a$a * mean(r1) + a$b * mean(r4) + a$c * mean(r5)


plot(sd_total, rp2)
```

```r
#R1

data <- as.data.frame(cbind(r1,r4,r5))
data_means <- colMeans(data)
datam <- as.matrix(data_means)

r <- datam - 0.001

cvi <- solve(cov(data))

z <- cvi %*% r
x <- z/sum(z)

rg <- t(x) %*% data_means
vg <- t(x) %*% cov(data) %*% x
sdg <- (t(x) %*% cov(data) %*% x)^0.5

s <- (rg-0.001)/sdg

segments(0,0.001,sdg,rg)
points(sdg, rg, cex = 1, pch = 1)

r2 <- 0.6*rg + 0.4 * 0.001
sd_G <- 0.6 * r2

points(sd_G, r2, cex = 1, pch = 19)
```




```
x2 <- as.data.frame(cbind(r1,r4,r5))
r3 <- as.matrix(colMeans(x2)) - 0.002

x3 <- (solve(cov(x2)))/sum(solve(cov(x2)))
vb <- t(x3) %*% cov(x2) %*% x3
cAB <- t(x) %*% cov(x2) %*% x3


#xA <- (vb - cAB)/(vb + vg - 2 *cAB))
```