Project-1-STATC183

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#Read your csv file:
a <- read.csv("stockData.csv", sep=",", header=TRUE)
#Convert adjusted close prices into returns:
r <- (a[-1,3:ncol(a)]-a[-nrow(a),3:ncol(a)])/a[-nrow(a),3:ncol(a)]
#Compute mean vector:
means <- colMeans(r) #Without ^GSPC
#Compute variance covariance matrix:
covmat <- cov(r) #Without ^GSPC
#Compute correlation matrix:
cormat <- cor(r) #Without ^GSPC
#Compute the vector of variances:
variances <- diag(covmat)
#Compute the vector of standard deviations:
stdev <- diag(covmat)^.5
# plot the expected return vs standard deviation of the assets
plot(stdev, means, xlab="Standard Deviation", ylab="Expected Return", main="Expected Return vs Standard Devia
tion", xlim=c(0, 0.1), ylim=c(0, 0.1))
#Compute the mean of the portfolio:
mean.port <- sum(means*1/ncol(r))
#Compute the standard deviation of the portfolio:
sd.port <- sqrt(sum(variances*1/ncol(r)))
#Add the portfolio to the plot:
points(sd.port, mean.port, col="red", pch=19)
#Compute the minimum risk portfolio:
ones <- rep(1, ncol(r))
A <- t(ones) %*% solve(covmat) %*% means
B <- t(means) %*% solve(covmat) %*% means
C <- t(ones) %*% solve(covmat) %*% ones
D <- B*C-A^2
test <- sqrt(1/C)
test2 <- A/C
# Plot the minimum Risk Portfolio
points(sqrt(1/C), (A/C), col="blue", pch=19)


#Efficient frontier:
minvar <- 1/C
minE <- A/C
options(warn = -1)
sdeff <- seq((minvar)^0.5, 1, by = 0.0001)
y1 <- (A + sqrt(D*(C*sdeff^2 - 1)))*(1/C)
y2 <- (A - sqrt(D*(C*sdeff^2 - 1)))*(1/C)
options(warn = 0)
# Plot Efficient Frontier
points(sdeff, y1, type = "l")
points(sdeff, y2, type = "l")

# Add a legend
legend("topright", legend=c("Equal Allocation Portfolio", "Minimum Risk Portfolio", "Individual Stocks", "Eff
icient Frontier"), col=c("red", "blue", "black", "black"), pch=c(19, 19, 1, NA), lty=c(NA, NA, NA, 1), lwd=c
(NA, NA, NA, 2))
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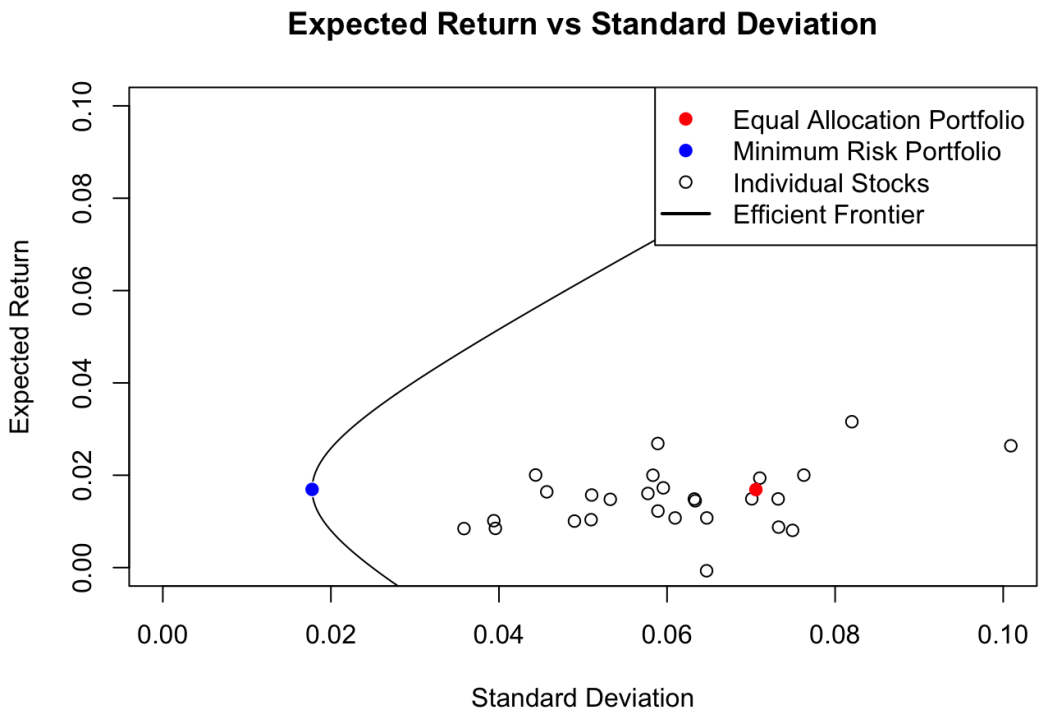
Expected Return vs Standard Deviation
Equal Allocation Portfolio
Minimum Risk Portfolio
Individual Stocks
Efficient Frontier
Expected Return
0.00
0.02
0.04
0.06
0.08
0.10
Standard Deviation
0.00
0.02
0.04
0.06
0.08
0.10