Predictive Project 2.2

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##### Testing #####  
#Setting the working directory for the project and reading the source data  
  
setwd('/Users/ravitejaayyagari/Documents/Teja/Saint Peters/3 Sem/Predictive')  
file\_name<-'data\_file\_ARQ.csv'  
  
#Reading the file into a data frame  
stock\_data <- read.csv(file\_name, header = T, sep =',')  
  
#initializing the returns vector and loading values into it  
return\_price<-vector();  
  
#Calculating the returnprice for each price value  
for(i in 2:length(stock\_data[,1])){  
 if (identical(stock\_data[i,1],stock\_data[i-1,1])){  
 return\_price[i] = (stock\_data[i,72]/stock\_data[i-1,72]);  
 }else{  
 return\_price[i] = 0;  
 }  
}  
  
return\_price[1]=0;  
#combining columns wise   
stock\_data<-cbind(stock\_data,return\_price)  
  
#Removing the Variables with more than 60% of blank values and then performing the Na.Omit  
stock\_data1<- subset(stock\_data, select = -c(`assetsavg`, `assetturnover`, `equityavg`, `invcapavg`, `liabilitiesnc`, `roa`, `roe`, `roic`, `ros`))  
stock\_data2 <- na.omit(stock\_data1)  
  
#Removing the non numeric columns for performing random forest  
stock\_data2<-stock\_data2[,6:85]  
  
  
#We get to know the important indicators from multicolinearity and random forest variable importance  
#We decide on the top 20 indicators  
stock\_final<-subset(stock\_data1,select = c(`calendardate`,`pe1`,`evebit`,`evebitda`,`pe`,`pb`,`price`,`marketcap`,`capex`,`ps`,`taxexp`,`ev`,`ps1`,`cashnequsd`,`fcfps`,`intexp`,`assetsnc`,`eps`,`assetsc`,`ebitdausd`,`netinccmnusd`,`return\_price`))  
  
#Again removing NAs  
stock\_final <- na.omit(stock\_final)  
  
remove\_outliers <- function(x, na.rm = TRUE, ...) {  
 qnt <- quantile(x, probs=c(.25, .75), na.rm = na.rm, ...)  
 H <- 1.5 \* IQR(x, na.rm = na.rm)  
 y <- x  
 y[x < (qnt[1] - H)] <- NA  
 y[x > (qnt[2] + H)] <- NA  
 y  
}  
  
for (i in 2:21){  
 stock\_final[,i] <-remove\_outliers(stock\_final[,i])  
}  
   
stock\_final <- na.omit(stock\_final)  
stock\_final <- subset(stock\_final, return\_price!=Inf)  
  
#To select the number of unique dates  
cal\_date<-unique(stock\_final$calendardate)  
  
#Creating a blank data frame y  
nms <- sample(LETTERS,sample(1:10))  
y<-as.data.frame(t(matrix(nrow=length(nms),ncol=0,dimnames=list(nms))))  
  
#Scaling the data and storing it into y  
y <- scale(stock\_final[2:21])  
  
#Traditional way of doing normalizing  
# for(k in 2:21){  
# for(i in 1:dim(stock\_final)[1]){  
# y[i,k-1]<-(stock\_final[i,k]-mean(stock\_final[,k]))/sd(stock\_final[,k])  
# }  
# }  
data\_final<-as.data.frame(y)  
data\_final <- cbind(data\_final,(stock\_final$return\_price))  
data\_final<-cbind(stock\_final$calendardate,data\_final)  
head(data\_final)

## stock\_final$calendardate pe1 evebit evebitda pe  
## 46 2015-09-30 1.473007 1.879170 2.22734418 1.614998  
## 47 2015-12-31 1.287819 1.581711 1.67769301 1.420340  
## 63 2012-06-30 -1.108035 -2.384402 0.73286778 -1.096474  
## 64 2012-09-30 -1.058741 -2.781013 0.02730248 -1.048283  
## 65 2012-12-31 -1.054944 -1.987791 0.32504816 -1.042791  
## 66 2013-03-31 -1.043486 -1.293721 -2.07746636 -1.038475  
## pb price marketcap capex ps taxexp  
## 46 1.0425398 0.33815090 -0.1930199 -0.1718977 1.0655998 -0.4823062  
## 47 0.3873904 -0.04942974 -0.3321122 -0.1768603 0.3329194 -0.6232797  
## 63 -1.4982392 -1.02249204 -0.7143615 0.3493922 -1.0746192 -0.5870201  
## 64 -1.4216136 -1.03658588 -0.7207668 0.5891253 -1.1039264 -0.5870201  
## 65 -1.4184209 -1.03717313 -0.7210337 0.6163276 -1.1047185 -0.5870201  
## 66 -1.4388544 -1.03658588 -0.7184448 0.5240602 -1.0928372 -0.5870201  
## ev ps1 cashnequsd fcfps intexp assetsnc  
## 46 -0.1477357 1.0521926 -0.5953761 -1.2634433 -0.2021383 -0.2827824  
## 47 -0.2578459 0.2650094 -0.5061523 -1.1555503 -0.2075866 -0.2555811  
## 63 -0.6920113 -1.0786866 -0.6315303 -0.5208858 -0.2600165 -0.5529808  
## 64 -0.6960005 -1.1085285 -0.6761087 -0.5928144 -0.2543921 -0.5575936  
## 65 -0.6974657 -1.1053024 -0.6746675 -0.4785748 -0.2982259 -0.5563486  
## 66 -0.6927948 -1.0972370 -0.6661205 -0.5081925 -0.1137278 -0.5594060  
## eps assetsc ebitdausd netinccmnusd  
## 46 -0.2220617 -0.5775786 -0.4897395 -0.3480329  
## 47 -0.5011677 -0.5470980 -0.5590369 -0.4879901  
## 63 -0.9663445 -0.7246072 -0.7257380 -0.7722354  
## 64 -0.7182502 -0.7384635 -0.6616072 -0.6125128  
## 65 -0.7492620 -0.7489140 -0.7008540 -0.6552542  
## 66 -1.1834269 -0.7538655 -0.9336556 -1.1011057  
## (stock\_final$return\_price)  
## 46 0.7188167  
## 47 0.7199830  
## 63 0.5633803  
## 64 0.4000000  
## 65 0.9375000  
## 66 1.0666667

#Renaming column names for data\_final using the stock\_final  
colnames(data\_final)<-colnames(stock\_final)  
row.names(data\_final)= (1:nrow(data\_final))  
  
#Converting the calendardate column to date  
data\_final$calendardate <- as.Date(data\_final$calendardate, format = "%Y-%m-%d")  
  
#Again, finding the unique date values and converting them to date format  
cal\_date<-unique(data\_final$calendardate)  
cal\_date <- as.data.frame(cal\_date)  
  
nms <- sample(LETTERS,sample(1:10))  
betas<-as.data.frame(t(matrix(nrow=length(nms),ncol=0,dimnames=list(nms))))  
  
#Running the for loop for only 15 dates  
for (i in 1:15){  
 data\_model<-subset(data\_final,calendardate==cal\_date[i,])  
 colnames(data\_model)<-colnames(stock\_final)  
 data\_model<-subset(data\_model,return\_price!=0)  
 data\_model<-subset(data\_model,return\_price!=Inf)  
 data\_model<-subset(data\_model, select = -c(`calendardate`))  
 model<-lm(log(data\_model$return\_price)~.,data=data\_model)  
 print(summary(model))  
 for (j in 1:21){  
 betas[i,j] <-model$coefficients[j]  
 }  
}

##   
## Call:  
## lm(formula = log(data\_model$return\_price) ~ ., data = data\_model)  
##   
## Residuals:  
## Min 1Q Median 3Q Max   
## -3.4283 -0.1116 0.0232 0.1482 0.9064   
##   
## Coefficients:  
## Estimate Std. Error t value Pr(>|t|)   
## (Intercept) -0.097799 0.008822 -11.086 < 2e-16 \*\*\*  
## pe1 -0.060560 0.062236 -0.973 0.33076   
## evebit 0.020500 0.016767 1.223 0.22175   
## evebitda -0.006749 0.013918 -0.485 0.62787   
## pe 0.095912 0.064202 1.494 0.13552   
## pb 0.026872 0.010645 2.524 0.01174 \*   
## price -0.007845 0.014836 -0.529 0.59706   
## marketcap 0.123866 0.087926 1.409 0.15923   
## capex 0.017685 0.014223 1.243 0.21402   
## ps -0.356571 0.137777 -2.588 0.00980 \*\*   
## taxexp -0.008940 0.016663 -0.537 0.59170   
## ev -0.144423 0.095941 -1.505 0.13256   
## ps1 0.360579 0.137407 2.624 0.00882 \*\*   
## cashnequsd -0.024250 0.016018 -1.514 0.13037   
## fcfps 0.005197 0.010331 0.503 0.61503   
## intexp -0.007211 0.024387 -0.296 0.76752   
## assetsnc 0.038047 0.022435 1.696 0.09023 .   
## eps 0.067047 0.017166 3.906 0.00010 \*\*\*  
## assetsc 0.026190 0.016187 1.618 0.10600   
## ebitdausd -0.001931 0.052032 -0.037 0.97040   
## netinccmnusd -0.022517 0.034022 -0.662 0.50823   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Residual standard error: 0.2695 on 973 degrees of freedom  
## Multiple R-squared: 0.1321, Adjusted R-squared: 0.1143   
## F-statistic: 7.405 on 20 and 973 DF, p-value: < 2.2e-16  
##   
##   
## Call:  
## lm(formula = log(data\_model$return\_price) ~ ., data = data\_model)  
##   
## Residuals:  
## Min 1Q Median 3Q Max   
## -2.81293 -0.12722 0.01208 0.14579 1.91657   
##   
## Coefficients:  
## Estimate Std. Error t value Pr(>|t|)   
## (Intercept) -0.1344100 0.0103129 -13.033 < 2e-16 \*\*\*  
## pe1 0.0456584 0.0744223 0.614 0.53968   
## evebit 0.0109370 0.0163312 0.670 0.50320   
## evebitda 0.0003617 0.0143368 0.025 0.97988   
## pe -0.0251732 0.0742233 -0.339 0.73456   
## pb 0.0406744 0.0126422 3.217 0.00134 \*\*   
## price 0.0115566 0.0190072 0.608 0.54332   
## marketcap 0.1771159 0.1057730 1.674 0.09435 .   
## capex 0.0066427 0.0147114 0.452 0.65170   
## ps -0.2914767 0.0663511 -4.393 1.24e-05 \*\*\*  
## taxexp 0.0128583 0.0180413 0.713 0.47619   
## ev -0.1857970 0.1148569 -1.618 0.10606   
## ps1 0.2883976 0.0685379 4.208 2.81e-05 \*\*\*  
## cashnequsd -0.0451072 0.0204075 -2.210 0.02731 \*   
## fcfps 0.0263243 0.0118575 2.220 0.02664 \*   
## intexp -0.0059713 0.0250212 -0.239 0.81143   
## assetsnc 0.0465215 0.0288252 1.614 0.10686   
## eps 0.0299411 0.0193729 1.546 0.12254   
## assetsc 0.0168985 0.0197632 0.855 0.39273   
## ebitdausd -0.0382883 0.0464037 -0.825 0.40950   
## netinccmnusd -0.0114237 0.0314621 -0.363 0.71661   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Residual standard error: 0.3115 on 998 degrees of freedom  
## Multiple R-squared: 0.1105, Adjusted R-squared: 0.09267   
## F-statistic: 6.199 on 20 and 998 DF, p-value: 6.97e-16  
##   
##   
## Call:  
## lm(formula = log(data\_model$return\_price) ~ ., data = data\_model)  
##   
## Residuals:  
## Min 1Q Median 3Q Max   
## -3.2645 -0.0989 0.0105 0.1081 1.7565   
##   
## Coefficients:  
## Estimate Std. Error t value Pr(>|t|)   
## (Intercept) -0.0477995 0.0069946 -6.834 1.28e-11 \*\*\*  
## pe1 -0.0396921 0.0480194 -0.827 0.40863   
## evebit 0.0020686 0.0135415 0.153 0.87861   
## evebitda 0.0110890 0.0118594 0.935 0.34994   
## pe 0.0615578 0.0486333 1.266 0.20583   
## pb 0.0310857 0.0089618 3.469 0.00054 \*\*\*  
## price 0.0066254 0.0152245 0.435 0.66351   
## marketcap -0.0070649 0.0733918 -0.096 0.92333   
## capex -0.0005061 0.0100443 -0.050 0.95982   
## ps -0.1151877 0.0801521 -1.437 0.15093   
## taxexp 0.0149587 0.0151131 0.990 0.32247   
## ev -0.0034438 0.0784976 -0.044 0.96501   
## ps1 0.1220191 0.0802262 1.521 0.12852   
## cashnequsd 0.0011061 0.0127375 0.087 0.93081   
## fcfps 0.0087646 0.0082646 1.060 0.28912   
## intexp 0.0062651 0.0174583 0.359 0.71976   
## assetsnc 0.0264688 0.0183879 1.439 0.15026   
## eps 0.0226143 0.0146971 1.539 0.12413   
## assetsc -0.0153621 0.0129962 -1.182 0.23741   
## ebitdausd -0.0462908 0.0387426 -1.195 0.23238   
## netinccmnusd 0.0158675 0.0264067 0.601 0.54802   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Residual standard error: 0.2367 on 1270 degrees of freedom  
## Multiple R-squared: 0.07151, Adjusted R-squared: 0.05688   
## F-statistic: 4.89 on 20 and 1270 DF, p-value: 1.025e-11  
##   
##   
## Call:  
## lm(formula = log(data\_model$return\_price) ~ ., data = data\_model)  
##   
## Residuals:  
## Min 1Q Median 3Q Max   
## -1.63756 -0.09886 0.00399 0.10523 1.29039   
##   
## Coefficients:  
## Estimate Std. Error t value Pr(>|t|)   
## (Intercept) -0.0078091 0.0065124 -1.199 0.2307   
## pe1 0.0717333 0.0578827 1.239 0.2155   
## evebit 0.0185649 0.0120951 1.535 0.1251   
## evebitda -0.0004332 0.0101526 -0.043 0.9660   
## pe -0.0668459 0.0595522 -1.122 0.2619   
## pb 0.0167617 0.0080634 2.079 0.0378 \*   
## price 0.0281165 0.0132968 2.115 0.0347 \*   
## marketcap 0.1106260 0.0740194 1.495 0.1353   
## capex 0.0076516 0.0094223 0.812 0.4169   
## ps -0.0275744 0.1374063 -0.201 0.8410   
## taxexp 0.0050604 0.0124615 0.406 0.6847   
## ev -0.1250729 0.0810340 -1.543 0.1230   
## ps1 0.0306433 0.1358500 0.226 0.8216   
## cashnequsd -0.0237808 0.0116644 -2.039 0.0417 \*   
## fcfps 0.0175472 0.0075241 2.332 0.0198 \*   
## intexp 0.0515884 0.0160039 3.223 0.0013 \*\*  
## assetsnc -0.0064921 0.0167013 -0.389 0.6975   
## eps 0.0158872 0.0141007 1.127 0.2601   
## assetsc 0.0235722 0.0117461 2.007 0.0450 \*   
## ebitdausd -0.0226290 0.0335521 -0.674 0.5002   
## netinccmnusd 0.0081017 0.0228250 0.355 0.7227   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Residual standard error: 0.2206 on 1267 degrees of freedom  
## Multiple R-squared: 0.09506, Adjusted R-squared: 0.08078   
## F-statistic: 6.655 on 20 and 1267 DF, p-value: < 2.2e-16  
##   
##   
## Call:  
## lm(formula = log(data\_model$return\_price) ~ ., data = data\_model)  
##   
## Residuals:  
## Min 1Q Median 3Q Max   
## -2.02005 -0.10678 -0.00352 0.10695 1.01425   
##   
## Coefficients:  
## Estimate Std. Error t value Pr(>|t|)   
## (Intercept) 0.0913010 0.0073275 12.460 < 2e-16 \*\*\*  
## pe1 -0.0231208 0.0643702 -0.359 0.71953   
## evebit 0.0033519 0.0141926 0.236 0.81334   
## evebitda 0.0007572 0.0115548 0.066 0.94776   
## pe 0.0319903 0.0646989 0.494 0.62109   
## pb 0.0297096 0.0094481 3.144 0.00171 \*\*   
## price -0.0088690 0.0142408 -0.623 0.53355   
## marketcap 0.0132622 0.0921975 0.144 0.88565   
## capex 0.0005467 0.0112613 0.049 0.96129   
## ps -0.0450949 0.0793803 -0.568 0.57009   
## taxexp -0.0117196 0.0145995 -0.803 0.42230   
## ev -0.0426936 0.1019844 -0.419 0.67557   
## ps1 0.0524147 0.0794225 0.660 0.50942   
## cashnequsd -0.0083869 0.0147985 -0.567 0.57101   
## fcfps 0.0209886 0.0078093 2.688 0.00730 \*\*   
## intexp 0.0162180 0.0194325 0.835 0.40413   
## assetsnc -0.0037868 0.0224244 -0.169 0.86593   
## eps 0.0209509 0.0152994 1.369 0.17115   
## assetsc 0.0234693 0.0142629 1.645 0.10016   
## ebitdausd -0.0139696 0.0396152 -0.353 0.72443   
## netinccmnusd 0.0199718 0.0271756 0.735 0.46254   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Residual standard error: 0.239 on 1109 degrees of freedom  
## Multiple R-squared: 0.04115, Adjusted R-squared: 0.02386   
## F-statistic: 2.38 on 20 and 1109 DF, p-value: 0.0005908  
##   
##   
## Call:  
## lm(formula = log(data\_model$return\_price) ~ ., data = data\_model)  
##   
## Residuals:  
## Min 1Q Median 3Q Max   
## -1.78073 -0.08687 -0.00382 0.08573 0.84290   
##   
## Coefficients:  
## Estimate Std. Error t value Pr(>|t|)   
## (Intercept) 0.0216725 0.0054010 4.013 6.38e-05 \*\*\*  
## pe1 0.0452134 0.0371609 1.217 0.22397   
## evebit -0.0003775 0.0099519 -0.038 0.96975   
## evebitda 0.0100164 0.0079392 1.262 0.20733   
## pe -0.0257934 0.0379582 -0.680 0.49694   
## pb 0.0192474 0.0065868 2.922 0.00354 \*\*   
## price -0.0055157 0.0097717 -0.564 0.57255   
## marketcap 0.0265231 0.0611931 0.433 0.66478   
## capex -0.0030932 0.0080997 -0.382 0.70262   
## ps -0.0700072 0.0992718 -0.705 0.48082   
## taxexp 0.0050305 0.0111642 0.451 0.65237   
## ev -0.0415553 0.0657962 -0.632 0.52779   
## ps1 0.0658480 0.0983084 0.670 0.50311   
## cashnequsd -0.0001256 0.0099543 -0.013 0.98993   
## fcfps 0.0091058 0.0058358 1.560 0.11896   
## intexp 0.0223044 0.0143879 1.550 0.12136   
## assetsnc -0.0036188 0.0129909 -0.279 0.78063   
## eps 0.0238866 0.0107473 2.223 0.02644 \*   
## assetsc -0.0078161 0.0104056 -0.751 0.45272   
## ebitdausd 0.0073985 0.0263509 0.281 0.77894   
## netinccmnusd -0.0084262 0.0181796 -0.463 0.64309   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Residual standard error: 0.1808 on 1167 degrees of freedom  
## Multiple R-squared: 0.06282, Adjusted R-squared: 0.04676   
## F-statistic: 3.911 on 20 and 1167 DF, p-value: 1.654e-08  
##   
##   
## Call:  
## lm(formula = log(data\_model$return\_price) ~ ., data = data\_model)  
##   
## Residuals:  
## Min 1Q Median 3Q Max   
## -2.18831 -0.09527 0.01517 0.11710 0.96052   
##   
## Coefficients:  
## Estimate Std. Error t value Pr(>|t|)   
## (Intercept) -0.0586100 0.0080678 -7.265 7.57e-13 \*\*\*  
## pe1 0.1103779 0.0352342 3.133 0.00178 \*\*   
## evebit 0.0192072 0.0133442 1.439 0.15036   
## evebitda 0.0235950 0.0109738 2.150 0.03179 \*   
## pe -0.0921831 0.0359847 -2.562 0.01056 \*   
## pb 0.0546285 0.0101070 5.405 8.12e-08 \*\*\*  
## price -0.0006027 0.0144734 -0.042 0.96679   
## marketcap 0.0465567 0.0841397 0.553 0.58016   
## capex 0.0151259 0.0122714 1.233 0.21801   
## ps -0.1208949 0.0797880 -1.515 0.13004   
## taxexp 0.0053509 0.0162124 0.330 0.74143   
## ev -0.0928764 0.0941934 -0.986 0.32437   
## ps1 0.1199986 0.0803432 1.494 0.13561   
## cashnequsd -0.0103189 0.0154440 -0.668 0.50419   
## fcfps 0.0237103 0.0099612 2.380 0.01749 \*   
## intexp -0.0223953 0.0208780 -1.073 0.28368   
## assetsnc 0.0607845 0.0244187 2.489 0.01296 \*   
## eps 0.0249138 0.0162011 1.538 0.12442   
## assetsc 0.0199540 0.0157872 1.264 0.20655   
## ebitdausd -0.0566166 0.0481340 -1.176 0.23979   
## netinccmnusd 0.0448154 0.0321464 1.394 0.16360   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Residual standard error: 0.2507 on 990 degrees of freedom  
## Multiple R-squared: 0.1869, Adjusted R-squared: 0.1705   
## F-statistic: 11.38 on 20 and 990 DF, p-value: < 2.2e-16  
##   
##   
## Call:  
## lm(formula = log(data\_model$return\_price) ~ ., data = data\_model)  
##   
## Residuals:  
## Min 1Q Median 3Q Max   
## -2.40031 -0.10518 0.01123 0.12520 0.98490   
##   
## Coefficients:  
## Estimate Std. Error t value Pr(>|t|)   
## (Intercept) -0.0405180 0.0082883 -4.889 1.18e-06 \*\*\*  
## pe1 0.0517686 0.0651199 0.795 0.426818   
## evebit 0.0085769 0.0149125 0.575 0.565320   
## evebitda 0.0397792 0.0119983 3.315 0.000948 \*\*\*  
## pe -0.0291898 0.0654163 -0.446 0.655539   
## pb 0.0405762 0.0095795 4.236 2.49e-05 \*\*\*  
## price -0.0156902 0.0133855 -1.172 0.241405   
## marketcap 0.0081434 0.0940804 0.087 0.931041   
## capex 0.0167547 0.0109858 1.525 0.127544   
## ps -0.0328958 0.0469650 -0.700 0.483821   
## taxexp 0.0171501 0.0154455 1.110 0.267112   
## ev -0.0187352 0.1017869 -0.184 0.854001   
## ps1 0.0319794 0.0486473 0.657 0.511093   
## cashnequsd 0.0003881 0.0162614 0.024 0.980965   
## fcfps 0.0201100 0.0090968 2.211 0.027286 \*   
## intexp -0.0261366 0.0228406 -1.144 0.252774   
## assetsnc 0.0327330 0.0231820 1.412 0.158261   
## eps 0.0266982 0.0153233 1.742 0.081758 .   
## assetsc 0.0089905 0.0156366 0.575 0.565445   
## ebitdausd 0.0165187 0.0388021 0.426 0.670406   
## netinccmnusd -0.0339487 0.0268705 -1.263 0.206735   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Residual standard error: 0.253 on 996 degrees of freedom  
## Multiple R-squared: 0.1558, Adjusted R-squared: 0.1389   
## F-statistic: 9.192 on 20 and 996 DF, p-value: < 2.2e-16  
##   
##   
## Call:  
## lm(formula = log(data\_model$return\_price) ~ ., data = data\_model)  
##   
## Residuals:  
## Min 1Q Median 3Q Max   
## -2.71454 -0.10064 0.01405 0.13754 1.43175   
##   
## Coefficients:  
## Estimate Std. Error t value Pr(>|t|)   
## (Intercept) -0.1185508 0.0084141 -14.090 < 2e-16 \*\*\*  
## pe1 0.0785173 0.0616739 1.273 0.2033   
## evebit 0.0296927 0.0157077 1.890 0.0590 .   
## evebitda 0.0294271 0.0120261 2.447 0.0146 \*   
## pe -0.0791163 0.0614264 -1.288 0.1980   
## pb 0.0497603 0.0103097 4.827 1.6e-06 \*\*\*  
## price -0.0002676 0.0157926 -0.017 0.9865   
## marketcap -0.0983349 0.0908672 -1.082 0.2794   
## capex -0.0022498 0.0122504 -0.184 0.8543   
## ps 0.0892392 0.1125734 0.793 0.4281   
## taxexp 0.0129799 0.0173295 0.749 0.4540   
## ev 0.0806041 0.0992621 0.812 0.4170   
## ps1 -0.0679418 0.1116746 -0.608 0.5431   
## cashnequsd 0.0027932 0.0165445 0.169 0.8660   
## fcfps 0.0144339 0.0093854 1.538 0.1244   
## intexp -0.0479016 0.0238857 -2.005 0.0452 \*   
## assetsnc 0.0103705 0.0226604 0.458 0.6473   
## eps 0.0372801 0.0181920 2.049 0.0407 \*   
## assetsc 0.0178834 0.0158884 1.126 0.2606   
## ebitdausd -0.0369733 0.0439631 -0.841 0.4005   
## netinccmnusd 0.0255491 0.0288146 0.887 0.3755   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Residual standard error: 0.2593 on 1007 degrees of freedom  
## Multiple R-squared: 0.192, Adjusted R-squared: 0.1759   
## F-statistic: 11.96 on 20 and 1007 DF, p-value: < 2.2e-16  
##   
##   
## Call:  
## lm(formula = log(data\_model$return\_price) ~ ., data = data\_model)  
##   
## Residuals:  
## ALL 10 residuals are 0: no residual degrees of freedom!  
##   
## Coefficients: (11 not defined because of singularities)  
## Estimate Std. Error t value Pr(>|t|)  
## (Intercept) 2.39850 NA NA NA  
## pe1 32.71535 NA NA NA  
## evebit -0.08896 NA NA NA  
## evebitda -0.81170 NA NA NA  
## pe -37.83793 NA NA NA  
## pb -1.83121 NA NA NA  
## price -43.55501 NA NA NA  
## marketcap 66.34827 NA NA NA  
## capex 13.40180 NA NA NA  
## ps 14.03994 NA NA NA  
## taxexp NA NA NA NA  
## ev NA NA NA NA  
## ps1 NA NA NA NA  
## cashnequsd NA NA NA NA  
## fcfps NA NA NA NA  
## intexp NA NA NA NA  
## assetsnc NA NA NA NA  
## eps NA NA NA NA  
## assetsc NA NA NA NA  
## ebitdausd NA NA NA NA  
## netinccmnusd NA NA NA NA  
##   
## Residual standard error: NaN on 0 degrees of freedom  
## Multiple R-squared: 1, Adjusted R-squared: NaN   
## F-statistic: NaN on 9 and 0 DF, p-value: NA  
##   
##   
## Call:  
## lm(formula = log(data\_model$return\_price) ~ ., data = data\_model)  
##   
## Residuals:  
## Min 1Q Median 3Q Max   
## -1.01757 -0.12209 0.01682 0.12847 1.29304   
##   
## Coefficients:  
## Estimate Std. Error t value Pr(>|t|)   
## (Intercept) -0.146463 0.006411 -22.846 < 2e-16 \*\*\*  
## pe1 0.106497 0.042240 2.521 0.011810 \*   
## evebit -0.023124 0.011406 -2.027 0.042830 \*   
## evebitda 0.055521 0.009384 5.917 4.17e-09 \*\*\*  
## pe -0.063098 0.042602 -1.481 0.138818   
## pb 0.034710 0.008573 4.049 5.44e-05 \*\*\*  
## price 0.054201 0.013623 3.979 7.30e-05 \*\*\*  
## marketcap -0.081336 0.058955 -1.380 0.167932   
## capex 0.005206 0.009800 0.531 0.595362   
## ps -0.084056 0.074209 -1.133 0.257551   
## taxexp -0.006651 0.013251 -0.502 0.615795   
## ev 0.090037 0.064042 1.406 0.159984   
## ps1 0.052322 0.074419 0.703 0.482133   
## cashnequsd -0.002654 0.010666 -0.249 0.803541   
## fcfps 0.013450 0.007149 1.881 0.060142 .   
## intexp -0.026331 0.015137 -1.740 0.082163 .   
## assetsnc -0.020999 0.015422 -1.362 0.173542   
## eps -0.011006 0.012759 -0.863 0.388516   
## assetsc -0.040993 0.012055 -3.400 0.000693 \*\*\*  
## ebitdausd 0.026723 0.036098 0.740 0.459254   
## netinccmnusd 0.011369 0.023600 0.482 0.630080   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Residual standard error: 0.2179 on 1335 degrees of freedom  
## Multiple R-squared: 0.1837, Adjusted R-squared: 0.1715   
## F-statistic: 15.02 on 20 and 1335 DF, p-value: < 2.2e-16  
##   
##   
## Call:  
## lm(formula = log(data\_model$return\_price) ~ ., data = data\_model)  
##   
## Residuals:  
## Min 1Q Median 3Q Max   
## -1.93396 -0.10741 0.01383 0.13120 1.70596   
##   
## Coefficients:  
## Estimate Std. Error t value Pr(>|t|)   
## (Intercept) -0.0565551 0.0073359 -7.709 2.48e-14 \*\*\*  
## pe1 -0.0303222 0.0517959 -0.585 0.558367   
## evebit 0.0227159 0.0120585 1.884 0.059811 .   
## evebitda 0.0103156 0.0110436 0.934 0.350435   
## pe 0.0515362 0.0516686 0.997 0.318736   
## pb 0.0367304 0.0094768 3.876 0.000112 \*\*\*  
## price -0.0002657 0.0145287 -0.018 0.985413   
## marketcap -0.0239549 0.0709270 -0.338 0.735613   
## capex -0.0091896 0.0108925 -0.844 0.399010   
## ps -0.5008467 0.1570132 -3.190 0.001457 \*\*   
## taxexp 0.0245176 0.0146072 1.678 0.093496 .   
## ev 0.0237615 0.0756852 0.314 0.753607   
## ps1 0.4968242 0.1549183 3.207 0.001374 \*\*   
## cashnequsd -0.0018024 0.0122370 -0.147 0.882924   
## fcfps -0.0016534 0.0083763 -0.197 0.843557   
## intexp -0.0181772 0.0169781 -1.071 0.284536   
## assetsnc 0.0258239 0.0181924 1.419 0.155995   
## eps 0.0508929 0.0136410 3.731 0.000199 \*\*\*  
## assetsc 0.0022928 0.0132409 0.173 0.862550   
## ebitdausd -0.0270523 0.0436165 -0.620 0.535213   
## netinccmnusd -0.0190760 0.0269172 -0.709 0.478643   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Residual standard error: 0.2428 on 1312 degrees of freedom  
## Multiple R-squared: 0.1283, Adjusted R-squared: 0.115   
## F-statistic: 9.654 on 20 and 1312 DF, p-value: < 2.2e-16  
##   
##   
## Call:  
## lm(formula = log(data\_model$return\_price) ~ ., data = data\_model)  
##   
## Residuals:  
## Min 1Q Median 3Q Max   
## -3.08065 -0.11086 -0.00465 0.11333 1.35484   
##   
## Coefficients:  
## Estimate Std. Error t value Pr(>|t|)   
## (Intercept) 0.0718525 0.0072898 9.857 < 2e-16 \*\*\*  
## pe1 0.0345183 0.0821880 0.420 0.674566   
## evebit 0.0250575 0.0136420 1.837 0.066488 .   
## evebitda -0.0020996 0.0119990 -0.175 0.861122   
## pe -0.0287783 0.0837629 -0.344 0.731231   
## pb 0.0284842 0.0096573 2.949 0.003245 \*\*   
## price -0.0187714 0.0147563 -1.272 0.203588   
## marketcap 0.0338874 0.0687513 0.493 0.622174   
## capex -0.0016297 0.0104332 -0.156 0.875902   
## ps -0.0143932 0.0533958 -0.270 0.787548   
## taxexp -0.0187503 0.0137972 -1.359 0.174405   
## ev -0.0318774 0.0757691 -0.421 0.674036   
## ps1 0.0075778 0.0548447 0.138 0.890131   
## cashnequsd -0.0007181 0.0125439 -0.057 0.954360   
## fcfps 0.0285580 0.0080869 3.531 0.000429 \*\*\*  
## intexp 0.0140285 0.0149847 0.936 0.349365   
## assetsnc -0.0027379 0.0193532 -0.141 0.887520   
## eps 0.0391257 0.0152789 2.561 0.010566 \*   
## assetsc 0.0062061 0.0136665 0.454 0.649829   
## ebitdausd -0.0135581 0.0364663 -0.372 0.710108   
## netinccmnusd 0.0111071 0.0239890 0.463 0.643443   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Residual standard error: 0.2443 on 1201 degrees of freedom  
## Multiple R-squared: 0.0714, Adjusted R-squared: 0.05593   
## F-statistic: 4.617 on 20 and 1201 DF, p-value: 8.625e-11  
##   
##   
## Call:  
## lm(formula = log(data\_model$return\_price) ~ ., data = data\_model)  
##   
## Residuals:  
## Min 1Q Median 3Q Max   
## -1.57839 -0.09440 0.00235 0.11152 0.86082   
##   
## Coefficients:  
## Estimate Std. Error t value Pr(>|t|)   
## (Intercept) -0.0364944 0.0059417 -6.142 1.09e-09 \*\*\*  
## pe1 -0.1203892 0.0626007 -1.923 0.054687 .   
## evebit -0.0050920 0.0109974 -0.463 0.643427   
## evebitda 0.0106621 0.0103068 1.034 0.301113   
## pe 0.1552607 0.0639597 2.427 0.015342 \*   
## pb 0.0287156 0.0082444 3.483 0.000513 \*\*\*  
## price -0.0088680 0.0121663 -0.729 0.466197   
## marketcap 0.0670083 0.0652710 1.027 0.304797   
## capex 0.0043228 0.0094664 0.457 0.648001   
## ps -0.4277252 0.0775944 -5.512 4.28e-08 \*\*\*  
## taxexp -0.0236678 0.0143423 -1.650 0.099147 .   
## ev -0.0494886 0.0705868 -0.701 0.483367   
## ps1 0.4125381 0.0775050 5.323 1.21e-07 \*\*\*  
## cashnequsd -0.0150995 0.0107899 -1.399 0.161935   
## fcfps 0.0047729 0.0064072 0.745 0.456449   
## intexp 0.0243269 0.0153508 1.585 0.113276   
## assetsnc -0.0000633 0.0163357 -0.004 0.996909   
## eps 0.0390324 0.0123927 3.150 0.001673 \*\*   
## assetsc -0.0055151 0.0110338 -0.500 0.617278   
## ebitdausd -0.0118230 0.0351668 -0.336 0.736777   
## netinccmnusd 0.0010635 0.0239148 0.044 0.964537   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Residual standard error: 0.2082 on 1271 degrees of freedom  
## Multiple R-squared: 0.1011, Adjusted R-squared: 0.08694   
## F-statistic: 7.146 on 20 and 1271 DF, p-value: < 2.2e-16  
##   
##   
## Call:  
## lm(formula = log(data\_model$return\_price) ~ ., data = data\_model)  
##   
## Residuals:  
## Min 1Q Median 3Q Max   
## -1.51465 -0.09647 -0.00343 0.09573 1.23550   
##   
## Coefficients:  
## Estimate Std. Error t value Pr(>|t|)   
## (Intercept) 0.069176 0.006268 11.037 < 2e-16 \*\*\*  
## pe1 0.002188 0.047291 0.046 0.96311   
## evebit -0.010093 0.011703 -0.862 0.38861   
## evebitda 0.023155 0.009526 2.431 0.01523 \*   
## pe -0.001858 0.048756 -0.038 0.96961   
## pb 0.023688 0.007484 3.165 0.00159 \*\*   
## price -0.020831 0.012348 -1.687 0.09190 .   
## marketcap -0.064625 0.077393 -0.835 0.40389   
## capex -0.002489 0.009813 -0.254 0.79984   
## ps -0.288637 0.056066 -5.148 3.11e-07 \*\*\*  
## taxexp 0.004600 0.014922 0.308 0.75795   
## ev 0.076972 0.083000 0.927 0.35394   
## ps1 0.288667 0.056704 5.091 4.19e-07 \*\*\*  
## cashnequsd 0.010971 0.012731 0.862 0.38902   
## fcfps 0.018035 0.007588 2.377 0.01764 \*   
## intexp -0.016252 0.017437 -0.932 0.35154   
## assetsnc -0.019839 0.016627 -1.193 0.23303   
## eps 0.038318 0.013922 2.752 0.00602 \*\*   
## assetsc 0.011496 0.011838 0.971 0.33169   
## ebitdausd 0.023662 0.032171 0.736 0.46219   
## netinccmnusd -0.060767 0.022947 -2.648 0.00821 \*\*   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Residual standard error: 0.2053 on 1101 degrees of freedom  
## Multiple R-squared: 0.06996, Adjusted R-squared: 0.05307   
## F-statistic: 4.141 on 20 and 1101 DF, p-value: 3.223e-09

#Preparing Data for Time Series  
data\_ts<- data\_final[order(data\_final$calendardate),]  
cal\_date<-unique(data\_ts$calendardate)  
  
#Time Series  
tr <- betas  
tr$date <- cal\_date[1:15]  
  
tr$date <- as.Date(tr$date, format = "%Y-%m-%d")  
  
#Performing Arima Time Series and Predicting betas for dates 16-19  
library(forecast)

## Warning: package 'forecast' was built under R version 3.3.2

for (j in 1:21){  
 for (i in 16:19){  
 coeff <- ts(tr[,j], start = c(2011,03), end = c(2014,09), frequency = 15+(i-15))  
 print(tr[,j])  
 fit <- arima(coeff, order = c(1,0,2))  
 pr <- predict(fit,n.ahead = 1)  
 tr[i, j] <- as.numeric(pr$pred)  
 }  
}

## [1] -0.097799284 -0.134410044 -0.047799507 -0.007809121 0.091300998  
## [6] 0.021672534 -0.058610039 -0.040517973 -0.118550825 2.398496812  
## [11] -0.146462815 -0.056555078 0.071852522 -0.036494439 0.069175625  
## [1] -0.097799284 -0.134410044 -0.047799507 -0.007809121 0.091300998  
## [6] 0.021672534 -0.058610039 -0.040517973 -0.118550825 2.398496812  
## [11] -0.146462815 -0.056555078 0.071852522 -0.036494439 0.069175625  
## [16] -0.271602055  
## [1] -0.097799284 -0.134410044 -0.047799507 -0.007809121 0.091300998  
## [6] 0.021672534 -0.058610039 -0.040517973 -0.118550825 2.398496812  
## [11] -0.146462815 -0.056555078 0.071852522 -0.036494439 0.069175625  
## [16] -0.271602055 -0.248734287  
## [1] -0.097799284 -0.134410044 -0.047799507 -0.007809121 0.091300998  
## [6] 0.021672534 -0.058610039 -0.040517973 -0.118550825 2.398496812  
## [11] -0.146462815 -0.056555078 0.071852522 -0.036494439 0.069175625  
## [16] -0.271602055 -0.248734287 -0.214556549  
## [1] -0.060560432 0.045658424 -0.039692130 0.071733318 -0.023120798  
## [6] 0.045213446 0.110377943 0.051768560 0.078517326 32.715351767  
## [11] 0.106496553 -0.030322234 0.034518319 -0.120389187 0.002187771  
## [16] NA NA NA NA  
## [1] -0.060560432 0.045658424 -0.039692130 0.071733318 -0.023120798  
## [6] 0.045213446 0.110377943 0.051768560 0.078517326 32.715351767  
## [11] 0.106496553 -0.030322234 0.034518319 -0.120389187 0.002187771  
## [16] 2.557725213 NA NA NA  
## [1] -0.060560432 0.045658424 -0.039692130 0.071733318 -0.023120798  
## [6] 0.045213446 0.110377943 0.051768560 0.078517326 32.715351767  
## [11] 0.106496553 -0.030322234 0.034518319 -0.120389187 0.002187771  
## [16] 2.557725213 2.821262687 NA NA  
## [1] -0.060560432 0.045658424 -0.039692130 0.071733318 -0.023120798  
## [6] 0.045213446 0.110377943 0.051768560 0.078517326 32.715351767  
## [11] 0.106496553 -0.030322234 0.034518319 -0.120389187 0.002187771  
## [16] 2.557725213 2.821262687 4.023485470 NA  
## [1] 0.0205002540 0.0109369918 0.0020686494 0.0185648990 0.0033518969  
## [6] -0.0003775362 0.0192072438 0.0085769148 0.0296927409 -0.0889646536  
## [11] -0.0231238104 0.0227159412 0.0250575127 -0.0050920377 -0.0100931471  
## [16] NA NA NA NA  
## [1] 0.0205002540 0.0109369918 0.0020686494 0.0185648990 0.0033518969  
## [6] -0.0003775362 0.0192072438 0.0085769148 0.0296927409 -0.0889646536  
## [11] -0.0231238104 0.0227159412 0.0250575127 -0.0050920377 -0.0100931471  
## [16] 0.0038255273 NA NA NA  
## [1] 0.0205002540 0.0109369918 0.0020686494 0.0185648990 0.0033518969  
## [6] -0.0003775362 0.0192072438 0.0085769148 0.0296927409 -0.0889646536  
## [11] -0.0231238104 0.0227159412 0.0250575127 -0.0050920377 -0.0100931471  
## [16] 0.0038255273 0.0008039057 NA NA  
## [1] 0.0205002540 0.0109369918 0.0020686494 0.0185648990 0.0033518969  
## [6] -0.0003775362 0.0192072438 0.0085769148 0.0296927409 -0.0889646536  
## [11] -0.0231238104 0.0227159412 0.0250575127 -0.0050920377 -0.0100931471  
## [16] 0.0038255273 0.0008039057 -0.0041527004 NA  
## [1] -0.0067485291 0.0003616687 0.0110890374 -0.0004332140 0.0007572440  
## [6] 0.0100163761 0.0235949753 0.0397792319 0.0294271369 -0.8116983040  
## [11] 0.0555211871 0.0103155669 -0.0020996219 0.0106621059 0.0231553122  
## [16] NA NA NA NA  
## [1] -0.0067485291 0.0003616687 0.0110890374 -0.0004332140 0.0007572440  
## [6] 0.0100163761 0.0235949753 0.0397792319 0.0294271369 -0.8116983040  
## [11] 0.0555211871 0.0103155669 -0.0020996219 0.0106621059 0.0231553122  
## [16] -0.0519921083 NA NA NA  
## [1] -0.0067485291 0.0003616687 0.0110890374 -0.0004332140 0.0007572440  
## [6] 0.0100163761 0.0235949753 0.0397792319 0.0294271369 -0.8116983040  
## [11] 0.0555211871 0.0103155669 -0.0020996219 0.0106621059 0.0231553122  
## [16] -0.0519921083 -0.0571983136 NA NA  
## [1] -0.0067485291 0.0003616687 0.0110890374 -0.0004332140 0.0007572440  
## [6] 0.0100163761 0.0235949753 0.0397792319 0.0294271369 -0.8116983040  
## [11] 0.0555211871 0.0103155669 -0.0020996219 0.0106621059 0.0231553122  
## [16] -0.0519921083 -0.0571983136 -0.0896801196 NA  
## [1] 0.095912395 -0.025173179 0.061557774 -0.066845914 0.031990272  
## [6] -0.025793425 -0.092183140 -0.029189779 -0.079116321 -37.837925479  
## [11] -0.063098146 0.051536244 -0.028778261 0.155260660 -0.001858052  
## [16] NA NA NA NA  
## [1] 0.095912395 -0.025173179 0.061557774 -0.066845914 0.031990272  
## [6] -0.025793425 -0.092183140 -0.029189779 -0.079116321 -37.837925479  
## [11] -0.063098146 0.051536244 -0.028778261 0.155260660 -0.001858052  
## [16] -2.935660838 NA NA NA  
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## [1] -0.001930965 -0.038288338 -0.046290786 -0.022629007 -0.013969636  
## [6] 0.007398530 -0.056616597 0.016518732 -0.036973308 NA  
## [11] 0.026722673 -0.027052308 -0.013558149 -0.011823013 0.023662009  
## [16] -0.010650534 -0.016346056 -0.017103910 NA  
## [1] -0.022516736 -0.011423715 0.015867450 0.008101719 0.019971835  
## [6] -0.008426230 0.044815353 -0.033948665 0.025549150 NA  
## [11] 0.011368624 -0.019075971 0.011107087 0.001063499 -0.060767126  
## [16] NA NA NA NA  
## [1] -0.0225167355 -0.0114237154 0.0158674502 0.0081017188 0.0199718352  
## [6] -0.0084262299 0.0448153535 -0.0339486651 0.0255491497 NA  
## [11] 0.0113686237 -0.0190759714 0.0111070874 0.0010634992 -0.0607671263  
## [16] -0.0006449885 NA NA NA  
## [1] -0.0225167355 -0.0114237154 0.0158674502 0.0081017188 0.0199718352  
## [6] -0.0084262299 0.0448153535 -0.0339486651 0.0255491497 NA  
## [11] 0.0113686237 -0.0190759714 0.0111070874 0.0010634992 -0.0607671263  
## [16] -0.0006449885 -0.0080212550 NA NA  
## [1] -0.0225167355 -0.0114237154 0.0158674502 0.0081017188 0.0199718352  
## [6] -0.0084262299 0.0448153535 -0.0339486651 0.0255491497 NA  
## [11] 0.0113686237 -0.0190759714 0.0111070874 0.0010634992 -0.0607671263  
## [16] -0.0006449885 -0.0080212550 -0.0060596780 NA

library(sqldf)

## Loading required package: gsubfn

## Loading required package: proto

## Loading required package: RSQLite

## Warning: package 'RSQLite' was built under R version 3.3.2

cal\_date<-as.data.frame(cal\_date[16:19])  
data\_ts<-sqldf('select \* from data\_ts where calendardate in cal\_date')

## Loading required package: tcltk

## Warning: Quoted identifiers should have class SQL, use DBI::SQL() if the  
## caller performs the quoting.

#Predicting Expected Log Returns - Named as Target  
nms <- sample(LETTERS,sample(1:10))  
target\_return<-as.data.frame(t(matrix(nrow=length(nms),ncol=0,dimnames=list(nms))))  
target<-0  
gg <-0  
data\_ts$target <-c()  
for (i in 1:dim(data\_ts)[1]){  
 a <- ifelse(data\_ts$calendardate[i] == "2014-12-31", 16, ifelse(data\_ts$calendardate[i] == "2015-03-31",17, ifelse(data\_ts$calendardate[i] == "2015-06-30", 18, 19)))  
 for (j in 2:21){  
 gg<- data\_ts[i,j]\*tr[a,(j)]  
 target = target + gg  
 }  
 gg= 0  
 data\_ts$target[i] <- log(target + tr[a,1])  
}

#Storing the dataset into data\_test  
data\_test <- data\_ts  
data\_test <- na.omit(data\_test)  
data\_test$log\_return\_price <- log(data\_test$return\_price)  
  
data\_test <- data\_test[order(data\_test$target),]  
row.names(data\_test)= (1:nrow(data\_test))  
  
#Dividing the Dataset into 5 buckets  
#Before that removing na's  
data\_test <- na.omit(data\_test)  
  
#Creating the Column grade for creating buckets based on the order  
#of epected return Values i.e. target and initializing with a value  
data\_test$grade <- "A"  
  
#Now creating the buckets  
data\_test$grade[1:(dim(data\_test)[1]/5)] <- "A"  
data\_test$grade[(dim(data\_test)[1]/5)+1:((dim(data\_test)[1]/5)\*2)] <- "B"  
data\_test$grade[(((dim(data\_test)[1]/5)\*2)+1):((dim(data\_test)[1]/5)\*3)] <- "C"  
data\_test$grade[(((dim(data\_test)[1]/5)\*3)+1):((dim(data\_test)[1]/5)\*4)] <- "D"  
data\_test$grade[(((dim(data\_test)[1]/5)\*4)+1):dim(data\_test)[1]] <- "E"  
  
#Creating New DataFrame df\_grade for computing the mean  
  
df\_grade <- as.data.frame(t(matrix(nrow=length(nms),ncol=0,dimnames=list(nms))))  
  
names(df\_grade)[1] <- "Flag"  
names(df\_grade)[2] <- "Mean\_Return"  
  
  
df\_grade[1,1] <- "A"  
df\_grade[2,1] <- "B"  
df\_grade[3,1] <- "C"  
df\_grade[4,1] <- "D"  
df\_grade[5,1] <- "E"  
  
#Calculating mean for Actual Return  
df\_grade$Mean\_Return <- c(mean(data\_test$log\_return\_price[data\_test$grade == "A"]),  
 mean(data\_test$log\_return\_price[data\_test$grade == "B"]),  
 mean(data\_test$log\_return\_price[data\_test$grade == "C"]),  
 mean(data\_test$log\_return\_price[data\_test$grade == "D"]),  
 mean(data\_test$log\_return\_price[data\_test$grade == "E"])  
)  
  
#Calculating mean for Expected Return  
df\_grade$Mean\_Target <- c(mean(data\_test$target[data\_test$grade == "A"]),  
 mean(data\_test$target[data\_test$grade == "B"]),  
 mean(data\_test$target[data\_test$grade == "C"]),  
 mean(data\_test$target[data\_test$grade == "D"]),  
 mean(data\_test$target[data\_test$grade == "E"])  
)  
  
#Keeping only the Grade, Mean\_Return and Mean\_Target  
df\_grade <- subset(df\_grade, select = c(Flag, Mean\_Return, Mean\_Target))  
print(df\_grade)

## Flag Mean\_Return Mean\_Target  
## 1 A -0.05214809 2.044093  
## 2 B -0.06560267 3.506867  
## 3 C -0.06822487 4.053031  
## 4 D -0.06623533 4.489411  
## 5 E -0.05464837 4.846144