S&P 500

Kevin OKiah

August 15, 2017

* Download the data

suppressMessages(library(tseries))

## Warning: package 'tseries' was built under R version 3.3.3

NUGTdata <- get.hist.quote('NUGT',quote="Close")

## 'getSymbols' currently uses auto.assign=TRUE by default, but will  
## use auto.assign=FALSE in 0.5-0. You will still be able to use  
## 'loadSymbols' to automatically load data. getOption("getSymbols.env")  
## and getOption("getSymbols.auto.assign") will still be checked for  
## alternate defaults.  
##   
## This message is shown once per session and may be disabled by setting   
## options("getSymbols.warning4.0"=FALSE). See ?getSymbols for details.

##   
## WARNING: There have been significant changes to Yahoo Finance data.  
## Please see the Warning section of '?getSymbols.yahoo' for details.  
##   
## This message is shown once per session and may be disabled by setting  
## options("getSymbols.yahoo.warning"=FALSE).

## time series starts 2010-12-08  
## time series ends 2017-08-11

Get the dimension of the data and peak at the data structure

dim(NUGTdata)

## [1] 1681 1

head(NUGTdata)

## Close  
## 2010-12-08 15356  
## 2010-12-09 15480  
## 2010-12-10 15604  
## 2010-12-13 15848  
## 2010-12-14 15872  
## 2010-12-15 15304

* Calculate log returns

NUGTret <- log(lag(NUGTdata)) - log(NUGTdata)  
NUGTvol <- sd(NUGTret) \* sqrt(250) \* 100  
  
#log returns  
print(head(NUGTret)) #print head

## Close  
## 2010-12-08 0.008042591  
## 2010-12-09 0.007978423  
## 2010-12-10 0.015516018  
## 2010-12-13 0.001513241  
## 2010-12-14 -0.036442318  
## 2010-12-15 -0.031327223

print(tail(NUGTret)) #print tail

## Close  
## 2017-08-03 -0.059685508  
## 2017-08-04 -0.019470236  
## 2017-08-07 0.002370071  
## 2017-08-08 0.042700545  
## 2017-08-09 0.062795264  
## 2017-08-10 0.007579239

length(NUGTret)

## [1] 1680

* Calculate volatility measure

## Function for creating volatility Measure  
getVol <- function(d, logrets){  
 var = 0  
 lam = 0  
 varlist <- c()  
 for (r in logrets) {  
 lam = lam\*(1 - 1/d) + 1  
 var = (1 - 1/lam)\*var + (1/lam)\*r^2  
 varlist <- c(varlist, var)  
 }  
 sqrt(varlist)  
 }

* Calculate volatility over entire length of series for various three different decay factors

#Volatility over 10, 30, 100 decay factors  
volest <- getVol(10,NUGTret)  
  
volest2 <- getVol(30,NUGTret)  
  
volest3 <- getVol(100,NUGTret)  
  
volatility<-cbind(volest,volest2, volest3)

* Plot the results, overlaying the volatility curves on the data, just as was done in the S&P example.

plot(volest,type="l", xlab = "Index", ylab = "Volatility", main = "Volatility curves for 3 lookback windows(10, 30, 100)")  
lines(volest2,type="l",col="red")  
lines(volest3, type = "l", col="blue")

