Portfolio Returns

Long Way

```
investment.amounts <- c(AMZN = 50e3, MSFT = 10e3, NFLX = 30e3, IBM = 10e3)
portfolio.names <- c("AMZN", "MSFT", "NFLX", "IBM")
date.from <- '2010-12-31'; date.to <- '2013-12-31'

getSymbols(portfolio.names, from = date.from, to = date.to, auto.assign = T)
```

```
'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.
```

```
[1] "AMZN" "MSFT" "NFLX" "IBM"
```

```
n <- nrow(AMZN)

combined.prices <- data.table(AMZN = AMZN[c(1, n), 6],
                              MSFT = MSFT[c(1, n), 6],
                              NFLX = NFLX[c(1, n), 6],
                              IBM = IBM[c(1, n), 6])
colnames(combined.prices) <- portfolio.names

period.return <- data.table(apply(combined.prices, 2, Delt))
period.return <- period.return[2]

portfolio.weights <- investment.amounts / sum(investment.amounts)

portfolio.return <- sum(period.return * portfolio.weights)
```

Portfolio Return over the Period: 99.85%

Matrix Algebra

```
wgt.mat <- t(as.matrix(portfolio.weights))
ret.mat <- t(as.matrix(period.return))

port.ret <- wgt.mat %*% ret.mat
```

Portfolio Return over the Period: 99.85%

Benchmark Returns

Benchmark Portfolios

Benchmark Portfolio with 3 names

```
benchmark.names <- c("AMZN", "MSFT", "IBM")
benchmark.prices <- data.table(Date = index(AMZN),
                               AMZN = AMZN[, 6],
                               MSFT = MSFT[, 6],
                               IBM = IBM[, 6])
colnames(benchmark.prices) <- c("Date", benchmark.names)

benchmark.returns <- data.table(Date = index(AMZN), apply(benchmark.prices[, 2:4], 2, Delt))
benchmark.returns[, ':='(Year = year(Date), Quarter = quarter(Date), Month = month(Date))]
benchmark.returns[1, c(2:4)] <- 0
```

```
benchmark.cumret <- benchmark.returns
benchmark.cumret[, ':='(AMZN = AMZN + 1, MSFT = MSFT + 1, IBM = IBM + 1)]
benchmark.cumret[, lapply(.SD, cumprod),
                 by = list(Year, Quarter, Month),
                 .SDcols = benchmark.names]
```

```
     Year Quarter Month      AMZN      MSFT      IBM
  1: 2010       4    12 1.0000000 1.0000000 1.000000
  2: 2011       1     1 1.0234444 1.0025081 1.004906
  3: 2011       1     1 1.0278333 1.0064494 1.005996
  4: 2011       1     1 1.0412222 1.0032246 1.001976
  5: 2011       1     1 1.0325556 1.0326048 1.012946
 ---
750: 2013       4    12 1.0236269 0.9603987 1.014192
751: 2013       4    12 1.0141762 0.9724627 1.019702
752: 2013       4    12 1.0273615 0.9819037 1.031556
753: 2013       4    12 1.0113307 0.9779702 1.030054
754: 2013       4    12 0.9993649 0.9779702 1.037456
```