Final Project

CFRM 462 - Introduction to Computational Finance and Financial Econometrics

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Testing

Contents

Chapter 1

Introduction

Dataset Description

VFINX - S&P 500 Index

TEstings[1]

VEURX - European Stock Index

VEIEX - Emerging Markets Fund

VBLTX - Long-Term Bond Fund

VBISX - Short-Term Bond Fund

VPACX - Pacific Stock Index

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[1]The Vanguard Group (2016)

Appendix A

Project Source Code

Initialization and Constants

```r
library(boot)
library(IntroCompFinR)
library(knitr)
library(PerformanceAnalytics)
library(tseries)
library(xlsx)

# Constants
asset.names <- c("VFINX", "VEURX", "VEIEX", "VBLTX", "VBISX", "VPACX")
export.pricedata.name <- "price_data.xlsx"
```

Helper Functions

```r
# Function to get adjusted close prices from online services See
# ??get.hist.quote for more info/options
get.adjclose <- function(instrument, interval, start = "1800-01-01", end = Sys.date()) {
    prices <- get.hist.quote(instrument = instrument, quote = c("AdjClose"),
        start = start, end = end, compression = interval, retclass = "zoo")
    prices
}
```

Downloading and Exporting Price Data

```r
# Defining date range
start.date <- "2011-06-01"
end.date <- "2016-06-30"

# Getting adjusted close prices for each of the securities
vfinx.adjclose <- get.adjclose("VFINX", "m", start.date, end.date)
veurx.adjclose <- get.adjclose("VEURX", "m", start.date, end.date)
```

```r
veiex.adjclose <- get.adjclose("VEIEX", "m", start.date, end.date)
vbltx.adjclose <- get.adjclose("VBLTX", "m", start.date, end.date)
vbisx.adjclose <- get.adjclose("VBISX", "m", start.date, end.date)
vpacx.adjclose <- get.adjclose("VPACX", "m", start.date, end.date)

# Changing class of index to yearmon, which is ideal for monthly data
index(vfinx.adjclose) <- as.yearmon(index(vfinx.adjclose))
index(veurx.adjclose) <- as.yearmon(index(veurx.adjclose))
index(veiex.adjclose) <- as.yearmon(index(veiex.adjclose))
index(vbltx.adjclose) <- as.yearmon(index(vbltx.adjclose))
index(vbisx.adjclose) <- as.yearmon(index(vbisx.adjclose))
index(vpacx.adjclose) <- as.yearmon(index(vpacx.adjclose))

# Merging price data
prices <- merge(vfinx.adjclose, veurx.adjclose, veiex.adjclose, vbltx.adjclose,
    vbisx.adjclose, vpacx.adjclose)
colnames(prices) <- asset.names

# Computing continuously compounded returns, and casting to different
# types for function compatibility
ret.z <- diff(log(prices))  # Type 'zoo'
ret.mat <- coredata(ret.z)  # Type 'matrix'
ret.df <- as.data.frame(coredata(ret.z))  # Type 'dataframe'

# Computing simple returns
ret.simple.z <- exp(ret.z) - 1

# Check if output Excel file exists, if so delete
if (file.exists(export.pricedata.name)) {
    file.remove(export.pricedata.name)
}

# Loop through each asset, and export price, simple and geometric
# return to separate sheets in an Excel file
for (i in seq_along(asset.names)) {
    simple.ret = exp(ret.df[, i]) - 1
    export.data.names <- c("Adjusted Close", "Simple Return", "Continuously Compounded Return")
    export.data = data.frame(prices[, i][-(1:1)], simple.ret, ret.df[,
        i])
    rownames(export.data) <- index(prices)[-(1:1)]
    colnames(export.data) <- export.data.names
    write.xlsx(export.data, file = export.pricedata.name, sheetName = asset.names[i],
        append = TRUE)
}
```

References

The Vanguard Group, I. (2016, July). Vanguard 500 index fund investor shares (vfinx). Retrieved from https://personal.vanguard.com/us/funds/snapshot?FundId=0040&FundIntExt=INT