

Part I: Generate the History Portfolio Valuation

1. \$100 million portfolio
2. Use the EQS function in Bloomberg to screen your stocks. Criteria:
 - a. You will make your selections based on 5/3/2011 trading date which gives you the previous day's closing prices to determine your portfolio
 - b. Only consider stocks in the S&P 100 index
 - c. Use metrics you think are good indicators of value. Be careful: You need to look at percentages and ratios, *i.e.*, use figures such as price/earnings, price/book, dividend yield, and NOT things such as earning per shares, book value or dividends
3. You will select a stock from each of the 9 sectors. Note: we are combining the Telecommunication and Technology sectors into one sector called Technology

Sectors:

Consumer Discretionary	Consumer Staples	Energy
Financial	Health Care	Industrial
Materials	Technology	Utilities

4. What was the methodology did you use to select the 9 stocks for your portfolio?
5. One you have selected the 9 stocks, one from each sector, create a portfolio of those stock where the allocation is market capitalization as of 5/2/2011 (this is done for you in the R code). You will edit **mktcap.csv** to include the tickers and market caps for your stocks.
6. Attached is an R program file that downloads the daily closing prices and dividends from Yahoo. The time range is 1/1/2009 to 11/8/2013. The program initializes your allocation as of 5/2/2011 based on the market caps, and then adjusts the number of shares in the portfolio prior to and after 5/2/2011. Be sure to change the input file **mktcap.csv** to include your tickers and 5/2/11 market capitalizations.

Getting Started with R

The CME Lab has R and RStudio already installed; however, you can also download these open source programs onto your personal laptops.

Download sites:

R: <http://cran.cnr.berkeley.edu/>

RStudio: <http://www.rstudio.com/ide/download/desktop>

Once you have installed the programs start RStudio. You will need to install some packages used by the R program **proj.r**. Go to the window with tabs titled Files, Plots, Packages. Select Packages then click on Install Packages. You will install **quantmod**, this package will also install other dependencies automatically.

1. Now open your **proj.r** file. Be sure that your market cap input file is in the same directory as the **proj.r** file.
2. Be sure your working directory also includes the following files:
 - a. **mktcap.csv** (with the edited tickers and market caps for you stocks)
 - b. **ES.generic.csv**
 - c. **SelSector.generic.csv**
3. Under Session/Set Working Directory, select To Source File Location.
4. Highlight the source code then press Ctrl-Return to run it.
5. The program will output the following files:
 - a. **port.csv**: the value for each stock and for the portfolio along with the prices of the S&P 500 E-mini contract
 - b. **port.ssec.csv**: the value for each stock and the portfolio along with the prices of the S&P 500 E-mini and each of the Select Sector Futures contract prices (note: the Select Sector Futures began trading in March 2011, so we don't have prices for earlier periods)
 - c. **port.wkly.csv**: weekly returns for the stocks, portfolio and ES (this file just contains the dates used to estimate the beta)
 - d. **ssec.wkly.csv**: two years of weekly returns for the Select Sector Futures, stocks, portfolio and ES
6. You will use the data in these files to work through parts II and III.

Part II: Using the S&P 500 Futures Contract to Transform the Portfolio

1. Using the data in the port.wkly.csv file, estimate the β and R^2 for the portfolio versus ES for the weekly time period 4/3/09 to 4/29/10.
2. Using the β you estimated, hedge the systematic risk of your portfolio from 5/2/11 until 12/30/11 (you will use the data in port.csv).
 - a. What is the value of the unhedged portfolio on 12/30/11?
 - b. What is the value of the hedged portfolio on 12/30/11?
 - c. What is the dollar and percentage difference between the hedged and unhedged portfolios on 12/30/11?
 - d. What are the Sharpe ratios for the unhedged and hedged portfolios?
 - e. List and compute other relevant risk measures you have learned about in your portfolio class.
 - f. What day was portfolio minimum value during the holding period (*i.e.*, what was the maximum draw down)?
 - g. What was the maximum drawdown percentage?
 - h. What was return for the hedged portfolio on that date?
 - i. Was your portfolio over- or under-hedged during the holding period?
 - j. If you answer to (i) was not no, how would you improve your hedge?

Part III: Using the S&P Select Sector Futures Contract to Transform the Portfolio

1. For each of the nine sectors, what is the stock associated with that sector?

E-Mini S&P Select Sector Index Futures	Bloomberg Ticker	Associated Stock
Consumer Discretionary	IXYA	
Consumer Staples	IXRA	
Energy	IXPA	
Financial	IXAA	
Health Care	IXCA	
Industrials	IXIA	
Materials	IXDA	
Technology	IXTA	
Utilities	IXSA	

Note: Your tickers end with 1 instead of A because we are using the generic contract because it automatically rolls.

2. As of 4/1/2013, compute how the composition of the portfolio has changed since 5/2/2011. Which stock has outperformed the portfolio? What stock has underperformed the portfolio?
3. Compute the following for the outperformer and underperformer: beta and R^2 using the ES and the appropriate select sector futures contract (use the ssec.wkly.csv file).
4. Partial sector rotation:
 - a. Compute the dollar amount that the outperformer share has grown since 5/2/11, how much is it (use the port.ssec.csv file)?
 - b. You are going to short the appropriate amount using the appropriate select sector beta for the stock and go long the appropriate amount of the select sector futures representing the stock that has underperformed. Using the prices from 4/1/13, your hedge ratio will be:

$$HR = \frac{P_H \beta_H}{P_L \beta_L}$$

- c. What is your hedge ratio? What is the respective number of contracts you are going long and short?
- d. What is the final value of the portfolio with a partial rotation compared to the portfolio without that adjustment?

5. For the security that has outperformed:
 - a. Consider the following three scenarios:
 - i. You sell that position on 4/1/13 and leave the proceeds in cash.
 - ii. Use the ES futures contract to eliminate the systematic risk due to the outperforming security.
 - iii. Use the appropriate select sector futures contract to hedge the systematic risk due to the outperforming security.
 - b. How does the return from (ii) and (iii) compare to the return found for (i)?

Part IV: Complete Your Report

1. Combine all your worksheets into a single Excel workbook.
2. You can either type your answers into a Word document with references to the spreadsheet where supporting data information can be found, or you can write your answers in the workbook itself. Just be sure that your information is organized.
3. While 70% of your project grade will be based on correctly completing the analysis (I will be checking the accuracy of you calculations), 30% comes from the analysis of the information, portfolio selection and analysis of ways to improve the hedges, or even alternative hedges.