I. Build an Equity Portfolio

Create an equity portfolio of at least 20 stocks. Eligible securities include any domestic or foreign security (ticker) tracked by Yahoo! Finance. For detailed instructions on portfolio creation, please refer to ARMDAT, chapter 20, Global Portfolio & Hedge Fund Management.

Create an Equity Portfolio

NOTE: For this assignment you may choose to create a portfolio from randomly selected stock tickers. On the User Entry for Portfolio dialog box, click the Simple Random radio button. To create a portfolio with randomly selected securities use the menu tree: /DCUL. You may now enter the number of equities desired for the portfolio. You should choose a number above the target (as some ticker symbols may have been dropped). For example, if 20 random selections are desired, then enter 25 (to account for ticker symbols that may have ceased trading). You can add and delete specific tickers after the spreadsheet portfolio is created with the randomly selected tickers. Again, please see ARMDAT, chapter 20 for additional details on using the right mouse click to add and delete tickers.

Price the Equity Portfolio

After creating your portfolio either by individual security selection or random creation, be sure to “Price” the portfolio. It is possible to utilize the update pricing feature at any time by menu tree /AFPPP or the $ glyph. That is click OK when presented with the option to update prices and other security specific information. If the procedure is “timed-out” by Yahoo (unable to complete the update of all tickers in the portfolio), you can restart the pricing process from the last ticker updated. See ARMDAT, chapter 20 for a more in-depth discussion. Once the pricing is updated be sure to save the file securely:

a. WinORS cloud

b. to your thumb drive.
Post the Portfolio to the WinORS Web Server for Automated Trading

In order to make your portfolio active for automated trading, please “Post to Web” your portfolio. Use menu tree: /AFPPW. You will need the following information to fill out the dialog box (note: for student groups, be sure to choose an email ID and password that all members may have access to):

a. Email Id: this is the email ID used to register WinORS (your ‘account’ in the database).
b. Password – this is any set of characters you want to use. Use an email/password combination
c. Name – this is the name of the portfolio for display purposes. By default it is set to the filename on disk.
   You may change this.
d. Objective – this is an optional field.
e. Style – this is an optional field.

Again, for a more detailed discussion see ARMDAT, chapter 20 for details.

II. Portfolio Insurance / Protective Put

Reference: ARMDAT, Chapter 6

1. Portfolio insurance is designed to protect an investor’s wealth when the investment portfolio is decreasing in value due to falling market prices. As the portfolio decreases in value the index option position increases in value, thereby leaving net worth “unchanged.” With this stated, the WinORS portfolio insurance computation is best viewed over a period of time and produces the more interesting analysis when markets are in decline. To choose a start date and then update prices daily over a period of time).

2. Update the market value of your portfolio – use the “$” glyph.

3. Build portfolio insurance. If you do not have a tab named “Portfolio Insurance” then insert one by executing the menu tree: /AFPPI. WinORS will require input on the level of insurance. The default is 5%; that is, protect against a 5% decline in the value of the equity portfolio. You may change this value as desired. The default for WinORS is to choose the index put option(s) with the lowest premium (lowest cost insurance) for the desired level of insurance. Puts for several major indexes are automatically tracked (see tab). **NOTE: the index options listed are in flux – all options may not show a price.**

4. On a daily (i.e., periodic) basis, bring the Portfolio Insurance tab into focus. Click the “$” glyph to update insured values.

5. After a period of time and after updating all values, discuss the outcome(s) of applying portfolio insurance against your portfolio. That is, choose one index (e.g., ^OEX) to make your point. That is, following the definition in the notes, address all columns. **NOTE: try this step after a market decline..! You might want to capture the results after a market decline. When the market resumes a bullish move, the insurance will become less needed.**

6. Note: To auto append the Portfolio Insurance results to your already opened WriteORS report, choose the Equity Portfolio option on the Reports Tab. Be sure the cursor in your WriteORS document is located at the desired insertion point (generally, the end of the document).

III. Equity Portfolio: Macro Hedging Basics

1. Merge-in the option-pricing template for equity indexes (e.g., Dow, S&P, etc.) by using the following menu tree: APPLICATIONS | FINANCE METHODS | OPTIONS ANALYSIS | OPEN TEMPLATE | INDEX OPTION (/AFOOI). The Index Option Analysis template is merged into the next available tab.
2. Choose the index that you would like to use for the portfolio hedge. Upon clicking on OK, WinORS will fetch a list of all options currently written against the index. When the list appears you may choose up to four (4) calls and four (4) puts. *NOTE (1): remember to center your selection around NTM options.* Perform this operation by using standard Windows keystrokes. That is, hold down the CTRL key with your left hand (a finger). Use the left-mouse button to choose an option (continue to hold down the CTRL key). This is a toggle; that is, to deselect an item simply use the left-mouse click again. Choose all desired call and put options. When done click on OK. *Note (2): Whoa! Remember the lecture demonstration. Index options behave somewhat differently than equity options. For example, you might want to consider skipping over a strike price rather than taking sequential strike prices.*

3. Examine advanced spread strategies for a combination of call and put options. You have the freedom to enter the number of contracts, exercise price, and market price. That is, you may experiment with the relationships are reported by the textbook. You are required to examine the following Spread Strategies for the macro hedge of the portfolio:

   a. Either a call-bull or call-bear spread (choose appropriately)
   b. A butterfly class spread (long or short)
   c. One straddle class strategy (straddle, strip or strap either long or short)
   d. gut (long or short)
   e. condor (long or short)
   f. One strategy of your choice

4. Provide a written analysis:
   a. A paragraph that explains the profitability impact for each solved strategy. Be sure to address which strategy(s) is projected to be profitable / unprofitable (and why / why not).
   b. Include the *Total Profit graph* for 3a – 3f.
   c. Clearly identify one (or more) strategy is the “recommended” hedge for the underlying portfolio.

5. Following the format of the previously assigned CAL, for one Index call contract, provide a detailed definition of the computed Black-Scholes Greek terms by using the computed value in the options output table (see the example paragraphs in chapter 5 of the ARMDAT textbook). Your explanation should be presented within the context of the stated volatility scenario. *NOTE: use a contract with a Delta ≤ 0.985.*

   a. Delta,
   b. Theta,
   c. Gamma,
   d. Vega,
   e. Rho
   f. Implied Volatility (include a 3D chart for a call and put option).
IV. Mitigating Portfolio Risk: The Basics of Futures Hedging

The objective of the futures hedging section of this project is designed to introduce you to the concept of “optimal” hedging for an equity portfolio. This is accomplished by conducting a historical simulation of your equity portfolio using WinORS Monte Carlo simulation methods. The objective is to have you, the analyst, develop an informed and comparative opinion regarding option-based hedging versus futures-based hedging for portfolios (not individual stocks). This statement is part of the deliverable but is ideally situated at the end of your report (see point #6 below).

Stock Index Futures Hedging

1. Put your portfolio tab in view (tab A).

2. On the WinORS Historical Valuation dialog box (/AFPPH), before setting simulation dates, choose:
   a. A market index and a corresponding futures contract using the supplied pull down list boxes.
   b. Explain why the chosen index is the best representation of a general market movement when compared to your managed portfolio.
   c. Explain how the chosen futures contract is “linked” to the chosen market index.

3. Back-test your portfolio to create a dynamic look-back hedge using the same dialog box (/AFPPH). Due to data limitations and computational complexity, it is suggested that you limit your back test to a range of 60 to 90 days (2 to 3 months). Follow the directions as provided in chapter 11 of the ARMDAT textbook. Note how the optimal hedge approach simulates the “stock-index futures hedge” as presented in class. Explain the output:
   a. Describe (narrative statement) the properties (components) of the stock index hedge ratio as first described in chapter 10 and exemplified in ARMDAT, chapter 11.
   b. For one “Open” and “Close” hedge operation, explain the role of the Stock Index Futures Hedge Ratio (Hint: see Futures Tab for Number of Contracts, Hedge Open and Hedge Close).
   c. At the end of the simulation period, summarize explain the findings for overall wealth change given the two components (the portfolio and the futures hedge).

4. Using performance measures located on the History Tab along with diagnostic graphs (/CDFP), compare and interpret the following for the managed portfolio and the market index.
   a. Market Tracking (charts)
      i. Indexed: Portfolio v/s Market index value
      ii. Indexed: Unhedged v/s Index Value
      iii. Present (copy/paste to your document) the chart titled “Indexed Portfolio v/s Market Index (History tab): /CDFP
      iv. One Technical Indicator graph (e.g., Momentum, Bollinger-Bands, etc). Be sure to define and or discuss the relevance of the technical indicator chart to the risk assessment of the portfolio.
b. Average return and associated standard deviation.
   i. Arithmetic (or geometric) portfolio returns (hedged and unhedged) vs Index returns
   ii. Simple measure of risk (e.g., Std Deviation, Skewness, etc.). Are these appropriate?
c. Risk-Adjusted Performance Measures
   i. Sharpe and Treynor measures
   ii. VaR
   iii. CVaR
   iv. Omega
   v. Sharpe-Omega

5. Use the SOLUTION | REPORTS | Reports Tab | Equity Portfolio (radio button) to auto-generate a final report (note – you may have to manually enter information on the portfolio beta). SUGGESTION: if the WriteORS word processor is already open (missing data print), then close the word processor before choosing the reports sequence.

6. The Qualified Opinion: Which hedging instrument did your team prefer – option contracts (and their associated spread strategies) or futures contracts? Be sure to differentiate your preference by indicating whether your conclusion is for an individual instrument (stock) or a portfolio of assets. Be sure to substantiate your opinion.

7. Save your WinORS file. The bond portfolio will be constructed in a new (fresh) spreadsheet.

V. **Build and Hedge a Fixed Income (bond) Portfolio**

I. Start with a new (fresh) WinORS spreadsheet view (/FN). Construct a Bond Portfolio In WinORS using Yahoo Bond Screener,

   a. Follow the instructions as presented in Chapter 12 of ARMDAT.
   b. Create a portfolio that contains 6-10 bonds.
      a. Set MIN Maturity to at least 2 years (higher is preferred).
      b. Set MIN YTM to 1.0 % or higher (do not add negative YTM bonds to the portfolio).
   c. For Types of bond choose from among the available types: Treasury or Corporate. Because of the tax implications of municipal bonds, ignore this category unless you are building an all municipal bond portfolio.
   d. Diversify your bond holdings:
      a. Rating
      b. Maturity
      c. Coupon
      d. Premium vs Discount
   e. After inserting about 12-15 bonds, click “Finish.” Click the button to price the portfolio. Note: Alternatively, you can use the $ glyph to re-price the portfolio; but, remember, Yahoo does not guarantee to find all bonds after a period of elapsed time (legal restrictions).
   f. After pricing the bond portfolio all necessary calculations are complete.
   g. Be sure to Save your work
h. Use the WinORS report function to generate a word processor document:
   a. /SR-Reports-Bonds
   b. Remember to save in native format (*.wpt). You may also “save as” .RTF format for easy open and read by Microsoft Word.
   c. Remember, to re-open a closed WPT document, you must start WinORS and use the menu sequence: /TW.

i. Append diagnostic charts to the report (as needed to make your analysis clear):
   a. Position the cursor of the WPT document at the desired insertion point.
   b. Go to WinORS. Follow menu tree: /CDFB
   c. Select from the pick list
   d. Make sure the graph window is the active window. Copy: /EC or /CC
   e. Go to the document (check cursor location). Paste graph: /EP

II. Analysis  *Reference is made to chapter 12*

Refer to either: a) the on-screen WinORS spreadsheet, or b) the report generated by the WinORS report writer. Provide a description (paragraph or two) to explain the printed tables, particularly as needed to address the following points:

1. **Portfolio Overview.** State the explicit (or implied) portfolio investment objectives for the constructed bond portfolio. Should any exist, identify any observable investment constraints (e.g., no more than 3 municipal bonds; or, only corporate bonds selling at a premium). In this section be sure to state the expected investment horizon for this investment portfolio (e.g., 1-3 years, 10-12 years, at least 25 years, etc.).

2. **Credit Quality.** Using the reported bond ratings, discuss the overall credit quality of the bond portfolio. What is the diversification pattern across risk categories (support with a diagnostic graph).

3. **YTM:** Identify the portfolio average YTM at buy (the decision / creation) date. Compare and contrast YTM to the portfolio current yield. Explain why the two are different. Is this a significant difference? See section label: Portfolio YTM

4. **Portfolio Duration**
   a. Explain and define the portfolio average duration. Be sure to relate your definition and explanation to the concept of interest rate risk.
   b. How might a bond risk manager use the modified duration for your portfolio? Exemplify. For example, using the computed average duration metric, if interest rates are expected to increase by 50 basis points what is your calculated expected change in the value of the bond portfolio?

5. **Bond Convexity, Risk and Sensitivity:** Using the computed fields of Bond Convexity, Bond Risk and Bond Sensitivity, discuss interest rate risk as it pertains to this portfolio. Be sure to use the values computed for the bond portfolio. Include an assessment of:
   a. 50 basis point drop in overall interest rate levels over the next 12 months
   b. 100 basis point increase in overall interest rate levels over the next 12 months.

6. **Portfolio Hedge (hypothetical):** This is a hypothetical thought proving question. How would you hedge this portfolio over a three (3) month period? Specifically,
   a. Which futures contract would you choose and on what exchange does it trade (cite an actual contract – use a combination of Barchart.com and ARMDAT, chapter 10)?
b. Assume a 50 basis point drop in overall interest rates levels over the next 3 months – formulate and discuss a possible hedge scenario (computation not required).

c. Assume a 25 basis point increase in overall interest rate levels over the next 3 months. Discuss a possible hedge scenario (computation not required).

VI. Automated Trading  Reference: ARMDAT, Chapters 14-15

To view your portfolio, use the Login: e-Portfolio link on Professor Dash’s homepage. You will need the username / email used to Post the portfolio to the web as well as the password entered at that time.  Using your preferred screen capture software (WinORS supports a basic capture tool), capture a snapshot of the portfolio trading screen.  Continue as follows:

1. Login to the Automated Trader via: a) Dash homepage, b) ARMDAT, or c) The NKD-Group homepage.
2. Follow instructions in Chapter 20 (ARMDAT).
3. Add a Portfolio Summary to the deliverable
   a. Refer to the Portfolio Summary table, Performance section.
   b. Report and contrast the current year ROR for the buy-hold strategy versus the automated trading method.
   c. Report and contrast the total automated simulation period (since 01-June-2009) ROR for the buy-hold strategy versus automated trading method.

4. Choose a stock ticker that has traded profitably. Summarize the performance of this stock.
   a. Click to highlight the stock of interest (e.g., IBM).
   b. Click on the “Start Menu” (see bottom of screen). Click on “Equity Trading Report” menu choice. The detailed trade history of the selected stock appears.
   c. Briefly summarize the first 2 and last 3 trades made by the AT. A trade is defined by an “open” followed by a “close”.
   d. Choose the “Summary Tab” for the individual security. Compare the after-transaction rate of return for “Buy-Hold” versus “Trading” (a few sentences).
   e. CLOSE THE “EQUITY TRADING REPORT” – click on the X.
5. Identify a stock that has traded un-profitably. Repeat steps 2a through 2e for this stock.

END of WRITTEN REPORT
VII. Assessment of Your Written Report

1. Performance evaluation is determined by how well you relate the quantitative criteria (cited above) to risk mitigation of the portfolio. To that end, the completed report should:
   a. provide a foundation and analysis of the data-driven analytics with particular emphasis to the computational metrics identified above in this assignment. Stated differently, the submitted report should be evidence based (from computed analytics) and should include specific comment from the team about what how various metrics can be used to help in measuring and mitigating risk.
   b. Present a deliverable document that possibly incorporates informed scholarship and external research citations.
   c. a deliverable document that uses a diversity of language. That is, go beyond a simple recitation of a definition by explaining how the metric computed for your portfolio (e.g., VaR) helps to understand risk mitigation for the underlying portfolio.

2. Lastly, please note that your final report may be posted to the Dash website as an “example.” To that end the document should positively impact the approach and development of projects completed by students who take this class in future semesters.

Last Update: 19-Apr-15