Portfolio and Risk Management

Acknowledgement
This publication was made possible by a grant from the FINRA Investor Education Foundation.

The FINRA Investor Education Foundation supports research and educational projects that give underserved Americans the knowledge, skills and tools necessary for financial success throughout life. Visit www.finrafoundation.org for details about grant programs and other FINRA Foundation initiatives.

(1/2010)

Inquiries and/or comments should be directed to Professor David Fehr at the Center for Financial Studies at Southern New Hampshire University: (603) 644-3197 or d.fehr@snhu.edu.

Executive Summary

The purpose of this module is to present three risk management tools that investors will find useful in managing a portfolio. The module consists of four segments:

1. An overview of the importance of risk management in investing
2. Dollar cost averaging
3. Portfolio rebalancing strategies
4. Laddering to achieve desired cash flow patterns

Dollar cost averaging, as explored in Segment 2, is a strategy in which the investor invests a constant dollar amount at regularly scheduled dates throughout the investment period. This strategy will have the effect of buying relatively more securities when prices are low and relatively fewer securities when prices are high. This concept appeared over 35 years ago as a disciplined approach to investing. In this module, a web calculator is used to present the concept and explore the consequences of dollar cost averaging. A second online tool compares dollar cost averaging to a lump sum investing approach.

Portfolio rebalancing, as explored in Segment 3, is the process by which investors buy and sell securities in the portfolio in order to keep asset allocation proportions consistent with the investor's original plan. As securities prices change through time, the asset allocation will change unless the investor "rebalances" the portfolio on a regular basis. A worksheet exercise will be used to illustrate rebalancing for a portfolio containing stocks, bonds and cash. The facilitator may want to consider this module in conjunction with the **Asset Allocation and Security Selection** module in this series.

Segment 4 addresses laddering, a risk reduction strategy that has the investor structure a portfolio so as to provide cash flows in a pattern consistent with her consumption needs. Often this strategy is employed for a bond portfolio because the promised cash payments for each bond are known. This strategy can be particularly useful in retirement planning.

Educational Motivation

- To understand both the strengths and the weaknesses of dollar cost averaging as an investment strategy
- To explore the importance of portfolio rebalancing as a risk management tool
- To present the advantages of investment laddering as a means to synchronize the investment portfolio with cash flow needs

Overview of Material

Key Terminology:

Active portfolio management: Portfolio management that attempts to identify and invest in under-priced securities.

Asset: Item of value. In this module, asset refers to financial assets such as stocks and bonds.

Asset allocation: A program to divide investment dollars among categories of assets, such as stocks, bonds, and cash.

Callable bond: A bond with a provision that allows the issuer to purchase the bond from the investor at a pre-specified price. These bonds may not be appropriate for laddering since their final maturities are not known for certain and since most bonds are called when interest rates have fallen and therefore the investor will need to reinvest the proceeds at lower rates.

Certificate of deposit (CD): A short-term financial instrument, issued by a bank, which earns interest. The United States Securities and Exchange Commission (SEC) describes CDs as follows: "A CD is a special type of deposit account with a bank or thrift institution that typically offers a higher rate of interest than a regular savings account. Unlike other investments, CDs feature federal deposit insurance up to $250,000."

Dollar cost averaging: A strategy that involves purchasing securities, most often mutual funds, at regular intervals (e.g., every month or every pay period) without regard to how the market is moving. The goal of dollar cost averaging is to reduce volatility and buy at a low average purchase price.

Index fund: A mutual fund portfolio created specifically to track a market index.

Laddering: A strategy to create a portfolio in which bond or CD maturities and/or coupon payment dates correspond to dates of cash need.

Rebalancing: Buying and selling securities in a portfolio to re-establish original portfolio proportions for each asset class.

S&P 500 index: A highly diversified stock index containing the largest stocks across a wide variety of industry sectors.

Zero coupon bond: A bond that makes no interest payments over its life but is issued at a price lower than its par value, i.e., at a discount.

Background Information

The sections **Dollar Cost Averaging**, **Portfolio Rebalancing** and **Laddering** discuss the three risk management techniques to be covered in this module.

Dollar Cost Averaging

Dollar cost averaging is an investment strategy in which a fixed dollar investment is made at regular intervals. Such a strategy will lead the investor to purchase more shares when prices are low and fewer shares when prices are high. In many ways the strategy takes the emotion out of investing.

The facilitator might want to explore with students how the typical investor might fixate on "winning" stocks, possibly leading to the urge to buy when securities prices are relatively high. Clearly, the preference would be to purchase near the bottom of a price range. An advantage of dollar cost averaging is that the investor need not decide when it is appropriate to purchase, but rather automatically purchases at regular intervals.

To set up a dollar cost averaging program, the investor would only need to decide the periodic investment amount and the frequency of investment and to determine the investment vehicle (a well-diversified mutual fund can be a wise choice). Each of these three factors is explicitly addressed by the students in assignment #1, using an online dollar cost averaging tool.

For advanced groups, the facilitator may wish to present an enhancement of the dollar cost averaging technique known as dollar value averaging. In this program, the investor adjusts the amount invested based upon the performance of the portfolio to date. Let's say I initially plan to invest $100 per month in the program. If, after the first month the value of my portfolio has fallen to $50, I will invest $150 in the second month, not $100. By doing so, I have taken the value of my portfolio to $200 at the start of the second period versus $150 under the standard dollar cost averaging. The $200 portfolio valuation in the second period is more consistent with my initial plans. Dollar value averaging is even more aggressive than dollar cost averaging in purchasing more shares when prices are low and fewer shares when prices are high.

Dollar cost averaging cannot guarantee superior investment results. Often it can be more productive to invest a lump sum immediately rather than initiate a dollar cost averaging program. In this case, it can be better to put all of the funds "to work" immediately as opposed to becoming fully invested over time. Assignment #2 considers a one-year investment horizon and uses actual S&P 500 returns (consistent with index fund investing) to evaluate the merits of investing a lump sum immediately versus dollar cost

averaging during the one-year period. The website claims that the lump sum strategy beats dollar cost averaging two times out of three. Presumably this occurs because the index tends to rise more consistently than fall, so that it pays to be fully invested sooner rather than later.

A take away for beginning investors might be that strategies that eliminate attempts to “time” the market may be advantageous.

Portfolio Rebalancing

At the start of any investment program, the investor (either explicitly or implicitly) sets an asset allocation. She will choose to divide her investment assets among a range of asset categories, usually including equities (stocks), fixed income securities (bonds), cash and possibly some more exotic assets. Ideally, she would have analyzed both her risk tolerance and risk capacity in order to set a sensible allocation. See the companion module in this series, *Asset Allocation and Security Selection*, for a description of this process.

Through time, as securities prices change, the portfolio allocations will likely move away from the initial asset allocation percentages chosen. As a consequence, our investor is now holding a portfolio with a different risk profile than that initially decided upon. To rectify this situation, the investor will want to “rebalance” the portfolio to come back to the original allocation parameters. As a practical matter, the process will involve the selling of securities in those asset categories that have increased in value and using the proceeds to purchase additional assets in those categories that have lost value. The goal is to return to the initial asset allocation percentages on a value weighted basis.

The facilitator will want to stress that while the portfolio rebalancing concept is straight forward, many investors tend not to be diligent in rebalancing. Maybe this is due to simple inertia, lack of time, intimidation by the process or any number of other excuses. Since the procedure requires taking money out of high performing investments and reallocating the funds to weaker performers, the process can seem counter-intuitive to some. Note that an opposite strategy of investing more heavily in top performers, in addition to moving the allocation away from the goal, also effectively buys high price securities in anticipation of selling later at even higher prices!

While beyond the scope of this module, the facilitator might want to point out that portfolio rebalancing involving the periodic buying and selling of financial securities has tax consequences. If this activity is employed for non-retirement accounts, the activity can trigger taxable events, e.g., realized capital gains. Even in taxable accounts, most experts argue that benefits of rebalancing are compelling.

As part of this segment, a worksheet has been included to demonstrate the portfolio rebalancing steps necessary for a particularly simple portfolio containing stocks, bonds and cash holdings. The worksheet presents the initial holdings, the value of this portfolio six months later after securities prices have changed and the necessary steps to rebalance back to the initial allocations.

Laddering

Laddering is a risk reduction strategy, most often associated with bond investing. Laddering builds a portfolio of bonds with different maturities, although certificates of deposit (CDs) may also be used. In practice, some portion of the bond portfolio will mature each year, at which point the investor maintains the ladder by using these cash proceeds to purchase new bonds. Note that callable bonds would not be appropriate for laddering because the bonds can be redeemed prior to maturity at the discretion of the issuer.

It can be shown that, in many interest rate environments, this bond investing strategy can outperform other bond strategies. Our emphasis will be to point out that the strategy can produce multiple risk management benefits:

1. Since our ultimate goal in investing is to generate sufficient funds for consumption (i.e., buying goods and/or services), laddering can be used to synchronize the receipt of cash flow from (bond) investments to projected consumption needs. Since any bond investment will have a well defined, promised payment pattern, the investor can choose bonds with payments (interest payments and return of

principal at bond maturity) that line up with consumption needs. For more advanced groups, the facilitator might discuss how zero coupon bonds could be an ideal vehicle for this program, since they are sold at a discount and provide one specific cash flow at maturity.

2. Since a laddered portfolio contains bonds of various maturities, the impact of interest rate fluctuations will be mitigated. With only a small percentage of bonds in the portfolio maturing in any year, the problem of reinvesting in falling interest rate environments is reduced.
3. As with dollar cost averaging and portfolio rebalancing, laddering introduces considerable discipline in the investing process. Investors with a laddered portfolio are less likely to speculate on interest rate movements and attempt to time the market.

An online tool is provided to apply the laddering approach to a portfolio of CDs, certificates of deposit. The goal is to construct a portfolio that will produce a specified cash flow pattern.

Web Site Documentation

www.finra.org/smartbonds/
Offers a comprehensive introduction to investing in bonds, including detailed information on laddering strategies.

www.sec.gov/investor/pubs/assetallocation.htm
A beginner's guide to asset allocation, diversification, and strategies for rebalancing one's portfolio.

www.americancentury.com/calculator/dollar_cost_averaging_calculator.jsp
Provides a dollar cost averaging tool with which the student can evaluate the benefits of the strategy for monthly investing during one year.

www.moneychimp.com/features/dollar_cost.htm
An online tool designed specifically to allow comparison of lump sum investing vs. dollar cost averaging.

www.bankrate.com/calculators/savings/cd-laddering-calculator.aspx
This website presents a tool that can be used to create a laddered CD portfolio based on cash flow requirements entered by the investor.

Lesson Plan and Relevant Assignments

Materials Needed:

- WEBSITES handout
- A PORTFOLIO REBALANCING PROBLEM worksheet

90-minute Lesson Plan:

15 minutes: Segment 1. Stress the importance of portfolio and risk management. Provide an overview of the risk management techniques to be considered.

20 minutes: Segment 2. Distribute the WEBSITES handout. Have students complete the assignment **Evaluating Dollar Cost Averaging** below. Encourage students to explore the variety of stock price patterns to appreciate the advantages of dollar cost averaging.

20 minutes: Segment 2 cont'd. Give students more practice with dollar cost averaging using the assignment **Dollar Cost Averaging vs. Lump Sum Investing** below.

20 minutes: Segment 3. Distribute the A PORTFOLIO REBALANCING PROBLEM worksheet. Use the **A Portfolio Rebalancing Problem** worksheet to demonstrate rebalancing calculations for a prototype portfolio.

15 minutes: Segment 4. Use the **Creating a Laddered CD Portfolio** assignment to see how a laddering strategy can be developed.

35-minute Lesson Plan:

The session can easily be restructured to 35 minutes by eliminating the comparison of dollar cost averaging to lump sum investing.

5 minutes: Segment 1. Stress the importance of portfolio and risk management. Provide an overview of the risk management techniques to be considered.

10 minutes: Segment 2. Distribute the WEBSITES handout. Have students complete the assignment **Evaluating Dollar Cost Averaging** below. Encourage students to explore the variety of stock price patterns to appreciate the advantages of dollar cost averaging.

10 minutes: Segment 3. Distribute the A PORTFOLIO REBALANCING PROBLEM worksheet. Use the **A Portfolio Rebalancing Problem** worksheet to demonstrate rebalancing calculations for a prototype portfolio.

10 minutes: Segment 4. Use the **Creating a Laddered CD Portfolio** assignment to see how a laddering strategy can be developed.

Assignments:

Segment 2 – Evaluating Dollar Cost Averaging

Each student can create a dollar cost averaging program assuming monthly investment of a constant dollar amount. The student can experiment with different per-share prices for each month during the year.

URL: www.americancentury.com/calculator/dollar_cost_averaging_calculator.jsp

1. Follow the link above. A data entry sheet appears that allows the student to enter the monthly dollar amount of investment and per-share prices during a 12-month period.
2. Enter the monthly amount and the 12 per-share prices. Click on the "Submit" button to produce a new screen with financial results.
3. Key financial data are presented for the given investing program, including the amount invested, accumulated balance at the end of the investment period, investment earnings during the period, average per-share purchase prices, etc.
4. Click the "Modify" button to return to the data entry screen. Note that the original data will be retained on the data entry page until changes are made. This feature facilitates studying the investment results viz. the inputted share price pattern.
5. As suggested on the data entry page, encourage students to evaluate alternative share price patterns, e.g., highly volatile prices, steadily increasing or decreasing prices, etc. For many patterns, the student will discover that the average share purchase price with dollar cost averaging is less than the share price with an immediate investment strategy.

Segment 2 – Dollar Cost Averaging vs. Lump Sum Investing

When beginning an investment program with a lump sum amount of cash, it can often be advantageous to invest the entire amount immediately as opposed to dollar cost averaging. The sense of this approach is to put the entire balance "to work" immediately as opposed to the sequential investment approach via dollar cost averaging. The tool can study this phenomenon using actual S&P 500 returns.

URL: www.moneychimp.com/features/dollar_cost.htm

1. Scroll down to the calculator in the middle of the "does dollar cost averaging work?" article.
2. Set a bank account interest rate to be applied to cash balances that are not invested in the S&P 500 index during the any part of the one year life of this illustration.
3. Using the radio dials and the scroll bar, set the starting date for a one-year dollar cost averaging vs. lump sum comparison.
4. Compare the results at the bottom of the panel.

Segment 3 – A Portfolio Rebalancing Problem

The purpose of this exercise is to practice the mechanics of rebalancing a portfolio. A PORTFOLIO REBALANCING PROBLEM worksheet is provided.

1. The appropriate dollar value for each asset class at the beginning of the investment period is given for a portfolio of $100,000 and the asset allocation outlined in the worksheet. Determine the appropriate dollar value for each asset class after the values of the assets in the portfolio have changed over time.
2. Determine which asset class(es) is/are overvalued and by how much. The investor will want to sell the excess of this asset class.
3. Determine which asset class(es) is/are undervalued and by how much. The investor will want to buy more of this asset class.

Segment 4 – Creating a Laddered CD Portfolio

The purpose of this exercise is to use CD laddering to produce high yields.

URL: www.bankrate.com/calculators/savings/cd-laddering-calculator.aspx

1. Enter the amount in dollars that you have available to invest in CDs. This is the total amount of the portfolio that you will commit to the laddering strategy.
2. Click the “Calculate” button and compare the laddering approach to investing in a single CD. Click on “View Report” for more detailed information.
3. On the next screen, you can consider CD investments from outside your home state. To simplify the results, choose the “No” radio dial and click enter.
4. The calculator allows users to view and update interest rates and calculate results accordingly.

PORTFOLIO AND RISK MANAGEMENT

WEBSITES

www.finra.org/smartbonds/
Offers a comprehensive introduction to investing in bonds, including detailed information on laddering strategies.

www.sec.gov/investor/pubs/assetallocation.htm
A beginner's guide to asset allocation, diversification, and strategies for rebalancing one's portfolio.

www.americancentury.com/calculator/dollar_cost_averaging_calculator.jsp
Provides a dollar cost averaging tool with which the student can evaluate the benefits of the strategy for monthly investing during one year.

www.moneychimp.com/features/dollar_cost.htm
An online tool designed specifically to allow comparison of lump sum investing vs. dollar cost averaging.

www.bankrate.com/calculators/savings/cd-laddering-calculator.aspx
This website presents a tool that can be used to create a laddered CD portfolio based on cash flow requirements entered by the investor.

PORTFOLIO AND RISK MANAGEMENT

A PORTFOLIO REBALANCING PROBLEM

Rebalance frequently to maintain your target asset allocation. This requires selling assets of a class for which value has increased so that the percentage of your portfolio invested in that class is too high and buying more assets of a class that have decreased in value so that the percentage of your portfolio invested in that class is too low. This ensures that you are not overly exposed to a particular asset class if that asset class should suffer a bear market. It also forces you to "buy low-sell high."

Example: Target asset allocation: 60% stocks, 30% bonds, 10% cash.

Initial investments:	$60,000 stocks	60%
	$30,000 bonds	30%
	$10,000 cash	10%
Values 6 months later:	$65,000 stocks	63.7%
	$27,000 bonds	26.5%
	$10,000 cash	9.8%
	$102,000 total	

After rebalancing:	_____ stocks	60% * $102,000
	_____ bonds	30% * $102,000
	_____ cash	10% * $102,000

Sell stocks worth _____

Buy bonds worth _____

Keep remaining _____ as cash

PORTFOLIO AND RISK MANAGEMENT

A PORTFOLIO REBALANCING PROBLEM

SOLUTION

Rebalance frequently to maintain your target asset allocation. This requires selling assets of a class for which value has increased so that the percentage of your portfolio invested in that class is too high and buying more assets of a class that have decreased in value so that the percentage of your portfolio invested in that class is too low. This ensures that you are not overly exposed to a particular asset class if that asset class should suffer a bear market. It also forces you to "buy low-sell high."

Example: Target asset allocation: 60% stocks, 30% bonds, 10% cash.

Initial investments:	$60,000 stocks	60%
	$30,000 bonds	30%
	$10,000 cash	10%
Values 6 months later:	$65,000 stocks	63.7%
	$27,000 bonds	26.5%
	$10,000 cash	9.8%
	$102,000 total	
After rebalancing:	$61,200 stocks	60% * $102,000
	$30,600 bonds	30% * $102,000
	$10,200 cash	10% * $102,000

Sell stocks worth $3,800 ($65,000-$61,200)
Buy bonds worth $3,060 ($30,600-$27,000)
Keep remaining $200 as cash ($10,200-$10,000)