

**Achievement of Market-Friendly Initiatives and Results Program
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Portfolio Management, Equity and Real Estate
Abstracts of Required Readings and LOs (2003 CFA III)

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Portfolio Management, Equity and Real Estate

Abstracts of Required Readings and LOs (2003 CFA III)

Note to Candidates: You need to refer to your Study Guide for wording of the LOs, which I have not duplicated here.

by

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**Study Session 5, “Asset Valuation: Market Indexes and Global Equity Investments”
Reilly and Brown, Investment Analysis and Portfolio Management, 6th ed., “Security
Market Indicator Series,” Ch. 5**

Uses of Market Indicator Series: The Purpose of market indicator series is to provide a general indication of the aggregate market changes or market movements. More specifically, the indicator series are used to derive market returns for a period of interest and then used as a benchmark for evaluating the performance of alternative portfolios. A second use is in examining the factors that influence aggregate stock price movements by forming relationships between market (series) movements and changes in the relevant variables in order to illustrate how these variables influence market movements. A further use is by technicians who use past aggregate market movements to predict future price patterns. Finally, a very important use is in portfolio theory, where the systematic risk of an individual security is determined by the relationship of the rates of return for the individual security to rates of return for a market portfolio of risky assets. Here, a representative market indicator series is used as a proxy for the market portfolio of risky assets.

Differentiating Factors in Constructing Market Indexes: A characteristic that differentiates alternative market indicator series is the sample--the *size* of the sample (how representative of the total market it is) and the source [whether securities are of a particular type or a given segment of the population (NYSE, TSE)]. The *weight* given to each security plays a discriminatory role -- with diverse securities in a sample, it would make a difference whether the series is price-weighted, value weighted, or unweighted. Finally, the *computational procedure* used for calculating return--i.e., whether arithmetic mean, geometric mean, etc. is important.

Price-weighted series: This is an unweighted arithmetic average of current prices of the securities included in the sample--i.e., closing price of all securities are summed and divided by the number of securities in the sample. Because the series is price weighted, a high priced stock carries more weight than a low-priced stock, so as shown in Table 4.2, a 10 percent change in \$100 stock (\$10) will cause a larger change in the series than a 10 percent change in a \$30 stock (3).

Table 4.2 Demonstration of the Impact of Differently Priced Shares on a Price-Weighted Indicator Series

	<u>Period</u>		
	<u>T+1</u> Period 1	Case A	Case B
A	100	110	100
B	50	50	50
C	30	30	30
Sum	180	190	180
Divisor	3	3	3
Average	60	63.3	60
Percentage Change		5.5	1.7

Major price-weighted indexes are: (1) Dow Jones Industrial Average (DJIA) - The DJIA is a price-weighted average of 30 large, well-known industrial stocks that are generally the leaders in their industry (blue-chips) and are listed on the NYSE. It is contended that the DJIA probably reflects price movements for large, mature blue-chip firms rather than for the typical company listed on the NYSE, (2) Nikkei-Dow Jones Average - This index is an arithmetic average of prices for 225 stocks on the First Section of the Tokyo Stock Exchange (TSE).

Value-weighted Series: Value weighted index begins by deriving the initial total market value of all stocks used in the series (market value equals number of shares outstanding times current market price). The initial value is typically established as the base value and assigned an index value of 100. Subsequently, a new market value is computed for all securities in the sample and this new value is compared to the initial value to derive the percent change which is then applied to the beginning index value of 100. An example of a computation of a Value-Weighted Index is illustrated in Table 4.3

Table 4.3 Example of a Computation of a Value-Weighted Index

Stock	Share Price	Number of Shares	Market Value
December 31, 1993			
A	\$10.00	1,000,000	\$ 10,000,000
B	15.00	6,000,000	90,000,000
C	20.00	5,000,000	<u>100,000,000</u>
Total			\$ 200,000,000
Base Value Equal to an Index of 100			
December 31, 1994			
A	\$12.00	1,000,000	\$ 12,000,000
B	10.00	12,000,000 (a)	120,000,000
C	20.00	5,500,000 (b)	<u>110,000,000</u>
Total			\$ 242,000,000
New Index Value = (Current Market Value / Base Value) x Beginning Index Value			
= (\$242,000,000 / \$200,000,000) x 100			
= 1.21 x 100 = 121			
(a) stock split two-for-one during year			
(b) Company paid a 10 percent stock dividend during the year			

Major value-weighted indexes are: (1) Standard & Poor Indexes, (2) New York Stock Exchange, (3) NASDAQ series, (4) American Stock Exchange, (5) Dow Jones Equity Market Index, (6) Willshire 5000 Equity Index, (7) The Russell Indexes, (8) Financial Times Actuaries Share Indexes (United Kingdom), (9) Tokyo Stock Exchange Price Index (TOPIX) (Japan)

Unweighted price indicator series: In an unweighted price indicator series, all stocks carry equal weight irrespective of their price and/or their value. One way to visualize an unweighted series is to assume that equal dollar amounts are invested in each stock in the portfolio, for example, an equal amount of \$1,000 is assumed to be invested in each stock. Therefore, the investor would own 50 shares of a \$20 stock, 100 shares of a \$10 stock, and 20 shares of a \$100 stock.

Major Unweighted price indicator series are: (1) University of Chicago Series, (2) Indicator Digest Index, (3) Value Line Averages. An example of a Computation of Value Line Index is illustrated in Table 4.4

Financial Times ordinary Share Index

Stock	Share Price		Index of Change
	T	T+1	
X	10	12	1.2
Y	22	20	0.91
Z	44	47	1.07
$\Pi = (1.20 \times 0.91 \times 1.07)^{1/3} = 1.0531$			
Index Value (T) x 1.0531 = Index Value (T+1)			

Important points:

Market indicator series are used to derive market returns for a period of interest and then used as benchmark for evaluating the performance of alternative portfolios

Sample is a differentiating factor for market indicator series - the size and the source of the sample are important characteristics. The weight given to each security makes a difference whether the series is price weighted, value weighted, or unweighted. The computational procedure used for calculating return could be arithmetic mean, geometric mean, etc.

Learning Outcomes

a) Price weighting - unweighted arithmetic average of current prices of securities; Value-weighting - computed new market value for all securities in the sample compared to the initial market value to derive the percent change; No weighting - all stocks carry equal weight regardless of their price or value.

b) The source and direction of bias for a price weighted index is downward because the stocks that have higher growth rates will have higher prices, and because such stocks tend to split, they will consistently lose weight within the index. For a value-weighted index, the bias is upward because a specified percentage change in the value of a large company has a greater impact than a comparable percentage change for a small company. For an unweighted index, the use of percentage price changes means that the price level or the market value of the stock does not make a difference—each percentage change has equal weight. This is like investing equal dollar amounts in each stock in the index.

c) *Although for three stocks, the examples above can easily be extended. Study these examples carefully.*

d) *The composition of major global stock indexes reflects a common methodology (market weighting) that allows direct comparison across regional indexes. The result is that the three major indexes (FT/S&P-Actuaries, Morgan Stanley, and Dow Jones), all are highly correlated in dollar terms (see Table 5.9, page 73). Domestic indexes that use market weighting are comparable to these global indexes as long as all are reported in a common currency.*

Self test question: Define major factors that must be considered when choosing a market index. Put another way, what characteristics differentiate indexes?

Suggested answer: A characteristic that differentiates alternative market indicator series is the sample—the size of the sample (how representative of the total market it is) and the source (whether securities are of a particular type or a given to each security) plays a discriminatory role. With diverse securities in a sample, it would make a difference whether the series is price weighted, value-weighted, or unweighted. Finally, the computational procedure used for calculating return—i.e., whether arithmetic mean, geometric mean, etc. is important.

Michaud, Bergstrom, Frashure, and Wolahan, The Journal of Portfolio Management, “Twenty Years of International Equity Investing”

The authors addresses two questions:

1. Has international equity diversification achieved its original objectives of raising return per unit of risk for U.S.-based and other global investors?
2. What new routes are open to future global investors?

The case for global investing—greater efficiency meaning either increased return at the same level of risk or reduced risk for the same level of expected return (efficient frontier moving up and to the left). The empirical evidence suggests that international portfolio diversification increases return per unit of risk relative to a comparable U.S.-only portfolio. For passive global strategies, the empirical data are much more convincing as a way of lowering risk than enhancing return. Be sure you can graph this concept for the exam and focus your discussion on risk reduction opposed to return enhancement. Also be sure to say that historical results heavily depend on the country, investment strategy and time period being analyzed.

Update on global equity returns—evidence indicates that simple extrapolation of historical returns has not been an effective methodology for predicting future country returns during the past two decades (through 1995).

Global market correlations—the evidence is consistent with the view that there has not been a significant reduction in the benefits of international diversification, even during periods when the U.S. market has declined.

Emerging markets—the definition of an emerging market is typically applies to a number of country equity markets not included in major international equity market indexes yet that have significant economic activity and that may be suitable for institutional investment. Emerging markets represent many interesting challenges for institutional investors. There is no particular homogeneity to country markets included in the indexes. Long-term correlations, both to other emerging markets and to developed ones, have been quite varied. Differences in economic development, industry composition, and local political factors, as well as fundamental

perceptions of the sources of economic growth, have led to substantial divergences in return even over long periods of time.

Small-capitalization international equities—are a natural extension of the domestic small-capitalization concept for portfolio diversification. At a minimum, international small-capitalization stocks represent an extension of the investment opportunity set for global investors and a means of enhancing return or minimizing risk (another efficiency argument).

Global stock pricing anomalies—anomalies in the international market include: (1) size, (2) e/p ratio, (3) book-to-price ratio, (4) cash earning-to-price ratio, (5) dividend discount model return, and (6) normalized earning-to-price ratio. Five factors (except for size), produced abnormally high rates of return.

Addressing challenges of global management

It is unlikely that simply adding factors will enhance information to a valuation model. That is, you need a reason for adding more explanatory variables.

High transaction costs (commissions, market impact and opportunity cost of not making a trade) in non-US equity markets is a fact, but these costs have been declining recently.

Currency hedging for US investors would have generated lower returns relative to an unhedged position (remember that currency hedging reduces risk that, in turn, reduces diversification benefits).

Global equity asset allocation—10% - 30% appear normal for institutional investors.

Learning Outcomes

a) The two main issues are whether international diversification has achieved its original objectives of raising return per unit of risk for U.S.-based and other global investors, and what new routes are open to future global investors.

b) Greater efficiency meaning either increased return at the same level of risk or reduced risk for the same level of expected return (efficient frontier moving up and to the left). The empirical evidence suggests that international portfolio diversification increases return per unit of risk relative to a comparable U.S.-only portfolio. For passive global strategies, the empirical data are much more convincing as a way of lowering risk than enhancing return. Be sure you can graph this concept for the exam and focus your discussion on risk reduction opposed to return enhancement. Also be sure to say that historical results heavily depend on the country, investment strategy and time period being analyzed.

c) The evidence is consistent with the view that there has not been a significant reduction in the benefits of international diversification, even during periods when the U.S. market has declined.

d) Anomalies in the international market include: (1) size, (2) e/p ratio, (3) book-to-price ratio, (4) cash earning-to-price ratio, (5) dividend discount model return, and (6) normalized earning-to-price ratio. Five factors (except for size), produced abnormally high rates of return.

e) Challenges to global equity investing include: (1) multiple valuation forecasts, which suggest that no single factor is beneficial in all time periods, and that factors can vary significantly in their predictive power by market and time period. (2) Transaction costs—the recent availability of data showing the decomposition of trading costs may lead to customizing valuation processes to the expected trade cost characteristics of individual stocks. (3) Currency hedging policy—allowing managers to hedge up to perhaps 30% of their non-domestic assets seems a practical

guideline for investors who wish to pursue some active management opportunities in currency markets. (4) Global asset allocation suggests allocations to emerging markets of 10% to 30% appear to be consistent with levels of active risk normally associated with institutional global equity mandates.

Self test question: Identify and briefly discuss a major problem of using empirical data in forming investment decisions.

Suggested answer: Empirical data are very dependent on the investment strategy, and country and the time period being analyzed.

Barry, Peavy, Rodriguez, Emerging Stock Markets: Risk, Return, and Performance, “Introduction”

Introduction

What are emerging markets? No universally accepted definition of an emerging market exists, nor does a consensus about which markets merit the “emerging” status. The World Bank, by far the largest investor in these markets, defines a “developing” country as one having a per capita gross national product of less than US\$8,626. Although developing countries contain approximately 85 percent of the world’s population, they represent only about 13 percent of the world’s stock market capitalization. Significant differences exist among emerging markets, but as a group, they share one primary similarity—change.

The appeal of emerging market investing—the primary motivation of investors in emerging market is the desire to add value at the margin to a domestic portfolio for some period. The dramatic growth in the market value of emerging market stocks is attributable to three factors: (1) appreciation over time of the individual securities composing these markets, (2) inclusion of new countries in the emerging market group, and (3) value growth occurred as new stock became publicly available in the emerging countries. Emerging markets have become increasingly attractive to investors as the developing countries focus on creating favorable conditions for economic growth. The low correlations of emerging markets with each other and, as a group, with developed markets combined with the emerging markets’ growth prospects provide the potential for enhancing the return and reducing the risk of the total portfolio.

Problems—investors must recognize that the risk must be carefully evaluated and understood. Emerging market investors must cope with high market volatility, economic and political instability, dramatic currency swings, illiquidity, high transaction costs, rapid but volatile growth constant change, and a limited amount of reliable information.

Selection of emerging markets for the study—uses IFC’s classification scheme (no need to know this detail). Same for construction of the study indexes (market weights) and calculation of returns.

Learning Outcomes

a) No universally accepted definition of an emerging market exists, nor does a consensus about which markets merit the “emerging” status. The World Bank, by far the largest investor in these markets, defines a “developing” country as one having a per capita gross national product of less than US\$8,626.

b) Emerging markets can best be described as growth and change that lead to investment opportunities. Such markets tend to be of high market volatility, economic and political instability, dramatic currency swings, illiquidity, high transaction costs, rapid but volatile growth, constant change, and a limited amount of reliable information.

c) The dramatic growth in the market value of emerging market stocks is attributable to three factors: (1) appreciation over time of the individual securities composing these markets, (2) inclusion of new countries in the emerging market group, and (3) value growth occurred as new stock became publicly available in the emerging countries. Emerging markets have become increasingly attractive to investors as the developing countries focus on creating favorable conditions for economic growth. The low correlations of emerging markets with each other and, as a group, with developed markets combined with the emerging markets' growth prospects provide the potential for enhancing the return and reducing the risk of the total portfolio.

d) Investors must recognize that the risk must be carefully evaluated and understood. Emerging market investors must cope with high market volatility, economic and political instability, dramatic currency swings, illiquidity, high transaction costs, rapid but volatile growth constant change, and a limited amount of reliable information.

Self test question: Explain how an emerging market can be unattractive to a local investor but attractive to a foreign investor.

Suggested answer: The local investor who is not investing outside his/her own local market lacks a broad perspective of diversification. A foreign investor bring that perspective to the investment decision. Currency also plays a role in that the foreign investor will benefit from a weaker foreign currency that could more than compensate for a low or even negative return in the local currency.

Barry, Peavy, Rodriguez, "Historical Performance of Emerging Equity Markets," Ch. 1

The authors present data and discussion of the rates of return and risk of emerging markets—in the aggregate, by regions and for individual country markets—was designed to equip the investor with solid empirical information about the long-term performance of securities in emerging markets. Because this analysis is so time dependent and country specific, I seriously doubt that you will see anything on the specifics on the exam. Still you could see something on the LOs presented below. Pay close attention to these LOs.

Learning Outcomes

a) Over the 20-year period from 1975 to 1995, emerging market stocks performed poorly in contradiction to the popular belief among many investors that emerging market securities are an attractive asset class with high expected rates of return and strong diversification benefits. Although the diversification benefit was indeed available during this period, the emerging market stocks underperformed U.S. stocks. Be careful, however, to recognize that this conclusion is very time and country dependent.

b) Currency issues are relevant because equity market performance may look quite different to a domestic investor than it looks to a global investor. Results converted from local returns to a different currency often look quite different. Currency is indeed important in the analysis of emerging stock markets. During the 20-year period, nearly all of the emerging market's' currencies declined in value, on average, through, which was bad news for a US investor.

c) Three specific risks were mentioned: (1) the high variability in the performance of emerging markets over time, whether measure in monthly standard deviation or in five-year compound growth rates (2) that the risk was not necessarily removed by a commitment to a “long” holding period, and (3) currency considerations can dramatically affect the performance analysis of a given market and must be seriously considered in portfolio design.

d) Economic policies can have significant effects on the market as illustrated in the reading. Currency convertibility, capital restrictions on conversion, policies on capital flight, downgrading of corporate debt, warning about government announcements versus government actions, and privatization are several factors mentioned. Investors prefer to see open markets, freely convertible currencies, responsible governments, and private ownership of assets when investing in emerging markets although such policies are not generally the norm.

Self test question: Identify conditions under which a foreign investment may be a poor investment to the local investor but a good investment to the foreign investor.

Suggested answer: It could be a poor investment to the local investor if it performed poorly on the local market. On the other hand, it could be a good investment to the foreign investor if the local currency strengthened relative to the foreign currency. Additionally, the diversification benefits to the foreign investor may more than offset the poor performance in the local market.

Barry, Peavy, Rodriguez, “Portfolio Construction Using Emerging Markets,” Ch. 2

This is another reading that is very time and country dependent. Again, pay close attention to the LOs.

Learning Outcomes

a) Theory is that by adding an emerging markets asset class to an existing portfolio of domestic securities should provide diversification benefits to the portfolio depending on the correlation of the new asset class with the existing portfolio. The emphasis is on correlations and covariances. The authors found some evidence that adding emerging market stocks to an existing portfolio of domestic securities increased the efficiency of the portfolio. In addition to low correlations with developed markets, such as the U.S. markets, equity portfolios from the various emerging markets are not highly correlated among themselves. A 20 percent allocation to emerging market stocks represented the lowest risk portfolio on the efficient frontier. Still, many of the small, new emerging markets do not by themselves provide meaningful diversification benefits to stock portfolios based on developed domestic markets.

b) Empirical research has revealed that, in addition to low correlations with developed markets, such as the as the US markets, equity portfolios from the various emerging markets are not highly correlated among themselves. You should note that the correlations were unstable across time, which means that the identification of efficient or desirable portfolios in one period is no assurance that they will be efficient or desirable in a subsequent period.

Self test question: Explain why designing an efficient portfolio using historical data may not provide the same level of efficiency in future periods.

Suggested answer: The reason is that correlations often change over time. Generally, the longer the holding period in the future, the more confidence you have in historical relationship assuming that the historical relationships were drawn from long periods in the past. For example, if your projected holding period is 10 years, you would have more confidence in correlations drawn from data over the prior 50 years than from data drawn from the prior 5 years.

Barry, Peavy, Rodriguez, “Investability in Emerging Markets,” Ch. 3

The main idea discussed in this chapter is whether a stock that is available to a local investor is also available to a foreign investor. If not, then the performance of a local index will be misleading. The authors find that the diversification benefits of investing in emerging market stocks is still present for a subset of investable stocks taken from the universe of all stocks available to the local investor. Use this on the exam when asked about problems of investment in emerging stocks.

Learning Outcomes

a) The concept is whether a stock that is available to a local investor is also available to a foreign investor

b) Investables have consistently outperformed All since September 1989.

c) Relative to all securities, the investables had higher average returns, lower standard deviations, and higher correlations with the S&P 500. For the exam, be sure to say that the portfolio characteristics can differ for investables relative to all securities. Specifics on how they differ are not that important.

Self test question: Given a portfolio of 30 stocks available to local investors of which 10 are not available for investment to foreign investors, **explain** whether you would expect the performance of the two portfolios to differ.

Suggested answer: In this case, the performance may not differ much depending on how representative the investable portfolio of the total portfolio. This is a statistical question.

Shapiro, Foundations of Multinational Financial Management, 3rd ed., “International Portfolio Investment,” Ch. 17

Learning Outcomes

a) International diversification suggests the possibility of achieving a better risk-return trade-off; that is, expanding the universe of assets available for investment should lead to higher returns for the same level of risk or less risk for the same level of expected return.

b) By diversifying across nations whose economic cycles are not perfectly in phase, investors should be able to reduce the variability of their returns. In other words, risk that is systematic in the context of the US economy may be unsystematic in the context of the global economy.

c) Emerging markets, with their volatile economic and political prospects, are often the ones that offer the greatest degree of diversification and the highest expected returns.

d) The benefits of diversification depend on relatively low correlations among assets. Correlations between the US and non-US stock markets have fallen in recent years and, thus, show the benefits of diversification (note: Be sure you understand the formula for measuring portfolio standard deviation for the exam. While you may not necessarily be asked to replicate this formula, you likely will be asked to discuss it in some fashion. The key is covariance or correlation).

e) Barriers to international diversification include lack of liquidity, currency controls, specific tax regulations, relatively less-developed capital markets abroad, exchange risk, and the lack of readily accessible and comparable information on potential foreign security acquisitions.

f) The impact of adding international bonds provides the portfolio superior performance through enhanced portfolio efficiency.

g) The one-period total dollar return on a foreign bond or stock investment = Foreign currency return \times Currency gain (loss).

Study Session 8, “Asset Valuation: Alternative Investments”

Lieblich, The Handbook of Real Estate Portfolio Management, “The Real Estate Portfolio Management Process,” Ch. 25, pp. 1011-1022 and 1026-1054

The purpose of this article is to explain a systematic and disciplined process to real estate portfolio management. You will not see anything new in this reading because the process for real estate is the same 6-step process as the one for equities and fixed income securities. The 6 steps are: (1) identify investor’s objectives and constraints, (2) analyze real estate market conditions and form the efficient frontier, (3) integrate steps 1 and 2 into a target asset allocation or optimal portfolio, (4) create the portfolio strategy and communicate it to the investor, (5) monitor both investor objectives and market conditions, (6) measure portfolio performance. More details of the reading follow below.

The Paradigm Shift--this means a shift from the investment decision based on the individual property’s fundamentals to a portfolio perspective driven by acceptance of modern portfolio theory (MPT).

The Portfolio Management Process--MPT allows the use of computer technology into the investment process by performing many calculations quickly. Remember that you need 3 statistics to construct the efficient frontier: (1) expected returns, (2) standard deviations, and (3) correlations. Additionally, the growth of institutional assets under a fiduciary framework requires a disciplined approach to decision making. At this point, the author discusses each step of the 6-step process outlined above (nothing new here). During the discussion, he concludes that the real estate market is inefficient and, thus, requires an active management approach opposed to a passive one. A few pages later, he discusses unsystematic risk and states that diversification can eliminate such risks. (I find this somewhat confusing because if the market is inefficient, the manager does not want to completely diversify.)

When discussing individual properties, he explains some determinants of a property’s sensitivity to local market supply and demand conditions. For example, as short-term leases (1.5 years) expire, the space is “market to market,” thus giving the building a high market supply and demand sensitivity. A long-term lease (20 years), has no exposure to the market for another 20 years and thus has low market supply and demand sensitivity, but it does have high sensitivity to movements in interest and inflation rates. You need to understand this concept for the exam.

Market Segmentation--diversification categories such as property type, geographic region, and economic region have similar return behaviors over time. Thus, the question is: what factors drive the returns in these segments? A single factor model such as the CAPM or a multi-factor model such as the Arbitrage Pricing Model may help identify factors that affect both returns and risk. Practical problems you may encounter when using any factor model include:

- Which factor should be used?
- Will the future look like the past?
- Are sensitivity coefficients (betas) constant over time?
- A probabilistic approach is still needed to determine the variance and covariance of returns for the MPT model

In addition to factor models, you could also use a fundamental market analysis model (page 30) for the purpose of determining intrinsic value. This model is similar to the bond model except that the cash flows are not fixed either during operations or at termination of the project. But instead of determining a single-point estimate of intrinsic value, multiple estimates can be obtained along with associated probabilities using “what if” analysis. Be sure you know the real estate cash flow model (Exhibit 25-12 in reading), A example of a cash flow analysis is also in your executive summary.

Forecasting Approaches--the author lists 4 approaches to forecasting the three inputs (expected return, standard deviation, and correlation) needed to derive the efficient frontier:

1. Factor models--single-factor and multi-factor
2. Fundamental analysis--used to estimate intrinsic value
3. Scenario analysis--probabilities associated with various economic events
4. Monte Carlo simulation--based on estimated distributions of each significant variable in the cash flow model such as rental rates and vacancy.

This is a possible list and discuss question. Be sure to know the following weaknesses:

- output only as good as inputs
- subjective estimates of scenarios, weights, and distributions
- future may not look like the past
- classification scheme such as market segmentation is subjective
- optimization process will ignore one of two investments with similar risk and return characteristics

Target Portfolio Determination--the issue here is to properly allocate the real estate component of the portfolio accurately across geographic regions and across multiple types of real estate such as office, retail, industrial and apartment. This allocation requires a high degree of subjective judgments as to where each type of property and each region is within its investment cycle.

Portfolio Strategy Determination--the issue here is recognizing the target portfolio relative to the current portfolio, and rebalancing in order to align the current with the target. This rebalancing will require some selling, buying and holding of certain properties.

Monitoring and Rebalancing--once the optimal real estate portfolio is constructed, you must monitor both investor needs and market conditions over time. Rebalancing costs as well as the psychology of rebalancing (i.e., emotions versus fundamental reasons) should be considered.

Portfolio Performance Measurement--Active management can add value in one of 3 ways:

1. market allocation (timing)--altering type of property away from benchmark
2. property selection--being able to identify mispriced properties
3. diversification--how portfolio correlates to benchmark. If not correlated, be sure to adjust for additional unsystematic risk.

Return Measures--leveraged, unleveraged, time-weighted or dollar-weighted are the main issues. Be sure to be consistent for both your portfolio and the benchmark.

Performance Attribution--the goal is to identify the portfolio impact of the portfolio manager's allocation and property selection decisions. The allocation effect measures the impact of the portfolio allocation deviating from the benchmark portfolio, and the property selection effect measures the impact of the properties actually owned in comparison to the benchmark portfolios.

Learning Outcomes

a) Top-down approach begins with analysis of national market (macro), followed by regional market analysis, local market analysis, and ends with property analysis (micro). Bottom-up approach works the other direction by focusing first on property analysis (micro) and end with national market analysis (macro).

b) An important risk factor is currency risk. In addition, political /organization risk is important. Generally, US investors are most interested in the duration of governments (which implies stability of policy), orderly transitions between regimes, and the actual stability of economic policies pertaining to matters such as property rights and foreign investment regulations and taxation. Another risk factor is a property's sensitivity to local market supply and demand conditions. For example, as short-term leases (1.5 years) expire, the space is "market to market," thus giving the building a high market supply and demand sensitivity. A long-term lease (20 years), has no exposure to the market for another 20 years and thus has low market supply and demand sensitivity, but it does have high sensitivity to movements in interest and inflation rates. Another risk factor is whether diversification categories such as property type, geographic region, and economic region have similar return behaviors over time. Thus, the question is: what factors drive the returns in these segments?

c) You could also use a fundamental market analysis model for the purpose of determining intrinsic value. This model is similar to the bond model except that the cash flows are not fixed either during operations or at termination of the project. But instead of determining a single-point estimate of intrinsic value, multiple estimates can be obtained along with associated probabilities using "what if" analysis.

d) The idea here is the same idea for determining the appropriate amount of any investment in a portfolio. Specifically, you would forecast expected return and risk for multiple portfolio comprised of various mixes of different asset classes (i.e., stocks, bonds and real estate), select the combination (frontier) which is most efficient, and identify the specific portfolio that suits the investor's risk tolerance. Once done, you would then observe the amount of real estate in the optimal portfolio.

e) Given a target portfolio, the strategy would be to monitor performance and periodically rebalance the portfolio to insure that it is consistent with market expectations (risk and return) and the investor's risk tolerance.

f) The goal of performance attribution is to identify the portfolio impact of the portfolio manager's allocation and property selection decisions. The allocation effect measures the impact of the portfolio allocation deviating from the benchmark portfolio, and the property selection effect measures the impact of the properties actually owned in comparison to the benchmark portfolios.

Self-test question: List and discuss 3 approaches to forecasting inputs needed to derive the efficient frontier. Explain 4 problems with these approaches. Explain the meaning of attribution analysis.

Suggested answer: The author lists 4 approaches to forecasting the three inputs (expected return, standard deviation, and correlation) needed to derive the efficient frontier: (1) Factor models--single-factor and multi-factor, (2) Fundamental analysis--used to estimate intrinsic value, (3) Scenario analysis--probabilities associated with various economic events, (4) Monte Carlo simulation--based on estimated distributions of each significant variable in the cash flow model such as rental rates and vacancy.

Weaknesses include (1) output only as good as inputs, (2) subjective estimates of scenarios, weights, and distributions, (3) future may not look like the past, (4) classification scheme such as market segmentation is subjective, (5) optimization process will ignore one of two investments with similar risk and return characteristics.

Attribution analysis decomposes the active return into 5 components: (1) passive return, (2) effects of property selection, (3) effects of market timing, (4) joint effects, and (5) effects of active management.

Arnold and Grossman, “International Real Estate Investment: A Realistic Look at the Issues,” Ch. 12, pp. 530-539 and 554-559

The purpose of this article is to present a model of how an institutional investor may approach the process of making a real estate investment decision in the international market. Typically, the investor would create a working group of senior real estate officers, often in combination with international in-house equities experts and outside consultants, including economists, real estate experts, and tax and legal advisors. The team would be comprised of people who can explain the risks of this type of investment.

Having done this, the problem then entails: (1) identifying the pertinent variables by which countries and local markets can be compared, (2) determining whether the characteristics of countries as a whole, as opposed to variables pertaining to a single market, have the greatest primary in weighting a selection, and (3) applying comparison and rank ordering, thus narrowing down the universe of nations to a small and numerically manageable sample that can then be studied in more detail. The macro issues conceptually relate to reducing systematic risks for portfolio allocation across particular nations. The micro issues are more oriented toward those items that determine unsystematic risk.

An all-encompassing, systematic approach for first-time international investors would analyze macroeconomic or political variables and select somewhat arbitrary performance cutoff points as benchmarks that serve to retain or eliminate nations such as size of market, per capital income, and type of government. Having reduced the universe of potential countries to a few, the urban market selection process begins, following a somewhat similar methodology but with much greater emphasis on actual return performance.

A past knowledge and intuition approach is for the experienced investor who has a feel for the process. The problem with either approach is demonstrating the validity of certain assumptions on volatility from a comparison of past return trends is formidably difficult because of the extremely mixed quality of real estate return information from the individual nations.

Understanding country risks: weighting economic and political/organizational systems—many investors are skilled at analyzing economic data, but less skilled at evaluating

political/organizational patterns of systematic risk that may affect foreign real estate markets, which are very important. Even then, analysts can have problems with the economic data due to the unreliable manner in which some countries collect and publish data, information presented that is unfamiliar to the analysts, and the lag involved in collecting and presenting the data (often up to 3 years). Including an economist who is experienced in comparing national economies should be included in the process.

“Fundamentals” Behind Local Market Cycles And Questions About Where The World Is Going—using the office market as an example, the author states that certain cities have a high demand for offices connected with financial services, while other cities have a high demand for offices connected with manufacturing and mining. The conclusion is that such differences in the local market office tenant base and its employment fluctuations help determine the diversification possibilities. The timing, location, and type of product demand will all vary from market to market.

Limits to new construction via financing practices for new construction (whether office or other property types), as well as political and bureaucratic restrictions, constitute an important factor in regulating new supply on the local scene and encouraging differences between market cycles.

Learning Outcomes

a) The problem entails: (1) identifying the pertinent variables by which countries and local markets can be compared, (2) determining whether the characteristics of countries as a whole, as opposed to variables pertaining to a single market, have the greatest primary in weighting a selection, and (3) applying comparison and rank ordering, thus narrowing down the universe of nations to a small and numerically manageable sample that can then be studied in more detail. The macro issues conceptually relate to reducing systematic risks for portfolio allocation across particular nations. The micro issues are more oriented toward those items that determine unsystematic risk

b) Analysts can have problems with the economic data due to (1) the unreliable manner in which some countries collect and publish data, (2) information presented that is unfamiliar to the analysts, and (3) the lag involved in collecting and presenting the data (often up to 3 years). Including an economist who is experienced in comparing national economies should be included in the process. This would make a good question on the exam.

c) The authors suggest a systematic top-down approach beginning with an analysis of national economic/political variable (macro risk-assessment), narrowing down the list to a short list of countries to analyze closer, selecting local markets from the short list and finally conducting micro analysis of local market fundamentals and opportunities.

d) Differences in the local market and its employment fluctuations help determine the diversification possibilities. The timing, location, and type of product demand will all vary from market to market. The important point for the exam is that real estate tends to be a local market.

Self test question: Briefly **describe** an approach for selecting global real estate investments.

Suggested answer: A systematic top-down approach involving macro analysis of countries and ending with microanalysis of specific deals is a disciplined approach the authors suggest.

Hudson-Wilson, Modern Real Estate Portfolio Management, “Leverage in a Private Equity Real Estate Portfolio,” Ch. 8

Learning Outcomes

a) Reasons for using leverage are increase total return, hedge the downside risk of an investment, enable a certain fixed amount of funds to be spread over more individual investments, increase the yield and the cash flow generated from a fixed pool of capital, reduce exposure to an asset or pool of assets as a way of reducing the allocation to a class of investments, and enhance the diversification role of real estate in the context of the overall portfolio.

b) Non-recourse debt allows the lender access only to the collateral in the case of a default or other violation of the mortgage and not to the borrower’s other assets. Thus, it is very useful to the borrower when times are tough since it essentially renders the mortgage a put option from the borrower to the lender. When the borrower borrows on a non-recourse basis, it is short selling the asset.

c) Leverage allows the investor to spread the investment over more properties and, thus, increase diversification benefits. Leverage also improves the correlation relationships among the assets in the portfolio. Unleveraged real estate behaves both like a bond (derived from the cash flows from the leases) and like an equity (derived from the marking-to-market of the residual equity value of the property). When leverage is used, it essentially removes bond-like behavior from the asset, which makes the asset be more driven by the equity effect (see page 254).

d) Leverage allows the investor invest borrowed funds into other asset classes and, thus, adjust the allocation to real estate in the case of a forthcoming down market.

*e) If there is an opportunity to exploit a spread sufficient to more than cover the transaction costs in the marketplace, and if it is possible to exploit the spread without incurring an unacceptable degree of risk, it would seem useful to exploit the spread. If the investor can borrow at a lower rate than the one at which it lends on a similar credit, it probably should consider doing so (pg 25&). **THIS LOOKS TO ME LIKE A VERY GOOD CFA III QUESTION.***

Brueggeman and Fisher, Real Estate Finance and Investments, 11th ed., “Real Estate Investment Performance and Portfolio Considerations,” Ch. 20, pp. 587-591 and 603-607

This chapter applies modern portfolio theory techniques to evaluation of real estate returns. Thus, this material is not new. I suggest that you review Study Session 19 material prior to your studying this material.

Problems - One major problem with evaluating real estate returns is lack of data. In the stock market, stocks trade frequently. Not so in the real estate market. Also, the real estate market is not centralized like the stock market.

Indexes. - The Frank Russell Company index is unleveraged, is based on both appraisal and actual sales data, and covers four geographical section of the US (West Midwest, East, and South). It includes retail, office, warehouse and apartments. Another index is the EREIT (Equity Real Estate Investment Trust) index. This is an index of stocks of real estate companies that own

real estate property, not a direct index of the properties. Thus, the EREIT measures management skill and is more liquid than the FRC.

When analyzing return data, be sure to understand the difference between arithmetic and geometric returns. You would use an arithmetic return as an estimate of future returns due to it being an unbiased statistical estimator. You would use a geometric return when measuring the historical performance of one or more managers.

Empirical data suggest that stocks outperform real estate (FRC), that outperform corporate bonds, that outperform T-bills, that outperform hybrid REITs, that outperform mortgage REITs. When analyzing risk, be sure to understand that individual properties contain micro risks from leverage, the possibility of default and the lack of liquidity. The question is whether the risk premium adequately compensates the investor for these risks.

Risk-adjusted returns. - The appraisal process, which is used in many indices, tends to reduce variability. This is a key criticism of any index based on appraised data. When comparing the standard deviation of real estate to the standard deviation of stocks or bonds, you must be careful. Also, the financial markets are mostly auction driven whereas the real estate market is negotiated driven. Finally, be sure to compare apples to apples; that is, when comparing returns from different real estate managers, be sure the managers employ similar investment style such as both in apartments.

Portfolio Theory. - The main key is covariance. Because real estate is less than perfectly correlated with stocks and bonds, for example, investing in properties provides positive diversification benefits to an existing portfolio of stocks and bonds. In other words, real estate increases portfolio efficiency. The greater the covariance (the greater the correlation), the less the diversification benefits. In addition to covariance, the weighing scheme is very important. Varying the weights to determine the most efficient portfolio is a strategy for reducing risk. Computer programs analyze many different weighting schemes to determine the best schemes that generate the efficient frontier.

Empirical evidence of the 1978 to 1990 period shows that real estate provided good diversification benefits to a portfolio comprised of financial assets. Over this period, pension fund managers increased their exposure to real estate due to these good benefits, but also because of fewer restrictions. The FRC index was negatively correlated with stocks and bonds. It was also positively correlated with inflation, which made it a good hedge against inflation.

Learning Outcomes

a) The Frank Russell Company index is unleveraged, is based on both appraisal and actual sales data, and covers four geographical section of the US (West Midwest, East, and South). It includes retail, office, warehouse and apartments. Another index is the EREIT (Equity Real Estate Investment Trust) index. This is an index of stocks of real estate companies that own real estate property, not a direct index of the properties. Thus, the EREIT measures management skill and is more liquid than the FRC.

b) When analyzing index data, be sure to understand the difference between arithmetic and geometric indexes. You would use an arithmetic index as an estimate of future indexes due to it being an unbiased statistical estimator. You would use a geometric index when measuring the historical performance of one or more managers.

c) *The key is covariance. Because real estate is less than perfectly correlated with stocks and bonds, for example, investing in real estate provides positive diversification benefits to an existing portfolio of stocks and bonds. In other words, real estate increases portfolio efficiency. The greater the covariance (the greater the correlation), the less the diversification benefits. In addition to covariance, the weighing scheme is very important. Varying the weights to determine the most efficient portfolio is a strategy for reducing risk. Computer programs analyze many different weighting schemes to determine the best schemes that generate the efficient frontier.*

d) *Empirical evidence of the 1978 to 1994 period shows that real estate provided good diversification benefits to a portfolio comprised of financial assets. Over this period, pension fund managers increased their exposure to real estate due to these good benefits. The Russell National Council of Real Estate Investment Fiduciaries (NCREIT) Index was positively correlated with inflation, which made it a good hedge against inflation, but the Equity Real Estate Investment Trust (EREIT) was not. If asked something on the exam about real estate acting as a hedge against inflation, state that the evidence generally supports that conclusion due to the positive correlation between real estate returns and inflation, but that the evidence is not uniform.*

Self test questions: (1) Briefly **describe** three characteristics of the FRC index. (2) **Explain** three problems related to real estate return data. (3) **Explain** the benefits of adding real estate to a portfolio consisting of stocks and bonds.

Suggested answers: (1) The FRC index is unleveraged, based on both appraisal and actual sales data, and is geographically diverse. (2) The data are not centralized like in the financial markets, transactions occur relatively infrequently, and the appraisal process tends to reduce variability. (3) Real estate tends to be negatively correlated with stocks and bonds, and usually acts as an inflation hedge. Thus, the efficient frontier is made more efficient.

Prowse, Economic Review, “The Economics of the Private Equity Market”

Learning Outcomes

a) *Private equity is important in the global markets because it represents an important source of funds for start-ups, private middle-market companies, firms in financial distress, and public firms seeking buyout financing.*

b) *The organized private equity market has three major players and an assortment of minor ones: investors (public and corporate pension funds mostly), intermediaries (mainly limited partnerships), and issuers (mostly firms that cannot raise financing from the debt or public equity markets) (see Figure 3, page 286).*

c) *Investors expect the risk-adjusted returns on private equity to be higher than those on other investments because of the potential benefits of diversification. Intermediaries manage an estimate 80 percent of private equity investments. Issuers tend to be young firms, most often those developing innovative technologies that are predicted to show very high growth rates in the future.*

d) *Funds invested in limited partnerships are illiquid over the partnership’s life, which in some cases runs more than ten years. General partners must establish a favorable track record to raise new partnerships. They also operate under a pay-for-performance scheme. Partnership agreements give limited partners restricted direct control over the general partners’ activities. See Table 3, pg 290.*

e) *The relationship between a partnership and its portfolio companies is one in which a company looking for funding has around a 1 in a 100 chance of being accepted by the partnership. Moral hazard is a problem in that management of a company pursues its own interests at the expense of investors. Partnerships rely on various mechanisms to align the interests of managers and investors including performance incentives such as stock options to managers and direct means of control such as seats on the board(see pg 292 for discussion and Table 3, pg 290 for graphic description).*

f) *The relationship between limited and general partners involves a delegation to the general partner by the limited partners of the labor-intensive responsibilities of selecting, structuring, managing, and eventually liquidating private equity investments. Limited partners must be alert to general partners not acting in their best interests by, for example, spending too little effort monitoring and advising portfolio firms, charging excessive management fees, taking undue investment risk, and reserving the most attractive investment opportunities for themselves.*

Purcell and Crowley, Journal of Investing, “The Reality of Hedge Funds,” pp. 26-35 (up to Conclusion Drawn from the Data”), Appendix B, and Appendix C

The purpose of this article is to describe how hedge funds operate. The conclusion is that hedge funds are attractive investment vehicles, particularly when viewed in a portfolio context.

Defining the Term “Hedge Fund.” - A classic hedge fund holds gross long positions in excess of capital, but also holds offsetting short positions such that the net is a long position between zero and 100% of capital. Hedge funds are privately organized; pooled investment vehicles investing primarily in publicly traded securities and derivatives with the use of leverage. Typically, they are domiciled off shore (relative to the US), organized as limited partnerships and largely unregulated. They can't have more than 100 “accredited” (net worth over USD 1 million) investors or 500 “super-accredited” (net worth over USD 5 million) investors. Hedge funds may not broadly advertise. Returns tend to be uncorrelated with traditional “long” portfolios.

Hedge Fund Strategies and Segmentation. - Usually, security selection is important. Shorting is also prevalent and leverage is used. They tend to be undiversified (more concentrated than index funds) and they are efficient in executing large trades.

Segments in the Hedge Fund Universe. - Similar to traditional long portfolios in that they buy stocks, they are dissimilar in that they short stocks that offer poor return prospects. Hedge funds use quantitative “back testing” in an attempt to gain a competitive edge. Some engage in arbitrage opportunities such as spread mispricing (ie. stock/bond differential misaligned). Macro funds bet on global macroeconomic events such as mispriced currencies. There are even “funds of funds.”

Focus on Risk in Hedge Funds. - Although hedge funds may reduce systematic risk, most do not eliminate it entirely. Security (unsystematic) risk is relatively small, but become large with the use of leverage. Other types of risks include non-market (industry) risk, liquidity risk, borrow risk (from shorting borrowed stocks), credit-crunch risk, operational (errors in administration) risk, and redemption risk (an investor can only redeem shares at specific time like annually).

Hedge Fund Performance. - They have been very successful in the 1990s. Still, the source and quality of the return data are questionable. Since unregulated, data are not available except on a

voluntary basis. Even then, the data are unaudited and suffers from survival bias (only survived accounts are included in end results).

Conclusions Drawn from the Data. Hedge funds have grown significantly in the 1990s. On a risk-adjusted basis, the returns are attractive. The lack of correlation with traditional long funds provides good diversification benefits (efficient frontier become more efficient—be able to draw this on the exam). Overall, there have been few failures and most of those were in bond funds.

Learning Outcomes

a) A classic hedge fund holds gross long positions in excess of capital, but also holds offsetting short positions such that the net is a long position between zero and 100% of capital. Recently, some “hedge funds” have net long or short positions that exceed 100% of capital.

b) Usually, security selection is important. Shorting is also prevalent and leverage is used. They tend to be undiversified (more concentrated than index funds) and they are efficient in executing large trades.

c) Similar to traditional long portfolios in that they buy stocks, they are dissimilar in that they short stocks that offer poor return prospects. Hedge funds use quantitative “back testing” in an attempt to gain a competitive edge. Some engage in arbitrage opportunities such as spread mispricing (ie. stock/bond differential misaligned). Macro funds bet on global macroeconomic events such as mispriced currencies. There are even “funds of funds.”

d) Although hedge funds may reduce systematic risk, most do not eliminate it entirely. Security (unsystematic) risk is relatively small, but become large with the use of leverage. Other types of risks include non-market (industry) risk, liquidity risk, borrow risk (from shorting borrowed stocks), credit-crunch risk, operational (errors in administration) risk, and redemption risk (an investor can only redeem shares at specific time like annually).

Jacobs, Alternative Investing, “Controlled Risk Strategies”

The purpose of this article is to explain the long-short strategy and how to implement it.

Basics. Long-short is a portfolio construction process in which the manager buys high-expected-return securities (undervalued securities), shorts low-expected return securities (overvalued securities), and balances the average betas of the long and short positions to neutralize market risk.

Advantages of Long Plus Short. - This technique allows the manager to eliminate systematic risk by buying undervalued stocks and, simultaneously, shorting overvalued stocks. The whole idea is to capture the alpha (excess return) of each position. In addition, the investor earns interest on short-sale proceeds. In a market-neutral long-plus-short portfolio, the alphas from the short portfolio plus the alpha from the long portfolio plus the interest earned on the proceeds from the short sales equals the total return.

The short side of the market tends to be more inefficient than the long side. Corporate publicity tends to support good news more than bad news. Also, analysts and brokers tend to favor buy over sell recommendations. Analysts are often swayed by their firms’ investment banking relationships and are reluctant to issue negative reports that might offend current and potential corporate clients.

Integrating Long-Short. - If you were a long-only manager and were negative on a specific stock, the only way you could capitalize on your insights is by not buying that stock. Given that your benchmark is an index, you are then constrained by the market weight of the stock in the index. This is a serious constraint to a long-only manager that the long-short manager does not have to endure on either long or short positions. Because the long-short portfolio eliminates systematic risk, the balance of the two positions eliminates the benchmark as a constraint in security selection and security weighting. The manager can overweight and underweight stocks by as much as the client's risk allows. It is important to note that the return to the long-short portfolio is not the alpha of the long plus the alpha of the short, but is the spread between the two. If the long alpha is 3% and the short alpha is also 3%, the spread is 6%. This is your return since you eliminated systematic risk.

Equalizing Long-Short. - If you wish not to eliminate systematic risk, you can add it to a long-short portfolio by purchasing stock index futures. Now, your return equals the long-short spread plus interest on the short plus the change in the price of the futures.

Transporting the Spread. - Long-short portfolios allow separation of the asset allocation decision and security selection by focusing on the alphas of individual stocks. Thus, it can be transported to other asset classes by combining the underlying long-short portfolio with other derivatives, such as futures or swaps.

Operational Considerations. - Problems with long-short portfolio management include difficulties with shorting especially small-cap stocks, trading costs for both long and short positions opposed to just long positions, and higher risk levels due to unbounded potential losses on short sales. Management fees may actually be lower when measured per dollar of active positions taken.

Learning Outcomes

a) Long only is designed to underweight or overweight specific stocks relative to a benchmark. Thus, the manager is constrained by market weights of stocks within the benchmark. Long-short allows the manager to eliminate systematic risk by buying undervalued stocks and, simultaneously, shorting overvalued stocks. The manager is not constrained by market weights.

b) Corporate publicity tends to support good news more than bad news. Also, analysts and brokers tend to favor buy over sell recommendations. Analysts are often swayed by their firms' investment banking relationships and are reluctant to issue negative reports that might offend current and potential corporate clients.

c) By allowing the manager to separate the security selection decision from the asset allocation decision. The success of this technique depends on the managers stock picking ability.

d) If you wish not to eliminate systematic risk, you can add it to a long-short portfolio by purchasing stock index futures. Now, your return equals the long-short spread plus interest on the short plus the change in the price of the futures. This is called equalizing.

e) Long-short portfolios allow separation of the asset allocation decision and security selection by focusing on the alphas of individual stocks. Thus, it can be transported to other asset classes by combining the underlying long-short portfolio with other derivatives, such as futures or swaps.

f) Problems with long-short portfolio management include difficulties with shorting especially small-cap stocks, trading costs for both long and short positions opposed to just long positions, and higher risk levels due to unbounded potential losses on short sales. Management fees may actually be lower when measured per dollar of active positions taken.

Steyn, “Market Neutral: Engineering Return and Risk”

The purpose of this article is to build on the Jacobs article in discussing market neutral investing, a technique free of index constraints that allows managers to allocate resources where markets are most inefficient. The focus is on manager skill (satellite management) for adding value to the portfolio. In this article, market neutral is synonymous with long-short.

Engineering Manager Skill. - The key to this technique is to invest in inefficient segments of the market. International markets tend to be more inefficient than the US market, but the trading costs of accessing it and the borrowing costs of short selling dwarf anything a market-neutral manager experiences in the US. Again, the freedom of not being constrained by index market weights is an important advantage of long-short management. For example, if you are a long-only manager and have a negative view of stock A, the only way you can act on that insight is not to buy A. If A represents 1 percent of the benchmark index, that means you are constrained to not investing 1 percent of your money in A. A long-short strategy has no such constraints.

Engineering Risk. - Long-only portfolio managers are concerned with passive return risk or market risk (systematic risk associated with asset allocation). Market-neutral managers are concerned with active-return risk or specific security risk (unsystematic risk associated with stock selection). To control this risk, market neutral managers use:

- **Pair diversification**—in a simple case, this is where the manager longs one stock and shorts another. In reality, there are portfolios of longs and portfolios of shorts designed to eliminate systematic risk. The emphasis is on the correlation between pairs of stocks, not between individual stocks. As the number of pairs increase, the risk decreases—assuming the pairs are not correlated.
- **Strategy diversification**—for example, combining a Japanese long-short portfolio with a US long-short portfolio creates a strategy diversification that lowers the risk of the total portfolio.
- **Leverage**—within a strategy (i.e., Japanese pair) and across two strategies (i.e. Japanese pair and US pair), leverage can control risk by magnifying the effects of diversification.

Matching risk and return. - This is a problem for the international manager. As the manager deviates further and further from the index (remember that the long-short technique frees the manager from index weights), the manager gets more and more dependent on models to control risk. The problem is that these models are forced to use unreliable data. Active-return opportunities exist in neglected stocks where the data are inaccurate, out of date, or unavailable.

Learning Outcomes

a) Long-only portfolio managers are concerned with passive return risk or market risk (systematic risk associated with asset allocation). Market-neutral managers are concerned with active-return risk or specific security risk (unsystematic risk associated with stock selection).

b) The emphasis is on the correlation between pairs of stocks, not between individual stocks. As the number of pairs increase, the risk decreases—assuming the pairs are not correlated.

c) Matching risk and return is a problem for the international manager. As the manager deviates further and further from the index (remember that the long-short technique frees the manager from index weights), the manager gets more and more dependent on models to control risk. The problem is that these models are forced to use unreliable data. Active-return opportunities exist in neglected stocks where the data are inaccurate, out of date, or unavailable.

Ineichen, UBS Warburg Global Alternative Investment Strategies, “The Search for Alpha Continues - Do Fund of Hedge Funds Managers Add Value?” pp. 26-61 and 73-80.

Learning Outcomes

a) Managers of funds of hedge funds face several risks: monitoring hedge fund managers and monitoring and managing hedge fund exposures is complex. A fund of funds operation is a business that includes a huge diversity in individual skill sets.

b) Industry characteristics include approximately 444 funds of funds officially or unofficially as of December 2000 managing around 20-25 percent of the whole hedge funds universe. In addition, liquidity is a concern, the fee structure is generally between 1.0 to 1.4 percent, volatility of returns is heterogeneous, and the place of domicile is most in Delaware (US) and British Virgin Islands.

c) Advantages include value-added (positive alphas) through manager selection, portfolio construction and monitoring investments and managers. Disadvantages to investors of funds of funds include double fee structures, lack of transparency, limited liquidity, and no “learning-by-doing” effect.

d) The investment process of a fund of funds manager is dynamic and can be classified into two selection processes (manager selection and portfolio construction) and two monitoring processes (manager review and risk management).

e) Directional funds are market timers with returns more volatile than non-directional fund that do not try to time the market (see Chart 34, pg 375).

f) A fund manager has an incentive not to be transparent. Market risk is only one source of risk-- other risks include credit risk and liquidity risk. Risk from leverage might be either accounting based (traditionally defined such as D/E) or risk-based (the risk of insolvency due to changes in the value of the portfolio). Thus, leverage risk is not easily defined. Style drift is where the manager drifts away from his/her area of expertise. Legal and compliance risk is where the fund manager of funds is exposed to legal consequences of, for example, not documenting transactions.

**Study Session 9 “Portfolio Management: Investment Policy for Individual Investors”
Maginn, Tuttle, McLeavey and Pinto, Managing Investment Portfolios: A Dynamic
Process, 3rd ed., “The Portfolio Management Process and the Investment Policy Statement”**

Learning Outcomes

a) (see Three steps in Figure 1-1, pg 7) Step 1: Planning that includes investor-related input plus economic and market related input; Step 2: The Execution Step that includes portfolio selection and implementation; Step 3: The Feedback Step that includes performance evaluation, monitoring, and rebalancing.

- b) *Investment objectives of risk and return are interdependent and cannot be discussed without reference to the other. Types of objectives in terms of willingness to take risk and ability to take risk (study table on page 14). For example, if ability to take risk is high but willingness to take risk is low, client needs educating.*
- c) *Constraints include liquidity, time horizon, taxes, legal and regulatory, and unique needs. All influence portfolio construction but the first two constraints bear directly on the ability to take risk and thus, constrain both risk and return objectives.*
- d) *The Investment Policy Statement (IPS) serves as the governing document for all investment decision-making. In addition to stating objectives and constraints, it also might cover other issues such as reporting requirements, rebalancing guidelines, frequency and format of investment communication, manager fees, investment strategy and/or the investment style of the manager.*
- e) *Elements of the IPS include a brief client description, purpose regarding establishment of policies, duties and investment responsibilities of parties involved, statement of investment goals, objectives and constraints, schedule for review of investment performance, asset allocation, and rebalancing guidelines.*
- f) *A passive strategy does not react to changes in expectations whereas an active strategy is based on responding to changing expectations. A semi-active strategy makes very controlled use of changes in expectational data.*
- g) *Long run capital market forecasts of risk and return for various asset classes form the basis for choosing portfolios that maximize expected return for given levels of risk or minimize risk for given levels of expected return.*
- h) *Strategic asset allocation involves combining the IPS with capital market expectations as a risk control mechanism.*
- i) *Portfolio selection and implementation is where the portfolio manager constructs and revises the portfolio within the guidelines of the strategic asset allocation.*
- j) *Performance evaluation is intended to assess progress toward achievement of investment objectives and to asset portfolio management skill. Performance measurement is the calculation or rates of return for the portfolio. Performance attribution is the analysis of why the portfolio performed as it did and involves a determination of the factors to which the rate of return can be attributed. Performance appraisal is the evaluation of whether the manager is doing a good job or not based on how the portfolio performed relative to a benchmark.*
- k) *Monitoring and rebalancing is an action that uses feedback to manage ongoing exposures to available investment opportunities so that the client's current objectives and constraints continue to be satisfied.*
- l) *Portfolio management is an ongoing process in which the investment objectives and constraints are identified and specified, investment strategies are developed, the portfolio composition is decided in detail, portfolio decisions are initiated by portfolio managers and implemented by traders, portfolio performance is measured and evaluated, investor and market conditions are monitored, and any necessary rebalancing is implemented.*

- m) *The risk objective largely determines the return objective. The investor must address several issues: measurement of risk, willingness to take risk, ability to take risk, how much risk is the investor both willing and able to bear, and specific risk objectives.*
- n) *The return objective must be consistent with the risk objective. Issues to address include measurement, stated return desire, required return, and objective setting.*
- o) *Liquidity is an anticipated or an unanticipated need for cash in excess of new contribution or saving at a specified point in time.*
- p) *Time horizon is most often the timer period associated with an investment objective and usually affected by the liquidity requirement.*
- q) *Tax concerns arise when the investor is faced with tax structures that reduce the amount of the total return that can be used for current needs or reinvested for future growth.*
- r) *Legal and regulatory factors are external factors imposed by governmental, regulatory or oversight authorities to constrain investment decision-making.*
- s) *Unique needs are internal factors (other than a liquidity requirement, time horizon or tax concern) that might constrain portfolio choices.*

Bronson, Scanlan, and Squires, “Managing Individual Investor Portfolios”

Learning Outcomes

- a) *Situational profiles attempt to categorize the individual investor by stage of life or economic circumstances. Source of wealth offers a degree of insight into the investor’s probable attitude toward risk. Measure of wealth: it is not unreasonable to consider that investors who perceive their holdings as small may demonstrate lower tolerance for portfolio volatility than investors who perceive their holdings as large. Stage of life: Younger investors have longer investment time horizons with their years of greatest capital formation yet to come, leading to higher than average willingness and ability to take risk.*
- b) *See Table 2.3, pages 35-37.*
- c) *Behavioral finance investment framework places emphasis on psychological considerations that appear to play an important role in guiding investor behavior (especially during periods of stress).*
- d) *Investor psychology in terms of underlying behavioral patterns play an important role in setting individual risk tolerance and return objectives.*
- e) *Risk attitudes and decision-making styles form the investor’s psychology that influences portfolio construction. More advisory firms are paying closer attention to these factors than before.*
- f) *An individual’s personality type is methodical, cautious, individualist, or spontaneous.*
- g) *The process of writing an IPS give the individual investor greater control over his/her financial destiny. The statement serves as a document of ;understanding that protects both the investment manager and ;the individual investor.*

h) Construction of the IPS is dynamic in which investment objectives, portfolio constraints, and risk tolerance are identified and then reconciled. The exercise should produce realistic investment goals and a common vocabulary for discussion of risk and return.

i) Major objectives are stated in terms of desired and required returns within the investor's risk tolerance. "Growth and income" or a total return objective usually in nominal terms are possibilities. If objective is total return, it is typically unimportant whether investment returns stem from income or price appreciation.

j) An investor's ability to take risk is suited to quantitative measurement. Financial goals, both long-term, and short-term, the importance of these goals, and the volatility tolerance of the investor are all quantitatively measurable. Willingness to take risk is more subjective.

k) Constraints: liquidity means to be able to efficiently meet anticipated and unanticipated demands for cash—ongoing expenses, emergency reserve, and possible future cash outflows. Time horizon is long-term generally if longer than 15-20 years; short-term if less than 3 years, and intermediate if between 3 and 15 years. Taxes could be levied on income, capital gains, wealth transfer, or wealth. Legal and regulatory constraints require consultation with local experts, such as tax accountants and/ or estate planning attorneys. Unique circumstances might include guidelines for social or special purpose investing; assets legally restricted from sale; directed brokerage arrangements; and privacy concerns. It would also be appropriate to list here any assets held outside the investment portfolio and not otherwise discussed in the policy statements.

l) See Gunther and Hilda Inger, pages 2-31..

m) Using historical data to project future returns assumes that the future will look like the past. Many times, the analyst will adjust historical returns in consideration of the analyst's perception of the future.

n) Current market data can provide a second perspective on capital market expectations about expected return and volatility.

o) Elimination means not including certain asset classes in the asset allocation. For example, you would not want to invest in tax-exempt bonds in a tax-sheltered account.

p) In a deterministic analysis, single numbers are specified for interest rates, asset return, inflation, and similar economic variables. In a Monte Carlo or probabilistic analysis, by contrast, a probability distribution of possible values is specified for economic variables, reflecting the uncertainty faced in real life about the future values of those variables.

q) A Monte Carlo analysis produces probability distribution for those objective variables by tabulating the outcomes of a large number (often 10,000) of simulation trials, each trial representing a possible 25-year experience. Each simulation trial incorporates a potential blend of economic factors (interest rates, inflation, and so forth), where the blending reflects the economic variables' probability distributions.

r) Monte Carlo simulation products might differ for several reasons. First, the simulation tool might rely only on historical data. Second, the tool might simulate returns of asset classes opposed to performance of specific investments. Third, the tool might not take into account tax considerations.

Tversky, Quantifying the Market Risk Premium Phenomenon for Investment Decision Making, "The Psychology of Risk"

This article deals with the perception of and reaction to risk and uncertainty. The author introduces several ideas different from classical theory demonstrating that human judgment and choice are subject to serious cognitive limitations.

I. Classical Decision-Making Theory--Assumptions of Rationality:

1. Asset integration--comparing alternative choices;
2. Risk aversion = less variability;
3. Rational expectations--unbiased forecasts;

II. Behavioral Decision Research

1. Decision-making is not rational;
2. Emotional and cognitive (failure to understand) factors affect decision-making process;
3. People often do not integrate, are not risk averse, and do not have rational expectations.

III. Loss Aversion

1. Risk aversion, Example: selection of a sure \$85,000 opposed to an 85% chance of gaining \$100,000 and a 15% chance of gaining nothing (same expected value of \$85,000).
2. Loss aversion, Example: selection of an 85% chance of losing \$100,000 and a 15% chance of losing nothing opposed to a sure loss of \$85,000 (same expected value of \$85,000);
3. Evidence that risk aversion holds for gains and risk seeking holds for losses--an "S-shaped" utility curve instead of the familiar "U-shaped" curve. The S curve is defined in terms of:
 - i. differences in wealth instead of absolute wealth;
 - ii. a reference point--the first \$100 you win gives you the most pleasure and the first \$100 you lose gives you the most pain per \$100.
 - iii. Utility is not symmetric--people are much more sensitive to negative than to positive stimuli.

Conclusion: Loss aversion dominates risk aversion.

IV. Reference Dependence--Investment selection depends more on the reference point (how much money you begin with) instead of the final outcome of gain or loss.

V. Mental Segregation--People tend to evaluate investment options one at a time instead of from a total portfolio perspective that incorporates combined outcomes. This leads to inferior decision-making and the possibility of manipulating people's choices by controlling their reference points. (Note that the CAPM takes the portfolio perspective)

VI. Mental Accounting--People's preferences depend on the way decisions are framed, not just on the objective outcomes. Example: Saving for a child's college education, but borrowing money to buy a car even though the interest rate on the borrowed money is higher than the interest rate on their savings for the child's education.

Conclusion: Money is not fungible--we cannot freely move it from one account to another.

VII. Biased Expectations--People's beliefs are neither accurate nor unbiased. A major reason for this is the phenomenon of overconfidence. Security analysts are more confident in their predictions than is justified by their hit rate. This may explain excess trading and other market anomalies.

Conclusions: Human judgment and choice are subject to serious cognitive limitations.

Learning Outcomes

a) Behavioral Decision Research shows that decision-making is not rational: (1) Emotional and cognitive (failure to understand) factors affect decision-making process, and (2) People often do not integrate, are not risk averse, and do not have rational expectations.

b) Being aware of the limitations of rational economic behavior should allow the manager to safeguard against his or her own limitations. In dealing with clients, this knowledge should allow the manager to focus on issues important to the client.

Self Test Question: Discuss the difference between risk aversion and loss aversion.

Suggested Answer: Risk aversion example: selection of a sure \$85,000 opposed to an 85% chance of gaining \$100,000 and a 15% chance of gaining nothing (same expected value of \$85,000). Loss aversion example: selection of an 85% chance of losing \$100,000 and a 15% chance of losing nothing opposed to a sure loss of \$85,000 (same expected value of \$85,000).

Wood, Investing Worldwide VI, “Behavioral Risk: Anecdotes and Disturbing Evidence”

The purpose of this article is to explain why investment managers, who are expected to act rationally, sometime act irrationally. Wood says flaws such as overconfidence, temptation, self-interest, fear, and greed are prevalent. The article is basically addressing the question of why investment managers lag their benchmarks for the majority of years. In reality, we are not as rational as we believe or have been taught to believe.

(1) Overconfidence leads to misapprehensions about oneself and to the illusion of control that, in turn, lead to biased judgments. (2) Decision framing or how we view a situation such as loss or gain has a great deal to do with what we decide. Why, for example, are people risk takers in negative situations and not risk takers in positive situations, even when the two situations show close similarity? Asset allocation decisions become a dilemma when the immediate risk of loss overpowers long-term potential. (3) Agency friction is another example. That is, people behave quite differently with their own money than they do as trustees. Committee decisions are often based on loss aversion. Additionally, committee members tend to review the investment list investment by investment (as opposed to a portfolio perspective). This means diversification loses relevance.

Learning Outcomes

a) Overconfidence leads to misapprehensions about oneself and to the illusion of control that, in turn, lead to biased judgments

b) Prospect theory challenges utility theory in the realm of the way people frame decisions. It shows that how we view a situation has a great deal to do with what we decide. For example, the threat of losing a benefit or asset has a strong effect. Asset allocation decisions become a dilemma when immediate risk of loss overpowers long-term potential.

c) Agency friction is when people behave quite differently with their own money than they do as trustees. Committee decisions are often based on loss aversion. Committee members tend to review the investment list investment by investment (as opposed to a portfolio perspective). This means diversification loses relevance.

Self test question. Describe three behavioral factors that lead investment managers to act irrationally.

Suggested answer. Overconfidence (assuming you know more than you actually know), decision framing (viewing a situation with a subjective bias) and agency friction (acting differently with someone else's money) often lead to irrationality.

Statman, Financial Analysts Journal, "Behavioral Finance: Past Battles and Future Engagements"

Learning Outcomes

a) The standard finance model is built on market efficiency and rational behavior. Behavioral theory of finance is based on observed investor behavior, which is often not rational.

b) (1) A central element of prospect theory is that people segment their money into mental accounts. A dividend dollar is identical to a capital dividend in standard finance, but a dollar dividend is different from a capital dollar in prospect theory because the two dollars belong to separate mental accounts and mental accounting is done account by account. (2) Investors who follow the representativeness heuristic overestimate the probability that the stock of a good company is a good stock because they mistakenly identify a good company as a good stock. (3) Behavioral investors think of money within mental accounts and distinguish paper losses from "realized losses." Behavioral investors are reluctant to realize losses, despite the tax advantages of doing so, because of the pain or regret that comes with kissing hope goodbye by selling a stock at a loss.

c) The CAPM theory is based on information. Traders use this information to transact free of cognitive errors and have mean-variance preferences. Behavioral asset pricing model theory is based on noise. Traders make decisions taking into consideration this noise dependent on cognitive errors and do not have strict mean-variance preferences. On the exam, make a clear distinction between information, which is rational behavior, and noise, which is irrational.

d) One meaning is that investors cannot systematically beat the market. The other is that security prices are rational. Rational prices reflect only utilitarian characteristics, such as risk, not value-expressive characteristics, such as sentiment. But behaviorists claim sentiment plays a role in security prices. Thus, the market may be efficient, meaning that you cannot beat the market, but prices are not rational, meaning that pricing models need to consider something other than the market portfolio (M) as the only factor affecting prices.

Study Session 10, "Portfolio Management: Investment Policy for Institutional Investors" Tschampion, Siegel, Takahashi, and Maginn, Managing Investment Portfolios: A Dynamic Process, 3rd ed., "Managing Institutional Investor Portfolios"

Learning Outcomes

a) A defined benefit plan is a pension plan that specifies the plan sponsor's obligation in terms of the benefit to plan participants. Investment risk is born by the employer. A defined

contribution plan specifies the sponsor's obligations in terms of contributions to the pension fund rather than benefits to plan participants. Investment risk is born by the employee.

b) Investment objectives are stated in terms of risk tolerance and return requirements. Risk tolerance is based on both ability and willingness to assume risk (see Table 4-1, pg 123). Return objectives depend on a number of factors, including the current funded status of the plan and pension contributions in relation to the accrual of pension benefits. Liquidity: The greater the number of retirees, the greater the liquidity needs of the plan. Time horizon: The younger the plan participants, the longer the time horizon. Legal and regulatory: all plans are regulated and, thus, the manager must understand the impact of these regulations on investment policy. Unique needs: No rule applies.

c) Risk tolerance is higher the greater the surplus, greater the more financial sound the plan sponsor is, greater the less common risk the plan and sponsor face, greater the fewer the plan features such as early retirement, and greater the younger the workforce.

d) See Example 4-7, pages 130-132.

e) Relative to plan surplus: The sponsor's ability to take investment risk in the plan increases with funded status, although the need to do so may so may be absent. Corporation valuation: When the sponsor's operating results are highly correlated with pension asset returns, the size of pension contribution may increase when the sponsor's operating results are weak. Corporation constituents (stockholders): The better the investment results and the greater the plan surplus, the lower the plan contributions (given risk within ERISA limits).

f) See Example 4-10, pg 134.

g) Foundation: see Table 4-2, pg 138; Endowments: see Example 4-12, pg 141; Insurance Co: see Example 4-14, pg 161.

h) See g) above.

i) Foundations: grant-making institutions with varying investment goals and time horizons. Could be long-term or short-term. Endowments: long-term funds generally owned by operating non-profit institutions such as universities and college with higher risk tolerance and return expectations. Life insurance companies: long-term horizon with higher risk tolerance and return expectations.

j) Very difficult to identify specific differences due to varying nature of each. In general, defined benefit plans tend to be long-term, foundations either short or long-term, endowments long-term, life insurance companies long-term, and nonlife insurance companies shorter term. Understanding the time horizon of each different sponsor is the best way to answer a CFA III question.

k) Asset-liability management (ALM) is a subset of the overall risk management of a company that typically focuses on financial risks created by the interaction of assets and on- and off-balance liabilities. Life insurance companies have a longer time horizon than non-life companies and, thus, can use ALM to a greater extent. Non-life companies are subject to acts of nature, which are unpredictable and, thus, have shorter time horizons.

l) After investment objectives and constraints have been identified and stated and capital market expectations have been specified and quantified, institutional investors then center attention on

the strategic asset allocations. The objective of strategic allocation is to specify a set of asset class weights to produce a portfolio that satisfies the return and risk objectives and constrains as stated in the investment policy statements.

m) In different economic environments, investment objectives and constraints of institutional investors depend on which institutional investor is the sponsor. As a general rule, the longer the time horizon, the more risk tolerant the institutional investor, and vice versa.

n) Pension plan (see Table 4-11, pg 175): Life insurance company (see Example 4-17, pg 183); Foundation (see table, pg 180); Endowment (see Example 4-16, pg 177).

Study Session 11, “Portfolio Management: Asset Allocation” Sharpe, “Asset Allocation,” Chapter 7, pp. 7-1 through 7-27

The purpose of this chapter is to explain asset allocation as part of the entire portfolio management process.

I. Investment As A Multiple Stage Process--Decisions Include:

- A. determination of the key asset classes in which funds can be invested
- B. the amount of money to be invested in each class
- C. security selection
- D. process either top down or bottom up

The importance of asset allocation--could explain up to 95 percent of the variance in returns from quarter to quarter

II. Approaching the Asset Mix Decision

- A. investment opportunities--depend on efficient frontier
 1. risk
 2. expected returncovariances--note inefficient investments interior to the frontier
- B. investor preferences
 1. indifference curves--show the same utility for different combinations of risk and return
 2. $Utility = E(R_M) - (S.D.^2/t_k)$
where $E(R_M)$ = the expected return for mix M, and t_k = investor k's risk tolerance
 3. expected utility can be considered a risk-adjusted expected return, because it equals the expected return minus a penalty for the associated risk
 4. for investors who are extremely risk-averse, t_k is small and the risk penalty is large, leading to a smaller value of Utility, and vice versa
 5. the goal of an investor is to select the asset mix with the greatest expected utility (taking any required constraints into account)
- C. taking opportunities and preferences into account--the best possible asset mix requires bring together information about an investor and information about capital markets
- D. investment manager discretion--could leave all decision up to an investment manager
- E. investor choice--ultimate investment decision to the investor
- F. mixed approaches--consultants advise investor making recommendations on asset allocation

III. Asset Allocation as Exposures to Key Factors

- A. choosing asset classes--depends on definition of class
 - 1. parsimony is one goal
 - 2. exposures should account for most of any changes in its value
 - 3. requires use of factor models
- B. return factor models--breaks returns into a series of components
 - a) factor related
 - b) nonfactor related (residual)
 - 1. one desirable characteristic is that the model accounts for most of the return
 - 2. effects of diversification--because when making predictions about future returns the values of the non-factor related components of return are unknown, diversification is very important
 - 3. asset class return factor models--each factor represents the return on an asset class and each b-value (sensitivity coefficient) represents a sensitivity of the return on the overall mix to the return on an asset class
 - 4. alpha value represents the manager's value added above the benchmark
 - 5. desirable asset class characteristics
 - a) return should be easily measured
 - b) it should be possible to form an effective index fund at low cost that will provide returns equal to those of each class
 - c) the whole (portfolio) should equal the sum of the parts
 - d) choosing an effective asset mix is the challenge

IV. Major Steps in Asset Allocation

- A. optimization--brings together investor needs with investment opportunities to generate the highest expected return with the lowest risk
- B. periodic changes in either investor needs or market expectation requires changing the optimal mix

V. Integrated, Strategic, Tactical, and Insured Asset Allocation

- A. integrated asset allocation--all steps discussed above combined in a dynamic process
- B. strategic asset allocation--long-run not dependent on changes in market conditions or investor assets
 - 1. constant mix--requires transactions to rebalance the mix periodically after market moves change relative asset values, opposed to buy-and-hold (no rebalancing)
 - a) long-run expectation do not change
 - b) investor risk preferences do not change
 - 2. strategic asset allocation provides an important set of benchmarks for an investor under "normal" conditions for an "average" level of risk tolerance
- C. tactical asset allocation
 - 1. assumes the investor's risk tolerance is unaffected by changes in his or her circumstances
 - 2. changes in predictions drive asset mix
 - 3. often contrarian in nature
- D. insured asset allocation--portfolio insurance
 - 1. relates the appropriate asset mix to the excess of the current value of a set of assets (or the investor's net worth) over a desired minimum or floor value
 - 2. the greater the current value over the floor, the greater the "cushion" and the greater the amount invested in the risky asset--note that investor changes in risk tolerance affect asset mix

Learning Outcomes

a) In a three-way portfolio, the asset allocation decision may account for over 90 percent of the variance in quarterly returns for a typical large pension fund.

b) By combining the set of investment opportunities (the efficient frontier) with investor preferences (indifference curves), the point of tangency is the optimal asset allocation.

c) A return factor model breaks the return on a security or portfolio into a series of components. Factor return models are designed to determine required rates of return similar to the way the CAPM does. Expected or required returns are essential to the asset allocation.

d) Major steps in the asset allocation decision are: (1) define investment opportunity set, (2) define investor's risk preferences as a utility curve, (3) bring the two together to optimize the portfolio, (4) monitor investment opportunities and investor's risk preferences, (5) measure performance relative to investor objectives, (6) start process over. **Be sure to study Figure 7-5, pg 228.**

e) Strategic is long-term; tactical is short term. Basic elements of a strategic plan include a constant asset mix with constant capital market conditions. Changing circumstances from period to period do not influence the investor's attitude toward risk (see Figure 7.22, pg 230).

f) the three different strategies are compared and contrasted as follows:

- Strategic asset allocation--long-run not dependent on changes in market conditions or investor assets
 - constant mix--requires transactions to rebalance the mix periodically after market moves change relative asset values, opposed to buy-and-hold (no rebalancing)
 - long-run expectation do not change
 - investor risk preferences do not change
 - strategic asset allocation provides an important set of benchmarks for an investor under "normal" conditions for an "average" level of risk tolerance
- Tactical asset allocation
 - assumes the investor's risk tolerance is unaffected by changes in his or her circumstances
 - changes in predictions drive asset mix
 - often contrarian in nature
- Insured asset allocation--portfolio insurance
 - relates the appropriate asset mix to the excess of the current value of a set of assets (or the investor's net worth) over a desired minimum or floor value
 - the greater the current value over the floor, the greater the "cushion" and the greater the amount invested in the risky asset--note that investor changes in risk tolerance affect asset mix

Self Test Question: List and discuss the statistical estimates necessary for construction of the efficient frontier.

Suggested Answer: Statistical estimates required include risk, expected return, and covariances (note that inefficient investments interior to the frontier).

Study Session 11, “Portfolio Management: Asset Allocation”
Perold and Sharpe, “Dynamic Strategies for Asset Allocation”

The purpose of this article is to discuss the different risk and return characteristics produced by 4 dynamic strategies using 2 asset classes: stocks and T-bills.

I. Payoff and exposure diagrams

- A. a payoff diagram relates portfolio performance to performance of the market
- B. an exposure diagram relates the dollars invested in stocks to total assets; it depicts the decision rule underlying a strategy; this diagram depicts the risk tolerance an investor must have in order for that strategy to be optimal for him or her

II. buy-and-hold strategies--i.e., 60/40 stock/T-bill mix and doing nothing

- A. portfolio value is linearly related to that of the stock market
- B. portfolio value will never fall below the value of the initial investment in bills
- C. upside potential is unlimited
- D. investor’s tolerance for risk becomes zero at asset levels below 60 percent of initial wealth

III. constant-mix strategies--maintain an exposure to stocks that is a constant proportion of wealth (i.e., 60/40 constant-mix)

- A. these strategies are do something since purchases and sales are required to maintain mix
- B. requires purchase of stocks as market values fall, and sell of stocks as market values rise
- C. rebalancing occurs according to a rule such as: rebalance if values change by 10 percent
- D. a buy-and-hold strategy clearly dominates a constant mix strategy, so why would anyone do this? It depends on the effects of volatility
 - 1. a strategy that buys stock as they fall and sells as they rise will capitalize on reversals; thus, a constant-mix strategy will outperform a comparable buy-and-hold strategy in a flat (but oscillating) market, and volatility will accentuate this effect. The opposite is also true.
 - 2. A constant-mix policy tends to be superior to a buy-and-hold strategy if markets are characterized more my reversals than by trends. A buy-an-hold policy tends to be superior if there is a major move in one direction.

IV. constant-proportion strategies--takes the form: dollars in stocks = m (assets - floor), where m is a fixed multiplier

- A. constant-proportion portfolio insurance (CPPI) strategies are constant-proportion strategies with multipliers greater than one
- B. to implement a CPPI strategy, the investor selects the multiplier and a floor below which she does not want the portfolio value to fall.
- C. The difference between assets and the floor is the “cushion,” and the idea is to keep stocks a constant multiple of the cushion
- D. risk tolerance is zero below a specified floor, but increases more quickly above the floor than with buy-and-hold strategies
- E. buy-and-hold strategies are constant-proportion strategies with a multiplier of one and a floor equal to the value invested in bills.
- F. CPPI strategy sells stocks as they fall and buys stocks as they rise
- G. in a bull market, CPPI strategy will do very well
- H. in a flat market, it will do relatively poorly because reversals mean sell on weakness only to see the market rebound, and buy on strength only to see the market weaken
- I. no one strategy dominates because performance depends on the behavior of the market

V. concave versus convex strategies

A. strategies giving convex payoff diagrams represent the purchase of portfolio insurance-- value of assets increase at an increasing rate as the value of stock market increases giving more upside potential

B. those giving concave payoff diagrams represent its sale-- value of assets increase at a decreasing rate as the value of stock market increases giving more downside protection

VI. option-based portfolio insurance

A. begins by specifying an investment horizon and a desired floor value at the end of that horizon

B. return distribution resembles strategy of call options and T-bills

VII. dynamic strategies with resetting--when, if ever, should one “reset” the parameters of a dynamic strategy? The answer depends not only on the rationale behind the choice of strategy, but also on the type of dynamic strategy chosen.

VIII. selecting a dynamic strategy--the best strategy should be measured by the degree of fit between a strategy’s exposure diagram and the investor’s risk tolerance

Learning Outcomes

a) Buy-and-hold strategies--i.e., 60/40 stock/T-bill mix and doing nothing has the following characteristics: A. portfolio value is linearly related to that of the stock market, B. portfolio value will never fall below the value of the initial investment in bills, C. upside potential is unlimited, D. investor’s tolerance for risk becomes zero at asset levels below 60 percent of initial wealth .Constant-mix strategies--maintain an exposure to stocks that is a constant proportion of wealth (i.e., 60/40 constant-mix) has the following characteristics: A. these strategies are do something since purchases and sales are required to maintain mix, B. requires purchase of stocks as market values fall, and sell of stocks as market values rise, C. rebalancing occurs according to a rule such as: rebalance if values change by 10 percent. Constant-proportion strategies--takes the form: dollars in stocks = m (assets - floor), where m is a fixed multiplier and, has the following characteristics: A. constant-proportion portfolio insurance (CPPI) strategies are constant-proportion strategies with multipliers greater than one; B. to implement a CPPI strategy, the investor selects the multiplier and a floor below which she does not want the portfolio value to fall; C. The difference between assets and the floor is the “cushion,” and the idea is to keep stocks a constant multiple of the cushion; D. risk tolerance is zero below a specified floor, but increases more quickly above the floor than with buy-and-hold strategies; E. buy-and-hold strategies are constant-proportion strategies with a multiplier of one and a floor equal to the value invested in bills; F. CPPI strategy sells stocks as they fall and buys stocks as they rise; Option-based portfolio insurance has the following characteristics: A. begins by specifying an investment horizon and a desired floor value at the end of that horizon, B. return distribution resembles strategy of call options and T-bills.

*b) see a) above. **Be sure to understand a) very well and be comfortable with payoff diagrams.***

c) Ultimately, the choice of which strategy alternative is best concerns the preferences of the various parties that will bear the risk and/or enjoy the reward from investment. There is no reason to believe that any particular type of dynamic strategy is best for everyone.

d) A strategy that buys stock as they fall and sells as they rise will capitalize on reversals; thus, a constant-mix strategy will outperform a comparable buy-and-hold strategy in a flat (but

oscillating) market, and volatility will accentuate this effect. The opposite is also true. A constant-mix policy tends to be superior to a buy-and-hold strategy if markets are characterized more by reversals than by trends. A buy-and-hold policy tends to be superior if there is a major move in one direction. CPPI strategy sells stocks as they fall and buys stocks as they rise. In a bull market, CPPI strategy will do very well; in a flat market, it will do relatively poorly because reversals mean sell on weakness only to see the market rebound, and buy on strength only to see the market weaken. No one strategy dominates because performance depends on the behavior of the market. Selecting a dynamic strategy--the best strategy should be measured by the degree of fit between a strategy's exposure diagram and the investor's risk tolerance. Option-based portfolio insurance begins by specifying an investment horizon and a desired floor value at the end of that horizon. Return distribution resembles strategy of call options and T-bills.

e) an exposure diagram relates the dollars invested in stocks to total assets; it depicts the decision rule underlying a strategy; this diagram depicts the risk tolerance an investor must have in order for that strategy to be optimal for him or her

f) Over time, a convex strategy (convex payoff diagrams) represents the purchase of portfolio insurance where the value of assets increases at an increasing rate as the value of stock market increases giving more upside potential. In a down market, a convex strategy means selling assets as the market declines. A concave strategy (concave payoff diagrams) represents sales where the value of assets increase at a decreasing rate as the value of stock market increases giving more downside protection. In a down market, a concave strategy means buying assets as the market declines as assets become cheaper. You can see that these two strategies are opposite each other. Resetting can dramatically alter the character of a strategy. Resetting rules should thus be considered an integral part of the dynamic strategy, and their effects explicitly taken into account.

Self Test Question: Compare and contrast a buy-and-hold strategy and a constant-mix strategy. **Explain** a constant-proportion strategy.

Suggested Answer: A buy-and-hold strategy does not adjust weights whereas a constant-mix strategy does depending on returns in each asset class. A constant-proportion strategy buys stocks as they fall and sells as they rise. This strategy is designed to capitalize on reversals; thus, a constant-mix strategy will outperform a comparable buy-and-hold strategy in a flat (but oscillating) market, and volatility will accentuate this effect.

Study Session 11, "Portfolio Management: Asset Allocation" Arnott and Lovell, "Monitoring and Rebalancing the Portfolio," Chapter 13

Once you have built a portfolio, you cannot leave it alone to run by itself. Over time, asset class weights become out-of-whack with target weights, as returns on one asset class rarely equal the returns on another asset class. In short, the portfolio needs constant monitoring and occasional rebalancing. This chapter presents a methodology for dealing with change through time. (Expect to see reference to this material on the exam.)

I. Observations on Portfolio Rebalancing--Portfolio rebalancing involves a simple trade-off: the cost of trading versus the cost of not trading. Costs include commissions, market impact, lost opportunities and a nonfinancial cost of lost client confidence. Not trading means that the portfolio is not optimal.

A. The Wrong Way to Revise Portfolios--emotionally!

1. Straying from Established Roles--changing style is not the answer to disappointing investment result
 2. Clashing Cultures--human tendency is to coast with a winning strategy and to change the portfolio when things are going poorly. This is counterproductive
- B. Traditional Portfolio Revision--know your client, and know your markets. If you were building a new portfolio today, would it look like your existing portfolio? If not, change is needed.

II. Factors Suggestion Portfolio Rebalancing

A. Changes Affecting the Client

1. Change in Wealth--can't tell how this will affect risk preferences
2. Changing Time Horizons--shorter time horizons usually mean a more conservative investment approach, less tolerance for risk
3. Changing Liquidity Requirements--the need for liquidity reduces investment options
4. Tax Circumstances--other things being equal, you should avoid taxes
5. Laws and Regulations--pension managers need to be aware of significant developments
6. Unique Circumstances/Preferences--client circumstances may change for many reasons, including political ones.

B. New Investment Alternatives

1. Changes in Asset Risk Attributes--generally, past volatility has been a useful indicator of future stock market performance
2. Bull and Bear Markets--ebullient markets provide selling opportunities, and vice versa
3. Central Bank Policy--effect on liquidity is important. Fed policy matters and should not be ignored. Restricted credit hurts stock returns, while eased credit enhances them.
4. Inflation Rate Changes--unexpected inflation drives stock and bond prices in the opposite direction. The PPI is a better predictor than the CPI of future inflation

C. Changing Return Prospects--as prices constantly change, so do return prospects. The emphasis is on relative prices (nuclear vs. nonnuclear), and the relationship between price change and return prospects seems to be inverse.

III. Principles of Monitoring and Rebalancing

A. Asset Mix Rebalancing Benefits

1. Drifting Mix--asset class weights drift over time. Simple rebalancing can provide the necessary measure of control over a drifting mix. It is worthwhile if properly managed.
2. Disciplined Rebalancing--requires no belief in market timing and is easy to sell to clients. It provides an effective way to dissuade clients from abandoning policy at inauspicious moments. Maintaining a 60/40 stock/bond mix is one example of disciplined rebalancing.
3. Disciplined Rebalancing vs. Ad Hoc Changes--ad hoc changes after the fact in the direction of the most recent market move is another way of changing the composition of a portfolio
4. The Burden of Excess Cash--cash acts as a drag on portfolio returns that works to the detriment of the long-term investor, who should maintain positions in stocks and bonds that generate higher returns.

5. Asset Mix Changes Based on Market Timing--market timing is beyond the capabilities (and courage) of most. Opportunities arise when the returns of one asset class become out-of-line with those of another asset class.
6. Can Ad Hoc Tactical Shifts Add Value?--results of one study show that market timing does not work.

B. Tactical Asset Allocation: Theoretic Underpinnings--active allocation among asset classes can add value depending on three assumptions:

1. Markets Tell Explicitly What Returns Are Available--cash yields and default-free yields to maturity provide objective evidence of prospective returns. Equity returns are not so easy, but can be arrived at in many ways such as earnings yield or discount models.
2. Relative Expected Returns Reflect Consensus--recent past experience exerts a strong influence on expected rates of return. Eventually, the market corrects itself.
3. Expected Returns Provide Clues to Actual Returns--using regression, the authors present evidence that spreads between expected returns on stocks and bonds can predict realized relative performance over spans as short as one month. Actual relative returns correct for transitory extreme disequilibria. Successful asset allocation pays off more in turbulent markets.

C. Tactical Allocation Simulation for Rebalancing--simulation results show that tactical association can produce impressive, positive results. It is an aggressive approach that attempts to exploit above average or below average risk premiums. Futures were used as an efficient and low cost way to allocate money across asset classes.

D. Rebalancing Without Futures--futures may not be available to some plan sponsors. Actual asset allocation in the cash market is more expensive and simulation results are not as impressive as they were with futures. Still, the results exceed a simple 60/40 strategy.

IV. Rebalancing With Stock Screens--results should be after transaction costs. Moreover, results from screens based on size should not be compared to the S&P 500 because there are more small stocks than large stocks in the index, which prohibits a fair comparison.

A. Return Erosion--evidence from several screening models shows that the models can deliver powerful results.

B. Introducing Turnover--inclusion of transaction costs for the screening models, however, alters the test results. Virtually all the benefit of quarterly rebalancing disappears if costs exceed 4 percent.

V. Active Management/Rebalancing: Why Bother?--the authors present data showing that long-term results of active managers are not consistent with a true random walk, an argument in favor of active management.

VI. Trading's Positive Side--traders provide liquidity and commissions that drive research that contributes to market efficiency.

VII. Summary--a manager needs to understand the client's needs in order to effect portfolio rebalancing. Sufficiently large changes in client needs place transaction costs in a secondary role. Still, legitimate changes to improve on diversified portfolios are rare. Normal policy is the beacon; one should generally steer toward it.

Learning Outcomes

a) *One way of looking at this question is yes, ebullient markets provide selling opportunities, and vice versa. The authors state that the portfolio needs constant monitoring and occasional rebalancing. Another factor that would trigger rebalancing is New Investment Alternatives: Changes in Asset Risk Attributes, Bull and Bear Markets, Central Bank Policy, and Inflation Rate Changes. Still another factor is Changing Return Prospects: as prices constantly change, so do return prospects. The emphasis is on relative prices (ie. nuclear vs. nonnuclear), and the relationship between price change and return prospects seems to be inverse. Another view is to rebalance only if internal factors change such as health or family circumstances change opposed to changes in external factors such as risk and return conditions. On the exam, the grader is not looking for a specific right answer because there is no such answer. Instead, the grader is looking for how you justify your answer.*

b) *Portfolio Rebalancing should occur with Change in Wealth, Changing Time Horizons, Changing Liquidity Requirements, changes in Tax Circumstances, changes in Laws and Regulations, and changes in Unique Circumstances/Preferences. You will see this concept on the exam especially the need to rebalance due to changing of time horizon due to the death of a family member or change in employment status.*

c) *The authors claim that any changes in the efficient frontier should trigger a need to rebalance the portfolio. Portfolio rebalancing involves a simple trade-off: the cost of trading versus the cost of not trading. Costs include commissions, market impact, lost opportunities and a nonfinancial cost of lost client confidence. Not trading means that the portfolio is not optimal.*

d) *Component costs of trading driven by portfolio revisions are more than just commissions. Market price changes before or after the trade or during the day are another inadequate measure. The real cost of transacting is the difference between realized price and the price that would have prevailed in the absence of the order. That cost is unmeasurable. Furthermore, the trades one seeks but fails to execute impose yet another tariff, an opportunity cost. This cost may be more onerous than the other, and it is equally unknowable and unmeasurable.*

e) *Disciplined Rebalancing requires no belief in market timing and is easy to sell to clients. It provides an effective way to dissuade clients from abandoning policy at inauspicious moments. Maintaining a 60/40 stock/bond mix is one example of disciplined rebalancing. Tactical Asset Allocation involves active allocation among asset classes can add value depending on three assumptions: (1) Markets Tell Explicitly What Returns Are Available--cash yields and default-free yields to maturity provide objective evidence of prospective returns. Equity returns are not so easy, but can be arrived at in many ways such as earnings yield or discount models; (2) Relative Expected Returns Reflect Consensus--recent past experience exerts a strong influence on expected rates of return. Eventually, the market corrects itself; (3) Expected Returns Provide Clues to Actual Returns--using regression, the authors present evidence that spreads between expected returns on stocks and bonds can predict realized relative performance over spans as short as one month. Actual relative returns correct for transitory extreme disequilibria. Successful asset allocation pays off more in turbulent markets. Tactical Allocation Simulation for Rebalancing--simulation results show that tactical association can produce impressive, positive results. It is an aggressive approach that attempts to exploit above average or below average risk premiums. Futures were used as an efficient and low cost way to allocate money across asset classes.*

f) *Active management can be beneficial to the extent that more managers produce excellent results than chance alone would predict. In asking the question as to whether institutional*

investors have a chance of producing superior results, the authors claim that the evidence supports a positive conclusion. If this is so, then active management can be beneficial. The obvious trick is how to identify successful active managers.

Self Test Question: Design a disciplined strategy for rebalancing a portfolio. List and explain three reasons for rebalancing a portfolio. **List** and **explain** six factors affecting a client's portfolio.

Suggested Answer: (1) One way to do this is to rebalance periodically back to the strategically determined weights. This is necessary due to one or more of the asset classes becoming out of balance with the others, which would be caused by unequal rates of return across all the asset classes. (2) Six factors include health, time horizon, tax needs, liquidity needs, unique needs, and regulatory needs.

Study Session 14, "Portfolio Management: Portfolio Strategies and Issues"
Christopherson and Williams, The Handbook of Equity Style Management, 2nd ed.,
"Equity Style: What It Is and Why It Matters," Ch. 1

This article presents various definitions of style that you should know. It also presents an historical perspective of returns to various styles.

Defining Equity Style. - Growth manager focuses on e in p/e ratio, whereas value manager focuses on p in p/e ratio. Over a cycle, the same stock may exhibit characteristics of both growth and value: growth at high point in cycle and value at low point. Because of this possibility, both managers arrive at opposite conclusions about a stock. Toward the peak of the cycle, the growth manager says invest in a growth stock and a value manager says not to invest in the same stock.

Types of Equity Styles. There are four: (1) value, (2) growth, (3) market-oriented, and (4) small-capitalization. Be sure you know basic characteristics of each. (1) Value managers invest in low p/e , are contrarians who favors depressed cyclical stocks, or like high dividend yielding stocks. (2) Growth managers like either consistent growth or stocks with good earnings momentum. (3) Market oriented managers may have a value bias, a growth bias, favor a market normal portfolio, or seek companies with above-average growth prospects selling a moderate valuation multiples. (4) Small-cap managers have styles similar to large-cap managers by being either value, growth or market oriented.

Evidence of Styles. - As expected, empirical evidence shows differences among styles. For example, value manager do favor low p/e ratios and growth managers do favor high p/e ratios.

Historical Perspective on Styles. - In the 1970s, large-cap style was the fad. In the 1980s, value became popular and in the 1990s, small-cap style dominated. History shows that style concepts evolve over time, and undergo refinement in the process.

CAPM, Factor Models, and Style Indexes. - In an efficient market, no one style would dominate any other style. That is, no stock characteristic would lead to differential returns. If styles exist, then returns to style portfolios and style indexes must be significantly different from the market, and index style returns must be significantly different from each other. Also, style portfolios and style indexes should have on average different factor exposure patters from the market as a whole and from each other (remember APT). Data show that style cycles exist, and p/b ratio distinguishes growth from value. Selecting the proper index that reflects the manager's style is

important when evaluating the manager's performance. Style indexes also allow passive investing.

Style Management: Practical Applications. - Selecting the proper benchmark is important, where the proper benchmark reflects the style of the manager you are evaluating. Evaluating a manager over the long term is also important because you may have selected the manager at the peak of the style cycle. If this happens, returns to that style will decline relative to the returns of other styles, and you could misjudge the manager due solely to the style cycle.

Achieving Target Equity Returns. - If you select a manager based only on recent performance, you could subject the entire plan to an unintended style bias because the style of the manager you selected may overlap with the style of other managers in the plan. Broad diversification is style neutral, which makes stock selection important.

Beyond Style Diversification. - Is one style better than another? Maybe. Value appears to be better than growth based on historical data. But in order to clearly answer this question, you need to keep several points in mind: (1) could some other effect be a factor in the historical returns; (2) has value been "discovered" in an efficient market sense?--meaning that this approach will not longer generate superior returns; and (3) why should history repeat itself?

Learning Outcomes

a) Value investor searches undervalued stocks by looking at low P/E multiple companies, and only buys when the current price is lower than expected price. Growth investors search the companies, which has high earning growth prospects. The value investor's risks; (1) misvaluation of stock price, (2) investor concerns about company may be correct. The growth investor's risks; (1) future growth may not occur, (2) P/E multiple may decline unexpectedly.

b) There are four: (1) value, (2) growth, (3) market-oriented, and (4) small-capitalization. Be sure you know basic characteristics of each. (1) Value managers invest in low p/e, are contrarians who favors depressed cyclical stocks, or like high dividend yielding stocks. (2) Growth managers like either consistent growth or stocks with good earnings momentum. (3) Market oriented managers may have a value bias, a growth bias, favor a market normal portfolio, or seek companies with above-average growth prospects selling a moderate valuation multiples. (4) Small-cap managers have styles similar to large-cap managers by being value, growth or market oriented.

c) Manager focuses on e in p/e ratio, whereas value manager focuses on p in p/e ratio. Over a cycle, the same stock may exhibit characteristics of both growth and value: growth at high point in cycle and value at low point. Because of this possibility, both managers arrive at opposite conclusions about a stock. Toward the peak of the cycle, the growth manager says invest in a growth stock and a value manager says not to invest in the same stock.

d) Over a cycle, same stock may exhibit characteristics of both growth and value: growth at high point in cycle and value at low point. In this case, toward the peak of the cycle, the growth manager says invest in a growth stock and a value managers says not to invest in the same stock.

e) Selecting the proper benchmark is important, where the proper benchmark reflects the style of the manager you are evaluating. Evaluating a manager over the long term is also important because you may have selected the manager at the peak of the style cycle. If this happens,

returns to that style will decline relative to the returns of other styles, and you could misjudge the manager due solely to the style cycle.

Self test questions. (1) **Explain** why style is important when evaluating a manager. (2) **Compare** and **contrast** value investing and growth investing. (3) **Discuss** the possibility of a stock being both a value and a growth investment.

Suggested answers: (1) Selecting the proper benchmark is important, and the only way to do this is according to the style of the manager being evaluated. (2) Characteristics of value investing include low p/e ratios and high dividend yields. The emphasis is on the p in the p/e ratio. Growth investing favors high p/e ratios and low dividend yields. The emphasis is on the e in the p/e ratio. (3) At one point in time, the stock may present good value, but as the price is bid up due to high demand of value investors, the same stock can become a growth stock. In other words, the same stock may exhibit both styles at different times, but not at the same time.

Sauter, Selected Topics in Equity Portfolio Management, “Medium and Small Capitalization Indexing,” Ch. 3, pp. 44-49

Learning Outcomes

a) Techniques for managing an index fund are either complete replication or sampling. Complete replication involves purchasing all of the stocks in the benchmark in the percentage that their market capitalization represents in the total market capitalization of the index. Sampling involves only a portion of the securities in the index here the fund tracks its benchmark less precisely, exhibiting the same cost drag on performance as replication plus an additional tracking error due to the sampling procedure. If liquidity is sufficient as it is with large cap stocks, replication is generally better. If liquidity is not sufficient, sampling is preferable. Another factor to consider is the size of the index fund. In the startup phase, sampling might be necessary. As the fund grows in size, replication becomes more appropriate.(See pg 326)

b) Stratified sampling is when every stock in the index is classified by its industry and size decile, which are the two most significant factors that determine a stock’s return, applying a weighting scheme, and then randomly selecting stocks in each cell. Stratified sampling generates a portfolio with the exact same exposure to the two most important return factors, industry and size. Optimization involves a more sophisticated sampling technique to produce a smaller tracking error. Optimization involves creating and solving a formula known as a utility function. The utility function has a theoretical justification for why it should minimize tracking error. (See pages 324-325)

Loftus, “Enhanced Equity Indexing,” Ch. 4

Learning Outcomes

a) Active management seeks to achieve positive alphas while controlling tracking error. Indexing has an expected alpha of zero with a small tracking error. Enhancing indexing focuses on generating modest levels of alpha with a low tracking error.

b) Stock-selection enhanced indexing strategies are typically broadly diversified portfolios that rely on some form of stock selection process in an attempt to generate a moderate, consistent alpha. The success of any stock-based strategy is predicated on the belief that some form of active stock selection can add value.

c) Synthetic enhanced index strategies make no attempt to select stocks within the index being tracked. Rather, they effectively obtain ownership of all the stocks in the index by means of futures, options, or stock index swaps. Index futures become the primary risk control element in the strategy, completely eliminating any tracking error or risk of under performing the index due to adverse results in stock selection. The risk of such a strategy is the mispricing of futures contracts. (See page 342)

Wagner and Edwards, Handbook of Portfolio Management, “Implementing Investment Strategies: The Art and Science of Investing,” Ch. 17

The purpose of this chapter is to explain implementation or execution of investment ideas. A question addressed is: if investment managers are able to pick winning stocks, why are they losing money relative to an index fund? The answer is that there is more to investing than good stock selection. On average, the cost of getting ideas into portfolios exceeds the value of the research. Consequently, the reward of active management is not worth its cost.

Why Trading is Not Like Portfolio Management. - Liquidity means finding shares at a price that preserves the value of the idea. In trading, one can trade for either liquidity or for information. A trader is constantly concerned that value is received for value given. Thus, trading can be thought of as the ongoing choice between trading now for a known price versus later for an unknown, and hopefully better, price.

Trade Motivation. - Information-based traders are more time sensitive than price sensitive. If you have superior information, you want your ideas implemented quickly. On the other hand, if you are a value-based trader, you are more price sensitive than time sensitive.

Assessing Market Conditions. - The question is: What is the expected cost of liquidity for the required size. To determine this cost, the trader needs to assess volume and diversity of opinion. The greater the volume and the more diverse the opinions, the more narrow the bid-ask spread. The opposite is also true.

Establish Initial Trading Strategy. - The tradeoff is between liquidity and price. The payment for immediate liquidity may exceed the value of the information motivating the trade. On the other hand, the patient trader risks share prices moving against him before the order is filled.

Probing for Liquidity and Information. - If you want to buy several thousand shares of a stock, seeking liquidity creates risk. By placing the order all at once, you may drive up the price. On the other hand, placing the order piecemeal may mean less price impact but more risk in terms of the price moving higher before you complete the buy order.

Adapting to Market Conditions and Effectiveness. - A successful trader must be alert to changing market conditions in order to change trading strategy as necessary. Every completed trade provides feedback to the trader that is essential to help the trader adapt to the market. Is there good liquidity at a high price, or good prices at low liquidity?

A Framework for Measuring Implementation. - The framework is to compare the information return of the decision on a no-cost basis to the realized return on a fully-costed basis.

Example: Say you want to buy 50,000 shares of NME. The current price is \$20 (last trade you observe). You give the order to the trading desk. The trading desk gives an order to a broker to

buy 40,000 shares at \$20.50 (most recent trade). The broker buys 40,000 shares at a price of \$20.75 with a commission of \$.05 per share. The price jumps to \$21.50 and the remainder of the order is cancelled. 15 days later the price is \$23. What happened? (This is a good example for the exam).

The Cost Components of Trading.

- Commission—explicit fee paid to broker
- Price impact—cost of \$20.75 compared to last price of \$20.50 means a market impact of \$.25 per share.
- Trader timing—price change between time you gave order to trader and when trader gave order to broker ($\$20.50 - \$20 = \$.50$).
- Opportunity cost—cost of failing to complete the order. 20,000 shares (40% of the order) were not bought and, thus, you incurred an opportunity cost of 6 percentage points [$.06 = (\$23 - 20/20) \times 40\%$].

The Iceberg of Trading. The key equation for understanding cost of execution is:

- Commissions + price impact + timing + opportunity.

Commissions are easiest to observe. Price impact reflects both the dealer spread plus any price movement required to attract additional liquidity to complete the trade. Timing is the counterpoint to price impact: as time increases, price impact decreases (and vice versa). Thus, if you have valuable information, you want the trade completed quickly and you are willing to pay for the liquidity (you demand liquidity). If you do not have valuable information, you are willing to take more time to wait for natural market liquidity. Opportunity is the highest cost. There are two reasons for unexecuted orders: (1) trader cannot locate the shares or (2) the stock has moved out of the range you are willing to pay for the stock. Note that demanding liquidity (you want to buy) is more expensive than providing liquidity (you are willing to sell). **The best execution is that procedure most likely to capture the potential investment return.**

Focus on the key equation above to understand tradeoffs. For example, holding down price impact may mean higher timing costs. The authors presents several cases where the point is to understand all the costs and not just one.

Recommendations: (1) one trading strategy does not fit all situations—know the motive for the trade and plan accordingly, (2) prioritize and make contingency plans—rank information-based orders higher than value-based orders, (3) build expected costs into portfolio decision making—know the total cost of execution puts the value of the decision in proper context, (4) rationalize broker use—understand the skills brokers need to implement your investment decisions.

Learning Outcomes

a) Information-based traders are more time sensitive than price sensitive. If you have superior information, you want your ideas implemented quickly. On the other hand, if you are a value-based trader, you are more price sensitive than time sensitive.

b) The Cost Components of Trading.

- *Commission—explicit fee paid to broker*
- *Price impact—cost of \$20.75 compared to last price of \$20.50 means a market impact of \$.25 per share.*
- *Trader timing—price change between time you gave order to trader and when trader gave order to broker ($\$20.50 - \$20 = \$.50$).*

- *Opportunity cost—cost of failing to complete the order. 20,000 shares (40% of the order) were not bought and, thus, you incurred an opportunity cost of 6 percentage points [$.06 = (\$23 - 20/20) \times 40\%$].*

c) Recommendations: (1) one trading strategy does not fit all situations—know the motive for the trade and plan accordingly, (2) prioritize and make contingency plans—rank information-based orders higher than value-based orders, (3) build expected costs into portfolio decision making—know the total cost of execution puts the value of the decision in proper context, (4) rationalize broker use—understand the skills brokers need to implement your investment decisions.

Leinweber, “Using Information from Trading in Trading and Portfolio Management: Ten Years Later” (AIMR 2002)

The purpose of this article is to examine the relationships between transaction costs and (1) trade size relative to market capitalization, (2) trade size relative to average trading volume, (3) management style, (4) patience in trading, and (5) use of crossing networks. 13,000 equity transactions by a large pension fund with all transactions completed were investigated based on the implementation shortfall method (the trade price less the decision price, plus commissions).

- I. Transaction Cost Prediction--reliable transaction cost forecasts can be applied in two places
- A. integration of portfolio management and trading--most portfolio construction tools and optimizers use overly simple assumptions about transaction costs
 - B. trading performance
 - C. the analysis shows
 1. value is added by skilled equity traders
 2. limit-order strategies may be appropriate to keep the transaction costs below the anticipated alpha added by the manager
 - D. electronic trading provide powerful means of
 1. exploiting the multiple execution channels available today
 2. allowing short-term market volatility to work in your favor
 3. applying the techniques simultaneously to a large number of orders
 4. incorporating feedback from the results of trading strategies on multiple time scales to refine the performance of those strategies

II. Transaction Costs Matter

- A. paper portfolio incur no commissions, no bid-ask spreads, no market impact, and no opportunity costs; real portfolios incur all of these costs
- B. from 1979 to 1991, the Value Line paper portfolio had an annualized return of 26.2 percent; during the same period, the real Value Line fund had an annualized return of only 16.1 percent
- C. some would say do not worry about transaction costs because you cannot accurately measure them; this is not correct since we now have reliable measurement techniques even though the exact costs are not observable

III. Progress in Information technology--if you had everything computationally, where would you put it financially? One place is in the improvement of the trading process, but How?

IV. A \$2 Billion Experiment--you must be careful in interpreting results of this study because all transactions came from one pension fund

V. Costs and Trade Size--results show

- A. the largest trades have costs much lower than those predicted by the model (they use the Loeb function to predict costs)
- B. the highest and lowest percentage costs are associated with the smaller trades
- C. many trades, of all sizes, have negative costs--that is, they produce transaction profits
- D. for smaller trades, the costs substantially offset the profits, suggesting that the cumulative price of "no-brainer" executions is much higher than has been realized
- E. the small orders represent the largest single contribution to total trading costs

VI. Costs and Management Style

- A. patient disciplines, such as value and growth investing, have longer time horizons and would be expected to have lower transaction costs
- B. earnings strategies depend on quicker execution to capture the market's reaction to differences between expected and actual earnings
- C. management styles expected to exhibit the highest costs had the lowest costs, and vice versa

VII. Costs and Patience--the expectation was that patience would be rewarded

- A. during the period when trading was done patiently, transaction costs were low
- B. when patience ran thin, the implementation shortfall rose dramatically

VIII. Costs and Crossing--one reason patience pays is that patient traders participate in crossing networks more often, and crossing should reduce execution costs

IX. Recapping the Problem and Finding a Solution--many factors appear to impact transaction costs including

- A. reason for trading
- B. momentum, volatility, and behavior relative to the market and the sector

X. Channels for Electronic Executions--the author list several technological advances that enhance equity execution

Learning Outcomes

a) The largest trades have the lowest costs much and the smallest trades have the highest costs with the costs substantially offsetting the profits. Management styles expected to exhibit the highest costs had the lowest costs, and vice versa. During the period when trading was done patiently, transaction costs were low. Advances in technology should also enhance equity execution.

b) Value is added by skilled equity traders and limit-order strategies may be appropriate to keep the transaction costs below the anticipated alpha added by the manager. Also, electronic trading can reduce transaction costs by providing a powerful means of exploiting the multiple execution channels available today, allowing short-term market volatility to work in your favor, applying the techniques simultaneously to a large number of orders, and incorporating feedback from the results of trading strategies on multiple time scales to refine the performance of those strategies

c) A possible advantage of using guaranteed principal bids (an important cost control strategy) is the perfect predictability of trading cost. A GPB is where traders receive a firm bid for an entire portfolio from a broker based on disclosure of characteristics of the portfolio, not the disclosure of its constituents.

Self Test Question: Explain why paper portfolio results often differ from actual portfolio results. Explain why predicting transaction costs is important. **Describe** the relationship between costs and trading size.

Suggested Answer: (1) Paper returns usually do not account for market impact. (2) Predicting transaction costs is important because such a prediction would allow you to evaluate the cost of implementing a trading strategy immediately opposed to later. (3) The relationship between costs and trading size is negative, meaning that costs tend to decline with larger orders.

Olson, The Independent Fiduciary, “Selecting Investment Managers,” Ch. 5 and Appendix A

Learning Outcomes

a) From the plan sponsor’s viewpoint, indexing differs from active management in that indexing is cheaper than active management and, most likely, produces better investment results.

b) The most effective way to develop the universe of candidates to assess is, over time, to get to know as many investment managers as we can. Another way is to obtain from a consultant a short list of managers he considers best in a given asset class. A third way is to go through directories, select those with the best past performance, and invite them to a visit.

c) There are 6 criteria for evaluating investment managers: (1) investment approach, (2) expected return usually based on historical returns, (3) expected impact on the overall volatility of our aggregate portfolio, (4) liquidity of account, (5) legal issues, and (6) trust.

d) Performance that is consistently strong relative to a valid benchmark would seem to have a lot more predictive value than performance that is all over the place.

e) The questionnaire should be constructed after reviewing the candidate manager’s marketing materials, and after learning as much from those materials as possible. The questionnaire should focus on those questions that are particularly relevant to that manager and which are likely to elicit responses that will help answer the “so what?” question.

f) The questionnaire (or a response to a request for proposal) is intended to prune the universe of possible candidates to invite for a visit.

g) A commingled fund (similar to a mutual fund except it is not publicly traded) is more diversified than a separate account and is usually given more “showcase” management attention. Disadvantages include extra fees, possible problems of withdrawing funds on short notice, and possible entrance or exit fees. Separate accounts allow investors to know more precisely holdings in the account and allows easier analysis.

h) A typical fee structure is based on a percentage of the account’s market value, payable quarterly. A possible issue is presence of performance fees. The advantage of performance fees is that the manager must perform in excess of a given benchmark before he/she gets paid. The disadvantage is that such fees encourage managers to take excessive risks.

Study Session 15, “Portfolio Management: Risk Considerations”
Clarke, Investment Management, “Alternative Measures of Risk”

The purpose of this article is to describe commonly used measures of risk. Volatility is the key. Be sure to recognize that the author is talking about future volatility, which is unobservable, opposed to historical volatility, which is observable. Using historical data requires the assumption that the future will look like the past.

Commonly Used Measures of Risk. - Expected return and standard deviation (variance) both depend on probabilities and are used in construction of the normal distribution from which confidence intervals can be calculated. Calculation of the standard deviation has two problems: (1) it assumes equal probability of both upside and downside returns whereas most investors are more averse to downside returns, and (2) it assumes symmetric returns whereas most investors would prefer right-skewed distributions.

Tracking Error. - Tracking error is defined as the standard deviation of the difference in return between the investment and a specified benchmark or target position (opposed to the mean return). Tracking error suffers from the same drawbacks as standard deviation.

Individual Security Risk Relative to a Market Index. - Beta is the common measure of risk. Tracking error is defined as $R_i - R_m$ where $R_i = \beta R_m + e_i$. Calculating the standard deviation of the tracking error opposed to the standard deviation of R_i gives a slightly different result. The same applies to bonds where risk is related to duration. (I do not consider this material important since it is so academic and, besides, there is not LOS for it).

Probability of Shortfall. - This is a measure of risk that the return may fall below some specified level, such as zero or any other level. The problem is that the probability of shortfall does not give any indication of how severe the loss may be. For example, A has a 10% chance of losing 20% while B has a 10% chance of losing 100%. According to this measure, both are equally risky but most investors would consider B more risky than A.

Expected Shortfall. - This measure improves on the probability of shortfall by incorporating the magnitude of the potential shortfall if it does occur. If the probability of shortfall below zero is 20 percent where R_i equals -10% , then the expected shortfall equals $E[R_i - 0] = .2[-.10 - 0] = -2\%$. The expected shortfall equals the magnitude of the shortfall times the probability of it occurring. The problem with this measure is that it treats a large probability of a small shortfall as equivalent to a small probability of a large shortfall.

Lower Partial Moments and Semivariance. - Lower refers to only part of the distribution (downside risk) and partial refers to only one side of the return. Semivariance is very similar to lower partial moments. These measures of risk suffer from being so academic without much practical use.

Portfolio Mathematics. - The traditional portfolio expected return and standard deviation can be modified for tracking error by incorporating a benchmark return in the equations.

Learning Outcomes

a) Standard deviation is the square root of the variance where variance equals the squared deviations of a return around the mean weighted by the probability of the return's occurrence. If probabilities are equal, divide the squared deviations by the number of observations (n).

- b) *Use of options truncates the distribution of returns.*
- c) *If one distribution is skewed to one side or the other, while another is symmetric around the mean, both might have the same standard deviation but be perceived as having quite different risk.*
- d) *Calculation of the standard deviation has two problems: (1) it assumes equal probability of both upside and downside returns whereas most investors are more averse to downside returns, and (2) it assumes symmetric returns whereas most investors would prefer right-skewed distributions.*
- e) *Beta equals the covariance of the security with the market index divided by the variance of the market. Beta is a measure of risk of an individual stock or portfolio relative to the risk of the market.*
- f) *Correlation between a stock and the market equals (beta times standard deviation of market) / standard deviation of stock. The correlation coefficient measures the relationship between the stock and the market with boundaries between -1 and $+1$. Correlation coefficient has same sign as beta and as covariance.*
- g) *Variance of a stock return equals (beta squared time variance of market) + (variance of error term). First component is systematic and second term is unsystematic.*
- h) *Tracking error is defined as the standard deviation of the difference in return between the investment and a specified benchmark. Specifically, tracking error equals the standard deviation of $\Delta R = R - B$ where R represents the return to the investment and B represents the benchmark or target return. Tracking error for a stock and a stock portfolio relative to a market index = $[(\text{beta} - 1)^2 \times \text{variance of market} + \text{variance of error terms from characteristic line}]$. My best bet is that you will need to know the concept but not be required to use the formula on the exam. I would not memorize this formula.*
- i) *(See part c above for the concept. Again, I suggest not memorizing the formula).*
- j) *Tracking error of a stock relative to the market index equals the differential return between the stock and the market index $(R_i - R_m) = (\text{Beta}_i - 1)R_m + E_i$. The author calls the variance of this equation the tracking error. On the exam, I would stick with calling $R_i - R_m$ the tracking error since this is intuitive.*
- k) *Tracking error is defined as the standard deviation of the difference in return between the investment and a specified benchmark or target position (opposed to the mean return). Tracking error suffers from the same drawbacks as standard deviation.*
- l) *The **probability of shortfall** is a measure of risk that the return may fall below some specified level, such as zero or any other level. The problem is that the probability of shortfall does not give any indication of how severe the loss may be. For example, A has a 10% chance of losing 20% while B has a 10% chance of losing 100%. According to this measure, both are equally risky but most investors would consider B more risky than A. **Expected Shortfall** improves on the probability of shortfall by incorporating the magnitude of the potential shortfall if it does occur. If the probability of shortfall below zero is 20 percent where R_i equals -10% , then the expected shortfall equals $E[R_i - 0] = .2[-.10 - 0] = -2\%$. The expected shortfall equals the*

magnitude of the shortfall times the probability of it occurring. The problem with this measure is that it treats a large probability of a small shortfall as equivalent to a small probability of a large shortfall. Relative semivariance is an asymmetric measure that focuses on the downside of the probability distribution and avoids penalizing outperformance.

Bookstaber, The Journal of Portfolio Management, “Global Risk Management: Are We Missing the Point?”

Zero exposure does not equal zero risk—that is, a portfolio with no apparent value at risk, still has residual risks, and these risk will tend to be correlated with inventory size (securities in inventory). One reason for this is that inventory is subject to hedging error. A hedge and the accuracy of that reported exposure are only as good as the hedging model and the assumptions that go into it.

Markets are not “normal”—the normal distribution assumes probabilities approach zero for very unusual events (low probability). Actual market returns, however, are not normal. This means that low probability events occur more often than expected (the actual distribution has “fat” tails). Thus, analysts should focus their attention on these fat tails (many standard deviations from the mean) and not on the middle of the distribution (only one or two standard deviations from the mean).

Correlations between markets during market events increase dramatically—VAR (variance/covariance method) depends on correlations that are not stable during market corrections. Thus, hedges that appear adequate during normal times, are not adequate during turbulent times. Scenario analysis (modeling various possible future events that does not require correlations) is one way to handle the correlation problem.

When it really matters, diversification does not work—during market crises, diversification does not work meaning all markets trend downward together.

Local measures miss the global risk—a major source of market risk arises from non-linear exposures: exposures that are small at the current level of the risk factor, but that grow more than proportionately with changes in the risk factor (risk grows exponentially, not linearly). This risk is called “negative gamma” risk. All of a sudden, the risk exposure is very large.

Catastrophic risks are not complex—catastrophic risks go unaddressed not because the risk are too complex, not because of a lack of sophistication in the financial analytics—but because of failure in the organization. Nobody asked the right question. The organization must encourage people to ask questions.

The material risks are not always the easiest to explore—the greatest risk facing a firm is the unseen risk. Catastrophic losses come not from digging deep enough, but from not digging in the right spot.

Learning Outcomes

a) A hedge and the accuracy of that reported exposure are only as good as the hedging model and the assumptions that go into it.

b) This means that low probability events occur more often than expected (the actual distribution has “fat” tails opposed to very thin tails). Thus, analysts should focus their attention on these fat tails (many standard deviations from the mean) and not on the middle of the distribution (only one or two standard deviations from the mean).

c) Non-linear exposures are exposures that are small at the current level of the risk factor, but that grow more than proportionately with changes in the risk factor (risk grows exponentially, not linearly). This risk is called “negative gamma” risk. All of a sudden, the risk exposure is very large.

d) VAR (variance/covariance method) depends on correlations that are not stable during market corrections. Thus, hedges that appear adequate during normal times, are not adequate during turbulent times. Scenario analysis (modeling various possible future events that does not require correlations) is one way to handle the correlation problem.

e) To ask whether the risk is negative gamma, which is the “right question,” requires people in the trading and staff positions who are both capable and willing to ask questions and focus on critical risk management issues. To do this, the organization must be open to critical analysis beyond the trading desk, and there must be incentives for people to do this analysis of others’ positions. An open structure is required where people are able to communicate their concerns beyond formal organizational lines.

Self test question: Explain the term “global risk management.”

Suggested answer: The term means looking at risk in the broadest possible way. Often risk is viewed in very narrow terms such as hedging risk for one specific security. Global risk management requires a macro or portfolio perspective that includes the entire firm and not just part of the firm.

Stocks and Ito, The Journal of Performance Measurement, “Value at Risk for the Asset Manager”

This article addresses the meaning of VAR, its benefits and drawbacks. Please review

Origins of VAR—VAR is simply “How much can I lose, in dollars?” It is a statistical calculation of the maximum potential loss over a specified holding period and confidence interval. Here is an example of a VAR calculation using historical data from another article (not in this article): Given daily returns on a T-bond futures contract (where a \$1 change in value of the contract results in a \$1,000 change in the value of the position) over the past year, the author calculates a daily average return of -.00224 percent with a standard deviation of .605074 percent. According to the normal distribution, this means that 98 percent of all returns would fall between -1.41 percent and +1.41 percent. If the current value of the contract is 110, VAR at the 1 percent probability level is: $VAR = .0141 \times 110 \times \$1,000 = \$1,551$. If the VAR is correct, this means that the daily loss on this position will exceed \$1,551 no more than one day out of a hundred.

How is VAR calculated?—three methodologies are used (you need to be familiar with all three; be ready for a discussion of strengths and weaknesses of all three):

Variance/covariance method—this method is based on MPT. Instead of calculating standard deviation from historical data (see above example), this method calculates standard deviation of

portfolio using the standard deviations of risk factors for each position in the portfolio plus the correlations between risk factors. Note that these data are still historical, and that the risk factors are based on “mapping” (identifying) the specific security in the portfolio to a specific risk factor such as interest rates or exchange rates (this is a major assumption).

Strengths: The author claims the Variance/covariance method is a relatively easy calculation (I agree once you have the data, which is based on accurately identifying the risk factors), and that it does not require market valuation of all securities in the portfolio. Weaknesses: How to identify risk factors and stability of correlations once you have identified the factors.

Historic simulation method—this approach (see above example) this method calculates standard deviation of portfolio using the standard deviations of risk factors for each position in the portfolio plus the correlations between risk factors. Strengths: No requirement of normality of return distribution or whether correlations are stable over time. Weaknesses: assumes readily available market data (liquidity of each position in portfolio) as well as use of historical data, which projects future same as past.

Monte Carlo simulation—this approach is also based on historical data and requires specification of a large number of possible scenarios: up to 10,000 that are based on historical returns and volatilities). For each possible scenario, a portfolio value is calculated. After a large number of portfolio values are calculated in this manner, a distribution of possible portfolio values is observed. From this distribution, you would calculate a standard deviation of portfolio values that you would then use to determine VAR the same way as in the above example.

A word about stress testing—“what if” analysis would show how sensitive each calculation is to changes in the underlying set of assumptions.

Potential applications of VAR for the investment manager—using the variance/covariance method, the portfolio manager must identify (map) risk factors that impact the value of each security or asset class in the portfolio. Having done this, the manager can hedge these risks. Additionally, the manager can quantify the risk impact of adding or removing an asset class or security to or from the portfolio. If VAR is an acceptable measure of risk, it should also be an acceptable measure for controlling risk. Still, explaining it to non-quantitative senior managers may be difficult. Again, all VAR measure depend to some degree on the use of historical data.

An alternative to VAR is the traditional standard deviation that can be used to calculate the Sharpe measure. This measure is easy to apply, is consistent across managers, and coincides with the time frame over which returns are measured. VAR, however, meets none of these characteristics. It is very difficult to use VAR to compare managers due to the three different possible methodologies. Also, VAR is a measure of current risk, whereas standard deviation is a measure of past risk. To consistently use VAR to compare managers, you would have to be very consistent in the methodology you use. This would require different managers to reveal sensitive data on the compositions of their portfolios (when using the variance/covariance approach), which they may not want to do. It would be easier to use VAR to compare a manager to a benchmark such as the S&P 500 where the composition is known. A relative VAR would then equal the portfolio VAR divided by the benchmark VAR.

Learning Outcomes

a) The variance/covariance method calculates standard deviation of portfolio using the standard deviations of risk factors for each position in the portfolio plus the correlations between risk factors. The historical method calculates standard deviation of portfolio using the standard

deviations of risk factors for each position in the portfolio plus the correlations between risk factors. The Monte Carlo method is also based on historical data and requires specification of a large number of possible scenarios: up to 10,000 that are based on historical returns and volatilities). For each possible scenario, a portfolio value is calculated. After a large number of portfolio values are calculated in this manner, a distribution of possible portfolio values is observed. From this distribution, you would calculate a standard deviation of portfolio values that you would then use to determine VAR.

b) The author claims the Variance/covariance method is a relatively easy calculation (I agree once you have the data, which is based on accurately identifying the risk factors), and that it does not require market valuation of all securities in the portfolio. Weaknesses: How to identify risk factors and stability of correlations once you have identified the factors. The strength of the historical method is that it has no requirement of normality of return distribution or stable correlations over time. Its weakness is that it assumes readily available market data (liquidity of each position in portfolio) as well as use of historical data, which projects future same as past. The Monte Carlo simulation is the most flexible and powerful, but it requires specification of a large number of possible scenarios and a lot of computer power.

c) “What if” analysis would show how sensitive each calculation is to changes in the underlying set of assumptions. This technique would allow a manager to assess risk by observing portfolio value changes based on different assumptions underlying the “what if.”

d) Using the variance/covariance method, the portfolio manager must identify (map) risk factors that impact the value of each security or asset class in the portfolio. Having done this, the manager can hedge these risks. Additionally, the manager can quantify the risk impact of adding or removing an asset class or security to or from the portfolio. If VAR is an acceptable measure of risk, it should also be an acceptable measure for controlling risk.

e) To consistently use VAR to compare managers, you would have to be very consistent in the methodology you use. This would require different managers to reveal sensitive data on the compositions of their portfolios (when using the variance/covariance approach), which they may not want to do. It would be easier to use VAR to compare a manager to a benchmark such as the S&P 500 where the composition is known. A relative VAR would then equal the portfolio VAR divided by the benchmark VAR.

Self test question: Briefly **describe** the meaning of VAR.

Suggested answer: VAR is simply “How much can I lose, in dollars?” It is a statistical calculation of the maximum potential loss over a specified holding period and confidence interval.

Culp, Miller, and Neves, Journal of Applied Corporate Finance, “Value at Risk: Uses and Abuses.”

Learning Outcomes

a) When it comes to generalizing VAR to a longer time horizon (more than 1 day), the assumption of no portfolio changes, which is necessary for the VAR model, becomes problematic.

b) A VAR manager is concerned with the firm’s total value at a particular point in time. This concern may arise from a desire to avoid bankruptcy, mitigate problems associated with informational asymmetries, or reduce expected tax liabilities. A cash flow risk manager, by

contrast, uses risk management to reduce cash flow volatility and thereby increase debt capacity. VAR manager typically manage the risk of a stock of assets, whereas a cash flow risk managers manage the risks of a flow of funds. A risk measure that is appropriate for one type of firm may not be appropriate for others.

c) The total VAR manager is concerned with the firm's total value whereas a selective risk manager deliberately chooses to manage some risks and not others. For firms managing total risk, the principal benefit of VAR is facilitates explicit risk control decisions, such as setting and enforcing exposure limits. For firms that selective manage risk, VAR is useful largely for diagnostic monitoring or for controlling risk in areas where the firm perceives no comparative informational advantage.

d) VAR in isolation will do little to keep a firm's risk exposures in line with the firm's chosen risk tolerances. Without a well-developed risk management infrastructure—policies and procedures, systems and well-defined senior management responsibilities—VAR will deliver little, if any, benefits. In addition, VAR many not always help a firm accomplish its particular risk management objectives, as we shall see.

Dowd, Beyond Value at Risk, “The Risk Management Revolution,” Ch. 1, pp. 3-8.

Learning Outcomes

a) The various risks are business risks, market risks, credit risks liquidity risks, operational risks, and legal risks. These terms are self-explanatory.

b) A number of background factors have contributed to development of risk management theory and practices including exchange rate instability, interest rate instability, stock market volatility, and other sources of instability such as the oil crisis of early 70s. These factors had focused attention on developing better risk control techniques.

Dowd, “Stress Testing,” Ch. 6.

Learning Outcomes

a) The main limitations of scenario analysis is that it tells us what we stand to lose in a particular state f the worlds, and does not tell us how likely any particular state is to occur. It is, therefore, a natural complement to VAR approaches that tell us something about the probability of a clearly defined bad even, but do not as such tell us what we would lose if a tail loss actually occurred.

b) Development of various scenarios is a reflection of a particular combination of risk factor movements that leads to a particular new portfolio value and, hence a particular profit or loss. Combined with some assessment of the likelihood of these changes, these computations give a good picture of the risk confronting our portfolio.

c) Scenario analysis can accommodate the risks associated with such events as delta hedges or changing correlations not reflected in historical data by permitting stress testing, which is the process of assessing the vulnerability of a position or portfolio to hypothetical events.

- d) *Two major problems with scenario analysis is “garbage in, garbage out, and being overwhelmed by a mass of different possibilities.*
- e) *Mechanical approaches to stress testing differ from scenario analysis in that they emphasize a range of possibilities rather than particular specified scenarios as such.*
- f) *Factor push analysis assumes a risk factor and pushes it through the impact of a bad scenario in the price of each security to determine the combined impact on the portfolio.*
- g) *Stress testing has three main uses: (1) they are ideal complements to VAR exercises. While VAR approaches tell us that we might lose with a certain maximum probability, stress tests give us an idea of what we stand to lose if a worst-case event actually occurs. The two approaches are, therefore, complementary; (2) stress tests can highlight weaknesses (such as awkward assumptions or failure in contingency plans) in our risk management procedures; and (3) the information provided by stress tests can be very useful in determining capital allocation within an institution.*

Dowd, “Credit Risk,” Ch. 9, pp. 166-179.

Learning Outcomes

- a) *The three main components of credit risk are (1) probability of default, (2) recovery rate of bad loans, and (3) credit exposure related to the amount we stand to lose in default.*
- b) *Notional amounts often give us little idea about derivative credit exposures. Derivative credit risks can vary enormously and in complicated ways with movements in underlying prices. In some cases, maximum losses can also occur when the underlying priced does not move at all (as with a long straddle). Portfolio effects further complicate derivative credit risk. With derivatives, there are no simple rules related to total credit exposure relative to the gross size of a derivatives portfolio. In general, we cannot get an accurate picture of overall credit exposure by adding up individual exposures, because the individual exposures may (and generally will) interact with each other.*
- c) *Credit risk tends to be over a long period of time whereas market risk tends to be over a short period of time such as a day.*
- d) *Credit risk management is a set of techniques for reducing default probability and risk exposure, and increasing the recovery rate.*

Dowd, “Liquidity, Operational, and Legal Risks,” Ch. 10

Learning Outcomes

- a) *Normal liquidity risk arises from dealing with markets that are less than fully liquid in their normal day-to-day operation. Crisis liquidity risk arises when the market has lost its normal level of liquidity and we can liquidate positions only by taking much larger losses than under normal circumstances.*
- b) *Operational risk is any and all risks associated with operational issues such as all phases of the business process, from origination through execution and delivery of making a loan.*

c) *To control operational risk, the right control systems must be in place and we need to have good people running them. A control system must have several elements: (1) a clear policy on risk, (2) proper rules and documentation, (3) separation of front and back offices, (4) a credible, independent risk management function, (5) a credible audit function, (6) appropriate decision rules, (7) appropriate incentive structure and (8) appropriate risk controls and limits.*

d) *Model risk is the risk of loss arising from the use of models, usually for valuation purposes. Fraud risk is the lack of awareness on the part of senior management of the risk of fraud occurring. Contingency planning is a process of planning for any possibility.*

e) *Legal risk is the risk of loss arising from uncertainty about the enforceability of contracts and includes risk arising from disputes over insufficient documentation, alleged breach of conditions, uncertain legality, and uncertainty about the enforceability of contract provisions.*

Dowd, “Allocating Capital,” Ch. 11, pp. 201-219.

Learning Outcomes

a) *Setting of position limits using nominal amounts is where a trader has a position of, say, \$30 million and trader 2 has a position limit of say \$10 million, etc. Position limits ignore leverage. VAR limits give us a common risk metric, across all units and types of position. A VAR position limit gives management a reasonably clear idea of what they stand to lose on a position, and thereby facilitates good risk management. VAR position limits incorporate diversification effects that nominal limits cannot handle.*

b) *Capital strength is a measure of how many losses a firm can absorb while still remaining solvent. VAR can be used for this purpose by incorporating risk into the analysis.*

c) *VAR approach includes the capita/asset ratio plus the standard of the portfolio. The traditional approach ignores the standard deviation.*

d) *The VAR approach can handle ordinary risk and can expose us to the danger of being wiped out by a “shock.” Stress testing is excellent for handling unusual shock so the combined effort of VAR and stress testing generates an estimate of the capital needed to absorb normal risks plus shocks.*

Dowd, “Firm-Wide Risk Management,” Ch. 12, pp. 230-237.

Learning Outcomes

a) *Enterprise-wide risk management (ERM) is the management of overall institutional risk across all risk categories and business units. An ERM deals with broad risk categories, the different risk attached to differing instruments and portfolios, the risks associated with different units up to the level of the institution as a whole and the risks associated with having offices in different locations operating under differing legal and regulatory system.*

b) *Main features of an ERM system are centralized data warehouse, an analytical system for process data, a software monitoring and evaluation system, and a decision making process consistent with compliance issues.*

c) Integrating the risk management system helps ensure that results are mutually consistent and, as far as possible, comparable with each other to facilitate decision making, avoids unnecessary duplication of effort, ensures that data and valuation models used in analyzing different types of risk are the same, or are at least consistent with each other, helps pick up interactions in the analysis process, and helps handle the new hybrid instruments that involve a combination of different types of risk and cannot sensibly be handled if we examine risks separately.

McCarthy, Risk Budgeting: A New Approach to Investing, “Risk Budgeting for Pension Funds and Investment Managers Using VAR,” Ch. 6.

Learning Outcomes

a) For a defined benefit plan, the key risk is that chance that the assets in the portfolio might under perform the pension liabilities it owes to its staff, causing the sponsor of the plan to have to unexpectedly contribute funds to make up the shortfall.

b) The key market risk for an asset management firm that its fee declines as the market value of the assets it manages declines. Another risk is customer dissatisfaction.

c) Risk budgeting for an investor is the process of allocating an allowable measure of potential loss to different aspects of the investment process, monitoring whether those pieces of the investment process have exceeded their measure, taking corrective action (if deemed necessary) when a measure is exceeded, and using the risk measurement process to evaluate risk-adjusted return.

d) Once an entity has decided which measures to monitor, the next step is to establish risk tolerance levels. The thresholds set an acknowledged, acceptable level of risk—in effect, an amount of loss that is tolerable in the pursuit of gain. The numbers used commonly come from historical experiences, and out performance expectations combined with Sharpe or information ratio expectations.

e) If the risk thresholds are exceeded, the entity might elevate the information to the board, shift the strategic asset allocation to reduce the potential threat to surplus, or take no action if the change is temporary.

f) Risk budgeting rests most easily on a framework of VAR measurement. VAR measurement builds on this framework by taking the analysis to the security level rather than remaining at the benchmark level.

**Study Session 16, “Portfolio Management: Performance Evaluation and Attribution”
Reilly and Brown, Investment Analysis and Portfolio Management, 6th ed., “Evaluation of Portfolio Performance,” Ch. 27, pp. 1132-1171.**

The purpose of this portion of the chapter is to discuss performance attribution analysis, which attempts to identify the factors that contribute to the portfolio’s overall performance. Carefully study Table 27.5 on page 1012 in the Reilly and Brown text.

$$\begin{aligned}\text{Total Value added} &= \text{Allocation Effect} + \text{Selection Effect} \\ &= (-0.02\%) + (0.54\%) = 0.52\%\end{aligned}$$

Because the returns are not risk-adjusted, it is possible that the asset class portfolios formed by the investor are riskier than their benchmark counterparts. For example, if the portfolio contains short-term corporate debt instead of T-bills, the investor should expect a higher return that has nothing to do with the manager's skill.

Measuring Market Timing Skills. - There are two reasons why attribution analysis is ill-suited to judge tactical asset allocation (TAA) decisions. First, by design, a TAA manager indexes his actual asset class investments and so the selection effect is not relevant. Second, a TAA approach to investing might entail dozens of changes to asset class weightings during an investment period, which could render meaningless an attribution effect computed on the average holdings.

Factors That Affect Use Of The Performance Measures. - According to the CAPM, the market portfolio (M) lies on the efficient frontier and is the tangent point of the CML. Roll points out that we have no true proxy for M and never will since we do not know how to measure M. M is a portfolio of all risky assets in the universe. Use of the S&P 500 (m) as a proxy represents only the stock market and ignores all other risky asset classes. For this reason, use of m is inappropriate and causes benchmark error, which can be large, especially for global portfolios.

Evaluation of Bond Portfolio Performance. - Similar to the SML for the stock market, the Bond Market Line is a straight line drawn through the return/duration of treasury bills and the return/duration of Lehman Brothers Index. This technique divides the portfolio return that differs from the return on the Lehman Brothers Index into four components: (1) a policy effect, (2) a rate anticipation effect, (3) an analysis effect, and (4) a trading effect. When the latter three effects are combined, they are referred to as the management effect (carefully study Figure 27.7 on page 1023 in the Reilly and Brown text).

- For example, assume the duration and return for the Lehman Brothers Index is 9.0 years and 8.25 percent, respectively. If your portfolio has duration of 9.5 years, according to the prevailing bond market line, your return should be about 8.6 percent. In this example, the policy effect is .5 years and .35 percent (8.60 – 8.25). The higher duration implies that your portfolio should have a higher average return of .35 percent. Further, assume the duration for the long-term portfolio is 9.5 years, which implies an expected return of 8.6 percent, and that the prevailing duration for the portfolio being evaluated is 10.0 years, which implies an expected return of 9.00 percent using the bond market line. Therefore, the rate anticipation effect during this period is .40 percent (9.00-8.40). If the actual return for this buy-and-hold portfolio was 9.40 percent, it would indicate an analysis effect of 40 basis points. If your total return is 10.50 percent, the combination of the analysis and trading effects is 1.50 percent (=10.50 – 9.00). Since the analysis effect is .40 percent, the trading effect must be 1.10 percent. Thus, the total excess of 2.25 percent is divided into .35 percent policy effect + .40 percent rate anticipation effect + .40 analysis effect + 1.10 percent trading effect. Note that this technique does not consider differences in the risk of default.

Learning Outcomes

a) All three measures are based on Modern Portfolio Theory. If the fund is perfectly diversified, all three will give similar relative results but not similar numerical results. If fund is not diversified, cannot use Treynor or Jensen, which means you must use Sharpe. Sharpe measure is appropriate because it uses a measure of total risk (systematic and unsystematic).

b) The Treynor measure (T) equals (average portfolio return – R_f) / Beta of the fund. Sharpe measure is similar except that Standard deviation of portfolio is used instead of beta. Jensen

measure is the CAPM with R_f subtracted from each side of the equation and alpha inserted on the right hand side. Alpha indicated the risk adjusted performance of the fund.

c) Investment performance using all three measures require an example. Work problem #4 at the end of the chapter. Selected solutions: part(a): MNO had the highest R2 and, thus, the highest level of diversification. part (b) ABC (Treynor) = .975, ABC (Sharpe) = .857, and ABC (Jensen) = .192. part (c) ABC (alpha = 1.7455). Be sure to recognize that all three measures require comparison to a benchmark's comparable measures.

d) Study Example pgs 100-101.

e) Attribution analysis does not use risk-adjusted returns and, thus, it is possible that the asset class portfolios formed by the investor are riskier than the benchmark counterparts. In addition, attribution analysis is ill-suited for market timing. There are two reasons why attribution analysis is ill-suited to judge tactical asset allocation (TAA) decisions. First, by design, a TAA manager indexes his actual asset class investments and so the selection effect is not relevant. Second, a TAA approach to investing might entail dozens of changes to asset class weightings during an investment period, which could render meaningless an attribution effect computed on the average holdings.

f) According to the CAPM, the market portfolio (M) lies on the efficient frontier and is the tangent point of the CML Roll points out that we have no true proxy for M and never will since we do not know how to measure M. M is a portfolio of all risky assets in the universe. Use of the S&P 500 (m) as a proxy represents only the stock market and ignores all other risky asset classes. For this reason, use of m is inappropriate and causes benchmark error, which can be large, especially for global portfolios.

g) Benchmark error is where the proxy used to measure the benchmark is not correct (this is Roll's critique). As a consequence, performance evaluation based on such a proxy is, in turn, incorrect.

h) Similar to the SML for the stock market, the Bond Market Line is a straight line drawn through the return/duration of treasury bills and the return duration of Lehman Brothers Index.

i) Carefully study Figure 27.8.

j) Carefully study Figure 27.8.

Dietz and Kirschman, Managing Investment Portfolios: A Dynamic Process, 2nd ed., "Evaluating Portfolio Performance," Ch. 14, pp. 14-23 through 14-47.

The purposes of performance measurement are to identify skill at portfolio management, to provide evidence that favorable performance coincides with the investment skills that were claimed by a particular manager, and to monitor the investment strategy that has been developed based on investor objectives. It also provides feedback to the manager concerning whether results coincide with expectations. Time-weighted returns are a far better measure of performance than dollar-weighted (IRR) returns, which are appropriate for actuarial assurance of meeting pension obligations.

Performance measurement begins with accounting data and translates that into rates of return. For equities, market values should be used. Bonds, however, present a problem because they are not traded frequently. Matrix pricing is often used based on the idea of matching the characteristics of the bond to be priced with those of comparable bonds that are more frequently traded. Non-U.S. securities are priced in terms of the U.S. dollar for a U.S. resident. Because pricing is not an exact science, pricing errors can magnify or reduce volatility measures especially in the short-run. For real estate, the appraisal process tends to smooth out price changes that might be reflected in actual transactions. Derivative securities present serious pricing problems and, thus, the manager and plan sponsor should agree upon the method of valuation in advance. The accrual basis of accounting (income earned but not yet received) is superior to the cash basis (income recognized only when cash is received), and the trade date (when the transaction is executed) is superior to the settlement date (when money changes hands).

Performance attribution:

- Allocation effect—this is a measure of the impact of the decision to allocate assets differently than the policy portfolio. It is also referred to as the tactical asset allocation or market timing effect. The allocation effect = (Actual weights – policy weights) x (Asset class return in policy portfolio – total return on policy portfolio).
- Selection effect—this is a measure of the impact of the manager’s security selections relative to the benchmark index. The selection effect can be calculated simply as the sum of the differences between the actual portfolio return and the allocated portfolio return for each asset. The selection effect = stock selection effect + bond selection effect + cash selection effect, where the stock selection effect = [(portfolio return for stocks x actual weight) – (allocated portfolio return for stocks x actual weight)], bond selection effect = [(portfolio return for bonds x actual weight) – (allocated portfolio return for bonds x actual weight)], and cash effect = [(portfolio return for cash x actual weight) – (allocated portfolio return for cash x actual weight)]. The selection effect excludes the impact of the allocation effect.

The allocation effect + selection effect = policy portfolio return - actual portfolio return

I. Evaluation of Bond Strategies

A. When evaluating bond strategies, two levels must be considered:

1. the choice of one strategy among alternative strategies
2. the choice of a particular manager among alternative managers pursuing the same or similar strategies.

B. Two types of comparisons are useful: comparisons with similarly managed portfolios (styles) and comparisons with benchmarks.

C. Active management styles can be classified as:

1. those that anticipate interest rates by changing portfolio duration
2. those that search for undervalued sectors or individual securities
3. those that specialize in a particular maturity range or in a particular sector

Problems include:

- identifying the appropriate universe of styles
- accurately classifying managers into styles
- length of time that performance is available

D. Benchmark comparisons involve the selection of an appropriate index. A "normal portfolio" represents the manager's neutral investment position and is used to evaluate active investment decisions (i.e., zero coupon bonds represent a normal portfolio for an immunized portfolio).

The purpose of performance attribution is decompose the total return into three effects:

- A. yield to maturity effect - the return accruing from income and amortization of price change (remember that the price of a bond converges to par at maturity--the amortization effect). The YTM effect is external to the manager
- B. interest rate effect - caused by changes in interest rates directly affected by the manager's decisions or internal to the manager
- C. sector effect - caused by yield spread shifts and internal to the manager
- D. residual effect - unexplainable events and external to the manager

II. Evaluation of Equity Strategies. There are 4 styles of equity managers: (1) price driven—these managers are value-oriented, (2) earnings growth—these managers try to identify above average earnings growth prospects, (3) market oriented—these managers select stocks from the broad market and do not fall into either the price or earnings growth styles, (4) small capitalization—these managers look for unseasoned and rapidly growing stocks, or small businesses with long histories.

Benchmark Development—Market indexes such as S&P 500 are widely available, but suffer from three major technical problems that reduce usefulness: (1) large cap bias, (2) double counting due to corporate cross ownership of equities in the index, and (3) relatively small coverage of all publicly traded securities. When selecting a benchmark, be sure to match the index with the manager's style. For example, if manager is a small-cap manager, select a small-cap index. If using the CAPM, select the risk free rate to match the investor's time horizon. For example, if a short-term horizon, the 90-day T-bill rate is appropriate. If, however, the horizon is 30 years, select the 30-year T-bond rate.

Performance Comparisons Within Styles. Besides comparing a manager's performance with a specialized benchmark, only use a universe of actual portfolios of the same investment style. If given a question on the exam, be sure to clearly identify the manager's style. For example, if the manager expects the technology sector to outperform the market and overweighs the technology sector, then the manager did a good job if returns to the technology sector actually exceed the market index. Still, we can't tell if the manager was lucky in picking stocks within the sector. If the manager was well-diversified within the technology sector, we know performance was in line with expectations. The key is to identify expectations with actual results. Discuss this on the exam.

Learning Outcomes

a) Allocation effects are driven by the allocation of funds among various asset classes such as stocks, bonds and T-bills. Security selection effects are driven by the selection of specific securities within a specific asset class (see Table 14-3).

b) (1) manager universes should reflect a manager's style, (2) benchmark indexes should reflect style, length of time, and level of risk, (3) normal portfolios represent the manager's neutral investment position and is used to evaluate active investment decisions (i.e., zero coupon bonds represent a normal portfolio for an immunized portfolio), and (4) attribution analysis should identify specific returns with expectations. Advantages of these appraisal techniques are that

they are well defined. The major disadvantage is lack of data and correctly identifying the appropriate style and length of time.

c) There are 4 styles of equity managers: (1) price driven—these managers are value-oriented, (2) earnings growth—these managers try to identify above average earnings growth prospects, (3) market oriented—these managers select stocks from the broad market and do not fall into either the price or earnings growth styles, (4) small capitalization—these managers look for unseasoned and rapidly growing stocks, or small businesses with long histories.

d) Market indexes such as S&P 500 are widely available, but suffer from three major technical problems that reduce usefulness: (1) large cap bias, (2) double counting due to corporate cross ownership of equities in the index, and (3) relatively small coverage of all publicly traded securities. When selecting a benchmark, be sure to match the index with the manager's style. For example, if manager is a small-cap manager, select a small-cap index. If using the CAPM, select the risk free rate to match the investor's time horizon. For example, if a short-term horizon, the 90-day T-bill rate is appropriate. If, however, the horizon is 30 years, select the 30-year T-bond rate.

e) Multiply sector weights to the absolute return of each sector for both the manager and the index to derive the return impact of each sector. Compare the return impact for each sector of the manager's portfolio to the return impact for each sector of the index to determine whether the manager's expectations were met.

f) Besides comparing a manager's performance with a specialized benchmark, only use a universe of actual portfolios of the same investment style. If given a question on the exam, be sure to clearly identify the manager's style. For example, if the manager expects the technology sector to outperform the market and overweighs the technology sector, then the manager did a good job if returns to the technology sector actually exceed the market index. Still, we can't tell if the manager was lucky in picking stocks within the sector. If the manager was well-diversified within the technology sector, we know performance was in line with expectations. The key is to identify expectations with actual results. Discuss this on the exam.

Self Test Question: Describe and explain two different styles for fixed income managers.

Design a methodology for evaluating each.

Suggested Answer: Active management styles can be classified as: (1) those that anticipate interest rates by changing portfolio duration, (2) those that search for undervalued sectors or individual securities, and (3) those that specialize in a particular maturity range or in a particular sector. A passive management style is defined as being fully diversified. A performance evaluation you could use is attribution analysis that decomposes the total return into three effects: (1) yield to maturity effect - the return accruing from income and amortization of price change (remember that the price of a bond converges to par at maturity--the amortization effect). The YTM effect is external to the manager, (2) interest rate effect - caused by changes in interest rates directly affected by the manager's decisions or internal to the manager, (3) sector effect - caused by yield spread shifts and internal to the manager, and (4) residual effect - unexplainable events and external to the manager

Fabozzi, Fixed Income Readings for the Chartered Financial Analyst Program, "Measuring and Evaluating Performance," Ch. 9, pp. 271-278 and 281-299

Learning Outcomes

Note: Be sure that work the questions at the end of each chapter. Solutions to the questions are found at the end of each chapter.

a) *Performance measurement involves the calculation of the return realized by a portfolio manager over some time interval. Performance evaluation is concerned with two issues: (1) whether the manager added value by outperforming the established benchmark, and (2) to determine how the manager achieved the calculated return.*

b) *Arithmetic return is the unweighted average of the sub-period returns. Time-weighted return measures the compounded rate of growth of the initial portfolio market value during the evaluation period, assuming that all cash distributions are reinvested in the portfolio. Dollar-weighted return is computed by finding the interest rate that makes the present value of the cash flows from all the sub-periods in the evaluation period plus the terminal market value of the portfolio equal to the initial market value of the portfolio. Arithmetic and time-weighted average returns will give different values for the portfolio return over some period because in computing the arithmetic average, the amount invested is assumed to be maintained (through additions or withdrawals) at its initial portfolio market value. The time-weighted return is the return that varies in size because of the assumption that all proceeds are reinvested. The dollar-weighted return provides information about the growth of the fund that a client will find useful. This growth, however, may not be attributable to the performance of the manager because of contributions and withdrawals.*

c) *(see b above).*

d) *A normal portfolio is a customized benchmark that includes “a set of securities that contains all of the securities from which a manager normally chooses, weighted as the manager would weight them in a portfolio. Construction of a normal portfolio requires: (1) defining the universe of bonds to be included in the normal portfolio and (2) determining how these securities should be weighted (i.e., equally weighted or capitalization weighted).*

e) *Decomposition of a domestic fixed income return involves four factors: (1) static return, (2) interest sensitive return, (3) spread change returns, and (4) trading return. The difference between the total return and the sum of the four factors is called the residual (error).*

Decomposition of an international fixed income return involves basically two factors:

- 1) *local return, that can be further decomposed into a return attributable to changes in the interest rate environments of the countries included in the portfolio (which is beyond the manager’s control) and to decisions made by the manager for making such decisions as selection of the exposure to interest rates and credits, and the selection of individual securities.*
- 2) *foreign exchange return that can also be further decomposed into a component that is beyond the control of the manager and a component of currency risk that is controlled by the manager.*

f) *Carefully study the example on pages 287-288 in the text and be prepared for a question of this type on your exam.*

g) *If a manager consistently outperforms his/her benchmark and that performance is related to the manager’s stated investment style, then you have confidence that the manager has skill. This is the only circumstance in which you can have confidence. On the other hand, if the manager outperforms his/her benchmark but that performance is not related to the manager’s stated*

investment style, then you do not have confidence that the manager has skill. In other words, the results are due to chance or luck.

Sharpe, The Journal of Portfolio Management, “Asset Allocation: Management Style and Performance Measurement”

I. The purpose of this article is to highlight the importance of asset allocation in the investment decision. The basic idea is derivation of a model that explains variation of mutual fund portfolio returns. An asset class factor model provides the theoretical underpinnings.

II. Using mutual funds, Sharpe develops a model that decomposes an investor's portfolio returns into two components:

A. style—he defined 12 asset classes: cash, intermediate-term Government bonds, long-term Government bonds, corporate bonds, mortgage-related securities, large-cap value stocks, large-cap growth stocks, medium-cap stocks, small-cap stocks, non-U.S. bonds, European stocks, Japanese stocks.

B. selection--securities selected within each of the 12 asset classes

III. Using time series data, the regression of a particular mutual fund's returns against returns on these 12 asset classes allows you to determine the fund's exposure to a specific asset class.

- The goal is to infer as much as possible about the fund's exposures to variations in the returns of the asset classes during the periods studied. This procedure is a much more economical than trying to conduct a detailed analysis of the securities held by the fund. Using quadratic programming allows you to produce an analysis of whether the mutual fund is more value oriented or growth oriented. In other words, quadratic programming would allow you to reduce the 12 styles in the analysis to 2 general styles: growth or value.

IV. Having conducted the analysis for a given period to time (for example, using historical data from 1/85-12/89), you could roll the time period forward by adding a month at the end and subtracting one month at the beginning. Doing this would allow you to observe a fund's style over time to infer whether it is consistently value or growth oriented.

V. If you invest in multiple funds (or managers), you could conduct the analysis to infer whether the style of the total portfolio meets your needs. For example, you could estimate the style of your portfolio (using Sharpe's model) and compare your portfolio returns (generated by that style) to the returns of a benchmark portfolio comprised of similar styles. This is another argument showing the importance of asset allocation. Results (good or bad) associated with the choice of a specific style should be attributed to you, the investor, not to the manager of a fund following that style.

VI. Sharpe uses his model to evaluate the performance of 636 mutual funds over a 5-year period and shows that the average mutual fund cannot "beat the market" before costs.

Given sixty monthly returns on a mutual fund, along with comparable returns for a selected set of asset classes (style indexes), one could simply use a multiple regression analysis with fund returns as the dependent variable and asset class returns as the independent variables. The resulting slope coefficients could then be interpreted as the fund's historic exposures to the asset class returns. A negative coefficient would represent an under-exposure to a particular style and a positive coefficient would represent an over-exposure to a particular style.

Learning Outcomes

a) An asset class factor model is a special case of a generic factor model where each factor represents the return on an asset class and the sensitivities (b_i values) are required to sum to 100 percent.

b) Sharpe uses his model to evaluate the performance of 636 mutual funds over a 5-year period and shows that the average mutual fund cannot "beat the market" before costs.

c) Evaluating a manager's ability to add value via security selection after controlling for management style is a 3-step process: First, the manager's style is estimated using historical returns. Second, the return on the resulting style is calculated for a specific month or quarter. Third, the difference between the manager's return and that of the style benchmark determined in steps 1 and 2 is computed. This difference is defined as the manager's Selection Return for the period (see page 188).

d) If you invest in multiple funds (or managers), you could conduct the analysis to infer whether the style of the total portfolio meets your needs. For example, you could estimate the style of your portfolio (using Sharpe's model) and compare your portfolio returns (generated by that style) to the returns of a benchmark portfolio comprised of similar styles. This is another argument showing the importance of asset allocation. Results (good or bad) associated with the choice of a specific style should be attributed to you, the investor, not to the manager of a fund following that style.

e) Using a multiple regression model, Sharpe's model regresses the returns on a mutual fund against the returns of 12 indexes. The purpose is to determine the fund's dominate style. The greater the coefficient for a specific style, the more that style is reflected in the returns of the particular fund.

Self Test Question: List 12 factors (asset classes) that impact investment returns of a mutual fund. Using these 12 factors, **explain** how you would evaluate the performance of your mutual fund manager.

Suggested Answer: Sharpe defines 12 styles using 12 asset classes: cash, intermediate-term Government bonds, long-term Government bonds, corporate bonds, mortgage-related securities, large-cap value stocks, large-cap growth stocks, medium-cap stocks, small-cap stocks, non-U.S. bonds, European stocks, Japanese stocks. Using time series data, regress your portfolio returns against the returns of the 12 styles. This will allow you to determine your mutual fund's exposure to specific asset classes or styles (i.e., value, growth, small-cap, bills, etc.). You would then compare the returns of your mutual fund to an index or mix of indices that best represents the style of your mutual fund (i.e., a value index or a mix of value and small-cap indices) in order to evaluate the performance of your mutual fund. The percentage of variation in returns unexplained by style is attributed to security selection.

Bailey, Richards, and Tierney, Current Topics in Investment Management, "Benchmark Portfolios and the Manager/Plan Sponsor Relationship"

(You should expect to see reference to this article on the exam. Focus special attention on the case study.)

I. Introduction

A. Two questions:

1. How to coordinate multiple managers
2. How to evaluate contributions of various components of plan

In both instances, benchmarks play a central role. Without appropriate benchmarks, investment skill is obscured and performance evaluation conclusions are more error prone.

B. Benchmarks offer pension plans an effective means of addressing two difficult investment policy issues:

1. Distinguishing active management skill from random results
2. Effectively combining money managers within a total investment program.

II. Investment Benchmark Concepts

A. A benchmark represents a passive strategy

B. The key equation is:

$$P = M + S + A \quad (5)$$

where:

P = manager's portfolio

M = index fund

S = manager's style = (B - M)

B = benchmark

A = active investment judgment = (P - B)

You will note that if the manager is passive, equation (5) results in:

$$P = M$$

Equation (5) provides a reference point by which to judge the value of active management and a methodology for identifying "gaps" in the risk coverage of the aggregate portfolio.

III. A Simple Benchmark Design--deviations from the benchmark represent a manager's active bets; it is the process by which the manager adds value to the passive investment results of the benchmark.

IV. Benchmark Portfolio Properties

A. A correct benchmark possesses several important traits:

1. Unambiguous
2. Investable
3. Measurable
4. Appropriate
5. Reflective of current investment opinions
6. Specified in advance

A commonly used benchmark, performance of the median manager from a broad universe of managers, fails to meet all traits except #3. Without a valid reference point, investment skill remains an elusive notion. Alternatively, a correct benchmark allows the plan sponsor to design a management team consistent with the plan's investment objectives.

V. Building Benchmark Portfolio

A. Building a benchmark could come from three sources:

1. plan sponsor
2. a consultant
3. the manager

The manager is in the best position to do this.

B. Constructing the "right" benchmark requires:

1. identifying prominent aspects of the manager
2. selecting appropriate universe of securities
3. devising weighting scheme, including cash
4. reviewing and modifying benchmark
5. rebalancing benchmark periodically

Constructing the right benchmark can involve considerable resources: database, computer, flexible weighting system, and a means of maintaining the integrity of the benchmark over time.

VI. A Case Study (Be sure to understand this well. I also covered it in the Executive Summary)

A. The Table 2 presents annualized returns for two managers over the initial four-and-one-half year period. Manager A appears superior. Figure 2 plots the returns and standard deviations of returns for the two managers and the S&P 500. The slope of the line, the Sharpe measure of excess return per unit of total risk, again shows A to be superior.

B. Table 4 lists return contributions associated with the two managers' exposures to 4 different common factors. A again appears superior. These four traditional performance evaluation approaches fail to take into account each manager's respective benchmark. Table 5 does this and shows that manager A actually under performed his/her benchmark while manager B outperformed his/her benchmark. A's style is small caps and B's is large caps. Small caps peaked in 1983.

C. The point of this case study is to emphasize that performance evaluation must consider the appropriate benchmarks or else the plan sponsor can be fooled.

V. Conclusion--The development of appropriate benchmarks has several beneficial effects:

1. manager performance will be compared to realistic expectations
2. plan sponsors will gain greater insights into the investment process
3. skillful managers will be better able to demonstrate their talents

Benchmark portfolios are essential investment tools for the plan sponsor concerned with passing the value of active management down to the plan's bottom line.

Learning Outcomes

a) A Simple Benchmark Design is one in which deviations from the benchmark represent a manager's active bets; it is the process by which the manager adds value to the passive investment results of the benchmark.

b) Qualities includes: 1. Unambiguous, 2. Investable, 3. Measurable, 4. Appropriate, 5. Reflective of current investment opinions, 6. Specified in advance.

c) Building a benchmark could come from three sources:

- 1. plan sponsor*

2.a consultant

3.the manager, who is in the best position

Constructing the "right" benchmark requires:

- *identifying prominent aspects of the manager*
- *selecting appropriate universe of securities*
- *devising weighting scheme, including cash*
- *reviewing and modifying benchmark*
- *rebalancing benchmark periodically*

d) Constructing the right benchmark can involve considerable resources: database, computer, flexible weighting system, and a means of maintaining the integrity of the benchmark over time

Self Test Question: Using the Sharpe measure, **design** a methodology for measuring the performance of an investment manager.

Suggested Answer: Graph the Sharpe measure of each manager and the one with the greatest slope achieved the better performance for that period.

Bailey, The Journal of Portfolio Management, "Are Manager Universes Acceptable Performance Benchmarks?"

The author critically examines the use of manager universes as acceptable performance benchmarks. He concludes that they are not acceptable due to conceptual shortcomings, survivor biases, and failure to pass benchmark quality tests. The purpose of this article is to challenge the widespread use of manager universe data from three perspectives: (1) conceptual shortcomings; (2) survivor bias; and (3) failure to pass benchmark quality tests.

I. Conceptual Shortcomings. A manager's benchmark conceptually represents a passive investment process. As such, it should be unambiguous, investable, measurable, appropriate, reflective of current investment opinions, and specified in advance. The manager universe, which focuses on performance of the median manager, is measurable but fails on all other accounts.

- The manager universe is ambiguous in that composition of the median manager's performance is unavailable for inspection, either before or after the evaluation period. It is not investable since before the fact we do not know whom the median will be. It is unlikely to be appropriate because of likely differences in style between the median manager the appraised manager. It is not reflective of current investment opinions in that the median manager's portfolio undoubtedly includes many securities for which the manager being evaluated has not formed a current investment opinion. Finally, the median manager cannot be specified in advance.

II. Survivor Bias. Survivor bias results from the tendency of poorly performing managers to drop out of manager universes, biasing the performance of these universes upward. Moreover, this bias increases with time since better performing managers tend to stay in the universe longer. The author cites his own empirical study as well as another study in substantiating this observation and concludes that the uncertainty introduced by survivor biases makes performance evaluation conclusions based on performance data problematic.

III. Failure to Pass Benchmark Quality Tests. A valid benchmark should possess certain qualities. Specifically it should exhibit:

- A. High coverage--of manager's actual portfolio;
- B. Low turnover--reflective of a realistic passive strategy;
- C. Positive active positions--realistically reflect manager bets relative to benchmark;
- D. Investable position sizes--benchmark positions represent "tradeable" positions;
- E. Reduced observed active risk--custom benchmark should have lower volatility than managed portfolio;
- F. High extra-market return correlation between the managed and benchmark portfolios--when the managed portfolio performs well on a risk-adjusted basis, so should the benchmark;
- G. Low style correlation--whether the manager's style, as represented by the benchmark, is in or out of favor should have no bearing on the manager's added value;
- H. Similar risk exposures--similar investment risks between benchmark and managed portfolios;

IV. The author then presents data on the performance of the median performing growth equity manager and shows that the median manager benchmark fails the quality tests. The overall conclusion is that manager universes are not acceptable performance benchmarks.

Learning Outcomes

a) The author concludes that benchmarks are not acceptable due to conceptual shortcomings, survivor biases, and failure to pass benchmark quality tests

b) A manager's benchmark conceptually represents a passive investment process. As such, it should be unambiguous, investable, measurable, appropriate, reflective of current investment opinions, and specified in advance. The manager universe, which focuses on performance of the median manager, is measurable but fails on all other accounts.

c) Survivor bias results from the tendency of poorly performing managers to drop out of manager universes, biasing the performance of these universes upward. Moreover, this bias increases with time since better performing managers tend to stay in the universe longer. The uncertainty introduced by survivor biases makes performance evaluation conclusions based on performance data problematic.

Self Test Question: Briefly **explain** three problems you would encounter when using manager universes as acceptable performance benchmarks.

Suggested Answer: The manager universe is ambiguous in that composition of the median manager's performance is unavailable for inspection, either before or after the evaluation period. It is not investable since before the fact we do not know whom the median will be. It is unlikely to be appropriate because of likely differences in style between the median manager the appraised manager. It is not reflective of current investment opinions in that the median manager's portfolio undoubtedly includes many securities for which the manager being evaluated has not formed a current investment opinion. Finally, the median manager cannot be specified in advance.