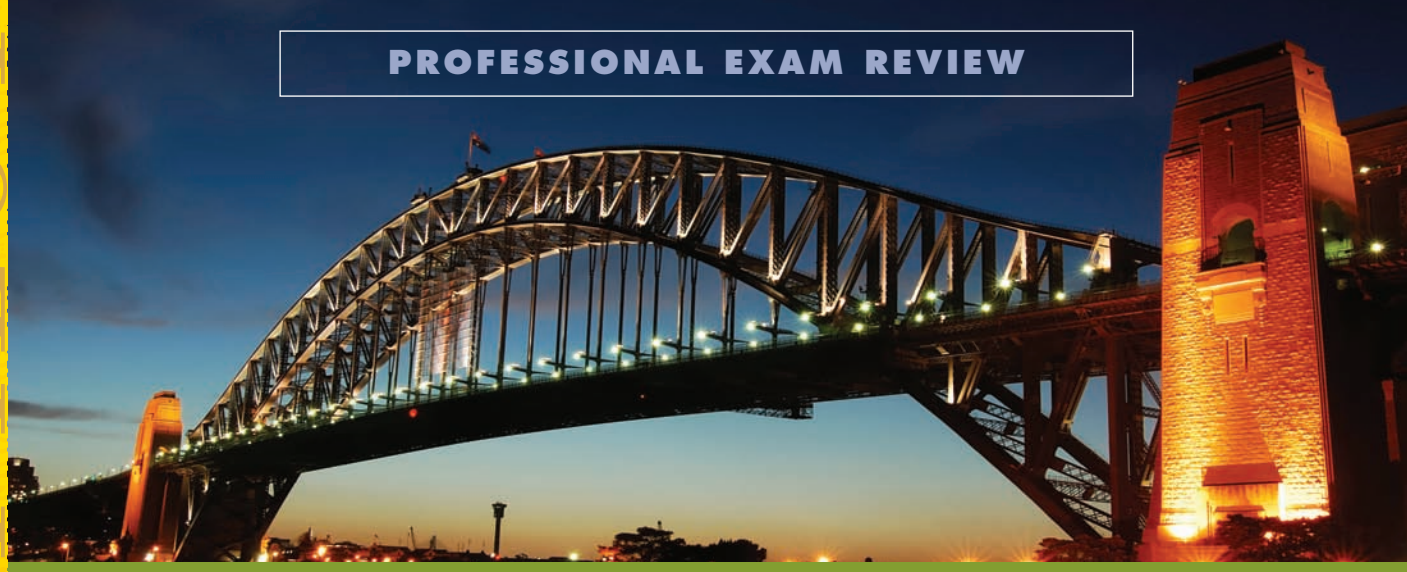

6 PORTFOLIO MANAGEMENT

Reading 49 The Asset Allocation Decision

The Portfolio Management Process – The process consists of four ordered steps:

1. **Construct a Policy Statement** with:
   a. investment goals,
   b. tolerance for risk, and
   c. constraints.
2. **Examine current and anticipated conditions.**
3. **Implement the plan by constructing the portfolio.**
4. **Monitor investor needs and capital market conditions.**

At Level I you only need to be able to expand on the first step.

Policy Statement has three main functions:

- imposes discipline on both the client and the portfolio manager
- guides the investment process
- helps an investor specify realistic goals, sometimes including a benchmark portfolio to evaluate the manager's performance.

Investment Goals:

- **Capital Preservation** – for strongly risk averse investors.
- **Capital Appreciation** – for risk tolerant investors.
- **Current Income** – for risk-averse investors.
- **Total Return** – for moderately risk-averse investors.

Investors' **Tolerance for Risk** comes from their:

1. psychological make-up
2. family situation
3. insurance coverage and cash reserves
4. net worth and income expectations (the future)
5. age

Investment Constraints:

- Liquidity Needs.
- Time Horizon.
- Tax Factors.
- Legal and Regulatory Constraints.
- Unique Needs and Preferences.

Asset Allocation – The single most important decision in portfolio management because it has such a strong influence on both risk and return. Asset allocation simply means how money is spread across the available asset classes. While we assume all people are risk-averse, portfolios in different countries respond to cultural norms and historical experience.

Reading 50 An Introduction to Portfolio Management

Risk Aversion – Risk aversion implies that, other things equal, the higher the risk, the lower the price and the higher the expected return of a security. Risk and return, therefore, are linked.

Markowitz Portfolio Theory – Risk-averse investors will hold portfolios because diversified portfolios are less risky than the constituent securities held individually.

Despite five intimidating assumptions, the model only requires 3 inputs:

1. The **expected return** for every individual security.
2. The risk of each security. **Variance**, or its square root, the **standard deviation**, is used as the measure of risk.
3. The **correlation (or covariance)** between security returns.

Expected Return – Individual Security

Eqn. 50.1 $$E(R_i) \sum_{i=1}^{n} = p_i E(R_i)$$

Variance – Individual Security

Eqn. 50.3 $$\sigma^2 = \sum^{n} [R_i - E(R_i)]^2 p_i$$

The **correlation (or covariance)** between two securities measures the degree to which their returns move together over time.

If correlation is:
- ***positive**, security returns* move together.
- ***zero**, security returns have* no linear relationship
- ***negative**, security returns are* inversely *related*

Covariance

Eqn. 50.5 $$Corr_{ij} = \frac{Cov_{ij}}{\sigma_i \sigma_j} \quad \text{or} \quad Cov_{ij} = Corr_{ij} (\sigma_i) (\sigma_j)$$

Portfolios are Different – The **expected return** of a *portfolio* **is** equal to the weighted average of the expected returns of the *individual assets*

in the portfolio **but** the *risk* of a portfolio **is not** equal to the weighted average of the risks of the *individual assets* in the portfolio.

The expected return on a portfolio:

Eqn. 50.2 $$E(R_p) = \sum_{i=1}^{n} w_i E(R_i)$$

The Variance/Standard Deviation of a Portfolio in the 2-security case:

Eqn. 50.4 $$\sigma_p = \sqrt{w_1^2\sigma_1^2 + w_2^2\sigma_2^2 + 2w_1w_2Cov_{1,2}}$$

The whole is not equal to the sum of its parts.

The impact of the covariance is greater than the variance so the covariance is the most important factor to consider.

The Efficient Frontier – For every level of standard deviation along the x-axis, the Efficient Frontier records the portfolio with the highest expected return on the y-axis.

Optimal Portfolios – Without a risk-free asset, the Efficient Frontier presents the best risk-return subset of all possible portfolios. Investors choose from among this subset based on their individual risk tolerance.

Reading 51 An Introduction to Asset Pricing Models

Capital Market Theory (CMT) has 8 assumptions:

- All investors want to locate the most suitable portfolio on the **efficient frontier**.
- Investors can borrow or lend unlimited amounts at the *risk-free* rate.
- All investors have *homogeneous expectations*.
- All investors have the same *one-period time horizon*.
- All investments are *infinitely divisible*.
- *No taxes* or *transactions costs* exist in buying or selling assets.
- There is *no inflation* or it is perfectly forecasted.
- Capital markets are in equilibrium.

CMT adds two elements that are crucial to the conclusion about systematic risk: the risk-free asset and the market portfolio.

Risk-free Asset – A risk-free asset has:

- an entirely certain expected return.
- a zero standard deviation of return.
- a zero covariance with any risky asset or portfolio.

Capital Market Line (CML) Adding the risk-free asset to the possible set of portfolios creates the CML where every portfolio on the line is superior to portfolios on the Efficient Frontier. The portfolio at the point of tangency is the **Market Portfolio** – the portfolio of all risky assets in proportion to their market value.

The **Market Portfolio** is:

- the only risky portfolio anyone would hold
- the only source of risk.
- completely diversified across all global assets.

All investors choose a combination of the risk-free asset and the market portfolio, according to their risk tolerance. All portfolios are two asset portfolios – the Market Portfolio and the risk-free asset.

Implications of CMT

The two important implications of CMT are systematic risk is the only risk that matters and the CAPM specifies the risk-return trade-off.

Total Risk = Systematic (market-related) Risk + Unsystematic (firm-specific) Risk

Diversification eliminates unsystematic risk. Diversification cannot reduce systematic risk, regardless of how many stocks are in the portfolio.

Capital Asset Pricing Model (CAPM)

The CAPM tells us what should be the expected or required rates of return on all risky assets. The **Security Market Line** (SML) represents the relationship between systematic risk and return.

The equation for the CAPM is:

Eqn. 51.3 $$E(R_i) = R_{Rf} + \beta_i [E(R_M) - R_{Rf}]$$

Beta measures systematic risk because it reflects the risk that matters – covariance with the Market Portfolio. Beta is also the *slope* of the **characteristic line**, which is the regression line of the return on an individual company's return as a function of the return on a market portfolio proxy like the S&P 500 index.

This is popular territory for multiple choice questions. ***Remember****:*

- *the CML uses standard deviation as the measure of risk, while the SML uses beta as the measure of risk*
- *The SML applies to all securities and portfolios and the CML applies only to efficient portfolios*
- *If the exam gives you graphs, remember to look at which variable is displayed on the horizontal axis. The CML uses total risk or standard deviation on the horizontal while the SML uses systematic risk or beta*

CAPM Assumptions Relaxed

When the CAPM assumptions are relaxed:

Differential Borrowing and Lending Rates – two CMLs and the *borrowing portfolio is not as profitable* as when it was assumed investors could borrow at the risk-free rate. An alternative model that does not require just one risk-free rate is the **Zero-Beta Model**.

Transactions Costs – mispricings may persist and diversification is limited.

Heterogeneous Expectations and Planning Periods – the CML and the SML cease to be single lines and become bands.

Taxes – When investors pay taxes, there are major differences in the **CML** and **SML**.

Using Capital Market Theory to Identify Mispriced Securities

1. *Calculate the* required rate of return *using the CAPM.*
2. *Determine the* market-implied expected rate of return *using an alternative methodology such as the dividend discount model.*
3. *Compare the two returns and if:*
   - *Market-implied expected return >* ***CAPM*** *required return, the security is* undervalued.
   - *Market-implied expected return =* ***CAPM*** *required return, the security is* correctly valued.
   - ***CAPM*** *required return > Market-implied expected return, the security is* overvalued.

