Solutions Manual

for

Managing Investment Portfolios: A Dynamic Process
Third Edition

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NOTE: This file includes solutions to the book's end-of-chapter problems (Part II).

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PART I

LEARNING OUTCOMES, SUMMARY OVERVIEW, AND PROBLEMS

CHAPTER 1

THE PORTFOLIO MANAGEMENT PROCESS AND THE INVESTMENT POLICY STATEMENT

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LEARNING OUTCOMES

After completing this chapter, you will be able to do the following:

- Justify the importance of the portfolio perspective.
- Formulate the steps of the portfolio management process and the components of those steps.
- Compare and contrast the types of investment objectives.
- Contrast the types of investment constraints.
- Justify the central role of the investment policy statement in the portfolio management process.
- Review the elements of an investment policy statement and distinguish among the components within (1) the risk objective, (2) the return objective, and (3) the time horizon constraint.
- Compare and contrast passive, active, and semiactive approaches to investing.
- Discuss the role of capital market expectations in the portfolio management process.
- Discuss the role of strategic asset allocation in the portfolio management process.
- Discuss the roles of portfolio selection/composition and portfolio implementation in the portfolio management process.
- Contrast the elements of performance evaluation.
- Explain the purpose of monitoring and rebalancing.
- Formulate the elements of portfolio management as an ongoing process.
- Formulate and justify a risk objective for an investor.
- Formulate and justify a return objective for an investor.
- Determine the liquidity requirement of an investor and evaluate the effects of a liquidity requirement on portfolio choice.
- Contrast the types of time horizons, determine the time horizon for an investor, and evaluate the effects of the investor's time horizon on portfolio choice.
- Determine the tax concerns, legal and regulatory factors, and unique circumstances for an investor and evaluate their effects on portfolio choice.
- Justify ethical conduct as a requirement for managing investment portfolios.

SUMMARY OVERVIEW

In Chapter 1, we have presented the portfolio management process and the elements of the investment policy statement.

- According to the portfolio perspective, individual investments should be judged in the context of how much risk they add to a portfolio rather than on how risky they are on a stand-alone basis.
- The three steps in the portfolio management process are the planning step (objectives and constraint determination, investment policy statement creation, capital market expectation formation, and strategic asset allocation creation); the execution step (portfolio selection/composition and portfolio implementation); and the feedback step (performance evaluation and portfolio monitoring and rebalancing).

- Investment objectives are specific and measurable desired performance outcomes, and constraints are limitations on the ability to make use of particular investments. The two types of objectives are risk and return. The two types of constraints are internal (posed by the characteristics of the investor) and external (imposed by outside agencies).
- An investment policy statement (IPS) is a written planning document that governs all investment decisions for the client. This document integrates a client's needs, preferences, and circumstances into a statement of that client's objectives and constraints.
- A policy or strategic asset allocation establishes exposures to IPS-permissible asset classes in a manner designed to satisfy the client's long-run objectives and constraints. The plan reflects the interaction of objectives and constraints with long-run capital market expectations.
- In a passive investment strategy approach, portfolio composition does not react to changes in expectations; an example is indexing, which involves a fixed portfolio designed to replicate the returns on an index. An active approach involves holding a portfolio different from a benchmark or comparison portfolio for the purpose of producing positive excess risk-adjusted returns. A semiactive approach refers to an indexing approach with controlled use of weights different from the benchmark.
- The portfolio selection/composition decision concerns portfolio construction and often uses portfolio optimization to combine assets efficiently to achieve return and risk objectives. The portfolio implementation decision concerns the trading desk function of implementing portfolio decisions and involves explicit and implicit transaction costs.
- The elements of performance evaluation are performance measurement, attribution, and appraisal. Performance measurement is the calculation of portfolio rates of return. Performance attribution is the analysis of those rates of return to determine the factors that explain how the return was achieved. Performance appraisal assesses how well the portfolio manager performed on a risk-adjusted basis, whether absolute or relative to a benchmark.
- Portfolio monitoring and rebalancing use feedback to manage ongoing exposures to available investment opportunities in order to continually satisfy the client's current objectives and constraints.
- Portfolio management is an ongoing process in which the investment objectives and constraints are identified and specified, investment policies and strategies are developed, the portfolio composition is decided in detail, portfolio decisions are initiated by portfolio managers and implemented by traders, portfolio performance is evaluated, investor and market conditions are monitored, and any necessary rebalancing is implemented.
- The steps to determine a risk objective include: (1) specify a risk measure (or measures) such as standard deviation, (2) determine the investor's willingness to take risk, (3) determine the investor's ability to take risk, (4) synthesize the investor's willingness and ability into the investor's risk tolerance, and (5) specify an objective using the measure(s) in the first step above.
- The steps to determine a return objective include: (1) specify a return measure such as total nominal return, (2) determine the investor's stated return desire, (3) determine the investor's required rate of return, and (4) specify an objective in terms of the return measure in the first step above.
- A liquidity requirement is a need for cash in excess of the contribution rate or the savings rate at a specified point in time. This need may be either anticipated or unanticipated.
- A time horizon is the time period associated with an investment objective. Investment objectives and associated time horizons may be short term, long term, or a combination

of these two. A multistage horizon is a combination of shorter-term and longer-term horizons. A time horizon can be considered a constraint because shorter time horizons generally indicate lower risk tolerance and hence constrain portfolio choice, making it more conservative.

- A tax concern is any issue arising from a tax structure that reduces the amount of the total return that can be used for current needs or reinvested for future growth. Tax concerns constrain portfolio choice. If differences exist between the tax rates applying to investment income and capital gains, tax considerations will influence the choice of investment.
- Legal and regulatory factors are external considerations that may constrain investment decision making. For example, a government agency may limit the use of certain asset classes in retirement portfolios.

Unique circumstances are internal factors (other than a liquidity requirement, time horizon, or tax concerns) that may constrain portfolio choices. For example, an investor seeking to avoid investments in tobacco companies will place an internal constraint on portfolio choice.

PROBLEMS

1. A. An individual expects to save €50,000 during the coming year from income from non-portfolio sources, such as salary. She will need €95,000 within the year to make a down payment for a house purchase. What is her liquidity requirement for the coming year?

   B. Endowments are funds that are typically owned by nonprofit institutions involved in educational, medical, cultural, and other charitable activities. Classified as institutional investors, endowments are almost always established with the intent of lasting into perpetuity.

   The Wilson-Fowler Endowment was established in the United States to provide financial support to Wilson-Fowler College. An endowment's spending rate defines the fraction of endowment assets distributed to the supported institution. The Wilson-Fowler Endowment has established a spending rate of 4 percent a year; the endowment follows the simple rule of spending, in a given year, an amount equal to 4% × (Market value of the endowment at the end of the prior year). This amount is committed to the budgetary support of the college for the coming year. At the end of the prior year, the market value of the Wilson-Fowler Endowment's assets stood at $75 million. In addition, the Wilson-Fowler Endowment has committed to contribute $1 million in the coming year to the construction of a new student dormitory. Planners at the endowment expect the endowment to receive contributions or gifts (from alumni and other sources) of $400,000 over the coming year. What is the anticipated liquidity requirement of the Wilson-Fowler Endowment for the coming year?

2. The Executive Director of the Judd University Endowment estimates that the capital markets will provide a 9 percent expected return for an endowment portfolio taking above-average risk, and a 7 percent expected return for an endowment portfolio taking average risk. The Judd Endowment provides tuition scholarships for Judd University students. The spending rate has been 4 percent, and the expected tuition inflation rate is 3 percent. Recently, university officials have pressured the endowment to increase the spending rate to 6 percent. The endowment has an average to below-average ability to accept risk and only an average willingness to take risk, but a university official claims

that the risk tolerance should be raised because higher returns are needed. Discuss an appropriate return objective and risk tolerance for the Judd Endowment.

3. Stux (1994) describes a country allocation strategy across five major equity markets: the United States, the United Kingdom, Germany, France, and Japan. In this strategy, a measure of relative attractiveness among the five equity markets is used as a factor in determining the weights of the five equity markets in the overall portfolio. The investment in each country, however, whatever the country's weight, is an indexed investment in the equity market of that country. The weights of the five equity markets in the overall portfolio generally are expected to differ from benchmark weights (the weights of the countries in an appropriate benchmark for the international equity market), within limits.

   A. Characterize the two components (portfolio weights and within-country investments) of the country allocation strategy using the text's framework for classifying investment strategies.
   B. Characterize the country allocation strategy overall.

4. Characterize each of the investment objectives given below as one of the following: an absolute risk objective, a relative risk objective, an absolute return objective, or a relative return objective.

   A. Achieve a rate of return of 8 percent a year.
   B. Limit the standard deviation of portfolio returns to 20 percent a year or less.
   C. Achieve returns in the top quartile of the portfolio's peer universe (the set of portfolios with similar investment objectives and characteristics).
   D. Maintain a 10 percent or smaller probability that the portfolio's return falls below the threshold level of 5 percent per annum over a one-year time horizon.
   E. Achieve a tracking risk of no more than 4 percent per annum with respect to the portfolio's benchmark.

Questions 5 through 10 relate to James Stephenson. Select and justify the best answer.

James Stephenson, age 55 and single, is a surgeon who has accumulated a substantial investment portfolio without a clear long-term strategy in mind. Two of his patients who work in financial markets comment as follows:

- James Hrdina: "My investment firm, based on its experience with investors, has standard investment policy statements in five categories. You would be better served to adopt one of these standard policy statements instead of spending time developing a policy based on your individual circumstances."
- Charles Gionta: "Developing a long-term policy can be unwise given the fluctuations of the market. You want your investment adviser to react continuously to changing conditions and not be limited by a set policy."

Stephenson hires a financial adviser, Caroline Coppa. At their initial meeting, Coppa compiles the following notes:

Stephenson currently has a $2.0 million portfolio that has a large concentration in small-capitalization U.S. equities. Over the past five years, the portfolio has averaged 20 percent annual total return on investment. Stephenson hopes that, over the long term, his portfolio will continue to earn 20 percent annually. When asked about his

risk tolerance, he described it as "average." He was surprised when informed that U.S. small-cap portfolios have experienced extremely high volatility.

He does not expect to retire before age 70. His current income is more than sufficient to meet his expenses. Upon retirement, he plans to sell his surgical practice and use the proceeds to purchase an annuity to cover his postretirement cash flow needs.

Both his income and realized capital gains are taxed at a 30 percent rate. No pertinent legal or regulatory issues apply. He has no pension or retirement plan but does have sufficient health insurance for postretirement needs.

5. The comments about investment policy statements made by Stephenson's patients are *best* characterized as

	Hrdina	Gionta
A.	Correct	Correct
B.	Correct	Incorrect
C.	Incorrect	Correct
D.	Incorrect	Incorrect

6. In formulating the return objective for Stephenson's investment policy statement, the *most* appropriate determining factor for Coppa to focus on is

A. Return desires
B. Ability to take risk
C. Return requirement
D. Stephenson's returns over past five years

7. Stephenson's willingness and ability to accept risk can be *best* characterized as

	Willingness to Accept Risk	Ability to Accept Risk
A.	Below average	Below average
B.	Below average	Above average
C.	Above average	Below average
D.	Above average	Above average

8. Stephenson's tax and liquidity constraints can be *best* characterized as

	Tax Constraint	Liquidity Constraint
A.	Significant	Significant
B.	Significant	Insignificant
C.	Insignificant	Significant
D.	Insignificant	Insignificant

9. Stephenson's time horizon is best characterized as

A. Short-term and single-stage
B. Short-term and multistage

C. Long-term and single-stage
D. Long-term and multistage

10. Stephenson's return objective and risk tolerance are most appropriately described as

	Return Objective	Risk Tolerance
A.	Below average	Below average
B.	Below average	Above average
C.	Above average	Below average
D.	Above average	Above average

11. James Stephenson Investment Profile

Case Facts

Type of investor	Individual; surgeon, 55 years of age, in good health
Asset base	$2 million
Stated return desire *or* investment goal	10 percentage points above the average annual return on U.S. small-capitalization stocks
Annual spending needs	$150,000
Annual income from nonportfolio sources (before tax)	$350,000 from surgical practice
Other return factors	Inflation is 3%
Risk considerations	Owns large concentration in U.S. small-capitalization stocks
Specific liquidity requirements	$70,000 charitable donation in 10 months
Time specifications	Retirement at age 70
Tax concerns	Income and capital gains taxed at 30 percent

Questions

1. Underline the word at right that best describes the client's:

A. *Willingness to accept risk*	Below average	Above average
B. *Ability to accept risk*	Below average	Above average
C. *Risk tolerance*	Below average	Above average
D. *Liquidity requirement*	Significant	Not significant
E. *Time horizon*	Single stage	Multistage
F. *Overall time horizon*	Short to intermediate term	Long term
G. *Tax concerns*	Significant	Not significant

2. Discuss appropriate client objectives:
   A. *Risk*
   B. *Return*

12. Foothill College Endowment Fund

Case Facts

Type of investor	Institutional; endowment
Purpose	Provide annual scholarships currently totaling $39.5 million
Asset base	$1 billion
Stated return desire	6 percent, calculated as spending rate of 4 percent plus previously expected college tuition inflation of 2 percent
Other return factors	Revised expectation of college tuition inflation is 3 percent
Tax concerns	Tax exempt

Questions

1. Underline the word at right that best describes the client's:

A. *Risk tolerance*	Below average	Above average
B. *Liquidity requirement*	Significant	Not significant
C. *Time horizon*	Single stage	Multistage
D. *Overall time horizon*	Short to intermediate term	Long term
E. *Tax concerns*	Significant	Not significant

2. Discuss appropriate client objectives:
   A. *Risk*
   B. *Return*

13. Vincenzo Donadoni Investment Profile (adapted from 1998 CFA Level III exam)

Case Facts

Type of investor	Individual; 56 year old male in good health
Asset base	13.0 million Swiss francs (CHF)
Stated return desire *or* investment goal	Leave a trust fund of CHF 15.0 million for three children
Annual spending needs	CHF 250,000 rising with inflation
Annual income from other sources (after tax)	CHF 125,000 consulting income for next two years only
Ability to generate additional income	No
Willingness to accept risk	Impulsive, opinionated, successful with large bets as a businessman, believes success depends on taking initiative
Specific liquidity requirements	CHF 1.5 million immediately to renovate house CHF 2.0 million in taxes due in nine months
Time specifications	Long term except for liquidity concerns
Legal and regulatory factors	None
Unique circumstances	None

Questions

1. Underline the word at right that best describes the client's:

A. *Willingness to accept risk*	Below average	Above average
B. *Ability to accept risk*	Below average	Above average
C. *Risk tolerance*	Below average	Above average
D. *Liquidity requirement*	Significant	Not significant
E. *Time horizon*	Single stage	Multistage
F. *Overall time horizon*	Short to intermediate term	Long term

2. Discuss appropriate client objectives:
   A. *Risk*
   B. *Return*

CHAPTER 2

MANAGING INDIVIDUAL INVESTOR PORTFOLIOS

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LEARNING OUTCOMES

After completing this chapter, you will be able to do the following:

- Review situational profiling for individual investors and discuss source of wealth, measure of wealth, and stage of life as approaches to situational profiling.
- Prepare an elementary situational profile for an individual investor.
- Discuss the role of psychological profiling in understanding individual investor behavior.
- Formulate the basic principles of the behavioral finance investment framework.
- Discuss the influence of investor psychology on risk tolerance and investment choices.
- Discuss the use of a personality-typing questionnaire for identifying an investor's personality type.
- Formulate the relationship of risk attitudes and decision-making styles with individual investor personality types.
- Discuss the potential benefits for both clients and investment advisers of having a formal investment policy statement.
- Review the process involved in creating an investment policy statement for a client.

- Discuss each of the major objectives that an individual investor's investment policy statement includes.
- Distinguish between an individual investor's ability to take risk and willingness to take risk.
- Discuss how to set risk and return objectives for individual investor portfolios.
- Discuss each of the major constraints that an individual investor's investment policy statement includes.
- Formulate and justify an investment policy statement for an individual investor.
- Demonstrate the use of a process of elimination to arrive at an appropriate strategic asset allocation for an individual investor.
- Determine the strategic asset allocation that is most appropriate given an individual investor's investment objectives and constraints.
- Compare and contrast traditional deterministic versus Monte Carlo approaches in the context of retirement planning.
- Discuss the advantages of the Monte Carlo approach to retirement planning.

SUMMARY OVERVIEW

Chapter 2 has presented an overview of portfolio management for individual investors, including the information-gathering process, situational and psychological profiling of clients, formulation of an investment policy statement, strategic asset allocation, and the use of Monte Carlo simulation in personal retirement planning.

- Situational profiling seeks to anticipate individual investors' concerns and risk tolerance by specifying the investor's source of wealth, measure or adequacy of wealth in relationship to needs, and stage of life.
- Psychological profiling addresses human behavioral patterns and personality characteristics and their effect on investment choices. It is particularly important in assessing risk tolerance.
- Underlying behavioral patterns often play an important role in setting individual risk tolerance and return objectives.
- Based on their responses to a questionnaire, individual investors may be classified into descriptive personality types, such as *cautious, methodical, spontaneous*, or *individualist*.
- Using the results of situational and psychological profiling, and the financial information gathered in the interviewing process, an adviser can formulate an investment policy statement (IPS).
- A carefully formulated IPS serves as the keystone to the relationship between investor and investment adviser. The process of creating an IPS mirrors the process of portfolio management. The policy statement reconciles investment goals with the realities of risk tolerance and investment constraints, resulting in operational guidelines for portfolio construction and a mutually agreed-upon basis for portfolio monitoring and review. By necessity, the investor and adviser must discuss the construction of an IPS in a linear fashion. In practice, the process is dynamic, similar to solving simultaneously for multiple variables.
- The return objective for an investment portfolio must ultimately be made consistent with the investor's risk tolerance and the portfolio's ability to generate returns. The traditional division of return requirements between ''income'' and ''growth'' objectives may seem intuitive, but these terms blur the distinction between return goals and risk tolerance. The ''total return'' approach seeks to identify a portfolio return that will meet the investor's objectives without exceeding the portfolio's risk tolerance or violating its investment constraints.

- Risk tolerance reflects both an investor's ability and willingness to accept risk. Ability to accept risk is a probabilistic assessment of the investment portfolio's ability to withstand negative investment outcomes and still meet the investor's objectives. Willingness to accept risk is a more subjective assessment of the investor's propensity for risk taking. Because many individuals are unfamiliar with the quantitative terminology of risk tolerance, the investment adviser may use psychological or situational profiling to anticipate client attitudes toward risk.
- Investment constraints include the following:

  1. *Liquidity*. Liquidity needs may be categorized as ongoing expenses, emergency reserves, and negative liquidity events. Liquidity is the ease and price certainty with which assets can be converted into cash. Because assets with stable prices and low transaction costs are generally low-risk investments, an increasing need for liquidity will constrain the investment portfolio's ability to accept risk. Significant illiquid holdings and their associated risks should be documented. For many investors, the home or residence represents a large percentage of total net worth and is relatively illiquid. Although the primary residence may be viewed as offsetting long-term needs for care and housing, it should be discussed as a source of investment risk and as a source of funding for future cash flow needs. The investor and adviser should together thoroughly review the risks associated with any concentration of net worth. Large "positive" liquidity events should also be documented, even though they will not act as a constraint.
  2. *Time horizon*. The investor's time horizon also constrains his ability to accept risk; shorter investment horizons allow less time to make up portfolio losses. The time horizon constraint may be categorized as short term, intermediate term, or long term and as single stage or multistage. With sufficient assets and multigenerational estate planning, even older investors may retain a long-term investment perspective.
  3. *Taxes*. The basic principles of tax deferral, avoidance, and reduction underlie all tax-driven portfolio strategies, but individual solutions are highly country specific and client specific. Taxes relevant to portfolio management generally fall into four major categories: income, gains, wealth transfer, and property.
  4. *Legal and regulatory environment*. The investment portfolio's legal and regulatory environment is ultimately country and client specific. A basic knowledge of English and American trust law is often valuable, however, as the terminology is widely recognized and the framework widely applied.
  5. *Unique circumstances*. The IPS should capture all unique investment considerations affecting the portfolio. Unique circumstances might include guidelines for social investing, trading restrictions, and privacy concerns.

- As a general rule, only certain asset allocations will be consistent with the client's return objectives, risk tolerance, and investment constraints. The adviser can use a process of elimination to arrive at an appropriate long-term strategic allocation.
- For individual investors, investment decisions, including asset allocation, are made on an after-tax basis. This is a key distinction in contrast to tax-exempt institutions.
- Monte Carlo simulation has certain advantages over deterministic approaches: It more accurately portrays risk–return trade-offs, can illustrate the trade-offs between the attainment of short-term and long-term goals, provides more realistic modeling of taxes, and is better suited to assessing multiperiod effects.

PROBLEMS

Problems 1 through 8 relate to the Inger family: father (Peter), mother (Hilda), son (Hans), and daughter (Christa) and her child (Jürgen). Peter is the founder and majority owner of IngerMarine.

Christa estimates that her revised annual living expenses, including a new studio and apartment, will average €132,500 (excluding Jürgen's educational costs). If necessary, she could combine her apartment and studio to reduce spending by €32,500. She does not want her financial security to be dependent on further gifting from her parents and is pleased that, after the sale of IngerMarine, she will be able to meet her new living expenses with proceeds from art sales (€50,000) and the expected total return of the proposed investment portfolio (€82,500). Because of the uncertainty of art sales, Christa plans to establish an emergency reserve equal to one year's living expenses. Her after-tax proceeds from the sale of IngerMarine are expected to be $€1,200,000 \times (1 - 0.15) = €1,020,000$. She also holds €75,000 in balanced mutual funds and €25,000 in a money market fund. Christa intends to reevaluate her policy statement and asset allocation guidelines every three years.

1. Discuss Christa's liquidity requirements.
2. Determine Christa's return requirement and evaluate whether her portfolio can be expected to satisfy that requirement if inflation averages 3 percent annually and she reduces her annual living expenses to €100,000 by combining her apartment and studio.
3. Explain why an analysis of Christa's investment policy statement might become necessary before the next three-year review.

Hans's increasingly irresponsible lifestyle has become a burden to his parents. Hans was recently arrested for reckless driving—he crashed his car into a restaurant, causing considerable damage and injuring a patron. As a result of Hans's behavior, Peter has placed him on probationary leave of absence from IngerMarine but will allow him to retain his annual salary of €100,000. The restaurant patron is suing Hans for €700,000 in damages, and the restaurant owner estimates that it will take €500,000 to repair damages to his building. Hans's insurance will cover costs to a maximum of only €200,000.

4. Assess the impact of these events on Hans's liquidity and his personal financial statement. What course of action should he pursue?
5. Assess Hans's probable future ability to assume risk, based on information about his background and current living situation.

Peter and Hilda are considering an investment of €1,000,000 in one of the following investment funds:

Investment	Projected Income	Projected Price Appreciation	Projected Turnover
High-growth stock fund	2.0%	12%	75%
Equity value fund	2.5%	10%	25%
Municipal bond fund	5.0% (tax free)	2%	15%

6. Evaluate each investment fund based only on its after-tax return. *Note:* Capital gains tax = Price appreciation $\times 15\% \times$ Turnover rate

IngerMarine has experienced a catastrophic event from which it cannot recover. Damage claims resulting from a design flaw are expected to leave IngerMarine bankrupt and its stock worthless. Peter's pension is also lost.

7. Assess the probable impact on Peter's and Hilda's return requirement.
8. Assess the probable impact on Peter's and Hilda's portfolio constraints.
9. Adapted from the 2001 CFA Level III examination:

   James Stephenson, 55 years old and single, is a surgeon. He has accumulated a $2.0 million investment portfolio with a large concentration in small-capitalization U.S. equities. During the past five years, his portfolio has averaged a 20 percent annual total return on investment. Stephenson's current portfolio of $2.0 million is invested as shown in Exhibit 2-1.

EXHIBIT 2-1 Summary of Stephenson's Current Portfolio

	Value	Percent of Total	Expected Annual Return	Annual Standard Deviation
Short-term bonds	$ 200,000	10%	4.6%	1.6%
Domestic large-cap equities	600,000	30	12.4	19.5
Domestic small-cap equities	1,200,000	60	16.0	29.9
Total portfolio	$2,000,000	100%	13.8%	23.1%

His newly hired financial adviser, Caroline Coppa, has compiled the following notes from her meetings with Stephenson:

Stephenson hopes that long term, his investment portfolio will continue to earn 20 percent annually. For the remainder of this year, he would like to earn a return greater than the 5 percent yield to maturity currently available from short-term government notes. When asked about his risk tolerance, he described it as "average." He was surprised when informed that U.S. small-cap portfolios have historically experienced extremely high volatility.

Stephenson does not expect to retire before age 70. His current annual income from his surgical practice is $250,000, which is more than sufficient to meet his current yearly expenses of $150,000. Upon retirement, he plans to sell his surgical practice and use the proceeds to purchase an annuity to cover his postretirement cash flow needs. He could not state any additional long-term goals or needs.

Stephenson's income and realized capital gains are taxed at a 30 percent rate. No pertinent legal or regulatory issues apply. He has no pension or retirement plan but does have sufficient health insurance for postretirement needs.

Stephenson soon expects to receive an additional $2.0 million from an inheritance and plans to invest the entire amount in an index fund that best complements the current portfolio. Coppa is evaluating the four index funds shown in Exhibit 2-2 for their ability to produce a portfolio that will meet the following two criteria relative to the current portfolio:

EXHIBIT 2-2 Index Fund Characteristics

Index Fund	Expected Annual Return	Expected Annual Standard Deviation	Correlation of Returns with Current Portfolio
A	15%	25%	+0.80
B	11%	22%	+0.60
C	16%	25%	+0.90
D	14%	22%	+0.65

1. Maintain or enhance expected return.
2. Maintain or reduce volatility.

Each fund is invested in an asset class that is not substantially represented in the current portfolio.

A. Formulate the following elements of Stephenson's investment policy statement and justify your response for each element with two arguments:

   i. Return objective
   ii. Risk tolerance
   iii. Liquidity requirements
   iv. Time horizon

B. State which fund Coppa should recommend to Stephenson. Justify your choice by describing how your chosen fund best meets both of the criteria set forth by Coppa. (No calculations are required.)

10. Adapted from the 2000 CFA Level III examination:

Robert Taylor, 50 years old and a U.S. resident, recently retired and received a $500,000 cash payment from his employer as an early retirement incentive. He also obtained $700,000 by exercising his company stock options. Both amounts are net of tax. Taylor is not entitled to a pension; however, his medical expenses are covered by insurance paid for by his former employer. Taylor is in excellent health and has a normal life expectancy.

Taylor's wife died last year after a long illness, which resulted in devastating medical expenses. All their investments, including a home, were liquidated to fully satisfy these medical expenses.

Taylor has no assets other than the $1.2 million cash referenced above, and he has no debts. He plans to acquire a $300,000 home in three months and insists on paying cash given his recent adverse experience with creditors. When presented with investment options, Taylor consistently selects the most conservative alternative.

After settling into his new home, Taylor's living expenses will be $2,000 per month and will rise with inflation. He does not plan to work again.

Taylor's father and his wife's parents died years ago. His mother, Renee, is 72 years old and in excellent physical health. Her mental health, however, is deteriorating and she has relocated to a long-term-care facility. Renee's expenses total $3,500 per month. Her monthly income is $1,500 from pensions. Her income and expenses will rise with inflation. She has no investments or assets of value. Taylor, who has no siblings, must cover Renee's income shortfall.

EXHIBIT 2-3 Robert Taylor Investment Policy Statement

Return objective	• Income requirement is $2,000 monthly. • Total return requirement is 2.7% annually ($24,000/$900,000).
Risk tolerance	• Substantial asset base and low return requirement provide ample resources to support an aggressive, growth-oriented portfolio.
Time horizon	• Client is 50 years old, recently retired, and in excellent health. • Time horizon exceeds 20 years.
Liquidity needs	• $300,000 is needed in three months for purchase of home. • Modest additional cash is needed for normal relocation costs. $100,000 may be needed for possible investment in son's business. • A normal, ongoing cash reserve level should be established.
Tax concerns	• There is little need to defer income. • Mother's expenses may have an effect.
Legal and regulatory factors	• No special considerations exist.
Unique circumstances	• Client desires to support mother. • Client insists that any investment in son's business be excluded from long-term planning. • Client has strong aversion to debt.

Taylor has one child, Troy. Troy and a friend need funds immediately for a start-up business with first-year costs estimated at $200,000. The partners have no assets and have been unable to obtain outside financing. The friend's family has offered to invest $100,000 in the business in exchange for a minority equity stake if Taylor agrees to invest the same amount.

Taylor would like to assist Troy; however, he is concerned about the partners' ability to succeed, the potential loss of his funds, and whether his assets are sufficient to support his needs and to support Renee. He plans to make a decision on this investment very soon. If he invests $100,000 in Troy's business, he insists that this investment be excluded from any investment strategy developed for his remaining funds.

With the above information, portfolio manager Sarah Wheeler prepared the investment policy statement for Taylor shown in Exhibit 2-3.

A. Evaluate the appropriateness of Taylor's investment policy statement with regard to the following objectives:

   i. Return requirement
   ii. Risk tolerance
   iii. Time horizon
   iv. Liquidity requirements

After revising the investment policy statement and confirming it with Taylor, Wheeler is now developing a long-term strategic asset allocation for Taylor. Wheeler will use the following revised information to recommend one of the allocations in Exhibit 2-4.

- Taylor has decided to invest $100,000 in his son's business but still insists that this investment be disregarded in making his allocation decision.
- Taylor's total cash flow needs have changed to $4,200 a month.
- The available asset base is $800,000.
- Wheeler estimates that the inflation rate will be 1 percent next year.

EXHIBIT 2-4 Potential Long-Term Strategic Asset Allocations

	Allocation			
	A	B	C	D
Asset Class Weighting				
Stocks	20%	40%	60%	80%
Bonds	75%	55%	35%	15%
Cash	5%	5%	5%	5%
Total	100%	100%	100%	100%
Expected Annual				
Return	6.7%	7.5%	8.2%	9.1%
Standard Deviation	9.0%	11.5%	15.3%	19.0%
Potential for Growth				
Asset Growth	Very low	Low	Moderate	High
Income Growth	Very low	Low	Moderate	High
Current Income	High	High	Low	Very low
Stability	Very high	High	Moderate	Low

- Taylor is determined to maintain the real value of his assets because he plans to set up a charitable foundation in the future.
- Taylor insists on taking no more risk than absolutely necessary to achieve his return goals.

B. Select the strategic asset allocation that is most appropriate for Taylor and justify your selection with two supporting reasons related to the revised information shown above.

11. Adapted from the 1999 CFA Level III examination:

Mark and Andrea Mueller, U.S. residents, are reviewing their financial plan. The Muellers, both 53 years old, have one daughter, 18 years old. With their combined after-tax salaries totaling $100,000 a year, they are able to meet their living expenses and save $25,000 after taxes annually. They expect little change in either their incomes or expenses on an inflation-adjusted basis other than the addition of their daughter's college expenses. Their only long-term financial goal is to provide for themselves and for their daughter's education. The Muellers both wish to retire in 10 years.

Their daughter, a talented musician, is now entering an exclusive five-year college program. This program requires a $50,000 contribution, payable now, to the college's endowment fund. Thereafter, her tuition and living expenses, to be paid entirely by the Muellers, are estimated at $40,000 annually.

The Mueller's personal investments total $600,000, and they plan to continue to manage the portfolio themselves. They prefer "conservative growth investments with minimal volatility." One-third of their portfolio is in the stock of Andrea's employer, a publicly traded technology company with a highly uncertain future. The shares have a very low cost basis for tax purposes. The Muellers, currently taxed at 30 percent on income and 20 percent on net realized capital gains, have accumulated losses from past unsuccessful investments that can be used to fully offset $100,000 of future realized gains.

In 10 years, Mark will receive a distribution from a family trust. His portion is now $1.2 million and is expected to grow prior to distribution. Mark receives no income from the trust and has no influence over, or responsibility for, its management. The Muellers

know that these funds will change their financial situation materially but have excluded the trust from their current financial planning.

A. Construct the objectives and constraints portion of an investment policy statement for the Muellers, addressing each of the following:

   i. Return objective
   ii. Risk tolerance
   iii. Time horizon
   iv. Liquidity requirements
   v. Tax concerns
   vi. Unique circumstances

Ten years have passed. The Muellers, now both aged 63, will retire this year. The distribution from Mark's family trust will occur within the next two weeks. The Muellers' current circumstances are summarized below:

Personal Circumstances and Assets

- Pension income will total $100,000 a year and will not increase with inflation.
- Annual expenses will total $180,000 initially and will increase with inflation.
- Inflation is expected to be 2 percent annually.
- Their personal investments now total $1 million (excluding trust distribution).
- The Muellers will rely on this $1 million portfolio to support their lifestyle and do not wish to reduce their level of spending.
- The Muellers have health problems and neither is expected to live more than 10 years. All health care expenses will be covered by employer-paid insurance.
- The Muellers' daughter is now financially independent, and the Muellers' sole investment objective is to meet their spending needs.
- The Muellers are not concerned with growing or maintaining principal. The income deficit may be met with both investment income and by invading principal.

Trust Distribution Assets

- The trust distribution totals $2 million and will occur within the next two weeks. No tax liability is created by the distribution.
- The Muellers will maintain separate accounts for their personal assets and the trust distribution.
- They do not plan to withdraw income or principal.
- Tax liabilities produced by these assets will be paid from this portfolio.
- The Muellers plan to donate these assets to an arts society when the surviving spouse dies. They have made a minimum pledge of $2.6 million toward construction of a new building.
- An after-tax annual return of 5.4 percent is required over five years to meet the minimum pledge.
- The Muellers are concerned only that a minimum gift of $2.6 million is available. The Muellers assume that at least one of them will live at least five years and that neither will live more than 10 years.

Alternative portfolios for the Muellers' consideration appear in Exhibit 2-5.

EXHIBIT 2-5

	Portfolio			
Asset Allocation	A	B	C	D
Domestic large-cap stocks	14%	30%	40%	30%
Domestic small-cap stocks	3	5	10	25
Foreign stocks	3	5	10	25
Intermediate-term fixed income	70	60	30	20
Cash equivalents	10	0	10	0
Total	100%	100%	100%	100%
Expected annual return[a]	4.2%	5.8%	7.5%	8.5%
Annual standard deviation	6.0%	8.0%	13.0%	18.0%

[a]Nominal after-tax returns.

B. Select and justify with three reasons the most appropriate of the four portfolios from Exhibit 2-5 as an asset allocation for the Muellers' $1 million in personal assets.

C. Select and justify with three reasons the most appropriate of the four portfolios from Exhibit 2-5 as an asset allocation for the Muellers' $2 million in trust distribution assets.

12. Adapted from the 1997 CFA Level III examination:

John Mesa, CFA, is a portfolio manager in the Trust Department of BigBanc. Mesa has been asked to review the investment portfolios of Robert and Mary Smith, a retired couple and potential clients. Previously, the Smiths had been working with another financial adviser, WealthMax Financial Consultants (WFC). To assist Mesa, the Smiths have provided the following background information:

Family. We live alone. Our only daughter and granddaughter are financially secure and independent.

Health. We are both 65 years of age and in good health. Our medical costs are covered by insurance.

Housing. Our house needs major renovation. The work will be completed within the next six months, at an estimated cost of $200,000.

Expenses. Our annual after-tax living costs are expected to be $150,000 for this year and are rising with inflation, which is expected to continue at 3 percent annually.

Income. In addition to income from the Gift Fund and the Family Portfolio (both described below), we receive a fixed annual pension payment of $65,000 (after taxes), which continues for both of our lifetimes.

Financial Goals. Our primary objective is to maintain our financial security and support our current lifestyle. A secondary objective is to leave $1 million to our grandchild and $1 million to our local college. We recently completed the $1 million gift to the college by creating a "Gift Fund." Preserving the remaining assets for our granddaughter is important to us.

Taxes. Our investment income, including bond interest and stock dividends, is taxed at 30 percent. Our investment returns from price appreciation (capital gains) are taxed at 15 percent, at the time of sale. We have no other tax considerations.

General Comments. We needed someone like WFC to develop a comprehensive plan for us to follow. We can follow such a plan once it is prepared for us. We invest only in companies with which we are familiar. We will not sell a security for less than we paid for it. Given our need for income, we invest only in dividend-paying stocks.

Investments. We benefit from two investment accounts:

- The Gift Fund ($1 million) represents our gift to the college. During our lifetimes, we will receive fixed annual payments of $40,000 (tax free) from the Gift Fund. Except for the annual payments to us, the Gift Fund is managed solely for the benefit of the college—we may not make any other withdrawals of either income or principal. Upon our deaths, all assets remaining in the Gift Fund will be transferred into the college's endowment.
- The Family Portfolio ($1.2 million) represents the remainder of our lifetime savings. The portfolio is invested entirely in very safe securities, consistent with the investment policy statement prepared for us by WFC as shown in Exhibit 2-6:

EXHIBIT 2-6 WFC Investment Policy Statement for Smith Family Portfolio

The Smith Family Portfolio's primary focus is the production of current income, with long-term capital appreciation a secondary consideration. The need for a dependable income stream precludes investment vehicles with even modest likelihood of losses. Liquidity needs reinforce the need to emphasize minimum-risk investments. Extensive use of short-term investment-grade investments is entirely justified by the expectation that a low-inflation environment will exist indefinitely into the future. For these reasons, investments will emphasize U.S. Treasury bills and notes, intermediate-term investment-grade corporate debt, and select "blue chip" stocks with assured dividend distributions and minimal price fluctuations.

To assist in a discussion of investment policy, Mesa presents four model portfolios used by BigBanc; Exhibit 2-7 applies the bank's long-term forecasts for asset class returns to each portfolio.

A. Prepare and justify an alternative investment policy statement for the Smiths' Family Portfolio.
B. Describe how your IPS addresses three specific deficiencies in the WFC investment policy statement.
C. Recommend a portfolio from Exhibit 2-7 for the Family Portfolio. Justify your recommendation with specific reference to:
   i. Three portfolio characteristics in Exhibit 2-7 other than expected return or yield.
   ii. The Smiths' return objectives. Show your calculations.

EXHIBIT 2-7 BigBanc Model Portfolios

Asset Class	Total Return	Yield	Portfolios			
			A	B	C	D
U.S. large-cap stocks	13.0%	3.0%	0%	35%	45%	0%
U.S. small-cap stocks	15.0	1.0	0	5	15	0
Non-U.S. stocks	14.0	1.5	0	10	15	10
U.S. corporate bonds (AA)	6.5	6.5	80	20	0	30
U.S. Treasury notes	6.0	6.0	0	10	5	20
Non-U.S. government bonds	6.5	6.5	0	5	5	0
Municipal bonds (AA)[a]	4.0	4.0	0	10	0	10
Venture capital	20.0	0.0	0	0	10	25
U.S. Treasury bills	4.0	4.0	20	5	5	5
Total			100%	100%	100%	100%
After-tax expected return			4.2%	7.5%	13.0%	6.4%
Sharpe ratio			0.35	0.50	0.45	0.45
After-tax yield			4.2%	2.9%	1.9%	3.3%
Expected inflation: 3.0%						

[a]Tax-exempt.

13. Adapted from the 2004 CFA Level III examination:

Louise and Christopher Maclin live in London, United Kingdom, and currently rent an apartment in the metropolitan area. Christopher Maclin, aged 40, is a supervisor at Barnett Co. and earns an annual salary of £80,000 before taxes. Louise Maclin, aged 38, stays home to care for their newborn twins. She recently inherited £900,000 (after wealth-transfer taxes) in cash from her father's estate. In addition, the Maclins have accumulated the following assets (current market value):

- £5,000 in cash
- £160,000 in stocks and bonds
- £220,000 in Barnett common stock

The value of their holdings in Barnett stock has appreciated substantially as a result of the company's growth in sales and profits during the past 10 years. Christopher Maclin is confident that the company and its stock will continue to perform well.

The Maclins need £30,000 for a down payment on the purchase of a house and plan to make a £20,000 non-tax-deductible donation to a local charity in memory of Louise Maclin's father. The Maclins' annual living expenses are £74,000. After-tax salary increases will offset any future increases in their living expenses.

During discussions with their financial adviser, Grant Webb, the Maclins express concern about achieving their educational goals for their children and their own retirement goals. The Maclins tell Webb:

- They want to have sufficient funds to retire in 18 years when their children begin their four years of university education.
- They have been unhappy with the portfolio volatility they have experienced in recent years. They state that they do not want to experience a loss in portfolio value greater than 12 percent in any one year.

- They do not want to invest in alcohol and tobacco stocks.
- They will not have any additional children.

After their discussions, Webb calculates that in 18 years the Maclins will need £2 million to meet their educational and retirement goals. Webb suggests that their portfolio be structured to limit shortfall risk (defined as expected total return minus two standard deviations) to no lower than a negative 12 percent return in any one year. Maclin's salary and all capital gains and investment income are taxed at 40 percent and no tax-sheltering strategies are available. Webb's next step is to formulate an investment policy statement for the Maclins.

A. i. Formulate the risk objective of an investment policy statement for the Maclins.
   ii. Formulate the return objective of an investment policy statement for the Maclins. Calculate the pre-tax rate of return that is required to achieve this objective. Show your calculations.

B. Formulate the constraints portion of an investment policy statement for the Maclins, addressing *each* of the following:

   i. Time horizon
   ii. Liquidity requirements
   iii. Tax concerns
   iv. Unique circumstances

Note: Your response to Part B should not address legal and regulatory factors.

CHAPTER 3

MANAGING INSTITUTIONAL INVESTOR PORTFOLIOS

R. Charles Tschampion, CFA
CFA Institute
New York, New York

Laurence B. Siegel
The Ford Foundation
New York, New York

Dean J. Takahashi
Yale University
New Haven, Connecticut

John L. Maginn, CFA
Maginn Associates, Inc.
Omaha, Nebraska

LEARNING OUTCOMES

After completing this chapter, you will be able to do the following:

- Contrast a defined-benefit plan to a defined-contribution plan from the perspectives of both the employee and employer.
- Discuss investment objectives and constraints for defined-benefit plans.
- Evaluate pension fund risk tolerance when risk is considered from the perspective of the (1) plan surplus, (2) sponsor financial status and profitability, (3) sponsor and pension fund common risk exposures, (4) plan features, and (5) workforce characteristics.

- Formulate an investment policy statement for a defined-benefit plan.
- Evaluate the risk management considerations in investing pension plan assets.
- Formulate an investment policy statement for a defined-contribution plan.
- Discuss hybrid pension plans (e.g., cash balance plans) and employee stock ownership plans.
- Distinguish among the types of foundations with respect to their description, purpose, source of funds, and annual spending requirements.
- Discuss investment objectives and constraints for foundations, endowments, insurance companies, and banks.
- Formulate an investment policy statement for a foundation, an endowment, an insurance company, and a bank.
- Contrast investment companies, commodity pools, and hedge funds to other types of institutional investors.
- Evaluate the factors that affect the investment policies of pension funds, foundations, endowments, life and non–life insurance companies, and banks.
- Differentiate among the return objectives, risk tolerances, liquidity requirements, time horizons, tax considerations, legal and regulatory environment, and unique circumstances of pension funds, foundations, endowments, insurance companies, and banks.
- Compare and contrast the asset/liability management needs of pension funds, foundations, endowments, insurance companies, and banks.
- Compare and contrast the investment objectives and constraints of institutional investors given relevant data such as descriptions of their financial circumstances and attitudes toward risk.

SUMMARY OVERVIEW

Chapter 3 has described the investment contexts in which institutional investors operate. Our chief focus has been the development of an investment policy statement for defined-benefit pension plans, defined-contribution pension plans, endowments, foundations, life insurance companies, non–life insurance companies, and banks. We have discussed the specific considerations that enter into the development of appropriate return and risk objectives. We then addressed liquidity requirements, time horizon, tax concerns, legal and regulatory factors, and unique circumstances.

- The two major types of pension plan are defined benefit (DB) plans and defined contribution (DC) plans. A defined-benefit plan specifies the plan sponsor's obligations in terms of the benefit to plan participants. In contrast, a defined-contribution plan specifies the sponsor's obligations in terms of contributions to the pension fund rather than benefits to participants.
- DB pension assets fund the payment of pension benefits (liabilities). The investment performance of a DB plan should be judged relative to its adequacy in funding liabilities even if it is also judged on an absolute basis. The funded status of a DB plan is the relationship of the plan assets to the present value of plan liabilities, and is usually measured with respect to the projected benefit obligation (PBO) definition of plan liabilities.
- In setting a risk objective, DB plan sponsors need to consider plan funded status, sponsor financial status and profitability, sponsor and pension fund common risk exposures, plan features (such as provision for lump-sum distributions), and workforce characteristics.

- A DB pension plan's broad return objective is to achieve returns that adequately fund its pension liabilities on an inflation-adjusted basis. An appropriate return requirement for a fully funded plan is the discount rate applied to pension liabilities. The pension fund's stated return desire may be higher and may reflect considerations relating to reducing pension contributions or increasing pension income.
- For DB plans, liquidity requirements relate to the number of retired lives, the size of contributions in relation to disbursements, and plan features. Factors affecting the time horizon length include whether the plan is a going concern, the age of the workforce, and the proportion of retired lives.
- Defined-contribution plans fall into two types: those in which the plan sponsor sets investment policy, and those in which the plan participants individually set policy. The investment process for the sponsor-directed plans is a simpler version of the process for DB plans.
- For participant-directed DC plans, the principal issues are offering participants sufficient investment choices and avoiding inadequate diversification because of holdings of the sponsor company's stock.
- Hybrid pension plans combine features of DB and DC plans. A cash balance plan is a hybrid plan in which the promised benefit is shown as a balance in a participant-individualized statement. Another important type of hybrid plan is the employee stock ownership plan (ESOP), a type of DC plan entirely or primarily invested in the employer's stock.
- Foundations are grant-making institutions. Private foundations are typically subject to a payout requirement that specifies a minimum level of spending. Endowments are generally not subject to a legal spending requirement. Endowments typically provide vital support of ongoing operations and programs of institutions such as universities, hospitals, museums, and religious organizations.
- The return objective for most foundations (and endowments) can be stated as the sum of the annual spending rate, the cost of generating returns (managing assets), and the expected inflation rate. A multiplicative formulation of the components is more precise than an additive one in specifying the return level that should allow the foundation or endowment to preserve the inflation-adjusted value of assets over many periods.
- A foundation's investment policy can often be more risk tolerant than the investment policy of DB plans because foundation assets need not be managed with respect to a stream of legal liabilities, in general. Endowment risk tolerance often depends on the importance of the endowment to the supported institution's operating budget as reflected in the spending rate, and the use of a smoothing rule for spending, which dampens the portfolio's sensitivity to short-run volatility.
- A foundation or endowment's liquidity requirements come from both anticipated and unanticipated cash needs in excess of contributions received. Anticipated needs are captured in the periodic distributions prescribed by a foundation's or endowment's spending rate. Generally, time horizons are long. A variety of legal and regulatory issues can affect a foundation or endowment's investment activities.
- Insurance companies play a role in absorbing personal and business risks. Insurers are broadly divided into life insurers and non–life insurers (casualty insurers); the two groups have distinct investment concerns.
- Historically, return requirements for life insurers have been tied to the interest rates used by actuaries to determine policyholder reserves or accumulation rates for the funds being held by a company for future disbursement. Actual return objectives have been less clearly defined but may relate to an interest rate spread concerning liabilities.

- Insurers have moved toward segmenting their portfolios in relation to associated liabilities and setting return objectives by major line of business. The result is that a single company's investment policy may incorporate multiple return objectives. Furthermore, many companies have established separate investment policies and strategies for each segment of their portfolios.
- Because of public policy concerns related to payment of insurance benefits, insurer portfolios are viewed as quasi–trust funds from a public policy perspective. As a result, conservative fiduciary principles limit the risk tolerance of both life and non–life insurers.
- As one consequence of the need for managing risk with respect to their contractual liabilities, insurers use a variety of asset/liability management techniques.
- Life insurance companies have valuation concerns (related to prescribed valuation reserves), reinvestment risk, credit risk, and cash flow volatility.
- The liquidity concerns associated with disintermediation of cash value policies, asset/liability mismatch, and asset marketability risk have increased insurers' traditionally relatively minimal liquidity requirements.
- Life insurers have been viewed as the classic long-term investor. As a result of portfolio segmentation, life insurers may establish relatively shorter time horizons for some portfolio segments (e.g., group annuities).
- As a regulated industry, life insurers face many regulatory and legal constraints including those relating to eligible investments, the prudent investor rule, and valuation methods.
- In contrast to life insurers, non–life insurers typically have shorter-term liabilities. The underwriting (profitability) cycle may require non–life insurers to liquidate investments to supplement cash flow shortfalls. For both of these reasons, non–life insurers have much shorter investment time horizons than do life insurers.
- Return requirements reflect competitive pricing policy, profitability concerns, and the requirement for a growing surplus to support the writing of new business.
- A bank's portfolio investments are a residual use of funds after loan demand has been met. The portfolio's overall objectives are to manage the interest rate risk of the balance sheet, manage liquidity, produce income, and manage credit risk. The bank's return objective is to earn a positive spread over the cost of funds. Banks typically have below-average risk tolerance, and liquidity is a key concern. Bank investment is subject to a range of legal and regulatory factors.
- Investment companies such as mutual funds as well as commodity pools and hedge funds are institutional investors that function as investment intermediaries. In contrast to other types of institutional investors, one cannot generalize about the investment objectives and constraints of these types of investors.
- Among institutional investors, asset/liability management (ALM) considerations are particularly important for DB pension funds, insurance companies, and banks.

PROBLEMS

1. Worden Technology, Inc.:

   Based in London, Worden Technology, Inc. is an established company with operations in North America, Japan, and several European countries. The firm has £16 billion in total assets and offers its employees a defined-benefit pension plan.

   Worden's pension plan currently has assets of £8.88 billion and liabilities of £9.85 billion. The plan's goals include achieving a minimum expected return of 8.4 percent

EXHIBIT 3-1 Investment Policy Statements

	IPS X	IPS Y
Return requirement	Plan's objective is to outperform the relevant benchmark return by a substantial margin.	Plan's objective is to match relevant benchmark return.
Risk tolerance	Plan has a high risk tolerance because of the long-term nature of the plan and its liabilities.	Plan has a low risk tolerance because of its limited ability to assume substantial risk.
Time horizon	Plan has a very long time horizon because of its infinite life.	Plan has a shorter time horizon than in the past because of plan demographics.
Liquidity requirement[a]	Plan has moderate liquidity needs to fund monthly benefit payments.	Plan has minimal liquidity needs.

[a]Assume Worden will not contribute to its pension plan over the next several years.

with expected standard deviation of return no greater than 16.0 percent. Next month, Worden will reduce the retirement age requirement for full benefits from 60 years to 55 years. The median age of Worden Technology's workforce is 49 years.

Angus Williamson, CFA, manages the pension plan's investment policy and strategic asset allocation decisions. He has heard an ongoing debate within Worden Technology about the pension plan's investment policy statement (IPS). Exhibit 3-1 compares two IPSs under consideration.

Identify which investment policy statement, X or Y, contains the appropriate language for each of the following components of Worden Technology's pension plan:

i. Return requirement
ii. Risk tolerance
iii. Time horizon
iv. Liquidity

Justify your choice in each instance.

2. LightSpeed Connections (adapted from the 2000 CFA Level III Exam):

Hugh Donovan is chief financial officer (CFO) of LightSpeed Connections (LSC), a rapidly growing U.S. technology company with a traditional defined-benefit pension plan. Because of LSC's young workforce, Donovan believes the pension plan has no liquidity needs and can thus invest aggressively to maximize returns. He also believes that U.S. Treasury bills and bonds, yielding 5.4 percent and 6.1 percent, respectively, have no place in a portfolio with such a long time horizon. His strategy, which has produced excellent returns for the past two years, has been to invest the portfolio as follows:

- 50 percent in a concentrated pool (15 to 20 stocks) of initial public offerings in technology and Internet companies, managed internally by Donovan.
- 25 percent in a small-capitalization growth fund.
- 10 percent in a venture capital fund.
- 10 percent in an S&P 500 index fund.
- 5 percent in an international equity fund.

Working with LSC's Investment Committee, the firm's president, Eileen Jeffries has produced a formal investment policy statement, which reads as follows:

"The LSC Pension Plan's return objective should focus on real total returns that will fund its long-term obligations on an inflation-adjusted basis. The "time-to-maturity" of the corporate workforce is a key element for any defined pension plan; given our young workforce, LSC's Plan has a long investment horizon and more time available for wealth compounding to occur. Therefore, the Plan can pursue an aggressive investment strategy and focus on the higher return potential of capital growth. Under present U.S. tax laws, pension portfolio income and capital gains are not taxed. The portfolio should focus primarily on investments in businesses directly related to our main business to leverage our knowledge base."

A. Evaluate Donovan's investment strategy with respect to its effect on each of the following:

   i. LSC's pension plan beneficiaries.
   ii. Managing pension assets in relation to LSC's corporate strength.

B. Evaluate LSC's investment policy statement in the context of the following:

   i. Return requirement
   ii. Risk tolerance
   iii. Time horizon
   iv. Liquidity

3. Gwartney International:

U.S.-based Gwartney International (GI) is a financially healthy, rapidly growing import/export company with a young workforce. Information regarding GI's defined-benefit pension plan (which is subject to the Employee Retirement Income Security Act [ERISA]) appears in Exhibits 3-2 and 3-3.

In accordance with GI policy, the plan discounts its liabilities at the market interest rate for bonds of the same duration. GI's risk objectives include a limitation on volatility of surplus.

EXHIBIT 3-2

Asset Class	Actual and Target Allocation	Prior-Year Total Return
Large-capitalization U.S. equities	35%	10.0%
Small-capitalization U.S. equities	10	12.0
International equities	5	7.0
Total equities	50	
U.S. Treasury bills (1-year duration)	10	4.5
U.S. intermediate-term bonds and mortgage-backed securities (4-year duration)	17	1.0
U.S. long-term bonds (10-year duration)	23	19.0%[a]
Total fixed income	50%	
Total	100%	10.0%

[a] Income element 7.0%; price gain element 12.0%.

EXHIBIT 3-3

Present value of plan liabilities	$298 million
Market value of plan assets	$300 million
Surplus	$2 million
Duration of liabilities	10 years
Actuarial return assumption	7.0%
GI board's long-term total return objective	9.0%

Giselle Engle, the newly appointed CFO, must explain to the board of directors why the surplus declined in a year when the actual investment return was 100 basis points more than the long-term objective stated by the board.

A. Explain how the plan surplus could decline in a given year despite an actual return in excess of the long-term return objective.
B. Explain the importance of an appropriate investment time horizon when setting investment policy for GI's corporate pension plan.
C. Discuss the risk tolerance of GI's corporate pension plan.

4. Food Processors Inc. (adapted from the 1994 CFA Level III exam):

Food Processors Inc. (FPI) is a mature U.S. company with declining earnings and a weak balance sheet. Its defined-benefit pension plan (which is subject to ERISA) has total assets of $750 million. The plan is underfunded by $200 million by U.S. standards—a cause for concern by shareholders, management, and the board of directors.

The average age of plan participants is 45 years. FPI's annual contribution to the plan and the earnings on its assets are sufficient to meet pension payments to present retirees. The pension portfolio's holdings are equally divided between large-capitalization U.S. equities and high-quality, long-maturity U.S. corporate bonds. For the purpose of determining FPI's contribution to the pension plan, the assumed long-term rate of return on plan assets is 9 percent per year; the discount rate applied to determine the present value of plan liabilities, all of which are U.S. based, is 8 percent. As FPI's Treasurer, you are responsible for oversight of the plan's investments and managers and for liaison with the board's Pension Investment Committee.

At the committee's last meeting, its chair observed that both U.S. stocks and U.S. bonds had recorded total returns in excess of 12 percent per year over the past decade. He then made a pointed comment: ''Given this experience, we seem to be overly conservative in using only a 9 percent future return assumption. Why don't we raise the rate to 10 percent? This would be consistent with the recent record, would help our earnings, and should make the stockholders feel a lot better.''

You have been directed to examine the situation and prepare a recommendation for next week's committee meeting. Your assistant has provided you with the background information shown in Exhibit 3-4.

Assume that consensus forecast total returns for bonds are at least approximately equal to the bonds' yields.

A. Explain what is meant when a pension plan is said to be ''underfunded'' and use FPI to illustrate.
B. Discuss the risk–return dilemma that FPI faces.
C. Explain a rationale for reducing the discount rate from its current level of 8 percent.

EXHIBIT 3-4 Capital Markets Data

Asset Class	Total Return 1929–1993	Total Return 1984–1993	Annualized Monthly Standard Deviation 1984–1993	Consensus Forecast Total Return 1994–2000
U.S. Treasury bills	3.7%	6.4%	2.2%	3.5%
Intermediate-term Treasury bonds	5.3	11.4	5.6	5.0
Long-term Treasury bonds	5.0	14.4	11.7	6.0
U.S. corporate bonds (AAA rated)	5.6	14.0	8.9	6.5
U.S. common stocks (S&P 500)	9.5	14.9	18.0	8.5
U.S. inflation rate (annual rate)	3.2%	5.5%	N/A	3.3%

D. Explain how the underfunded condition of FPI's plan would be affected if the discount rate were reduced to 7 percent from the current 8 percent.

5. Medical Research Foundation (adapted from the 1993 CFA Level III exam):

The Medical Research Foundation (MRF), based in the United States, was established to provide grants in perpetuity. MRF has just received word that the foundation will receive a $45 million cash gift three months from now. The gift will greatly increase the size of the foundation's endowment from its current $10 million. The foundation's grant-making (spending) policy has been to pay out virtually all of its annual net investment income. Because its investment approach has been conservative, the endowment portfolio now consists almost entirely of fixed-income assets. The finance committee understands that these actions are causing the real value of foundation assets and the real value of future grants to decline because of inflation effects. Until now, the finance committee believed it had no alternative to these actions, given the large immediate cash needs of the research programs being funded and the small size of the foundation's capital base. The foundation's annual grants must at least equal 5 percent of its assets' market value to maintain MRF's U.S. tax-exempt status, a requirement that is expected to continue indefinitely. The foundation anticipates no additional gifts or fundraising activity for the foreseeable future.

Given the change in circumstances that the cash gift will make, the finance committee wishes to develop new grant-making and investment policies. Annual spending must at least meet the 5 percent of market value requirement, but the committee is unsure how much higher spending can or should be. The committee wants to pay out as much as possible because of the critical nature of the research being funded; however, it understands that preserving the real value of the foundation's assets is equally important in order to preserve its future grant-making capabilities. You have been asked to assist the committee in developing appropriate policies.

A. Identify and discuss the three key elements that should determine the foundation's grant-making (spending) policy.
B. Formulate and justify an investment policy statement for the foundation.

6. James Children's Hospital (adapted from the 1998 CFA Level III Exam):

   The James Children's Hospital (JCH), based in Washington, D.C., has an operating budget of $15 million and has been operating at a budget surplus for the last two years. JCH has a $20 million endowment (JCHE) whose sole purpose is to provide capital equipment for the hospital. The endowment's long-term expected total return is 8.6 percent, which includes a 3.3 percent income component. JCHE has no minimum payout requirement and expects no future contributions. Traditionally, the JCHE board of directors has determined the annual payout based on current needs. Payouts have been rising steadily—to $1,375,000 two years ago and to $1,400,000 last year.

   Michelle Parker, CFO of JCHE, has asked the board's guidance in establishing a long-term spending policy for JCHE. She has received $1.6 million in requests to buy equipment and is concerned about the inflation rate for medical equipment prices, which is 4 percent, versus 2.5 percent for the U.S. Consumer Price Index.

   A. Discuss the implications of the current pressure on JCHE to increase spending.
   B. Discuss how JCHE's time horizon affects its risk tolerance.
   C. Determine a long-term spending policy for JCHE, including a spending rate as a percentage of assets, and justify the policy.

7. Donner Life Insurance (adapted from the 2000 CFA Level III Exam):

   Susan Leighton, treasurer for U.S.-based Donner Life Insurance, has just joined the board of a charitable organization that has a large endowment portfolio. She is researching how the investment policy for an endowment differs from that of life insurance companies and has thus far reached the following conclusions:

   1. Both endowments and life insurance companies have aggressive return requirements.
   2. Endowments are less willing to assume risk than life insurance companies because of donor concerns about volatility and loss of principal.
   3. Endowments are less able to assume risk than life insurance companies because of expectations that endowments should provide stable funding for charitable operations.
   4. Endowments have lower liquidity requirements than life insurance companies because endowment spending needs are met through a combination of current income and capital appreciation.
   5. Both endowments and life insurance companies are subject to stringent legal and regulatory oversight.

   Evaluate each of Leighton's statements in terms of accuracy and justify your conclusions.

8. Hannibal Insurance Company (adapted from the 1997 CFA Level III Exam):

   U.S.-based Hannibal Insurance Company sells life insurance, annuities, and guaranteed investment contracts (GICs) and other protection- and savings-based products. The company has traditionally managed its investments as a single portfolio, neither segmenting the assets nor segregating the surplus. The data in Exhibit 3-5 describe the portfolio.

   The company attributes the decline in the duration of its liabilities to increases in interest rates and the passage of time.

   Hannibal's CFO has instructed the portfolio manager as follows: "The rapidly increasing popularity of our two-year fixed-rate GIC product has increased our asset base substantially during the last year. Interest rates have been rising and will probably rise another 100 basis points this year. You should continue to take advantage of this situation by investing in higher-yielding, investment-grade, longer-duration bonds in order to

EXHIBIT 3-5 Hannibal Insurance Portfolio Data

	Four Years Ago	Last Year
Assets (reserves and surplus portfolio)	$450 million	$500 million
Duration of assets	6.0 years	6.0 years
Liabilities	$390 million	$470 million
Estimated duration of liabilities	5.5 years	4.0 years

maximize our spread and maintain a constant duration of the assets. This strategy will ensure the delivery of a competitive return to our customers.''

A. Judge the appropriateness of Hannibal's investment strategy as stated by the CFO. Prepare two arguments that support your position.
B. Evaluate two factors that would affect liability duration for a life insurance company other than changes in interest rates and the passage of time. Relate the two factors to the specific situation at Hannibal. Assume stable mortality rates.
C. Determine the suitability of the segmentation approach to portfolio management at Hannibal Insurance Company. Prepare three arguments that support your position.
D. Contrast the return requirement of the surplus portfolio to the return requirement of policyholder reserves, in regard to U.S. life insurance companies in general.

9. Winthrop Bank:

Winthrop Bank is a commercial bank with operations in North America. Evaluate the effect of each of the following scenarios on the bank's investment objectives, constraints, or risk-taking ability.

A. The target average maturity of loans is increased, with overall risk tolerance unchanged.
B. The asset/liability risk management committee (ALCO) decides to increase Winthrop Bank's credit standards for loans although Winthrop Bank's overall risk tolerance is unchanged.
C. Winthrop decides to sell its mortgage loans as soon as they are booked.
D. More opportunities exist for expanding net interest margins with low risk in Winthrop's loan portfolio than in its securities portfolio.

CHAPTER 4

CAPITAL MARKET EXPECTATIONS

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LEARNING OUTCOMES

After completing this chapter, you will be able to do the following:

- Discuss the role of capital market expectations in the portfolio management process.
- Review a framework for setting capital market expectations.
- Identify and discuss the following as they affect the setting of capital market expectations: the limitations of economic data, data measurement errors and biases, the limitations of historical estimates, *ex post* risk as a biased measure of *ex ante* risk, biases in analysts'