

A Core Curriculum for Insurance Supervisors

ICP 21: Investments

Basic-level Module



THE WORLD BANK

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About the Core Curriculum

A financially sound insurance sector contributes to economic growth and well-being by supporting the management of risk, allocation of resources, and mobilization of long-term savings. The insurance core principles (ICPs), developed by the International Association of Insurance Supervisors (IAIS), are key international standards relevant for sound financial systems.

Effective implementation of the ICPs requires skilled and knowledgeable insurance supervisors. Recognizing this need, the World Bank and the IAIS partnered in 2002 to develop a “core curriculum” for insurance supervisors. The Core Curriculum Project, funded and supported by various sources, accelerates the learning process of both new and experienced supervisors. The ICPs provide the structure for the core curriculum, which consists of a set of modules that summarize the most relevant aspects of each topic, focus on the practical application of supervisory concepts, and cross-reference existing literature.

The core curriculum is designed to help those studying it to:

- Recognize the risks that arise from insurance operations
- Know the techniques and tools used by private and public sector professionals to identify, measure, and manage these risks
- Operate effectively within a supervisory organization
- Understand the ICPs and other IAIS principles, standards, and guidance
- Recommend techniques and tools to help a particular jurisdiction observe the ICPs and other IAIS principles, standards, and guidance
- Identify the constraints and identify and prioritize supervisory techniques and tools to best manage the existing risks in light of these constraints.

Note to learners

Welcome to ICP 21: Investments module. This is a basic-level module on investments that does not require specific prior knowledge of this topic. The module should be useful to either new insurance supervisors or experienced supervisors who have not dealt extensively with the topic or are simply seeking to refresh and update their knowledge.

Start by reviewing the objectives, which will give you an idea of what a person will learn as a result of studying the module, and answer the questions in the pretest to help gauge your prior knowledge of the topic. Then proceed to study the module either on an independent, self-study basis or in the context of a seminar or workshop. The amount of time required to study the module on a self-study basis will vary, but it is best addressed over a short period of time, broken into sessions on sections if desired.

To help you engage and involve yourself in the topic, we have interspersed the module with a number of hands-on activities for you to complete. These exercises are intended to provide a checkpoint from time to time so that you can absorb and understand the material more readily and can apply the material to your local circumstances. You are encouraged to complete each of these activities before proceeding with the next section of the module. If you are working with others on this module, develop the answers through discussion and cooperative work methods. An answer key in appendix II sets out some of the points that you might consider when tackling the exercises and suggests where you might look for the answers.

As a result of studying the material in this module, you will be able to do the following:

1. State the essential criteria in the definition of assets and, given a specific fact situation, judge whether an item meets this definition.

2. Describe the operation of financial markets, and show how the rules of organized exchanges contribute to liquidity.
3. Explain why investment management is an inherent part of insurance operations.
4. Describe the various types of investments typically held by insurers in terms of the issuers, markets, and income, maturity, liquidity, and risk characteristics.
 - a. In describing risk characteristics, distinguish credit, market, and liquidity risks.
 - b. Explain the relationship between bond yields and bond prices.
 - c. Enumerate other factors that typically influence market prices of investment securities.
5. Compare the advantages and disadvantages of each type of asset in relation to a specific investment objective.
6. Explain the risk-return trade-off in selecting investment instruments, and show how appropriate diversification can improve the efficiency of an investment portfolio.
7. Explain the nature and purpose of regulatory restrictions placed on the allocation of assets within an insurer's investment portfolio.
8. Explain each of the following influences on investment strategy and the possible trade-offs among them:
 - a. The nature of the liabilities
 - b. Profit objectives
 - c. Liquidity objectives
 - d. Sufficiency requirements
 - e. Duration matching
 - f. Shareholder expectations
 - g. Rating agency expectations
 - h. Regulatory requirements
 - i. Tax considerations
 - j. Transaction costs
 - k. Information advantages or deficiencies
9. Assess the appropriateness of a particular insurer's strategic investment policy.
10. Explain why some assets might be nonadmitted or disregarded under the insurance accounting rules of a particular jurisdiction. Give common examples.
11. Explain the problem of investment valuation, and describe the most common valuation methods.
12. Justify the supervisory imperative for consistent investment valuation rules, and illustrate the impact of different asset valuation methods on an insurer's financial position.
13. Describe the steps in the investment process, and explain the roles of the company's board, management, investment officers, and advisors.

14. Describe the normally expected qualifications of investment professionals and explain how to measure their performance.
15. Describe the systems used to manage market, credit and liquidity risks.
16. Describe the types of stress testing that an insurer could undertake in order to assess the appropriateness of its asset allocation limits.
17. Assess the reasonableness of a particular insurer's contingency plans to mitigate the effects of deteriorating conditions.
18. Illustrate an appropriate management system that enables insurers to formulate policies for and monitor the performance of their investment portfolios.
 - a. Identify the information requirements for such a system and analyze the information quality issues that could arise.
 - b. Describe the benchmarks that could be used.
19. Describe appropriate management procedures to ensure:
 - a. Compliance with the established investment policy, and
 - b. Safekeeping of assets.
20. Assess the adequacy of a particular insurer's internal controls on its investment activities.
21. Summarize the requirements of ICP 21.

Pretest

Before studying this module on licensing, answer the following questions. The questions are designed to help you gauge your existing knowledge of this topic. An answer key is presented in appendix II at the end of the module.

For each of the following questions, circle the response that is correct or most relevant.

1. With which of the following statements do you most agree?

- a. Insurance companies should be free to invest funds as they please since the money belongs to them
- b. Supervisors should require insurers to meet certain standards of asset-liability management
- c. Given the size of most insurers' investment portfolios, diversification occurs automatically over time
- d. The valuation of assets is best left to the insurer's accountants.

2. Real estate may be a suitable investment for an insurer for which of the following reasons?

- a. The insurer writes non-life business
- b. Rents provide a stable income superior to returns from equity investments
- c. Real estate values are certain to appreciate rapidly
- d. The insurer might need quick access to the invested funds.

- 3. Which of the following factors influence the price of a bond?**
 - a. The maturity of the bond
 - b. Tax considerations
 - c. The prevailing interest rate
 - d. Call provisions
 - e. All of the above.

- 4. The advantages of valuing assets on the basis of their original cost include each of the following except:**
 - a. The values are readily verifiable
 - b. The resulting statement of the insurer's capital is less subject to fluctuation
 - c. Realistic comparisons among all insurers in the market are easier
 - d. This approach is generally conservative.

- 5. Nonadmitted or disregarded assets typically include each of the following except:**
 - a. Overdue reinsurance recoveries
 - b. Certificates of deposit
 - c. Furniture and equipment
 - d. Loans to company personnel.

- 6. An investment regulation based on the prudent person rule means that:**
 - a. No actuaries are required
 - b. Investments are restricted to certain classes of assets defined as "prudent"
 - c. Insurers have less flexibility in matching assets and liabilities
 - d. Investment managers must act with due diligence and skills comparable to other managers in similar situations.

- 7. An insurer's investment policy should be:**
 - a. In writing
 - b. Approved by its board of directors
 - c. Reviewed at least annually
 - d. All of the above.

8. Diversification of the assets in a portfolio tends to reduce:

- a. Market risk
- b. Turnover
- c. Performance
- d. Company-specific risk.

9. For asset-liability management purposes, the most useful measure of an asset portfolio is its:

- a. Maturity
- b. Average return
- c. Turnover
- d. Duration.

10. Preventive controls to guard against unauthorized investment transactions might include each of the following except:

- a. A requirement that only bearer bonds may be purchased
- b. Double signature requirements
- c. Lists of approved investments
- d. An investment committee that reviews all proposed investments.

ICP 21: Investments

Basic-level Module

A. Overview

Insurance companies generally collect premiums from their customers before they pay claims. As a result, they accumulate a reservoir of funds that they use to purchase securities in the money and capital markets. Those securities then generate investment income.

Since the ability to pay claims depends, in part, on the quality of those investments, prudential supervision of insurance companies includes scrutiny of the insurers' investments. Insurance core principle (ICP) 21 addresses the issue as follows:

The supervisory authority requires insurers to comply with standards on investment activities. These standards include requirements on investment policy, asset mix, valuation, diversification, asset-liability matching, and risk management.

This module focuses on investments and the related issues for insurance supervisors. It identifies the concerns that insurance supervisors might have about the investments made by insurance companies under their jurisdiction, discusses the nature of financial assets, including common features, as well as how they are issued and traded, catalogs the types of assets typically held by insurance companies, which should help them to judge the appropriateness of specific investments in relation to the available possibilities, and addresses the problems of asset valuation and investment regulation, considering various approaches to both. Finally, to give supervisors a reference point

for setting expectations for the companies they supervise, it describes the process of managing investment risk.

B. Supervisory Concerns

Insurance companies invest substantial funds in the world's financial markets and are among the most sophisticated investors. They have much at stake and have powerful incentives to employ the best investment management practices possible. Why, then, should supervisors concern themselves with an insurer's investments? The answers are clear.

An insurance supervisor's first concern is that the insurer has *sufficient assets in place to cover its obligations to policyholders*. Insurer assets should be invested prudently and wisely to ensure that they are available to pay policyholders' claims when needed. Confirmation that the purported assets actually exist, that they are not encumbered or pledged, and that they belong to the insurer is essential. Furthermore, they should be appropriate given the corresponding liabilities of the insurer. In 1996 an insurer registered in Antigua listed among its assets \$80 million in German government bonds that had been in default since World War II. More recently, a €5 billion hole appeared in the balance sheet of the dairy-processing giant Parmalat after the discovery of fictitious bank accounts. Such irregularities are infrequent, in part because the supervisor's independent confirmation of assets deters any temptation toward deception.

A second concern is with *prudent valuation*. In order to supervise insurer solvency, asset values must be measurable with a comfortable degree of certainty. Fluctuating interest rates, thin and volatile capital markets, and infrequent turnover add to the difficulty of putting values on investments. A consistent valuation procedure is imperative, however, as it provides a foundation for the measurement of asset risk for use in estimating the sufficiency of technical provisions and calculating risk-based capital charges. International financial reporting standards may eventually solve this problem, but in the meantime the insurance supervisor must prescribe or approve the valuation methods to be followed by all insurers within the jurisdiction and then monitor compliance.

Supervisors also need assurance that an insurer's investments are *properly diversified*. Whether they are invested mostly in government bonds or mostly in real estate, any excessive concentration affects the security of policyholders. During the 1990s, some European insurers lost substantial sums investing heavily in Argentine and Russian bonds. Diversification of investments among issuing entities and various asset classes, such as investment-grade bonds, non-investment-grade bonds, equities, mortgage loans, real estate, and other permitted investments, reduces risk. Certain other investments are often prohibited, such as speculative derivative instruments. Use and disclosure requirements for derivatives and similar commitments are also becoming increasingly important.

If assets are to be available to pay claims, they must be *sufficiently liquid*. Can the issuer convert the assets to cash in a timely manner? In 1991 the sixth largest life insurer in the United States, Mutual Benefit, had assets of \$13.1 billion but could not satisfy

its policyholder obligations because depressed real estate constituted 37 percent of its investment portfolio.

Finally, policyholder protection dictates a supervisory concern for the *safeguarding of assets*. Barings, the world's oldest merchant bank, lost £625 million from the unauthorized trading of a single employee. This loss exceeded the value of the entire firm and ended its 223-year history. Ultimately, an insurer's board of directors is responsible for the management of its investments, and supervisors want assurance that adequate controls are in place to ensure that the company is following the investment policy dictated by the board.

Inappropriate investments in high-yield non-investment-grade bonds, commercial mortgages, and real estate, along with illiquidity, inadequate portfolio analysis, and insufficient reporting on performance to top management, have contributed to many insurer insolvencies. New developments—derivatives, hybrid instruments, joint ventures, partnerships, asset-backed securities, and vehicles as yet unimagined—bring new risks and compound the task of supervision. Investment policy is the responsibility of the insurer's management and board, but in this area supervisors can take nothing for granted.

Q1

Answer the following questions in the role of the insurance supervisor responsible for the jurisdiction.

- 1. Many jurisdictions distinguish assets covering liabilities from the other assets of an insurer. Do any of the concerns mentioned in the module apply to these so-called "free assets"?**
- 2. Why or why not?**

C. Financial Assets

Assets are resources of the enterprise that provide future economic benefits. To be considered an asset, the resource must have three essential characteristics:

- The resource must provide some specific right to future benefits or service potentials.
- The firm must have the exclusive right to those future benefits.
- The firm must have a legally enforceable claim to the rights or services, based on a transaction that has already occurred.

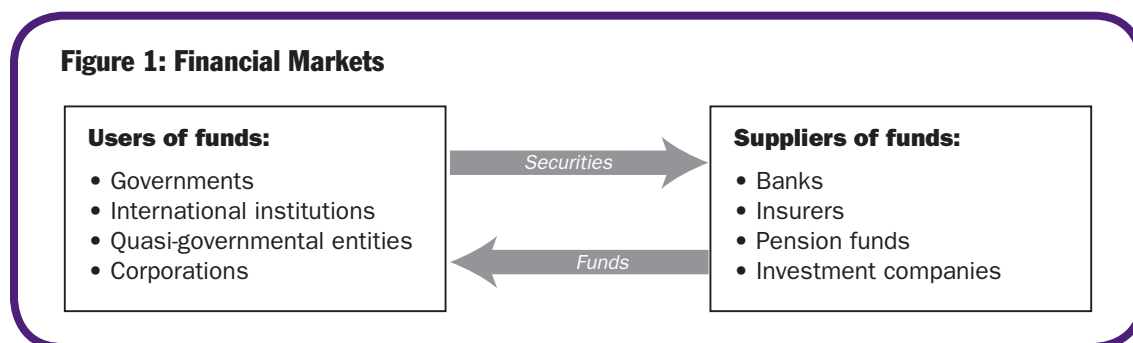
Most insurance company assets consist of securities such as bonds and stocks, mortgages, and real estate. Insurance companies have relatively few fixed assets, and regulators might not even take these into account when assessing their financial position. As financial intermediaries, insurers are major participants in financial markets, the places where financial assets are traded.

Financial markets

Financial markets bring together entities with a need for funds and entities with surplus funds to invest (see figure 1). To raise funds, governments, corporations, and other entities issue securities that promise repayment according to defined terms. These securities provide diverse vehicles for savers, while enabling issuers to raise funds at a relatively reasonable cost. Through this channel, savings flows are allocated to investment.

Financial markets also provide a mechanism for pricing financial assets. Generally speaking, since riskier enterprises are less attractive to investors than relatively safe ones, investors expect them to have higher returns. This risk-reward tradeoff tends to allocate the limited savings of a society toward the most profitable investments.

Financial markets experience a constantly changing set of counteracting forces. The forces of supply and demand tend to move relative interest rates apart, while the forces of equilibrium tend to keep the expected returns from different securities in a relationship that reflects only their relative risks and not their relative supplies. The ease



with which funds can flow from one market to another links various financial markets together. Even the prices of assets not traded in financial markets reflect the market prices, since the financial markets offer close alternatives to other financial assets. Also, changes in the business cycle, economic activity, and inflation influence the supply of and demand for funds in the business, household, and government sectors. Thus the rate of interest is the essential indicator of financial market conditions.

Primary financial markets are places where new financial assets are issued and sold, and *secondary financial markets* are places where outstanding financial assets are traded to new owners. Primary markets distribute new issues from their issuers to buyers. In addition to initial public offerings (IPOs) of securities, some new issues are *private placements*. Since a public offering must be registered with the securities regulator, a direct sale of securities to a few—sometimes only one—sophisticated investors offers large corporations convenient and confidential financing with lower transaction costs. Life insurers find this private placement market attractive for a number of reasons, especially since they usually have in-house credit analysts to evaluate the credit risk. Many privately placed securities offer a favorable risk-reward tradeoff, and the customized nature of a private placement allows insurance companies to match the duration of their liabilities more effectively. Limited marketability, however, is a significant disadvantage of investing in private placements. Once in, the investor cannot exit prior to maturity unless the securities regulations permit large, sophisticated institutions to trade private placements freely among themselves.

Secondary markets offer trading in already issued securities. Formal secondary markets such as exchanges trade stocks and bonds that have already been sold to the public. A *stock exchange* is an organization formed to permit its members to trade securities among themselves. In order to use the facilities of the exchange, it is necessary to become a member. Members must meet the requirements of the exchange regarding capital and knowledge of trading techniques and must adhere to a standard of ethical conduct. Exchanges have listing requirements for the securities traded. For their stock to be traded on a particular exchange, corporations must comply with these disclosure and governance rules as well as meet minimum size requirements.

In addition, many securities are traded not on formal exchanges, but rather in dealer or over-the-counter markets. Most bonds, for example, are more likely traded over the counter, although the structure of secondary markets varies widely from country to country.

LIQUIDITY

Whether a secondary market functions well depends on its depth and breadth. A market is said to have *depth* if there exist orders, either actual or easily uncovered, both above and below the price at which a security is currently trading. Temporary imbalances of buy or sell orders, which would otherwise cause substantial price changes, encounter

offsetting—and therefore stabilizing—buy or sell orders. Prompt communication of quotations, prompt execution of orders, and low transaction costs are preconditions for a deep market.

A market is said to have *breadth* if there is a large volume of orders. The broader the market, the greater the potential for stabilization of transitory price changes, which arise out of temporary order imbalances. The larger the quantity of securities traded, and the greater the number of traders, the better the secondary market. A deep and broad market provides liquidity for investors, making the assets they trade more attractive to buyers and sellers. Markets that display the greatest liquidity include foreign currency markets, the U.S. treasury bond market, and the stock exchanges in New York, London, and Tokyo.

AUTONOMY

This liquidity comes at a cost. To appeal to as many potential buyers as possible, financial instruments must have standard features that conform to investor expectations. Efficient financial markets are impersonal. Securities trade at prices that equilibrate supply and demand on the basis of generally available information. Insider trading can undermine this market unless vigilant securities regulation prevents it.

The more standardized the financial instruments, the less control an investor has over the issuer's management. In jurisdictions with less developed capital markets, institutional investors such as insurers might be willing to pay a premium (or sacrifice some portion of the potential returns) to gain more control over the firms in which they invest. Thus the prices set in *related-party transactions* might differ significantly from the prices determined in *arm's-length transactions*.

Characteristics of investments

The financial instruments traded in financial markets offer an array of distinguishing characteristics. This diversity of available instruments enables insurers to match investments to their needs.

A crucial aspect of any investment vehicle is the risk-reward tradeoff. As an investor assumes more risk, the expected return should increase. Interest rate differentials between various financial instruments also depend on the maturity, liquidity, marketability, tax status, and restrictions of the instruments involved.

Business risk, *financial risk*, or *credit risk* is the risk that the borrower might not have sufficient earnings to make interest payments or repay the principal. This risk is often referred to as the *risk of default*. For fixed-income securities, such as bonds, the evaluation of business risk in many jurisdictions is simple. Credit rating agencies evaluate the riskiness of particular bonds and publish the ratings. Investors can use these

bond ratings to choose a bond that fits their criteria for risk and return. Generally, a bond with a AAA rating has a relatively low risk of default. Yields on such bonds are closer to the risk-free rate than to the rates on more risky bonds. As ratings decline, default risk increases, meaning that the probability of repayment is lower. Therefore, the yield should be higher to compensate for the greater risk.

Whenever a security, such as a bond, carries a *call provision* that allows the issuer the right to retire the obligation prematurely, the investor faces the risk that the security will be called. Because of this disadvantage to the investor, callable bonds command slightly higher yields than non-callable bonds. Call provisions are common on bonds and preferred stock and, in a scenario of falling interest rates, protect the borrower from paying a relatively high coupon until the issue matures.

A similar risk unique to mortgage-backed securities is the prepayment risk. As interest rates decline, mortgage prepayments accelerate, thus reducing the volume of mortgage debt available to investors.

A feature that might enhance the appeal of a security is *convertibility*. This feature allows the investor to convert the security into the common stock of the issuing corporation at a designated price, which might be lower than the market price at some point in the future. A convertible bond thus offers an investor the possibility of both current income and capital gain. Investors might accept lower yields from securities with a convertible feature or be willing to invest in companies that would have difficulty finding a market for their bonds if they did not contain a convertibility feature. Convertibility compensates to some extent for the risk of default.

Tax considerations can create a major yield differential between corporate bonds and government bonds or between the bonds issued by different government entities. If the government does not directly tax the interest income of a particular type of bond, the interest rate will be lower on these bonds than on comparable corporate bonds.

A major consideration in investing is the *marketability* of an asset. Money market assets have good liquidity; therefore, they have good marketability. Marketability means that the asset trades at a narrow range between the bid and ask prices. Therefore, the market supporting the asset is good. A good market is broad and deep, where the bid and ask price quotes are very close. The less marketability an asset has, the greater the spread between the bid and ask prices. Securities that are not highly marketable carry higher yields to compensate the investor for the marketability risk.

The attractiveness of holding a particular asset can also depend on whether the gain comes from income or from appreciation. *Ordinary income* consists of periodic payments of interest or dividends. Appreciation is the increase in the value of the asset, resulting in a *capital gain*. Regulations or taxation can give certain investors a preference for one type of gain or the other.

Still another characteristic influencing the appeal of a particular financial instrument is its denomination. It must be available in the amounts and the currency desired by the investor. Most bonds are denominated in U.S. dollars, followed by euros, British

pounds, and Japanese yen. Insurers in other countries may be limited to investing in securities denominated in the currency of their country.

Types of Assets

Insurance company assets consist of short-term investments, long-term investments, and other assets held primarily for reasons other than investment. By convention, short-term investments mature in one year or less. Long-term investments are securities with maturities longer than one year. They may be either debt instruments, which create direct creditor claims against the issuer for a fixed repayment period, or equity securities, which represent permanent rights to the residual value of the issuer after other claims have been satisfied.

CASH AND SHORT-TERM INVESTMENTS

Insurance companies can maintain several bank accounts designated for specific purposes. These bank accounts could include a general operating account, an investment account, a payroll account, a claim account, a loss adjustment account, and others. In addition to bank accounts, insurance companies can have a portion of their cash in certificates of deposit, cash in transit, and petty cash. An asset can be classified as cash if it is a medium of exchange that a bank will accept for deposit and immediately credit to a depositor's account.

Short-term investments are generally issued on a discounted basis. These money market instruments serve as convenient short-term investment vehicles. Most money market instruments are issued by entities with the highest credit ratings and thus provide a high degree of safety of principal. They also provide a high degree of liquidity, enabling an insurer to convert the security quickly when it needs cash.

Negotiable *certificates of deposit* (CDs) are uncollateralized bank liabilities. The credit quality of the issuer and the size and maturity of the issue, as well as general market conditions, determine the interest rate. Although most CDs are sold directly by

Q2

The following question is intended to stimulate discussion. Answer the following question in the role of the insurance supervisor responsible for the jurisdiction.

- 1. Facing severe fiscal constraints, your government has proposed cutting staff assigned to the enforcement of securities regulation while maintaining the budget for the insurance authority. Should you comment on this proposal? What would you say?**

banks to their customers, dealers also sell them for the banks for a small commission. CDs are issued at face value, pay interest at maturity, and have maturities between seven days and about 10 years.

Commercial paper consists of unsecured promissory notes issued by nonfinancial corporations, financial companies, and bank holding companies. For corporations with high credit ratings and large short-term financing needs, commercial paper can be a cheaper source of funds than bank loans. Commercial paper is redeemed by a single payment at maturity. Its price before maturity is discounted from its face value. Rates paid vary according to maturity (up to 270 days) and the credit rating of the issuer. Issuers must have a good credit rating so that their obligations are accepted for trading in the money market.

Bank-supported commercial paper has the underlying irrevocable support of a well-known commercial bank with the highest credit ratings. Although the investor still attaches some value to the basic creditworthiness of the operating company, in effect such commercial paper notes actually become “two-name” papers and therefore constitute a stronger credit than bank-name paper alone. The irrevocable nature of the support shifts the focus of the investor’s credit judgment from the actual issuer of commercial paper to the underlying support bank. The bank guarantee provides for the immediate payment of each commercial paper note on presentation at maturity. Thus, if the funds are not made available at maturity, a letter of credit obligates and empowers the paying agent to draw on the issuer’s account or to create loans under the revolving loan commitment to provide the investor with payment in full.

Bankers’ acceptances, widely used in international trade because they acknowledge an obligation to pay for goods in transit, are orders to pay specific amounts at a given time. These time drafts are negotiable instruments. For example, suppose an importer buys goods that will not be delivered for three months and goes to a bank to draw a draft payable in three months. As soon as the bank stamps the draft accepted, this banker’s acceptance can be sold as a money market instrument at a discount from its face value.

Many banks keep a portion of the acceptances they create as investments and then sell the rest to other banks, dealers, money market funds, central banks, corporations, and foreign and domestic institutional investors. In this secondary market, bankers’ acceptances trade on a discount basis with interest payments on an actual-day, 360-day basis. They closely resemble commercial paper in form because they are short-term, non-interest-bearing notes sold at a discount and redeemed by the accepting bank at maturity for full face value. Bankers’ acceptances carry the issuer’s pledge to pay as well as the accepting bank’s guarantee. The bank guarantees the payment, and the underlying goods financed provide collateral. Bankers’ acceptances originated by major banks are extremely liquid instruments.

Money market funds can be sponsored by insurance companies, investment companies, and brokerage firms. These funds, which invest in short-term credit instruments with maturities of less than one year, pay customers money market rates less operating

expenses. A money market fund represents a good short-term, liquid investment for insurance company portfolio managers who prefer to invest in a managed fund rather than place funds directly into the open market. Their rates tend to lag behind direct investments in money market instruments when rates are rising, but they occasionally pay higher rates when rates are falling because of the extended average maturity of their portfolio. Maturities of money market funds tend to range between 25 and 50 days and depend on the outlook for interest rates.

DEBT SECURITIES

More than 3 million stocks, bonds, and other securities are traded in capital markets around the world. The variety of securities available in the market usually enables investors to choose those with the desired payment streams, maturity, risk-return combination, and taxable or tax-exempt status to fit their risk profile.

The securities traded in capital markets are of two types: debt and equity. Whereas equity securities represent ownership claims, *debt instruments* such as bonds and notes create a direct financial claim against the issuer. The claim can be either a general claim or a claim secured by specific collateral. A *bond* is a written promise by the issuer to repay a fixed amount of borrowed money on a specified date and to pay a set annual rate of interest, at specified (generally semiannual) intervals.

A considerable variety of entities issue bonds to satisfy their credit needs. The most important issuers of long-term debt instruments are governments and international institutions. In addition, quasi-government agencies and corporations issue debt instruments. Since there are many types of debt securities and many issuers of them, the risk

Figure 2: Value of a Bond

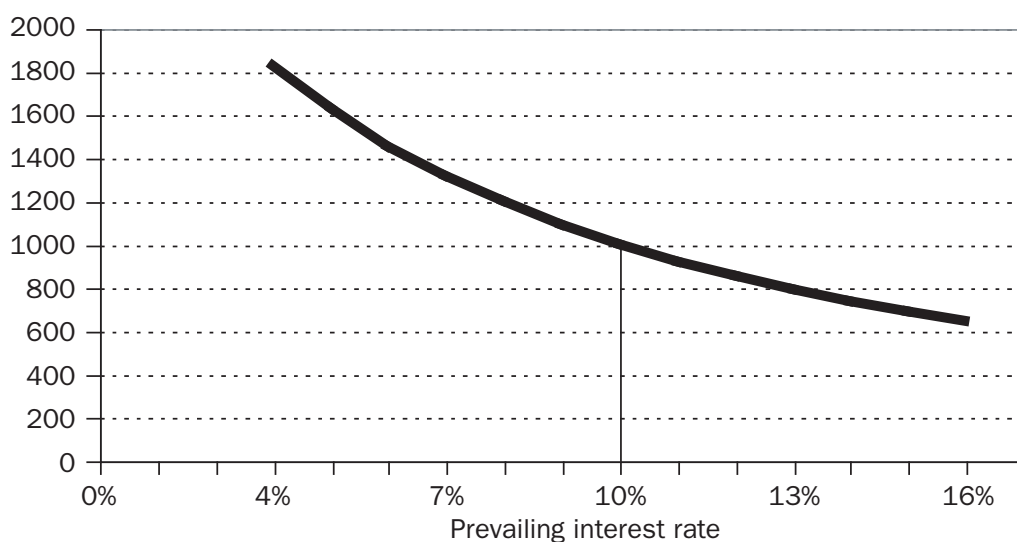


Figure 3: Influence of Maturity on Bond Price

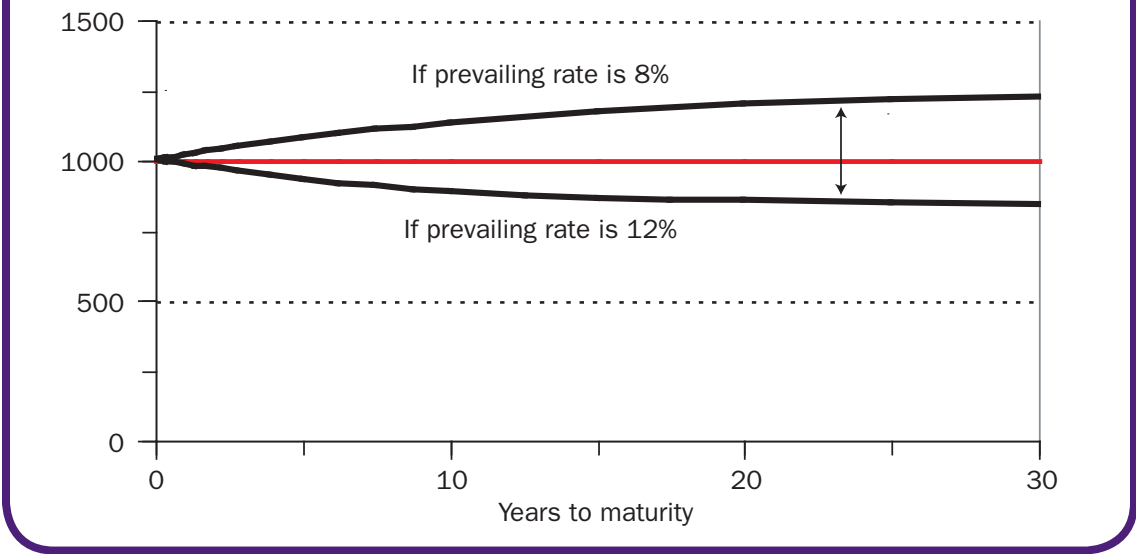
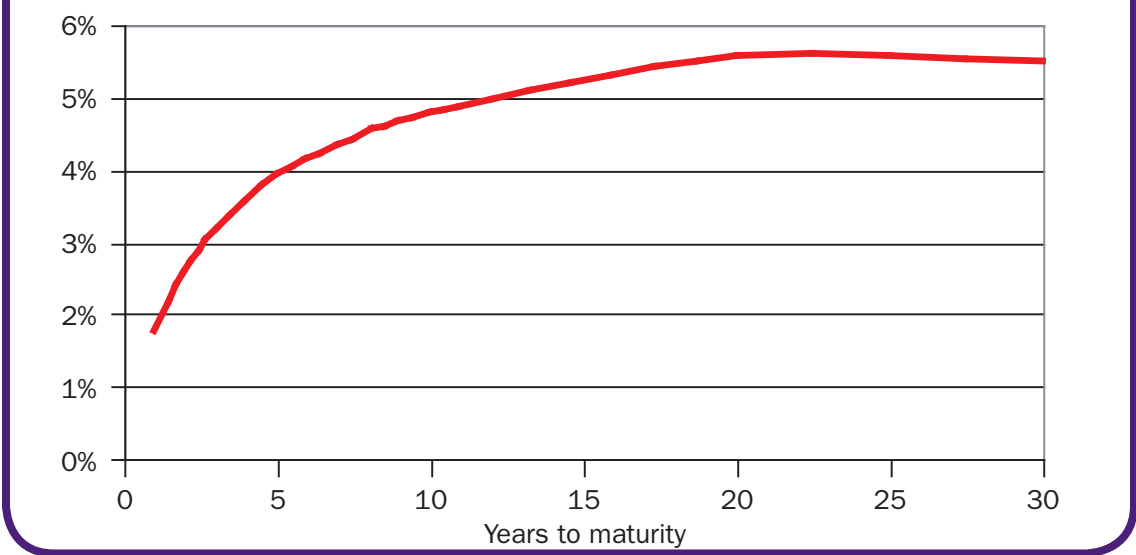


Figure 4: Yield Curve



of default is an important investment consideration. Bond yields vary according to the degree of risk involved. In addition, a bond instrument can contain features such as call provisions or convertibility options that either restrict or enhance the legal rights of the bondholder. Accordingly, any of these features can make a particular bond more or less attractive as an investment.

Government debt carries the guarantee of principal and interest payment of the government that issues the bonds. Notes have a maturity of not less than two and not more than 10 years, while bonds generally have a maturity of more than 10 years. Investors pay the face value at purchase and receive interest payments semiannually during

the life of the note or bond; the face value is returned at maturity. Because of the guarantee, government securities carry lower interest rates than corporate or agency bonds or mortgage securities of comparable maturity.

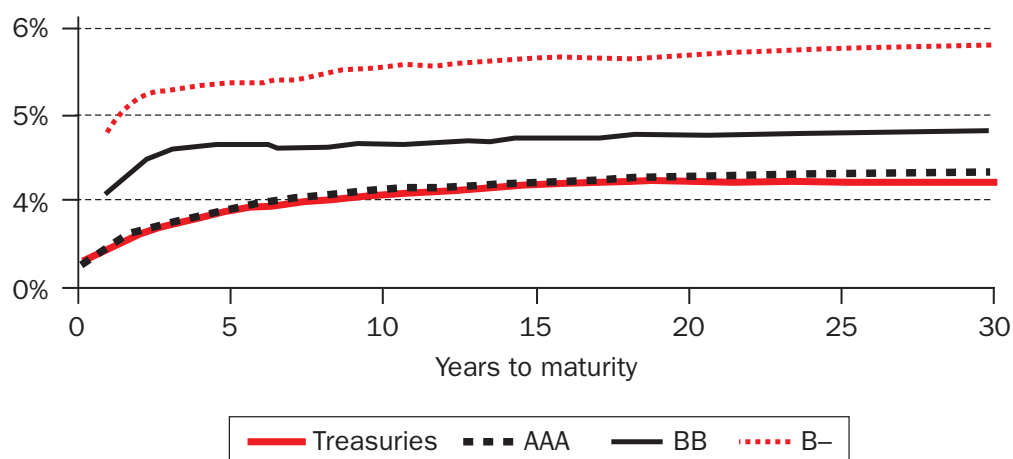
Corporate bonds are usually issued by large corporations. A corporate bond is an agreement between a lender and a borrower. In some cases, corporate bonds are backed by specific collateral, and in others they are backed by the general credit of the issuing corporation. Corporate bondholders are creditors, not owners, and their claims have priority in liquidation proceedings. They do not share in profits and losses, but they must be paid before common stockholders receive dividends.

The contract obligates the borrower to repay the lender by a specific date the full amount lent and to make semiannual interest payments at an agreed rate. Bond maturities typically range from five to 30 years, while notes typically mature in one to five years. Bonds and notes are conventionally denominated in units with a principal value in round numbers, such as \$10,000 or £10,000. Some bonds give issuers the option of redeeming, or *calling*, their bonds before they mature. Bonds with a *sinking fund* provision repay the principal in partial installments over the life of the bond instead of all at once.

Compared with government bonds, individual corporate bonds trade less often because the issues are relatively small and the number of different issuers is large. Dealers quote spreads between bid and ask prices on corporate bonds considerably wider than the spreads quoted on government issues. The relatively high cost of trading corporate bonds encourages trading mechanisms other than cash sales and purchases. Many dealer-customer transactions are arranged in pairs, in which the customer and dealer swap two issues of comparable value, settling the difference in cash. This swap eliminates the customer's need to sell one issue first and then, with the proceeds, buy another issue. Swaps are also usually more economical because transaction costs are reduced.

Junk bonds are non-investment-grade corporate bonds carrying lower credit ratings from rating agencies. They are regarded as speculative with respect to the issuer's

Figure 5: Comparative Yield Curve



capacity to meet the terms of the debt obligation. The concept of junk bonds recognizes that there must be higher yields associated with the commensurate risk of non-investment-grade or speculative bonds. Interest rates on these speculative bonds can be several hundred basis points higher than on government issues of similar maturity (one basis point equals 0.01 percent). Junk bonds appeal primarily to investors who want high returns, can properly assess the risk, and have a sufficiently balanced portfolio to absorb potential losses. Most jurisdictions limit an insurer's investments in junk bonds to a tiny portion of the overall asset portfolio, and some prohibit them entirely.

Bond prices move inversely with changes in interest rates. When interest rates rise, bond prices fall. When interest rates fall, bond prices rise. For example, figure 2 shows the value of a bond paying 10 percent interest as the prevailing interest rate changes. If alternative investments offer higher rates than 10 percent, the value of the bond falls below its face value. Conversely, as interest rates fall, the value of the bond increases. Other asset prices often respond similarly to changes in interest rates, but not with the same mathematical precision as bond prices. The value of a bond can be defined as the present value of the future stream of income payments (*coupon rate*) plus the present value of the principal payment at maturity, both discounted at the prevailing rate of interest for bonds of that quality and maturity. The rate is known as the *effective yield* or the *yield to maturity*.

In managing a bond portfolio, the magnitude of the price change given a change in interest rates is critical. It depends largely on two factors: (1) the maturity of the bond and (2) the coupon interest rate. As shown in figure 3, the longer the maturity of a bond, the larger the change in price for a given change in rates. If market interest rates fluctuate between 8 and 12 percent, for example, the value of a bond portfolio with a one-year average life will be relatively stable as rates change over time. A bond portfolio with a 25-year average life, however, will experience substantial price volatility as market rates change.

The second factor influencing the degree of interest rate risk in a bond portfolio is the size of the coupon. The lower the coupon, the more sensitive the bond's value to changes in market rates. Therefore, the most volatile bond portfolio is one made up of long-maturity zero-coupon bonds. A measure of such price elasticity is *duration*, which is discussed later in the module.

The set of yields from bonds of different maturities is called the *term structure*, which is usually portrayed by the yield curve. The yield curve shown in figure 4 represents the effective yield on U.S. treasury securities of different maturities on May 1, 2004. Although it is typically an upward-sloping curve, the yield curve can take any shape, depending on economic conditions and investor expectations at a particular time.

The set of yields from bonds of different risk is called the *risk structure*. Risk differentials are added to the interest rates for default-free bonds to obtain the relevant yields for lower-quality bonds. Differentials between yields of related bonds, bills, or notes are usually called *yield spreads* and are measured in *basis points*. One basis point equals 0.01 percent. If the yield-to-maturity is 10.90 percent for one bond and 9.80 for

another, the spread is 110 basis points. Figure 5 shows the yield curve for U.S. treasury securities and the corresponding yields for corporate bonds rated AAA, BB, and B-. On this particular day, the spreads for 10-year AAA, BB, and B- corporate bonds were 31, 450, and 800 basis points, respectively.

Many factors influence the price of a bond: current market interest rates, general economic conditions, and the call provisions, tax status, and credit rating of a bond.

EQUITY SECURITIES

Stocks or shares create ownership claims in the issuing firm. Bonds and other debt securities represent creditor claims, which have priority over ownership claims. Equity securities represent residual claims to the equity of the firm after creditor claims have been satisfied. Stockholders of the firm have an *equity interest*, which means that they have the right to whatever profits remain after all other groups have been compensated. As an investment, therefore, equities involve a greater degree of risk, but also an opportunity for greater returns.

Common stock shares are the first security issued by a corporation and the last retired. Common stock has the lowest priority in regard to dividend payment and liquidation. Dividends on common stock are not fixed; rather they are determined by the company's board of directors. When a company's earnings increase continually, the dividend usually increases correspondingly. Common stockholders are the legal owners of the corporation. With their right to vote for members of the board, they can indirectly exercise control over company management. Management is supposed to act in the best interest of shareholders and to take those actions that it believes will maximize share price.

Preferred stock has features of both debt and equity. It resembles debt because its dividend might be a fixed obligation. Unlike common stock, preferred stock usually carries a stated dividend, which must be paid in full before any dividends can be paid on the common stock. However, the issuing corporation makes no contractual commitment to pay a preferred stock dividend. Omission of a preferred dividend is not considered default. In the case of cumulative preferred stock, omitted dividends accumulate, and all must be paid before any dividend can be paid on the common stock. Holders of preferred stock have a claim on the assets of the corporation up to the stated par value of their stock holdings. Although this claim is subordinate to all claims of corporate creditors, it has priority over the claims of holders of common stock. Preferred stockholders do not normally have voting rights, but in some cases their shares may be converted to common stock.

Once issued, most corporate stocks exist perpetually, unless the firm goes out of business or merges into another corporation.¹ Although the initial public offerings of new issues receive more attention, most stock trading occurs in the secondary market because of the amount of equity securities already outstanding. The volume of second-

1. Some preferred stocks have fixed redemption dates, for example, 30 years after the date of issuance.

ary market activity supports several highly organized exchanges and over-the-counter markets. The breadth and depth of the secondary market facilitate diversification of risk, but investing in stocks involves complex valuation issues.

There are both primary and secondary markets for corporate stock. The primary market places new issues, providing corporations with a source of equity funds. Continuous trading in the secondary market provides the liquidity that makes investment in stocks attractive to investors. Although the total number of shares traded from day to day varies considerably, in countries with developed capital markets, the volume is substantial. In the primary market, the volume of new issues fluctuates drastically, according to market conditions. Since corporate issuers naturally wish to sell stocks at the highest possible prices, there is more activity in the new issues market when stock prices are rising or are perceived to be at high levels.

Since many corporations are privately owned, only a relatively small percentage of corporations have publicly traded stock, and only a fraction of those have shares listed on an exchange. More often shares of public corporations are traded privately or over the counter.

Despite the breadth and depth of the secondary market for major corporate stocks and the amount of information available concerning them, their prices fluctuate sharply. Since equity securities represent residual claims, their value depends on the firm's earnings potential, discounted by the required return demanded by investors. Thus changes in interest rates account for some of the price fluctuations. Judgments concerning the firm's earnings potential, the relative price-to-earnings ratio, the potential takeover and breakup value, the dividend payout ratio, and the quality of management all influence the price of common stock. Stock valuation is significantly more complex and controversial than bond valuation.

Headlines often announce stocks that rose or fell in value by several points or dollars in a single day. Although it is not common, it is possible to see the value of a stock double, or decline by half, in a few months.

Stock price fluctuations reflect the supply and demand position of the stock in the marketplace. *Investor perceptions* of the economy, the level and outlook for interest rates, the currency outlook, the prospect for that particular industry segment, the performance of the company relative to the industry, the company's dividend and growth in earnings potential, and the quality of its management affect the price of a stock. A new management might give investors the hope that a previously marginal company will gain market share and become an attractive investment option, or the departure of a highly regarded manager might cause investors to shun a stock that was previously a market favorite. Stock prices react to investors' anticipation of future results and the failure to achieve those expectations. Stock prices commonly react sharply to earnings that are either above or below those anticipated. The announcement of some event that will have an effect on future performance of a company can change stock prices.

Although difficult to measure, there is an obvious relationship between stock prices and interest rates. When capital costs rise or interest rates increase, the attraction of

alternative investments such as bonds increases and money appears to flow from stocks into fixed-income investments.

Although common stock prices are often very volatile, they represent a security with an above-average expected return in the long run.

DERIVATIVE INSTRUMENTS

Derivative instruments, as the name suggests, are linked to an underlying security or commodity. Their value fluctuates in relation to the price of the underlying instrument. Some insurers use derivative instruments such as options, futures, forwards, and swaps primarily as a hedging tool to manage currency or interest rate risks. Hedging involves taking a position that offsets a possible adverse financial development.

An *option* is a contract giving the right to perform a specific act at a future date. For example, call options give the buyer the right to buy the underlying commodity or security from the option writer at a specified price, and a put option conveys to the option buyer the right to sell the underlying commodity or security to the option writer at a specified price. Buyers of options can choose to exercise the option if prices move advantageously or to abandon the option if the market moves against their position. Since there is no obligation to exercise the option, the maximum possible loss is the premium paid for the option.

A *futures contract* is an obligatory agreement to buy or sell a specific commodity at a specific time at a specific price in a central regulated marketplace. Price is the only variable, and the agreement is standardized. A forward contract, in contrast, is not standardized and is usually not transferable. It is a cash market transaction in which two parties agree to the purchase and sale of a commodity at a future time under conditions agreed upon by the two parties.

In an interest rate *swap agreement*, two parties exchange designated cash flows over a defined period of time. Often a floating-rate obligation is swapped for a fixed-rate obligation to hedge liability costs or asset yields.

Not all jurisdictions permit insurers to own derivatives, and their use raises complex regulatory and accounting issues considered elsewhere in the core curriculum (see ICP 22). The fundamental rule, however, is that insurers should purchase derivative instruments only for hedging purposes, not for speculation or arbitrage.

REAL ESTATE

Insurance companies own real estate either as investments or as office space for normal business activities. Real property is land and interests closely associated with land. It includes buildings permanently affixed to the land, as well as fixtures, which are personal property installed on, attached to, or used with land or buildings in such a way as to

become or be considered a part of the land. Real estate investments can include the following:

- Office blocks
- Vacant land
- Shopping centers
- Residential property
- Agricultural land.

The instrument that actually transfers title to real property is a deed. A general warranty deed, in addition to transferring whatever title the grantor has, contains the grantor's warranty that the title is free of all encumbrances (prior claims on the property), that the grantor has the title being transferred, and that no one else has a better title. In the event of breach of any of these warranties—also called covenants—the grantee can sue the grantor. If there is an encumbrance, such as a mortgage on the property, the deed so states.

Under the property laws of most countries, the deed must be in writing, it must name the buyer and the seller, it must state the sales price, and it must describe the property conveyed. The deed usually contains a paragraph reciting who transferred the property previously, when it was transferred, and the place where the recorded copy of that deed may be found.

Since each property is unique, a willing buyer may or may not exist. Thus the current value of real estate is more problematic than the value of marketable securities. Although professional appraisals, if reasonably current, can provide some indication of a property's value, an insurance company selling into a distressed market might not realize that value fully. This low degree of liquidity makes significant real estate investments unsuitable for non-life insurance company operations.

For long-term investors like life insurers, however, the rental income from real estate investments can offer attractive returns. Moreover, in some situations the cash flows from rental income are less variable than those from equity investments. If forced liquidation is unlikely, the equivalent net present value of the rental income cash flows might be a more appropriate indicator of the value of real estate investments. (A quick estimate is as follows: value of property = net annual rental income ÷ discount rate.) As with bonds, the higher the market interest rate (and therefore the appropriate discount rate), the lower the value of the property.

MORTGAGES

Insurers, particularly life insurers, are major investors in the mortgage market. Usually a real estate mortgage transfers an interest in real property, with a statement of the debt and a provision that the mortgage shall be void on full payment of the debt. A mortgage

takes the form of an encumbrance added to the deed or transfer of land by the borrower in favor of the lender, giving the lender the right to take possession of the property in the event the borrower defaults on the debt. It must be in writing and signed in the same manner as a deed. If not properly executed, it may not be eligible for recording. The mortgagor is the property owner who obtains the mortgage, and the mortgagee is the lender, such as a bank or insurance company. Originators of residential mortgages, such as commercial banks and thrifts, often sell their newly originated loans to the secondary market. The largest participants in the secondary market are government agencies, large corporations, and financial institutions such as insurance companies and pension funds.

The securitization of mortgage loans has broadened the mortgage market by pooling loans and converting the pooled loans into a security. The securitization process has created a secondary market consisting of a wide range of investors for whom the security is acceptable, but the actual mortgage loans are not acceptable. In addition to mortgage-backed securities, other asset-backed securities represent pools consisting of leases, automobile loans, and credit card balances.

Life insurers are major holders of a mortgage-backed security called a *collateralized mortgage obligation*, or CMO. It is usually a AAA-rated bond, collateralized by mortgages. A CMO issue consists of several different classes—or tranches—each having its own weighted average life, coupon, and stated maturity date. The principal payments and prepayments on the underlying mortgage collateral are channeled to pay principal on the class with the earliest stated maturity. Retiring CMO classes in order of stated maturity provides a variety of investment options plus call protection for investors in intermediate and long-term classes. Although CMOs cannot eliminate prepayment risk, they do moderate the effects of fluctuations in prepayment rates through their multiple-class structure. The allocation of principal payments to the respective CMO classes in order of stated maturity effectively channels unexpected prepayments to classes with earlier stated maturities. Bondholders of the classes with later-stated maturities can expect that, in many prepayment scenarios, their bonds will remain outstanding for more extended periods of time. Since the longer-maturity classes of a CMO have substantial price risk, however, the investor should clearly understand how the investment will perform in different interest-rate environments. Their multi-class structure makes these instruments particularly useful for asset-liability management by creating more possibilities for matching maturities.

OTHER ASSETS

The securities described above constitute the most common investments of insurance companies, but other assets also appear on the balance sheet. The following items are assets, but not investments. For the most part, they arise directly from insurance activity.

Q3

Answer the following question in the role of the insurance supervisor responsible for the jurisdiction.

- 1. Because your country faces severe catastrophe exposures, the insurance law limits insurers' investments to secure assets, which it defines exclusively as government bonds and real estate. Should you recommend any changes to this law? If so, what should be changed?**

Similar to mortgage loans, *collateral loans* represent obligations due the insurer that are secured by collateral. The insurance company retains the collateral to ensure the repayment of the loan in case of default. Depending on the rules of the relevant jurisdiction, the loan might be considered an asset as long as (1) its unpaid balance does not exceed the market value of the collateral held and (2) the collateral itself is an authorized investment. Collateral loans are not commonly found among insurance company assets.

In some cases, insurance companies might make loans that are not secured by collateral, perhaps to the owners or related parties. In most jurisdictions, such *unsecured loans* are nonadmitted assets, disregarded in the evaluation of the insurer's solvency.

Agents' balances, or uncollected premiums, represent the sum of insurance premiums due from agents, policyholders, or other insurance companies. In some jurisdictions, agents collect premiums and then remit the premiums that they collect net of commissions, according to an established agency billing arrangement. Most agency contracts specify the period of time that an agent has to collect premiums and to pay the insurance company, typically 30 to 45 days after the policy is recorded. Companies that bill policyholders directly also have uncollected premiums outstanding at year-end. Most jurisdictions do not consider agents' balances or uncollected premiums over three months due as assets for solvency purposes.

When a claim is settled and paid for a reinsured loss exposure, the reinsurer is billed for its portion of the settlement. The insurer records a receivable from the reinsurer for its portion of the loss in an asset account called *reinsurance recoverables*. Reinsurance recoverables on paid losses are comparable to agents' balances in that both accounts are receivables. As with any receivable, delayed collection can impair cash flow. The insurer should have effective collection procedures, since disputes can arise over the interpretation of reinsurance contracts. Overdue reinsurance recoverables or recoverables from slow-paying reinsurers might not qualify as assets under the rules of some jurisdictions.

Valuation of Assets

Any determination about the sufficiency of an insurer's assets depends on valuation, the measurement of assets in monetary units. This quantification of assets is not straightforward, however, since many different concepts of value can be applied. Comparisons among firms are possible only if all insurers within the same jurisdiction value their assets according to the same rules.

Traditionally, insurance supervisors have sought valuation rules that result in a conservative statement of an insurer's financial position and that, as much as is reasonably possible, prevent sharp fluctuations in the solvency margin or owners' equity account. A conservative measurement of financial position results when the lowest possible value is selected for assets and the highest possible value is selected for liabilities. Stability comes from selecting asset and liability values that experience the least amount of change from period to period.

Accountants have attempted to measure asset values in various ways, but each approach involves a compromise of some sort. By definition, assets are probable future economic benefits obtained or controlled by a particular entity as a result of past transactions or events. Future economic benefits come from being exchanged for something else of value to the enterprise, by being used to produce something of value, or by being used to settle its liabilities. For insurance firms, the exchange value is the most significant. The measurement issue is which exchange should be counted: the input, the output, or something in between.

EXCHANGE INPUT VALUES

Input values have the advantage of being readily verifiable. In fact, the historical cost (or historical exchange price) method underlies most conventional accounting. Inventories, property, plant, and equipment are often recorded at historical or acquisition cost. Cost is the exchange price of the asset at the time it is acquired.

The main disadvantage of historical cost valuation is that asset values change over time. With the elapse of time, the cost becomes less useful as a measure of an asset's value to the firm. Moreover, gains and losses in the asset portfolio are not associated with the period in which they occurred. The historical cost of financial assets has little relevance to financial risk management decisions. Finally, comparisons between firms are more difficult, since the value of an asset portfolio of securities held for a long time will deviate from the current market value more than a portfolio with more frequent turnover.

AMORTIZED COST

The valuation rules of many jurisdictions show the value of bonds at amortized cost. Amortized cost is the price paid for the bond adjusted to the current period in such a way as to equal eventually the precise sum that is payable at the bond's maturity date. A bond that is purchased above (at a premium) or below (at a discount) par value is gradually written down or up to par value between the date of purchase and date of maturity. A portion of the bond's premium or discount is allocated to investment income proportionally over the period the bond is held, which has a stabilizing effect on income and the solvency position. The amortized cost valuation rule recognizes that insurance companies are going concerns. They normally do not have to liquidate securities at depressed prices but can rely on normal cash flow from underwriting and scheduled investment maturities to meet disbursement requirements. Although bond values based on amortized cost reduce the variability shown in an insurer's financial statements, they can distort the measurement of the insurer's true economic position.

LOWER OF COST OR MARKET

Direct real estate investments are valued at cost adjusted for additions, improvements, and depreciation. Depreciation allocates the cost of a tangible long-lived asset over its useful life in a systematic manner. Encumbrances due to mortgages on company property serve to reduce the balance sheet value of real estate. If the market value exceeds cost, no adjustment is made. However, market values below cost require a reduction of the asset's value to reflect the difference. Thus real estate values are cost or market values, whichever is lower. The low liquidity of real estate justifies this valuation rule, even when it appears inconsistent with valuations placed on other assets.

EXCHANGE OUTPUT VALUES

More relevant to an insurer's future financial position is the exit value of an asset: the amount realized when the asset matures or is sold. General accounting uses expected exit value for accounts receivable and accounts payable, and present value of expected cash flows is frequently used for long-term receivables and payables. Since insurers can hold assets for a long period of time, the ultimate exchange output value can only be estimated. This estimate includes appropriate discounting to calculate the present value.

CURRENT EXIT VALUE OR FAIR VALUE

Most accounting systems measure marketable equity securities using current exit value: the price at which the asset could be sold assuming an orderly disposition. It is not the same as *liquidation value*, which is the amount that could be realized in a forced sale.

The framework for international financial reporting standards attempts to measure all assets and liabilities at *fair value*. International accounting standards define fair value as “the amount for which an asset could be exchanged, or a liability settled, between knowledgeable, willing parties in an arm’s-length transaction.” The concept of fair value assumes a current transaction, rather than settlement at some future date.

The process of estimating fair value seeks to determine the price at which that transaction would occur. For actively traded securities, published price quotations provide a reliable measure of fair value. If activity in a market is infrequent, the market is not well established, or small volumes are traded, quoted market prices may not reflect the fair value of the asset. For some assets, there might be little information to support an estimate of fair value. To discourage manipulation of stated values, some jurisdictions define actively traded securities according to specified minimum market characteristics.

Measuring assets by current values results in unrealized capital gains or losses appearing on the balance sheet to account for the changes in values; changes since the prior reporting period flow through the insurer’s income statement. This valuation rule exposes the insurer’s solvency position to fluctuations in response to market conditions. Temporarily depressed market prices might make the insurer appear financially troubled even though it does not need to sell assets to meet its policyholder obligations.

Ideally, the valuation rules for assets should be consistent with the valuation rules for liabilities. Valuing assets at market if liabilities are not valued at market, or vice versa, might cause large fluctuations in equity. In the fixed annuity market, consistent valuation rules for assets and liabilities are crucial. Otherwise, comparing very long-term liabilities, discounted to present value, with the long-term assets backing such liabilities would be nearly impossible.

The International Accounting Standards Board is working to solve these problems in measuring insurer assets, as well as the even more difficult problems in measuring insurer liabilities. As their work has shown, the basis of valuation selected to measure assets has major implications for insurance supervisors.

NONADMITTED OR DISREGARDED ASSETS

For insurance supervisory purposes, some assets have zero value even though the same items might appear on the financial statements of non-insurance enterprises. Assets classified as nonadmitted, or disregarded, items generally have one of two characteristics: either (1) they are not legally allowed or (2) they are not liquid. Either characteristic can disqualify an asset from being entered on the insurer’s statutory balance sheet.

Q4

Answer the following questions in the role of the supervisor responsible for the jurisdiction.

- 1. Sometimes insurance companies have some assets that are measured in a conservative way and some that are not, but the balance is still conservative. Would you accept this situation?**
- 2. Would you accept that assets are measured in a conservative way, while liabilities are not? Explain your reasons.**

An asset's liquidity is measured in two dimensions. First, the less time needed to convert the asset to cash, the more liquid the asset. Second, the greater the certainty of how much value will be realized when the asset is converted to cash, the more liquid the asset. The uncertainties about the time required to convert to cash or the value realized on liquidation exclude certain assets from insurance company balance sheets. Assets such as automobiles, leasehold improvements, furniture, certain types of equipment, and supplies are not admitted because of their low liquidity.

Other nonadmitted assets can include goodwill, prepaid expenses, deferred expenses, uncollected premiums over 90 days due, overdue reinsurance, and loans or advances to certain company personnel. Even though the value of those assets cannot be considered for solvency purposes, the company should maintain formalized accounting control over them because their values are reported elsewhere.

D. Investment Regulation

Regulatory restrictions on how insurance companies invest their assets strive to ensure that insurers can meet their financial obligations to policyholders. In most jurisdictions, regulations define the permissible investments for each category of funds and include minimum or maximum percentage requirements for government bonds, equities, and other types of investments. These restrictions on type, concentration, mix, and quality of investments constrain the investment strategies available to insurers. Appropriate investment regulations recognize that various parties in the system have different goals. These goals can be summarized as follows:

- Policyholders seek the best products and service at the lowest cost (and sometimes through unit-linked products the opportunity to participate in the results of insurance and investment operations).
- Insurers seek the maximum return on their investment consistent with liquidity needs, capital requirements, and regulatory constraints.
- Regulators seek to protect policyholders from insurer insolvencies and to promote a viable insurance market (one in which the contending interests of many buyers and many sellers direct risk-bearing resources efficiently).

For the insurance system to work, it must allow each party room to pursue these goals. Investment regulations that are good for policyholders might not be good for insurers and vice versa. A balance must be achieved so that each is willing to participate in the system. Sound investment regulation should recognize the risks facing insurers and encourage them to manage those risks in a prudent manner without unduly limiting management initiative and judgment. Investment regulation tends to become less prescriptive as markets develop, but it should always monitor insurers' investment performance to minimize the threats to solvency.

Mandatory investments

In some jurisdictions, insurers must invest in prescribed assets. Such investments might be designated because of their presumed safety, or because the government seeks to promote a socially desirable capital allocation. For example, the regulation might require a certain percentage of an insurer's assets to be invested in the bonds of the central government or the bonds of a housing authority or for some other social purpose. Insurers may be required to channel investments into specified sectors of the economy to stimulate growth of priority sectors. Such prescribed investments can facilitate supervision, since they are easy to value. However, limiting the insurer's investment options in a competitive environment leads to lower returns and discourages capital deployment.

Thus mandatory investments impede the healthy development of the insurance industry and can result in higher premiums for policyholders.

Permitted or prohibited investments

Investment regulations can also define the categories of assets in which insurers are permitted to invest or prohibited from investing. Permitted assets generally are those exhibiting safety of principal and liquidity sufficient to avoid the need (in reasonably expected circumstances) to sell assets at distressed prices. They also generally exhibit stability of value, although assets exhibiting higher risk and possible fluctuations of value may be permitted if these factors are compensated by a commensurate increase in yield and growth possibilities and by reserves that are sufficient to cover reasonable foreseeable fluctuations in value.

Prohibited investments frequently include the following:

- Investments of a speculative nature
- Investments directly benefiting officers or directors of the insurer
- Investments in enterprises in which officers or directors have a significant interest
- Investments in partnerships
- Investments in the insurer's own stock, except in an employee plan or a conversion plan approved by the supervisor
- Investments in commercial and industrial companies other than insurance and financial companies.

Investment limitations or ceilings

Most jurisdictions have laws and regulations that limit an insurer's investments in various instruments. For example, those limitations often restrict an insurance company from investing in the stock of any one issuer an amount greater than a prescribed percentage of the investing insurance company's admitted assets. The limitations might also restrict the amount of stock ownership to a specified percentage of the issuer's outstanding stock. If an insurance company's investment exceeds those specified limits, the excess is a nonadmitted asset and is not considered in the solvency margin.

Regulations limiting investments in specific categories have two main advantages. First, they encourage reasonable portfolio diversification with respect to geographic area, industry, maturity, types of investment, individual investments, issuer and related companies, and other relevant variables. Diversification reduces risk.

Second, they discourage insurance companies from obtaining proprietary interests in non-insurance-related activities if those activities are not totally prohibited. Careful monitoring is necessary to assure compliance. In a dynamic environment, investment ceilings must be adjusted frequently to take account of changing economic conditions and new investment vehicles.

In South Africa, legislation specifies two separate solvency tests. One ascertains whether the insurer has enough assets (allowable and valued according to supervisory requirements) to cover its liabilities and capital adequacy requirements. The other determines whether the insurer has enough assets after applying the investment limitations to cover its liabilities. The legislation also allows the supervisor to relax the investment limits in certain circumstances, such as a newly registered insurer that cannot easily and quickly spread its investments.

Risk-based capital requirements

Risk-based capital requirements set capital standards that vary according to the risk inherent in an insurer's overall business operation. They discriminate between companies according to the extent to which they endanger the required solvency safety margin, thus detecting the companies that need additional monitoring or modifications in their operation. Under risk-based capital requirements, each insurer must calculate the amount of capital required to handle the company's total risk. Each company compares this figure to its reported surplus. A surplus figure below the required amount might indicate an inadequately capitalized company and the need for regulatory and management action.

The calculation of a risk-based capital requirement involves identifying the various components of an insurer's activities that create risk. A weight is determined for each risk factor, and the product of the weight and the amount at risk yields the amount of capital required to support the firm's activities in that area. The appropriate risk factors depend on the conditions of the market and the nature of the business.

Asset risk addresses the possibility that an asset will not produce the amount of income expected on a timely basis, that an asset will decrease in value, or that bondholders will not receive promised interest payments on the due date. Even without a default, equities are risky because of fluctuations in their market value over time.

The risk-based capital system of the National Association of Insurance Commissioners (NAIC) in the United States, for example, applies a low factor for high-grade bonds for which there is little chance of default. The weight increases through each of six rating classes, from a weight of 0.003 for the highest-rated bonds to a weight of 0.30 for the lowest-rated bonds. Unaffiliated common stock has a weight or risk factor of 30 percent. If an insurer had \$1 million in unaffiliated common stock, the risk-based capital standards would require the firm to have \$300,000 of capital available to support the risk of a decrease in value of that common stock.

The European index-based approach determines the calculation of a solvency requirement with regard either to the total amount of premiums or to the total amount of claims (if higher). A weight is also established for the whole amount of premiums or claims determining the minimum solvency level required. There is also a risk-weighted charge for reinsurance activity because reinsurance means transferring insurance risks to other entities.

While the risk-based capital concept has strong theoretical underpinnings, it can be cumbersome to apply in practice. Since the measurement of risk requires substantial longitudinal data, in the absence of broad assumptions about the levels of various risks, it is virtually unworkable in transitional economies. As markets mature, however, they can move in this direction.

Prudent-person rule

The type of investment regulation that allows the greatest flexibility in investments uses a prudent-person rule to judge whether an insurer has appropriate investments. In Canada, for example, prior to 1992 the Insurance Companies Act restricted the types of investments life insurance companies could hold by providing a detailed list of the asset classes and investment limits. The 1992 revision of the law adopted a *prudent-portfolio* investment regulation that allows managers to pursue a broader class of investments, with fewer quantitative limits, while employing a prudent-manager's discretion. Under the standards of the Canadian actuarial profession, the valuation actuary now has the freedom to determine the valuation assumptions, which can become less restrictive as experience improves over time. The valuation of liabilities is also closely linked to the composition of the investment portfolio. Dynamic capital adequacy testing requires actuaries to project a company's surplus position over the medium term under a number of different scenarios; based on the results, the actuary can recommend appropriate investment policies to the board.

The regulatory approach based on a prudent-person rule implies that managers must act with due diligence using experience and skills that are comparable to those of other managers in similar situations within the industry. This new rule grants more flexibility to Canadian life insurance companies in matching asset portfolios with their liabilities. The boards of directors of these companies are required to develop and approve written investment policies that encourage prudent behavior. This change provides Canadian life insurers with a more modern regulatory environment and the ability to invest and operate more actively without cumbersome constraints. The prudent-person-rule approach also conserves supervisory resources, although standards can be difficult to apply consistently and the actuarial opinion is crucial.

By and large many countries now accept this approach and define classes of investments very broadly in order to permit and assess managers' discretion and responsibility.

Q5

Answer the following question in the role of the insurance supervisor responsible for the jurisdiction.

- 1. You would like to adopt a prudent-person approach to investment regulation, but the country has very few actuaries. What is your next step?**

E. Investment Management

As insurance companies collect premiums from policyholders and invest the accumulated funds, they seek the highest possible return at appropriate levels of risk, given regulatory constraints. The investment department manages the company's portfolio of bonds, mortgages, stocks, and real assets, but top management usually determines the investment strategy of the company consistent with its underwriting experience, expenses, and tax position. Ultimately, the investment strategy and its implementation are the responsibility of the insurer's board of directors. The following discussion should enable supervisors to understand the management of investments, not so they can direct investment policy, but so they can monitor it properly.

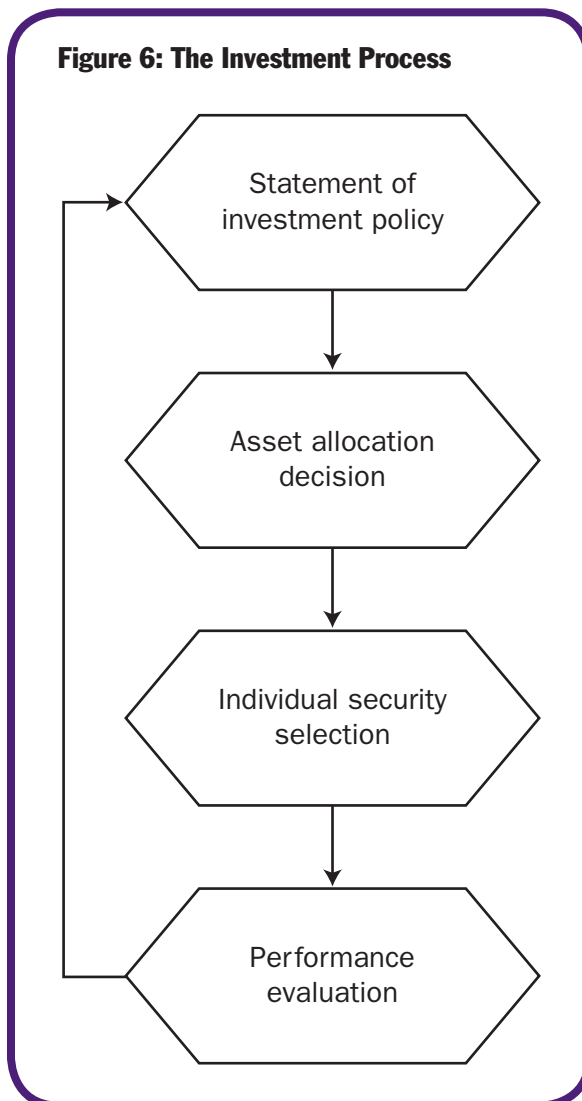
As financial intermediaries, insurers simultaneously manage two portfolios. Their insurance portfolio contains claims against the insurer resulting from the underwriting risks accepted. The investment portfolio consists of securities held for the profitable employment of funds. The value of each portfolio fluctuates according to economic and business

conditions. Therefore, insurers must manage efficiently not only each one individually but also the combination of these two portfolios.

Some invest aggressively, attempting to maximize return and accept a certain degree of investment risk. Others invest defensively, seeking to minimize investment risk while seeking the highest rate of return consistent with safety. During periods of high interest rates, when sizable investment earnings are possible, some insurance companies have increased premium writings in order to increase the amount of investable funds by lowering underwriting standards and cutting prices. This *cash-flow underwriting* strategy is successful only when the gain on the additional investable funds is greater than the underwriting loss. In many cases, companies pursuing such a strategy have suffered terrible losses resulting from underpriced or mispriced insurance risks and sacrificed market share anyway.

Tariff markets, on the one hand, can diminish the incentive for managing investment portfolios because the insurer can expect profits in any case. Highly com-

Figure 6: The Investment Process



petitive pricing environments, on the other hand, can motivate insurers to hold higher-return, higher-risk investment portfolios in order to compensate for technical losses from the underpricing of products.

The development and implementation of an *investment strategy* involves a series of steps that, taken together, form the investment process. The ideal process for making investment decisions applies to all types of investors, including insurance firms. As figure 6 shows, it begins with the formulation of objectives and restrictions and concludes with an evaluation of how well the portfolio achieved the stated objectives.

Statement of investment policy

Responsibility for drafting an investment policy statement usually rests with either the chief financial officer or the chief investment officer. Review and approval of the statement occur at the level of the board of directors, with reevaluation at least annually. To ensure and document adequate controls, the statement should clearly define the responsibility for individual decisions, establish the authority to approve transactions, and specify limits on the execution of monetary transactions. The investment policy statement should be a written document, and some jurisdictions require it to be filed with the supervisor.

One objective should be to maximize the risk-adjusted rate of return on the portfolio, but other *portfolio objectives* can be included as well. Constraints can be imposed by management, shareholders, and regulators and might include a constraint on the amount of diversification in the portfolio. Since the degree of risk is greatly affected by the number of securities in a portfolio, the policy statement might require holding a minimum number of securities. Because risk-based capital rules can penalize inadequately diversified portfolios, it makes sense for company management to adopt a policy that ensures sufficient diversification of its portfolio.

The policy statement should address the investment horizon. An explicit *investment horizon* raises the question of whether the maturity of the firm's assets will coincide with the maturity of the firm's liabilities. As far as possible, any asset-liability mismatch should be deliberate, occurring only after management has evaluated the costs and benefits of a mismatch and documented the reasons for it. (If enough suitable long-term investments are not available, some asset-liability mismatch might be unavoidable.)

Portfolio turnover also requires clear rules. A buy-and-hold strategy makes portfolio changes only as investment goals change. A strategy of active portfolio management makes portfolio changes in anticipation of changing investment potentials. A market-timing strategy involves transferring funds among different types of investments to earn the highest possible return during each investment period. Mechanical timing plans establish investment purchases or sales using predetermined plans, such as cost averaging and stop-loss orders. Although the cost to trade securities has fallen in recent years, these costs can still be high in the presence of excessive trading in the portfolio

or in countries with developing capital markets. Management should decide how much turnover is acceptable and ensure that frequent churning does not result in speculative tendencies, thereby exposing the portfolio to additional risks.

Tax considerations can also influence investment decisions. The tax treatment of alternative investments may restrict their use. Special tax treatments such as heavy taxation of foreign-issued instruments, heavy corporate taxation on investment profits, or tax-free status for public sector bonds often give the investment manager the decision of weighing the gain from not paying taxes on interest income received from tax-free bonds or obtaining the higher interest rate available from corporate or other taxable bonds but paying the extra taxation on capital gains. Where taxes are concerned, communication between the insurance operations and the investment operations is important. For example, unexpected losses on insurance operations might suggest a marginal adjustment to include more taxable securities in the portfolio.

Finally, *liquidity needs* should be considered. In managing the investment portfolio, the insurance company must maintain sufficient liquidity to meet its expenses and pay claims. For example, life insurers invest substantial amounts in mortgages that are not liquid assets. Prudence calls for the insurer to hold cash and near-cash asset reserves to be able to respond to unexpected demand for cash arising from claims, policy loans, or some other need.

Asset allocation decision

After the board of directors adopts the policy statement, management must determine what proportion of the portfolio's assets should be allocated to equities, various fixed-income categories, and derivative securities. Research has shown that this is an extremely important determinant of the portfolio's long-term return.

Individual security selection

Multiplication of the total amount in the portfolio by the proportion to be invested in an asset category yields the amount of funds available to invest in individual securities. The portfolio manager must then decide which securities to purchase, hold, or sell in accordance with the investment goals and risk constraints. Selection is an ongoing process, and investment ideas are generated internally as well as externally, such as by brokers. The section on portfolio composition and diversification provides more information on this topic.

Performance evaluation

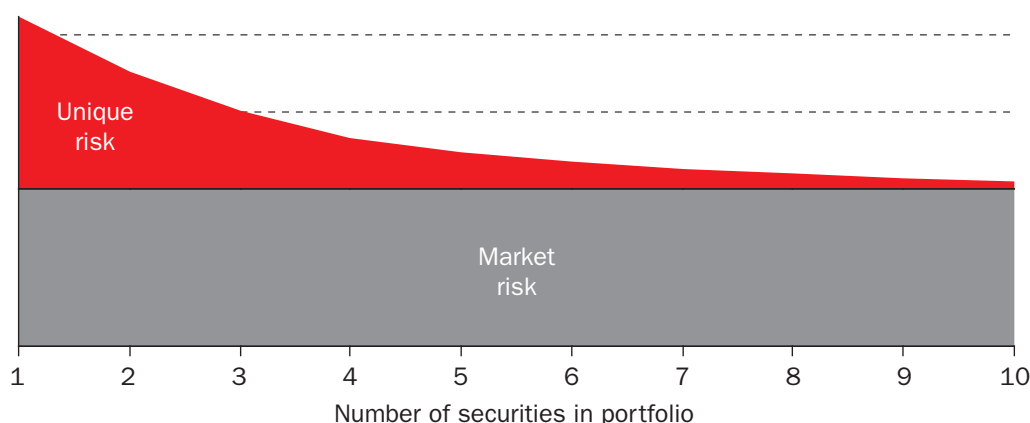
The last step in the process is to monitor the performance of the portfolio. This monitoring involves measuring both the rate of return and the degree of risk taken in achieving the return. The frequency of measurement varies, but it should be done at least quarterly, and the portfolio's performance should be reviewed annually to identify the reasons for variation in the portfolio results. By analyzing the need for modifying the investment policy, the annual review leads back to the first step of the decisionmaking process for the subsequent year.

Performance evaluation also includes evaluation of the investment managers. Beyond a solid educational grounding in business and finance and skill in financial analysis, the qualifications of investment professionals are varied. Since experience is a major factor, investment analysts often work as a team, with younger analysts gradually assuming more responsibility. The surest way to gain distinction in this field is to achieve superior results for the portfolio one manages. Sometimes incentive compensation might be tied to achieving the targeted rate of return on the portfolio under management. Actual results, however, depend more on overall market conditions than on the ability of the investment manager. Thus the most useful comparisons are to peers or to indexes of similar portfolios. (This point should be addressed in the investment policy itself, which should establish the benchmarks against which performance will be assessed. Otherwise, performance evaluation could become an exercise in finding comparisons that, after the fact, make the investment manager look good.)

Portfolio composition and diversification

In constructing an investment portfolio, investment managers draw on modern portfolio theory to choose the assets and specify the amount to invest in each asset that will achieve the investor's goals. Portfolio theory measures the amount of portfolio risk and uses information about each market risk to manage or control the level of portfolio risk.

Suppose that a risky portfolio is composed of only one stock, Microsoft Corporation. The sources of *risk* to this portfolio come from two broad categories. One is systematic risk associated with conditions in the general economy, such as the business cycle, inflation, interest rates, and exchange rates. In addition to these unpredictable macroeconomic factors are company-specific influences, such as Microsoft's success in research and development and the attraction of superior personnel, that could affect the rate of return on Microsoft stock. These firm-specific factors affect Microsoft without noticeably affecting other firms in the economy, except its direct competitors. This risk, which can be eliminated by diversification, is called company-specific, nonsystematic, or diversifiable risk.

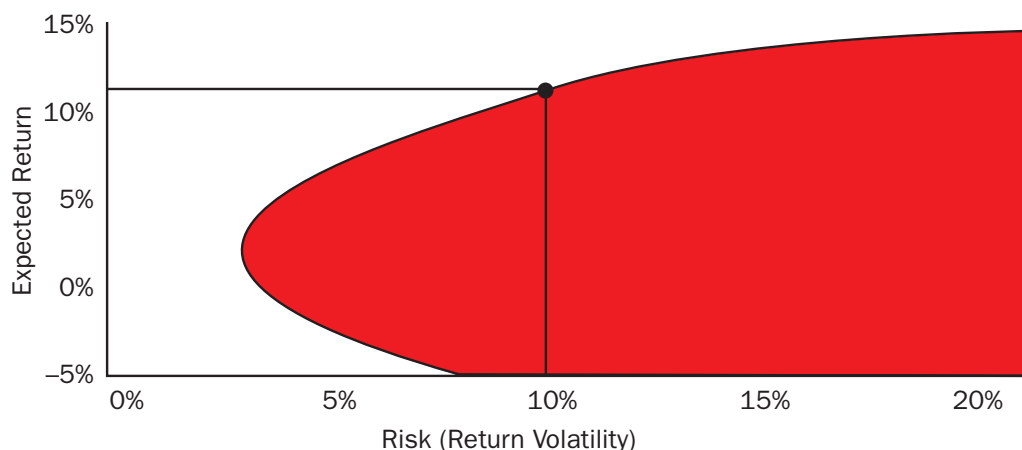
Figure 7: Portfolio Diversification

Suppose that the investment manager diversifies the portfolio by investing half of the assets in ExxonMobil, leaving the other half in Microsoft. What should happen to portfolio risk? If company-specific influences on the two stocks differ, this diversification will reduce portfolio risk. For example, when oil prices rise, helping ExxonMobil, software prices might fall, possibly hurting Microsoft. These offsetting effects tend to stabilize a portfolio's return.

As figure 7 shows, diversification beyond these two stocks into many securities will continue to spread the exposure to unique company-specific factors, and portfolio volatility will continue to decline, arresting the downward risks on the portfolio. This diversification can be by country or region, by type of investment security, by industry, and by responsiveness to the business cycle. However, the risk cannot be reduced below a certain level, since virtually all securities are affected by the market's systematic risk. Under these circumstances, portfolio managers cannot avoid exposure to business cycle risk regardless of how many stocks they hold.

When all risk is company-specific, and less than perfectly correlated, diversification can reduce risk to low, even virtually negligible, levels. This reduction of risk when risk sources are independent is sometimes called the *insurance principle*. An insurance company depends on the risk reduction achieved through diversification when it writes many policies insuring against many independent sources of risk, with each policy representing a small portion of the company's overall portfolio.

When common sources of risk affect all firms, even extensive diversification cannot eliminate risk. The portfolio standard deviation falls as the number of securities increases, but it cannot be reduced to zero. The risk that remains even after extensive diversification is called *market risk*, risk that is related to market-wide risk sources. Market risk is systematic or nondiversifiable risk. Portfolio diversification works as long as assets are less than 100 percent positively correlated in a statistical sense. The greater an asset's correlation or covariance with the other assets in the portfolio, the more it

Figure 8: Efficient Frontier of Investments

contributes to portfolio variance. An asset that is perfectly negatively correlated with a portfolio can serve as a perfect hedge, reducing the portfolio variance to zero. Most portfolios consist of more than one security. Individual investors might hold five or ten securities, and insurance companies might hold hundreds of securities.

An *efficient frontier* of investments represents the best attainable combinations of expected return and risk (see figure 8). Any point on the frontier represents the maximum possible expected return for a given risk level or the minimum risk for a given expected return. Given the standard assumption of risk aversion, no rational investor will want to hold a portfolio that offers less than the efficient point.

Q6

Answer the following question in the role of the insurance supervisor responsible for the jurisdiction.

- 1. An insurer's investment portfolio includes some real estate investments. Although diversification requirements have been met, you are concerned that the insurer is excessively exposed to real estate construction risks. What arguments can you make to the insurer?**

F. Investment Risk Management

Since the risk profile of each firm differs, prudential supervisors face expanding challenges as the market continues to innovate. No model will ever capture the entire risk profile, but efforts to improve the quantification of risk are essential. As insurers improve their risk management techniques, supervisors also benefit. If supervisors monitor the market carefully and recognize the probable consequences of various company strategies, they can protect policyholders with less drastic measures. The starting point is the supervisor's insistence that insurers practice risk management.

Six general types of financial risks face the insurance industry:

- Actuarial
- Systematic
- Credit
- Liquidity
- Operational
- Legal.

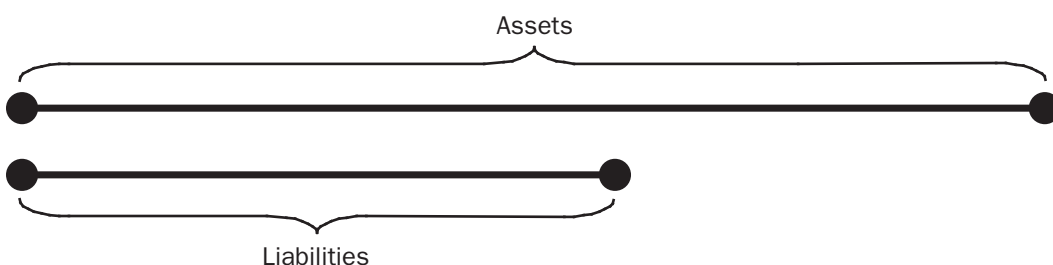
As these risks vary with the type of business, insurance company managements work very hard to define the inherent financial risks that can alter their course of success.

Actuarial risks arise from raising funds by means of issuing policies and other liabilities. The two risks that affect companies are (1) paying too much for the funds received and (2) receiving too little for the risks taken.

Systematic risk, also called the market risk, deals with changes in the value of assets and liabilities. Any movement in interest rates affects the yields on those investments as well as their market value. Insurers invest in assets that vary in credit quality, liquidity, and maturity, which subjects them to market value variations independent of fluctuating liability values.

Credit risk, the possibility that borrowers will not fulfill their obligations, reflects borrowers' financial condition and the value of their collateral. Insurers are exposed to credit risk because investments in bonds form a substantial part of their asset portfolios.

Figure 9: Maturity and Liquidity Characteristics of Securities



Liquidity risk may present potential funding crises connected with unexpected events in the market. Because of the long-term nature of the risk they underwrite, life insurers make long-term investments so they can fulfill their contractual obligations as they fall due. Unexpected situations such as disintermediation can arise when policyholders make increased withdrawals and surrenders due to high interest rates offered in the market. If policyholders take such actions, companies could be forced to sell off long-term assets at losses to pay for these unexpected events.

Operational risk involves not only management and employees but also management information systems used for processing data and record keeping. Inefficiency in this area can produce costly outcomes for insurance companies. Other operational risks can include reinsurance risk, intermediaries' risks, transactions risk, custody risks, financial reporting risk, strategic management risk, market conduct risk, and corporate governance risk.

Legal risk should be of great concern to the insurance industry. New legal trends can be observed in litigation outcomes, especially in the United States, and globalization adds new meaning to the legal environment. Other reasons such as fraud, violation of regulations, and misinterpretation of contracts by policyholders add to the complexity of this kind of risk. This legal risk can result in catastrophic losses to insurance companies.

Asset-liability management

Often, the securities owned by insurers have different maturity and liquidity characteristics than the obligations they issue (see figure 9). This mismatch in assets and liabilities exposes the insurer to interest rate risk. For example, an insurer might invest in bonds that do not mature for 15 years, while its liabilities come due in an average of 10 years. The solvency of the company is not in doubt now, but in 10 years it might be if rising interest rates diminish the market value of the bonds.

The opposite scenario—long-term liabilities and shorter-term assets—can also be a problem for insurers. Nissan Mutual Life, a Japanese company with assets of \$17 billion, sold annuities paying guaranteed interest rates of 5 percent or greater without hedging these liabilities. A drop in government bond yields created a large gap between the interest rates Nissan Mutual promised and the returns it was earning on its investments. In 1997 the Japanese finance minister took over the company, with losses of \$2.5 billion.

The Society of Actuaries defines asset-liability management (ALM) as “the ongoing process of formulating, implementing, monitoring, and revising strategies related to assets and liabilities to achieve an organization’s financial objectives, given the organization’s risk tolerances and other constraints” (Society of Actuaries 2003, p. 7). This coordinated, ongoing process pursues the multiple financial objectives of the firm.

- ALM is coordinated because the decisions on assets and liabilities are made in an integrated, not separate, fashion.
- ALM is ongoing because the changing nature of market factors, claims experience, and consumer behavior requires continual readjustment of these decisions.
- ALM has many financial objectives, not just one, and tolerances and constraints that form boundaries within which asset-liability managers must work.

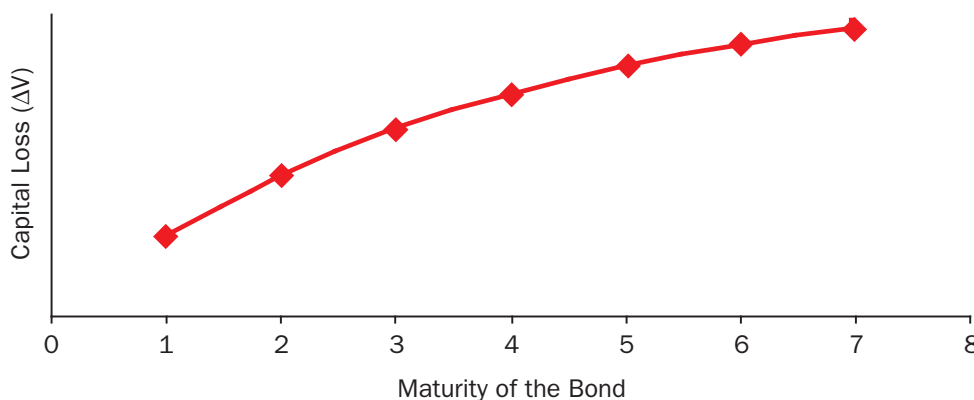
Insurance companies have many options to structure adequate asset portfolios to match their liability structures and maximize firm value. In a stable environment where interest rates are constant, this would be an easy task, because the outcomes would be more predictable. However, volatile interest rates and fluctuations in the real estate market values in recent years have challenged insurance companies to develop adequate solutions to achieve their objectives. In addition, government regulations, agency ratings, and informed customers have further challenged business strategies.

When evaluating exposures, insurers must look at the aggregate risk exposure and formulate asset-liability management processes that involve all levels of an organization. With the help of computer technology and sophisticated software programs, such as simulation, insurers can quickly perform different situational analysis before choosing an alternative.

ASSET-LIABILITY STATISTICS

The insurance industry has the opportunity to consider statistics for financial instruments to facilitate management’s task. Such statistics recognize information regarding several different assets and liabilities in a single value. Such recognition is a major step toward managing assets and liabilities more efficiently. The most important statistics

Figure 10: Maturity and Capital Loss



used in analyzing both assets and liabilities are maturity, duration, and convexity statistics.

Maturity is time remaining until the principal payment of a security comes due. The maturity of the portfolio is equal to the weighted average of the maturities of the securities that compose the portfolio. The longer the maturity of a fixed-income asset or liability, the greater its fall in price and market value due to an increase in interest rates. However, the rate of decrease in the value diminishes as maturity lengthens, for any given increase in interest rate (see figure 10).

Therefore, when the maturity of the assets is greater than the maturity of the liabilities, any change in interest rates will affect the value of assets more than it would the value of the liabilities and vice versa. However, hedging strategies based on matching maturities would not always eliminate all interest rate risk because the cash flows of the instruments in the portfolio are not considered, only their time until maturity.

Because of the relationship between maturity and the interest rate, the longer the term-to-maturity on a fixed-income investment, the more sensitive is the value of that investment to a change in interest rates, keeping everything else constant. *Duration* is a more appropriate measure of interest rate risk than maturity because it takes into account not only the maturity but also the timing of the cash flows. Duration is the weighted average time over which scheduled cash flows of a fixed-income instrument such as a bond are received.² The higher the measure of duration, the more sensitive is the value of the financial instrument to changes in interest rates. A mismatch between the durations of assets and liabilities places the value of equity at great risk to variations in the interest rate. It is for this reason that asset-liability management focuses on duration.

The duration of a bond is always smaller than its maturity. (The only exception is a zero-coupon bond, for which its duration and maturity are equal.) As figure 11 illustrates, increasing the coupon rate while keeping the maturity and the yield constant decreases the duration of the bond. Bonds with higher coupons distribute relatively more cash flows earlier, decreasing the “average life” of the bond.

Alternatively, as figure 12 illustrates, increasing the yield of a bond while keeping its maturity and coupon rate constant decreases the duration of the bond. With a higher yield, the discount factor decreases, giving those cash flows closer to the maturity of the bond less relative weight, therefore less “average life” for the bond. Thus a portfolio manager seeking to lessen the exposure to interest rate risk might try to replace an instrument with another of the same maturity and coupon rate, but higher yield.

2. The most commonly used duration is Macaulay's duration, calculated as follows:

$$\frac{\sum t \cdot CF_t \cdot [1/(1+i)]^t}{\sum CF_t \cdot [1/(1+i)]^t}$$

Macaulay's duration computes the present value weighted average time to maturity of the cash flows of a certain financial instrument.

Figure 11: Duration versus Coupon Rate

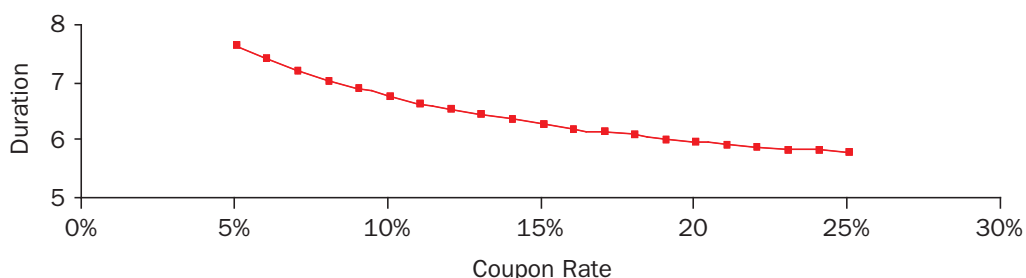
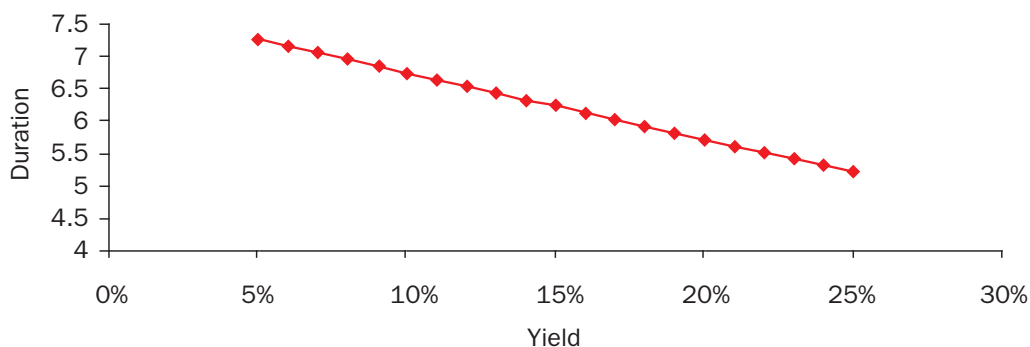


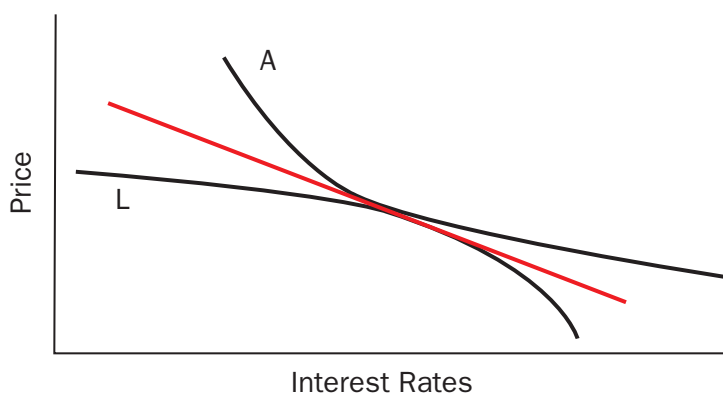
Figure 12: Duration versus Yield



Convexity is a property associated with most fixed-income instruments such as bonds. For example, as the yield-to-maturity on a financial instrument decreases, its price increases at an increasing rate. Convexity measures how the duration changes as interest rates change.³ There is a convex relationship between the price of a financial instrument and the interest rate. Figure 13 shows the relationship between the price of a financial instrument and its yield. The curve gets steeper at higher levels of price. The slope of this curve can be used to estimate the change in price for very small changes in the yield. A positive convexity is a good attribute for an asset to have; for example, if the interest rate increases 200 basis points, the asset will gain more value than if the interest rate falls by the same amount. In contrast, liabilities benefit from negative convexity. Figure 13 illustrates a price curve for an asset and a liability financial instrument.

3. Convexity is defined as the second derivative of price, expressed by the following formula:

$$C = \frac{1}{2} \cdot \frac{1}{(1+i)^2} \cdot \left[\sum_{t=1}^T t^2 \frac{\frac{CF_t}{(1+i)^t}}{\sum_{t=1}^T \frac{CF_t}{(1+i)^t}} + \sum_{t=1}^T t \frac{\frac{CF_t}{(1+i)^t}}{\sum_{t=1}^T \frac{CF_t}{(1+i)^t}} \right]$$

Figure 13: Price Curve for an Asset and Liability

Organizational steps

After management has developed comprehensive and understandable asset-liability portfolio objectives, it is necessary to communicate these to all levels in an organization. To accomplish the objectives, it is also important that insurance companies provide adequate technology and develop organizational structures to assist management in performing its task.

Organizational structures, however, vary among insurers, and no one structure will work equally well for all of them. Thus in planning effective organizations, “structure follows strategy” (see Life Office Management Association 1993, p. 41). Organizational structure should reflect the objectives of asset-liability management, based on each insurer’s strategy and level of risk tolerance, to improve effectiveness in realizing a company’s target. Structural measures to achieve investment risk management objectives include appointing a high-level asset-liability committee and appropriating segmentation of investments and financial measurements.

ALM COMMITTEE

A high-level ALM committee, sometimes called a risk committee, is responsible for monitoring and managing asset and liability risks on an ongoing basis. It typically consists of senior executives from the finance, actuarial, and investment areas of the company, with the managing director or chief operating officer as chair. Its tasks include reviews of investment strategies, pricing, and product development as well as market developments. Life insurance products are particularly sensitive to disintermediation in a high-interest-rate environment, and interest rates established by insurers may fall below those on competing products. The higher the returns on the other investment options in the financial sector, the more competition the insurer is likely to face while market-

ing its products, both in terms of pricing and introducing innovative features to attract customers. The responsibility of this risk committee is to evaluate products in light of economic conditions and investment opportunities so that pricing and investments can be synchronized to meet companies' required returns on equity and other established objectives. Regular stress testing of the impact of potential changes in market conditions on the company's assets and liabilities is an important risk management tool. The ALM committee should require regular stress testing and periodically provide key results to the board of directors. Supervisors should also consider the results of stress testing in their evaluation of insurers' risk profiles.

SEGMENTATION OF INVESTMENTS AND FINANCIAL MEASUREMENTS

Another risk management step is to segment investments by products or line of business and to measure returns on capital against return targets varying by product line according to risk characteristics and other factors. Segmentation decisions, for example, can be based on the size, risk, and profitability of the product or line of business. Related operational issues include establishing rules for trading assets among segments, restructuring or refinancing shared investments, and allocating taxes and expenses. In addition, companies must have good financial information systems in place because management needs to know the cash flows from the segmented lines of business in order to make appropriate investments. Such a segmentation approach can facilitate a life insurer's corporate-wide analysis by reassembling the investments and other segmented factors. This procedure should provide management with quicker insights to weaknesses or opportunities in a company's portfolio and reveal certain offsetting risks among product lines in a given environment.

Custody and control

Internal control objectives for an insurance company's assets consist of capturing all the necessary information at the exchange or entrance point, processing accurately the captured information in its entirety, and safeguarding the necessary securities and any other type of negotiable investments (for minimum expectations in this area, see IAIS 1999).

AUTHORIZATION AND APPROVAL OF PURCHASES AND SALES TRANSACTIONS

Prior to any transaction entering the system, the board of directors should directly or indirectly approve such transactions. Directly means that the board approves the individual transaction; indirectly means that the board empowers management with the authority to approve the individual transactions. A common arrangement is to stag-

ger authority levels by seniority. For example, assistant vice presidents may approve transactions up to \$250,000, vice presidents, up to \$500,000, executive or senior vice presidents, up to \$1 million, and so on.

Preventive controls are designed to capture transactions that do not follow the guidelines before they take place. They might include, for example:

- Documented procedures for reviewing and approving requests to buy and sell investment securities
- Written policy statements or procedures manuals detailing investment guidelines and limitations
- An investment or finance committee involving the board directors or officers of the corporation that reviews specific proposed investment activities before they occur
- Lists of approved investments, authorized brokers, and authorized signature files
- Double signature requirements for every investment transaction.

Detective controls are designed to capture an irregular transaction after it has occurred. These include:

- Reconciliations between investment income, accrued income, income received
- Comparisons of income accrued and income received
- Ratio analysis comparing expected investment yields and investment income earned
- Periodic reviews of investment transactions by the investment or finance committee (and internal auditors or controllers)
- The use and audit of forms such as trading advice, investment confirmations by an independent third party such as the treasury, and the accountability of such forms
- The continuous process of reporting transactions executed on a daily basis
- Reauthorization of the approvals taken on buy and sell limits after a specified period (daily in case of highly volatile scenarios; weekly or biweekly otherwise).

Controls can be circumvented. Ideally, controls are segregated over a number of employees or departments, minimizing the odds that a dishonest or uninformed employee will successfully circumvent them. Additionally, such controls should be constantly reviewed for their appropriateness.

PROCESSING CONTROLS

Controls to ensure that all information is processed correctly might include the following:

- Security transactions should be processed with signed prenumbered authorization tickets to ensure that a complete record is maintained.
- A separate department (not reporting to the investment manager) should verify the accuracy of all securities transactions. The use of separate departments strengthens controls by separating duties, making it harder to circumvent controls.
- The accounting system should calculate the income accrual and receipt of bond interest, dividends, rental income, and mortgage interest on a monthly basis.
- Changes to investment values, such as for permanent impairment of an investment, should require the same authorization procedures as purchases and sales of securities.
- Endorsements of endorsable securities should be checked.
- A concurrent audit is critical for certain insurer functions.

PHYSICAL CONTROL AND SAFEKEEPING OF SECURITIES

Safekeeping of securities is crucial, since bonds are typically the largest investment that insurance companies own and bearer bonds could be a substantial proportion of total bonds. Anyone possessing a bearer bond may, on presentation to a bank, receive cash on maturity of this instrument or sell the instrument prior to maturity.

Other negotiable instruments besides bonds should be safeguarded. These instruments are stock, mortgage notes, property deeds, and any other instrument that might be converted easily into cash. The most likely place to store these securities is in a vault at the head office, although other alternatives are financial institutions, custodial accounts at banks, and central counterparties, entities that safeguard bonds and stock securities and transfer them quickly on purchase or sale. Custodians also offer such services as follow-up on the collection of dividends, subscription to rights, and other similar value added services. Custodial service is especially convenient for transferring securities immediately, benefiting companies involved in securities lending or those needing to warehouse securities for a short period of time. Insurance companies planning to hold securities until maturity may keep these securities in their vault or in a custodial account at a bank secured by a contract and insurance. Whenever custodial services are used, periodic reconciliations are critical to ensure that the records at the insurer's office and at the custodian's office tally.

Insurance companies may have to maintain securities on deposit with different jurisdictions. This deposit protects the company's policyholders residing in that jurisdiction. These situations create the need to keep separate records to achieve the same objective: safekeeping of securities.

Controls over safekeeping of securities should start when these instruments are delivered. The treasury department should compare the purchase authorization form to the security received.

The treasury department should prepare a prenumbered vault deposit form or safekeeping receipt for every security that enters the vault. This form would be used to prepare a vault control listing. A similar prenumbered form should be used to update the vault control listing when a security leaves the vault. The use and accessibility of these forms should be highly restricted. Preventive controls are critical to prevent the misplacement of securities. The following are some preventive controls:

- Always have two or more employees withdraw the security
- Restrict the number of employees allowed in the vault area
- Have two combinations to the vault
- Rotate the duties of the employees
- Install a timer so the vault can only be opened at certain times
- Have an internal auditor, independent auditor, or supervisory personnel count the securities.

Detective controls are still useful in discovering whether securities are missing. If such securities are registered, the company may be able to recover the security. If the misplaced security is payable to the bearer, the company will most likely incur a loss and will need to tighten the preventive controls. A good detective control is a security count, which compares the securities in inventory to the perpetual inventory record or vault control listing and then to the general ledger. An additional detective control is the listing of expected cash receipts. If the company is not receiving the cash amounts the system predicted, this discrepancy may indicate that the securities were miscoded into the accounting system, that the securities are registered under a different name, or that the bond issuer is having financial difficulties and a write-down due to permanent impairment might be needed.

These detective controls may not be effective with respect to zero-coupon bonds. The risk involves counterfeit or fraudulent bonds. Zero-coupon bonds do not pay interest; therefore, the second control would not be applicable, and a cursory review of the first control might overlook any imperfections in the zero-coupon investment. A company dealing with zero-coupon bonds may want to strengthen its preventive control to ensure that a counterfeit bond does not enter the vault. A closer inspection during the security count may unveil any wrongdoing in case the bond does enter the vault.

A control similar to the vault control listing should be maintained for external depositories or bank custodians. Regular confirmation of their holdings with compari-

sons to the perpetual inventory record should provide adequate control. The perpetual inventory record is an inventory of securities holdings that is updated every time a security is purchased or sold. Additionally, periodic internal control letters may be obtained from depositories.

G. Conclusions

ICP 21 stipulates that insurance supervisors should require insurers to comply with accepted standards on investment activities. This scrutiny is part of the supervisor's duty to protect policyholders. Proper management of investments gives the insurer the liquidity to meet its liabilities as and when they arise, as well as ensuring the right mix of investments to generate adequate returns without incurring undue risk that might threaten the insurer's ability to meet its obligations toward the policyholders.

Supervisors must evaluate a particular insurer's investments in relation to the structure and practices of the country's capital markets. The liquidity of the market, as indicated by its depth and breadth, affects the insurer's ability to realize the value of its investments when it needs funds to satisfy policyholder obligations. The depth and integrity of the market also affect the reliability of market prices as indicators of asset values.

The choice of investments can be extremely wide-ranging, although insurers in countries with less developed capital markets may encounter more difficulty finding investment vehicles that match their objectives. To meet their liquidity requirements insurers hold short-term assets such as bank deposits and money market instruments. They normally invest the remainder of their assets in a diversified portfolio of long-term debt instruments, equity securities, and sometimes real estate, mortgages, and other assets.

The value of these assets is a critical component in the evaluation of an insurer's solvency, but sound valuation methodology is elusive. Book values are more readily verifiable, since they reflect actual acquisition prices, but they become less relevant to the current situation as time passes. Yet market values are not always available, and estimates can miss the mark. Regardless of the problems, supervisors should insist on consistent methodology and thorough documentation, while always bearing in mind the consequences for an insurer's apparent financial position stemming from one method of asset valuation or another.

Q6

Answer the following question in the role of the insurance supervisor responsible for the jurisdiction.

- Favorable economic conditions in your country have led to a long-term downward trend in interest rates. In order to attract new customers, however, Big Life Insurance Company has introduced a unit-linked product with a guaranteed return more in line with expectations generated by the higher-interest-rate environment of the past than with present or probable future conditions. Although Big Life is the largest financial institution in the country, you fear that Big Life cannot sustain this situation. What should you do?**

Investment regulations can take a variety of approaches. The simplest way to prevent insurers from misusing policyholder funds is to require them to invest corresponding assets in designated vehicles such as government bonds. Such mandatory investments can also allocate capital to socially desirable purposes, but they undermine the insurer's incentive to seek the most efficient investments. Regulations that define certain permitted categories of investments give insurers more freedom to choose investments, but ceilings or limitations for each category can still encourage diversification by preventing over concentration in specific asset classes. Risk-based capital requirements can also encourage prudent investing through risk weightings that raise the capital requirements when insurers choose riskier investments. The prudent-person rule gives insurers the most freedom but still requires them to make investments consistent with the choices of a prudent person.

Investment management is the responsibility of the insurance company management and ultimately the company's board of directors, but supervisors need to be sufficiently familiar with the process to recognize company deficiencies. The board's investment strategy should be contained in a statement of investment policy, which management systematically implements through asset allocation decisions, individual security selection, and performance evaluation, leading back to revision of the investment policy statement. In the selection of securities, the portfolio managers construct a diversified portfolio that seeks the maximum return consistent with the acceptable level of risk.

Risk management necessitates attention not only to credit risk but also to interest rate risk, actuarial risk, liquidity risk, operational risk, and legal risk. Particularly for life insurers but also for non-life insurers, asset-liability management is critical to minimize interest rate risk. Given the magnitude of insurer investments, physical control and safeguarding of assets are major risk exposures. The consequences of lapses in these areas amply justify the close attention of insurance supervisors to insurers' risk management systems.

H. References

IAIS (International Association of Insurance Supervisors). 1999. *Supervisory Standard on Asset Management by Insurance Companies*. Basel, December. Available at www.iaisweb.org.

Life Office Management Association. 1993. *Asset-Liability Management in the Life Insurance Industry*. Atlanta. May be ordered at www.loma.org.

Society of Actuaries. 2003. *Professional Actuarial Specialty Guide: Asset-Liability Management*. Available at www.soa.org.⁴⁷

Appendix I. ICP 21

ICP 21: Investments

The supervisory authority requires insurers to comply with standards on investment activities. These standards include requirements on investment policy, asset mix, valuation, diversification, asset-liability matching, and risk management.

Explanatory notes

21.1. Insurers must manage their investments in a sound and prudent manner. An investment portfolio carries a range of investment-related risks that might affect the coverage of technical provisions and the solvency margin. Insurers need to identify, measure, report, and control the main risks.

21.2. For insurers in many jurisdictions, concentration risk arising from the limited availability of suitable domestic investment vehicles is a real problem. By contrast, international insurers' investment strategies are potentially complex because they often need to manage and match assets and liabilities in a number of currencies and different markets. In addition, the need for liquidity resulting from potential large-scale payments may further complicate an insurer's investment strategy.

21.3. The supervisory authority ensures that standards are established for insurers in managing their investment portfolios and inherent risks. The supervisory authority needs to have both the authority and ability to assess these risks and their potential impact on technical provisions and solvency. However, the detailed formulation of an insurer's investment management policy and internal risk control methodology is the responsibility of the board of directors.

Essential criteria

- a. Requirements regarding the management of investments are in place, either in the law or in supervisory rules. These requirements address, but may not be limited to, the following:
 - The mixture and diversification by type
 - Limits or restrictions on the amount that may be held in particular types of financial instruments, property, and receivables
 - The safekeeping of assets
 - The appropriate matching of assets and liabilities
 - The level of liquidity.

- b. Investments are valued according to a method prescribed by or acceptable to the supervisory authority.
- c. The supervisory authority requires insurers to have in place an overall strategic investment policy, approved and reviewed annually by the board of directors, that addresses the following main elements:
- The determination of the strategic asset allocation—that is, the long-term asset mix over the main investment categories
 - The establishment of limits for the allocation of assets by geographic area, markets, sectors, counterparties, and currency
 - The extent to which the holding of some types of assets is restricted or disallowed—for example, illiquid or volatile assets or derivatives
 - The conditions under which the insurer can pledge or lend assets
 - An overall policy on the use of financial derivatives and structured products that have the economic effect of derivatives (refer to ICP 22)
 - Clear accountability for all asset transactions and associated risks.
- d. The risk management systems must cover the risks associated with investment activities that might affect the coverage of technical provisions and/or solvency margins (capital). The main risks include the following:
- Market risk
 - Credit risk
 - Liquidity risk
 - Failure in the safekeeping of assets (including the risk of inadequate custodial agreements).
- e. The supervisory authority checks that insurers have in place adequate internal controls to ensure that assets are managed in accordance with the overall investment policy, as well as in compliance with legal, accounting, and regulatory requirements. These controls should ensure that investment procedures are documented and properly overseen. Normally the functions responsible for measuring, monitoring, settling, and controlling asset transactions are separate from the front-office functions (refer to ICP 10).
- f. The supervisory authority requires that oversight of and clear management accountability for an insurer's investment policies and procedures remain ultimately with the board of directors, regardless of the extent to which associated activities and functions are delegated or outsourced.
- g. The supervisory authority requires that key staff involved with investment activities have the appropriate levels of skills, experience, and integrity.
- h. The supervisory authority requires that insurers have in place rigorous audit procedures that include full coverage of their investment activities to ensure

the timely identification of internal control weaknesses and operating system deficiencies. If the audit is performed internally, it should be independent of the function being reviewed.

- i. The supervisory authority requires that insurers have in place effective procedures for monitoring and managing their asset-liability position to ensure that their investment activities and asset positions are appropriate to their liability and risk profiles.
- j. The supervisory authority requires that insurers have in place contingency plans to mitigate the effects of deteriorating conditions.

Advanced criterion

- k. The supervisory authority requires that insurers undertake regular stress testing for a range of market scenarios and changing investment and operating conditions in order to assess the appropriateness of asset allocation limits (refer to ICP 20, advanced criterion g, and ICP 23, advanced criterion j).

Appendix II. Answer key

Pretest

1. b
2. b
3. e
4. c
5. b
6. d
7. d
8. d
9. d
- 10.a.

Exercises

Q1

1. *Many jurisdictions distinguish assets covering liabilities from the other assets of an insurer. Do any of the concerns mentioned in the module apply to these so-called “free assets”?*

Many of the concerns mentioned in the module apply to free assets, such as their existence, valuation, and safeguarding.

2. *Why or why not?*

Liabilities are only estimates of the amounts needed to settle obligations to policyholders. Additional funds may be needed to meet obligations—for example, if the estimates were erroneous, adverse claims experience occurred, or the values of some of the assets assigned to cover liabilities declined. However, as long as the assets covering liabilities are adequately liquid, safe, diversified, and matched to the liabilities, it is appropriate that insurers be provided more flexibility in the investment of free assets.

Q2

1. *Facing severe fiscal constraints, your government has proposed cutting staff assigned to the enforcement of securities regulation while maintaining the budget for the insurance authority. Should you comment on this proposal? What would you say?*

This proposal could have a significant impact on insurers and the challenges that you might face in supervising them, so it merits your comment. You could start by pointing out that ICP 1, essential criterion i, states, “Well-functioning money and securities markets exist to support the availability of both long-term and short-term investment opportunities.” If securities regulations are not adequately enforced, the confidence of both investors—including insurers—and issuers will likely suffer. The depth and breadth of the markets will decrease, making it more difficult for insurers to invest in a diversified and liquid portfolio of assets. As a result, policyholders would be put at increased risk. You might suggest that the government consider changing the approach to funding securities (and insurance) regulation and supervision, to assess costs against the industry rather than using general tax revenues.

Q3

1. *Because your country faces severe catastrophe exposures, the insurance law limits insurers’ investments to secure assets, which it defines exclusively as government bonds and real estate. Should you recommend any changes to this law? If so, what should be changed?*

The insurance law significantly restricts an insurer’s ability to diversify its investments, which could be a problem particularly in the event of a severe catastrophe. A catastrophe could put real estate values at risk and may even strain government resources to the point of defaulting (or perhaps deferring payment) on their obligations. Therefore, you should recommend changes to the insurance law. The law should permit insurers to invest in a broader range of assets, both in terms of asset type and location. Insurers should be required to adopt a prudent investment policy. The law should establish specific requirements on asset mix, valuation, diversification, asset-liability matching, and risk management.

Q4

1. *Sometimes insurance companies have some assets that are measured in a conservative way and some that are not, but the balance is still conservative. Would you accept this situation?*

You might be willing to accept this situation, if you are certain that the balance will always be conservative and you have enough information to estimate how much conservatism exists (for example, compared to the fair values of assets). It is important that the supervisory authority understand the asset values that would be available not only on a going-concern basis, but also in the event of an insurer's insolvency.

2. *Would you accept that assets are measured in a conservative way, while liabilities are not? Explain your reasons.*

You probably would not accept that assets are measured conservatively, while liabilities are not. The solvency position of an insurer is measured based on the difference between the value of its assets and the value of its liabilities. Ideally, the valuation rules for assets should be consistent with the valuation rules for liabilities. Valuing assets at market if liabilities are not valued at market, or vice versa, might cause large fluctuations in equity.

Q5

1. *You would like to adopt a prudent-person approach to investment regulation, but the country has very few actuaries. What is your next step?*

The prudent-person approach relies on the ability of insurers to understand the risk and cash flow characteristics of both their liabilities and various investment alternatives, in order to prudently select investments that are appropriate to the nature of their liabilities. Actuaries can play an important role in this process, for example, by developing models of the asset and liability portfolios and performing stress tests under various scenarios. Your next step might be to determine the extent to which insurers are already using such analyses, perhaps prepared by foreign consulting actuaries, as part of their risk management processes. Discussions with the insurers, local actuaries and investment specialists, and foreign consultants working in the country could help to determine how any shortcomings in the existing analysis might be remedied, when, and by whom. A plan for the adoption of a prudent-person approach, including a timeline, could be then developed and implemented.

Q6

1. *An insurer's investment portfolio includes some real estate investments. Although diversification requirements have been met, you are concerned that the insurer is excessively exposed to real estate construction risks. What arguments can you make to the insurer?*

You could remind the insurer that, although diversification within the real estate portfolio helps to protect against the risks unique to each property, it does not protect against market risks to which all real estate investments may be subject. For example, severe weather may delay all construction, increases in financing costs may affect the viability of projects, and a downturn in the economy may increase vacancy rates and depress real estate prices. Diversification into asset classes other than real estate could help to protect the insurer against such real estate market risks.

Q7

1. *Favorable economic conditions in your country have led to a long-term downward trend in interest rates. In order to attract new customers, however, Big Life Insurance Company has introduced a unit-linked product with a guaranteed return more in line with expectations generated by the higher-interest-rate environment of the past than with present or probable future conditions. Although Big Life is the largest financial institution in the country, you fear that Big Life cannot sustain this situation. What should you do?*

The risk in this situation is actuarial risk, since the insurer may be paying too much for the funds received (via the generous guarantee) and charging too little for the risks assumed (via an inadequate implicit charge for providing the guarantee). You should review the analysis performed by the insurer as it designed and priced the new product. Your review should examine the reasonableness of the assumptions that were made and the rigor of the stress tests performed, for example, regarding the impact of further declines in interest rates. The risk management practices of the insurer should also be examined. For example, does it have a senior-level ALM committee to oversee the management of the risks inherent in this product? The insurer should be required to take corrective action to deal with any weaknesses identified through your review.