

REFRESHER READING

2025 CFA® PROGRAM • LEVEL III

Portfolio Construction

Portfolio Management for Institutional Investors

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LEARNING OUTCOMES

Mastery	The candidate should be able to:
<input type="checkbox"/>	discuss common characteristics of institutional investors as a group
<input type="checkbox"/>	discuss investment policy of institutional investors
<input type="checkbox"/>	discuss the stakeholders in the portfolio, the liabilities, the investment time horizons, and the liquidity needs of different types of institutional investors
<input type="checkbox"/>	describe the focus of legal, regulatory, and tax constraints affecting different types of institutional investors
<input type="checkbox"/>	evaluate risk considerations of private defined benefit (DB) pension plans in relation to 1) plan funded status, 2) sponsor financial strength, 3) interactions between the sponsor's business and the fund's investments, 4) plan design, and 5) workforce characteristics
<input type="checkbox"/>	evaluate the investment policy statement of an institutional investor
<input type="checkbox"/>	evaluate the investment portfolio of a private DB plan, sovereign wealth fund, university endowment, and private foundation
<input type="checkbox"/>	describe considerations affecting the balance sheet management of banks and insurers

CFA Institute would like to thank Karl Mergenthaler, CFA, for his contributions to earlier drafts of this reading.

1

INSTITUTIONAL INVESTORS: TYPES AND COMMON CHARACTERISTICS



discuss common characteristics of institutional investors as a group

Institutional investors are corporations, trusts, or other legal entities that invest in financial markets on behalf of groups or individuals, including both current and future generations. On a global basis, the total value of assets under management (AUM) by the global asset management industry as of 2020 reached more than USD100 trillion, and, as such, wields significant influence over capital markets.

The universe of institutional investors includes, but is not limited to, defined benefit and defined contribution pension plans, sovereign wealth funds, endowments, foundations, banks, and insurance companies. Pension plans, which account for approximately US\$57 trillion in investable assets or roughly half of global institutional assets under management, include both defined benefit plans, in which the sponsor (employer) assumes investment risk, and defined contribution plans, in which the individual makes investment decisions and assumes the investment risk. Sovereign wealth funds, which account for about US\$8 trillion in assets as of the end of 2020, are government-owned investment funds that invest in financial and/or real assets. Endowments and foundations, which account for approximately US\$1.6 trillion in assets, manage assets on behalf of educational institutions, hospitals, churches, museums, and other charitable organizations. Banks and insurance companies, comprising net financial assets on the order of US\$9 trillion, are financial intermediaries that balance portfolios of securities, loans, and derivatives for the purposes of (i) meeting the claims of depositors, counterparties, policyholders, and creditors and (ii) providing adequate returns to their contractual capital holders. The universe of institutional investors is comprised of large, complex, and sophisticated investors that must contend with a multitude of investment challenges and constraints.

There has been an important shift in the asset allocation of institutional investors over the last half century. In the 1970s, most pensions and endowments invested almost exclusively in domestic, fixed-income instruments. In the 1980s, many institutional investors began to invest in equity markets and often pursued a long-term strategic allocation of 60% equities/40% fixed income. In the 1990s, investors recognized the benefits of diversification and many made their first forays into international equity markets. At the turn of the 21st century, many of the world's largest pension funds and endowments further diversified their portfolios and increased investments in alternative asset classes, including private equity, hedge funds, real estate, and other alternative or illiquid assets.

Meanwhile, institutional investors have seen broad shifts in their strategic investment behavior. The trend toward Liability Driven Investing (LDI), long a mainstay of banks and insurance companies, has taken hold among many defined benefit pension plans, particularly US corporate and public pension funds. Sovereign wealth funds have amassed significant assets over the past several decades, and many have implemented innovative investment approaches characterized by active management. Many endowments have adopted the "Endowment Model" of investing that involves significant exposure to alternative investments. Meanwhile, banks and insurers must navigate a complex and ever-changing economic and regulatory environment.

In this reading, we endeavor to put the numerous factors that affect investment by institutional investors into context. Section 1 discusses common characteristics of institutional investors as a group. Section 2 provides an overview of investment policies for institutional investors. Detailed coverage by institutional investor type

begins with Sections 3–7, pension funds, where we discuss various factors that influence investments, including: stakeholders, liability streams, investment horizons, and liquidity needs; major legal, regulatory, accounting, and tax constraints; investment objectives and key components of Investment Policy Statements; and, finally, asset allocation and investment portfolios that emanate from the foregoing factors and constraints. Sections 8–10 follow the same approach for sovereign wealth funds, and Sections 11–15 do the same for university endowments and private foundations. Sections 16–19 covers banks and insurers and includes balance sheet management considerations. A summary of key points concludes the reading.

Institutional Investors: Common Characteristics

For the purposes of this reading, institutional investors include pension plans, sovereign wealth funds, endowments, foundations, banks, and insurance companies. As we will see in upcoming sections where we cover each of these six institutional types in detail, their objectives and constraints can vary widely. First, in this section we discuss important defining characteristics of institutional investors as a group, characteristics that set them apart from individual (retail and high-net-worth) investors. The common defining characteristics of institutional investors include the following:

1. **Scale (i.e., asset size):** The issue of scale is relevant for institutional investors because it may impact investment capabilities, access to investment strategies, liquidity, trading costs, and other key aspects of the investment process.
2. **Long-term investment horizon:** Institutional investors generally have a long-term investment horizon that is often determined by a specific liability stream, such as the benefit obligation of a pension plan, the spending policy of an endowment, or other obligations.
3. **Regulatory frameworks:** Institutional investors must contend with multiple regulatory frameworks that frequently vary by jurisdiction and complexity and are often evolving.
4. **Governance framework:** Institutional investors typically implement their investment programs through an investment office that often has a clearly defined governance model.
5. **Principal–Agent issues:** As institutional investors manage assets on behalf of others, principal–agent issues must be recognized and managed appropriately.

We discuss these five common characteristics in more detail next.

Scale

Institutional investors' assets under management can range from relatively small (e.g., less than US\$25 million) to relatively large (e.g., more than US\$10 billion). Smaller institutions may face challenges in building a diversified portfolio spanning public and private asset classes because they may be unable to access certain investments that have a high minimum investment size. For example, smaller institutions are less likely to be able to invest in private equity or real estate assets (i.e., property). Small institutional investors may also face challenges in hiring skilled investment professionals. As a result, they are more likely to outsource investments to external asset managers and rely on investment consultants. Larger institutional investors experience scale benefits that allow them access to a wider investment universe, and they can readily hire investment professionals. They may potentially manage part of their portfolios in-house if benefits outweigh costs. The largest institutional investors, however, may experience dis-economies of scale. For example, they might be unable to invest in

certain niche investments like venture capital (“VC”). Given the huge asset size of investments under management, a small allocation to VC may not generate sufficient returns to justify the position (including due diligence costs). The largest institutional investors may also be unable to deploy as much capital as desired with some external managers as certain investment strategies are capacity constrained. External managers who want to avoid jeopardizing their ability to generate superior returns will close the strategy to new investors. To overcome these constraints, some of the largest institutions buy private companies, property, and infrastructure assets directly and manage their traditional asset-class portfolios in-house. Large institutional investors also face the costs of market impact given their sizable trading orders.

Rapidly growing institutional investors may experience high cash inflow relative to the size of their portfolios, which requires them to continuously invest inflows and to maintain the appropriate asset mix (strategic asset allocation). Ensuring access to investments capable of absorbing their growth in assets under management may be challenging when investing in capacity-constrained strategies, such as small-cap equity or venture capital.

Long-Term Investment Horizon

Pension funds, sovereign wealth funds, endowments, and foundations all typically have long investment horizons and relatively low liquidity needs. Cash outlays are relatively modest as a percent of assets under management, with net payouts typically around 5% or less. However, there are exceptions: For example, frozen defined benefit plans might be in a de-risking mode that increases their liquidity needs. Relatively low liquidity needs allow these institutions to invest in a broad range of alternative asset classes, including private equity, private real estate, natural resources, infrastructure, and hedge funds. Banks and insurance companies, however, tend to be much more asset/liability focused while operating within tight regulations designed to ensure adequacy of capital.

Regulatory Frameworks

Institutional investors are typically subject to different legal, regulatory, tax, and accounting frameworks than individual investors. These frameworks define the set of rules an institutional investor must follow to qualify for reduced tax rates or tax-exempt status. Importantly, these frameworks and rules typically differ by national jurisdiction in which the institutional investor operates. Some examples of important relevant legal, regulatory, taxation, and accounting frameworks and organizations include the following:

- United States:
 - Employee Retirement Income Security Act (ERISA)
 - Pension Protection Act (PPA)
 - Uniform Prudent Management of Institutional Funds Act (UPMIFA)
 - Uniform Prudent Investor Act (UPIA)
 - Freedom of Information Act (FOIA)
 - Governmental Accounting Standards Board (GASB)
 - Generally Accepted Accounting Principles (GAAP) set by the Financial Accounting Standards Board (FASB)
 - Statutory Accounting Principles (SAP) set by the National Association of Insurance Commissioners (NAIC)
- United Kingdom:
 - Pensions Act

- Finance Acts (various)
- European Union:
 - Institutions for Occupational Retirement Provision (IORP) II
- South Korea:
 - Employee Retirement Benefit Security Act
- Australia:
 - Superannuation Industry (Supervision) Act (SIS Act)
- International:
 - International Financial Reporting Standards (IFRS) set by the International Accounting Standards Board (IASB)
 - International Organization of Securities Commissions (IOSCO)

Many relevant regulatory bodies govern and supervise institutional investors and their portfolios globally. The International Organization of Securities Commissions (IOSCO) is the international body that brings together the world's securities regulators, and it has 217 members. Ordinary members (127) include the national securities commissions or similar governmental bodies. Associate members (24) are supranational governmental regulators, subnational governmental regulators, intergovernmental international organizations, and other international standard-setting bodies. Affiliate members (66) include self-regulatory organizations, securities exchanges, and other financial market infrastructure and international regulatory bodies.

The key drivers of the legal and regulatory frameworks faced by institutional investors are investor protection, safety and soundness of financial institutions, and integrity of financial markets. Changes to these frameworks following the 2007–2009 global financial crisis focused on leverage limits, enhanced collateral requirements, increased liquidity requirements, central clearing, proprietary trading limits, private equity limits, trading tax implementation, brokerage fee limits, compensation limits, and requirements for more transparent reporting. Examples of regulations focusing on such reforms include the following:

- United States:
 - Dodd-Frank Wall Street Reform and Consumer Protection Act (Dodd-Frank)
 - Section 619 (12 U.S.C. Section 1851) of the Dodd-Frank Act (Volcker Rule)
 - Foreign Account Tax Compliance Act (FATCA), which has international implications
- United Kingdom:
 - Retail Distribution Review (RDR)
- European Union (with most adopted by the United Kingdom):
 - Undertakings for the Collective Investment of Transferable Securities V (UCITS V)
 - Alternative Investment Fund Managers Directive (AIFMD)
 - Solvency II Directive (Solvency II)
 - Markets in Financial Instruments Directive II (MIFID II)
 - European Market Infrastructure Regulation (EMIR)
 - Financial Transaction Tax (FTT)

- Packaged Retail Investment and Insurance Products (PRIIPs)
- International:
 - Third Basel Accord / Capital Requirements Directive (Basel III / CRD IV)
 - Santiago Principles (Generally Accepted Principles and Practices for Sovereign Wealth Funds)
 - Principles of the Linaburg-Maduell Transparency Index (Sovereign Wealth Funds)

Governance Framework

Institutional investors typically operate under a formal governance structure. The governance structure generally includes a board of directors and an investment committee. The board may comprise company representative directors, employee representative directors, and independent directors. Independent directors are usually selected to increase the board's overall investment expertise. Investment committees can be sub-committees of the board with delegated authority to oversee investment policy. Alternatively, investment committees can be internal and consist of investment staff tasked with implementing the investment policy set by the board. The board and/or investment committee provide a key role in establishing the organization's investment policy, defining the risk appetite, setting the investment strategy, and monitoring the investment performance.

The board often sets the long-term strategic asset allocation and can delegate the setting of medium-term tactical asset allocation to its investment staff. It may also delegate manager selection to investment staff. Notably though, many institutional investor boards will seek to retain control through overseeing hiring and firing of managers. Best practice suggests, however, that it is better to delegate the hiring and firing of external managers to investment staff to ensure that the board focuses on such broader issues as governance, investment policy, and strategic asset allocation.

Institutional investors typically implement their investment strategy through an investment office. The investment office can be structured in different ways, but the most common model involves a Chief Investment Officer, who is supported by a team of asset-class specialists or a team of generalists working across asset classes. Institutional investors may manage investments in-house (e.g., some large Canadian pension plans and Australian superannuation funds) or outsource investment management partially or entirely to external assets managers. The factors affecting the decision to manage assets internally include the size of assets under management, capability of internal resources, or a desire to pursue custom strategies not readily offered by external managers. It can be costly to build the capability to manage assets internally, so in most cases asset owners need to achieve a certain threshold of assets under management before the benefits outweigh the costs of internalization.

For pension funds, sovereign wealth funds, endowments, and foundations, outsourcing elements of the investment function to external asset managers—or even outsourcing the entire investment operation to an outsourced chief investment officer (CIO) firm—is much more common than managing investments in-house. Such asset owners typically rely on specialized consultants to assist with asset allocation decisions and investment manager selection. These consultants often provide macro-economic forecasts and capital market assumptions for asset classes that are integral to determining the investor's optimal asset allocation. In addition, the consultant assists in monitoring the large universe of external asset managers. Finally, the consultant may provide independent performance attribution and reporting and may monitor any internally managed investments and benchmark them against the external asset manager universe.

In contrast, banks and insurance companies undertake most of their investing, risk budgeting, compliance, and balance sheet management activities internally.

Principal–Agent Issues

Institutional investors frequently experience conflicts of interest that stem from principal–agent issues. The principal–agent issue arises if one person, the agent, makes decisions on behalf of another person or institution, the principal, and their interests are not aligned. A dilemma exists for the agent when he/she may be motivated to act in his/her own best interests and not in the best interests of the principal. Because of operational and investment complexity, institutional investors generally rely on various parties (i.e., agents) to act on their behalf. Agents may be internal or external. Internal agents include investment committee members and investment staff. External agents include third-party asset managers, broker/dealers, consultants, and board members. A typical example of the principal–agent problem is where performance fee structures are designed by external fund managers to provide attractive compensation to them via a high base fee, which is due regardless of fund performance. This fee structure gives little incentive for the fund manager to produce superior performance. Such fee arrangements are common among hedge funds and have led to greater demand for fee transparency and alignment of interest between hedge fund managers and their clients. To manage principal–agent issues, institutional investors will typically have highly developed governance models and high levels of accountability with a board and/or investment committee typically overseeing the investment office. Such models should be designed to explicitly acknowledge and manage conflicts of interest and align the interests of all agents with those of the principals.

OVERVIEW OF INVESTMENT POLICY

2

- ☐ | discuss investment policy of institutional investors

Institutional investors codify their mission, investment objectives, and guidelines in an Investment Policy Statement (IPS). The IPS establishes policies and procedures for the effective administration and management of the institutional assets. A well-crafted IPS can help minimize principal–agent challenges by providing clear guidance on day-to-day management of the assets. Besides mission and investment objectives (i.e., return and risk tolerance), the IPS should cover any constraints that affect the asset allocation, asset allocation policy with ranges and asset class benchmarks, rebalancing policy, guidelines affecting the implementation of the asset allocation policy, and reporting requirements. The IPS should be reviewed annually; however, revisions should be infrequent, such as when material changes occur in investor circumstances and/or the market environment, as the IPS serves as the foundation for the investment program. The asset allocation policy and investment guidelines are typically included in an appendix that can be modified more easily.

Investment objectives flow from the organization's overall mission. For banks and insurance companies, the investment objective is to maximize net present value by balancing (i) the expected returns on assets, (ii) the expected cost of liabilities, (iii) the overall risks of assets and liabilities, and (iv) the economic relationships between and among assets and liabilities.

The investment objectives are more straightforward for the other types of institutions covered in this reading. For example, the overall objective of a DB pension fund might be to maintain a funded ratio in excess of 100%; for an endowment, it may be

to maintain long-term purchasing power while providing needed financial support to its university. Investment objectives are typically expressed as a desired return target over the medium-to-long term (which should be clearly specified) with an acceptable level of risk. This return target should be evaluated in the context of the organization's overall mission and should be tied to the evaluation of liabilities (e.g., discount rate used to value DB pension plan liabilities or spending rate for an endowment). When expressing the return target in real terms, the relevant inflation metric must be defined. For example, GIC—Singapore's sovereign wealth fund—uses global inflation defined as G3 (the US, Japan, and Eurozone) inflation, while some US endowments use the Higher Education Price Index (HEPI) published by Commonfund (an independent asset management firm serving non-profit organizations and promoting best practices among institutional investors).

Investment objectives and return targets must be consistent with an organization's risk tolerance and other constraints. Risk tolerance can be expressed in different ways, such as for:

- DB pension funds: surplus volatility (standard deviation of asset returns in excess of liability returns);
- Sovereign wealth funds (SWFs): probability of investment losses (or probability of not maintaining purchasing power) over a certain time period;
- Endowments and foundations: volatility of total returns (standard deviation of total returns); and
- Banks and insurance companies: value at risk (VaR) or conditional VaR (CVaR) and comprehensive, scenario-based stress tests.

Finally, constraints (legal, regulatory, tax, and accounting) have a bearing on investment objectives and should be incorporated into the design of an investment policy. For example, constraints might limit the scope of acceptable risk and available asset classes.

Once the investment objectives—the desired risk and return characteristics—have been established, a strategic asset allocation or policy portfolio is designed. The investment portfolio of an institutional investor is designed to meet its objectives and should reflect the appropriate risk and liquidity considerations addressed in the IPS. For example, a large allocation to private equity is probably not appropriate for institutions with a relatively short investment horizon and high liquidity requirements. Similarly, a large fixed-income allocation might not be appropriate for an institution with a long investment horizon and low liquidity requirements. While institutional investors each have unique liability characteristics, several investment approaches have emerged over the past couple of years. Broadly speaking, these can be grouped into four different approaches:

1. **Norway model** popularized by Norway's global pension fund, Government Pension Fund Global (GPF). The Norway model is characterized by an almost exclusive reliance on public equities and fixed income (the traditional 60/40 equity/bond model falls under the Norway model), with largely passively managed assets and with very little to no allocation to alternative investments. Investments are usually managed with tight tracking error limits. The advantages of this approach are that investment costs/fees are low, investments are transparent, the risk of poor manager selection is low, and there is little complexity for a governing board. The disadvantage is that there is limited potential for value-added (i.e., alpha from security selection skills) above-market returns. However, Norway's GPF has begun to seek additional value over market-capitalization benchmarks by attempting to capture systematic risk factors.

2. **Endowment model** popularized by the Yale Endowment. The endowment model is characterized by a high allocation to alternative investments (private investments and hedge funds), significant active management, and externally managed assets. This investment approach stands in almost direct contrast to the Norway model. Although labeled ‘endowment model,’ this investment approach is not only followed by many university endowments and foundations but also by several sovereign wealth funds and defined benefit pension funds. The endowment model is appropriate for institutional investors that have a long-term investment horizon, high risk tolerance, relatively small liquidity needs, and skill in sourcing alternative investments (the nature of alternative investments is such that there is large variation between the worst and best performing asset managers, and selecting the right manager is therefore critically important). The endowment model is difficult to implement for small institutional investors as they might not be able to access high quality managers. It might also be difficult to implement for very large institutional investors because of their very large footprint. The endowment model is more expensive in terms of costs/fees compared to the Norway model.
3. **Canada model** popularized by the Canada Pension Plan Investment Board (CPIB). The Canada model, just like the endowment model, is characterized by a high allocation to alternatives. Unlike the endowment model, however, the Canada model relies more on internally managed assets. The innovative features of the Canada model are the: a) reference portfolio, b) total portfolio approach, and c) active management. The reference portfolio is a passive mix of public equities, fixed income, and cash that represents a cheap and easily implementable portfolio that is expected to achieve the long-term expected return consistent with the institution’s investment objectives and risk appetite. The reference portfolio effectively defines a transparent, risk-equivalent benchmark for the investment portfolio, and serves as a low-cost alternative to the fund’s actual portfolio. The reference portfolio might be different from the institution’s strategic asset allocation or policy portfolio. Importantly, the reference portfolio is typically made up of only publicly traded securities (in the form of common public market indices in equities and fixed income) that can be more easily understood by the governing board, while the strategic asset allocation may include target allocations to private markets and hedge funds. The total portfolio approach is the method of constructing the portfolio to ensure that planned risk exposures at the total portfolio level are maintained as individual investments enter, leave or change in value. It is an approach that is aimed at minimizing the unintended exposures and uncompensated risks that may arise as added value is sought by extending investments beyond the reference portfolio. For example, if private equity is added, management considers that it is leveraged equity and as a result the exposure to public equities needs to be reduced by more than the proposed allocation to private equity and the allocation to fixed-income needs to be increased to offset the leverage. Although the Canada model starts with a passive reference portfolio, it is important to note that the Canada model employs active management from tilting asset allocation through to stock selection. A good example of a sovereign wealth fund that has embraced the concept of the reference portfolio is the New Zealand Superannuation Fund.
4. **Liability Driven Investing (LDI) Model** has gained significant importance, particularly among corporate defined benefit pension plans in the United States, although some of the European pension funds—particularly in Denmark and in the Netherlands—adopted the LDI concept even prior to

the 2007–2009 global financial crisis. In the LDI model, the primary investment objective is to generate returns sufficient to cover liabilities. As such, the investor's focus shifts away from operating in an asset-only context, to a focus on maximizing expected surplus return (excess return of assets over liabilities) and managing surplus volatility. Although the implementation and resultant asset allocation may vary significantly, LDI portfolios—other than for banks and insurance institutions—typically have a significant exposure to long duration fixed-income securities. In some LDI implementations, institutional investors separate their portfolios into a hedging portfolio (this portfolio usually hedges the main risk factor in the liabilities, which is interest rate risk) and a return-generating portfolio (this portfolio needs to generate sufficient returns to offset the growth rate of liabilities, other than changes in the discount rate). The hedging portfolio for defined benefit pension funds, sovereign wealth funds, and endowments/foundations usually consists of long duration fixed-income securities and may entail the use of derivatives, such as interest rate swaps, to extend the duration of the portfolio. The return-generating portfolio usually includes public equities and alternative investments.

Exhibit 1 summarizes these four investment approaches.

Exhibit 1: Common Investment Approaches Used by Institutional Investors

Investment Approach	Description
Norway Model	Traditional style characterized by 60%/40% equity/fixed-income allocation, few alternatives, largely passive investments, tight tracking error limits, and benchmark as a starting position. <i>Pros:</i> Low cost, transparent, suitable for large scale, easy for board to understand. <i>Cons:</i> Limited value-added potential.
Endowment Model	Characterized by high alternatives exposure, active management and outsourcing. <i>Pros:</i> High value-added potential. <i>Cons:</i> Expensive and difficult to implement for most sovereign wealth funds because of their large asset sizes.
Canada Model	Characterized by high alternatives exposure, active management, and insourcing. <i>Pros:</i> High value-added potential and development of internal capabilities. <i>Cons:</i> Potentially expensive and difficult to manage.
LDI Model	Characterized by focus on hedging liabilities and interest rate risk including via duration-matched, fixed-income exposure. A growth component in the return-generating portfolio is also typical (exceptions being bank and insurance company portfolios). <i>Pros:</i> Explicit recognition of liabilities as part of the investment process. <i>Cons:</i> Certain risks (e.g., longevity risk, inflation risk) may not be hedged.

3

PENSION FUNDS: TYPES AND STAKEHOLDERS

Pension funds are long-term saving and investment plans designed to accumulate sufficient assets to provide for the financial needs of retirees. There are two main types of pension plans: **defined benefit**, in which a plan sponsor commits to paying a specified retirement benefit, and **defined contribution**, in which contributions are defined but the ultimate retirement benefit is not specified or guaranteed by the plan

sponsor. Globally, there are many variations and nuances of these two broad categories of pension plans. Exhibit 2 compares the key features of defined benefit and defined contribution pension plans.

Exhibit 2: Comparison of Defined Benefit and Defined Contribution Pension Plan Features

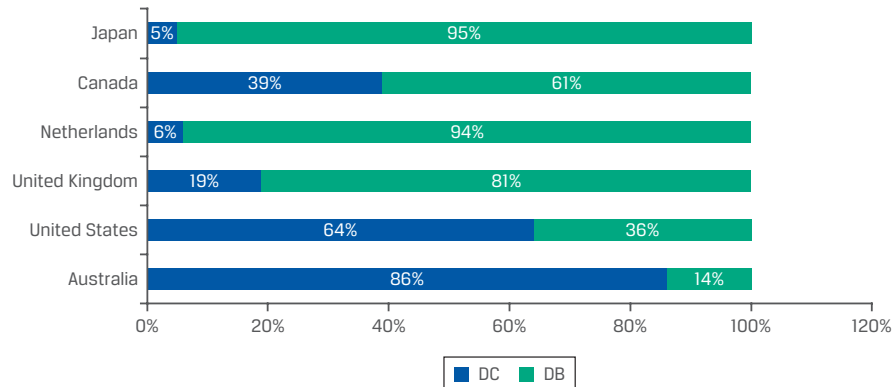
Characteristics/Features	Defined Benefit Pension Plan	Defined Contribution Pension Plan
Benefit payments	Benefit payouts are defined by a contract between the employee and the pension plan (payouts are often calculated as a percentage of salary).	Benefit payouts are determined by the performance of investments selected by the participant.
Contributions	The employer is the primary contributor, though the employee may contribute as well. The size of contributions is driven by several key factors, including performance of investments selected by the pension fund.	The employee is typically the primary contributor—although the employer may contribute as well or may have a legal obligation to contribute a percentage of the employee's salary.
Investment decision making	The pension fund determines how much to save and what to invest in to meet the plan objectives.	The employee determines how much to save and what to invest in to meet his/her objectives (from the available menu of investment vehicles selected by the plan sponsor).
Investment risk	The employer bears the risk that the liabilities are not met and may be required to make additional contributions to meet any shortfall.	The employee bears the risk of not meeting his/her objectives for this account in terms of funding retirement.
Mortality/Longevity risk	Mortality risk is pooled. If a beneficiary passes away early, he/she typically leaves a portion of unpaid benefits in the pool offsetting additional benefit payments required by beneficiaries that live longer than expected. As a result, the individual does not bear any of the risk of outliving his/her retirement benefits.	The employee bears the risk of not meeting his/her objectives for this account in terms of funding retirement. The employee bears longevity risk.

Source: World Economic Forum, "Alternative Investments 2020: The Future of Alternative Investments" (2015).

Pension funds are significant players in the global investment landscape. Over the past 20 years, there has been a move away from defined benefit (DB) plans (especially non-government DB plans) to defined contribution (DC) plans. Among drivers of this shift are DC plans' lower financial risk for plan sponsors, absence of risk of becoming underfunded, and ease of portability (simplifies job mobility). Willis Towers Watson reports in its "Global Pension Assets Study 2018" covering the seven largest pension markets, the "P7" (Australia, Canada, Japan, the Netherlands, Switzerland, the United Kingdom, and the United States) that during the past 20 years DC pension plans have risen from 33% to 49% of total plan assets.

The split between DB and DC plans can vary significantly from country to country. One of the challenges of classifying countries by this split is that many countries offer hybrid pension plans, such as that in Switzerland where defined contribution connotes a cash balance plan in which all assets are pooled and the plan sponsor shares the investment risk. There are basically no pure DC plans in Switzerland. Exhibit 3 presents the split between DB and DC plans for the P7 countries. Together these countries comprise more than 90% of worldwide pension assets. Note that a substantial difference exists between countries. Some countries (such as Australia) rely almost exclusively on DC plans, while others (such as Japan and the Netherlands) predominantly use DB plans.

Exhibit 3: Split Between DB or Hybrid Plans and DC Plans in Select Countries (2021)



Source: Willis Towers Watson Thinking Ahead Institute (2021).

Stakeholders

Many entities are involved with institutional retirement plans. These include the employer, employees, retirees, unions, management, the investment committee and/or board, and shareholders. Governments have generally encouraged pension plans as a tool to assist individuals to build sufficient financial resources to fund their retirement needs. Government support typically comes in the form of favorable tax treatment for both companies and individuals who contribute to or manage pension plans, provided they operate according to local pension plan regulations. The government and taxpayers will bear some of the shortfall risks (in terms of added welfare or social security payments) in instances of employers failing to pay agreed on defined benefit payments and where individuals fail to accumulate sufficient wealth for retirement.

Defined Benefit Pension Plans

The stakeholders of a defined benefit pension plan are the employer [typically referred to as the plan sponsor and usually represented by management and the Chief Financial Officer (CFO)]; plan beneficiaries (employees and retirees); the Chief Investment Officer (CIO) and investment staff; the investment committee and/or board; and the government, unions, and shareholders in the case of corporate DB plans. Defined benefits promised to beneficiaries create liabilities for the plan sponsor. In operating the pension plan, the sponsor and investment staff must make investment decisions in the interest of the ultimate beneficiaries (employees and retirees). Defined benefit pension liabilities are typically funded from two sources: 1) employer and employee contributions and 2) investment returns on funded assets. Employee contributions can be fixed or variable, but employer contributions usually vary depending on the plan's funded status. Although each of the stakeholders has a strong interest in plan assets being invested appropriately, opinions might differ over the acceptable level of investment risk and the magnitude of employer contributions to the plan.

The plan sponsor may have an interest in 1) minimizing employer contributions due to budget constraints and/or 2) managing the volatility of employer contributions (by aiming for less volatility in investment returns). This allows management to plan future contributions with less uncertainty. Management and the CFO may also want to manage the impact of pension assets and liabilities on the sponsor's balance sheet. Employees and retirees, however, want to maximize the probability that plan liabilities

are met and thus want the sponsor to make timely and sufficient plan contributions. Finally, the CIO and investment staff should be interested in meeting the investment objectives and constraints of the investment policy statement.

In a defined benefit pension plan, the sponsor bears the ultimate risk of the portfolio falling short of meeting liabilities. This risk manifests itself in the form of higher contributions from the plan sponsor when the plan becomes underfunded. In the extreme case of default, however—when the plan sponsor can no longer meet its legal obligations and cannot contribute further to the plan—the employee bears the ultimate risk and may need to find alternative means to meet financial needs in retirement. Some of this risk may be shared by taxpayers via additional social security or welfare payments, making the government a stakeholder in a defined benefit pension plan.¹

The investment office of the DB pension plan is tasked with investing assets appropriately and may have variable compensation (bonuses) tied to investment performance. The investment committee or board will consider recommendations from investment staff, such as setting strategy and investment manager selection. In setting and executing strategy, all stakeholders' positions must be considered, including the sponsor's ability to make plan contributions. Ultimately, however, the board has a fiduciary duty to employees and retirees.

Finally, for corporate DB plans the company's shareholders are stakeholders. They are interested in the sustainability of the pension plan because if it is underfunded, any shortfall becomes a liability on the balance sheet, reducing the value of the company. Contributions to an underfunded plan also reduce net income. Underfunded status also increases financial risk, which may cause higher volatility in the stock price.

Defined Contribution Pension Plans

The main stakeholders of a defined contribution pension plan are the plan beneficiaries, the employer, the board, and the government.

A key stakeholder in a DC plan is the participant. Each participant has an individual account into which contributions are made on a regular basis—either by the employee, the employer, or both. Plan participants must ensure that 1) adequate contributions are made and 2) appropriate investment options are selected to generate sufficient investment returns. For a DC pension plan, the individual participant bears the investment risk of the portfolio failing to meet future liabilities (i.e., retirement needs). If plan participants outlive their savings, they will need to find other ways to meet their financial needs in retirement. In that case, the government (via taxpayers) may need to provide additional social welfare benefits, making the government another stakeholder in a DC plan.

Although DC plan participants control the investment decisions for their individual accounts, perhaps acting upon the advice of their financial adviser, the plan sponsor still has important fiduciary responsibilities, including overseeing the appropriate investment of plan assets (either by internal staff or by third-party asset managers or a combination thereof), offering suitable investment options, and selecting administrative providers. The plan sponsor, therefore, is an important stakeholder in a DC plan. The plan sponsor typically has an obligation to contribute to the DC plan on behalf of the employee as specified by the employment contract or through a government-mandated system. In some countries, a plan sponsor may also have an obligation to provide employees with a choice of different investment options within the employer-sponsored DC plan or even the choice of different DC plans. The sponsor typically must ensure that the investment options provide appropriate

¹ Some risk is also shared by other plan sponsors through agencies as the Pension Benefit Guaranty Corporation (PBGC) in the United States. It is not funded by the government; rather, PBGC's funding comes primarily from insurance premiums paid by DB plan sponsors, the assets of failed pension plans that the PBGC takes over, and investment income.

levels of diversification. It may also need to provide investment education and communications so that employees can make well informed investment choices. Running DC plans can be more expensive than DB plans given their increased complexity of administration and meeting regulatory compliance, all of which may result in higher fees for DC plan participants.

The board of a DC plan sponsor must consider the differing levels of sophistication among participants and provide adequate disclosure in communications to ensure participants are well informed. The board may be required to select a default investment option when participants do not explicitly make an investment choice. In such cases, the board has a higher obligation because by entering the default option, the participant is indicating that he/she either does not have sufficient understanding to make an informed choice or that he/she trusts the board of the pension plan to make the best choice.

4

PENSION FUNDS: LIABILITIES, INVESTMENT HORIZON, AND LIQUIDITY NEEDS



discuss the stakeholders in the portfolio, the liabilities, the investment time horizons, and the liquidity needs of different types of institutional investors

Liabilities and Investment Horizon

Defined Benefit Pension Plans

The liabilities of a DB pension plan are the present value of the future payments it will make to beneficiaries upon retirement, disability, or death. Calculating DB liabilities is complex and typically undertaken by actuaries employed by the plan sponsor or by external actuaries. Here we will highlight some key elements and focus on the discount rate used in calculating the present value of future benefit payments.

The first step in determining DB liabilities is to calculate the expected future cash flows (i.e., retirement benefits). These depend on the design and specifics of the pension plan. Some of the key elements common among DB plans in the calculation of expected cash flows are:

1. **Service/tenure:** The number of years the employee has been with the company or organization (or service years) determines the defined benefit the employee is expected to receive upon retirement. The higher the service years, the higher the retirement benefit. Sometimes a minimum number of service years is required before retirement benefits become vested (i.e., the employee becomes eligible to receive a pension).
2. **Salary/earnings:** The salary or earnings level of the employee affects the calculation of the defined benefit the employee is expected to receive upon retirement. The defined benefit may be a function of the average earnings over the entire career or the average earnings over the last several years prior to retirement (e.g., last three years).
3. **Mortality/longevity:** The length of time that retirement benefits are expected to be paid to plan participants is important in calculating expected cash flows. This requires assumptions about employees' and retirees' life

expectancies. Importantly, ever-increasing life expectancies is a key factor in making DB pension plans less affordable from the sponsor's perspective. Longevity risk is the risk to the plan sponsor that participants will live longer than assumed in the pension liabilities calculations.

In estimating future benefits, the plan sponsor must make several key assumptions, such as the growth rate of salaries, expected vesting, and mortality and disability assumptions. **Vesting** means that employees only become eligible to receive a pension after meeting certain criteria, typically a minimum number of years of service. In measuring defined benefit obligations, the plan sponsor must consider the likelihood that some employees may not satisfy the vesting requirements. Under both International Financial Reporting Standards (IFRS) and US generally accepted accounting principles (GAAP), pension obligations are determined as the present value of future benefits earned by employees for service provided to date. Assumptions about future salary increases, expected vesting, and life expectancy change over time and will change the estimated pension obligation. Given the importance of these factors, pension plans require periodic actuarial reviews to determine the value of the liabilities and the sponsor's annual required contribution rate.

Once expected future benefits are calculated, they must be discounted to determine their present value. Practices of marking-to-market liabilities using market discount rates can vary considerably based on country, or even within a country, between private and public pension plans. Typical discount rates include government bond yields or swap rates, corporate bond yields, and constant actuarial discount rates (long-term expected rate of return). Plan sponsors might be inclined to use a higher discount rate that will, all else equal, result in lower pension liabilities, a better funded status, and potentially lower contributions. Beneficiaries prefer to see a lower discount rate being used that will, all else equal, result in higher pension liabilities, a worse funded status, and potentially higher contributions. There is a delicate balance, however, because if contributions become unsustainable, the plan sponsor might decide to shut down its DB plan and substitute it with a less risky DC plan.

Over the past 15 years, a shift has occurred in many countries toward tying the discount rate to market rates. As a result, many pension plans have adopted a more liability-driven investment approach to partially or fully hedge the interest rate risk in their liabilities. Given the low interest rate environment since the 2007–2009 financial crisis, this has posed tremendous challenges for pension funds globally.

Discount Rates for Defined Benefit Plans in the US

In the United States, private and corporate DB pension plans may discount liabilities at rates based on high-grade bond yields averaged over 25 years. This was allowed under the 2012 update to the Pension Protection Act (PPA), part of broader legislation known as MAP-21. The change effectively raised the applicable discount rates (and reduced DB pension liabilities), providing some relief to defined benefit plans given what were perceived to be 'artificially' low interest rates. Prior to the PPA, corporate DB plans had to discount liabilities using current investment-grade corporate bond yields, not a historical average.

US public DB pension plans use actuarial discount rates which, as required by the US Governmental Accounting Standards Board (GASB), are based on the expected return of the pension plan asset portfolio. These are typically far higher than bond rates. The higher discount rates lower their liabilities and raise their funded status. However, this may cause such pension plans to potentially make

inadequate plan contributions and take on excessive risk by investing heavily in equities and alternatives in hope of generating an expected rate of return that supports the high discount rate.

Exhibit 4 summarizes the key elements in the calculation of defined benefit pension plan liabilities.

Exhibit 4: Factors Affecting Calculation of Defined Benefit Liabilities

Factor	Impact on Liabilities
Service/tenure	Depending on plan design, often the longer the period of service or tenure, the larger the benefit payments.
Salary/earnings	The faster salaries or earnings grow, the larger the benefit payments.
Additional or matching contributions	Additional or matching contributions are often rewarded by a step change increase in benefit payments.
Mortality/Longevity assumptions	If life expectancy increases, the obligations or liabilities will increase.
Expected Vesting	If employee turnover decreases, expected vesting will increase.
Expected Investment Returns	In some cases, increases in expected returns will result in a higher discount rate being used—hence, lower obligations or liabilities.
Discount Rate	A higher (lower) discount rate results in lower (higher) liabilities.

The main objective of a DB plan is to have sufficient assets to cover future benefit payments. A common pension industry metric used to gauge asset sufficiency is the funded ratio, also known as the vested benefit index (VBI) in some countries. The funded ratio is defined as:

$$\text{Funded ratio} = \text{Fair value of plan assets} / \text{PV of Defined benefit obligations}$$

In some countries, if the funded ratio is less than 100%, the sponsor must increase contributions until it exceeds 100%. Improving the plan's funded ratio can transform the pension obligation from a liability to an asset on the plan sponsor's balance sheet. It is important to note that in some cases, underfunded pension plans may take more investment risk in the hope of achieving higher returns and growing assets sufficiently to return to fully funded status. In other cases, underfunded pension plans reduce investment risk and rely on other actions to improve their funded status, such as increasing contributions or reducing benefits.

Additional considerations in DB pension design are:

1. the size of the pension plan relative to the size of the sponsor's balance sheet; and
2. the cyclicity of the plan sponsor's core business.

If plan assets and liabilities are small relative to the sponsor's balance sheet, then there may be more flexibility in taking investment risk and more tolerance for volatility in employer contributions. If, on the other hand, plan asset and liabilities are large in relation to the sponsor's balance sheet, then there may be less appetite for volatility of employer contributions and hence a reduced desire for taking investment risk.

Another important factor is the core business of the plan sponsor. If the plan sponsor's revenues are highly cyclical, it will not want plan funded status to deteriorate when the core business suffers from a cyclical downturn. In such cases, the DB plan's

asset allocation would be modified to ensure adequate diversification so as not to have significant exposure to assets highly correlated with the sponsor's core business or industry. In sum, it is desirable for plan assets to have low (high) correlations with the sponsor's operating assets (liabilities).

The plan sponsor's ability to tolerate volatility of contribution rates may impact the investment horizon, and hence the pension plan's appetite for such illiquid investments as private equity and venture capital. Another important factor determining the investment horizon is the mix of active plan participants (i.e., current employees) versus retirees. The higher the proportion of retirees (so the higher the liability associated with retirees only) relative to the proportion of active participants (or the liability associated with active participants), the more mature the plan—hence, the lower its risk tolerance. Some mature DB pension plans have been frozen (closed to new participants) as they typically experience negative cash flow where benefit payments exceed contributions. Generally, the more mature a pension fund, the shorter its investment horizon, which directly affects risk tolerance and the allocation between fixed-income assets and riskier assets.

Defined Contribution Pension Plans

In a DC plan, participants' pension benefits are based on amounts credited to their individual accounts in the form of contributions (from the employee and possibly the employer) and investment returns. Consequently, the liabilities of a DC pension plan sponsor are equal only to its required contributions. DC plan assets are typically pooled, and the sponsor invests according to the investment choices selected by plan participants. Often the DC plan may invest in a broadly diversified portfolio that may include investments not generally offered to retail investors, such as private equity and hedge funds. This is possible since pooling of assets gives rise to scale and the long-term horizon of the aggregate beneficiaries. In such case, the plan sponsor takes on the residual investment risk of its asset allocation. Once invested in such alternative asset types, the DC plan sponsor bears liquidity risk if any event occurs that causes a significant proportion of its participants to exit the plan. The asset allocation may be impacted to such an extent that the plan sponsor is unable to provide the asset allocation promised to its participants. Such a circumstance will have regulatory and reputational consequences for the DC plan sponsor.

Individuals in a DC plan are at different stages of their careers, so each has a different investment time horizon (the time period from his/her current age until expected death or expected death of a spouse, whichever is longer) as well as different risk tolerances. Therefore, key considerations for most DC plans are participants' ages and invested balances. If the plan has a larger proportion of older (younger) participants with large (small) invested balances, the investment options might reflect a shorter (longer) investment horizon. Many DC plans offer investment options that allow participants to select the investment horizon that best aligns with their own investment horizon. Examples are life-cycle options or target date options, which feature a glide path that manages the asset mix based on a desired retirement date. In the United States, most DC plans offer target-date options as default options; in Hong Kong SAR it is mandated that every default option plan have a life-cycle option.

There are two main types of life-cycle options. **Participant-switching life-cycle options** automatically switch members into a more conservative asset mix as their age increases. There may be several automatic de-risking switches at different age targets. A **participant/cohort option** pools the participant with a cohort that has a similar target retirement date. For example, if a participant is 40 years old in 2020 and plans to retire at the age of 65, he/she could invest in an option with a target date of 2045 and the fund would manage the appropriate asset mix over the next 25 years. In

2020, the assets might be 90% invested in equities and 10% in bonds. As time passes, however, the fund would gradually change the asset mix (less equities and more bonds) to reflect an appropriate allocation given the time to retirement.

Liquidity Needs

Although pension plans typically have long investment time horizons, they still must maintain sufficient liquidity relative to their projected liabilities. Liquidity needs are driven by:

- Proportion of active employees relative to retirees—The former contribute to the plan, while the latter receive benefit payments. More mature pension funds have higher liquidity needs. Frozen DB pension plans, often facing negative cash flow, must hold even more cash and other liquid investments compared to open mature plans.
- Age of workforce—Liquidity needs rise as the age of the workforce increases, since the closer participants are, on average, to retirement, the sooner they will switch from the contribution phase to benefit payment stage. This is true for both DB and DC plans.
- DB plan funded status—If the plan is well funded, the plan sponsor may reduce contributions, generating a need to hold higher balances of liquid assets to pay benefits.
- Ability of participants to switch/withdraw from plan—If pension plan participants can switch to another plan or withdraw on short notice, then higher balances of liquid assets must be held to facilitate these actions. This applies to DB and some DC plans.

A pension plan with lower liquidity needs can hold larger balances in private investments—such as real estate, infrastructure, private equity, and hedge funds—and can invest a higher proportion in equities and credit. A pension plan with higher liquidity needs, however, must invest a higher proportion of its assets in cash, government bonds, and highly liquid, investment-grade corporate bonds.

It is important for pension plans to regularly perform liquidity stress tests, which may include stressing the value of their assets and modelling reduced liquidity of certain asset classes in a market downturn. Such stress-testing may also help DC plans anticipate whether participants might switch out of more volatile investment options during market downturns.

EXAMPLE 1

Comparing Defined Benefit (DB) and Defined Contribution (DC) Pension Plans

1. Geoff Albright is 35 years old and has been working at Henley Consulting in Melbourne, Australia, for 10 years. Henley Consulting offers a defined benefit (DB) pension plan for its employees. The defined benefit plan is fully funded. Geoff Albright's benefit formula for monthly payments upon retirement is: final monthly salary \times benefit percentage ($=1.5\%$) \times number of years of service, where final monthly salary equals his average monthly earnings for the last three financial years immediately prior to retirement date. Hav-

ing been at Henley Consulting for 10 years, his benefits have vested and can be transferred to another pension plan.

Geoff has been offered a job at rival Australian firm, Horizon Ventures Consulting, which is offering a similar salary; however, Horizon Ventures Consulting offers a defined contribution (DC) pension plan for its employees. Horizon Ventures Consulting will pay 15% of annual salary into the plan each year. Employees can choose to invest in one of three diversified portfolios offered by the plan sponsor—Horizon Growth, Horizon Balanced, and Horizon Conservative—based upon their risk appetite, and employees can elect to make additional contributions to the plan. The monthly pension payments will depend on what has accumulated in Geoff's account when he retires.

Discuss the features that Geoff should consider in evaluating the two plans. Please address benefit payments, contributions, shortfall risk, and mortality/longevity risks.

Solution:

- Geoff notes his benefits at Henley Consulting have vested and can be transferred to Horizon Ventures Consulting's DC plan.
- Henley Consulting's plan provides a defined benefit payment linked to years of service and final salary, whereas Horizon Ventures Consulting's plan provides an uncertain benefit payment linked to the company's and Geoff's contribution rates and investment performance of plan assets. The benefits he can achieve in Henley Consulting's DB plan increase both by time employed as well as by growth in his wages. Geoff considers his capacity to achieve wage growth and compares this to the return objectives of his chosen option in Horizon Ventures Consulting's DC plan. Geoff notes his risk appetite and time horizon are suited to the Horizon Growth option.
- Although Henley Consulting's contribution rate is not known, Geoff is aware that the plan is currently fully funded and that it is Henley Consulting's obligation to maintain a fully funded status. Horizon Ventures Consulting's contribution rate is known (15% of annual salary), and Geoff can also make additional contributions himself.
- Geoff notes that the shortfall risk of plan assets being insufficient to meet his retirement benefit payments falls to his employer in the case of Henley Consulting's DB plan. But, for Horizon Ventures Consulting's DC plan, the shortfall risk falls to Geoff and depends on the contribution rate (15% from the company plus any additional contributions he chooses to make) and the performance of his chosen investments.
- Henley's DB plan pools mortality risk such that those in the pool who die prematurely leave assets that help fund benefit payments for those who live longer than expected. Horizon Venture Consulting's DC plan pays out the amount accumulated in Geoff's account, and he bears the risk of outliving his savings.

5

PENSION FUNDS: EXTERNAL CONSTRAINTS



describe the focus of legal, regulatory, and tax constraints affecting different types of institutional investors

In this section, we take a high-level view of some of the legal and regulatory constraints faced by pension funds. In the next section, we consider tax and accounting constraints that may affect investing by pension funds.

Legal and Regulatory Constraints

Regulatory bodies supervising pension funds typically cover financial services licensing and regulation, prudential supervision, capital adequacy, market integrity, and consumer protection. Breaching key regulations may result in loss of operating licenses and/or loss of tax benefits, where applicable, which provides a strong incentive to comply. Regulations do vary from country to country; for example, some countries specify minimum and maximum percentage allocations to certain asset classes, while other countries require a minimum contribution rate by employers, particularly if the plan's funded ratio falls below 100%. However, despite national differences, there are similar themes in regulation globally.

Reporting and transparency are heavily influenced by regulatory requirements, as some regulators now require extensive reporting, not only on direct investment fees and costs incurred by pension plans but also on indirect fees and costs of external commingled vehicles. Drivers of more detailed reporting and transparency are avoidance of corruption by government officials involved with public pension plans and increased consumer protection for private pension plans so participants and stakeholders make appropriate investment choices. Many countries have increased personal liability for pension trustees to ensure they act in the best interests of ultimate beneficiaries. For example, DC plan participants must choose their contribution rates and the investment risk they are willing to bear. However, regulators are aware that many DC plan participants have little understanding of how to invest for retirement. Although regulators may require the plan sponsor to provide investor education to their employees, DC plan trustees, as fiduciaries, are still required to operate with prudence and as if they were the asset owners.

In Australia, for example, most employees are covered by the DC Superannuation Guarantee, under which employers must contribute 9.5% of an employee's salary. Since many participants do not actively make investment decisions, the government applies strict licensing and other obligations for trustees when offering the default option (MySuper), including: providing a single diversified investment strategy as a default option suitable for the majority of participants; avoiding unnecessary or excessive fees; and delivering value for money (measured by long-term net returns). A similar default DC plan account exists in the United States (known as the Qualified Default Investment Alternative), which must also be diversified.

In Europe the updated Institutions for Occupational Retirement Provision (IORP II) will lead to regulatory changes for pension plans. Although each country will interpret the provisions slightly differently, the changes relate to governance, risk management, and disclosure. A number of key functions are defined, such as an internal audit, and standards are applied to those executing these key functions, including a requirement that such a person does not carry out a similar function for the plan sponsor. Many pension plans will need to document their risk management policies and procedures. For example, each fund must document its "own risk assessment" covering items

such as the risk of not meeting benefit obligations and operational risk, including administrative error or fraud. For disclosure, there will also be greater harmonization of pension benefit statements with certain items required to be included.

US corporate pension plans are subject to significant regulatory oversight. The Employee Retirement Income Security Act of 1974 (ERISA) regulates vesting, funding requirements, and payouts. ERISA includes a fiduciary code of conduct and required disclosures. ERISA established the Pension Benefit Guaranty Corporation, a US government agency that collects premiums from pension plan sponsors and pays benefits to participants (approximately 630,000) in terminated plans. Although ERISA protects benefits that workers have earned, an employer may still terminate a plan, essentially freezing a worker's ability to earn additional benefits. Moreover, the US Pension Protection Act of 2006 established minimum funding standards for DB plans, while later revisions raised the rates corporations could use to discount their liabilities (high-grade bond yields averaged over 25 years). Importantly, a potential consequence of using higher discount rates is these DB plans must generate higher returns for their funding status to remain sustainable, which typically requires taking on greater investment risk.

Tax and Accounting Constraints

Governments around the world encourage citizens to save for retirement by typically providing favorable tax treatment to retirement savings. Favorable tax treatment may come in different forms: reduced taxes on retirement plan contributions, favorable tax rates on investment income and/or capital gains, and lower tax rates on benefit payments drawn throughout retirement (versus higher taxes on lump sum payments). Foregone tax revenues from such favorable tax treatment are costly, so to ensure pension plans actually reduce tax burdens for retirement savers, governments typically place restrictions on plan design, governance, and investment activities in order for plans to qualify for the favorable tax treatment.

In the United States, 401(k) plans are tax deferred as participants make pre-tax contributions and do not pay tax on investment earnings; benefit payments, however, are taxed as ordinary income. To encourage savings retention within the pension plan, early withdrawals before age 59½ are taxed an additional 10%. In the United Kingdom, private pension plans are also tax deferred, with no tax on contributions or on investment earnings. The first 25% of benefit payments are tax free, and the remaining 75% is taxed as ordinary income after a tax-free personal allowance. In China, companies providing occupational pensions (known as Enterprise Annuities) are given tax relief amounting to 4% of wages; however, there are taxation differences between regions.

Pension plans taxed on investment earnings must be aware of tax implications of their investment activities. For example, there may be favorable capital gains tax treatment for investments held over 1 year, which should incentivize investing in lower turnover strategies. Also, pension plans must consider tax implications when returns from investing via futures and other derivatives are treated as income and taxed at higher rates than returns from investing in the underlying securities, which are typically taxed at lower capital gains and dividend rates. When investing internationally, double taxation may occur when the same income or capital gain is taxed both by the jurisdiction in which it is earned *and* in the jurisdiction where the pension fund resides. To achieve tax efficiency, pension plans should invest via legal structures that provide access to double taxation treaties, whereby taxes paid in the country of residence are exempt in the country where they arise (alternatively, the plan receives a foreign tax credit in its country of residence to reflect taxes withheld in the country where the income/gain arose).

Accounting treatment is another important external factor that drives investment decision making by pension funds. These treatments may differ across countries, so it is important to be fully aware of them. Here we focus on the United States to illustrate how accounting treatment may influence investment choices. Corporate DB pension plans must follow generally accepted accounting principles—notably, Accounting Standards Codification (ASC) 715, Compensation—Retirement Benefits, which requires that an overfunded (underfunded) plan must appear as an asset (liability) on the balance sheet of the corporate sponsor. Such plan sponsor must also report gains, losses, and service costs as part of net income. This accounting treatment significantly increased the transparency of US plans' funded status, and it prompted many corporate plans to implement liability-driven investing techniques to reduce the effect of funded ratio volatility on their financial statements.

Public pension plans in the US must follow Governmental Accounting Standards Board (GASB) rules. Under GASB rules, public plan sponsors must report fair market values of plan assets and can use a blended approach to valuing plan liabilities. The latter involves discounting the funded portion of pension liabilities using the (higher) expected return on plan assets as well as discounting the unfunded portion of liabilities based on the (lower) yield on tax-exempt municipal bonds. Using a higher discount rate for the funded portion of liabilities skews the risk tolerance of public pension plans and incentivizes them to allocate relatively large proportions of assets to equities and alternative investments.

6

PENSION FUNDS: RISK CONSIDERATIONS



evaluate risk considerations of private defined benefit (DB) pension plans in relation to 1) plan funded status, 2) sponsor financial strength, 3) interactions between the sponsor's business and the fund's investments, 4) plan design, and 5) workforce characteristics

Despite the long-term trend in the shift away from DB plans toward DC plans, as previously demonstrated, DB plans (and their hybrids) are still a key part of the pension landscape in several P7 countries, such as Canada, Japan, the Netherlands, and Switzerland. As such, it is important to review risk management considerations of private defined benefit pension plans—a topic that has intensified following the global financial crisis of 2007-2009. Key risk considerations of such plans must be measured and managed.

1. Plan funded status

When a defined benefit pension plan is fully funded, the value of assets is greater than or equal to the present value of the liabilities. If the value of the assets falls below the present value of the liabilities, the pension plan is considered to be underfunded and the plan sponsor is left with a financial liability. The plan sponsor can take several approaches in order to minimize the risk of generating a financial liability:

- a. Seek to match assets to liabilities in terms of quantity, timing, and risk using a Liability Driven Investing (LDI) approach. Duration gap management or cash flow-matching suits plans that are close to fully funded and seek to maintain that status.

- b. Seek to grow assets at a higher rate of return than the expected growth in liabilities—which typically involves taking on more investment risk. This form of investment suits plans that are underfunded and wishing to return to a fully funded status. It may also suit fully funded plans that are seeking to lower their contribution rate over time and are willing to endure the increased volatility in funded status that this approach entails.
- c. Seek to invest in more defensive assets expected to deliver less volatile returns. This may suit defined benefit pension plans where the plan sponsor is willing to make higher contributions over time in exchange for less variability in the plan funded status.

In cases where a plan is adequately funded, the sponsoring corporation may seek to remove pension-driven balance sheet volatility by engaging pension risk transfer through such mechanisms as:

- offering lump sum payments to beneficiaries in exchange for voluntarily leaving the plan; or
- negotiating a transfer of the risk to an insurance provider.

2. Sponsor financial strength

When a defined benefit pension plan sponsor is not financially strong, there is a considerable risk that it may fail to make the necessary contributions to the plan. The plan sponsor may not be able to meet its defined benefit pension plan liabilities if there is a funding shortfall. If the plan sponsor files for bankruptcy protection, an underfunded pension plan is in the same difficult position as other creditors, having to join the queue claiming the firm's remaining assets.

The relative size of the plan also influences the sponsor's ability to assume risk. If the pension plan is small (large) relative to the size of the sponsor, then volatility in pension assets, liabilities, and/or contributions will have a smaller (larger) effect on the sponsoring company's balance sheet.

3. Interactions between the sponsor's business and the fund's investments

In the past, many private defined benefit pension plans have held significant stakes in the equity of the sponsor company. However, due to the risk involved, many regulators have restricted how much a plan may invest in the stock of the sponsor company. This risk materializes in circumstances in which the company performs poorly and its share price falls, thereby increasing the risk that pension plan assets fall below liabilities. This may coincide with a point in time when the sponsor's financial strength is poor, constraining its ability to make additional contributions necessary to address the developing funding shortfall. For this reason, it is advisable for the plan to diversify out of the sponsor company's stock. It is also prudent to diversify away from companies operating in the same industry, because their risk and return are expected to be highly correlated with those of the sponsor company's stock.

4. Plan design

Poor plan design can contribute many risks for the private defined benefit pension plan sponsor. When setting out the formula for calculation of defined benefit payments, the plan sponsor must balance adequacy (will the benefit payment be sufficient to meet income needs in retirement) and sustainability (what contribution rate is sustainable, and what investment return can realistically be achieved) within the context of its risk tolerance.

There is a significant risk that a company will be overly optimistic in predicting its ability to make contributions to its pension plan decades into the future.

The plan design is informed by its purpose as an employee retention tool to mitigate the risk of losing employees to a competitor. The company/sponsor may also wish to increase future defined benefit payments to address worker unrest, which may otherwise lead to strike action or lengthy negotiations with unions. If a company does not have immediate excess cash flow, it may prefer to increase future defined benefit payments instead of granting immediate pay raises.

5. Workforce characteristics

The nature of the workforce is an important risk consideration for companies because it impacts what the duration of the assets should be. The younger the workforce, the longer the duration of assets and the greater risk tolerance the plan will have. If a company's workforce has high turnover, it may have few employees whose entitlements to defined benefit payments will vest. On the other hand, if the average tenure of the workforce increases, then more liabilities will vest, thereby reducing the plan's funded status. If the workforce is older and nearer to retirement age, an important risk consideration is keeping sufficient liquidity so the plan can meet liabilities when they become due. Conversely, in a plan where the workforce is younger, on average, the sponsor may take on more liquidity risk. A workforce with a high level of vested benefits may constrain the company in terms of flexibility in managing its workforce. For example, a company may prefer to downsize its workforce, but doing so might require it to pay out excessive vested benefits.

Retired workers also influence the longevity risk of DB plans. Longevity risk is the risk that an individual will live longer than expected and draw more in benefit payments than the amount determined in the calculation of plan liabilities. In private DB pension plans, longevity risk is pooled such that if a participant dies earlier than expected, he/she leaves more assets in the pool that can then cover additional payments for those who live longer than expected. However, this pooling of longevity risk does not mitigate the effect of rising life expectancies, which implies, all else equal, an increase in total DB plan liabilities.

In setting a risk objective, plan sponsors must consider plan status, sponsor financial status and profitability, sponsor and pension fund common risk exposures, plan features, and workforce characteristics, as shown in Exhibit 5.

Exhibit 5: Factors Affecting Risk Tolerance and Risk Objectives of Defined Benefit Plans

Category	Variable	Explanation
Plan status	<ul style="list-style-type: none"> Plan funded status (surplus or deficit) 	<ul style="list-style-type: none"> Higher pension surplus or higher funded status implies potentially greater risk tolerance.
Sponsor financial status and profitability	<ul style="list-style-type: none"> Debt to total assets Current and expected profitability Size of plan compared to market capitalization of sponsor company 	<ul style="list-style-type: none"> Lower debt ratios and higher current and expected profitability imply greater risk tolerance. Large sponsor company size relative to pension plan size implies greater risk tolerance.

Category	Variable	Explanation
Sponsor and pension fund common risk exposures	<ul style="list-style-type: none"> Correlation of sponsor operating results with pension asset returns 	<ul style="list-style-type: none"> The lower the correlation, the greater the risk tolerance, all else equal.
Plan features	<ul style="list-style-type: none"> Provision for early retirement Provision for lump-sum distributions 	<ul style="list-style-type: none"> Such options tend to reduce the duration of plan liabilities, implying lower risk tolerance, all else equal.
Workforce characteristics	<ul style="list-style-type: none"> Age of workforce Active lives relative to retired lives 	<ul style="list-style-type: none"> The younger the workforce and the greater the proportion of active lives, the greater the duration of plan liabilities and the greater the risk tolerance.

EXAMPLE 2**Andes Sports Equipment Corporation—Defined Benefit Plan**

1. Frank Smit, CFA, is chief financial officer of Andes Sports Equipment Company (ADSE), a leading Dutch producer of winter and water sports gear. ADSE is a small company based in Amsterdam, and all of its revenues come from Europe. Product demand has been strong in the past few years, although it is highly cyclical. The company has rising earnings and a strong (low debt) balance sheet. ADSE is a relatively young company, and as such, its defined benefit pension plan has no retired employees. This essentially active-lives plan has €100 million in assets and an €8 million surplus in relation to the projected benefit obligation (PBO). Several facts concerning the plan follow:

- The duration of the plan's liabilities (which are all Europe-based) is 20 years.
- The discount rate applied to these liabilities is 6 percent.
- The average age of ADSE's workforce is 39 years.

Based on the information provided, discuss ADSE's risk tolerance.

Solution:

ADSE appears to have above average risk tolerance for the following reasons:

- The plan has a small surplus (8 percent of plan assets); that is, the plan is overfunded by €8 million.
- The company's balance sheet is strong (low use of debt).
- The company is profitable despite operating in a cyclical industry.
- The average age of its workforce is low.

2. Smit must set risk objectives for the ADSE pension plan. Because of excellent recent investment results, ADSE has not needed to make a contribution to the pension fund in the two most recent years. Smit considers it very important to maintain a plan surplus in relation to PBO. Because an €8 million surplus will be an increasingly small buffer as plan liabilities increase, Smit

decides that maintaining plan funded status, stated as a ratio of plan assets to PBO at 100 percent or greater, is his top priority.

Based on the information provided, state an appropriate risk objective for ADSE.

Solution:

Given Smit considered it very important to maintain a plan surplus in relation to PBO, an appropriate risk objective for ADSE relates to shortfall risk with respect to the plan's funded status falling below 100 percent. For example, ADSE may want to minimize the probability that funded status falls below 100 percent, or it may want the probability that funded status falls below 100 percent to be less than or equal to 10 percent. If a plan surplus is maintained, ADSE may experience more years in which it does not need to make a contribution. Indeed, a major motivation for maintaining a plan surplus is to reduce the contributions ADSE needs to make in the future. As such, another relevant type of risk objective would be to minimize the present value of expected cash contributions.

7

PENSION FUNDS: INVESTMENT OBJECTIVES AND ASSET ALLOCATION

- ☐ evaluate the investment policy statement of an institutional investor
- ☐ evaluate the investment portfolio of a private DB plan, sovereign wealth fund, university endowment, and private foundation

Investment Objectives

Defined Benefit Pension Plans

Defined benefit pension plans ultimately need to meet pension liabilities through a combination of investment returns and contributions. In practice, the investment objective of a DB pension plan is often to achieve a long-term rate of return on plan assets that exceeds the assumed rate of return used by the pension plan actuaries, typically the discount rate used in valuing pension liabilities. Importantly, targeting a long-term return based on the discount rate may be inappropriate in some cases. For example, when the discount rate is set using yields on government bonds, the target return is likely too low. In such a case, it may be preferable to fully hedge interest rate risk by adopting a liability-driven investing approach.

In determining an appropriate target return, it is worth noting that, ideally, the asset base should grow—through investment returns and contributions—in line with the growth of liabilities. If a plan is underfunded, the asset base must grow faster than liabilities. Because the growth of liabilities is met through investment returns and contributions (from the plan sponsor and/or employees), the DB plan's board and investment committee must consider the appropriate level of portfolio risk relative to the plan sponsor's willingness and ability to raise contribution rates should investment returns fall short of expectations.

In summary, the primary objective for DB pension plans is to achieve a long-term target return (usually defined in nominal terms) over a specified investment horizon (3–5 years or even as long as 10 or 25 years) with an appropriate level of risk that allows the plan to meet its contractual liabilities. The secondary objective could be to minimize the present value of expected cash contributions.

In setting overall investment strategy, many DB pension plans engage in detailed Asset Liability Management studies every 3–5 years. These studies include Monte Carlo simulations of thousands of scenarios for asset returns and factors driving pension liabilities (importantly, the discount rate) aimed at producing probability distributions for funded ratios and contribution rates at different horizons. These distributions are useful for determining key metrics, such as the expected funded ratio in 10 or 15 years, surplus volatility, surplus-at-risk, and volatility of contribution rates. Additionally, many pension funds engage in detailed liquidity modeling and stress testing that involve modeling contributions, benefit payments, capital calls for funding private equity investments, stressed asset values, and reduced liquidity of certain asset classes in market downturns. Besides providing an assessment of the appropriateness of the pension fund's liquidity profile, such stress testing provides insights into meeting liquidity needs during a financial crisis.

Defined Contribution Pension Plans

The main objective of defined contribution pension plans is to prudently grow assets that will support spending needs in retirement. Defined contribution plans usually offer a variety of investment options with differing investment objectives to suit participants of different ages, asset balances, and risk appetites. The investment options offered by the DC plan sponsor can be managed either in-house or externally as well as passively or actively. Most DC pension plans also provide a default option for disengaged participants. Plan trustees/boards must set an appropriate investment objective of the default option after reviewing the characteristics of existing default participants. Unsurprisingly, many DC plans end up with a balanced asset allocation mix as the default option—frequently in the form of a life-cycle fund. In cases where a DC plan provides participants a balanced asset allocation option with active management, a secondary objective may be to outperform the long-term policy benchmark consisting of the weighted average of individual asset class benchmarks and the policy weights defined by the strategic asset allocation. Finally, for some DC plans it is important their investment options outperform those of other DC pension plans, which is particularly relevant in countries where participants can voluntarily switch between DC plan providers.

Sample Investment Objectives of Different Pension Plans

Public DB Pension Plan:

1. The assets of Public Plan will be invested with the objective of achieving a long-term rate of return that meets or exceeds the Public Plan actuarial expected rate of return.
2. Public Plan will seek to maximize returns for the level of risk taken.
3. Public Plan will also seek to achieve a return that exceeds the Policy Index.
4. Public Plan will seek to achieve its objectives on an after fees basis.

Corporate DB Pension Plan:

The Trustee wishes to ensure that the Corporate Plan can meet its obligations to the beneficiaries while recognizing the cost implications to the Company of pursuing excessively conservative investment strategies. The objectives of the Plan are defined as: wishing to maximize the long-term return on investments subject to, in its opinion, an acceptably low likelihood of failing to achieve an ongoing 105% funding level.

Corporate DC Pension Plan:

The Fund currently offers a range of investment options to its participants and has adopted an age-based default strategy for participants who do not choose an investment option.

The investment strategy of the Fund is to put in place portfolios to achieve the objectives of its stakeholders over a reasonable period of time with a reasonable probability of success.

In establishing each option's investment objectives, the Trustee takes into account the average participant's age, account balance, and risk appetite. The participant's choice of investment option indicates his/her risk appetite.

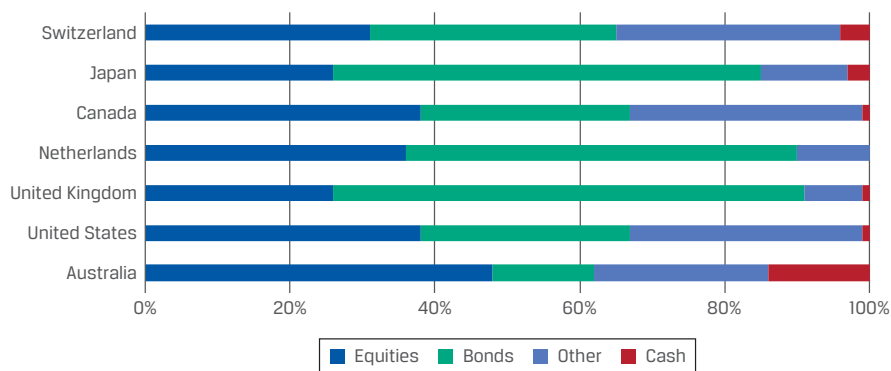
For example, a participants selecting the growth option indicates a higher risk tolerance over a longer investment time horizon. The investment objective for the growth option is to build an investment portfolio to outperform inflation + 4% per annum over 7-year periods while accepting a high level of risk that is expected to generate 4–6 negative annual returns over any 20-year period.

Asset Allocation by Pension Plans

An examination of pension fund asset allocations shows very large differences in average asset allocations by country. Moreover, examining pension fund asset allocations within a country also typically shows large differences despite these plans seeking to achieve similar goals. Such inter- and intra-national differences are driven by many factors discussed earlier in this reading, including the differences in legal, regulatory, accounting, and tax constraints; the investment objectives, risk appetites, and investment beliefs of the stakeholders; the liabilities to and demographics of the ultimate beneficiaries; the availability of investment opportunities; and the expected cost of living in retirement.

Exhibit 6 presents the average asset allocation of pension funds in the world's largest pension fund markets. The data are an aggregation of both DB and DC plans as presented (the split between DB and DC plans for each of the P7 countries is shown in Exhibit 3).

Note the category 'Other' includes hedge funds, private equity funds, loans, structured products, other mutual funds (i.e., not invested in equities, bonds, or cash), land, buildings, and other miscellaneous investments.

Exhibit 6: Pension Asset Allocation for P7 Countries (2021)

Source: Willis Towers Watson Thinking Ahead Institute (2021).

The key observations regarding the data presented in Exhibit 6 are as follows:

- Equities:** Equities provide a long-term risk premium over bonds and cash and are typically viewed as the asset class of choice for long-term investors, like pension plans because of the higher expected returns they offer. Traditionally, equities are also viewed as an inflation hedge, as opposed to bonds that do not perform well in an inflationary environment. However, over the past decade, there has been a decrease in the equity allocation in several countries, particularly in Japan, Canada, and Australia. In aggregate, the resulting reallocation has been to the category 'Other,' which includes such alternatives as private equity and debt, real assets, and hedge funds, as well as to bonds (and fixed income, generally) as DB pension funds have reduced their risk appetite to lower the volatility of their funded ratios. Australia and the US have the largest proportions of DC pension assets and also the largest allocations to equities. Although not shown in Exhibit 6, it is worth noting that the United States, Australia, and the Netherlands have the highest proportions of their equities allocations invested in their local markets. Given the size of the domestic equities markets in Australia and the Netherlands, this implies significant home bias.
- Fixed Income:** Fixed income plays a defensive role in pension fund portfolios, because during times of financial market stress, equity markets and interest rates tend to fall. Fixed-income investments also help DB pension plans hedge the interest rate risk relative to their pension liabilities. Many regulators, in fact, require DB pension plans to hold a minimum allocation in fixed-income investments. Over the last decade, US corporate pension plans have increased their allocations to fixed-income investments, despite low expected returns, driven by the desire to reduce their funded ratio volatility. Conversely, US public pension plans have reduced their fixed-income allocations overall while increasing their allocations in the fixed-income space to high yield (riskier) bonds. The reallocation and repositioning are driven by the large gap that has opened between their expected rate of return and the yield available on long-term government securities.
- Alternatives (Other):** This category includes private equity and debt markets, real estate, hedge funds, and real assets. As a group, these alternative assets tend to have low, or negative, correlations with traditional investments as well as lower drawdowns. In the case of hedge funds, this may be explained by the lower volatility of these strategies versus equity markets. Private asset

classes have historically also exhibited lower drawdowns compared to equities. This may be partially explained by a lack of fully marking-to-market because of limited market transactions as well as appraisal-based valuations that lag changes in market pricing. Overall, the perception of institutional investors is that alternatives can produce equity-like returns over the long run with relatively low drawdowns, which has been the motivation for the shift from equities to alternatives over the past decade and a half. However, given the complexity and skill required to manage alternative investments, these investments come with high fees; thus, fee-sensitive institutions with significant liquidity needs may be unable to make sizable allocations to alternatives. Furthermore, attractive investment opportunities in private markets and in hedge fund strategies may be scarce. Increased competition and the huge amounts of capital deployed on a global scale by institutional investors may put downward pressure on future returns. Although still a smaller part of most institutional portfolios, allocations to real assets have increased significantly because they are considered an attractive way to hedge inflation. Japan has been slowest among the select countries to increase allocations to alternatives; however, the transition is underway with the country's largest pension plan, Government Pension Investment Fund (GPIF), which is reducing its allocation to domestic bonds in favor of alternatives.

EXAMPLE 3

Asset Allocation by a Public Defined Benefit Plan

1. Susan Liew, CFA, is the chief investment officer of the Lorenza State Pension Plan (LSPP), a public DB plan. The plan maintains an asset allocation of 30% US equities, 30% international equities, 30% US fixed income, and 10% international fixed income. Liew's investment team developed the following long-term expected real returns for the asset classes in which the LSPP has traditionally invested. The outlook for US and international equities is slightly below long-term averages, while the outlook for US and international fixed income is well below long-term averages.

Asset Class	Expected Long-Term (10-Year) Annual Return
US equities	4.0%
International equities	5.0%
US fixed income	1.0%
International fixed income	−0.5%

Given the poor prospects for fixed income and the mediocre expectations for equities, Liew is exploring making allocations to various alternatives and has asked LSPP's asset consultant to provide comments on considerations for each alternative asset class, as shown here:

Asset Class	Comments
Alternative debt	Represents a diverse range of high yielding and floating-rate debt expected to return 300 bps annually over traditional fixed income (default-adjusted basis). The additional returns are compensation for increased liquidity risk in private debt, added credit risk in high yield and EM debt, and non-performing loans.
Infrastructure funds	Strong income-like characteristics given contracted cash flows for most underlying infrastructure projects. This asset class entails increased liquidity risk but offers some inflation protection (many contracted cash flows are linked to inflation).
Hedge funds	Provide access to various diversifying strategies, including those with potential to generate gains in both rising and falling markets. Expected to return 250 bps annually over traditional long-only equities. Careful manager selection and underlying strategy selection (especially exposure to equity market beta) are important factors.

Liew recommends to LSPP's Board of Trustees the following change in asset allocation:

Asset Class	Current Asset Allocation	Recommended Asset Allocation
US equities	30%	25%
International equities	30%	25%
US fixed income	30%	15%
International fixed income	10%	5%
Alternative debt	—	10%
Infrastructure funds	—	10%
Hedge funds	—	10%

How would the recommended change in asset allocation be expected to affect LSPP's funded status?

Solution:

The recommended changes in asset allocation would likely affect LSPP's funded status as follows:

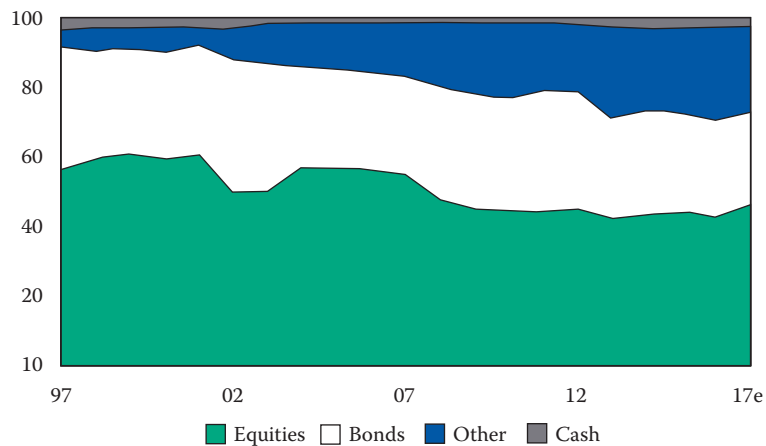
- The changes would increase expected returns, implying higher expected asset values for LSPP over time.
- Given that both alternative debt and hedge funds have higher projected long-term returns than traditional debt and equities, respectively, the discount rate applied to LSPP's liabilities can be increased, thereby reducing their present value.

- On balance, LSPP's funded status would be expected to improve because of the recommended changes in asset allocation. In addition to generating higher asset values and lower present value of liabilities, the volatility of assets (and therefore the risk to funded status) should be reduced because of the lower correlation among asset returns.

Note that although these alternative investments entail reduced liquidity, this does not impact funded status; in fact, funded status improves because of the factors mentioned previously. However, the reduced liquidity must be considered to ensure sufficient coverage of prospective liabilities. Alternative investments entail greater manager selection risk and larger dispersion of returns around the policy benchmark relative to a passive allocation to public markets. Careful manager selection would likely require resources that would increase internal costs, and also require paying higher fees to access skilled alternative asset managers.

Exhibit 7 shows the evolution of pension fund asset allocation trends from 2000 –2020 for the P7 countries. It is apparent that the allocation to equities has decreased from about 60% in 2000 to about 43% in 2020, while allocations to the 'Other' category of alternatives has increased from about 7% to 26% over the same time period. This is consistent with the general trend among institutional investors of diversifying out of equities and into alternative investments, including private equity, natural resources, real estate, and hedge funds.

Exhibit 7: Evolution of Pension Asset Allocation from 2000 to 2020



Source: Willis Towers Watson Thinking Ahead Institute (2021).

SOVEREIGN WEALTH FUNDS: TYPES AND STAKEHOLDERS

8

- discuss the stakeholders in the portfolio, the liabilities, the investment time horizons, and the liquidity needs of different types of institutional investors

Sovereign wealth funds (SWFs) are state-owned investment funds or entities that invest in financial or real assets. Sovereign wealth funds have increased significantly in number and size over the past two decades. Governments have established SWFs from budget surpluses to meet different objectives. The International Monetary Fund (IMF) has defined five broad types of sovereign wealth funds, and each pursues different investment objectives. Exhibit 8 summarizes these five types with their main objective and some notable examples.

Exhibit 8: Major Types of Sovereign Wealth Funds

Type	Objective	Examples
Budget stabilization funds	Set up to insulate the budget and economy from commodity price volatility and external shocks.	Economic and Social Stabilization Fund of Chile; Timor-Leste Petroleum Fund; Russia's Oil Stabilization Fund
Development funds	Established to allocate resources to priority socio-economic projects, usually infrastructure.	Mubadala (UAE); Iran's National Development Fund; Ireland Strategic Investment Fund; Temasek (Singapore)
Savings funds	Intended to share wealth across generations by transforming non-renewable assets into diversified financial assets.	Abu Dhabi Investment Authority; Kuwait Investment Authority; Qatar Investment Authority; Russia's National Wealth Fund
Reserve funds	Intended to reduce the negative carry costs of holding reserves or to earn higher return on ample reserves.	China Investment Corporation; Korea Investment Corporation; GIC Private Ltd. (Singapore)
Pension reserve funds	Set up to meet identified future outflows with respect to pension-related contingent-type liabilities on governments' balance sheets.	National Social Security Fund (China); New Zealand Superannuation Fund; Future Fund of Australia

Source: International Monetary Fund, "Sovereign Wealth Funds—A Work Agenda" (29 February 2008).

Exhibit 9 shows some of the largest sovereign wealth funds, which manage a total of about US\$3.6 trillion in assets—close to 50% of all SWF assets (more than US\$7.3 trillion).

Exhibit 9: Select Large Sovereign Wealth Funds

Fund	Inception Date	Country	Type
Kuwait Investment Authority	1953	Kuwait	Savings Fund
Abu Dhabi Investment Authority	1976	Abu Dhabi, United Arab Emirates	Savings Fund
Norway's Government Pension Fund—Global	1990	Norway	Budget Stabilization/ Savings/Pension Reserve
China Investment Corporation	2007	China	Reserve Fund

Source: SWF Institute (www.swfinstitute.org).

Stakeholders

SWF stakeholders include the citizens, the government, and external asset managers as well as the SWF management, investment committees, and boards.

The ultimate SWF stakeholders are the current and future citizens (or residents) of the country. Depending on the objectives of the SWF, these stakeholders either benefit directly in the form of payments (e.g., for pension reserve funds) or indirectly through stabilization of government budgets, lower taxes, or investments by the SWF in the domestic economy. If the SWF fails to meet its objectives, citizens/residents might be impacted through higher future taxes. Several SWFs are explicitly set up to benefit not only the current generation but also future generations. When such intergenerational wealth transfer is part of the objective, significant transparency and communication are required by the SWF and government to gain support from all stakeholders. This also requires long-term thinking by the government, which can be challenging when some governments have tenures of only a few years and when fiscal budgets vary significantly over the economic cycle.

The management or investment office of an SWF is tasked with investing its assets according to the investment policy and objectives of the fund. They monitor assets, make recommendations on investment strategy, and either select external asset managers or manage assets in-house. Appointment to an SWF's board, which oversees the management or investment office, is typically executed through a formal process that may include appointment by the current ruling government. In any case, the board has a fiduciary duty to the ultimate beneficiaries, the nation's current and future generations.

9

SOVEREIGN WEALTH FUNDS: OTHER CONSIDERATIONS

Liabilities and Investment Horizons

There is a wide variety in investment objectives, liabilities, investment horizons, and liquidity needs among the five types of SWFs, so we will discuss each type separately. As a group, however, SWFs are different from the other institutional investors

covered in this reading when it comes to liabilities. The liabilities of DB pension funds, endowments and foundations, insurance companies, and banks are clearly defined, which facilitates asset/liability management (ALM) processes. SWFs, however, do not generally have clearly defined liabilities given their mission of intergenerational wealth transfer. It is also worth noting that SWFs do not necessarily fit neatly into one of the five different types discussed in this section. For example, Norway's Government Pension Fund Global (formerly known as Norway's Petroleum Fund) undertakes elements of stabilization and sterilization, accumulating pension reserves, and saving for future generations.

Budget Stabilization Funds

Budget stabilization funds are established to insulate the fiscal budget from commodity price volatility and other external shocks, particularly if a nation's revenue is tied to natural resource production or other cyclical industries. These funds have uncertain liabilities and relatively short investment horizons. Their main purpose is risk management because such funds may be needed on a short-term basis to help support the government budget. The investment objective is usually to deliver returns in excess of inflation with a low probability of a negative return in any year. Budget stabilization funds typically avoid assets that are highly correlated with the main sources of government revenue, and they may engage in hedging against declines in prices of commodities that are important revenue generators for the local economy. These funds mainly invest in government bonds and other debt securities. Examples of budget stabilization funds include the Economic and Social Stabilization Fund of Chile and Russia's Oil Stabilization Fund.

Development Funds

Development funds are established to support a nation's economic development through investing in essential infrastructure, innovation, or by supporting key industries. Liabilities are not clearly defined and typically uncertain for development funds, but their overall objective is to raise a country's economic growth or to diversify the economy. As such, these funds have an implicit real return target: to increase real domestic GDP growth and productivity. Some initiatives, such as infrastructure/industrial development, may be ongoing and long-term, while others may have a fixed, medium-term horizon, such as a medical research fund. Examples of development funds include Mubadala Development Corp. (UAE) and the National Development Fund of Iran.

Savings Funds

Savings funds are typically established to transform proceeds from the sale of non-renewable natural resources into long-term wealth and a diversified portfolio of financial assets. The mission of a savings fund is wealth transfer to future generations after the sources of natural wealth have been depleted. As such, their liabilities are long-term. Some savings funds have a real return objective or an explicit spending policy (like endowments). Norway's Government Pension Fund Global (GPF) uses a fiscal spending rule whereby it intends to withdraw 3% of the fund's value annually with the goal of gradually phasing oil revenue into the Norwegian economy. This spending rate is linked to the expected real return earned by the GPF. A special case of savings funds involves government investment holding companies, which are funded from the privatization proceeds of national companies (e.g., Singapore's Temasek Holdings). Because of their long-term horizons, savings funds invest in risky and illiquid assets, including equities and a wide range of alternative investments. Of course, savings funds should avoid investing in assets highly correlated with the non-renewable resources from which the government is trying to diversify.

Reserve Funds

Reserve investment funds are established from central bank excess foreign currency reserves. The objective is to achieve a return higher than that on FX reserves (usually invested in low-duration, high-grade debt instruments) and to reduce the negative cost-of-carry of holding FX reserves. Reserve funds are common in export-intensive economies that have built up large FX reserves. Central banks accumulate such reserves as they print local currency to buy FX (like US dollars or euros) from local firms selling export goods. The central banks then issue monetary stabilization bonds to absorb the excess local currency. So, the central banks typically end up with FX reserves invested in low-yielding US Treasury or other high-quality sovereign debt instruments, while their liabilities (monetary stabilization bonds) pay much higher yields that create the negative cost-of-carry. Countries mitigate this cost by creating sovereign wealth reserve funds, placing excess FX reserves in these funds, and investing them globally in higher yielding, risky assets. Although their true liabilities are the central bank's monetary stabilization bonds, in practice, reserve funds operate somewhat similarly to endowments and foundations by having either a nominal or real return target. Also, their investment horizons are very long, with typically no immediate or interim pay-out expectation. Consequently, reserve funds generally invest in diversified portfolios with significant exposure to equities and other high-yielding alternative investments. Examples of reserve funds include China Investment Corporation (CIC), Korea Investment Corporation (KIC), and GIC Private Limited (GIC), formerly known as Government of Singapore Investment Corporation.

Pension Reserve Funds

Pension reserve funds are established to help prefund contingent pension-related liabilities on the government's balance sheet. Pension reserve funds are usually funded from fiscal surpluses during economic booms. The goal is to help reduce the burden on future taxpayers by prefunding social security and health care costs arising from aging populations, so these funds generally have long-term investment horizons. There is usually an **accumulation phase (decumulation phase)** where the government predominantly contributes to (withdraws from) the fund. However, additional uncertainty also exists around expected cash flows, particularly in the case of funding health care because those costs are quite volatile. The investment objective of pension reserve funds is to earn returns sufficient to maximize the likelihood of meeting future pension, social security, and/or health care costs as they arise. Therefore, such funds will typically invest in a diversified portfolio with the majority in such equities and alternative investments as property, infrastructure, hedge funds, and private markets. An example of a pension reserve fund is Future Fund of Australia (FFA). Its goal is to meet unfunded pension liabilities (retirement payments or superannuation payments in Australia) that will be owed to former public employees starting in 2020. FFA was funded from budget surpluses and privatization proceeds of Telstra, an Australian telecommunications company that was formerly a state-owned enterprise. The investment mandate for FFA is to achieve an average annual return of at least the Consumer Price Index (CPI) + 4% to 5% per year over the long term with an acceptable level of risk.

Liquidity Needs

Budget Stabilization Funds

Stabilization funds must maintain a high level of liquidity and invest in assets that have a low risk of significant losses over short time periods. For example, in the event of a negative commodity price shock, the government might experience a significant budget deficit caused by lower commodity-based revenues. To stabilize the budget

and meet spending needs, the stabilization fund's assets must be readily accessible. As a result, budget stabilization funds invest a significant portion of their portfolios in cash and high-grade, fixed-income instruments that are very liquid and carry little risk of significant drawdown.

Development Funds

A development fund supports national economic development. Liquidity needs depend on the particular strategic economic development initiatives the fund was created to support. For example, infrastructure investments are very long-term, so funds established to develop infrastructure would have low liquidity needs. Development funds designed to promote research and innovation may also require long time periods to see the fruits of investments in innovation and research and are likely to have low liquidity needs as well.

Savings Funds

Savings funds have a very long-term investment horizon and low liquidity needs. Their main objective is to grow wealth for future generations, so their liquidity needs, being long-term in nature, are comparable to those of endowments and foundations. In instances where the savings fund was established to transform the proceeds from the sale of non-renewable commodities into long-term wealth, the fund's liquidity needs may change once the nation's natural resources have been depleted because the government is more likely to begin withdrawing money from the fund to support its budgetary needs.

Reserve Funds

Reserve funds operate to offset negative carry effects of holding FX reserves, and consequently, excess reserves are invested in higher growth investments. The liquidity needs of reserve funds are lower than those of stabilization funds but higher than those of savings funds. Reserve funds typically hold 50%–70% in equity or equity-equivalent investments to achieve their return targets. The remainder, however, is likely to be invested in liquid fixed-income securities that could be readily sold should a dramatic change in the balance of trade require additional central bank reserves.

Pension Reserve Funds

Pension reserve funds need to meet future pension or health care liabilities when they come due. Depending on when significant fund withdrawals are expected, liquidity needs change over time. During the accumulation phase, reserve funds can hold a significant part of their portfolios in equities and relatively illiquid investments. Once the decumulation phase begins, the asset allocation will gradually shift toward more liquid, high-quality, fixed-income investments.

External Constraints Affecting Investment

In this section and the next, we briefly highlight some legal/regulatory and tax constraints, respectively, that sovereign wealth funds must consider when investing.

Legal and Regulatory Constraints

Sovereign wealth funds are typically established by national legislation that contains details on: the fund's mission; contributions to the fund; circumstances allowing withdrawals from the fund; and governance structure, including selection of board members, their roles, and the level of board independence. Some SWFs are set up with clear rules on asset allocation. For example, a technology development fund may be required to be 100% invested in offshore technology assets to provide diversification

(versus local economic drivers) and eventual technology transfer. Alternatively, an industrial development fund may be required to invest 100% locally to support the development of key industries in the domestic economy. In any case, SWFs should operate in a transparent and accountable manner as they are ultimately established for the benefit of a nation's people and future generations. Sound governance, independence, transparency, and accountability are all essential to ensure that SWFs are protected from political influence.

The International Forum of SWFs (IFSFW) is a self-governing body established to promote best practices among SWFs. All IFSWF members have endorsed a set of generally accepted principles and practices (GAPP). Known as the “Santiago Principles” for the city where they were drafted, the GAPP provide a best practices framework by which SWFs should operate that addresses such key elements as sound legal framework, well-defined mission, independence, accountability, transparency, disclosure, ethics and professionalism, effective risk management, and regular review for compliance with the Santiago Principles.

Tax and Accounting Constraints

Typically, sovereign wealth funds are given tax-free status by the legislation that governs them. However, SWFs may be ineligible to claim withholding taxes or tax credits that are ordinarily available to taxable investors. As SWFs invest in offshore markets, they also need to consider any tax treaties that may exist between the countries in which they are investing and their own country. Some regulators allow SWFs to be exempt from domestic tax rules that have been put in place to deter tax avoidance by corporations and individuals. To prevent any international diplomatic issues, SWFs should be sensitive to ensuring they are not perceived as trying to avoid paying taxes in any offshore jurisdictions where they operate or invest.

10

SOVEREIGN WEALTH FUNDS: INVESTMENT OBJECTIVES AND ASSET ALLOCATION

- ☐ evaluate the investment policy statement of an institutional investor
- ☐ evaluate the investment portfolio of a private DB plan, sovereign wealth fund, university endowment, and private foundation

Investment Objectives

Budget Stabilization Funds

The investment objective of budget stabilization funds is capital preservation. This is achieved by endeavoring to deliver returns in excess of inflation with a low probability of a negative return in any given year. In addition, budget stabilization funds should avoid cyclical assets whose returns are highly correlated to the main sources of government revenue (such as natural resources industries). According to the stated investment objectives of Chile's Economic and Social Stabilization Fund, *“the main aim of its investment policy is to maximize the fund's accumulated value in order to partially cover cyclical reductions in fiscal revenues while maintaining a low level of*

risk. Its risk aversion is reflected by the choice of an investment portfolio with a high level of liquidity and low credit risk and volatility, thereby ensuring the availability of the resources to cover fiscal deficits and preventing significant losses in the fund's value."

Development Funds

Development funds are established to support a nation's economic development with the ultimate goal of raising a country's long-term economic growth. The implicit investment objective of development funds is therefore to achieve a real rate of return in excess of real domestic GDP or productivity growth. Accordingly, Khazanah Nasional Berhad, the strategic investment fund of the government of Malaysia, *"strives to create sustainable value and cultivate a high-performance culture that helps contribute to Malaysia's economic competitiveness. Utilizing a proactive investment approach, we aim to build true value through management of our core investments, leveraging on our global footprint for new growth, as well as undertaking catalytic investments that strategically boost the country's economy. We also actively develop human, social and knowledge capital for the country."*

Savings Funds

The mission of savings funds is to ensure wealth transfer to future generations. Therefore, their primary objective is to maintain purchasing power of the assets in perpetuity while achieving investment returns sufficient to sustain the spending necessary to support ongoing governmental activities. According to Alaska Statutes 37.13.020, the Alaska Permanent Fund, *"should provide a means of conserving a portion of the state's revenue from mineral resources to benefit all generations of Alaskans; the fund's goal should be to maintain safety of principal while maximizing total return; the fund should be used as a savings device managed to allow the maximum use of disposable income from the fund for purposes designated by law."*

Reserve Funds

The investment objective of reserve funds is usually to achieve a rate of return above the return the government must pay on its monetary stabilization bonds, thereby eliminating the negative cost-of-carry of holding excess FX reserves (that are typically invested in low duration, high-grade, fixed-income instruments). For example, Singapore's Government Investment Corporation (GIC) has a clearly defined purpose: *"We aim to achieve good long-term returns for the Government—a reasonable risk-adjusted rate above global inflation over a 20-year investment horizon. By achieving these returns, we meet our responsibility to preserve and enhance the international purchasing power of Singapore's foreign reserves. The reserves provide a stream of income that can be spent or invested for the benefit of present and future generations."*

Pension Reserve Funds

The investment objective of pension reserve funds is to earn sufficient returns to maximize the likelihood of being able to meet future unfunded pension, social security, and/or health care liabilities of plan participants as they arise. Accordingly, among its mandates, the Australian government states that its Future Fund should *"maximise the return earned on the Fund over the long term; ... adopt an average return of at least the Consumer Price Index (CPI) +4 to +5 per cent per annum over the long term as the benchmark return on the Fund; [and] in targeting the benchmark return, the Board must determine an acceptable but not excessive level of risk for the Fund..."*

EXAMPLE 4**The People's Fund of Wigitania—A Pension Reserve Fund**

The People's Fund is a pension reserve fund established by the government of Wigitania by setting aside current government surpluses. Its objective is to meet future unfunded social security payments caused by an aging population. The following is an extract from the People's Fund IPS.

Effective from 2030, the government will have the ability to withdraw assets to meet pension and social security liabilities falling due each year. Actuarial projections estimate annual payouts to be about 5% of the total fund value at that time. Given this level of cash flow, the Fund is expected to maintain most of its asset base for the foreseeable future. As such, 2030 does not represent an 'end date' for measurement purposes. A long-term investment horizon remains appropriate at present. However, the appropriate timeframe, risk tolerance, portfolio construction and liquidity profile may change.

1. What are the liquidity needs of the People's Fund?

Solution:

From the extract, we see that the unfunded pension and social security liabilities that the Fund is meant to cover are expected to be about 5% of total fund value per year, starting in 2030. Management of the fund will need to ensure that they have sufficient liquidity at that time to meet those ongoing liabilities. Until that time, liquidity needs are very low, which should allow the People's Fund to invest a significant part of its portfolio in less-liquid alternative asset classes.

2. What factors does the Board need to consider when reviewing the Fund's investment horizon?

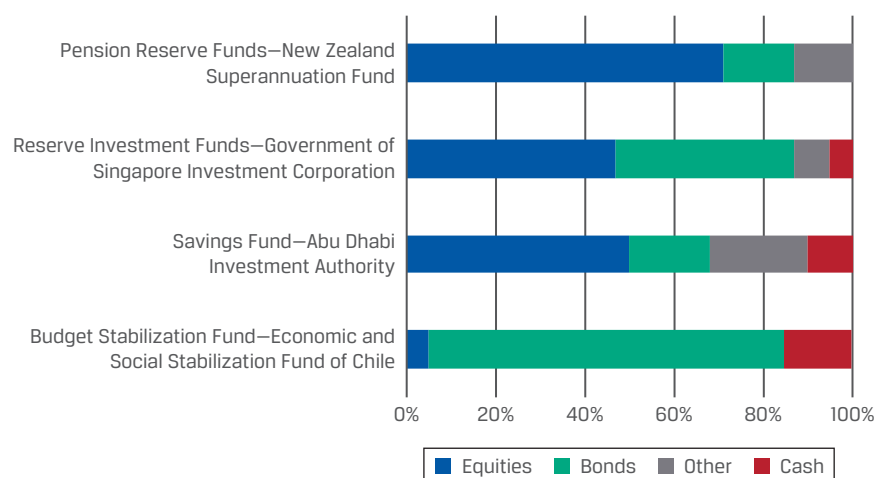
Solution:

The Board should consider two separate phases when reviewing the Fund's investment horizon and investment policy: an accumulation phase and a decumulation phase. The accumulation phase lasts until 2030 and allows the Fund to invest with little to no liquidity needs and little concern for interim volatility. The decumulation phase starts after 2030, when the government expects to withdraw about 5% of the assets on an annual basis. The investment horizon, liquidity needs, and risk tolerance will need to be modified during the decumulation phase, which will affect the investment policy.

Asset Allocation by Sovereign Wealth Funds

Each of the five types of sovereign wealth funds have very different objectives and purposes. Not surprisingly then, these funds have very different asset allocations. Development funds usually have little flexibility with their asset allocations as they operate within a limited investment universe as part of their mandate (e.g., they are required to invest in local infrastructure development projects). Given that national development projects can be different in nature and purpose between countries, it would be difficult to envision a 'typical' asset allocation for a development fund. The other four types of sovereign wealth funds are more homogeneous within their respective groups, for which Exhibit 10 provides illustrative asset allocations.

Exhibit 10: Illustrative Asset Allocations for Different Types of Sovereign Wealth Funds



Sources: 1. Economic and Social Stabilization Fund of Chile website; 2. Abu Dhabi Investment Authority (ADIA), *2020 Review*; 3. Government Investment Corporation (GIC), *Report on the Management of the Government's Portfolio for the Year 2020/21*; 4. NZSUPERFUND, *New Zealand Superannuation Fund Annual Report 2021*.

Several key points stand out from the data in Exhibit 10:

- The portfolios of budget stabilization funds are dominated by fixed-income investments because of their defensive nature, relatively stable investment returns, and diversification against cyclically sensitive factors (such as commodity prices) that drive government budget revenues in some countries. The conservative asset allocation may be partly explained by the fact that several major stabilization funds are managed by their countries' central bank or Ministry of Finance; these entities tend to be relatively risk averse.
- The portfolios of savings funds are shown to be tilted toward growth assets, equities, and alternatives (the "Other" category). Due to their very long investment horizons, these funds can take on more equity-related risks, and they consequently hold relatively high allocations to such alternative investments as real assets, private equity and debt (loans), and hedge funds.
- Reserve investment funds have a similar allocation to savings funds but they tend to allocate less to alternatives. This may be partially explained by reserve funds having potentially higher liquidity needs compared to savings funds because of central bank activities. Public equities are typically the most liquid growth asset available and help counter the negative carry generated by foreign exchange reserves, while bonds and other fixed-income investments help to reduce reserve funds' portfolio volatility.
- The portfolios of pension reserve funds are relatively heavily tilted toward equities with a significant allocation to alternative assets, such as real assets and infrastructure, private equity and debt markets, and hedge funds. Pension reserve funds generally have long-term investment horizons (but not necessarily inter-generational as with savings funds) and low liquidity needs during their accumulation phases, which can explain their high allocation to alternatives compared with other SWFs.

Sovereign wealth funds with savings or pension reserve objectives typically follow the endowment investment model. Some also adopt the Canada reference portfolio model. An example of the latter is the New Zealand Superannuation Fund (NZSF). As noted previously, this model makes use of a reference portfolio comprising passive investment in stocks and bonds that are expected to meet the fund's investment objectives. The total portfolio is then invested to replicate the risk factors of the reference portfolio, while individual investments are benchmarked against a combined stock and bond benchmark representing the risk factors driving the individual investments. Both models result in higher allocations to alternative investments, as observed in Exhibit 10.

In the Asia Pacific region, sovereign wealth funds are the largest institutional investors. Some examples include China Investment Corporation (CIC), State Administration of Foreign Exchange (SAFE) Investment Company (China), Hong Kong Monetary Authority Investment Portfolio (HKMAIP) and Government Investment Corporation of Singapore (GIC). Given the huge size of their assets, these SWFs tend to dominate the regional investment landscape. They typically have fewer investment constraints than other Asia Pacific institutional investors. These SWFs also have broader investment mandates, minimal investment management fee constraints, and longer time horizons as compared to (for example) pension funds. Such flexibility allows these SWFs to implement higher allocations to alternative assets.

11

UNIVERSITY ENDOWMENTS AND PRIVATE FOUNDATIONS



describe the focus of legal, regulatory, and tax constraints affecting different types of institutional investors

This section introduces university endowments and private foundations. As will be seen shortly, these two types of institutional investors have some similarities but also important differences that affect their investing activities.

University Endowments

Many institutions have endowments, including universities, churches, museums, and hospitals. These endowments are typically funded through gifts and donations and are intended to help the institutions provide for some of their main services. Endowment funds invest in capital markets to provide a savings and growth mechanism that allows the institution to meet its mission in perpetuity. The main objective is to provide intergenerational equity. As James Tobin wrote in 1974: "The trustees of an endowed institution are the guardians of the future against the claims of the present. Their task is to preserve equity among generations."

Throughout this reading, for simplicity we will focus on university endowments. The investment objectives and philosophies of the endowments of other institutions are typically not very different from those of university endowments. Exhibit 11 shows some large (by assets) university endowments.

Exhibit 11: Select US University Endowments

University	Assets (US\$ bn)
Harvard University	40.5
University of Texas System	31.9
Yale University	31.2
Stanford University	28.9
Princeton University	26.6

Source: TIAA and the National Association of College and University Business Officers (NACUBO), 2020 NACUBO–TIAA Study of Endowments (NCSE).

Private Foundations

Foundations are nonprofit organizations that typically make grants to outside organizations and persons who carry out social, educational and other charitable activities. Many foundations are located in the United States, but some large foundations are outside the United States, such as the Wellcome Trust in the United Kingdom. Foundations are more common in the United States because of favorable tax treatment. Outside the United States, charitable giving is typically undertaken by family offices.

There are four different types of foundations:

1. *Community foundations*: These are charitable organizations that make social or educational grants for the benefit of a local community (e.g., the New York Community Trust). These foundations are usually funded by public donations.
2. *Operating foundations*: Organizations that exist to operate a not-for-profit business for charitable purposes. They are typically funded by individual donors or donor families.
3. *Corporate foundations*: These are established by businesses and funded from profits.
4. *Private grant-making foundations*: These are established by individual donors or donor families to support specific types of charities. Most of the largest foundations in the US fall into this category.

Community foundations are a type of public charity associated with such community organizations as hospitals, schools, and churches. They are funded by many relatively small donors, and they typically provide charitable support in the region or community where they are located. Private operating foundations are established to provide funding and support for related programs and activities (e.g., operating a museum) rather than giving grants to outside organizations or activities.

Private grant-making foundations (also called private non-operating foundations) are by far the largest group (in number of foundations and in total assets), so they are our primary focus. Private grant-making foundations support different types of charities and usually run a large grant-making operation in addition to an investment office. The main objective of most private grant-making foundations is to maintain purchasing power into perpetuity, so that the organization can continue making grants. In recent years, however, there has been a trend toward limited-life foundations as original donors seek to maintain control over foundation spending during their lives.

The focus of grants varies widely and includes issues such as health, education, environment, arts, and culture. Some foundations make large and targeted grants to very specific causes while others make many smaller grants to a wide variety of causes. Exhibit 12 shows some large US foundations and their missions.

Exhibit 12: Select US Foundations

Foundation	Mission
Bill & Melinda Gates Foundation	Focus on global health and poverty. In US focus on education.
Ford Foundation	Focus on inequality.
Robert Wood Johnson Foundation	Improve health and health care of all Americans.
Lilly Endowment Inc.	Support religion, education, community development.
William and Flora Hewlett Foundation	Help people build measurably better lives by focusing on education, the environment, global development, performing arts, philanthropy, and population. Also supports disadvantaged communities in San Francisco.

Source: Foundation Center (www.foundationcenter.org).

External Constraints Affecting Investment

In this section and the next we briefly touch on some legal/regulatory and tax constraints, respectively, that affect investing by university endowments and private foundations.

Legal and Regulatory Constraints

Charitable organizations, including endowments and foundations, are typically subject to rules and regulations in their country of domicile that: 1) require investment committees/officers/boards to invest on a total return basis and consider portfolio diversification when managing assets (i.e., follow the principles of modern portfolio theory, MPT); and 2) require investment committees/officers/boards to exercise a duty of care and prudence in overseeing the assets and making investment decisions (i.e., fiduciary duty).

In the United States, endowments and foundations are governed by the Uniform Prudent Management of Institutional Funds Act of 2006 (UPMIFA). Two important features of UPMIFA include:

1. Allowing charitable organizations flexibility in spending decisions, which could be adjusted for fluctuations in the market value of assets. Endowments, particularly, could meet the fiduciary standard of prudence by maintaining purchasing power of the fund.
2. Modernizing the standard of prudence for the management of charitable funds by adopting the principles of MPT established by the Uniform Prudent Investor Act (1994).

UK endowments and foundations are typically organized as trusts. Until 2000, UK trusts were limited to spending only income earned from investments (not capital gains). The Trustee Act (2000) changed that and, like UPMIFA in the United States, required trustees to manage trust assets based on MPT principles. The act also imposed a duty of care upon trustees. The shift toward managing portfolios using MPT principles has enabled endowments and foundations to embrace a broader range of asset classes compared to the traditional 60/40 equity/bond mix. It has also allowed them to focus on total return rather than solely on income return (high coupon bond and/or high-dividend-yield stocks).

Tax and Accounting Constraints

Endowments and foundations typically enjoy tax-exempt status. Tax-exempt status has three elements:

1. *Taxation of gifts and donations to endowments and foundations:* Gifts and donations to endowments and foundations are usually tax-deductible (up to a certain percentage of adjusted gross income) for the person or entity making the gift or donation.
2. *Taxation of income and capital gains on assets:* Income and capital gains on assets are usually tax-exempt in countries that have endowments and charitable organizations, which are tied to such non-profit, tax-exempt organizations as universities, religious organizations, or museums.
3. *Taxation on payouts from endowments and foundations:* Payouts are tax exempt if the receiving institution is exempt from income tax. If payouts are made to support the operating budget of a for-profit business, then that business is required to treat the payout as taxable income.

In the United States, private grant-making foundations enjoy the same tax-exempt status as endowments. But unlike endowments, such private foundations are subject to minimum payout (spending) requirements, whereby they must distribute a minimum of 5% of their asset value on an annual basis in grants that support their mission. Failing to meet this spending requirement subjects such foundations to 30% tax on undistributed income. Most tax-exempt private foundations also have an excise tax of 2% on their net investment income. In the United Kingdom, charitable organizations do not pay taxes on most of their income and gains if these are used for charitable purposes; however, taxes must be paid on funds that are not used for charitable purposes.

UNIVERSITY ENDOWMENTS: OTHER CONSIDERATIONS

12



discuss the stakeholders in the portfolio, the liabilities, the investment time horizons, and the liquidity needs of different types of institutional investors

Stakeholders of a university endowment include current and future students, alumni, current and future university faculty and administrators, and the larger university community. Each of these stakeholders has a strong interest in seeing the endowment invested prudently. There is potential, however, for tension between increasing spending to meet current needs versus preserving sufficient funds to serve future generations. Endowment boards or investment committees, therefore, need to determine an appropriate balance.

University endowments are generally funded by gifts and donations from alumni. It is common that donors specify the handling and use of their gifts—for example, that only the income portion be spent or that only specific scholarships, programs, or departments benefit. Other gifts may be unrestricted and can be spent for general purposes. Alumni are concerned about current students and faculty and also future generations, so they expect endowment assets to be invested for the long-run. Endowment payouts support the university's operating budget and provide an important source of income. Endowments provide stability and continuity when other revenues

sources, such as tuition and government funding, fluctuate. Endowments also allow universities to more readily undertake long-term capital projects, knowing required resources are available to meet those future commitments.

Stakeholders of a university endowment often have representation on the endowment's board or investment committee, including alumni who are investment professionals running or working for financial services organizations.

University Endowments—Liabilities and Investment Horizon

Although most endowments operate on an asset-only basis, their main purpose is to support the university's operating budget based on the principle of intergenerational equity. The investment horizon for endowments is thus perpetuity, and their main objective is to maintain long-term purchasing power. An endowment's liabilities are the future stream of payouts to the university, which are typically codified in an official spending policy. The spending policy serves two important purposes: 1) to ensure intergenerational equity; and 2) to smooth endowment payouts to partially insulate contributions to the university from capital market volatility.

Although the spending policy defines how much of the endowment's assets are paid out annually, several other liability characteristics should be considered when designing an appropriate investment policy, including:

- a. What is the university's capacity for fund-raising: How much in gifts and donations are contributed (on average) each year?
- b. What percentage of the university's operating budget is supported by the endowment?
- c. Balance sheet health: Does the endowment or university have the ability to issue debt?

We first discuss different types of spending policies and then discuss other important liability-related characteristics. Broadly speaking, there are three different types of endowment spending policies:

1. *Constant Growth Rule*: The endowment provides a fixed amount annually to the university, typically adjusted for inflation (the growth rate). The inflation rate is usually based on the Higher Education Price Index (HEPI)² in the United States or a more general consumer price index elsewhere, possibly with an additional spread. A shortcoming of constant growth spending rules is that spending does not adjust based on the endowment's value. If the endowment experiences weak (strong) average returns, the spending amount expressed as a percentage of assets may become very high (low). This spending rule is therefore commonly complemented with caps and floors, typically between 4% and 6% of average assets under management (AUM) over one or three years.
2. *Market Value Rule*: The endowment pays a pre-specified percentage (the spending rate) of the moving average of asset values, typically between 4% and 6%. Asset values are usually smoothed using a 3- to 5-year moving average. A disadvantage of this spending rule is that it tends to be pro-cyclical; when markets have performed well (poorly), the overall payout increases (decreases).

² The HEPI is calculated annually by Commonfund and tracks the most important components in the cost of higher education. More information can be found at <https://www.commonfund.org/commonfund-institute/higher-education-price-index-hepi>.

3. *Hybrid Rule:* Spending is calculated as a weighted average of the constant growth and market value rules. Commonly referred to as the Yale spending rule, weights can range from 30% to 70%. This spending rule was designed to strike a balance between the shortcomings of the respective spending rules.

All three spending rules can be summarized by the following formula:

Spending Amount in Year $t + 1$

$$= w \times [\text{Spending Amount in Year } t \times (1 + \text{Inflation Rate})] + (1 - w) \times \text{Spending Rate} \times \text{Average AUM},$$

where w denotes the weight put on the prior year's spending amount. When $w = 1$, the formula simplifies to a constant growth rule; when $w = 0$, it simplifies to a market value rule. For any other choice of w ($0 < w < 1$), the formula represents a hybrid spending rule. Most US endowments use a market value spending rule, but some of the larger ones use a hybrid rule. As noted, a market value spending rule is pro-cyclical: This may not be an issue for universities that receive only a small percentage of their operating budgets from their endowment, but this may be more problematic otherwise. The goal of providing intergenerational equity means university endowments aim to maintain their purchasing power. Therefore, endowments target a real rate of return (after inflation) equal to or greater than their spending rates. Given that endowments pay out (on average) between 4% and 6% of assets annually, they typically target a 5% to 5.5% real, long-term rate of return.

Other liability-related factors must be considered when managing an endowment. Universities regularly raise money from donors. Depending on the wealth of their alumni base, such fund-raising activity may be more or less successful. Because of gifts and donations, endowments' net spending rate tends to be lower than the headline spending of 4% to 6% of assets previously discussed. On average, net spending is closer to 2% to 4% of assets. Another important distinction between endowments is how much the university relies on its endowment to support the operating budget. Such support may be less than 5% for some universities, while in other cases, 40% to 50% of the university's operating budget is provided by its endowment. All else equal, endowments that support a smaller percentage of the overall budget should be able to tolerate more market, credit, and liquidity risk. In practice, however, this important distinguishing factor is typically insufficiently incorporated in the design of investment policies. It is common for university endowments to be benchmarked against each other, which creates herding behavior even though the organizations might have very different liability characteristics. A final consideration is the debt issuance capability of the endowment (or university). Some endowments access the public and private debt markets on a regular basis. The capability to access debt markets, especially during periods of market stress, affects the levels of risk and illiquidity endowments can accept in their investments.

University Endowments—Liquidity Needs

The liquidity needs of university endowments are relatively low (compared to foundations). On average, endowments' annual net spending is 2% to 4% of assets, after factoring in gifts and donations. Low liquidity needs combined with long investment horizons allow endowments to accept relatively high short-term volatility in pursuit of superior long-term returns. Consequently, many university endowments have relatively high allocations to equity markets and illiquid private asset classes and small allocations to fixed income. Having significant allocations to illiquid asset classes, such as private equity and private real estate, creates additional liquidity needs to meet annual net capital calls from general partners managing these assets. Finally, to the

extent that endowments use derivatives for rebalancing or portable alpha strategies, there may be further liquidity needs—particularly during times of financial market stress—to meet margin calls or to cover higher collateral demands.

13

PRIVATE FOUNDATIONS

Stakeholders of a foundation include the founding family, donors, grant recipients, and the broader community that may benefit indirectly from the foundation's activities. Each has a strong interest in seeing the foundation's assets invested appropriately. As with university endowments, a tension may exist between increasing current grant spending versus preserving sufficient funds to serve future generations of grant recipients. The founding family and donors typically want their donations to support grant recipients in perpetuity. There is a trend, however, toward limited-life foundations as donors seek to maintain control over foundation spending during their lives. Finally, the government (Internal Revenue Service in the United States) may also be a stakeholder because of the favorable tax treatment that foundations enjoy. The government's main concern is that foundations remain engaged strictly in charitable work.

The boards of foundations tend to be different in terms of skill sets than the boards of endowments. University endowments typically have alumni sitting on their boards—people with a special relationship to the university and who may have significant financial market skills (for example, in private equity or hedge funds). Board members for foundations, however, are typically individuals involved with grant making and not necessarily investment professionals. This difference in skill sets may affect the quality of board oversight, the level of delegation of decision making to investment staff, and the quality of investment decisions.

Mission-related investing (also known as “**impact investing**”), which aims to direct a significant portion of assets in excess of annual grants into projects promoting the foundation's mission, is becoming increasingly important. For example, the Ford Foundation has allocated up to US\$1.0 billion (more than 8% of assets) over 10 years to investments related to its mission of addressing global inequality. The challenge for foundations is to ensure that mission-related investments generate financial returns commensurate with risks assumed. As typically lower yielding mission-related investments are undertaken at the expense of higher return investment opportunities, portfolio returns (expected and realized) may decline, which could result in foundation assets being spent down sooner and annual grant-making activities being reduced.

Private Foundations—Liabilities and Investment Horizon

In practice, the investment philosophy of private foundations is typically similar to that of university endowments, despite important differences between them in terms of liabilities and liquidity needs. Foundations and endowments both typically have perpetual investment horizons (although, as noted shortly, some foundations may have finite lives) and both invest to maintain purchasing power; however, foundations generally have higher liquidity needs. In the United States, private grant-making foundations are legally required to pay out 5% of assets (on a trailing 12-month basis) plus investment expenses, while university endowments have more-flexible spending rules. In addition, foundations must spend any donations in the year received, known as flow-through (but this is not necessarily the case outside the United States). Foundations typically use a smoothing formula similar to that of university endowments to ensure payouts do not fluctuate with the market volatility of assets. The constant growth spending rule and the hybrid spending rule, discussed previously for university endowments, are rarely used by foundations.

Foundations sometimes issue bonds. The capability to access debt markets, especially during periods of market stress, is positively associated with the levels of investment risk and liquidity risk that foundations can accept in their investments. The Wellcome Foundation (United Kingdom), with a credit rating of AAA, has occasionally issued bonds. For example, in early 2018, it issued £750 million of century bonds (i.e., 100-year maturity) with a coupon of 2.517%.³ Proceeds from such bonds have been used to support charitable work, and bondholders are repaid by the returns generated on the investment portfolio.

Spending Rate and Investment Expenses of Foundations

Costs of running a foundation are included in the 5% required payout, excluding investment expenses, which means the investment office is considered a cost center. Consequently, the investment office of a foundation will typically be much smaller compared to that of a similar-sized (by AUM) endowment, leading to potentially different investment behavior. For example, many small foundations have limited investment staff and therefore rely on an outsourced CIO model, whereby assets are managed by an external organization that assumes fiduciary duty and takes responsibility for the strategic asset allocation and investments across various asset classes. Although many outsourced CIOs do offer allocations to alternative asset classes, the result of such outsourcing may typically be a heavier allocation to public markets, more-intensive use of passive strategies, and a heavier reliance on beta as a driver of returns.

Many foundations typically receive a one-time gift from the founding family. Some foundations are allowed to raise money on an ongoing basis, but in the US, any such donations must be spent on a flow-through basis. Unlike universities that derive revenues from other sources besides their endowments, such as tuition and research grants, foundations rely almost exclusively on their investment portfolios to support operating budgets. This high dependency has important implications for risk tolerance, and as a result, foundations (on average) have more conservative, more-liquid investment portfolios compared to endowments.

Typically, the original gift must be maintained in perpetuity (principal protection). There is, however, a trend toward **limited-life foundations**, as some founders seek to maintain control of spending while they (or their immediate heirs) are still alive. For example, the Bill and Melinda Gates Foundation is mandated to spend down assets to zero within 30 years of the Gates' death. There is risk—and concern by some founding donors—that as the foundation's leadership changes over time, the mission may move away from the founder's vision. Thus, to minimize this risk, more limited-life foundations are being established. Importantly, a limited-life foundation faces a different investment problem than a perpetual foundation: As the investment horizon of a limited-life foundation shortens, its liquidity needs increase and risk tolerance decreases.

Real-Life Example of a Limited-Life Foundation

The Atlantic Philanthropies, set up by Chuck Feeney in 1982, is among the largest limited-life foundations to complete its grant-making activities. After giving a total of US\$8 billion over 35 years to human rights, health care, and education

³ In late 2017, Oxford University issued a century bond with the same size and similar coupon.

causes, the last grant was made in 2016 and the Atlantic Philanthropies expects to close in 2020. All stakeholders have been informed of the spend-down process and critical challenges are being addressed, including: 1) choosing who will oversee the portfolio wind-down process with staff departing for other employment opportunities; and 2) deciding how best to liquidate private investments. As a limited-life foundation gives away its assets, liquidity needs increase and risk tolerance decreases, resulting in lower financial returns and thus limiting the size of the grants that can be made. The de-risking process requires a very “hands-on” investment approach and includes liquidating private portfolios by reducing/stopping commitments, selling private portfolios in the secondary markets, and reinvesting distributions. This becomes increasingly challenging as talented investment staff depart the organization. Actions taken and lessons learned by The Atlantic Philanthropies provide a great case study for other limited-life foundations.

Private Foundations—Liquidity Needs

The liquidity needs of foundations are relatively low but still higher than those of university endowments. US foundations are legally required to spend 5% of assets or face a tax penalty. They must set aside monies to pay one-year grants and to meet annual installments for longer-term (typically two- to five-year) grants. Having a significant allocation to such relatively illiquid asset classes as private equity and private real estate creates additional liquidity needs to meet general partners’ annual net capital calls. Also, derivatives use for such activities as portfolio rebalancing or implementing portable alpha strategies may result in added liquidity demands to meet increased margin calls or to cover higher collateral demands (especially during times of financial market stress).

Exhibit 13 presents a summary comparison of foundations and endowments.

Exhibit 13: Comparison Between Private US Foundations and US University Endowments

	US Foundation	US University Endowment
Purpose	Grant-making for social, educational, and charitable purposes; principal preservation focus.	General support of institution or restricted support; principal preservation focus.
Stakeholders	Founding family, donors, grant recipients, and broader community that may benefit from foundation’s activities.	Current/future students, alumni, university faculty and administration, and the larger university community.
Liabilities/Spending	Legally mandated to spend 5% of assets + investment expenses + 100% of donations (flow-through).	Flexible spending rules (headline spending rate between 4% and 6% of assets) with smoothing.
Other liability considerations	Future gifts and donations, or just one-time gift?	Gifts and donations, percentage of operating budget supported by endowment, and ability to issue debt.
Investment time horizon	Very long-term/perpetual (except limited-life foundations).	Perpetual
Risk	High risk tolerance with some short-term liquidity needs.	High risk tolerance with low liquidity needs.
Liquidity needs	Annual net spending is at least 5% of assets.	Annual net spending is typically 2% to 4% of assets, after alumni gifts and donations.

UNIVERSITY ENDOWMENTS: INVESTMENT OBJECTIVES AND ASSET ALLOCATION

14

- ☐ evaluate the investment policy statement of an institutional investor
- ☐ evaluate the investment portfolio of a private DB plan, sovereign wealth fund, university endowment, and private foundation

We now consider the investment objectives and investment policy statement for university endowments and the investment objectives of private foundations.

University Endowments

A university endowment's mission is to maintain the purchasing power of the assets into perpetuity while achieving investment returns sufficient to sustain the level of spending necessary to support the university budget. For a university endowment, investment policy and spending policy are intertwined, so the IPS should cover spending policy. As discussed previously, endowments use different spending rules. In general, endowments target a spending rate of about 5% of (average) assets. The effective spending rate will, however, be reduced after accounting for gifts and donations. An endowment's primary investment objective is typically to achieve a total real rate of return (after inflation) of $X\%$ with an expected volatility of $Y\%$ over the long term (K years). A common target for $X\%$ is 5%, with inflation being measured using the Higher Education Price Index (HEPI), to be achieved over 3 to 5 years (i.e., $K = 3$ or 5). The expected volatility of returns, $Y\%$, is typically in the range of 10% to 15% annually. Note that the target rate of return may also be expressed as a nominal (as opposed to real) return.

Endowments sometimes have secondary and tertiary investment objectives. A secondary objective might be to outperform the long-term policy benchmark. A third objective might be to outperform a set of pre-defined peers (e.g., outperform the average of the 20 largest university endowments). Peer comparison can lead to herding behavior and be detrimental to long-term success if the focus moves away from managing investments based on each organization's unique liability characteristics to exploit their own comparative advantages. To achieve their objectives, endowments invest in a broad range of asset classes, including fixed income, public equities, hedge fund strategies, private equity, private real estate, and natural resources (e.g. energy and timber). Given that endowments aim to maintain the purchasing power of their assets, they tend to have significant allocations to real assets that are expected to generate returns commensurate with inflation.

The following box provides two examples of investment objectives found in IPSs for real-life endowments.

Investment Objectives of University Endowments

Oxford University Endowment: *"The specific investment objective of the Oxford Endowment Fund is to grow our investors' capital by an average of 5% per annum in real terms, and to achieve this at a lower volatility than would be experienced by investing solely in the public equity markets."*

Source: Oxford Endowment Fund, www.ouem.co.uk/the-oxford-endowment-fund/.

Note: The Oxford Endowment Fund defines its investors as the University of Oxford, including 23 of its colleges and five associated foundations and trusts.

Massachusetts Institute of Technology Endowment: “Our primary long-term goal is to generate sufficient investment returns to maintain the purchasing power of the endowment after inflation and after MIT’s annual spending. Assuming inflation will average around 3% over the long-term and MIT’s spending rate will average around 5%, we need to earn approximately 8% to meet this goal. As a secondary check on the quality of our performance, we compare our returns to other endowments and to passive benchmark alternatives.”

Source: www.mitimco.org/wp-content/uploads/2017/03/MITIMCo-Alumni-Letter.pdf.

One of the lessons from the 2007–2009 global financial crisis is that liquidity risk must be managed carefully, particularly for institutions that invest heavily in illiquid assets. Most endowments now engage in detailed cash flow modeling for the illiquid portions of their portfolios, and some use a liquidity risk band as part of their overall risk profile. The liquidity risk band is defined as total NAV allocated to illiquid investments plus uncalled commitments to total fund AUM. If the liquidity band is violated (i.e., when the total allocation to illiquid investments exceeds a pre-specified upper bound), this may trigger a reduction (or even a stoppage) of commitments or possibly a sale of some illiquid investments in secondary markets to bring the overall illiquid allocation back to within the liquidity risk band.

EXAMPLE 5

Investment Objectives of the Ivy University Endowment

The hypothetical Ivy University Endowment was established in 1901 by Ivy University and supports up to 40% of the university’s operating budget. Historically, the endowment has invested in a traditional 20% public US equities and 80% US Treasury portfolio, entirely implemented through passive investment vehicles. The investment staff at the endowment is relatively small. With the appointment of a new chief investment officer, the investment policy is being reviewed. Endowment assets are US\$250 million, and the endowment has an annual spending policy of paying out 5% of the 3-year rolling asset value to the university.

An investment consultant hired by the new CIO to assist with the investment policy review has provided the following 10-year (nominal) expected return assumptions for various asset classes: US equities: 7%, Non-US equities: 8%, US Treasuries: 2%, hedge funds: 5%, and private equity: 10%. Additionally, the investment consultant believes the endowment could generate an extra 50 bps per year in alpha from active management in equities. Expected inflation for the next ten years is 2% annually.

1. Draft the investment objectives section of the IPS of the Ivy University Endowment.

Solution:

The mission of the Ivy University Endowment is to maintain purchasing power of its assets while financing up to 40% of Ivy University’s operating budgeting in perpetuity. The investment objective, consistent with this mission, is to achieve a total real rate of return over the Higher Education Price Index (HEPI) of at least 5% with a reasonable level of risk; the volatility of returns should not to exceed 15% annually.

2. Discuss whether the current investment policy is appropriate given the investment objectives of Ivy University Endowment.

Solution:

Given the expected returns provided by the consultant, a portfolio of 80% fixed income and 20% public equities, invested passively, is expected to provide a nominal expected return of 3% per year ($= 0.8 \times 2\% + 0.2 \times 7\%$). Given, expected inflation of 2%, this implies a 1% real rate of return, which falls well short of the 5% spending rate and the stated objective of a 5% real rate of return. The endowment will see its purchasing power deteriorate over time if it continues with its current asset mix and spending rate.

3. What decisions could the CIO and board of the Ivy University Endowment take to align the investment policy and the spending policy?

Solution:

The CIO and board could either change the investment policy by adopting an asset mix that has a more reasonable probability of achieving a 5% real rate of return (an asset allocation including non-US equities and private equity); they could change the spending rate to more accurately reflect the expected real rate of return of the current investment policy; or the new CIO may want to recommend a combination of both.

Below is an example of a university endowment Investment Policy Statement. In this case the university endowment has clearly articulated primary and secondary investment objectives.

University Endowment Investment Policy Statement

A. Introduction

The hypothetical Ivy University Endowment Fund (the “Endowment”) has been established to fund scholarships, fellowships, faculty salaries, programs, activities, and facilities designed to promote and advance the mission of Ivy University (the “University”). This investment policy statement (IPS) is established by the Investment Committee of the Board of Trustees (the “IC”) for the guidance of the IC, the Investment Office, the Endowment’s investment managers, and other fiduciaries in the course of investing the monies of the Endowment. This IPS establishes policies and procedures for the administration and investment of the Endowment’s assets. This document formally defines the goals, objectives, and guidelines of the Endowment’s investment program.

B. Mission and Investment Objectives

The Endowment provides financial support for the operations of the University. Investment and spending policies are designed to balance the current goals of the University with its future needs, in order to achieve parity in supporting both current and future generations of Ivy students. The goal for the Endowment is to provide a real total return that preserves the purchasing power of the Endowment’s assets while generating an income stream to support the academic activities of the University.

The primary investment objective of the Endowment is to earn an average annual real total return (net of portfolio management fees) of at least 5% per year over the long term (rolling five-year periods), within prudent levels of risk. Attainment of this objective will be sufficient to maintain, in real terms, the purchasing power of the Endowment's assets and support the defined spending policy.

A secondary investment objective is to outperform, over the long term, a blended custom benchmark based on a current asset allocation policy of: 30% MSCI World Index, 20% Cambridge Associates LLC US Private Equity Index, 10% NCREIF Property Index, 10% Consumer Price Index for All Urban Consumers (annualized CPI-U) + 5%, 20% HFRI Fund of Funds Index, and 10% Citigroup US Treasury Index.

C. Spending Policy

The Endowment's spending policy was developed to meet several objectives, namely to: (a) provide a sustainable level of income to support current operations, (b) provide year-to-year budget stability, and (c) meet intergenerational needs by protecting the future purchasing power of the Endowment against the impact of inflation. Under this policy, spending for a given year equals 80% of spending in the previous year, adjusted for inflation (CPI within a range of 0% and 6%), plus 20% of the long-term spending rate (5.0%) applied to the 12-quarter rolling average of market values. This spending policy has two implications. First, by incorporating the previous year's spending, the policy eliminates large fluctuations and so enables the University to plan for operating budget needs. Second, by adjusting spending toward a long-term rate of 5.0%, the policy ensures that spending levels will be sensitive to fluctuating market value levels, thereby providing stability in long-term purchasing power.

D. Asset Allocation Policy, Allowable Ranges, and Benchmarks

The single most important investment decision is the allocation of the Endowment to various asset classes. The primary objective of the Endowment's asset allocation policy is to provide a strategic mix of asset classes that produces the highest expected investment return within a prudent risk framework. To achieve this, the Endowment will allocate among several asset classes with a bias toward equity and equity-like investments caused by their higher long-term return expectations. Other asset classes may be added to the Endowment to enhance returns, reduce volatility through diversification, and/or offer a broader investment opportunity set.

To ensure broad diversification among the major categories of investments, the Endowment has adopted the following capital allocation policy ranges for each asset class within the overall portfolio set forth in the Annex. This asset allocation framework is reviewed annually by the IC, but because of the long-term nature of the Endowment, changes to the framework are expected to be infrequent:

Asset Class	Policy Range	Benchmark
Global equity	20%–40%	MSCI World Index
Private equity & venture capital	15%–25%	Cambridge Associates LLC US Private Equity Index
Private real estate	5%–15%	NCREIF Property Index

Asset Class	Policy Range	Benchmark
Real assets	5%–15%	Consumer Price Index for All Urban Consumers (annualized CPI-U) + 5%
Absolute return strategies	15%–25%	HFRI Fund of Funds Index
Fixed income & cash	5%–15%	Citigroup US Treasury Index

The following core investment principles provide the foundation for the asset allocation policy:

- **Equity dominance:** Equities are expected to be the highest-performing asset class over the long term and thus will dominate the portfolio.
- **Illiquid assets:** In general, private illiquid investments are expected to outperform more-liquid public investments by exploiting market inefficiencies.
- **Global orientation:** The Endowment will consider the broadest possible set of investment opportunities in its search for attractive risk/return profiles.
- **Diversification:** Thoughtful diversification within and between asset classes by region, sector, and economic source of return can lower volatility and raise compound returns over the long term.

E. Rebalancing

The IPS establishes the long-term asset allocation targets for the endowment and policy ranges for the various asset classes approved by the IC. The role of the capital allocation ranges is to allow for short-term fluctuations caused by market volatility or near-term cash flows, to recognize the flexibility required in managing private investments, and to provide limits for tactical investing. The IC will rely on investment staff to determine allocations within the stated ranges and to regularly manage actual asset class allocations to be within the ranges where possible. In addition, the IC will review actual asset allocations relative to this asset allocation framework at each quarterly meeting.

F. Reporting

The Investment Team, with the oversight of management, must provide adequate reporting to the Board of Trustees, the IC, and other stakeholders. The reporting structure should include the following:

- Performance measurement and attribution for the quarter and trailing periods for the portfolio both in absolute terms and relative to the established benchmarks
- Asset allocation of the total portfolio
- Market value of the total portfolio

Asset Allocation

We now consider asset allocation, investment portfolios, and investment performance of university endowments. We follow with a similar discussion focusing on private foundations.

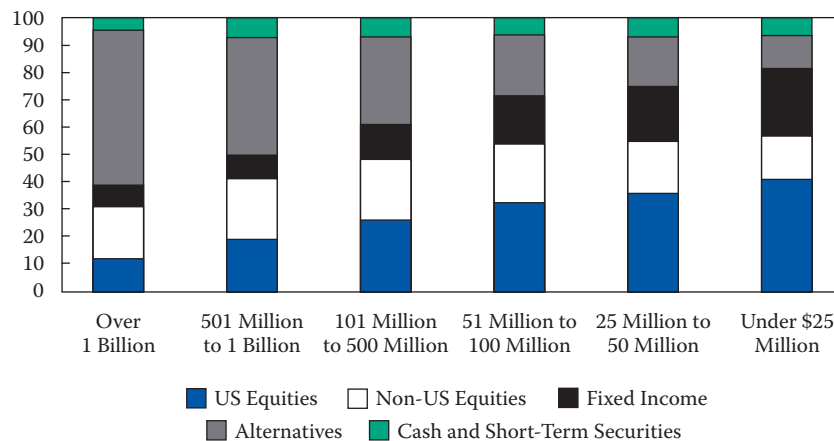
University Endowments

Most large endowments follow the endowment investment model and rely heavily on alternative investments to achieve their long-term investment objectives. This approach is not without risks. During the global financial crisis, several large endowments faced significant liquidity challenges and were forced to either sell portions of their private investment portfolios in the secondary markets, reduce payouts to their universities, or issue bonds to bridge their liquidity needs. The rapid post-crisis recovery arguably bailed out many endowments, but had the crisis lasted longer, the pain would have been substantially worse. David Swensen, the longtime CIO of the Yale Endowment, and his colleagues have regularly warned against a blanket application of the endowment model. Yale and some of the other large endowments have enjoyed a first-mover advantage in their private investments, and their alumni networks have provided access to investment opportunities that may not be as easily accessible to other institutions.

Exhibit 14 shows the average asset allocation for US endowments by size at the end of June 2020 using data from a study in which more than 800 colleges and universities participated. Here alternatives include private equity and venture capital, hedge funds and other marketable alternative strategies, private real estate, energy and natural resources (e.g., oil, gas, timber, commodities, and managed futures), and distressed debt.

These data reveal several important points. First, the larger endowments have a significantly higher allocation to alternatives. Larger endowments have achieved better returns over the past 10 years, and their larger allocation to alternatives has played an important role. Second, the larger endowments do not face the “home bias” issue that smaller endowments seem to suffer. The allocation of smaller endowments to US equities is significantly larger than their allocation to non-US equities. Finally, the larger endowments hold a significantly smaller amount of their assets in fixed-income securities. This might pose a challenge during liquidity crises—such as in the 2007–2009 global financial crisis when some larger endowments struggling to meet their liquidity needs pressured managers of private investment funds to delay any calls (i.e., demands) for additional capital. Some universities also issued bonds during the crisis to help relieve the liquidity pressures faced by their endowments.

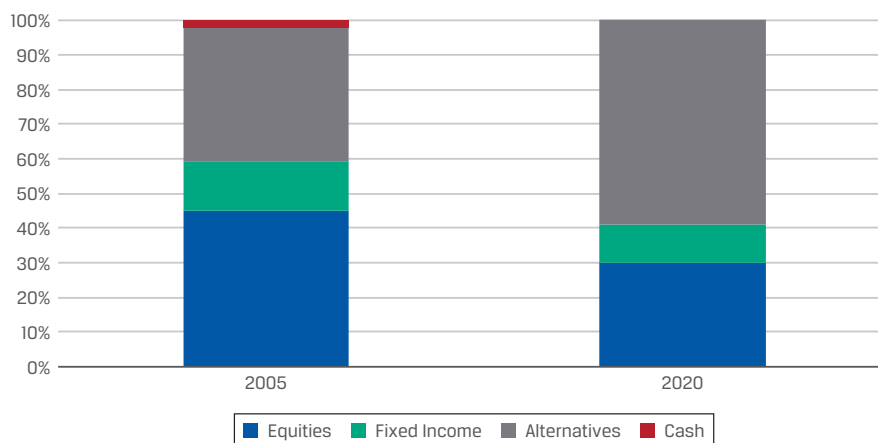
Exhibit 14: Average Asset Allocation for US University Endowments, as of June 2020 [note: x-axis is in US\$ and y-axis is Allocation (%)]



Source: TIAA and the National Association of College and University Business Officers (NACUBO), 2020 NACUBO–TIAA Study of Endowments.

Exhibit 15 shows the average asset allocation at the end of June 2005 and June 2017 for university endowments of more than US\$1 billion in size. During this period, the largest endowments significantly increased their allocation to alternatives from 39% to 60%. This increased allocation to alternatives has come at the expense of public equities (reduced from 45% to 30%) and fixed income (reduced from 14% to 11%).

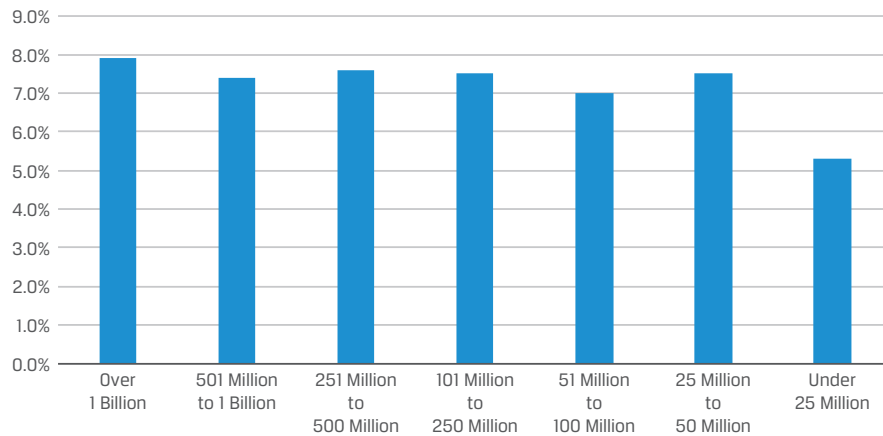
Exhibit 15: Average Asset Allocation for the Largest (> US\$1 billion) US Endowments: FY2005 versus FY2020 [note: y-axis is Allocation (%)]



Sources: Commonfund and the National Association of College and University Business Officers (NACUBO), *2005 NACUBO–Commonfund Study of Endowments* and TIAA and the NACUBO, *2020 NACUBO–TIAA Study of Endowments*.

Given asset allocations that are tilted toward alternative investments, how have endowments fared over the past 10 years? Exhibit 16 shows the average annual 10-year return (net of fees) for US endowments by size as of end-June 2020. The mean US Consumer Price Index was about 1.8% over the same period, while the mean Higher Education Price Index (HEPI) was 2.0%. Note: Larger endowments have generally been able to generate higher returns during this period. Endowments of more than US\$1 billion have generated anywhere between 50 bps to 60 bps higher returns (annually) compared to the smaller endowments (with less than US\$500 million). This difference compounds to a significant gap over a 10-year period. These higher returns have allowed the larger endowments to pay out a larger part of their assets to support their universities. It is worth noting that the 10-year period ending 30 June 2020 is time-period specific. A different 10-year period might lead to a different conclusion. However, this 10-year period is reasonably representative of long-term asset class returns because capital markets have generally rewarded growth assets over the period.

Exhibit 16: Average Annual 10-Year Nominal Returns for US University Endowments as of June 2020 [note: x-axis is in US\$ and y-axis is Nominal Return (%)]



Source: TIAA and the National Association of College and University Business Officers (NACUBO), 2020 NACUBO–TIAA Study of Endowments.

EXAMPLE 6

Investment Portfolio of the Ivy University Endowment

The hypothetical Ivy University Endowment was established in 1901 and supports Ivy University. The endowment supports about 40% of the university's operating budget. Historically, the endowment has invested in a traditional 20% public US equities, 80% US Treasury portfolio, and it is entirely implemented through passive investment vehicles. The investment staff at the endowment is relatively small. With the appointment of a new chief investment officer, the investment policy is being reviewed. Endowment assets are US\$250 million, and the endowment has a spending policy of paying out 5% of the 3-year rolling asset value to the university.

The new CIO has engaged an investment consultant to assist her with the investment policy review. The investment consultant has provided the following 10-year (nominal) expected return assumptions for various asset classes: US equities: 7%, Non-US equities: 8%, US Treasuries: 2%, hedge funds: 5%, private equity: 10%. In addition, the investment consultant believes that the endowment could generate an additional 50 bps in alpha from active management in equities. Expected inflation for the next 10 years is 2%.

The new CIO was at a previous endowment that invested heavily in private investments and hedge funds and recommends a change in the investment policy to the board of Ivy University Endowment. She recommends investing 30% in private equity, 30% in hedge funds, 30% in public equities (15% US and 15% non-US with *active* management), and 10% in fixed income. This mix would have an expected real return of 5.1% based on the expected return assumptions provided by the investment consultant.

1. Given the expected return assumptions from the investment consultant, provide an asset mix that would be more appropriate for Ivy University Endowment?

Solution:

To achieve a 5% real rate of return, the endowment will need to accept significantly more equity risk, diversify its assets internationally, allocate some of its assets to hedge funds and private equity, and engage in active management. There are several possible combinations that could result in a portfolio with a 5% expected real rate of return. Here are two possible asset mixes:

I: 40% in US equities with active management (7.5% expected return), 40% in non-US equities with active management (8.5% expected return), 10% in US Treasuries (2% expected return), 10% in hedge funds (5% expected return). This asset mix would result in an expected nominal return of 7.1% or an expected real return of 5.1%.

II: 50% in US equities with passive management (7% expected return), 30% in non-US equities with active management (8.5% expected return), 10% in US Treasuries (2% expected return), 10% in private equity (10% expected return). This asset mix would result in an expected nominal return of 7.25% or an expected real return of 5.25%.

2. Should the board approve the new CIO's recommendation? Provide your reasoning.

Solution:

The board should reject the CIO's recommendation. This is a very significant departure from the current practice. The size of the investment team is small, and they have no prior experience in managing hedge fund and private equity portfolios (except for the new CIO). Additionally, given the size of the endowment, it is unlikely to have access to top quartile managers in the hedge fund and private equity spaces. The CIO should explain why the recommended asset mix with 60% in alternatives is preferable over asset mixes that deliver the same or higher expected real return (such as I and II in Solution 1).

PRIVATE FOUNDATIONS: INVESTMENT OBJECTIVES AND ASSET ALLOCATION

15

- ☐ evaluate the investment policy statement of an institutional investor
- ☐ evaluate the investment portfolio of a private DB plan, sovereign wealth fund, university endowment, and private foundation

As discussed previously, private foundations in the United States are legally required to pay out a minimum of 5% of assets annually to be eligible for tax-exempt status. Foundations strive to be capable of making grants that support their overall missions in perpetuity while meeting the minimum 5% payout requirement. The primary

investment objective for foundations is typically to generate a total real return over consumer price inflation of 5%, plus investment expenses, with a reasonable expected volatility (approximately 10%–15% annual standard deviation) over a 3- to 5-year period. A secondary investment objective may include outperforming the policy benchmark with a specified tracking error budget. Monte Carlo-based modeling for generating expected returns and risk distributions as well as liquidity modeling and asset stress testing mentioned earlier for DB pension plans are also used by management and consultants to develop cogent investment objectives and policies for foundations and endowments. Foundations, like endowments, invest in a broad range of asset classes, including fixed income, public equities, hedge fund strategies, and private equity.

The following box provides two real-life examples of investment objectives for foundations.

Investment Objectives for Private Foundations

Wellcome Trust (UK):

“Our overall investment objective is to generate 4.5% real return over the long term. This is to provide for real increases in annual expenditure while preserving the Trust's capital base to balance the needs of current and future beneficiaries. We use this absolute return strategy because it aligns asset allocation with funding requirements and provides a competitive framework in which to judge individual investments.”

Note: Wellcome Trust's IPS mentions that the real return is based on an average of US and UK consumer price inflation.

Source: Wellcome Trust, wellcome.ac.uk/about-us/investments.

Robert Wood Johnson Foundation:

“The Robert Wood Johnson Foundation is working to improve the health and well-being of everyone in America. Reflecting our Guiding Principles, ‘we act as good stewards of private resources, using them to advance the public's interest with a focus on helping the most vulnerable.’... Achieving comprehensive and meaningful change in health and health care will require sustained attention over many years to come. The Foundation therefore seeks to earn an investment return that, over time, equals or exceeds the sum of its annual spending, as a percentage of the Foundation's assets plus the rate of inflation. This balance of investment return and spending is designed to spread risk and promote a steady, stable flow of support for our grantees.”

Source: Robert Wood Johnson Foundation, www.rwjf.org/en/about-rwjf/financials.html.

The IPS of a private foundation is not very different from that of a university endowment and follows a similar format as outlined in the previous section. The mission statement would be framed slightly differently, but the IPS would cover the same elements.

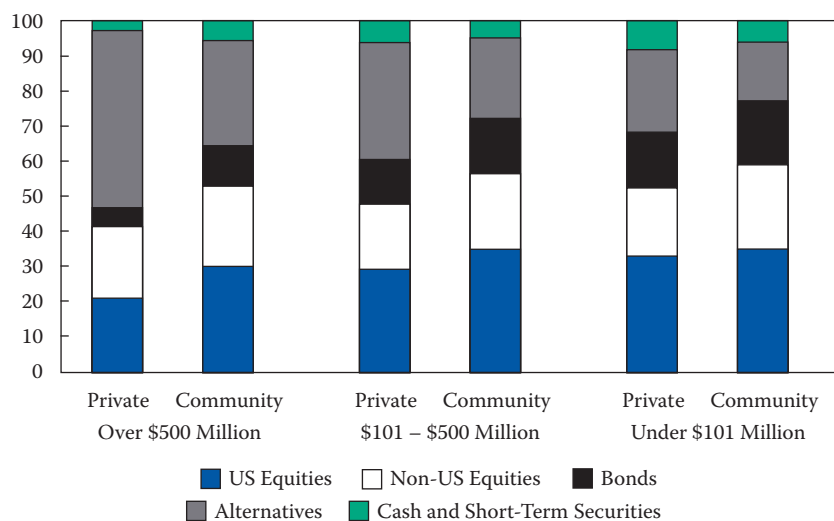
Private Foundations

Foundations tend to follow a similar investment approach compared to endowments, despite important differences in their liability structures. Two of the most notable differences between foundations and endowments that should have a bearing on their asset allocation are that:

1. foundations support the entire budget of their organization, while universities have significant other sources of financing available besides the endowment; and
2. foundations (in the United States) are mandated to pay out at least 5% of their assets to maintain tax-exempt status and typically receive no additional inflows in the form of gifts and donations (or, if there are gifts/donations, these need to be spent in the same year that they are received and do not count against the 5% mandated payout), whereas university endowments typically have a net payout of less than 5%.

Exhibit 17 shows the average asset allocations for US foundations by size and type at year-end 2016. The underlying data cover 203 institutions (123 private foundations and 80 community foundations). Here, alternative investments include private equity and venture capital, hedge funds and other marketable alternative strategies, private real estate, energy and natural resources, and distressed debt.

Exhibit 17: Average Asset Allocation for US Foundations as of Year-End 2016 [note: x-axis is in US\$ and y-axis is Allocation (%)]



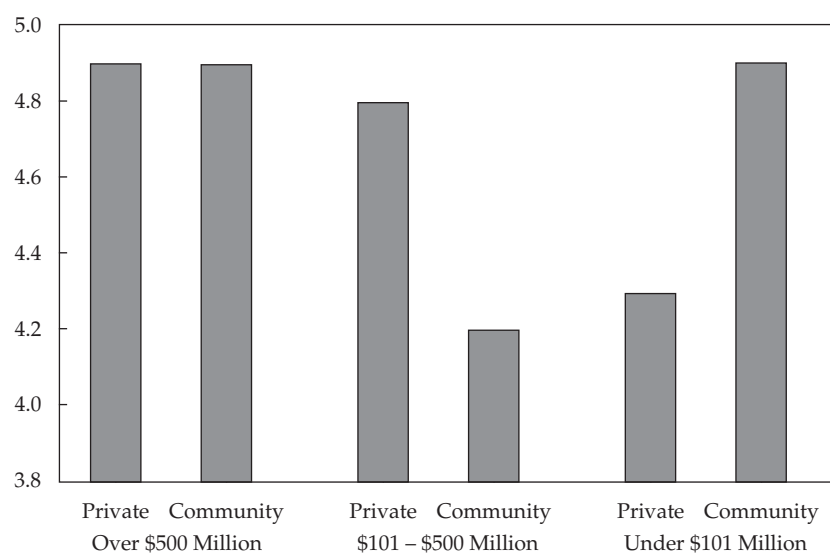
Source: Council on Foundations–Commonfund, 2016 *Council on Foundations–Commonfund Study of Investment of Endowments for Private and Community Foundations (CCSF)*: www.cof.org/content/2016-council-foundations-commonfund-study-investment-endowments-private-and-community.

These data highlight several key points. The larger foundations have a significantly higher allocation to alternatives, and private foundations have higher allocations to alternatives compared to community foundations. The largest private foundations (more than US\$500 million) have about half of their assets invested in alternatives. Although not shown, the largest private and community foundations have similar allocations to marketable alternatives (hedge funds), but the private foundations have significantly higher allocations to the higher-return-generating, illiquid alternatives—such

as private equity, venture capital, private real estate, and distressed debt. Smaller foundations seem generally to have a higher allocation to US equities compared to the larger foundations. Finally, the larger private foundations hold a smaller amount of their assets in fixed-income securities.

Foundations must generate real (net of fee) returns above 5% to maintain their purchasing power. Exhibit 18 shows that over the 10-year period to year-end 2016 (when US CPI averaged 1.8%), US foundations have fallen well short of this minimum target. As a result, their purchasing power has deteriorated. However, during this period larger private foundations (more than US\$500 million) have been able to generate higher returns—anywhere between 10 bps to 60 bps higher returns (annually)—compared to medium/small private foundations. Their larger allocation to alternatives likely played a key role in this outperformance. Note that the effective spending rate in 2016 was 5.8% for private foundations.

Exhibit 18: Average Annual 10-Year Nominal Return for US Foundations as of Year-End 2016 [note: x-axis is in US\$ and y-axis is Nominal Return (%)]



Source: Council on Foundations–Commonfund, 2016 *Council on Foundations–Commonfund Study of Investment of Endowments for Private and Community Foundations (CCSF)*: www.cof.org/content/2016-council-foundations-commonfund-study-investment-endowments-private-and-community.

Real-Life Case Study: Wellcome Trust (UK)

Wellcome Trust (“the Trust”) provides a historical example of how a foundation transformed its investment approach and asset allocation and, in the process, significantly improved its investment performance. The Wellcome Trust was founded in 1936 and managed about £23 billion in its investment portfolio (as of end-September 2017). The investment portfolio supported all of the charitable work of the Trust, which provides funding for scientific and medical research to improve health worldwide. During FY2016–17, charitable grants were more than £1 billion.

Between 1936 and 1986, the Trust was the sole owner of Burroughs Wellcome, the pharmaceutical company founded by Henry Wellcome. In 1986, the Trust began selling shares in the company and used the proceeds to diversify its assets. Over the two decades leading up to 2017, the portfolio generated an average annual (nominal) return of 14%. The overall investment objective was to generate a 4.5% real return over the long term. The Trust used to target a payout rate of 4.7% of the weighted average value of the portfolio over the previous three years. Historically, this resulted in an average annual payout of 4.3%.

Daniel Truell joined the Trust as CIO in 2005 and initiated radical changes to its investment approach and asset mix, shifting from short-term, liquid, and low-risk assets to longer-term, less-liquid, and higher risk assets. The most notable changes were an increase in the allocation to private equity (including buyout and venture capital funds) and hedge funds as well as reduced allocations to public equities and cash. In addition to radically changing its allocations, the decision was made to concentrate assets with fewer managers and in fewer, higher quality investments, such that by 2017 less than 100 investments represented nearly 85% of the portfolio's value. The Trust also shifted to more direct investments, and active management in public equities was brought predominantly in-house and conducted by an investment team of more than 30 professionals.

At end-September 2017, the Trust's investment portfolio consisted of 53% in public equities, 9% in hedge funds, 24% in private equity, 9% in property and infrastructure, 1% in commodity futures and options, and 4% in cash. The Trust has issued bonds totaling £2 billion—representing about 8% of total assets. Proceeds from the bond issuance are used for investments.

In 2017, the Trust adopted a new approach to determine how much to fund its charitable activities. According to the October 2017 IPS, the Trust *“targets an annual real cash spend in the Primary Fund (based on UK CPI) of £900 million in 2017 prices. This level of spending will be reviewed in 2022, or earlier in the event of declines in the investment portfolio below £20 billion in 2017 prices.”*

The Trust managed risk by ongoing monitoring of the following key risk factors: 1) 95% value-at-risk at a one-year horizon (if more than 20%, then this is highlighted to the Investment Committee), 2) foreign currency exposure (if more than 85%, then this is highlighted to the Investment Committee), 3) forecast of cash levels (unencumbered cash should exceed 2% of gross assets within a 5-year forecast period), and 4) estimated equity beta for the portfolio should be in the range of 0.4 to 0.8.

Sources: 1. Wellcome Trust, “Investment Policy” (October 2017): <https://wellcome.ac.uk/sites/default/files/investment-policy-october-2017.pdf>. 2. Wellcome Trust, *Annual Report and Financial Statements 2016* (https://wellcome.ac.uk/sites/default/files/WellcomeTrustAnnualReportFinancialStatements_160930.pdf). 3. Wellcome Trust, *Annual Report and Financial Statements 2017* (<https://wellcome.ac.uk/sites/default/files/wellcome-trust-annual-report-and-financial-statements-2017.pdf>). 4. World Economic Forum, “Alternative Investments 2020: The Future of Alternative Investments” (2015). 5. Steve Johnson, “Uncovering Little Investment Gems among the Shrunken Heads,” *Financial Times* (12 April 2014): www.ft.com/content/c49bb40c-be63-11e3-b44a-00144feabdc0.

BANKS AND INSURERS

16

This section focuses on institutional investors that are also financial intermediaries, namely banks and insurance companies.

Banks

Banks are financial intermediaries that take deposits, lend money, safeguard assets, execute transactions in securities and cash, act as counterparties in derivatives transactions, provide advisory services, and invest in securities. The universe of banks is quite large and diverse, ranging from small community banks to global diversified financial services institutions. A precise estimate of total worldwide banking assets is difficult to obtain; nevertheless, using publicly available data from such sources as the Bank for International Settlements (BIS), Reuters, and individual balance sheets for the largest public banks, an estimate of more than US\$100 trillion seems reasonable.⁴ An order-of-magnitude estimate for bank equity capitalization works out to US\$7 trillion. Our focus here is on the largest, most globally important banks—the two to three dozen banks that account for the great majority of international commercial bank assets and liabilities. Exhibit 19 shows some of these banks, all of which are designated as global systemically important banks by the Financial Stability Board, an international body that monitors the global financial system.

Exhibit 19: Select Large Global Banks

Bank	Country/Region
Industrial & Commercial Bank of China	China
China Construction Bank Corp.	China
Agricultural Bank of China	China
Bank of China	China
HSBC Holdings Plc	Hong Kong SAR/United Kingdom
JPMorgan Chase & Co.	United States
Wells Fargo	United States
Mitsubishi UFJ Financial Group	Japan
Bank of America	United States
CitiGroup	United States

Source: Marie Kemplay, “Top 1000 World Banks 2021,” *The Banker*, <https://top1000worldbanks.com/> (20 October 2021).

Insurers

The universe of insurance companies can be divided into two broad categories:

- Life insurers
- Property and casualty (P&C) insurers

According to the OECD (Organisation for Economic Co-Operation and Development) data on 35 large countries (ex-China and India), aggregate direct-insurance assets for both types of insurers had combined totals of more than US\$22 trillion, with equity capitalization of more than US\$2.2 trillion.⁵

⁴ Inter-company and cross-border transactions, non-contemporaneous reporting dates, differing accounting treatment (IFRS vs. GAAP, for example), and currency exchange rate conversions are inescapable complications.

⁵ OECD (2016).

The life insurance product set includes traditional whole and term insurance, variable life insurance and annuity products, as well as health insurance. The P&C product suite encompasses insurance against a wide range of perils—covering commercial property and liability, homeowner’s property and liability, and automotive as well as such multiple specialty coverage lines as marine, surety, and workers’ compensation. Exhibit 20 lists some of the largest global insurance companies.

Exhibit 20: Select Large Global Insurance Companies

Entity	Country/Region
AXA	France
Zurich Insurance Group	Switzerland
China Life Insurance	China
Ping An Insurance	China
Berkshire Hathaway	United States
Prudential plc	United Kingdom
Nippon Life Insurance	Japan
Munich Re Group	Germany
Assicurazioni Generali S.p.A.	Italy
Japan Post Holding Co., Ltd.	Japan
Allianz SE	Germany

Source: “Commercial Insurance,” Insurance Information Institute, www.iii.org/publications/commercial-insurance/rankings (accessed 20 October 2021).

External Constraints Affecting Investment

The legal and regulatory environments, as well as tax and accounting constraints, faced by banks and insurers are complex and may vary according to the national and local jurisdictions in which these institutional investors do business. In this section, we take a high-level view of some of the major legal and regulatory constraints within which banks and insurers must operate. In the following section, we consider tax and accounting constraints that affect investing by banks and insurers.

Legal and Regulatory Constraints

For banks and insurance companies, the liabilities to depositors, the claims of policyholders, and the amounts due to creditors are clearly and contractually defined. This is different from the other types of institutions discussed previously where there typically can be a great deal of discretion in the timing and amounts due and paid to stakeholders. Furthermore, banks and insurance companies carry out important functions with respect to the underlying economies in which they operate. These include facilitation of individual and commercial payments, extensions of credit, safeguarding of assets, and transfers of risk—to name the more important. The activities of companies in the financial industry not only are deeply intertwined with the non-financial, or *real*, economy, but their activities also are deeply intertwined with each other. Thus, a disturbance in the operation of individual banks and insurance companies can spread through the entire financial industry with great speed and with compounding damage; significant adverse effects can easily overflow into the real economy. Such negatives can include depositor runs on a banking system, credit crunches whereby companies or governments cannot obtain funding for maintaining operations, or the failure of

insurance companies that undermine the viability of large sectors of the economy, such as residential housing or the health care markets. Consequently, banking and insurance regulators in most jurisdictions are intensely focused on capital adequacy, liquidity, and leverage to mitigate systemic or contagion risk.

Banks and insurance companies are primarily regulated at national and state levels and are increasingly overseen by supranational regulatory and advisory bodies. The need to regulate banks and insurance companies at high, rather than local, levels stems from the fact that financial institutions are mainly large and spread across many local and national jurisdictions. At its most essential, the regulation of financial institutions centers on making sure banks and insurance companies have adequate capitalization to absorb losses rather than allowing losses to be borne by the rest of the financial system or the real economy—including depositors, insurance policyholders, creditors, or taxpayers.

Lowering the risk of assets through regulation is the first way to lower the potential strains on bank and insurance company capitalization. This can be through requirements for diversification, asset quality (including adequate reserve provisioning for credit, market, and operational risk losses) and liquidity maintenance. Likewise, setting requirements on liabilities can lower potential stress on bank and insurance capital resources. Such regulation of liabilities may include requirements for funding sources to be diversified over time and among different groups of depositors and debtholders. In the case of insurance companies, potential losses from liabilities can be regulated through rules limiting the size and concentration of potential policy claims. In addition to limiting potential losses from assets and liabilities—or from other operational risks—regulators may mandate certain minimum required capitalization.

Turning to insurers, the US insurance industry is regulated by individual states, each having its own administrative agency; the federal government does not play a major role in oversight. The National Association of Insurance Commissioners (NAIC), of which every state is a member, provides a forum for industry issues and sets accounting policies and financial reporting standards for the industry. In Europe, regulators have developed the Solvency II framework to standardize insurance regulation across member states.

The size and diversity of financial institutions result from powerful economies of scale. These economies of scale arise because most activities of banks and insurance companies (such as extension of credit, underwriting health or property risks, or taking of deposits) are made in large numbers, where the successes and failures of individual transactions are not normally highly correlated among each other. By the law of large numbers, the volatility of the weighted sum of independent risks decreases as a function of the square root of the number of independent risks assumed. This diversification effect would be a benefit to a financial firm that grows larger than its competitors. In fact, it would represent increasing returns to scale because the largest institution could hold a portfolio of assets with less capital than its competitors, because asset and liability volatility would be much less and would result in a higher and less volatile return on capital for the largest institution. Of course, offsetting factors keep this effect from dominating. Other marginal costs of operation, communications, and management keep the industry from eventually evolving into one giant financial firm. Nevertheless, the powerful impacts of diversification in terms of credit defaults, deposit funding, casualty insurance claims, and life-and-health mortality/morbidity claims are very strong factors in contributing to the existence of a small number of large national and international financial firms that comprise most of the financial industry's assets and earnings.

These few large firms are regarded as systemically important financial institutions (SIFIs). Since the worldwide financial system meltdown of 2008–2009, legislators and regulators worldwide have moved in the direction of bolstering the financial system by raising capital requirements—directly, by requiring higher absolute amounts of

primary capital, and indirectly, by (1) effectively increasing the amount of capital needed to support the holding of certain investments, (2) limiting the payout of dividends and repurchases of common equity, and (3) making subordinated debt and preferred shareholders less able to assert their claims in the event of bankruptcy or regulator-mandated restructuring. Furthermore, regulators' actions have resulted in tightening regulations on the use of derivatives, proprietary trading, and off-balance-sheet liabilities/guarantees. These actions require institutions through stress testing to show how they can survive severe economic and financial market turbulence, and they impose more stringent accounting/disclosure rules and reserving requirements. The consequences of a relatively small number of SIFIs dominating the financial industry and the existence of regulatory cycles mean that the management of a financial institution must take into account the actions of its SIFI competitors and must integrate its asset and liability portfolio decisions with a view to where the rules are today *and* where they are likely heading.

Accounting and Tax Considerations

Three different types of accounting systems apply for every financial institution. For the enterprise and its subsidiaries, the first is standard financial accounting, whether in the form of GAAP or IFRS, and which is used for communicating results to shareholders (or members), deposit or policyholders, and suppliers of debt capital. Regulators of banks and insurance companies, in addition, impose a second type of accounting in various forms and known as *statutory* accounting. Statutory accounting rules can be very different across different national and local regulatory jurisdictions. Although statutory results are normally available to the public, they mostly are utilized by regulators. Finally, the third type, true economic accounting, marks all assets and liabilities (net of imputed income taxes) to current market values.

Each accounting system is designed with a particular objective in mind, and it is incumbent upon financial institution managers and investment analysts to understand the purposes of all three. Economic or mark-to-market (MTM) accounting provides the best picture of an entity's assets, liabilities, and changes in economic well-being. MTM earnings are the most volatile of all because they reflect all value changes contemporaneously rather than being smoothed over time. The results of MTM reporting are likely to differ from those from financial reporting, where the reporting rules are consistently and conservatively applied over time (but where asset and liability values may depart from reported balance sheet amounts). Financial reporting has moved increasingly in the direction of MTM accounting over the past several decades, although changes in asset and liability values often are reported by way of balance sheet comprehensive income accounts rather than directly through an income statement. On balance, financial reporting will provide the smoothest reporting of income and asset/liability valuations.

Statutory accounting represents essentially a system of adjustments to standard financial accounting. For both bank and insurance regulators, this means most significantly the subtracting of intangible assets from asset and common equity accounts and/or the acceleration of certain expenses, such as policy underwriting and sales costs. In other cases, it is the recognition and assignment of additional reserves against losses on assets or unexpectedly large losses on guarantees or insurance claims. Statutory accounting usually results in lower earnings and lower common equity capital than in financial accounting. Capital requirements for both banks and insurance companies are predicated on one or another version of statutory reporting.

In terms of taxation, banks and insurance companies typically are taxable entities, and the industry-specific tax rules can be quite complicated. As taxable entities, banks and insurance companies must manage their investment programs with consideration of after-tax returns.

17

BANKS: OTHER CONSIDERATIONS



describe considerations affecting the balance sheet management of banks and insurers

Bank stakeholders include external parties (such as shareholders, creditors, customers, credit rating agencies, regulators, and even the communities where they operate) as well as internal parties (such as employees, management, and boards of directors). A bank's investment program must meet the needs and expectations of multiple parties. Most large, international banks are typically companies with publicly issued securities, which are expected to maximize the net present value of shareholders' capital. As will be seen shortly in greater detail, this hinges importantly on the ability of banks to manage the volatility of the value of shareholders' capital.

On the liability side, bank customers are comprised of a variety of depositors, including individuals, corporations, and municipalities. Individuals deposit cash and depend on banks to safeguard their assets over time. Legal entities, ranging from small privately held companies to large publicly listed corporations, often have multiple banking relationships and depend on banks to provide financing throughout economic cycles. Similarly, municipalities and other public entities deposit funds and rely on banks' safekeeping and transaction services. In addition, both for their own account and for the benefit of customers, banks are important counterparties to both publicly traded and over-the-counter derivatives transactions. Finally, most global banking institutions are significant issuers of fixed-income securities, either directly or via such other means as asset-backed trusts.

On the asset side, bank customers include both retail and commercial borrowers. Individuals borrow money from banks to finance large purchases, such as houses that are often financed with mortgages. On the corporate side, real estate developers often require bank financing through commercial real estate loans. Additionally, large companies require commercial and industrial loans from banks in order to finance working capital, ongoing operations, or capital improvements.

Internal stakeholders include a bank's employees, management, and board of directors. Notably, the largest banks may each have more than 200,000 employees around the globe. At banks with a national or global presence, management teams are often highly visible in regulatory and economic affairs. At the regional and local level, bank management teams are often integrated within the local business community.

Banks—Liabilities and Investment Horizon

Banks are unique in that they originate assets (loans), liabilities (deposits, derivatives, fixed-income securities), and capital (preferred and common stock) in the normal course of business. The ability to originate and manage both assets and liabilities has implications for the management of a bank's interest rate risk exposure (i.e., asset/liability gap management) and the volatility of equity capitalization.

The largest component of bank assets is loans, typically comprising up to 50% or more of the assets of the large, international banks that dominate the sector. The next largest component of assets is debt securities, typically accounting for 25% or more of total assets. The largest remaining portion of assets consists of currency, deposits with central banks (e.g., Bank of Japan or Bank of England), receivables, and bullion.

Banks' liabilities are comprised of deposits and also include short-term funding, such as commercial paper, as well as longer term debt. Deposits are the largest component of liabilities, usually more than half of total liabilities. Bank deposits include the following:

- **Time deposits** or **term deposits** – These interest-bearing accounts have a specified maturity date. This category includes savings accounts and certificates of deposit (CDs). Banks have visibility on the duration of these deposits because they require advance notice prior to withdrawal.
- **Demand deposits** – These accounts can be drawn upon regularly and without notice. This category includes checking accounts and certain savings accounts that are often accessible through online banks or automated teller machines (ATMs). Consequently, banks have limited visibility on the expected lives of these accounts and tend to assume they are short-term in duration.

In addition to deposits, banks can access wholesale funding, sources of which include Federal Funds, public funds, and other government-supported, short-term vehicles. Banks must actively monitor the expected cash outlays and timing of their liabilities. For time deposits, the amount and timing of the cash outlay are known, while for demand deposits, the amount is known but the timing is uncertain. Other liabilities comprise (1) long-term debt, 10%–15% of total balance sheet; and (2) such items as trading/securities payables and repurchase finance payables, also on the order of 10%–20% of balance sheet liabilities.

The tactical investment horizon for a bank's investment portfolio is directly impacted by the nature and maturities of its asset base and liability structure.⁶ Although commercial banks, as corporations, have a perpetual time horizon (possibly longer than the other institutions in this reading), the instruments held in a bank portfolio tend to have far shorter maturities than those held by other financial institutions.

SUSTAINABILITY LINKED LOANS: PROMOTING SUSTAINABLE DEVELOPMENT WHILE ALSO MANAGING RISK

As per the Sustainability Linked Loan Principles, "Sustainability linked loans are any types of loan instruments and/or contingent facilities (such as bonding lines, guarantee lines or letters of credit) which incentivize the borrower's achievement of ambitious, predetermined sustainability performance objectives." These loans aim to support environmentally and socially sustainable economic activity and growth and look to improve the borrower's sustainability profile by aligning loan terms to the borrower's performance against the relevant predetermined targets.

As some environmental and social issues such as carbon emissions, deforestation, water scarcity, and occupational health and safety become increasingly material for certain sectors, they could affect a company's ability to generate sustainable returns in the long term. Therefore, ensuring that corporates are managing such issues sufficiently well and avoiding any large negative impact on their ability to repay the loan is in the interest of providers of capital such as banks. In this context, a product such as a sustainability-linked loan provides the right incentive for corporates viz. a lower cost of capital, if they can manage the said risk(s) well. For banks, it is a way to manage and mitigate their credit risk exposure.

⁶ Its strategic horizon is perpetuity because of its corporate structure, which makes it as long, or longer, than many defined benefit plans, endowments, foundations, and sovereign wealth funds.

Example:

During Q1 2021, ING together with Santander coordinated one of the largest sustainability-linked revolving credit facilities ever issued. Anheuser-Busch InBev (AB InBev), a multinational drinks and brewing company, was provided a USD10.1 billion revolving credit facility with a five-year term by a consortium of 26 leading global financial institutions.

The pricing mechanism incentivizes AB InBev to address four key performance areas that are aligned with its sustainability goals:

1. Further improving water efficiency at AB InBev's breweries globally
2. Increasing PET recycled content in PET primary packaging
3. Sourcing purchased electricity from renewable sources as outlined in the RE100 commitment
4. Reducing greenhouse gas emissions as part of the science-based Climate Action Goal

The difference between the long time horizon of the institution and the much shorter maturity of most of its assets and liabilities may seem counterintuitive. Suppose that in the current market, the credit spreads on loans are narrow and the economy is nearing recession. The long-term horizon of the bank is evidenced by it: (1) cutting back new lending, (2) selling part of its existing loan portfolio, (3) increasing allocations to short-maturity, liquid securities, and (4) decreasing leverage through fewer large wholesale time deposits. The bank is sacrificing current earnings while looking forward to an uncertain time horizon when it can aggressively expand in the more favorable future environment. The long-term time horizon means that it expects to apply similar tactics—with medium to short-term maturity assets and liabilities—many more times over the indefinite future.

Banks—Liquidity Needs

Liquidity management is a core consideration in the management of bank portfolios. Given the short duration of deposits, as well as the potential need for increased liquidity in adverse market conditions, management and regulators have developed a robust framework around liquidity management for bank portfolios. Apart from asset or cash flow securitization, banks must have the ability to liquidate their investment portfolios within a certain period to generate adequate cash in the event of a crisis.

Bank liquidity needs have evolved since the global financial crisis of 2007–2009. Prior to that period, deficiencies in liquidity from deposits were made up with wholesale funding; banks would use their portfolios as a source of return so were invested in lower quality, less liquid securities. In the post-crisis environment, however, bank portfolios are increasingly comprised of higher quality, more liquid securities. This trend to more conservative management of investment portfolios has largely been driven by increased regulatory scrutiny on a global basis, most noticeably through the introduction of mandated liquidity coverage ratios (LCRs) and net stable funding ratios (NSFRs).⁷

⁷ LCRs require that highly liquid assets must constitute more than 100% of highly probable near-term expected cash outflows. NSFRs set minimum requirements for stable funding sources relative to assets; such stable sources include capital, long-term debt, and non-volatile deposits.

In general, contrasting commercial banks and retail-oriented banks, commercial banks have a higher cost of funds and lower liquidity because of wholesale funding of loan commitments and other contingent commitments. Conversely, retail banks have a lower cost of funds and better liquidity because their retail deposits are relatively low cost and tend to be more stable.

INSURERS

18

The stakeholders of insurers include such external parties as shareholders, derivatives counterparties, policyholders, creditors, regulators, and rating agencies as well as such internal parties as employees, management, and boards of directors. Insurance companies are organized as either companies with publicly listed securities or mutual companies.

In North America and Europe, most large insurers are companies with publicly issued securities, with the inherent shareholder concerns and pressures. As such, there is significant interest and scrutiny on quarterly investment performance, corporate earnings, and balance sheet strength. Within this context, as with banks, optimal management must focus on the long-term maximization of net present value of shareholders' capital. Concretely, this requires balancing expected returns on investments and policy writing in such a way that all insurance liabilities will be met. This requires a very strong focus by management and regulators on maintaining tight control over the volatility of the value of shareholder capital. Capital must be maintained at all investment horizons and under all scenarios so that the company will be able to honor its obligations, especially to policyholders.

Mutual companies are owned by policyholders. Mutual companies either retain profits as surplus or rebate excess cash to policyholders in the form of dividends or premium reductions.⁸ Although mutual companies are free from the shareholder pressure for earnings performance, they have less access to capital markets than peers with publicly issued securities. Mutual companies remain quite prevalent in the United States, Canada, Japan, and many European countries. To provide certainty that policyholders are paid under all economic conditions, the need to control and maintain capital surplus is fundamentally the same as in the case of for-profit insurers.

Customers are primarily policyholders who have a need to protect themselves against specific risks. The main objective of any insurance company investment program is to fund policyholder benefits and claims.

Given the nature and requirements of their product suite, life insurers maintain both a **general account** and **separate accounts**. For traditional life insurance products and fixed annuities, insurers bear all the risks—particularly mortality risk and longevity risk, respectively—so they maintain a general account of assets to fund future liabilities from these products. However, in the case of variable life and variable annuity products, customers make investment decisions from a menu of options and themselves bear investment risk. Consequently, insurers invest the assets arising from these products within separate accounts. Exhibit 21 summarizes the main bearers of investment risk and the account structure for the major categories of insurance and annuity products.

⁸ Mutual companies can also increase the amount of “paid up insurance” for whole-life policies.

Exhibit 21: Main Investment Risk Bearers for Different Insurance Products

Products	Bearer of Investment Risk	Account
Whole and term life insurance	Company	General
Universal life insurance	Company	General
Fixed annuities	Company	General
Variable life insurance	Policyholder	Separate
Variable annuities	Policyholder	Separate

The insurance industry is tightly regulated in most countries, usually by state or national authorities. The regulatory environment, including constraints impacting insurance asset management, will be discussed shortly. The rating agencies—including A.M. Best, Standard & Poor's, Moody's, and Fitch—are stakeholders in the management of insurance investment portfolios because they monitor the financial stability of insurance companies and provide credit ratings and data on the industry to the investment community globally.

An insurance company's management team and employees are also direct stakeholders. The large global insurance companies may have thousands of employees spread over many countries. Their management teams are often highly visible in terms of regulatory and economic affairs. Clearly, the employees are impacted by the amount of risks taken on an insurance company's balance sheet.

Insurers—Liabilities and Investment Horizon

Insurance companies manage their investment portfolios with an intense focus on asset/liability management (ALM). Within the insurance industry, the business line is critical because it determines the nature and structure of the liabilities. Further, effective management of liabilities is crucial to the long-term viability of any insurance company.

Life Insurers

Broadly speaking, life insurers face a liability stream and time horizon with a long duration. Life insurance involves a range of products, including Individual Life, Group Life and Disability, Individual Annuity, and Retirement Plan products. Life insurance portfolios are comprised of asset accumulation products, with some nuances in the associated liability stream. The liability stream is driven by the predictability of claims, which can vary based on the specific product line. For example, Term Life products have a one-time payout and the predictability is relatively high using statistical and actuarial analyses on large portfolios with many policies. Meanwhile, annuity products involve an ongoing payout with shorter duration that is subject to longevity risk. The nature of the liability stream has important implications for the amount of investment risk that can be tolerated.

Within life insurance, product features and resulting liabilities as well as policyholder behavior are key determinants of the associated portfolios' investment horizons. Historically, life insurance companies set portfolio return objectives with long time horizons of 20 to 40 years.

Property & Casualty Insurers

In general, P&C insurers face a shorter duration liability stream and investment horizon than life insurers. Further, P&C insurance involves events with lower probability of occurrence and potentially higher cost (especially in the case of natural disasters), leading to highly volatile business claims. This results in a liability stream with short duration and high uncertainty.

For example, a P&C insurance company may initiate policies against catastrophic events, such as hurricanes or other natural disasters. By definition, this insurance involves unpredictable and infrequent events that are difficult to hedge against. Insurance companies utilize statistical and actuarial analyses to forecast liability cash flows on a probabilistic (scenario) basis. P&C insurers may benefit from developing global, diversified portfolios that are more applicable to statistical analysis because of the law of large numbers. In any case, P&C insurers face a liability stream with a shorter duration and more potential volatility than life insurers.

MEASURING AND MANAGING PHYSICAL CLIMATE RISKS

Environmental risks such as the physical impacts of climate change (e.g., floods, droughts, wildfires) are affecting our day-to-day lives both more frequently and on a larger scale than ever imagined. Physical risks might have financial implications for organizations, such as direct damage to assets and indirect impacts from supply chain disruption. Wildfires in California, the Amazon Forest, and Australia that caused billions of dollars in financial losses, in addition to the loss of life and to megacities such as Cape Town and Chennai almost running out of water, are just a few recent examples of how climate change and related global warming are accelerating the frequency and magnitude of such erratic weather patterns.

For insurance companies, this increase in frequency of the hitherto infrequent and low-probability events poses a new set of modeling challenges. AXA S.A., a French multinational insurance company, for example, states that as of the end of 2020, the annual average losses (AAL) for its real estate portfolio are estimated to be EUR4.3 million due to floods and EUR6.2 million due to windstorms. To manage these physical climate risks, AXA's models that assess the risk of natural hazards consider three components: the hazard (as defined by its severity and frequency), the exposure (as characterized by the building's physical properties), and the vulnerability (as defined by destruction rates, function of the hazard, and the exposure). These risk evaluation and management efforts would naturally evolve to consider potential financial impacts under various climate scenarios that are published by the Intergovernmental Panel on Climate Change, such as the Representative Concentration Pathways 2.6 and 8.5 scenarios, which make predictions of how concentrations of greenhouse gases in the atmosphere (and thus global temperature rise) will change in the future because of human activities.

As these physical climate risks become more and more material, insurance companies will have to better understand their exposure to physical risk and chart appropriate adaptation efforts to limit such exposures.

With both life and P&C insurers, as with banks, the nature and timing of expected policy claims strongly influence the time horizon and nature of investments held. Even so, the ultimate management time horizon is perpetuity. A natural and frequently occurring example for both types of insurers is the case of underwriting cycles. Such cycles relate to the pricing of newly issued policies relative both to then-existing expected security returns and to the actuarial outlook for life and casualty loss claims. Long-term strategic investment and balance-sheet management policies result in

modifications to portfolios and overall company leverage at different points in time to adjust to the varying relative attractiveness of bearing investment risk versus bearing underwriting risk and/or financial (leverage) risk.

Insurers—Liquidity Needs

Insurance companies must actively manage and monitor the liquidity of their portfolios. The level of liquidity required has important implications across the portfolio management process, including the insurer's ability to utilize leverage. Further, liquidity needs can vary greatly based on the business line.

Both life and P&C insurers need a sound, two-part liquidity plan that includes internal and external components. An insurer's internal liquidity includes cash and cash equivalents maintained on the balance sheet. Insurers must actively manage cash from operations (including investment income) that involves steady inflows and outflows. Further, insurers manage and project the cash flows from investment portfolio income and principal repayments. An insurer's external liquidity includes the ability to issue bonds in the capital markets and to access credit lines through syndicated commercial bank credit lines or other lines of credit. Finally, insurers manage short-term liquidity by actively buying and selling repurchase agreements. In this way, insurers consistently manage both internal and external sources of liquidity.

The liquidity needs of life insurance companies must also be considered in the context of the interest rate environment. In periods of rising/high interest rates, insurance companies may face the risk of significant net cash outflow as policies are surrendered by customers searching for higher yields in other investments. P&C insurers face uncertainty regarding both the value and timing of the payment of benefits. This significant cash flow uncertainty necessitates maintaining ample liquidity and results in P&C portfolios comprised of high proportions of cash and cash substitutes as well as short-term fixed-income instruments.

Insurers segment general account investment portfolios into two major components: **reserve portfolio** and **surplus portfolio**. Insurance companies are typically subject to specific regulatory requirements to maintain a reserve portfolio that is intended to ensure the company's ability to meet its policy liabilities. The surplus portfolio is intended to realize higher expected returns. Insurance companies manage reserve assets relatively conservatively. The size of the reserve portfolio is typically dictated by statute, and assets must be highly liquid and low risk. Meanwhile, insurance companies have more of an ability to assume liquidity risk in the surplus portfolio. Insurance companies are often willing to manage these assets aggressively with exposure to alternative assets, including private equity, hedge funds, and non-security assets.

19

BANKS AND INSURERS: INVESTMENT OBJECTIVES



describe considerations affecting the balance sheet management of banks and insurers

We now consider the investment objectives of banks followed by a discussion of investment objectives and an investment policy statement for insurers.

Banks

The investment securities portfolio of a bank is an integral component of the overall banking enterprise. The primary objective of a bank's securities investment portfolio is to manage the bank's liquidity and risk position relative to its non-securities assets, derivatives positions, liabilities, and shareholders' capitalization. Given the highly regulated nature of the industry, banks typically have formally documented investment policies as well as multiple levels of oversight in the form of internal committees and external regulators.

What follows provides a real-life example of how investment objectives are framed at banks.

Bank Investment Objective

JPMorgan Chase & Co., Treasury and Chief Investment Officer Overview

"Treasury and CIO is predominantly responsible for measuring, monitoring, reporting and managing the Firm's liquidity, funding, capital, structural interest rate and foreign exchange risks. The risks managed by Treasury and CIO arise from the activities undertaken by the Firm's four major reportable business segments to serve their respective client bases, which generate both on- and off-balance sheet assets and liabilities.

Treasury and CIO achieve the Firm's asset-liability management objectives generally by investing in high-quality securities that are managed for the longer-term as part of the Firm's investment securities portfolio. Treasury and CIO also use derivatives to meet the Firm's asset-liability management objectives."

Source: JPMorgan Chase & Co., *Annual Report 2020*, www.jpmorganchase.com/content/dam/jpmc/jpmorgan-chase-and-co/investor-relations/documents/annualreport-2020.pdf.

Banks establish an asset/liability management committee ("ALCo") that provides direction and oversight of the investment portfolio. The ALCo has significant visibility with the bank's management and board of directors, as well as with external regulators. This ALCo sets the investment policy statement (IPS), monitors performance on an ongoing basis, and has the ability to mandate adjustments on the asset and liability sides of the balance sheet. The ALCo also ensures that market (interest rate and FX), credit, liquidity, and solvency (capital adequacy) risk positions are within the limits of the bank's specified risk tolerances. Once the overall investment objectives and risk levels are set, the investment team establishes policy benchmarks. The investment team monitors performance and such portfolio characteristics as duration and convexity relative to the benchmark for each asset class. Further, the investment team may monitor performance relative to a set of peers with comparable business models and investment objectives. Finally, the investment team makes periodic presentations to senior management and the board of directors regarding performance and characteristics of the investment portfolio.

Insurers

Given the highly regulated nature of the insurance industry, a detailed and well-documented Investment Policy Statement is of paramount importance. It is a best practice for an IPS to take a holistic approach and include the parent company's

strategic enterprise risk management framework. Similar to banks, insurers manage their investment portfolios with a focus on liquidity as well as interest rate, foreign exchange, credit, and other risk factors.

The investment oversight function is a critical part of an insurer's overall governance. Insurers typically have a committee on the board of directors that maintains oversight of all investment policies, procedures, strategies, and performance evaluation. Insurers provide significant transparency to their underlying portfolios—including showing the inherent duration, credit, and other risks to regulators and other external stakeholders.

The IPS should encompass the insurer's appetite for market risk, credit risk, and interest rate risk. An insurer's risk tolerance may vary relative to the competitive environment for various product lines, regulatory and tax changes, market conditions, and other factors. Moreover, the IPS should be a "living document" that evolves as market, regulatory, and business conditions change.

Hypothetical Life Insurance Company—Investment Policy Statement

i. Introduction

XYZ Life Insurance Company ("the Company") underwrites and markets life insurance and annuity products. The Company is licensed to provide insurance products in all 50 US states, as well as several foreign countries. This investment policy statement ("IPS") documents the policies and procedures that govern the Company's general account securities portfolio. There are detailed policy statements for each asset segment within the portfolio that provide a more granular breakdown of investment guidelines.

ii. Governance and Stakeholders

The Company's investment policies, including investment objectives and constraints, are the responsibility of the Investment and Finance Committee ("IFC") of the board of directors ("BoD"). The insurer's senior management team ("Mgmt") is responsible for implementation of the investment program consistent with this policy. In turn, the investment team ("InvTeam") manages the investment portfolio on a day-to-day basis.

The IFC will review the investment policy on an annual basis. The IFC must consider changes to the Company's strategic direction, regulatory changes, tax changes, financial market conditions, and any other relevant factors that may arise. The IFC proposes adjustments to the IPS to the BoD, and all material changes must be approved by the BoD in their entirety.

The IFC has responsibility to employ appropriate resources for the management of the investment portfolio. The IFC may retain or dismiss InvTeam personnel at its discretion. Further, the IFC may retain investment consultants or other advisers to manage specific asset classes or other sub-components of the portfolio. All consultant, external investment managers, and other advisers are required to comply with this IPS.

iii. Mission and Investment Objective

The core mission of the general account is twofold:

1. Provide liquidity for the payment of policyholder claims in the normal course of insurance operations.
2. Grow the Company's surplus over the long-term.

The investment objective must follow prudent investing practices and achieve an appropriate balance between maintaining short-term liquidity and contributing to long-term asset growth.

iv. Risk Tolerance and Constraints

The Company is subject to significant scrutiny from internal and external stakeholders, including shareholders, regulators, and others. The general account investment program must take into account the following key factors:

- **Liquidity.** The investment portfolio must maintain sufficient liquidity to meet all policyholder claims that may arise on a short-term and long-term basis. The InvTeam monitors investment cash flow to ensure the Company's ability to meet all obligations in a timely manner. Further, the InvTeam may liquidate publicly traded securities as a secondary source of liquidity.
- **Interest Rate Risk.** The InvTeam monitors the portfolio's exposure to changes in interest rates, including the relative exposure of both assets and liabilities.
- **Credit Risk.** The InvTeam monitors the credit (default) risk inherent in the portfolio and must continually monitor the financial health of key counterparties.
- **Foreign Exchange Risk.** The Company is subject to foreign exchange risk in the normal course of business. The InvTeam monitors the aggregate foreign exchange risk of the portfolio.
- **Regulatory Requirements.** All investments must adhere to the insurance code of the Company's state of domicile as well as all other applicable domestic and foreign guidelines. Further, the investment program must comply with risk-based capital considerations and rating agency requirements.
- **Tax Considerations.** Further, the securities portfolio must account for tax considerations, and all investment decisions should be evaluated on an after-tax basis. The income tax planning of the Company may impact the timing of realization of capital gains and losses.

v. Asset Allocation Policy, Allowable Ranges, and Benchmarks

The primary investment vehicles within the Company's investment portfolio will consist of highly liquid instruments, including US and foreign government obligations, corporate debt, and other fixed-income instruments. Further, the Company may invest in private placement bonds, commercial mortgage loans, and other less liquid instruments within the parameters specified. Further, the Company may invest in real estate and private equity in order to enhance long-term returns and contribute to the surplus growth of the company. However, strict guidelines apply for less liquid asset classes.

The IFC establishes the strategic asset allocation that is consistent with the long-term constraints of the Company. The IFC will review the strategic asset allocation annually and may make adjustments as appropriate. Further, the IFC sets out allowable ranges of allocation for each asset class. Further, the IFC approves appropriate benchmarks for each asset class upon consultation with the InvTeam.

vi. Investment Guidelines

The InvTeam should seek to diversify holdings in terms of economic exposure, counterparty, and other applicable attributes to the extent possible. Securities that are guaranteed by the US government or its agencies must constitute at least 25% of the portfolio.

vii. Reporting

The InvTeam, with the oversight of Mgmt, must provide adequate reporting to the BoD and other stakeholders. The reporting structure should include the following:

- Daily Flash Report: Summary of market values, yield, and interest rate position of entire portfolio
- Monthly Investment Performance Detail: Detailed investment performance by asset class, including market values, yields, and interest rate position
- Quarterly Investment Summary: Detailed analysis of market values, yield, and interest rate exposure, including long-term performance metrics and attribution

20

BANKS AND INSURERS: BALANCE SHEET MANAGEMENT AND INVESTMENT CONSIDERATIONS



describe considerations affecting the balance sheet management of banks and insurers

We turn now to the portfolio investment strategy for banks and insurance companies. The objectives and constraints are very different from what we have seen with respect to pensions, sovereign wealth funds, endowments, and foundations. In the case of banks and insurance companies, the need is to fund deposits, policy claims, derivatives payoffs, and debtholders. A financial institution's fundamental purpose is to assure such contractual parties the full and timely payment of claims when they come due. A firm can only hope to earn a profit if it can provide counterparties assurance it will be able to meet all claims with extremely high probability.

The financial claims against banks and insurers may not always be known with certainty, but they are, at any point in time, measurable. Such measurement may require the use of probabilistic methods to account for such outcomes as: (1) the liquidation of bank deposits; (2) insurance policy claims and surrenders; (3) losses on derivatives, guarantees, or forward purchase commitments; and (4) returns on variable annuities, among other outcomes. Thus, in the case of banks and insurers, the well-defined, contractual nature of the financial claims, along with their measurability, imply

that—unlike with defined benefit and defined contribution pension plans, sovereign wealth funds, endowments, and foundations—the underlying investment strategy is mainly liability driven investing (LDI as earlier defined).

We can obtain insight about both investment strategy and regulation of financial institutions by applying a fairly simple but intuitive economic model. The model's first two equations define the relationship between an institution's assets A , liabilities (claims) L , and residual equity of the institution's shareholders or members E :

$$A = L + E \quad (1)$$

$$\Delta A = \Delta L + \Delta E \quad (2)$$

Assets are equal to the sum of contractual claims and residual ownership. Likewise, all changes in assets must equal the sum of changes in the value of contractual claims and ownership interest (equity capitalization). These equations are set forth in terms of current market—or economic—values, which will not necessarily coincide with GAAP, IFRS, or regulatory/statutory values. However, using current market values will facilitate the subsequent application of these other accounting valuations.

These equations can be used to understand not just market value changes but also the impact of earnings, the consequences of adding or selling off assets in total, and changes in an institution's capital structure. All of these are relevant to investment strategy and are additional layers of complexity as compared with the other portfolio strategies in this reading.

By multiplying the various terms by 1 (i.e., $A \div A$ or $L \div L$), dividing both sides by E , and doing a little regrouping, we obtain a useful expression, namely:

$$\frac{AA}{A} \left(\frac{A}{E} \right) = \frac{AL}{L} \left(\frac{L}{E} \right) + \frac{AE}{E} \quad (3)$$

Using Equation 1 and moving liabilities and assets to the same side of the equation, we rewrite this as:

$$\frac{AE}{E} = \frac{AA}{A} \left(\frac{A}{E} \right) - \frac{AL}{L} \left(\frac{A-E}{E} \right) = \frac{AA}{A} \left(\frac{A}{E} \right) - \frac{AL}{L} \left(\frac{A}{E} - 1 \right) \quad (4)$$

Equation 4 provides an easy way to see how percentage changes in market value of both assets and liabilities are magnified by the leverage factors.

To demonstrate this point, Exhibit 22 presents the effects on the market value of the institution's equity capital as a function of (i) declines in underlying asset value,⁹ and (ii) beginning degree of leverage. Asset values can decline for several reasons, such as deterioration in credit quality and/or liquidity of loans or securities held. The value of assets can also be hurt by rising interest rates in the case of fixed-rate loans or securities.

Exhibit 22: Effects on Market Value of Equity Due to Change in Market Value of Assets (Given Beginning Degree of Leverage)

Beg. Equity to Assets Ratio	Leverage (x)	Percentage Change in Institution's Equity Value Due to Change in Asset Value of:			
(E÷A)	(A÷E)	−0.5%	−1.0%	−1.5%	−2.0%
20%	5.0	−2.5%	−5.0%	−7.5%	−10.0%
15%	6.7	−3.3%	−6.7%	−10.0%	−13.3%

⁹ Which, for our analysis, focuses on the investment portfolio assets. The net equity described here is net financial equity. The portion of an institution's equity associated with financing other assets, such as buildings and equipment, are not a focus of this reading.

Beg. Equity to Assets Ratio	Leverage (x)	Percentage Change in Institution's Equity Value Due to Change in Asset Value of:			
(E÷A)	(A÷E)	−0.5%	−1.0%	−1.5%	−2.0%
10%	10.0	−5.0%	−10.0%	−15.0%	−20.0%
5%	20.0	−10.0%	−20.0%	−30.0%	−40.0%

This analysis reveals that even small losses in the market value of assets can have a pronounced negative effect on the institution's equity capital account because of the leverage factor. Naturally, it works in reverse; Small gains in assets can have a very positive impact for equity capital holders. These relationships give rise to a conflict of interest: Because equity capital holders can only lose the value of their investment but also can make extremely large gains if assets perform well, liability holders require some form of protection against the potential inclination of the institution to take excessive risks. Contractual, regulatory, and reputational methods all come into play to provide such protection. In one form or another, they relate to limiting the volatility of assets and providing for a capital cushion so that equity capital holders, rather than liability holders, are expected to absorb unforeseen losses on assets.

Similarly, financial institutions face the possibility of loss from adverse changes in the market value of liabilities. In the case of insurance companies, unexpectedly high policy loss claims are the most notable cause of expanding liabilities. For banks, it could be having to make a forward-funding commitment to a struggling company, the exercise of a guarantee, or a loss on forward currency purchase contracts. Exhibit 23 uses Equation 4 to illustrate the effect on the market value of the institution's equity capital as a function of (i) increases in its liabilities and (ii) beginning degree of leverage.

Exhibit 23: Effects on Market Value of Equity Due to Change in Market Value of Liabilities (Given Beginning Degree of Leverage)

Beg. Equity to Assets Ratio	Leverage (x)	Percentage Change in Institution's Equity Value Due to Change in Liability Value of:			
(E÷A)	[(A÷E) − 1]	+0.5%	+1.0%	+1.5%	+2.0%
20%	4.0	−2.0%	−4.0%	−6.0%	−8.0%
15%	5.7	−2.8%	−5.7%	−8.5%	−11.3%
10%	9.0	−4.5%	−9.0%	−13.5%	−18.0%
5%	19.0	−9.5%	−19.0%	−28.5%	−38.0%

Exhibit 23 bolsters the conclusions reached in Exhibit 22. Mainly, liability holders, regulators, and owners (equity shareholders) of a financial institution all are motivated to limit the volatility and magnitude, relative to the base capital level, of market value changes in the institution's liabilities.

Now we must integrate the analysis of both sides of the balance sheet with the capital management strategy of the financial institution. To do this, we would like to have a framework for understanding various interactions in a more rigorous manner. A customary starting point is with an analysis of interest rate risk. Our framework comfortably accommodates the standard duration-based model of value changes with respect to interest rate changes. In order to find the percentage change in the value of the institution's equity capital associated with a change in the reference yield, y , on the asset holdings, we divide Equation 4 by the change in such yield, thereby obtaining:

$$\frac{\Delta E}{E \Delta y} = \frac{\Delta A}{A \Delta y} \left(\frac{A}{E} \right) - \frac{\Delta L}{L \Delta y} \left(\frac{A}{E} - 1 \right) \quad (5)$$

Likewise, we want to understand how this relates to the change in the effective yield on the liabilities, i . Multiplying by $1 = \Delta i \div \Delta i$ in the appropriate location, we restate Equation 5 as:

$$\frac{\Delta E}{E \Delta y} = \frac{\Delta A}{A \Delta y} \left(\frac{A}{E} \right) - \frac{\Delta L}{L \Delta i} \left(\frac{\Delta i}{\Delta y} \right) \left(\frac{A}{E} - 1 \right) \quad (6)$$

Recall that the modified duration of asset W with respect to its yield-to-maturity, r , (D_W^*) is defined as:

$$D_W^* = -\frac{\Delta W}{W \Delta r} \quad (7)$$

This allows us to revise Equation 6 to a practical and intuitive analytical tool, namely,

$$D_E^* = \left(\frac{A}{E} \right) D_A^* - \left(\frac{A}{E} - 1 \right) D_L^* \left(\frac{\Delta i}{\Delta y} \right) \quad (8)$$

Over reasonably modest yield changes, Equation 8 provides a useful way to break down the volatility of a financial institution's equity capital as a function of degree of leverage, comparative (modified) duration of assets and liabilities, and correlation (or sensitivity) of changes in yields of assets and liabilities.

Exhibit 24 and Exhibit 25 show how sensitive the valuation of equity is to changes in the security portfolio yield for differing degrees of mismatching of asset and liability durations. In both these exhibits, the x-axis shows the duration of the financial institution's liabilities, the y-axis shows the duration of its security portfolio assets, and the z-axis (vertical axis) shows the resulting duration of the institution's shareholders' equity. The yields on liabilities are assumed to move only 90% as much as the yields on portfolio assets. That is,

$$\frac{\Delta i}{\Delta y} = \frac{\Delta i}{\Delta y} = 0.90$$

Exhibit 24 and Exhibit 25 show results for differing initial degrees of leverage, as measured by the equity-to-assets ratio, which is 20% and 10%, respectively.

Exhibit 24: Duration of Shareholders' Equity as a Function of Asset and Liability Durations (Given Equity/Assets = 20% and Sensitivity of Yield Changes = 0.90)

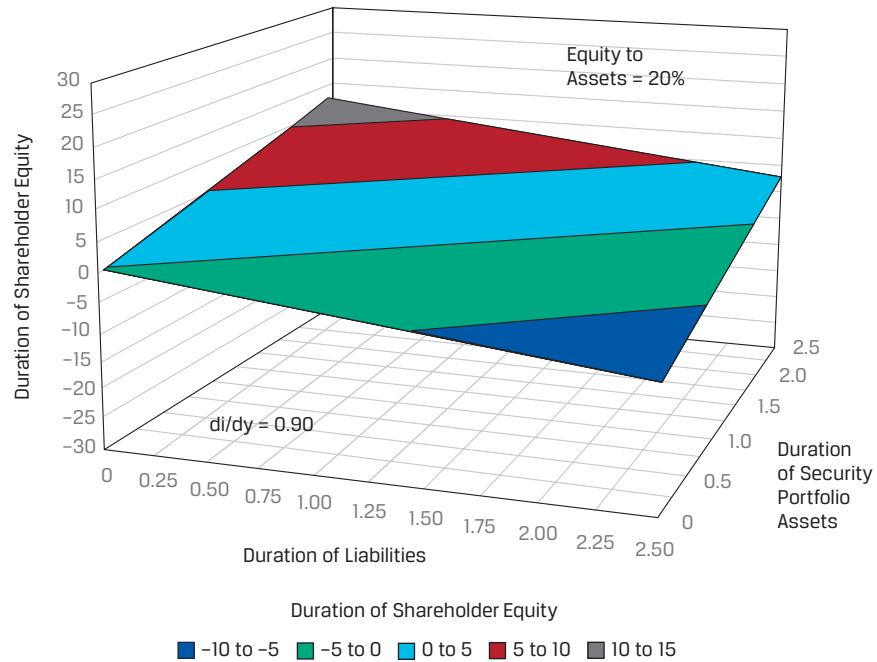
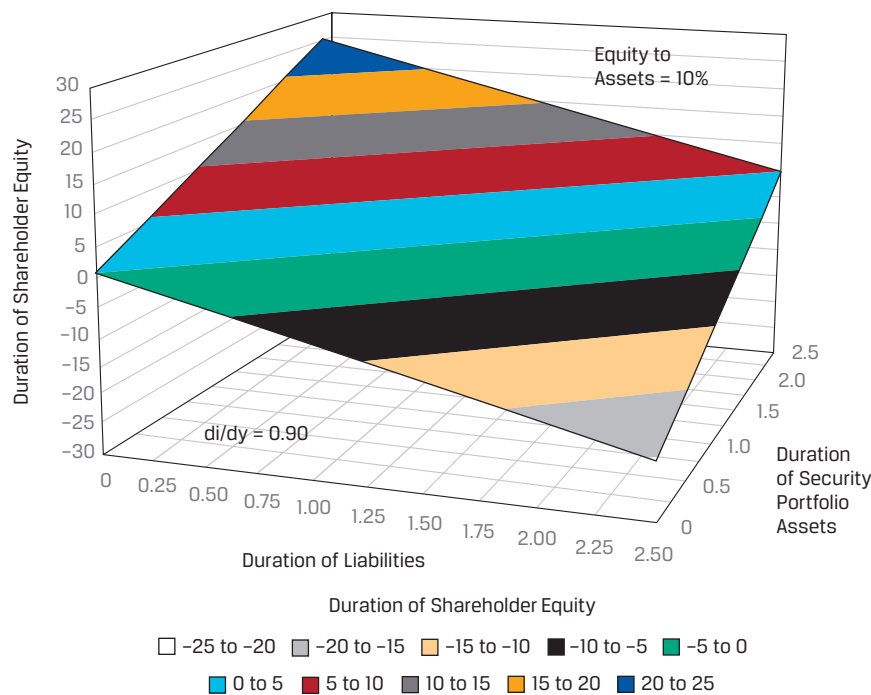


Exhibit 24 indicates that, even at relatively high capital ratios of 20%, moderate differences between asset and liability durations can imply durations for equity that can be sizable in either a positive or negative direction. Remember that, by definition, the modified duration of a zero-coupon bond is its final maturity divided by one plus its yield. Thus, by comparison, a 10-year zero coupon bond would have a modified duration around 9.75. Utilizing Equation 7, a ± 100 basis point change in interest rates when multiplied by a modified duration of 9.75 implies an approximate $\pm 10\%$ change in value. It is highly unlikely that regulators would like to see large asset/liability duration mismatches, since regulators want equity capital to remain stable in periods of large adverse interest rate changes.

Exhibit 25: Duration of Shareholders' Equity as a Function of Asset and Liability Durations (Given Equity/Assets = 10% and Sensitivity of Yield Changes = 0.90)



In Exhibit 25, we see that lowering the equity capital ratio to 10% means that in order to avoid very high durations for equity capitalization, it is all the more necessary to keep assets and liabilities from having large differences in duration. It is often mistakenly thought that banks (and to a lesser degree, insurance companies) climb the yield curve by raising capital through the issuance of short maturity deposits that they then invest in longer duration loans and securities. The foregoing exhibits indicate the potential dangers of such an asset/liability mismatch. In Exhibit 25, assuming a liability duration of close to zero (very short-term deposits and overnight borrowing), even if the security portfolio duration is only 2.5 years, the duration of shareholder's equity reaches 25 years (about the equivalent of a 26-year zero coupon bond). In such a case, a ± 100 basis point change in asset yields would produce a $\pm 25\%$ change in shareholder equity value. The loss potential is a danger that neither deposit holders, creditors, stockholders, nor regulators would be keen to embrace.

In actuality, in order to lower asset duration, financial institutions hold cash, deposits at central banks, foreign currency reserves, and other highly liquid (zero duration) assets. Also, as a means of lowering effective asset durations, banks typically make business loans that float according to market reference rates, which are expected to move in line with the variable cost of deposits. Likewise, credit card and many real estate loans are tied to variable rate indexes in order to minimize the sensitivity of values to interest rates. Moreover, many fixed-rate mortgage loans are securitized and sold off to private investors. All these foregoing techniques are ways of limiting the duration of asset portfolios.

On the liability side, there are many ways in which the duration of liabilities can be extended far beyond the implicit zero duration of demand deposits. These include issuance of intermediate and longer-term debt instruments, deeply subordinated capital securities, and perpetual preferred stock. Finally, banks can and do utilize financial futures and interest rate swaps to alleviate asset/liability mismatches.

In the light of persistent low interest rates since the global financial crisis of 2007–2009, many large international banks have an asset/liability structure where earnings are poised to benefit from a rise in interest rates. In such cases, the duration of assets is actually shorter than the duration of liabilities. This is clearly not the naïve “borrow short and lend long” strategy.

EXAMPLE 7

MegaWorld Bancorp has an equity capital ratio for financial assets of 9%. The modified duration of its assets is 2.0 and of its liabilities is 1.5. Over small changes, the yield on liabilities is expected to move by 85 bps for every 100 bps of yield change in its asset portfolio.

1. Compute the modified duration of the bank's equity capital.

Solution:

Using Equation 8, $A \div E = 1/0.09 = 11.11$; $(A \div E) - 1 = 10.11$; $D_A^* = 2.0$; $D_L^* = 1.5$; and $\Delta i \div \Delta y = 0.85$.

Therefore, the modified duration of shareholders' capital is:

$$D_E^* = (11.11 \times 2) - (10.11 \times 1.50) \times 0.85 = 9.33$$

2. What would be the impact on the value of shareholder capital of a 50 basis point rise in the level of yields on its asset portfolio?

Solution:

Using the implications of Equation 7, the change in equity capitalization value is computed as:

$$0.5\% \times -9.33 = -4.67\%.$$

3. Management is considering issuing common stock, selling investment portfolio assets, and paying off some liabilities in order to achieve an equity capitalization ratio of 10%. Assuming no change in the durations of assets and liabilities and assuming no change in the sensitivity of liability yields to asset yields, what is the resulting modified duration of the bank's equity capital?

Solution:

With this less leveraged balance sheet, $A \div E = 1/0.1 = 10$; $(A \div E) - 1 = 9$; and the duration of shareholders' equity is:

$$D_E^* = (10 \times 2) - (9 \times 1.50) \times 0.85 = 8.53$$

4. Using the facts in question 3 but assuming the bank rebalances its investment portfolio to achieve a modified duration of assets of 1.75, what happens to the duration of the bank's equity capital?

Solution:

The duration of shareholders' capital now declines to:

$$D_E^* = (10 \times 1.75) - (9 \times 1.50) \times 0.85 = 6.03$$

BANKS AND INSURERS: INVESTMENT STRATEGIES AND ASSET AND LIABILITY VOLATILITY

21

Our previous discussion has given us some insight into the effects of leverage and the volatility of underlying assets and liabilities on the value of a financial institution's equity. The degree of leverage was given; the sensitivity of changes in liability to asset yields (di/dy) was constant; and the durations of assets and liabilities varied. Although quite useful in many circumstances, such duration analysis captures the effects of only small changes in overall levels of interest rates and only over short time intervals.¹⁰ Although of great significance, changes in the overall levels of interest rates are only one source of volatility. An expansion of Equation 4 is therefore necessary. A natural step is to extend it in a probabilistic way. We can thereby capture the volatility of the market value change in the financial institution's equity capital as shown in Equation 9. Volatility is defined here as standard deviation, where $\sigma_{\frac{\Delta E}{E}}$, $\sigma_{\frac{\Delta A}{A}}$, and $\sigma_{\frac{\Delta L}{L}}$ represent the standard deviations of the percentage changes in market value of equity capital, asset holdings, and liability claims, respectively.¹¹ Furthermore, $-1 \leq \rho \leq 1$ denotes the correlation between percentage value changes of assets and liability claims.¹²

$$\sigma_{\frac{\Delta E}{E}}^2 = \left(\frac{A}{E}\right)^2 \sigma_{\frac{\Delta A}{A}}^2 + \left(\frac{A}{E} - 1\right)^2 \sigma_{\frac{\Delta L}{L}}^2 - 2 \left(\frac{A}{E}\right) \left(\frac{A}{E} - 1\right) \rho \sigma_{\frac{\Delta A}{A}} \sigma_{\frac{\Delta L}{L}} \quad (9)$$

Equation 9 states the relationship in precise mathematical terms. It also incorporates the concept of correlation, which is an essential element of liability-driven investing. Exhibit 26 is a graphical representation of Equation 9 and illustrates the magnitude of the asset/liability correlation effect (ρ is measured on the x-axis) on the volatility of the financial institution's equity capital ($\sigma_{\frac{\Delta E}{E}}$ is measured on the y-axis) for various levels of leverage (the downward-sloping dotted lines). For purposes of this exhibit, the volatilities of asset and liability percentage value changes ($\sigma_{\frac{\Delta A}{A}}$, $\sigma_{\frac{\Delta L}{L}}$) are both assumed to be constant at 1.5%.

Exhibit 26 demonstrates that over the range of leverage shown (equity/assets ratios from 5% to 20%), the volatility of the financial institution's equity capital decreases as the correlation between asset and liability *value changes* (ρ) increases toward +1.0. This beneficial effect is most pronounced when the financial institution is highly leveraged.

For example, assuming leverage of 20% (assets/equity = 5x) and correlations (ρ) of 0.5 and then 0.9, the volatility of equity declines from 6.9% to 3.5%. However, if higher leverage is assumed, at 5% equity/assets, and ρ takes the same two values, then the decrease in volatility of equity from 29.3% to 13.2% is more dramatic.

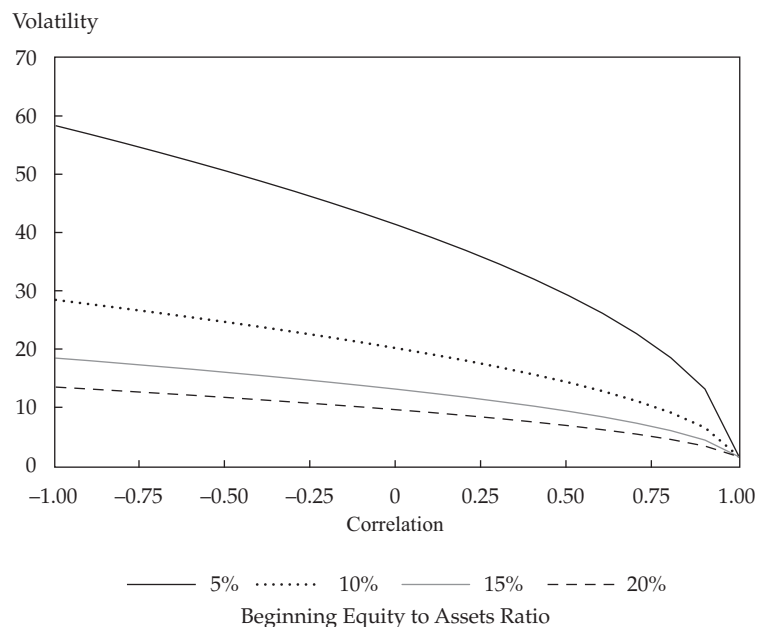
If the correlation between assets and liabilities is 1.0, the volatility of shareholders' equity capital shrinks to minimal amounts, even for high leverage (equity to assets = 5.0%). However, the flip side is that any divergence in correlations—such as can often occur in turbulent markets—causes equity volatility to increase and especially dramatically when leverage is high.

10 Most notably, the duration model does not reflect well on non-linear factors, such as convexity and embedded options in many fixed-income securities and derivatives.

11 The variance of any random variable is equal to the square of the standard deviation of the variable.

12 Transforming Equation 4 into Equation 9 follows the basic statistical property that, for any random variable Z , which is a linear sum of two other random variables X and Y (specifically, $Z = AX + BY$), the variance of Z is $\sigma_Z^2 = A^2 \sigma_X^2 + B^2 \sigma_Y^2 + 2AB\rho \sigma_X \sigma_Y$. This expression does not depend on the nature and shape of the underlying probability distributions of either X or Y .

Exhibit 26: Volatility of Value of Shareholders' Equity as a Function of Correlation of Asset and Liability Value Changes and Beginning Leverage



With the comprehensive framework provided by Equation 9, we next turn to a brief catalogue, shown in Exhibit 27, of how differing portfolio strategies and actions affect the inputs and thus the results of the volatility paradigm in Equation 9. Before doing so, however, it is important to note that hedging with derivatives, duration-based portfolio management and funding, and other techniques for raising the correlation between asset and liability values are not a cure-all. High correlations between assets and liabilities are not easy to achieve in practice, and often breakdown during periods of financial industry stress or stress in an individual institution. In the final analysis, techniques for raising correlations are not a pure substitute for maintaining adequate capitalization buffers.

Exhibit 27: Investment Strategies and Effects on Bank/Insurer Asset and Liability Volatility

Portfolio Strategy Considerations	Main Factors Affected	Explanation/Rationale	Additional Regulatory Concerns
Diversified fixed-income investments	Decreases $\frac{\sigma_{AA}}{A}$	Debt securities are less volatile than common equities, real estate, and other securities.	Effective diversification involves a multiplicity of issuers and industries, both domestic and foreign.
High-quality bond/debt investments	Decreases $\frac{\sigma_{AA}}{A}$	Overall, higher quality securities are less likely to be downgraded or default, thereby lessening the probability of significant loss of value through either losses or widening of credit spreads.	Regulatory structures and central banks favor sovereign issuers most for this reason.

Portfolio Strategy Considerations	Main Factors Affected	Explanation/Rationale	Additional Regulatory Concerns
Maintain reasonable balance between asset and liability durations, key rates durations, and sensitivity to embedded borrower and claimant options	Increases ρ	Requires more in-depth analysis than simple duration-matching strategy, because must account for convexity and asymmetric payoffs due to (i) defaults, (ii) principal payoffs prior to maturity, and (iii) annuity, life-insurance policy, and bank CD surrenders in high interest rate scenarios.	Regulatory structures penalize institutions with unjustifiable asset/liability mismatches.
Common Stock Investments	Increases $\frac{\sigma_{AA}}{A}$, typically decreases ρ	Equity and other high-volatility assets provide only slight diversification benefits while adding to volatility. Also, common stock returns do not correlate well with financial institution returns, which pushes correlation, ρ , away from 1.0 toward 0.0.	Most regulatory structures require 100% or more risk weighting for common stock investments thus, such investments are ineligible for backing financial liability issuance.
Derivatives transparency, collateralization	Decreases both $\frac{\sigma_{AA}}{A}$ and $\frac{\sigma_{AL}}{L}$ and increases ρ	Whether derivatives are used to hedge or synthesize (i) assets or (ii) liabilities, the more “plain vanilla” (and protected against counterparty default) they are, the less likely they will revalue in unexpected directions.	Transparency fosters regulatory “financial stress test” confidence. It also allows regulators and claimants to ascertain whether derivatives are being used in a justifiable manner.
Liquidity of portfolio investments	Decreases $\frac{\sigma_{AA}}{A}$	Includes short-maturity debt securities of highly rated issuers, currency reserves, access to credit lines, and access for banks to emergency central bank borrowing.	Problems occur for regulators when financial contagion extends beyond just a few institutions.
Surrender penalties	Decreases $\frac{\sigma_{AL}}{L}$	For typical life insurance, annuities, and bank deposits, such penalties cushion losses to financial institutions for having to pay back liabilities “at par” when rising interest rates would otherwise have reduced the discounted present value of the obligations.	Properly computed surrender penalties must account for interest rate volatility and slope of the yield curve. Typically, regulators/customers do not tolerate economically justified surrender penalties (they are usually priced too low to offset the institution’s risk).
Prepayment penalties on debt investments	Increases ρ	When interest rates are declining, borrowers must incur a penalty to repay loans at par to refinance. Also, prepayment penalties help institutions offset rising values of their fixed-rate liabilities in falling rate environments.	None.
Catastrophic insurance risks	Increases $\frac{\sigma_{AL}}{L}$	By definition, these losses faced by insurance companies are less predictable and possibly very large.	Regulators and insurance customers usually expect (i) higher capital ratios, (ii) higher quality and liquid investment portfolios, and (iii) strong reinsurance agreements compared with typical home, health, auto, and fire insurance.

Portfolio Strategy Considerations	Main Factors Affected	Explanation/Rationale	Additional Regulatory Concerns
Predictability of underwriting losses	Decreases $\frac{\sigma_{\Delta L}}{L}$	High frequency, low cost loss events caused by law of large numbers make total insurance liabilities less uncertain.	Adverse changes in legal or regulatory systems cannot be offset by actions on the asset side of the financial institution. These are risks borne by owners of the institution's equity capital.
Diversifying insurance business	Decreases $\frac{\sigma_{\Delta L}}{L}$	Diversifying across several business lines increases aggregate risk-reduction potential (due to law of large numbers).	None.
Variable annuities	Increases ρ , and $\frac{\sigma_{\Delta A}}{A}$, $\frac{\sigma_{\Delta L}}{L}$ diminish in relevance	Where equity/bond market risks are fully borne by policyholders, the correlation between asset and liability returns approaches 1.0, independent of investment performance of the underlying, segregated account assets.	Assuming adequate risk disclosure to policyholders, and sufficient asset custody protections, regulators permit greater investment flexibility than in insurer's standard business lines.

The last key implication of the aggregate risk framework in Equation 9 relates to the importance of raising equity capitalization externally. The ability to raise capital is not just the key to expanding operations; more importantly, it is a way of buffering financial uncertainty. It diminishes both the probability of default to liability holders and the total volatility of equity capitalization values.¹³ Over the past several decades, the financial industry has moved increasingly to publicly traded, for-profit, corporations, rather than mutual or membership co-ops. This is primarily because publicly traded companies can issue new common stock capital in cases of either opportunity or emergency. Mutual and membership co-ops (for example, credit unions) are restricted by the growth of their membership, which usually cannot change much over short periods of time.

EXAMPLE 8

Foresight International Assurance is an international multiline insurance conglomerate. Under its overall strategic financial plan, it computes the annualized standard deviation of returns on investment assets as 5.0% and on liabilities as 2.5%. The bulk of its liabilities are constituted by the net present value of expected claims payouts. The correlation between asset and liability returns is therefore a very low 0.25. Foresight's common equity to financial assets ratio is 20.0%.

¹³ Although raising equity ratios negatively impacts return on common equity (ROCE) and earnings per share of financial companies, the diminished volatility of earnings and economic value acts toward raising price-earnings and market-to-book ratios. Perhaps somewhat counterintuitively, the issuing of common stock by financial companies can be neutral or even a net benefit to pre-existing shareholders.

1. What is the standard deviation of changes in the value of Foresight's shareholder capitalization?

Solution:

We use Equation 9 recognizing that $A \div E = 1/0.20 = 5$; $(A \div E) - 1 = 4$; the standard deviation of asset returns $(\sigma_{AA}) = 0.05$; the standard deviation of changes in liability values $(\sigma_{LL}) = 0.025$; and the correlation between asset and liability value changes $(\rho) = 0.25$.

First, we compute the variance of shareholders' capital value changes:

$$\sigma_{\frac{AE}{E}}^2 = 5^2 \times 0.05^2 + 4^2 \times 0.025^2 - 2 \times 5 \times 4 \times 0.25 \times 0.05 \times 0.025 = 0.06.$$

The standard deviation of shareholder capital valuation change is the square root of the variance. Thus,

$$\sigma_{\frac{AE}{E}} = \sqrt{\sigma_{\frac{AE}{E}}^2} = \sqrt{0.06} = 0.245 = 24.5\% \text{ per year.}$$

2. Management believes the overall risk profile of the company is too high and desires to increase the common equity ratio by issuing additional shares of common equity and listing such shares on several international stock market exchanges. The new target equity ratio will be 25.0%. All other things being equal, how does this impact the volatility of value changes in shareholder capitalization?

Solution:

The new asset to equity ratio is $A \div E = 1/0.25 = 4$, and so $(A \div E) - 1 = 3$. Using the existing values of the other variables in Equation 9, we obtain

$$\sigma_{\frac{AE}{E}}^2 = 4^2 \times 0.05^2 + 3^2 \times 0.025^2 - 2 \times 4 \times 3 \times 0.25 \times 0.05 \times 0.025 = 0.038125.$$

from which we see $\sigma_{\frac{AE}{E}} = \sqrt{\sigma_{\frac{AE}{E}}^2} = \sqrt{0.038125} \approx 0.195 = 19.5\% \text{ per year.}$

3. Management believes it also needs to lower the volatility of its assets. It shifts out of low-quality bonds into higher quality, more liquid government securities and, by doing so, expects to lower the standard deviation of asset returns to 4.0% per year without having any impact on the correlation ratio between assets and liabilities. Along with the stronger capital ratios premised in question 2, what does this do to the volatility of shareholder equity value?

Solution:

Equation 9 now produces the following results:

$$\sigma_{\frac{AE}{E}}^2 = 4^2 \times 0.04^2 + 3^2 \times 0.025^2 - 2 \times 4 \times 3 \times 0.25 \times 0.04 \times 0.025 = 0.025225$$

from which we obtain $\sigma_{\frac{AE}{E}} = \sqrt{\sigma_{\frac{AE}{E}}^2} = \sqrt{0.025225} \approx 0.159 = 15.9\%.$

4. What is the impact of the various portfolio and capitalization changes on the value of Foresight's common shares outstanding? Explain your answer.

Solution:

We note that the proposed changes are likely to reduce earnings per share, first by having a greater number of shares outstanding and second by lowering the expected returns on assets (because there will now be a greater percentage of safer, lower yielding assets). All other things being equal, this would pressure the common stock price. However, Foresight is also lowering its overall equity risk exposure while strengthening its reputation as a more soundly operated and capitalized insurance company. The lower risk profile might well result in a higher credit rating and a lower discount rate at which the lower earnings per share trajectory is valued. Also, the improved long-term survivability and underwriting strength could result in a higher *long-term* growth outlook. In sum, the impact on common equity prices cannot be predicted merely by a change in capital structure and near-term reduction in earnings and portfolio expected returns.

22

BANKS AND INSURERS: IMPLEMENTATION OF PORTFOLIO DECISIONS



describe considerations affecting the balance sheet management of banks and insurers

With sovereign wealth funds, endowments, foundations, and employee benefit plans (DB and DC), the investment adviser must primarily focus on the investment of assets. In the case of financial institutions, optimal management must simultaneously focus on liabilities, particularly the volatility and convexity of asset and liability payouts. Consequently, the investment strategy of financial institutions must also consider the appropriate degree of leverage and total amount of common equity capital. Returning to the basic framework of Equations 2 and 4, the proper way to maximize long-term economic earnings thus might be to raise (lower) leverage through: (a) the acquisition (disposal) of portfolio assets; (b) the underwriting (retirement) of liabilities; or (c) the repurchase (issuance) of capital stock.

The financial management of a bank or insurer has not only to deal with the level and direction of interest rates, credit spreads, derivatives markets, economic cycles, and stock markets as they impact the investment portfolio, but we also now see it needs to have a keen understanding of the valuation of its own common equity and debt capital securities. Financial management also requires a view on the actions of competitors. For example, will they create a housing bubble through excessive lending to low-quality borrowers? Will they drive down insurance policy premiums through overly aggressive underwriting? Finally, financial management must satisfy all existing regulations as well as the ones that may evolve with changes in global economic circumstances and other political pressures.

In sum, financial and portfolio management of banks and insurance companies is an attempt to create positive net present value for capital holders by solving simultaneously several different conditions with several different variables. Consequently,

key decisions are typically made at the highest levels of the institution's management. Specific analysts and investment managers are typically assigned only to specialized subsets of the institution's varied assets and liabilities.

In such dynamically changing economic and regulatory environments, it is difficult to specify particular portfolio investment rules and policies. Therefore, the following mini-case studies are offered to provide illustrations of the types of high-level portfolio decisions that are required.

EXAMPLE 9

Mini-Case A:

A bank considers reducing its ownership of commercial loans in smaller businesses. These loans pay interest quarterly at various contractually pre-specified spreads above the floating market reference rate (MRR). The runoff of the loan portfolio through repayments, together with proceeds of outright sales and securitizations of other loans, are to be reinvested in a portfolio of fixed-rate government securities of comparable maturities. The securities will be hedged fully against general interest rate risk through the use of publicly traded options and futures on government securities. Additionally, hedging interest rate risk completely would create a synthetic variable rate asset. If interest rates rise, gains on hedges can be reinvested to raise overall portfolio income; if interest rates fall, losses on hedges will require some assets to pay counterparties, thereby lowering overall portfolio income.

1. How would this portfolio restructuring affect the asset/liability profile of the bank?
2. What is the expected impact on the volatility of bank shareholder equity valuation?
3. What is the likely impact on bank earnings?
4. What are reasons that argue in favor of this portfolio redeployment?

Solution to 1:

Switching from variable rate to fixed-rate assets of similar maturities increases the duration of the bank's overall portfolio. However, entering into hedging positions with futures and options on fixed-rate assets has the effect of shortening overall duration. As described, the net effect of the portfolio alteration likely should have little effect on the bank's existing asset/liability duration profile, because floating-rate corporate loans also have little price exposure in the event of rising or falling interest rates.

Solution to 2:

The overall volatility of assets and bank capitalization should decrease, because a hedged portfolio of government securities is more liquid than a portfolio of individual small business loans and also less subject to volatility arising from changes in credit default spreads on corporate loans.

Solution to 3:

Bank earnings would be expected to decline, independent of subsequent changes in the overall level of interest rates. This is because the yields on business loans, adjusting for expected default rates, are higher than on government securities, adjusting for the costs of hedging the government securities. Furthermore, if overall interest rates subsequently rise, the business loan portfolio would generate higher income to the bank. However, hedges on the government securities generate gains when interest rates rise—offsetting losses on the underlying

securities and thus permitting more money to be reinvested in now higher yielding government securities. Similarly, a decline in interest rates would lead to a loss on the hedges and a sale of appreciated underlying government securities to cover these hedge losses. The portfolio value is approximately unchanged, but the (reduced) ability to generate income has tracked interest rates downward. In sum, *changes* in overall interest rates impact income-generating ability similarly for both the loan portfolio and the hedged securities portfolio. This is the flip side of the coin; in other words, the two portfolios have similar modified durations. In any environment, the net yields on the hedged government securities are lower than on the business loans. Thus, bank net income is unambiguously lower because of the portfolio rebalancing.

Solution to 4:

Although the proposed redeployment is expected to lower bank earnings, there are at least three good reasons for this action, any of which would justify the decision: (a) the bank believes it needs to have a more liquid investment portfolio because of the risk of unexpected claims against assets; (b) the bank needs to raise its regulatory “equity to risky assets” ratio (by substituting low credit-risk for high credit-risk assets); and (c), the bank believes it will be able to reverse the trade in the future after a recession has driven up the effective default-adjusted spreads (i.e., driven down the prices) on small business loans. In all three rationales, overall volatility is expected to decline and the reduction in volatility is expected to provide a benefit that more than offsets the anticipated reduction in earnings. That is, the risk-adjusted return is projected to rise.

Mini-Case B:

A medium size insurance company plans to sell a large portion of its diversified, fixed-rate, investment-grade-rated securities in order to redeploy proceeds into a special purpose trust holding a diversified portfolio of automobile loans with original loan lives of 5 years. The loans are collateralized by direct liens on the vehicles, and the underlying borrowers meet minimum consumer credit scores set by a national credit rating agency. The underlying loans were randomly selected for the trust, and the collateral constitutes a nationwide sample of automobiles of different foreign and domestic manufacturers.

1. What does this transaction reveal about the regulatory capital of this insurer?
2. What key information must the insurer know about the automobile loans held by the trust in order to manage its asset/liability duration profile?
3. What external factors might the insurer need to consider with respect to the duration of trust assets?
4. What is the expected impact from the proposed investment transaction on (a) the insurer’s earnings, and (b), the overall volatility of the insurer’s common equity capitalization?

Solution to 1:

The portfolio redeployment reduces the insurer’s liquidity. Given that the insurer is able to undertake this action, the company has excess regulatory capital, because the underlying illiquid loans require more regulatory capital than high-quality/investment-grade, marketable, fixed-income securities.

Solution to 2:

The insurer must make actuarial projections of contractual cash flows from the auto loans, which must take into account full and partial pre-payments because of accidents, auto trade-ins, and loan defaults. The acceptable credit quality of the borrowers and the geographical and brand diversity contribute to the accuracy of such predictions. The overall asset/liability profile for the insurer might well change depending on how the projected modified duration of the auto loan receivables compares with the investment-grade marketable securities to be sold. A material difference might require management to undertake (a) changes in the modified duration of the insurance company's liabilities, such as by altering the maturities of future debt issuances; or (b), implementation of interest rate-hedging transactions.

Solution to 3:

The insurer must be concerned about an adverse change in the economic cycle, changes in technology, and/or energy prices—all of which could adversely impact the value of the auto loan receivables (as compared with the marketable securities portfolio to be sold) and which could undermine the cash flow assumptions made with respect to setting the company's overall asset/liability profile.

Solution to 4:

The portfolio redeployment is likely to raise the insurer's earnings, because the expected yield on the auto loans, net of credit losses, is higher than for investment-grade, liquid securities. However, the company is taking on more credit risk, which should translate into higher volatility of the value of assets and, thus, higher volatility of equity capitalization.

Mini-Case C:

Floating-rate securities, paying a fixed spread over the floating MRR, are trading at historically narrow yield spreads over MRR. In addition, issuers of these securities tend to be concentrated disproportionately in a small number of industries—notably in banks, insurers, and other financial services companies. A bank's investment manager considers selling the bank's portfolio holdings of these floating-rate securities, which have a 5-year maturity and trade at 0.1% over MRR. The proceeds will be used to buy more-diversified (by issuer type), investment-grade, fixed-rate securities that are selling at more normal spreads versus government bond yields of comparable duration (which trade at 1.0% over 5-year US Treasury bond yields). The fixed-rate securities portfolio is to be combined with pay-fixed/receive-floating interest rate swaps under standard mark-to-market collateralization terms. The 5-year interest rate swap terms permit one to receive MRR while paying 0.4% over Treasury yields.

1. What does the portfolio alteration do to required regulatory risk-based capital?
2. What might indicate that the bank's senior managers are more concerned about risks to equity capitalization than are regulators?
3. What is the expected effect on the bank's asset/liability profile?
4. What is the expected effect on expected earnings?
5. Summarize the rationale for the portfolio alteration.

Solution to 1:

To a first approximation, substituting one kind of marketable security for another should have little effect on regulatory risk-based capital requirements, because there is little apparent change in average credit quality. The new portfolio will

have more issuer and industry diversification than the securities being sold. Thus, under robust scenario simulation testing, the new portfolio should be somewhat more resistant to loss than the more-concentrated portfolio assets being sold.

Solution to 2:

The bank's senior managers appear to be concerned about systemic risk in the financial sector, especially since the securities the bank plans to sell are concentrated in the financial sector and are trading at unusually high prices (narrow spreads to MRR). Apart from interest rate risk, the probability of underperformance for financial company securities is higher than for a diversified portfolio of fixed-rate securities. In the bank's view, the prospective volatility of floating-rate bank assets—and thus, the company's own equity capital—is higher than what is reflected in the regulatory risk-weight framework, because the latter does not take into account relative price risk. Thus, from the bank's perspective, the proposed trade lowers asset and equity volatility.

Solution to 3:

Substituting fixed-rate securities in place of variable-rate securities tends to increase the modified duration of the bank's assets. However, entering into a pay-fixed/receive-floating swap is equivalent to creating a synthetic liability, which becomes (i) smaller as interest rates rise and (ii) greater as interest rates fall. The interest rate swap can be tailored to offset the tendency of the newly acquired fixed-rate securities to lose value as interest rates rise and gain value as interest rates fall. Said differently, the synthetic liability increases the duration of the bank's liabilities to counterbalance the rise in asset duration from replacing variable-rate with fixed-rate debt securities.

Solution to 4:

Earnings are expected to rise. The securities sold pay a low spread over MRR. The new package (fixed-rate securities plus pay-fixed/receive-floating interest rate swap) pays a higher expected spread over MRR. The high yield received on the fixed-rate securities, net of the fixed-rate leg of the interest rate swap paid, represents the new built-in spread that is then added to the MRR received in the floating-leg of the interest rate swap. Specifically, the new portfolio will (i) receive 5-year Treasury yield plus 1.0% on the fixed-rate securities, (ii) pay 5-year Treasury yield plus 0.4% on the fixed leg of the interest rate swap, and (iii) receive MRR on the floating side of the interest rate swap. The net result is that the hedged, fixed-rate holdings will pay the bank the 5-year Treasury yield $(T) + 1.0\% - (T + 0.4\%) + MRR = MRR + 0.6\%$. This synthetic floating-rate portfolio compares with the original floating-rate portfolio that paid just $MRR + 0.1\%$.

Solution to 5:

A pay-fixed/receive-floating interest rate swap is "plain vanilla"; it is easy to value and unwind. The trade would thus not have any major adverse impact on the institution's liquidity. The bank, by selling securities in the banking and financial services industry, can lower its own exposure to systemic financial risk. In essence, the trade achieves better diversification while creating cheap (i.e., higher yielding) synthetic MRR floaters in place of true MRR floaters. The regulatory system in which the bank operates likely has a statistical system that penalizes excessive use of derivatives by deeming worst-case liabilities in a stress test. This should not be an issue assuming the proposed trade is small enough, relative to the institution's size, to have no significant impact on stress test

results. Overall, the trade would be a duration-neutral trade, achieving higher net earnings and lower asset and equity risk without significantly impacting the bank's regulatory capital ratios.

Mini-Case D:

In the aftermath of prolonged financial turmoil and a recession, a large pan-European life insurance company believes that corporate debt securities and asset-based securities are now very attractive relative to more-liquid government securities. The yield spreads more than compensate for default and credit downgrade risk. Interest rates for government securities are near cyclical lows. The insurance company is concerned that rates may rise and that, as a result, many outstanding annuities might be surrendered. The insurer believes the probability of a large, adverse move in interest rates is much higher than is currently reflected by the implied volatility of traded options on government securities in the eurozone. The insurer's regulatory capital and reserves are deemed to be healthy.

1. What are the consequences of lowering allocations to government securities and raising allocations to corporate and asset-backed securities?
2. Are there steps that the insurer should take on the liability side?

Solution to 1:

These proposed asset reallocations have several implications. First, corporate debt securities have higher yields and thus shorter durations than government securities of similar maturity. Asset-backed securities tend to have lower effective durations than corporate and government bonds. Thus, the proposed rebalancing would likely lower the overall duration of the investment portfolio, which is consistent with the insurer's concerns about rising interest rates and the expected consequences. Second, the change in portfolio allocation would likely lower the company's overall liquidity and lower regulatory risk-based capital measures, because the new securities are treated less favorably for regulatory purposes (less liquid, higher credit risk corporate debt and asset-backed securities require a higher equity charge than liquid, low credit risk government securities, so regulatory "equity to risky assets" is reduced). Thus, the proposed portfolio moves make sense only if the regulatory capital position of the insurer is already ample and if the existing liquidity elsewhere in the portfolio is enough to fund an uptick of annuity surrenders in the case of rising interest rates. Finally, the reallocation would increase expected earnings (from higher interest income) and set the stage for price gains if credit spreads versus government securities contract to more normal levels.

Solution to 2:

Because overall interest rates are low, the company must also deal with an asymmetric risk separate and apart from the reallocation of its investment portfolio. In other words, the insurer must alter its liability profile in order to minimize potential adverse changes in its common equity capitalization. A spike up in interest rates could result in a rise in surrenders of annuities during a time when asset values are coming under pressure. Because the company is more concerned about higher interest rate volatility than is reflected in current option prices, the insurer might consider purchasing out-of-the-money puts on government securities and/or purchasing swaptions with the right to be a fixed-payer/floating-receiver. Sharp rises in rates would make both positions

profitable¹⁴ and offset some of the burden of premature annuity surrenders. If time passes without any substantial rise in interest rates, the cost of purchasing option protection would detract from the incremental benefits from the proposed switch into higher yielding securities.

SUMMARY

This reading has introduced the subject of managing institutional investor portfolios. The key points made in this reading are as follows:

- The main institutional investor types are pension plans, sovereign wealth funds, endowments, foundations, banks, and insurance companies. Common characteristics among these investors include a large scale (i.e., asset size), a long-term investment horizon, regulatory constraints, a clearly defined governance framework, and principal–agent issues.
- Institutional investors typically codify their mission, investment objectives, and guidelines in an Investment Policy Statement (IPS).
- Four common investment approaches to managing portfolios used by institutional investors are the Norway model, the Endowment model, the Canada model, and the Liability Driven Investing (LDI) model.
- There are two main types of pension plans: defined benefit (DB), in which a plan sponsor commits to paying a specified retirement benefit; and defined contribution (DC), in which contributions are defined but the ultimate retirement benefit is not specified or guaranteed by the plan sponsor.
- Pension plan stakeholders include the employer, employees, retirees, unions, management, the investment committee and/or board of directors, and shareholders.
- The key elements in the calculation of DB plan liabilities are as follows:
 - Service/tenure: The higher the service years, the higher the retirement benefit.
 - Salary/earnings: The higher the salary over the measurement period, the higher the retirement benefit.
 - Mortality/longevity: The longer the participant's expected life span, the higher the plan sponsor's liability.
 - Vesting: Lower turnover results in higher vesting, increasing the plan sponsor's liabilities.
 - Discount rate: A higher discount rate reduces the present value of the plan sponsor's liabilities.
- DB plan liquidity needs are driven by the following:
 - Proportion of active employees relative to retirees: More mature pension funds have higher liquidity needs.

¹⁴ A put option becomes valuable to the holder if prices of the underlying asset fall. A swaption with the right to enter a swap paying fixed and receiving floating is economically analogous to a put option on a bond. If rates rise, the swaption owner has the right to receive a rising stream of floating payments in exchange for what will have then become a stream of reasonably low fixed payments. The swaption contract will have gained in value.

- Age of workforce: Liquidity needs rise as the age of the workforce increases.
- Plan funded status: If the plan is well funded, the sponsor may reduce contributions, generating a need to hold higher balances of liquid assets to pay benefits.
- Flexibility: Ability of participants to switch among the sponsor's plans or to withdraw from the plan.
- Pension plans are subject to significant and evolving regulatory constraints designed to ensure the integrity, adequacy, and sustainability of the pension system. Some incentives, such as tax exemption, are only granted to plans that meet these regulatory requirements. Notable differences in legal, regulatory, and tax considerations can lead to differences in plan design from one country to another or from one group to another (e.g., public plans vs. corporate plans).
- The following risk considerations affect the way DB plans are managed:
 - Plan funded status
 - Sponsor financial strength
 - Interactions between the sponsor's business and the fund's investments
 - Plan design
 - Workforce characteristics
- An examination of pension fund asset allocations shows very large differences in average asset allocations by country and within a country despite these plans seeking to achieve similar goals. Such inter- and intra-national differences are driven by many factors, including the differences in legal, regulatory, accounting, and tax constraints; the investment objectives, risk appetites, and investment views of the stakeholders; the liabilities to and demographics of the ultimate beneficiaries; the availability of suitable investment opportunities; and the expected cost of living in retirement.
- The major types of sovereign wealth funds (SWFs) follow:
 - Budget Stabilization funds: Set up to insulate the budget and economy from commodity price volatility and external shocks.
 - Development funds: Established to allocate resources to priority socio-economic projects, usually infrastructure.
 - Savings funds: Intended to share wealth across generations by transforming non-renewable assets into diversified financial assets.
 - Reserve funds: Intended to reduce the negative carry costs of holding foreign currency reserves or to earn higher return on ample reserves.
 - Pension Reserve funds: Set up to meet identified future outflows with respect to pension-related, contingent-type liabilities on governments' balance sheets.
- Stakeholders of SWFs include the country's citizens, the government, external asset managers, and the SWF's management, investment committee and board of directors.
- Given their mission of intergenerational wealth transfer, SWFs do not generally have clearly defined liabilities, so do not typically pursue asset/liability matching strategies used by other institutional investor types.

- Sovereign wealth funds have differing liquidity needs. Budget stabilization funds require the most liquidity, followed by reserve funds. At the other end of the spectrum are savings funds with low liquidity needs, followed by pension reserve funds.
- The investment objectives of SWFs are often clearly articulated in the legislative instruments that create them. They are often tax free in their home country, though must take foreign taxation into consideration. Given their significant asset sizes and the nature of their stakeholders, SWFs have aimed to increase transparency regarding their investment activities. In this regard, the Santiago Principles are a form of self-regulation.
- The typical asset allocation by SWF type shows budget stabilization funds are invested mainly in bonds and cash given their liquidity needs. Reserve Funds invest in equities and alternatives but maintain a significant allocation of bonds for liquidity. Savings funds and pension reserve funds hold relatively higher allocations of equities and alternatives because of their longer-term liabilities.
- Endowments and foundations typically invest to maintain purchasing power while financing their supporting university (endowments) or making grants (foundations) in perpetuity—based on the notion of intergenerational equity. Endowments and foundations usually have a formal spending policy that determines how much is paid out annually to support their mission. This future stream of payouts represents their liabilities. For endowments, other liability-related factors to be considered when setting investment policy are: 1) the ability to raise additional funds from donors/alumni, 2) the percentage of the university's operating budget provided by the endowment, and 3) the ability to issue debt.
- Foundations and endowments typically enjoy tax-exempt status and face relatively little regulation compared to other types of institutional investors.
- Foundations face less flexible spending rules compared to endowments; foundations in the US are legally mandated to pay out 5% of their assets annually to maintain tax-exempt status. Endowments and foundations have relatively low liquidity needs. However, foundations have somewhat higher liquidity needs (vs. endowments), because they 1) typically pay out slightly more as a percentage of assets, and 2) finance the entire operating budget of the organization they support.
- Endowments and foundations typically have a long-term real return objective of about 5% consistent with their spending policies. This real return objective, and a desire to maintain purchasing power, results in endowments and foundations making significant allocations to real assets. In general, endowments and foundations invest heavily in private asset classes and hedge funds and have relatively small allocations to fixed income.
- Banking and insurance companies manage both portfolio assets and institutional liabilities to achieve an extremely high probability that obligations on deposits, guarantees, derivatives, policyholder claims, and other liabilities will be paid in full and on time.
- Banking and insurance companies have perpetual time horizons. Strategically, their goal is to maximize net present value to capital holders; tactically, this may be achieved by liability driven investing (LDI) over intermediate and shorter horizons.

- Financial institutions are highly regulated because of their importance to the non-financial, or real, sectors of the economy. Such institutions are also regulated in order to minimize contagion risk rippling throughout the financial and real sectors.
- The underlying premise of regulation is that an institution's capital must be adequate to absorb shocks to both asset and liability values. This implies limiting the volatility of value of the institution's shareholder capital.
- The volatility of shareholder capital can be managed by (a) reducing the price volatility of portfolio investments, loans, and derivatives; (b) lowering the volatility from unexpected shocks to claims, deposits, guarantees, and other liabilities; (c) limiting leverage; and (d) attempting to achieve positive correlation between changes in the value of assets and liabilities.
- Ample liquidity, diversification of portfolio and other assets, high investment quality, transparency, stable funding, duration management, diversification of insurance underwriting risks, and monetary limits on guarantees, funding commitments, and insurance claims are some of the ways management and regulators attempt to achieve low volatility of shareholder capital value.

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PRACTICE PROBLEMS

The following information relates to questions 1-5

Bern Zang is the recently hired chief investment officer of the Janson University Endowment Investment Office. The Janson University Endowment Fund (the Fund) is based in the United States and has current assets under management of \$12 billion. It has a long-term investment horizon and relatively low liquidity needs. The Fund is overseen by an Investment Committee consisting of board members for the Fund. The Investment Office is responsible for implementing the investment policy set by the Fund's Investment Committee.

The Fund's current investment approach includes an internally managed fund that holds mostly equities and fixed-income securities. It is largely passively managed with tight tracking error limits. The target asset allocation is 55% equities, 40% fixed income, and 5% alternatives. The Fund currently holds private real estate investments to meet its alternative investment allocation.

1. **Identify** the investment approach currently being used by the Investment Committee for managing the Fund. **Justify** your response.

Identify the investment approach currently being used by the Investment Committee for managing the Fund.
(circle one)

Norway Model	Endowment Model	Canadian Model	LDI Model
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Justify your response.

2. **Discuss** the advantages and the disadvantages of the investment approach currently being used by the Investment Committee.

Discuss the advantages and the disadvantages of the investment approach currently being used by the Investment Committee.

Advantages

Disadvantages

3. **Describe** how *each* of the following common characteristics of institutional investors supports the Fund's allocation to private real estate:
 - i. Scale
 - ii. Investment horizon
 - iii. Governance framework

Describe how *each* of the following common characteristics of institutional investors supports the Fund's allocation to private real estate.

Scale

Investment Horizon

Governance Framework

4. After a thorough internal review, Zang concludes that the current investment approach will result in a deterioration of the purchasing power of the Fund over time. He proposes a new, active management approach that will substantially decrease the allocation to publicly traded equities and fixed income in order to pursue a higher allocation to private investments. The management of the new investments will be outsourced.

Identify the new investment approach proposed by Zang for managing the Fund.
Justify your response.

**Identify the new investment approach proposed by Zang for managing the Fund.
(circle one)**

Norway Model

Endowment Model

Canadian Model

LDI Model

Justify your response.

5. After a thorough internal review, Zang concludes that the current investment approach will result in a deterioration of the purchasing power of the Fund over time. He proposes a new, active management approach that will substantially decrease the allocation to publicly traded equities and fixed income in order to pursue a higher allocation to private investments. The management of the new investments will be outsourced.

Discuss the advantages and the disadvantages of the new investment approach proposed by Zang.

Discuss the advantages and the disadvantages of the new investment approach proposed by Zang.

Advantages

Disadvantages

The following information relates to questions 6-12

William Azarov is a portfolio manager for Westcome Investments, an asset management firm. Azarov is preparing for meetings with two of Westcome's clients and obtains the help of Jason Boulder, a junior analyst. The first meeting is with Maglav Inc., a rapidly growing US-based technology firm with a young workforce and high employee turnover. Azarov directs Boulder to review the details of Maglav's defined benefit (DB) pension plan. The plan is overfunded and

has assets under management of \$25 million. Boulder makes the following two observations:

- Observation 1 Maglav's shareholders benefit from the plan's overfunded status.
- Observation 2 The funded ratio of Maglav's plan will decrease if employee turnover decreases.

Maglav outsources the management of the pension plan entirely to Westcome Investments. The fee structure requires Maglav to compensate Westcome with a high base fee regardless of performance. Boulder tells Azarov that outsourcing offers small institutional investors, such as Maglav's pension plan, the following three benefits:

Benefit 1: Regulatory requirements are reduced.

Benefit 2: Conflicts of interest are eliminated from principal–agent issues.

Benefit 3: Investors have access to a wider range of investment strategies through scale benefits.

In the meeting with Maglav, Azarov describes the investment approach used by Westcome in managing the pension plan. The approach is characterized by a high allocation to alternative investments, significant active management, and a reliance on outsourcing assets to other external asset managers. Azarov also explains that Maglav's operating results have a low correlation with pension asset returns and that the investment strategy is affected by the fact that the pension fund assets are a small portion of Maglav's market capitalization. Azarov states that the plan is subject to the Employee Retirement Income Security Act of 1974 (ERISA) and follows generally accepted accounting principles, including Accounting Standards Codification (ASC) 715, *Compensation—Retirement Benefits*.

Azarov's second meeting is with John Spintop, chief investment officer of the Wolf University Endowment Fund (the Fund). Spintop hired Westcome to assist in developing a new investment policy to present to the Fund's board of directors. The Fund, which has assets under management of \$200 million, has an overall objective of maintaining long-term purchasing power while providing needed financial support to Wolf University. During the meeting, Spintop states that the Fund has an annual spending policy of paying out 4% of the Fund's three-year rolling asset value to Wolf University, and the Fund's risk tolerance should consider the following three liability characteristics:

- Characteristic 1 The Fund has easy access to debt markets.
- Characteristic 2 The Fund supports 10% of Wolf University's annual budget.
- Characteristic 3 The Fund receives significant annual inflows from gifts and donations.

The Fund has a small investment staff with limited experience in managing alternative assets and currently uses the Norway model for its investment approach. Azarov suggests a change in investment approach by making an allocation to externally managed alternative assets—namely, hedge funds and private equity. Ten-year nominal expected return assumptions for various asset classes, as well as three proposed allocations that include some allocation to alternative assets, are presented in Exhibit 1.

Exhibit 1: 10-Year Nominal Expected Return Assumptions and Proposed Allocations

Asset Class	Expected Return	Allocation 1	Allocation 2	Allocation 3
US Treasuries	4.1%	45%	10%	13%
US Equities	6.3%	40%	15%	32%
Non-US Equities	7.5%	10%	15%	40%
Hedge Funds	5.0%	0%	30%	5%
Private Equity	9.1%	5%	30%	10%

Expected inflation for the next 10 years is 2.5% annually.

6. Which of Boulder's observations regarding Maglav's pension plan is correct?
 - A. Only Observation 1
 - B. Only Observation 2
 - C. Both Observation 1 and Observation 2
7. Which of the benefits of outsourcing the management of the pension plan suggested by Boulder is correct?
 - A. Benefit 1
 - B. Benefit 2
 - C. Benefit 3
8. Westcome's investment approach for Maglav's pension plan can be *best* characterized as the:
 - A. Norway model.
 - B. Canadian model.
 - C. endowment model.
9. The risk tolerance of Maglav's pension plan can be *best* characterized as being:
 - A. below average.
 - B. average.
 - C. above average.
10. Based on Azarov's statement concerning ERISA and ASC 715, which of the following statements is correct?
 - A. Maglav is not allowed to terminate the plan.
 - B. Maglav can exclude the plan's service costs from net income.
 - C. Maglav's plan must appear as an asset on Maglav's balance sheet.
11. The risk tolerance of the Wolf University Endowment Fund can be *best* characterized as:
 - A. below average.

- B. average.
 - C. above average.
12. Which proposed allocation in Exhibit 1 would be *most appropriate* for the Fund given its characteristics?
- A. Allocation 1
 - B. Allocation 2
 - C. Allocation 3
-

The following information relates to questions 13-15

The Prometheo University Scholarship Endowment (the Endowment) was established in 1950 and supports scholarships for students attending Prometheo University. The Endowment's assets under management are relatively small, and it has an annual spending policy of 6% of the five-year rolling asset value.

13. **Formulate** the investment objectives section of the investment policy statement for the Endowment.
14. Prometheo University recently hired a new chief investment officer (CIO). The CIO directs her small staff of four people to implement an investment policy review. Historically, the endowment has invested 60% of the portfolio in US equities and 40% in US Treasuries. The CIO's expectation of annual inflation for the next 10 years is 2.5%.
- The CIO develops nominal 10-year return assumptions for US Treasuries and US equities, which are presented in Exhibit 1.

Exhibit 1: Asset Class Return Assumptions

Asset Class	10-Year Return Assumptions
	(Nominal)
US Treasuries	4.0%
US Equities	7.4%

Discuss whether the current investment policy is appropriate given the Endowment's annual spending policy.

15. Upon completion of the investment policy review by her four-person staff, the CIO makes some recommendations to the Endowment's board regarding the investment objectives and asset allocation. One of her recommendations is to adopt the endowment model as an investment approach. She recommends investing 20% in private equity, 40% in hedge funds, 25% in public equities, and 15% in fixed income.
- Determine** whether the board should accept the CIO's recommendation. **Justify** your response.

Determine whether the board should accept the CIO's recommendation. (circle one)

Justify your response.

Accept

Reject

16. Fiona Heselwith is a 40-year-old US citizen who has accepted a job with Lyricul, LLC, a UK-based company. Her benefits package includes a retirement savings plan. The company offers both a defined benefit (DB) plan and a defined contribution (DC) plan but stipulates that employees must choose one plan and remain with that plan throughout their term of employment.

The DB plan is fully funded and provides full vesting after five years. The benefit formula for monthly payments upon retirement is calculated as follows:

- Final monthly salary \times Benefit percentage of 2% \times Number of years of service
- The final monthly salary is equal to average monthly earnings for the last five financial years immediately prior to the retirement date.

The DC plan contributes 12% of annual salary into the plan each year and is also fully vested after five years. Lyricul offers its DC plan participants a series of life-cycle funds as investment choices. Heselwith could choose a fund with a target date matching her planned retirement date. She would be able to make additional contributions from her salary if she chooses.

Discuss the features that Heselwith should consider in evaluating the two plans with respect to the following:

- i. Benefit payments
- ii. Contributions
- iii. Shortfall risk
- iv. Mortality/longevity risks

Discuss the features that Heselwith should consider in evaluating the two plans with respect to the following:

Benefit Payments

Contributions

Shortfall Risk

Mortality/ Longevity

Risks

17. Dianna Mark is the chief financial officer of Antiliaro, a relatively mature textile production company headquartered in Italy. All of its revenues come from Europe, but the company is losing sales to its Asian competitors. Earnings have been steady but not growing, and the balance sheet has taken on more debt in the past few years in order to maintain liquidity. Mark reviews the following facts concerning the company's defined benefit (DB) pension plan:

- The DB plan currently has €1 billion in assets and is underfunded by €100 million in relation to the projected benefit obligation (PBO) because of investment losses.
- The company to date has made regular contributions.

- The average employee age is 50 years, and the company has many retirees owing to its longevity.
- The duration of the plan's liabilities (which are all Europe based) is 10 years.
- The discount rate applied to these liabilities is 6%.
- There is a high correlation between the operating results of Antiliaro and pension asset returns.

Determine whether the risk tolerance of the DB plan is below average or above average. **Justify** your response with *two* reasons.

Determine whether the risk tolerance of the DB plan is below average or above average. (circle one)	Justify your response with <i>two</i> reasons.
Below Average	1.
Above Average	2.

18. Meura Bancorp, a US bank, has an equity capital ratio for financial assets of 12%. Meura's strategic plans include the incorporation of additional debt in order to leverage earnings since the current capital structure is relatively conservative. The bank plans to restructure the balance sheet so that the equity capitalization ratio drops to 10% and the modified duration of liabilities is 1.90. The bank also plans to rebalance its investment portfolio to achieve a modified duration of assets of 2.10. Given small changes in interest rates, the yield on liabilities is expected to move by 65 bps for every 100 bps of yield change in the asset portfolio.
- Calculate** the modified duration of the bank's equity capital after restructuring. **Show** your calculations.

SOLUTIONS

1.

**Identify the investment approach currently being used by the Investment Committee for managing the Fund.
(circle one)**

Norway Model	Endowment Model	Canadian Model	LDI Model
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Justify your response.

The investment approach currently used to manage the Fund's assets is the Norway model. This approach is characterized by a heavy allocation to public equities and fixed-income securities with little allocation to alternatives and largely passively managed assets with tight tracking error limits.

2.

Discuss the advantages and the disadvantages of the investment approach currently being used by the Investment Committee.

Advantages	Advantages of using the Norway model are that investment costs/fees are low, investments are transparent, manager risk is low, and there is little complexity for a governing board (the model is easy to understand).
Disadvantages	The disadvantage of using the Norway model is that there is limited potential for value-added (i.e., alpha from security selection skills), above-market returns.

3.

Describe how each of the following common characteristics of institutional investors supports the Fund's allocation to private real estate.

Scale	The Fund has \$12 billion of assets under management. Its relatively large size allows it access to a broad investment universe and to investments that have a high minimum investment size, such as private real estate.
Investment Horizon	Alternative investments, such as private real estate, require a long-term investment horizon. Janson, like most university endowments, has a long-term investment horizon and relatively low liquidity needs. This makes private real estate an appropriate investment and also helps the endowment maintain long-term purchasing power.
Governance Framework	Institutional investors usually operate under a formal governance framework. Janson has a well-structured governance framework that includes an Investment Committee that is part of the board overseeing the endowment's investment portfolio. This framework also includes an Investment Office that implements the investment policy approved by the Investment Committee. The decision to invest in private real estate had to go through an approval process that is set and maintained by the governance structure in place.

4.

Identify the new investment approach proposed by Zang for managing the Fund. (circle one)

Norway Model	Endowment Model	Canadian Model	LDI Model
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Justify your response.

The new investment approach proposed by Zang is the endowment model. This model is characterized by significant active management, a high allocation to alternative investments, and externally managed assets (which distinguishes it from the Canadian model, an approach that relies more on internally managed assets).

5.

Discuss the advantages and the disadvantages of the new investment approach proposed by Zang.

Advantages	The primary advantage of using the endowment model is a higher potential for value-added, above-market returns.
Disadvantages	The endowment model can be difficult to implement for small institutional investors because they might not be able to access high-quality managers. The endowment model may also be difficult to implement for a very large institutional investor because of the institutional investor's very large footprint. Furthermore, relative to the Norway model, the endowment model is more expensive in terms of costs/fees.

6. C is correct. Both observations are correct. For a corporate defined benefit plan, Maglav's shareholders are stakeholders. These stakeholders are interested in the sustainability of the pension plan, and the overfunded status is an asset on the balance sheet, potentially increasing the value of Maglav's stock. The overfunded status also allows management to potentially lower employer contributions to the plan and increase net income. It also lowers financial risk, which may reduce volatility in the stock price. In addition, decreasing employee turnover will increase plan liabilities and worsen the funded ratio. With high turnover, fewer workers will be vested and entitled to defined benefit payments. Conversely, if employee turnover decreases, expected vesting will increase, leading to higher plan liabilities and a lower funded ratio.
7. C is correct. Scale (asset size) is a defining characteristic for institutional investors since it affects key aspects of the investment process. Maglav's pension plan is small, with \$25 million in assets under management. Smaller institutions may be unable to access certain investments that have a high minimum investment, such as private equity and real estate assets. These smaller institutions may also have difficulty in hiring skilled investment professionals. As a result, small institutional investors, such as Maglav's pension plan, are more likely to outsource all or most of the investment operations to external asset managers or investment consultants.
8. C is correct. The endowment model operates in an asset-only context and is characterized by a high allocation to alternative investments, including private investments and hedge funds; significant active management; and outsourcing to external managers. These characteristics describe the investment approach used by Westcome. The skill in sourcing alternative investments is critically important given the large variation in performance among asset managers, especially for alternative investments.

9. C is correct. The risk tolerance for Maglav's defined benefit plan is high and thus above average. Several factors influence the plan sponsor's ability to assume risk. For Maglav, the overfunded status of the pension fund allows the plan to withstand more volatility, and its small size relative to the company size implies greater risk tolerance. The low correlation of Maglav's operating results with pension asset returns also results in greater risk tolerance. Finally, the workforce characteristics imply greater risk tolerance. The younger workforce increases the duration of the plan liabilities and enables the sponsor to take on more liquidity risk. The high turnover of the workforce means fewer employees may be vested, reducing the number of employees entitled to receive defined benefit payments. All these factors contribute to an above average risk tolerance for Maglav's defined benefit plan.
10. C is correct. ASC 715, *Compensation—Retirement Benefits* requires that an overfunded (underfunded) plan appear as an asset (liability) on the balance sheet of the corporate sponsor. Maglav's plan is overfunded, so it appears as an asset on Maglav's balance sheet.
11. C is correct. The risk tolerance of the Wolf University Endowment Fund is above average since endowments that support a small percentage of the university's operating budget (10% in this case) should be able to tolerate more market, credit, and liquidity risk. In addition, the Fund's ability to access debt markets, especially during periods of market stress, increases the level of risk the endowment can accept in its investments. Finally, because of the significant inflows from gifts and donations, the effective spending rate will be lower than the annual spending policy of paying out 4% of the Fund's three-year rolling asset value. Thus, the Fund can rely less on investment returns to generate the income stream needed to support the university and can accept higher-risk investments.
12. C is correct. Allocation 3 is the most appropriate allocation for the Fund. The annual expected returns for the three allocations are as follows:

$$\begin{aligned}\text{Allocation 1 exp. return} &= (0.45 \times 4.1\%) + (0.40 \times 6.3\%) + (0.10 \times 7.5\%) + (0.05 \\ &\quad \times 9.1\%) \\ &= 5.57\%.\end{aligned}$$

$$\begin{aligned}\text{Allocation 2 exp. return} &= (0.10 \times 4.1\%) + (0.15 \times 6.3\%) + (0.15 \times 7.5\%) + (0.30 \\ &\quad \times 5.0\%) + (0.30 \times 9.1\%) \\ &= 6.71\%.\end{aligned}$$

$$\begin{aligned}\text{Allocation 3 exp. return} &= (0.13 \times 4.1\%) + (0.32 \times 6.3\%) + (0.40 \times 7.5\%) + (0.05 \\ &\quad \times 5.0\%) + (0.10 \times 9.1\%) \\ &= 6.71\%.\end{aligned}$$

The real return for Allocation 1 is 3.07% ($= 5.57\% - 2.50\%$), and the real return for Allocation 2 and Allocation 3 is 4.21% ($= 6.71\% - 2.50\%$).

Therefore, Allocation 1 is not appropriate because the expected real rate of return is less than the annual spending rate of 4%. With expected spending at 4%, the purchasing power of the Fund would be expected to decline over time with Allocation 1.

Allocations 2 and 3 both offer an expected real rate of return greater than the annual spending rate of 4%. Thus, the purchasing power of the Fund would be expected to grow over time with either allocation. However, Allocation 3 is more appropriate than Allocation 2 because of its lower allocation to alternative assets (hedge funds and private equity). The total 60% allocation to alternative assets

in Allocation 2 is well above the 15% allocation in Allocation 3 and is likely too high considering the Fund's small investment staff and its limited experience with managing alternative investments. Also, given the Fund's relatively small size of assets under management (\$200 million), access to top hedge funds and private equity managers is likely to be limited.

13. The mission of the Prometheo University Scholarship Endowment is to provide scholarships for students attending the university. In order to achieve this mission, the Endowment must maintain the purchasing power of the assets in perpetuity while achieving investment returns sufficient to sustain the level of spending necessary to support the scholarship budget. Therefore, the investment objective of the endowment should be to achieve a total real rate of return (after inflation) of at least 6% with a reasonable level of risk.

14. GUIDELINE ANSWER:

- The policy is not appropriate.
- The expected real return of 3.54% is less than the spending policy rate of 6%.
- Therefore, the current allocation and investment objectives are not sustainable.

The nominal expected return on the current portfolio, according to the nominal return assumptions in Exhibit 1, is 6.04% per year ($0.6 \times 7.4\% + 0.4 \times 4.0\% = 6.04\%$). The expected real return is approximately 3.54% ($6.04\% - 2.5\% = 3.54\%$), which is below the 6% spending rate and the stated objective of a 6% real return. Therefore, this real return is not sufficient to meeting the spending policy, which makes the Endowment's goals unsustainable. The Endowment will need to change its asset allocation to earn higher returns and/or lower its spending policy rate.

15.

Determine whether the board should accept the CIO's recommendation. (circle one)	Justify your response.
Accept Reject	The board should reject the CIO's recommendation. This recommendation is a significant departure from current practice and entails a much higher level of risk. The size of the investment team is small, with only four people, and it may not have adequate access to or experience in alternative investments. Given the relatively small size of the Endowment, it is unlikely that it has access to top managers in the hedge fund and private equity spaces.

16.

Discuss the features that Heselwith should consider in evaluating the two plans with respect to the following:

Benefit Payments	Heselwith notes that the vesting schedule with regard to the company's contributions is the same in both plans, although her contributions in the DC plan are vested immediately. The DB plan provides a defined payment linked to final salary and years of service, whereas the DC plan provides an uncertain benefit based on Lyricul's and Heselwith's contributions as well as the investment performance of the plan assets.
Contributions	Lyricul's contribution rate to the DB plan is not known, but the plan is fully funded. However, there is no guarantee that it will remain fully funded or that Lyricul is committed to maintaining the DB plan's fully funded status. The rate for the DC plan is stated to be 12% of annual salary.
Shortfall Risk	Heselwith notes that the shortfall risk of plan assets being insufficient to meet her retirement benefit payments falls to her employer, Lyricul, with the DB plan. However, for the DC plan, the shortfall risk falls to her and depends on the 12% contribution rate from the company, plus any additional contributions she chooses to make, as well as the performance of the chosen investments.
Mortality/ Longevity Risks	The DB plan pools mortality risk such that those in the pool who die prematurely leave assets that help fund benefit payments for those who live longer than expected. Heselwith bears the risk of outliving her savings with the DC plan.

17.

Determine whether the risk tolerance of the DB Plan is below average or above average. (circle one)

Justify your response with two reasons.

Below Average

- The plan is underfunded, and the discount rate being used is fairly aggressive.
- 1. The DB plan already has a deficit, despite regular contributions, and is suffering from investment losses. The discount rate is already aggressive and should not be increased to lower the contribution.
- The uncertain financial condition of the company.
- 2. The uncertain condition of Antiliaro may constrain its ability to make contributions to the DB plan. Lack of earnings growth and increasing debt on the balance sheet over the last few years imply below-average risk tolerance.

Determine whether the risk tolerance of the DB Plan is below average or above average. (circle one)

Justify your response with two reasons.

Above Average

- The plan suffers from investment losses.
- 3. Often, investment losses can lead a DB plan to take on more investment risk to achieve higher returns, but the other constraints, such as the plan's underfunded status and the company's financial condition, prevent this approach.
- The older age of employees necessitates liquidity.
- 4. The average employee age is 50 years, and the company has many retirees because of its longevity. These characteristics generate a need for liquidity, which lowers the amount of risk the plan can assume.
- The high correlation between the operating results of Antiliaro and pension asset returns lowers the risk tolerance of the pension plan.
- 5. The high correlation between the operating results of Antiliaro and the pension asset returns suggests a low risk tolerance. If Antiliaro is performing poorly as a company, this will constrain its ability to make additional contributions that may be necessary to address the shortfall in the pension's funding.

18. The modified duration of the bank's equity capital after restructuring is 9.89 years:

$$\begin{aligned}
 D_E^* &= \left(\frac{A}{E}\right) D_A^* - \left(\frac{A}{E} - 1\right) D_L^* \left(\frac{\Delta i}{\Delta y}\right) \\
 &= \left(\frac{1}{0.10}\right) \times 2.10 - \left(\frac{1}{0.10} - 1\right) \times 1.90 \times 0.65 \\
 &= 9.89 \text{ years}
 \end{aligned}$$