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Level III – Portfolio Management for Institutional Investors

Portfolio Management for Institutional Investors

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3. Overview of Investment Policy
4. Pension Funds
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2. Institutional Investors: Common Characteristics

The main institutional investor types are:

- Pension plans
- Sovereign wealth funds
- Endowments
- Foundations
- Banks
- Insurance companies

1. Scale
2. Long-Term Investment Horizon
3. Regulatory Frameworks
4. Governance Framework
5. Principal-Agent Issues

2.1 Scale

- Scale can range from relatively small (less than USD 25 million) to relatively large (more than USD 10 billion)
- Challenges of small institutions
 - Unable to access certain investments
 - Hiring skilled investment professionals might be difficult
- Challenges of very large institutions
 - Unable to invest in capacity constrained asset classes
 - Higher trading costs

2.2 Long-Term Investment Horizon

- Pension funds, sovereign wealth funds, endowments, and foundations have:
 - Long investment horizons
 - Low liquidity needs
 - Modest cash needs as a percentage of AUM
- Banks and insurance companies
 - Asset/liability focused
 - Operate within tight regulatory framework designed to ensure capital adequacy

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2.3 Regulatory Frameworks

- Institutional investors are subject to legal, regulatory, tax and accounting frameworks
 - Frameworks define set of rules that must be followed
 - Rules vary by national jurisdiction and complexity; rules are often evolving
 - Some regulatory bodies supervise institutional investors globally
- Key drivers of legal and regulatory framework
 - Investor protection
 - Safety and soundness of financial institutions
 - Integrity of financial market
 - 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)
 - 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



2.4 Governance Framework

- Institutional investors typically operate under a formal governance structure
 - Board of directors sets long-term asset allocation
 - Investment programs are implemented through an investment office
- Decision on whether to manage investments in-house depends on:
 - Size of assets under management
 - Capability of internal resources
 - Desire to pursue custom strategies
- Pension funds, sovereign wealth funds, endowments, and foundations often outsource some elements of the investment function
- Banks and insurance companies undertake most investment-related activities in house

2.5 Principal-Agent Issues

- Institutional investors frequently experience principal-agent issues
- Agents might be internal or external
- Example: external agents might charge high fees despite poor performance
- Principal-agent issues can be addressed through strong governance and high levels of accountability

3. Overview of Investment Policy

The IPS documents an institution's mission, investment objectives, constraints and guidelines

Investment objectives are based on the organization's overall mission

- DB pension fund: maintain funded ratio in excess of 100%
- Endowment fund: maintain long-term purchasing power while providing needed financial support
- Bank: maximize NPV while balancing several factors

Investment objectives should be consistent with an organization's risk tolerance and other constraints

- DB pension fund: surplus volatility
- Endowment fund: volatility of total returns
- Bank: VaR, CVaR, stress tests

Strategic asset allocation is based on desired risk and return characteristics

Exhibit 1: Common Investment Approaches Used by Institutional Investors

Investment Approach	Description
Norway Model	<p>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.</p> <p>Pros: Low cost, transparent, suitable for large scale, easy for board to understand.</p> <p>Cons: Limited value-added potential.</p>
Endowment Model	<p>Characterized by high alternatives exposure, active management and outsourcing.</p> <p>Pros: High value-added potential.</p> <p>Cons: Expensive and difficult to implement for most sovereign wealth funds because of their large asset sizes.</p>
Canada Model	<p>Characterized by high alternatives exposure, active management, and insourcing.</p> <p>Pros: High value-added potential and development of internal capabilities.</p> <p>Cons: Potentially expensive and difficult to manage.</p>
Liability Driven Investing (LDI) Model	<p>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).</p> <p>Pros: Explicit recognition of liabilities as part of the investment process.</p> <p>Cons: Certain risks (e.g., longevity risk, inflation risk) may not be hedged.</p>

4. Pension Funds

Pension funds are long-term saving and investment plans designed to accumulate sufficient assets to provide for the financial needs of retirees

1. Stakeholders
2. Liabilities and Investment Horizon
3. Liquidity Needs
4. External Constraints Affecting Investment
5. Risk Considerations of Private Defined Benefit Pension Plans
6. Investment Objectives
7. Asset Allocation by Pension Plans

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).

4.1 Stakeholders

Defined Benefit Pension Plan Stakeholders	
Plan sponsor (employer, CFO)	Want to 1) minimize employer contribution and 2) manage volatility of employer contribution Bears risk of portfolio falling short of meeting liabilities
Plan beneficiaries	Employees and retirees want sponsor to make timely and sufficient plan contributions
CIO and investment staff	Want to meet investment objectives and constraints as documented in the IPS Should have variable compensation based on investment performance
Investment committee and/or board	Fiduciary responsibility towards plan beneficiaries Should set investment strategy; responsible for asset manager selection
Company shareholders	If plan is underfunded the shortfall becomes a liability and reduces the value of the company
Governments, taxpayers	Might bear risk if sponsor defaults
Defined Contribution Pension Plan Stakeholders	
Plan beneficiaries (participant)	Each participant has an individual account into which contributions are made on a regular basis Participant must ensure 1) adequate contributions are made and 2) appropriate investment options are selected; individual participant bears investment risk
Plan sponsor (employer)	Offer suitable investment options, select administrative providers Make contributions if required
Governments, taxpayers	If participant outlives plan (longevity risk), the government might have to pay

4.2 Liabilities and Investment Horizon (DB Plans)

DB plan liabilities: present value of future payments to be made to beneficiaries.

- Service/tenure
- Vesting
- Salary/earnings
- Mortality/longevity
- Discount rate

Major objective is to have sufficient assets to cover future benefit payments

Funded ratio = Fair value of plan assets / PV of defined benefit obligations

Considerations in DB pension design

Pension plan size relative to sponsor's balance sheet size

Cyclical nature of plan sponsor's core business

Investment Horizon Considerations

- Portion of retirees relative to active lives
- Sponsors ability to tolerate volatility of contribution rates

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4.2 Liabilities and Investment Horizon (DC Plans)

Liabilities of DC plan sponsors are equal to required contributions

DC plan assets are typically pooled

Sponsor invests according to investment choices selected by plan participants

Investment Horizon

DC plan participants have different time horizons

In some countries DC plan participants have a life-cycle option

1. Participant-switching life-cycle options
2. Participant/cohort option

4.3 Liquidity Needs

A pension plan's liquidity needs are driven by the following:

- Proportion of active employees relative to retirees
- Age of workforce
- Plan funded status
- Flexibility

Example 1: Comparing DB and DC Pension Plans

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. Having 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.

- 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.

4.4 External Constraints Affecting Investment

Legal and Regulatory Constraints

- Pension plans are subject to significant and evolving regulatory constraints
- Objective of regulations is to ensure the integrity, adequacy, and sustainability of the pension system
- Regulations vary from country to country
 - Some countries specify minimum and maximum percentage allocations to certain asset classes
 - Some countries require a minimum contribution rate if funded ratio falls below 100%
 - Some regulators require detailed reporting and transparency

Tax and Accounting Constraints

- Governments provide favorable tax treatment to retirement savings
- Incentives, such as tax exemption, are only granted to plans that meet 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)

4.5 Risk Considerations of Private Defined Benefit Pension Plans

Category	Variable	Explanation
Plan status	Plan funded status (surplus or deficit)	Higher pension surplus or higher funded status implies potentially greater risk tolerance.
Sponsor financial status and profitability	Debt to total assets	Lower debt ratios and higher current and expected profitability imply greater risk tolerance.
	Current and expected profitability	
	Size of plan compared to market capitalization of sponsor company	Large sponsor company size relative to pension plan size implies greater risk tolerance.
Sponsor and pension fund common risk exposures	Correlation of sponsor operating results with pension asset returns	The lower the correlation, the greater the risk tolerance, all else equal.
Plan features	Provision for early retirement	Such options tend to reduce the duration of plan liabilities, implying lower risk tolerance, all else equal.
	Provision for lump-sum distributions	
Workforce characteristics	Age of workforce Active lives relative to retired lives	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.

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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.

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 to 1:

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

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

Solution to 2:

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.

4.6 Investment Objectives

Defined Benefit Pension Plans

- Primary objective: achieve long-term target return over a specified investment horizon with an appropriate level of risk which allows plan to meet contractual liabilities
 - Achieve long-term rate of return > return assumed by pension plan actuaries
 - Return objective will depend on funded status
- Secondary objective: minimize present value of expected cash contributions

Defined Contribution Pension Plans

- Primary objective: prudently grow assets that will support spending needs in retirement
- If there is active management a secondary objective would be to outperform the benchmark
- For some DC plans it is important that investment options outperform other DC 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.

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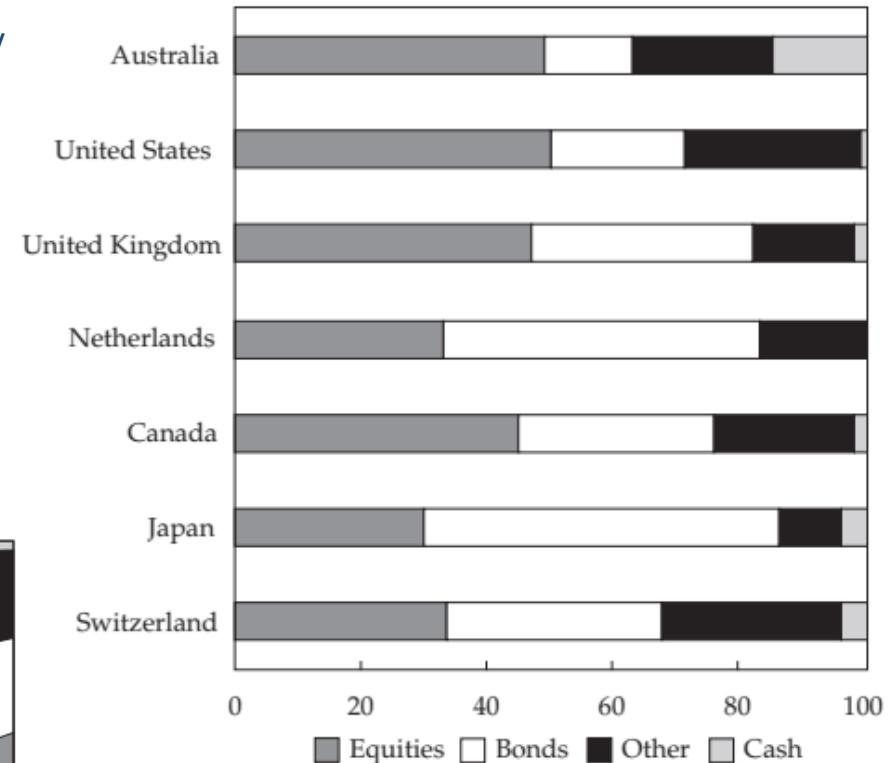
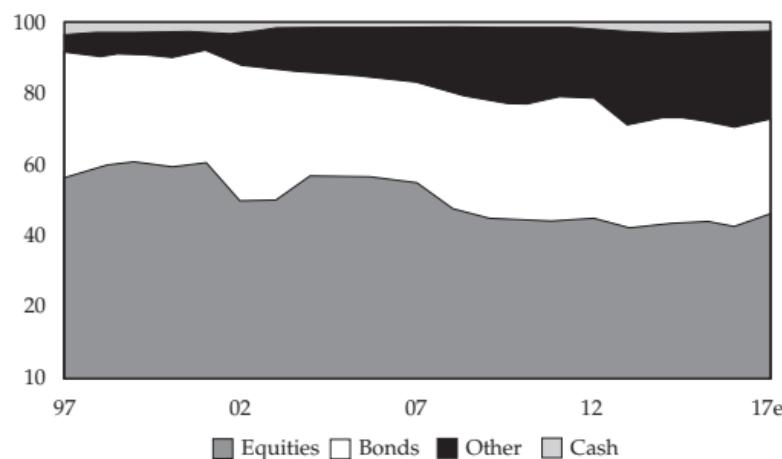


4.7 Asset Allocation by Pension Plans

Most pension plans have similar goals, but asset allocations vary considerably

This is because of differences in:

- Legal, regulatory, accounting, and tax constraints
- 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
- The expected cost of living in retirement



Source: Willis Towers Watson Thinking Ahead Institute (2018).

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Example 3: Asset Allocation by a Public Defined Benefit Plan (1/2)

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?

Example 3: Asset Allocation by a Public Defined Benefit Plan (2/2)

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.

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5. Sovereign Wealth Funds

Sovereign wealth funds (SWFs) are state-owned investment funds or entities that invest in financial or real assets.

Fund Type	Objective
Budget stabilization	Insulate the budget and economy from commodity price volatility and external shocks
Development	Allocate resources to priority socioeconomic projects, usually infrastructure; diversify the economy
Savings	Share wealth across generations by transforming non-renewable assets into diversified financial assets
Reserve	Reduce the negative carry costs of holding foreign currency reserves or to earn higher return on ample reserves
Pension reserve	Meet identified future outflows with respect to pension-related, contingent-type liabilities on governments' balance sheets

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5. Investment Objectives
6. Asset Allocation by Sovereign Wealth Funds

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5.1 Stakeholders

- Current citizens
- Future citizens
- The government
- External asset managers
- The SWF's management
- Investment committee and board of directors

5.2 Liabilities and Investment Horizons

SWFs do not generally have clearly defined liabilities and do not typically pursue asset/liability matching strategies

Fund Type	Objective	Liabilities	Investment Horizons
Budget stabilization	Insulate the budget and economy from commodity price volatility and external shocks	Uncertain liabilities	Relatively short
Development	Allocate resources to priority socioeconomic projects, usually infrastructure; diversify the economy	Not clearly defined; uncertain economic growth	Long-term for infrastructure or industrial development projects; medium-term for medical research fund
Savings	Share wealth across generations by transforming non-renewable assets into diversified financial assets	Not clearly defined Wealth for future generations Some funds might have a spending policy	Long-term
Reserve	Reduce the negative carry costs of holding foreign currency reserves or to earn higher return on ample reserves	Typically have a nominal or real return target	Very long-term
Pension reserve	Meet identified future outflows with respect to pension-related, contingent-type liabilities on governments' balance sheets	Future taxpayer burden	Variable and uncertain

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5.3 Liquidity Needs

Fund Type	Objective	Investment Horizons	Liquidity Needs
Budget stabilization	Insulate the budget and economy from commodity price volatility and external shocks	Relatively short	High
Development	Allocate resources to priority socioeconomic projects, usually infrastructure	Variable	Depend on development initiatives
Savings	Share wealth across generations by transforming non-renewable assets into diversified financial assets	Long-term	Low
Reserve	Reduce the negative carry costs of holding foreign currency reserves or to earn higher return on ample reserves	Long-term	Lower than budget stabilization funds Higher than savings funds
Pension reserve	Meet identified future outflows with respect to pension-related, contingent-type liabilities on governments' balance sheets	Variable and uncertain	Low during accumulation phase High during decumulation phase

Lowest
Liquidity
Requirement



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5.4 External Constraints Affecting Investment

Legal and Regulatory Constraints

Typically established by national legislation that contains details on:

- fund's mission
- contributions to the fund
- circumstances allowing withdrawals from the fund
- governance structure and level of board independence

International Forum of SWFs (IFSWF) and the “Santiago Principles”

Transparency of investment activities

Tax and Accounting Constraints

Typically given tax free status by the legislation that governs them

Foreign taxes might apply

5.5 Investment Objectives

The investment objectives of SWFs are often clearly articulated in the legislative instruments that create them.

Fund Type	Objective	Investment Objective
Budget stabilization	Insulate the budget and economy from commodity price volatility and external shocks	Deliver returns in excess of inflation with a low probability of a negative return in any given year; avoid cyclical assets whose returns are highly correlated to the main sources of government revenue
Development	Allocate resources to priority socioeconomic projects, usually infrastructure	Achieve a real rate of return in excess of real domestic GDP or productivity growth
Savings	Share wealth across generations by transforming non-renewable assets into diversified financial assets	Maintain purchasing power of the assets in perpetuity while achieving investment returns sufficient to sustain the spending necessary to support ongoing governmental activities
Reserve	Reduce the negative carry costs of holding foreign currency reserves or to earn higher return on ample reserves	Achieve a rate of return above the return the government must pay on its monetary stabilization bonds
Pension reserve	Meet identified future outflows with respect to pension-related, contingent-type liabilities on governments' balance sheets	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

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

Solution to 1:

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.

Solution to 2:

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.

5.6 Asset Allocation by Sovereign Wealth Funds

Development funds operate under a national mandate

Budget stabilization funds invest mainly in bonds and cash

Reserve Funds invest in equities and alternatives but maintain a significant allocation of bonds for liquidity

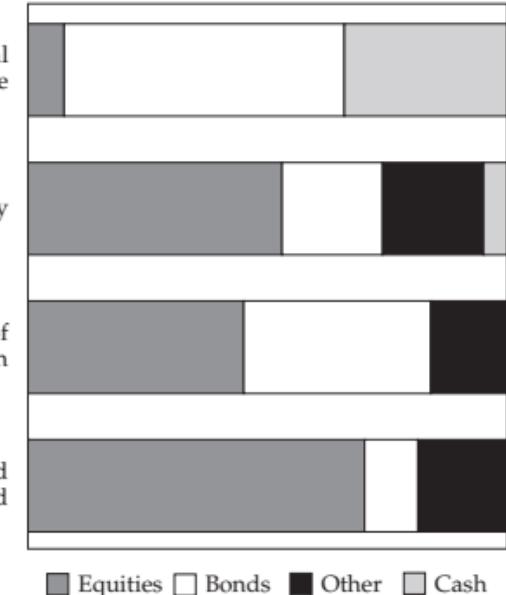
Savings funds and pension reserve funds hold relatively higher allocations of equities and alternatives because of their longer-term liabilities

Budget Stabilization Funds - Economic and Social Stabilization Fund of Chile

Savings Funds - Abu Dhabi Investment Authority

Reserve Investment Funds - Government of Singapore Investment Corporation

Pension Reserve Funds - New Zealand Superannuation Fund



■ Equities □ Bonds ■ Other □ Cash

Sources: 1. Economic and Social Stabilization Fund of Chile website; 2. Abu Dhabi Investment Authority (ADIA), 2015 Review; 3. Government Investment Corporation (GIC), *Report on the Management of the Government's Portfolio for the Year 2016/17*; 4. NZSUPERFUND, New Zealand Superannuation Fund Annual Report 2017.

6. University Endowments and Private Foundations (1/2)

Endowments

Funded through gifts and donations

Help institutions cover a percentage of their operating costs

Main objective is to provide intergenerational equity

Foundations

Nonprofit organizations

Typically make grants to organizations engaged in charitable activities

Four types of foundations

1. Community foundations: These are charitable organizations that make social or educational grants for the benefit of a local community. 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.

6. University Endowments and Private Foundations (2/2)

1. University Endowments—Stakeholders
2. University Endowments—Liabilities and Investment Horizon
3. University Endowments—Liquidity Needs
4. Private Foundations—Stakeholders
5. Private Foundations—Liabilities and Investment Horizon
6. Private Foundations—Liquidity Needs
7. External Constraints Affecting Investment
8. Investment Objectives
9. Asset Allocation

6.1 University Endowments—Stakeholders

Stakeholders

- Current and future students
- Alumni
- Current and future faculty and administrators
- Larger university community

General points

- Tradeoff between current spending and future needs
- Stakeholders have representation on endowment board or investment committee
- Funded by gifts and donations by alumni
- Endowments provide financial stability and continuity
- Allow for long-term capital projects

6.2 University Endowments—Liabilities and Investment Horizon

Endowments usually have a formal spending policy; future stream of payouts represents the liabilities

Three types of endowment spending policies:

1. Constant growth rule
2. Market value rule
3. Hybrid rule

$$SA_{t+1} = w \times [SA_t \times (1 + \text{Inflation Rate})] + (1 - w) \times \text{Spending Rate} \times \text{Average AUM}$$

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
3. the ability to issue debt

The investment horizon is infinite

6.3 University Endowments – Liquidity Needs

- Liquidity needs are relatively low compared to foundations
- Net spending is 2% - 4% of assets
- High risk tolerance

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6.4 Private Foundations—Stakeholders

Stakeholders

- Founding family
- Donors
- Grant recipients
- Broader community
- Government

General Points

- Tradeoff between current spending and future needs
- Board members are individuals involved in grant making, not necessarily investment professionals
- Mission-related investing is becoming increasingly important

6.5 Private Foundations—Liabilities and Investment Horizon

- Foundations typically invest to maintain purchasing power while making grants in perpetuity (intergenerational equity)
- 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 the foundation's liabilities
- 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
- Foundations rely almost exclusively on investment portfolios to support operating budgets
- Most foundations have an infinite horizon but there is a trend toward limited-life foundations

6.6 Private Foundations—Liquidity Needs

Foundations have somewhat higher liquidity needs versus endowments

- Typically pay out slightly more as a percentage of assets
- Finance the entire operating budget of the organization they support
- Set aside monies to pay one-year grants and to meet annual installments of longer-term grants
- Meet capital calls related to private equity investments

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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.

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

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6.7 External Constraints Affecting Investment

Legal and Regulatory Constraints

Foundations and endowments face relatively little regulation compared to other types of institutional investors

Specific regulations vary by country, but generally investment committees/officers/boards should:

- Invest on a total return basis and follow principles of modern portfolio theory
- Exercise duty of care and prudence

In the United States, endowments and foundations are governed by the Uniform Prudent Management of Institutional Funds Act of 2006 (UPMIFA)

In the UK, endowments and foundations are typically organized as trusts

Tax and Accounting Constraints

Foundations and endowments typically enjoy tax-exempt status

1. Gifts and donations to endowments and foundations are usually tax-deductible for the person or entity making the gift or donation.
2. 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. Payouts are tax exempt if the receiving institution is exempt from income tax.

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6.8 Investment Objectives

University Endowments

- Primary objective: achieve a total real rate of return (after inflation) of X% with an expected volatility of Y% over the long term
- Secondary objective: outperform long-term policy benchmark
- Tertiary objective: Outperform set of pre-defined peers

Foundations

- Primary objective: generate a total real return over consumer price inflation of 5%, plus investment expenses, with a reasonable expected volatility over a 3- to 5-year period
- Secondary objective: outperform long-term policy benchmark within specific tracking error budget

Investment Objectives of University Endowments

Oxford University Endowment: "The Oxford Endowment Fund aims to preserve and grow the value of perpetuity capital across the collegiate University of Oxford, while providing a sustainable income stream. ... The Oxford Endowment Fund's investment objective is to produce an average (often referred to as annualised) real return of 5% in excess of the Consumer Price Index (CPI) over the long term."

Source: http://www.ouem.co.uk/wp-content/uploads/2017/10/OUem_Fund_Report_17.pdf.

Note: 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."

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."

Robert Wood Johnson Foundation:

"The Robert Wood Johnson Foundation's mission is to help Americans lead healthier lives and get the care they need. Reflecting that mission and our Guiding Principles, we recognize that as a private foundation, 'We are stewards of private resources that must be used in the public's interest.' ... 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: <http://www.rwjf.org/en/about-rwjf/financials.html>.

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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.
- 2 Discuss whether the current investment policy is appropriate given the investment objectives of Ivy University Endowment.
- 3 What decisions could the CIO and board of the Ivy University Endowment take to align the investment policy and the spending policy?

Solution to 1:

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 exceed 15% annually.

Solution to 2:

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.

Solution to 3:

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.

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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.

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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
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.
- **Illiiquid 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

6.9 Asset Allocation

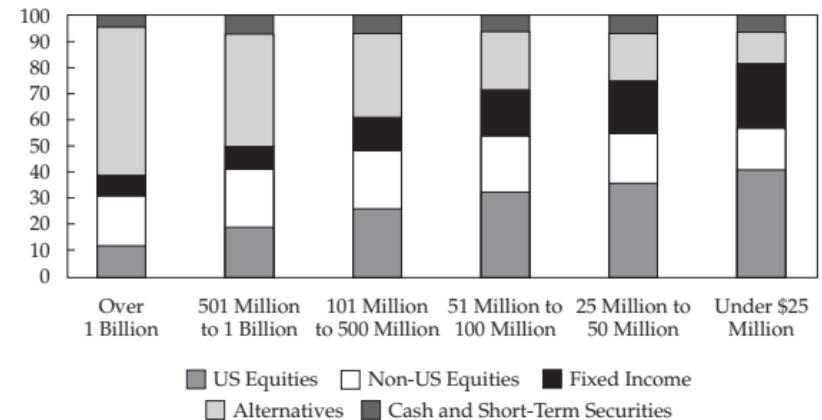
University Endowments

Most large endowments follow the endowment investment model

Larger endowments have a higher allocation to alternatives

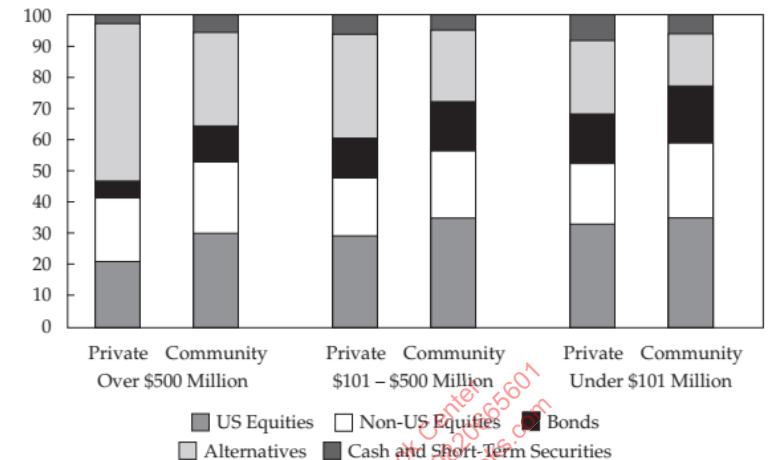
“Home bias” is more prominent in smaller endowments

Larger endowments allocate a relatively smaller portion to fixed income



Foundations

- Investment approach is similar to endowments despite differences in liability structure
- Larger foundations have higher allocation to alternatives
- Private foundations have higher allocation to alternatives compared to community foundations



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

Solution to 1:

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%.

Solution to 2:

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).

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7. Banks and Insurers (1/2)

Banks

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

Total banking assets exceed \$100 trillion

Banking universe is diverse

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
BNP Paribas	France

Insurers

Two major types 1) Life insurers and 2) Property and Casualty (P&C) insurers

Life insurance product set includes traditional whole and term insurance, variable life insurance and annuity products, as well as health insurance

P&C covers commercial property and liability, homeowner's property and liability, automotive and more

Entity	Country/Region
AXA	France
Zurich Insurance Group	Switzerland
China Life Insurance	China
Berkshire Hathaway	United States
Prudential plc	United Kingdom

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7. Banks and Insurers (2/2)

1. Banks—Stakeholders
2. Banks—Liabilities and Investment Horizon
3. Banks—Liquidity Needs
4. Insurers—Stakeholders
5. Insurers—Liabilities and Investment Horizon
6. Insurers—Liquidity Needs
7. External Constraints Affecting Investment
8. Investment Objectives
9. Banks and Insurers—Balance Sheet Management and Investment Considerations

7.1 Banks—Stakeholders

- External stakeholders
 - Shareholders
 - Customers
 - Creditors
 - Credit rating agencies
 - Regulators
 - Communities
- Internal stakeholders
 - Board of directors
 - Management
 - Employees

7.2 Banks—Liabilities and Investment Horizon

Assets

Loans
Debt securities
Currency
Deposits with central banks
Receivables
Bullion

Liabilities

Time/term deposits
Demand deposits
Wholesale funding
Long-term debt

Strategically banks have a perpetual time horizon

Tactical investment horizon is impacted by nature and maturities of asset base and liability structure

Banks manage portfolio assets and institutional liabilities to achieve an extremely high probability that obligations on deposits, guarantees, and other liabilities will be paid in full and on time

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7.3 Banks—Liquidity Needs

- Liquidity management is of fundamental importance to banks
- Deposits have a short duration
- In adverse conditions the need for liquidity increases
- Banks should have ability to liquidate investment portfolios within a certain period to generate adequate cash if there is a crisis
- After the 2007-2009 financial crisis, banks have moved towards more conservative investment portfolios
- Compared to retail-oriented banks, commercial banks have higher cost of funds and lower liquidity

7.4 Insurers—Stakeholders

- External stakeholders

- Shareholders
- Customers/Policyholders
- Derivatives counterparties
- Creditors
- Regulators
- Rating agencies

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

- Internal stakeholders

- Board of directors
- Management
- Employees

7.5 Insurers—Liabilities and Investment Horizon

Life Insurers

- **Liabilities** generally have a long duration
- Claims are fairly predictable
- Term Life products have one-time payouts which are predictable based on statistical and actuarial analyses
- Annuity products have ongoing payouts with shorter duration
- **Investment horizons** are based on product features and policyholder behavior
- Historically between 20 and 40 years

Property & Casualty Insurers

- **Liabilities** have a relatively short duration
- Claims are very unpredictable
- Example: policies against catastrophic events
- **Investment horizons** are based on product features and policyholder behavior
- Investment horizons are much shorter relative to life insurers

Insurance companies manage both portfolio assets and institutional liabilities to achieve an extremely high probability that obligations on policyholder claims, derivatives and other liabilities will be paid in full and on time.

While insurance companies have perpetual time horizons, portfolio assets must reflect the nature of liabilities.

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7.6 Insurers—Liquidity Needs

P&C companies have relatively high liquidity requirements → more liquid portfolios

Internal liquidity plan

- Cash and cash equivalents on balance sheet
- Cash from operations

External liquidity plan

- Ability to issue bonds
- Access to credit lines
- Buying and selling repurchase agreements

Interest rate environment impacts life insurance liquidity

Two types of portfolios

- Reserve portfolio ensures ability to meet policy liabilities
- Surplus portfolio helps generate high returns



7.7 External Constraints Affecting Investment

Legal and Regulatory Constraints

Financial institutions are highly regulated because of

- Contractual commitments
- Importance to the economy
- Interdependence and contagion risk

Regulation involves

- Capital adequacy
- Asset safety
- Liability management

Objective: immunize volatility of shareholder capital

Economies of scale

Since 2008-09 regulators have imposed more stringent requirements on systematically important financial institutions (SIFIs)

Accounting Considerations

Three types of accounting systems:

1. Standard financial accounting
2. Statutory accounting
3. Economic accounting

Tax Considerations

Banks and insurance companies are taxable entities

Tax rules can be complicated

Investment programs should consider after-tax returns

7.8 Investment Objectives

Banks

Primary objective of investment portfolio: manage the bank's liquidity and risk position relative to its non-securities assets, derivatives positions, liabilities, and shareholders' capitalization

Asset/liability management committee (ALMCo) provides direction and oversight of investment portfolio

- Sets IPS
- Monitors and mandates changes to assets or liabilities as needed
- Establishes overall investment objectives and risk levels

Investment team manages investments

- Ensures different asset classes have appropriate characteristics
- Monitors performance relative to peers
- Makes periodic presentations to senior management

Insurers

- Primary objective: provide liquidity for payment of policyholder claims
- Secondary objective: grow surplus over the long-term
- IPS should encompass appetite for market risk, credit risk and interest rate risk

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

7.9 Banks and Insurers—Balance Sheet Management and Investment Considerations

Effects on the value of equity due to changes
in value of assets and liabilities

$$A = L + E$$

$$\Delta A = \Delta L + \Delta E$$

$$\frac{\Delta A}{A} \left(\frac{A}{E} \right) = \frac{\Delta L}{L} \left(\frac{L}{E} \right) + \frac{\Delta E}{E}$$

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

Adding interest rate risk to the equation...

% Δ portfolio = - mod duration x Δ yield

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



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.
- 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?
- 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?
- 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?

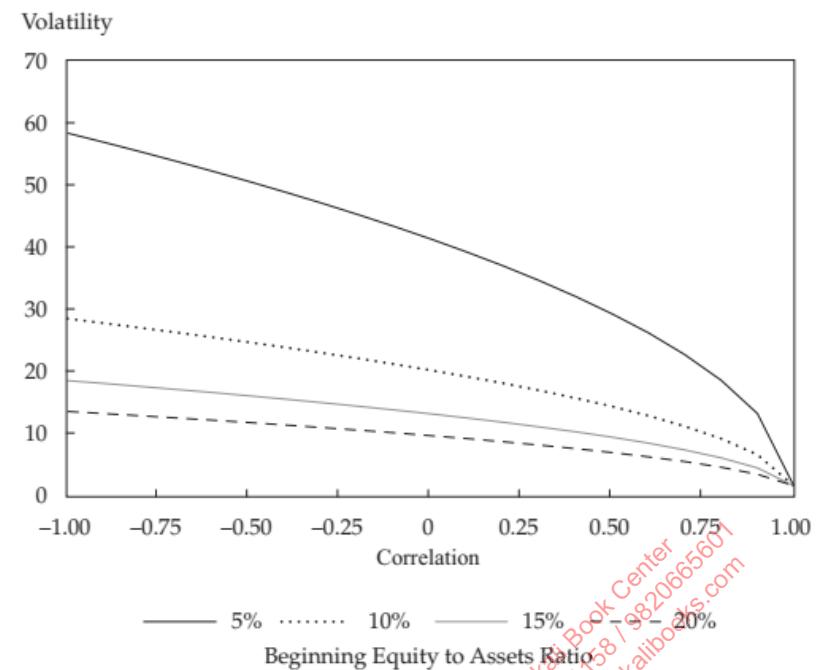
Volatility of Shareholder's Equity

The volatility of shareholder capital can be managed by

1. reducing the price volatility of portfolio investments, loans, and derivatives
2. lowering the volatility from unexpected shocks to claims, deposits, guarantees, and other liabilities
3. limiting leverage
4. attempting to achieve positive correlation between changes in the value of assets and liabilities

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

$$\sigma_Z^2 = A^2\sigma_X^2 + B^2\sigma_Y^2 + 2AB\rho\sigma_X\sigma_Y$$



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Investment Strategies and Effects on Bank/Insurer Asset & Liability Volatility

Portfolio Strategy Considerations	Main Factors Affected	Portfolio Strategy Considerations	Main Factors Affected
Diversified fixed-income investments	Decreases $\frac{\sigma_{\Delta A}}{A}$	Derivatives transparency, collateralization	Decreases both $\frac{\sigma_{\Delta A}}{A}$ and $\frac{\sigma_{\Delta L}}{L}$, and increases ρ
High-Quality bond/debt investments	Decreases $\frac{\sigma_{\Delta A}}{A}$	Liquidity of portfolio investments	Decreases $\frac{\sigma_{\Delta A}}{A}$
Maintain reasonable balance between asset and liability durations, key rates durations, and sensitivity to embedded borrower and claimant options	Increases ρ	Surrender penalties	Decreases $\frac{\sigma_{\Delta L}}{L}$
Common Stock Investments	Increases $\frac{\sigma_{\Delta A}}{A}$, typically decreases ρ	Predictability of underwriting losses	Decreases $\frac{\sigma_{\Delta L}}{L}$

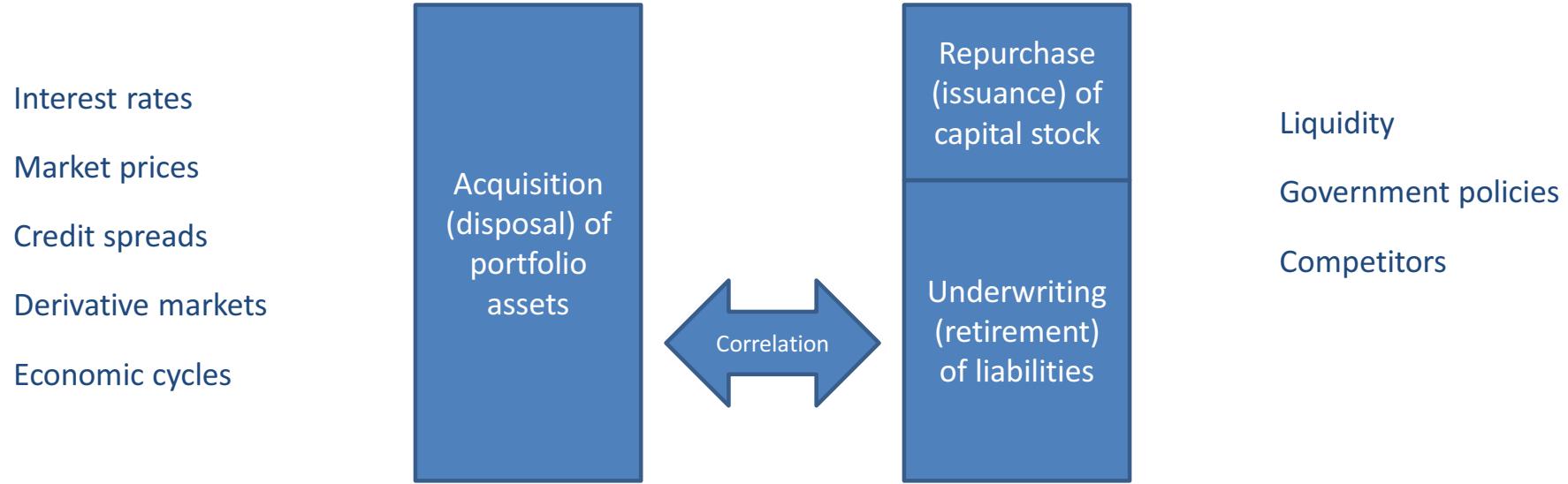
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Example 8

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%.

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

Implementation of Portfolio Decisions for Banks and Insurance Companies



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.

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.

Example 9 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.

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Example 9 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.

Example 9 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 profitable¹⁵ 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.

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Summary

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