Portfolio Management for Institutional Investors

CFA三级培训项目

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- **服务客户：** Areva，Lubrizal，Arkema，International Paper，Johnson Controls，Augusta、Philips、中国工商银行、中国银行、建设银行、农业银行、杭州银行、兴业证券、南京证券、湘财证券、兴业银行、杨浦区党校、太平洋保险、泰康人寿、中国人寿、人保资产管理、中国平安、华夏基金、中邮基金、富国基金、中国再保险、中国进出口银行、中信建投、北京外经贸大学、安徽省投资集团、阿里巴巴、携程等

Topic in CFA Level III

Session	Content
Study Session 1-2	ETHICS & PROFESSIONAL STANDARDS (1)&(2)
Study Session 3	BEHAVIORAL FINANCE
Study Session 4	CAPITAL MARKET EXPECTATIONS【NEW】
Study Session 5	ASSET ALLOCATION AND RELATED DECISIONS IN PORTFOLIO MANAGEMENT
Study Session 6	DERIVATIVES AND CURRENCY MANAGEMENT 【NEW】
Study Session 7-8	FIXED-INCOME PORTFOLIO MANAGEMENT (1)&(2)
Study Session 9-10	EQUITY PORTFOLIO MANAGEMENT (1)&(2)
Study Session 11	ALTERNATIVE INVESTMENTS FOR PORTFOLIO MANAGEMENT 【NEW】
Study Session 12-13	PRIVATE WEALTH MANAGEMENT (1)&(2) 【NEW】
Study Session 14	**PORTFOLIO MANAGEMENT FOR INSTITUTIONAL INVESTORS 【NEW】**
Study Session 15	TRADING, PERFORMANCE EVALUATION, AND MANAGER SELECTION 【NEW】
Study Session 16	CASES IN PORTFOLIO MANAGEMENT AND RISK MANAGEMENT 【NEW】

Framework

Portfolio Management for Institutional Investors

- **SS14 Portfolio Management for Institutional Investors**
  - R33 Portfolio Management for Institutional Investors
    - ✓ Common characteristics of Institutional Investors
      1. Pension plan (DB & DC)
      2. Sovereign wealth funds
      3. University endowments
      4. Private foundations
      5. Banks
      6. Insurers

Institutional Investors

- **Types of institutional investors in the Level 3 curriculum:**
  - Pension plans
  - Sovereign Wealth Funds
  - University Endowments and Private Foundations
  - Banks and Insurers

	New	Old
S	**Stakeholders**	
L	**Liquidity Needs**	**Liquidity Needs**
L	**Liabilities and Investment Horizon**	**Time Horizon**
E	External Constraints	Unique
(R)	Risk (only for DB & DC)	Risk (only for DB & DC)
I	**Investment Objectives**	**Return**
A	Asset Allocation	

Institutional Investors

2008	Pension Plan
2009	Pension Plan, Endowments & Foundation
2010	Pension Plan, Life Insurance Company
2011	Endowments & Foundation
2012	Pension Plan
2013	Pension Plan, Endowments & Foundation
2014	Pension Plan, Endowments & Foundation
2015	Pension Plan, Endowments & Foundation
2016	Endowments & Foundation
2017	Pension Plan
2018	Endowments & Foundation

Portfolio Management for Institutional Investors

Institutional Investors: Common Characteristics

- **Scale (i.e., asset size):** The issue of scale is relevant for institutional investors because it may impact investment capabilities, access to strategies, liquidity, trading costs, and other key aspects of the investment process.
  - Institutional investors' assets under management can range from relatively small (e.g., less than US$25 million) to relatively large (e.g., more than US$10 billion).
  - Smaller institutions may face challenges that unable to access certain investments that have a high **minimum investment size**.
    - ✓ Small institutional investors may also face challenges in hiring skilled investment professionals. They are more likely to **outsource** investments to external asset managers and rely on investment consultants.
  - Larger institutional investors experience **scale benefits** that allow them access to a wider investment universe, and they can readily hire investment professionals.

Institutional Investors: Common Characteristics

- **Long-term investment horizon:** Institutional investors generally have a long-term investment horizon that is often determined by a specific liability stream, such as the benefit obligation of a pension plan, the spending policy of an endowment, or other obligations.
  - Pension funds, sovereign wealth funds, endowments, and foundations all typically have **long investment horizons** and relatively **low liquidity needs**.
    - ✓ Low liquidity needs allow these institutions to invest in a broad range of alternative asset classes, including private equity, private real estate, natural resources, infrastructure, and hedge funds.
  - Banks and insurance companies, however, tend to be much more **asset/liability focused** while operating within tight regulations designed to ensure adequacy of capital.

Institutional Investors: Common Characteristics

- **Governance framework:** Institutional investors typically implement their investment programs through an investment office that often has a clearly defined governance model. The governance structure generally includes a **board of directors** and an **investment committee**.
  - The board and/or investment committee provide a key role in establishing the organization's **investment policy**, defining the **risk appetite**, setting the **investment strategy**, and monitoring the investment performance.
  - The board may comprise company representative directors, employee representative directors, and independent directors.
    - ✓ Independent directors are usually selected to increase the board's overall investment expertise.
  - Investment committees can be sub-committees of the board with delegated authority to oversee investment policy.

Institutional Investors: Common Characteristics

- **Regulatory frameworks:** Institutional investors must contend with multiple regulatory frameworks that frequently vary by jurisdiction and complexity and are often evolving.
  - Regulations have been tightened since the 2007-2009 global financial crisis in an attempt to lower leverage, increase centralized clearing, and improve reporting transparency.
- **Principal–Agent issues:** As institutional investors manage assets on behalf of others, principal–agent issues must be recognized and managed appropriately.
  - For institutions, this conflict occurs internally through the appointment of the investment committee and investment staff and occurs externally through the use of outsourced investment managers.

Overview of IPS

- The IPS establishes policies and procedures for the effective administration and management of the institutional assets. A well-crafted IPS can help minimize principal–agent challenges by providing clear guidance on day-to-day management of the assets. The IPS should include:
  - The institution's **mission** and **investment objectives** (i.e., return and risk tolerance).
  - Discussion of the **investment horizon** and **liabilities.**
  - **Any constraints** affecting the asset allocation (legal, regulatory, tax, and accounting).
  - **Asset allocation policy** with ranges and asset class benchmarks.
  - **Rebalancing policy.**
  - **Reporting requirements**.
  - The IPS should be **reviewed annually or when material changes occur** in investor circumstances and/or the market environment, as the IPS serves as the foundation for the investment program.

Investment Approaches

- The investment portfolio of an institutional investor is designed to meet its objectives and should reflect the appropriate risk and liquidity considerations addressed in the IPS.
- While institutional investors each have **unique** liability characteristics, **four different approaches evolved, including**:
  - Norway Model;
  - Endowment Model;
  - Canada Model;
  - Liability Driven Investing (LDI) Model.

Investment Approach Description

- **Norway Model (sovereign wealth fund)**
  - 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.
  - *Pros*: Low cost, transparent, suitable for large scale, easy for board to understand.
  - *Cons*: Limited value-added potential.
- **Endowment Model (university endowment，也有SWF, DB)**
  - Characterized by high alternatives exposure, active management and outsourcing.
  - *Pros*: High value-added potential.
  - *Cons*: Expensive and difficult to implement for most sovereign wealth funds because of their large asset sizes. High fees/costs

Investment Approach Description

- **Canada Model (pension plan，也有SWF)**
  - Characterized by high alternatives exposure, active management, and internally managed assets.
  - *Pros*: High value-added potential and development of internal capabilities.
  - *Cons*: Potentially expensive and difficult to manage.
- **LDI Model (banks & insurers，也包括美国的DB和部分欧洲养老金)**
  - 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).
  - *Pros*: Explicit recognition of liabilities as part of the investment process.
  - *Cons*: Certain risks (e.g., longevity risk, inflation risk) may not be hedged.

1. Pension Funds

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

Types of Pension Plans

- Comparison of DB & DC Pension Plan

Characteristics	Defined Benefit Pension Plan	Defined Contribution Pension Plan
Benefit payments	Benefit payouts are defined by a contract between the **employee** and the pension plan.	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 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).

Types of Pension Plans

Characteristics	Defined Benefit Pension Plan	Defined Contribution Pension Plan
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.	The employee bears the risk of not meeting his/her objectives for this account in terms of funding retirement. The employee bears longevity risk.

DB: Stakeholders

- **Plan sponsors (employers)** must make contributions to plan assets. Poor investment performance will result in sponsors having to make extra contributions to an underfunded plan (i.e., when assets are lower than liabilities).
- **Plan beneficiaries (employees and retirees**) face the ultimate risk that an employer defaults on contributions to plan assets.
- **The investment staff, the investment committee**, and/or the board are directly impacted by the success or failure of the plan.
- **Governments** are stakeholders in that they provide tax incentives for employees to save for retirement, and taxpayers will ultimately face the costs of providing welfare for those that have failed to adequately save for retirement.
- **Shareholders** in the corporate employer are stakeholders since an underfunded plan will cause a balance sheet liability and lower income for the company. It will also lead to higher financial risk, which will likely increase share price volatility.

DB: Liabilities and Investment Horizon

- The liabilities of a DB pension plan are the **present value of the future payments** it will make to beneficiaries upon retirement disability, or death.
- In estimating future benefits, the plan sponsor must make several **key assumptions**, such as the growth rate of salaries, expected vesting, and mortality and disability assumptions.
  - **Vesting** means that employees only become eligible to receive a pension after meeting certain criteria, typically a minimum number of years of service.
- A common pension industry metric used to gauge asset sufficiency is the funded ratio, also known as the vested benefit index (**VBI**) in some countries. The **funded ratio** is defined as:

$$Funded\ ratio = fair\ value\ of\ plan\ assets / PV\ of\ Defined\ benefit\ of\ obligations$$

DB: Liabilities

Factor	Impact of Increase in Factor	Rationale
Service/tenure (years worked)	Increases liability	Benefits are usually linked directly to years of service by the employee.
Salary	Increases liability	Benefits are usually linked to final salary.
Longevity	Increases liability	Plan participants are paid benefits for every year they live in retirement. If they live longer in retirement, they will receive more years of benefits.
Additional contributions	Increases liability	Additional/matching contributions usually increases the benefits promised to employees.
Employee turnover	Lower liability	Higher employee turnover means fewer employees are likely to work the number of years of service required for vesting of benefits.
Expected investment return	Potentially Lower liability	In some cases, an increase in expected returns increases the discount rate used for liabilities, lowering liabilities.
Discount rate	Lower liability	A higher discount rate will give a lower present value of benefits, hence a lower liability.

DB: Investment Horizon

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

DB: Risk Considerations

- 风险目标：DB plan的风险容忍度主要取决于计划的盈亏状态，发起人的财务状况和盈利能力，发起人和退休金计划基金的风险暴露共性，计划本身特征和劳动力特征等，详见下表：

Category	Variable	Explanation
Plan status	Plan funded status (surplus or deficit).	**Higher pension surplus** or higher funded status implies greater risk tolerance
Sponsor financial status and profitability	Debt to total assets; Current and expected profitability; Size of plan compared to market capitalization of sponsor company.	**Low debt ratios and higher current and expected profitability** imply greater risk tolerance. Large sponsor company size relative to pension plan size implies greater risk tolerance.

DB: Risk Considerations

Category	Variable	Explanation
Sponsor and pension fund common risk exposures	**Correlation** of sponsor operating results with pension asset returns.	**The lower the correlation**, the greater risk tolerance, all else equal.
Plan features	Provision for **early retirement;** Provision for **lump sum distribution.**	Such options tend to reduce the duration of plan liabilities, implying **lower risk tolerance**, all else equal
Workforce characteristics	**Age** of workforce; Active lives relative to retired lives.	**The younger the workforce, the greater the proportion of active lives, the greater the duration of plan liabilities** and the greater the risk tolerance.

DB: Investment Objective

- The **primary objective** for DB pension plans is to meet pension liabilities through a combination of investment returns and contributions.
- The **secondary objective** could be to minimize the present value of expected cash contributions.
- **Computation**
  - Ideally, $g_A=g_L$.
    - ✓ Where
      - ◆g_A= Long-term rate of return on plan assets
      - ◆g_L= actuarial discount rate
  - Underfunded, $g_A>g_L$;
  - When consider the risk relative to the plan sponsor's willingness and ability to raise contribution rates, $g_A=g_L$+risk premium

DB: Liquidity Needs

- Pension plans must maintain enough liquidity to pay their liabilities as they come due. **Liquidity needs are generally higher** when:
  - The **proportion of retired lives in the plan** is higher, since retired lives are receiving benefit payments. **Frozen plans** will have **higher liquidity needs** than non frozen plans due to benefits exceeding contributions.
  - The **workforce** of the employer is older, since the time to pay benefits will be shorter.
  - The plan has higher **funded status**, since this will likely lead to lower sponsor contributions and more benefit payments will need to be met from existing plan assets.
  - The plan participants have the **ability to switch or withdraw** from the plan, an event that usually triggers payments to participants.

DC: Stakeholders

- **Plan sponsors (employers): not** facing the investment risk or longevity risk of the assets, retain important fiduciary responsibilities. These include contributing to the plan, overseeing the investment of plan assets, and offering suitable investment options to plan participants.
- **Plan beneficiaries (employees and retirees)** face the investment risk of contributions and investment returns not meeting retirement needs. They also face the longevity risk of living longer than expected and outliving their savings.
- The **board** must communicate with participants to keep them well informed, and these communications must consider the participants' level of sophistication. The board may be required to select a default investment option when participants are disengaged.
- **Governments** are stakeholders in that they provide tax incentives for employees to save for retirement, and taxpayers will ultimately face the costs of providing welfare for those that have failed to adequately save for retirement.

DC: Liabilities and Investment Horizon

- In a DC plan, participants' pension benefits are based on amounts credited to their individual accounts in the form of contributions (from the employee and possibly the employer) and investment returns.
  - Consequently, the liabilities of a DC pension plan sponsor are equal only to its **required contributions**.
- The DC plan may invest in a broadly diversified portfolio that may include investments not generally offered to retail investors, such as private equity and hedge funds.
  - This is possible since **pooling of assets gives rise to scale** and the **long-term horizon** of the aggregate beneficiaries.

DC: Liabilities and Investment Horizon

- Many DC plans offer investment options that allow participants to select the investment horizon that best aligns with their own investment horizon.
  - Examples are life-cycle options or target date options, which feature a glide path that manages the asset mix based on a desired retirement date.
  - There are **two main types of life-cycle options**:
    - ✓ **Participant-switching options** automatically switch members to a more conservative asset allocation as they age.
    - ✓ **Participant/cohort option** pools the participant with other investors with a similar retirement date and the fund being managed more conservatively as the retirement date is approached.

DC: Investment Objectives

- The **main objective** of defined contribution pension plans is to prudently grow assets that will **support spending needs in retirement**.
  - The investment options offered by the DC plan sponsor can be managed either in-house or externally as well as passively or actively.
- If the plan offers funds with **active management**, **a secondary objective** may be to **outperform the long-term policy benchmark** consisting of the weighted average of individual asset class benchmarks and the policy weights defined by the strategic asset allocation.
  - For some DC plans it is important their investment options outperform those of other DC pension plans, which is particularly relevant in countries where participants can voluntarily switch between DC plan providers.

DC: Liquidity Needs

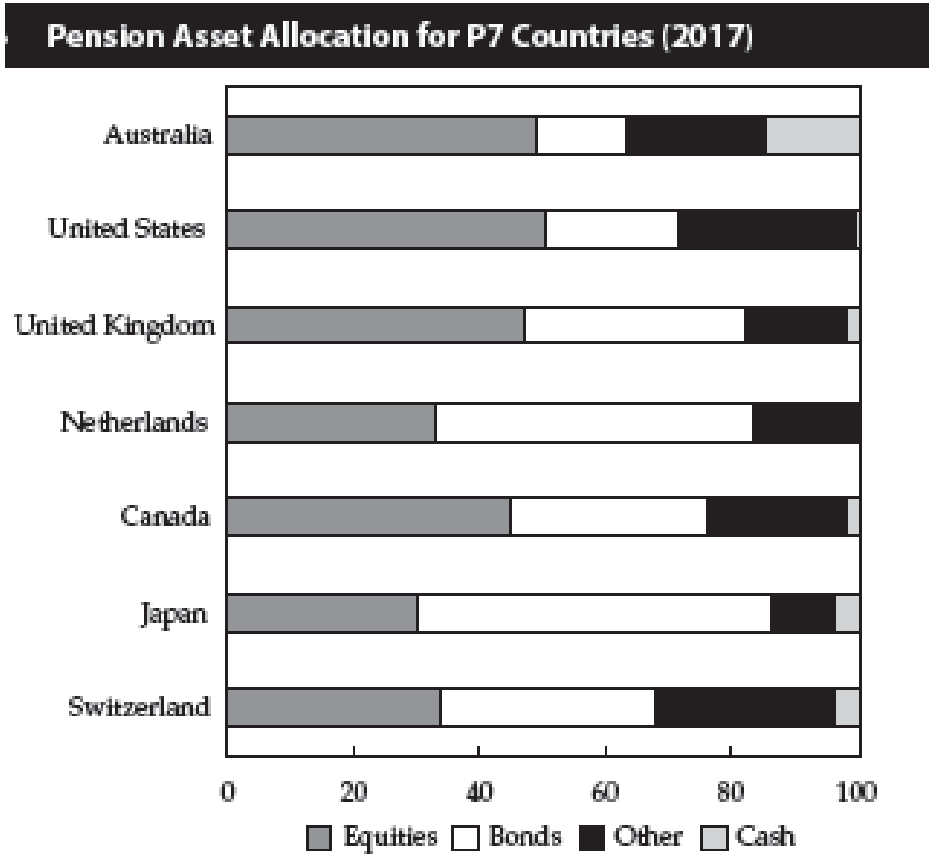
- The primary drivers of liquidity needs are the **age of the workforce** and **ability of participants to switch or withdraw from the plan**.
  - As is the case for DB schemes, if these factors are high, then liquidity needs of the fund will be high.
- It is important for pension plans to regularly perform liquidity stress tests, which may include stressing the value of their assets and modelling reduced liquidity of certain asset classes in a market downturn.
  - Such stress-testing may also help DC plans anticipate whether participants might switch out of more volatile investment options during market downturns.

DB & DC: External Constraints

- **Regulations** vary by country; however, there are similar themes in global regulation. Many regulators now require extensive reporting on fees and costs incurred by plans both internally and externally.
  - In Australia and the United States, there is a requirement for the plan to offer a diversified default option for participants.
- From a **tax perspective**, rules once again vary by country; however, pension funds are often treated favorably by governments in order to encourage individuals to save for retirement.
  - DC plans in the United States (referred to as 401(k) plans) are tax deferred. This means participants make pretax contributions and investment earnings are not taxable; however, benefits are taxed as ordinary income.
- **Accounting rules**, differ by country. In the United States, corporate DB pension plans must follow GAAP, particularly Accounting Standards Codification (ASC) 715, Compensation—Retirement Benefits, which requires that funded status be shown as an asset or liability on the balance sheet.

DB & DC: Asset Allocation

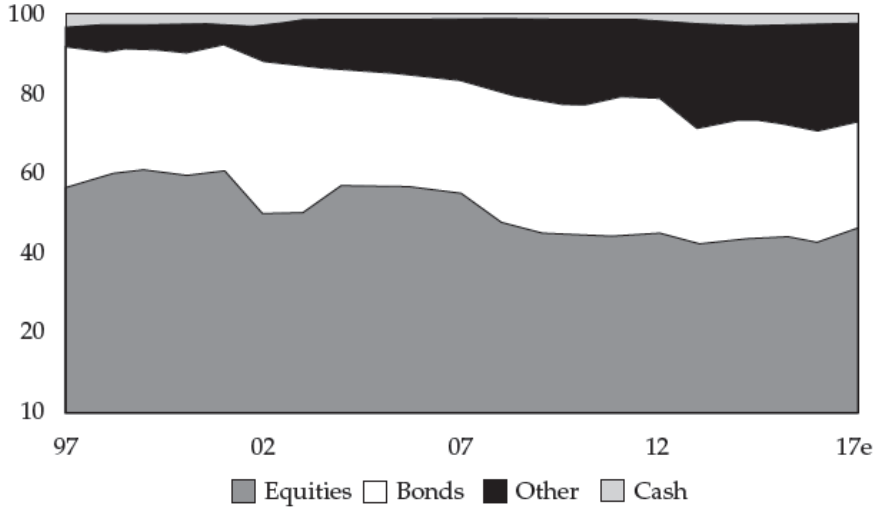
- An examination of pension fund asset allocations shows very large differences in average asset allocations by country.
  - Such inter- and intra-national differences are driven by many factors discussed earlier in this reading, including the differences in legal, regulatory, accounting, and tax constraints; the investment objectives, risk appetites, and investment beliefs of the stakeholders.



DB & DC: Asset Allocation

- It is apparent that the allocation to equities has decreased from about 57% in 1997 to about 46% in 2017, while allocations to the 'Other' category of alternatives has increased from about 4% to 25% over the same time period.
- Note the category 'Other' includes hedge funds, private equity funds, loans, structured products, other mutual funds (i.e., not invested in equities, bonds, or cash), land, buildings, and other miscellaneous investments.
- Within equities, there is some evidence of **home bias** to domestic equity markets.

Exhibit 7 Evolution of Pension Asset Allocation from 1997 to 2017



Example

- Frank Smit, CFA, is CFO of company A. Company A 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. Company A 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.

Example

- **Solution:**
  - ADSE appears to have above average risk tolerance for the following reasons:
    - ✓ The plan has a small surplus (8 percent of plan assets); that is, the plan is overfunded by €8 million.
    - ✓ The company's balance sheet is strong (low use of debt).
    - ✓ The company is profitable despite operating in a cyclical industry.
    - ✓ The average age of its workforce is low.

2. Sovereign Wealth Funds (SWFs)

- Sovereign wealth funds (SWFs) are state-owned investment funds or entities that invest in financial or real assets. Governments have established SWFs from budget surpluses to meet different objectives.
- The International Monetary Fund (IMF) has defined five broad types of sovereign wealth funds

Type	Objective	Examples
Budget stabilization funds	Set up to insulate the budget and economy from commodity price volatility and external shocks.	Economic and Social Stabilization Fund of Chile; Timor-Leste Petroleum Fund; Russia's Oil Stabilization Fund
Development funds	Established to allocate resources to priority socio-economic projects, usually infrastructure.	Mubadala (UAE); Iran's National Development Fund; Ireland Strategic Investment Fund

Sovereign Wealth Funds (SWFs)

Type	Objective	Examples
Savings funds	Intended to share wealth across generations by transforming non-renewable assets into diversified financial assets.	Abu Dhabi Investment Authority; Kuwait Investment Authority; Qatar Investment Authority; Russia's National Wealth Fund
Reserve funds	Intended to reduce the negative carry costs of holding reserves or to earn higher return on ample reserves.	China Investment Corporation; Korea Investment Corporation; GIC Private Ltd. (Singapore)
Pension reserve funds	Set up to meet identified future outflows with respect to pension-related contingent-type liabilities on governments' balance sheets.	National Social Security Fund (China); New Zealand Superannuation Fund; Future Fund of Australia

SWFs: Stakeholders

- **The stakeholders in an SWF are as follows:**
  - **Current and future citizens** benefit from the fund's success either directly through receiving payments or indirectly through lower taxation or increased investment in the domestic economy.
  - **Investment offices** invest SWF assets either directly in-house or appoint external managers.
  - The **board** has a **fiduciary duty** to the ultimate beneficiaries of the fund.
  - **Governments** are stakeholders in that they may rely on SWF returns to balance budget deficits.

SWFs: Liabilities and Investment Horizons

- There is a wide variety in investment objectives, liabilities, investment horizons, and liquidity needs among the five types of SWFs, so we will discuss each type separately.
- **Budget stabilization funds** are established to insulate the fiscal budget from commodity price volatility and other external shocks, particularly if a nation's revenue is tied to natural resource production or other cyclical industries.
  - These funds have **uncertain liabilities** and relatively **short investment horizons**. Their main purpose is risk management because such funds may be needed on a short-term basis to help support the government budget.
  - The investment objective is usually to deliver **returns in excess of inflation** with a low probability of a negative return in any year.

SWFs: Liabilities and Investment Horizons

- **Development funds** are established to support a nation's economic development through investing in essential infrastructure, innovation, or by supporting key industries.
  - **Liabilities** are not clearly defined and typically uncertain for development funds, but their overall objective is to **raise a country's economic growth** or to **diversify the economy**.

SWFs: Liabilities and Investment Horizons

- **Savings funds** are typically established to transform proceeds from the sale of non-renewable natural resources into long-term wealth and a diversified portfolio of financial assets.
  - The mission of a savings fund is wealth transfer to future generations after the sources of natural wealth have been depleted.
  - As such, their **liabilities are long-term**. Some savings funds have a real return **objective** or an explicit spending policy (like endowments).
  - A special case of savings funds involves government investment holding companies, which are funded from the privatization proceeds of national companies (e.g., Singapore's Temasek Holdings).
  - Savings funds should avoid investing in assets highly correlated with the non-renewable resources from which the government is trying to diversify.

SWFs: Liabilities and Investment Horizons

- **Reserve funds** are established from central bank excess foreign currency reserves.
  - The objective is to **achieve a return higher than that on FX reserves** (usually invested in low-duration, high-grade debt instruments) and to reduce the negative cost-of-carry of holding FX reserves.
  - Central banks accumulate such reserves as they print local currency to buy FX (like US dollars or euros) from local firms selling export goods. The central banks then issue **monetary stabilization bonds** to absorb the excess local currency.
- Their **investment horizons are very long**, with typically no immediate or interim payout expectation.

SWFs: Liabilities and Investment Horizons

- **Pension reserve funds** are established to help prefund contingent pension-related liabilities on the government's balance sheet. Pension reserve funds are usually funded from fiscal surpluses during economic booms.
  - The goal is to help reduce the burden on future taxpayers by prefunding social security and health care costs arising from aging populations, so these funds generally have **long-term investment horizons.**
    - ✓ There is usually an **accumulation phase (decumulation phase)** where the government predominantly contributes to (withdraws from)the fund.
  - The investment objective of pension reserve funds is to earn returns sufficient to maximize the likelihood of **meeting future pension**, social security, and/or health care costs as they arise.

SWFs: Liquidity Needs

- **Budget stabilization funds.** These must maintain the highest liquidity level and invest in assets with low risk of significant loss in the short term, in order to meet short-term deficits caused by negative economic- or commodity-related events.
- **Development funds.** Because infrastructure and research and innovation investments are long term, funds established to develop such projects generally have low liquidity needs.
- **Savings funds.** The main objective is to accumulate wealth for future generations; hence, liquidity needs are lowest. Liquidity needs increase as the nation's natural resources become depleted and the government withdraws from the fund to meet budgetary needs.
- **Reserve funds.** Liquidity needs are lower compared to stabilization funds but higher compared to savings funds. Liquid fixed-income securities are usually held that can be readily sold if there is a dramatic change in the reserves of the central bank.
- **Pension reserve funds.** Liquidity needs vary, being lower during the accumulation stage and higher during the decumulation stage.

SWFs: External Constraints

- From a **legal and regulatory** perspective, SWFs are typically established by laws that give the SWF its mission and structure. This may involve clear rules of asset allocation, particularly in the case of a development fund with a specific socioeconomic mission.
  - The Santiago Principles, a best-practices framework established by the International Forum of SWFs (IFSWF), addresses such concerns alongside other key elements expected of a high-quality SWF, such as ethics, risk management, and regular monitoring for compliance with the principles.
- SWFs are generally **tax exempt**. This may void the SWF's ability to claim withholding taxes or tax credits that are normally available to taxable investors.

SWFs: Investment Objectives

SWF Type	Investment Objectives
Budget stabilization	● Capital preservation ● Aims to earn returns above inflation with a low probability of losses ● Should avoid assets correlated with the source of government revenues
Development	● Support a nation's economic development and increase long-run economic growth ● Implicit objective is to earn a real rate of return greater than real domestic GDP growth or productivity growth
Savings	● Maintain purchasing power of the assets over time while making ongoing spending on government budgetary needs
Reserve	● Earn a rate of return in excess of the yield the government/central bank pays on bonds it has issued
Pension reserve	● Earn returns to meet future unfunded pension and social care payments promised by the government

SWFs: Asset Allocation

- **Budget stabilization funds.** The majority of fixed income and cash is due to the defensive nature of the fund.
- **Development funds.** These are driven by the socioeconomic mission of the fund (e.g., investment in local infrastructure projects).
- **Savings funds.** A long investment horizon means relatively high allocations toward equities and alternative investments, such as private equity and real assets.
- **Reserve funds.** Allocations are similar to those of savings funds, but with lower allocation to alternatives due to the potentially higher liquidity needs.
- **Pension reserve funds.** These have high allocations to equities and alternatives due to a long investment horizon and low liquidity needs in the accumulation phase.

Example

- 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.

Example

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

Example

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

3. University Endowments: Stakeholders

- These endowments are typically funded through gifts and donations and are intended to help the institutions provide for some of their main services.
- Endowment funds invest in capital markets to provide a savings and growth mechanism that allows the institution to meet its mission in perpetuity.
- **Stakeholders**
  - The stakeholders of a university endowment are current and future **students**, **alumni** who contribute gifts and donations, and **university employees** whose livelihoods depend on the university.
  - Stakeholders often have representation on the endowment's board or investment committee, such as alumni who may be investment professionals

Endowments: Liabilities & Investment Horizon

- The need to maintain intergenerational equity and the unlimited life of the university mean endowments have a **perpetual investment horizon**.
- The endowment's liabilities are the **future payouts promised to the university**, presented in an official spending policy.
  - The endowment's spending policy should ensure intergenerational equity while **smoothing payouts** to insulate the university from market volatility.
  - The dollar amount of spending each year can be stated as a weighted average of the previous year's spending (adjusted for inflation) and a spending rate (usually between 4% and 6%) applied to a moving average of assets under management (AUM).

Endowments: Liabilities & Investment Horizon

- Spending rules can be summarized by the following formula:

$$Spending_{t+1} = w \times Spending_t \times (1 + Inflation) + (1 - w) \times (spending\ rate \times \text{Average } AUM)$$

  - ✓ w =weight of the prior year's spending amount

- **Constant growth rule (w = 1)**
  - ✓ The endowment provides a fixed (real) annual payout to the university once adjusted for inflation by the Higher Education Price Index (HEPI). While this method gives more certainty to the university of the payouts that will be received, this means the percentage of endowment value paid out periodically will fluctuate with the endowment value.

Endowments: Liabilities & Investment Horizon

- **Market value rule (w = 0)**
  - ✓ Annual payouts are a prespecified percentage (the spending rate, usually between 4% and 6%) of the three- to five-year moving average of asset values.
  - ✓ Payouts under this method are procyclical in that spending will fluctuate in line with the moving average of asset values.
- **Hybrid rule (0 < w <1)**
  - ✓ Spending is a weighted average of the previous two rules.

Endowments: Liabilities & Investment Horizon

- Other **liability-related factors** that need to be considered are as follows:
  - **Fundraising from donors.**
    - ✓ Gifts and donations coming into the endowment mean that the net spending rate is closer to 2% to 4% of assets rather than the 4% to 6% spending rate applied.
  - **Reliance of the university on the spending from the endowment.**
    - ✓ All else equal, if the endowment spending comprises a larger proportion of the university's operating budget, then the risk tolerance of the endowment is lower.
  - **Capability of the endowment or university to issue debt.**
    - ✓ Access to debt markets increases the risk tolerance of the endowment because the institution can borrow to meet spending in times of poor investment performance.

Endowments: Liquidity Needs & External Constraints

- **Liquidity Needs:** As noted previously, the endowment's annual spending net of gifts and donations is usually very low (around 2% to 4% of assets).
  - Low liquidity needs plus the perpetual time horizon mean endowments usually have a high risk tolerance and absorb relatively high volatility in the short term in pursuit of longer-term returns.
- **External Constraints:** From a legal and regulatory perspective, regulation varies by jurisdiction; however, endowments are typically subject to laws that require:
  - Investment on a total return basis (i.e., earning returns from both income and capital gains, not simply generating spending through income returns) and diversification according to modern portfolio theory (MPT).
  - Investment committees or boards and staff who have a fiduciary duty of care in overseeing investments.

Endowments: External Constraints

- **External Constraints:**
  - In the United States, the Uniform Prudent Management of Institutional Funds Act 2006 (UPMIFA) allows flexibility in spending decisions and enforces the adoption of MPT. In the U.K., the Trustee Act (2000) plays a similar role (relevant to endowments since they are often structured as trusts in the U.K.). The shift to MPT principles has **allowed endowments to allocate to a broad range of asset classes.**
  - Endowments typically have **tax-exempt status** when generating investment returns. Universities are not typically taxed on payouts from the endowment, and donors to endowments usually can deduct gifts from their taxable income.

Endowments: Investment Objectives

- The investment objective is to preserve **the purchasing power of the assets** in perpetuity (i.e., grow in line with inflation) while achieving returns adequate to **maintain the level of spending**.
  - In practice, this means the university endowment has a primary objective to **generate a real return** (i.e., after inflation measured using the HEPI) of about 5% on average over a three- to five-year period. A reasonable volatility limit is typically 10% to 15%.
  - There may be a secondary objective of **outperforming a passive benchmark** or even a tertiary objective of outperforming a peer group of similar endowments. An issue with the objective of outperforming a peer group is that it may lead to decisions becoming dislocated from the core mission of funding unique liabilities and may lead to herding by investment managers into similar investments.

Endowments: Asset Allocation

- **Asset Allocation by University Endowments**
  - Most large U.S. university endowments follow the endowment model, which involves **a majority (>50%) allocation to alternative investments**, an allocation that has increased over the past two decades.
  - Smaller U.S. university endowments tend to allocate less to alternatives and more to domestic equities and fixed income, with some evidence of **home bias** causing U.S. equities to be overweighted in these portfolios relative to non-U.S. equities.

4. Private Foundations

- Foundations are nonprofit institutions set up to make grants to support specified charitable causes.
- The focus of this reading is on private foundations set up **by individual donors and their families**, an example of which is the Bill & Melinda Gates Foundation, with focuses on global health and poverty.
  - Foundations can also be **community** foundations set up by and for the good of the local community, **operating** foundations set up to fund a specific not-for-profit business, or **corporate** foundations set up from the profits of an existing company.

Private Foundations: Stakeholders

- The stakeholders of a private foundation may include the **founding family**, **donors** to the foundation, **recipients** of grants from the foundation, and the **wider community** that the foundation's activities may benefit.
  - The **government** could also be considered a stakeholder due to the favorable tax treatment of foundations.
- Board members of foundations are less likely to have professional investment experience than alumni on endowment boards.
  - This may affect the quality of investment decisions, particularly in more sophisticated markets such as alternative investments.
- **Mission-related investing** (also known as **impact investing**) is a technique increasingly adopted by foundations whereby investments are made into projects that promote the foundation's mission. The challenge with such investments is maintaining a sufficient return on assets to meet the foundation's long-term objectives.

Foundations: Liabilities and Investment Horizon

- Foundations typically have an investment horizon that is **perpetual**.
  - There is a trend toward **limited-life foundations** that are mandated to spend down assets within a limited time frame of the founder's death, which would shorten the investment horizon.
- In the United States, tax laws require private grant-making foundations to pay out a **minimum of 5% of assets** (on a 12-month trailing basis) plus investment expenses. Foundations must also spend any donations in the year the donation is received (known as **flow through**).
- Unlike universities, which have other sources of revenue outside the spending of their endowment, foundations are relied upon almost exclusively to meet budgets.
  - **The higher liquidity requirements of foundations, means they typically have a lower risk tolerance than university endowments.**

Foundations: Liquidity Needs & Investment Objective

- **Liquidity Needs**
  - U.S. foundations are legally required to spend 5% of assets. Foundations should **maintain sufficient liquidity** to meet near-term spending, capital calls from private limited partnership fund investments, and any margin calls on derivatives employed by the investment portfolio.
- **Investment Objectives**
  - The investment objective is to **generate a real return** over consumer price inflation of the spending rate plus investment expenses, with expected annual volatility in a reasonable range (approximately 10% to 15%) over a three- to five-year period.
  - There may be a secondary objective of **outperforming a policy benchmark** based on a tracking error budget.

Foundations: External Constraints & Asset Allocation

- **External Constraints**
  - From a **legal and regulatory** perspective, foundations are subject to similar laws, such as UPMIFA in the United States and the Trustee Act in the U.K., which demand investment on a total return basis, diversification, and a duty of care from the board and investment staff.
  - Foundations typically have similar **tax-exempt status** to endowments, but this status depends on the minimum spending rules mentioned in the previous section.
- **Asset Allocation by Private Foundations**
  - Their overall risk tolerance remains high and, with a long-term objective of beating inflation, larger U.S. foundations allocate about half of the portfolio to alternative investments. Smaller foundations tend to have a higher allocation to domestic equities and fixed-income securities.

Comparison Between Foundations and Endowments

	US Foundations	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.

Comparison Between Foundations and Endowments

	US Foundations	US University Endowment
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.

5. Banks: Stakeholders

- They are financial intermediaries that are run for profit. It is important to remember throughout this discussion that we are advising the institution on its **investment portfolio**, not on its core business of being a bank or an insurance company.
- **Stakeholders**
  - Most major large international banks are publicly listed, making **shareholders** a key external stakeholder with an interest in maximization of profits. **Customers** of a bank, such as depositors and **borrowers,** are also key external stakeholders. Other external stakeholders include creditors, credit rating agencies, regulators, and communities where the bank operates.
  - **Internal stakeholders** include the bank's employees, managers, and directors.

Banks: Liabilities and Investment Horizon

- **Deposits** constitute the majority of a bank's liabilities. This includes **demand deposits** which can be withdrawn without notice and are therefore deemed short term in duration—and **time/term deposits** that require advance notice before withdrawal.
  - Other liabilities include short-term wholesale funding from other financial institutions, long-term debt, and trading/securities payables and repo finance payables.
- The investment horizon for a bank portfolio is influenced by the difference between the **long-term illiquid assets (mortgage and commercial loans)** and the **short-term liquid liabilities** of the bank.
  - Although banks are perpetual organizations, the instruments held in the investment portfolio of a bank are likely to be **very short in nature**, such that the bank can manage the volatility of shareholder capital on a medium-to short-term basis.

Banks: Liquidity Needs

- **Liquidity Needs**
  - **Liquidity management is a core consideration** in the management of bank portfolios. Banks must have the ability to liquidate their investment portfolios within a certain period to generate adequate cash in the event of a crisis.
  - Since the 2007-2009 financial crisis, regulations have been introduced that require banks to have sufficiently liquid assets to cover near-term expected cash outflows (liquidity coverage ratios, or **LCRs**) and to have adequate levels of capital from stable sources (net stable funding ratios, or **NSFRs**).
  - In general, contrasting commercial banks and retail-oriented banks, commercial banks have a higher cost of funds and lower liquidity. **Retail banks** have a lower cost of funds and better liquidity because their retail deposits are relatively low cost and tend to be more stable.

Banks: Investment Objectives

- **Investment Objectives**
  - The primary objective of a bank's investment portfolio is to **manage liquidity** and **reduce risk mismatches** between the bank's noninvestment assets and liabilities.
  - Banks establish an asset and liability management committee (ALMCo) to oversee investment activities.
    - ✓ The ALMCo will set the IPS, monitor performance, and set risk limits regarding market, credit, liquidity, and solvency risks, with the authority to require changes on the asset and liability sides of the balance sheet. Having established these objectives, the investment team sets policy benchmarks, monitors performance, and reports to the bank's management and board.

Banks: External Constraints

- From a **legal and regulatory** perspective, the risks that a systemic bank failure pose to critical economic functions such as payment processing and extension of credit mean that regulators are intensely focused on capital adequacy, liquidity, and leverage levels.
  - The main goal of regulators is to make sure that banks **have adequate capitalization to absorb losses** rather than the losses having to be faced by customers, creditors, or taxpayers.
- Banks typically are **fully taxable entities**; hence, they must consider the after-tax returns of their investment programs.

Banks: External Constraints

- Economies of scale and the benefits of diversification encourage banks to increase their size, with the largest banks regarded by regulators as systemically important financial institutions (SIFIs). Since the global financial crisis, regulations for these SIFIs have:
  - Increased capital required to absorb losses on assets.
  - Placed limits on the amount of dividends and share buy backs since these payouts to shareholders. effectively increase the leverage of the institution.
  - Restricted the ability of subordinated debt holders and preferred shareholders to exert their claims in a bankruptcy, forcing them to bear more of the risk of the bank's activities.
  - Restricted the use of derivatives, proprietary trading, and the use of off-balance sheet liabilities and guarantees.

Banks: External Constraints

- From an **accountancy perspective**, three different accounting systems apply to financial institutions:
  - Standard financial reporting (GAAP or IFRS) is used to communicate results to shareholders. Due to the accruals process of accounting, this provides the smoothest reporting of income.
  - Statutory accounting is utilized by regulators and is comprised of a series of adjustments to make the accounts more conservative
  - True economic accounting uses market value for all assets and liabilities. This is likely to give the most volatile measure of income.

6. Insurers

- **Insurers can be divided into the following two broad categories:**
  - **Life insurers.** They write insurance relating to whole life or term insurance with fixed payments, variable life insurance (with payouts linked to returns of investment funds chosen by the policyholder), annuity products, health insurance, and universal life insurance (with flexible premiums and benefit payouts).
  - **Property and casualty (P&C) insurers.** They write insurance relating to commercial property and liability, home ownership, marine insurance, surety, and legal liabilities.

Insurers: Stakeholders

- Insurers tend to be organized as either publicly listed companies or mutual companies.
  - For **publicly listed companies**, key external stakeholders are shareholders who require long-term maximization of the value of their capital while simultaneously honoring obligations to policyholders.
  - **Mutual companies** are owned by their policyholders, either retaining profits as a surplus against potential losses or distributing them to policyholders through dividends or premium reductions. Other external stakeholders include derivatives counterparties, creditors, regulators, and rating agencies.

Insurers: Stakeholders

- For traditional life insurance and annuity policies (including universal life), life insurers maintain a **general account** to fund the liabilities because the **insurer** bears the investment risk associated with meeting claims under these contracts.
- For variable life policies, the insurer operates a **separate account** in which assets are invested according to the investment choices of policyholders. For these policies, the **policyholder** bears the investment risk.
- Internal stakeholders include an insurer's employees, management, and board of directors.

Insurers: Liabilities and Investment Horizon

- Insurance companies manage their investments with a focus on asset and liability management.
  - **Life insurers** generally face a long duration liability stream through their contract payouts. Life insurance companies have historically set investment horizons of 20 to 40 years.
  - **P&C insurers** generally face a liability stream with a shorter duration and higher uncertainty because claims are relate to unlikely, unpredictable events with high payouts, such as natural disasters.
- The institution has a **perpetual time horizon**, the nature and timing of policy claims will strongly affect the time horizon of investments held. A key consideration for both life and P&C insurers is the frequently occurring underwriting cycle, which causes fluctuations in profitability driven by changes in the level of competition at different points of the insurance business cycle.

Insurer: Liquidity Needs

- An insurer needs to manage both **internal liquidity** (cash from operations and investing activities) and **external liquidity** (ability to borrow in debt markets).
  - Liquidity needs are affected by the level of interest rates. In times of high interest rates, policyholders with historically low-yielding contracts may surrender (i.e., cash in) their policies in order to invest at higher yields in other investments, thereby increasing the net cash outflows of the life insurer.
- As noted previously, P&C insurers face **significant cash flow uncertainty** due to the nature of their liabilities; hence, portfolios require the ample liquidity of high proportions of cash or cash equivalents and short-term fixed-income securities.

Insurer: Liquidity Needs

- Insurers divide general account investments into two major components: the reserve portfolio and the surplus portfolio.
  - Regulations require the insurer to maintain a ***reserve portfolio*** capable of **meeting policy liabilities**, and this is therefore managed conservatively.
  - The ***surplus portfolio*** is used to **generate higher returns**, often by assuming liquidity risk and allocating to alternative investments.

Insurer: External Constraints

- From a **legal and regulatory** perspective, insurers, like banks, carry out crucial financial intermediary roles and can become large enough to be classified by regulators as SIFIs. Similar to banks, regulators will aim to ensure that insurers have sufficient capital to absorb losses in the business and losses from investments.
- In the United States, the National Association of Insurance Commissioners (NAIC) is an association of state regulators that set accounting and reporting policies. In Europe, Solvency II is a framework being used to standardize regulation across member states.
- From an **accountancy** perspective, standard financial reporting, statutory reporting, and true economic accounting rules apply to insurers just as they do to banks. Insurers typically are **fully taxable entities** and must run their investment programs with consideration of after-tax returns.

Insurer: Investment Objectives

- The primary objective of an insurer's investment portfolio is to **manage liquidity** and **reduce risk mismatches** between the institution's assets and liabilities.
  - This process must therefore consider the general business conditions of the insurer and the expected external economic conditions.
- The investment oversight function of an insurer is typically carried out by a board committee that is responsible for all investment policies and procedures and reports to regulators and external stakeholders.

Banks & Insurers: Balance Sheet Management

- A financial institution's fundamental purpose is to assure such contractual parties the full and timely payment of claims when they come due. A firm can only hope to earn a profit if it can provide counterparties assurance it will be able to meet all claims with extremely high probability.
- Thus, in the case of banks and insurers, the well-defined, contractual nature of the financial claims, along with their measurability, imply that—unlike with defined benefit and defined contribution pension plans, sovereign wealth funds, endowments, and foundations—the underlying investment strategy is mainly **liability driven investing** (LDI as earlier defined).

Banks & Insurers: Balance Sheet Management

- We can obtain insight about both investment strategy and regulation of financial institutions by applying a fairly simple but intuitive economic model.

$$A = L + E$$

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

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

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

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

Banks & Insurers: Balance Sheet Management

- The effects on the market value of the institution's equity capital as a function of changes in the market value of assets, liabilities, and leverage level.
- Example: A bank has an equity-to-assets ratio of 5%. Calculate the estimated percentage change in the market value of equity if liabilities rise by 1.5% and assets remain stable.
- Answer:
- With an equity-to-assets ratio of 5%, this means the bank has a leverage multiplier of 20. $\%\Delta E = (0\%*20) - (1.5\% * 19) = -28.5\%$

Banks & Insurers: Balance Sheet Management

- In order to find the percentage change in the value of the institution's equity capital associated with a change in the reference yield, y, on the asset holdings, we divide equation by the change in such yield, obtaining:

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

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

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

Banks & Insurers: Balance Sheet Management

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

$$D_W^* = -\frac{\Delta W}{W \Delta r}$$

- This allows us to revise equation to a practical and intuitive analytical tool, namely,

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

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

Banks & Insurers: Balance Sheet Management

- In order to lower asset duration, financial institutions hold cash, deposits at central banks, foreign currency reserves, and other highly liquid (zero duration) assets.
- On the liability side, there are many ways in which the duration of liabilities can be extended far beyond the implicit zero duration of demand deposits.
  - Finally, banks can and do utilize financial futures and interest rate swaps to alleviate asset/liability mismatches.
- In the light of persistent low interest rates since the global financial crisis of 2007–2009, many large international banks have an asset/liability structure where earnings are poised to benefit from a rise in interest rates. In such cases, the duration of assets is actually shorter than the duration of liabilities

Example

- 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. Management is considering achieve an equity capitalization ratio of 10%. Assuming no change in the D_A^*、D_L^*、$\Delta i/\Delta y$, what is the resulting modified duration of the bank's equity capital ?

Banks & Insurers: Balance Sheet Management

- **Solution 1:**
  - $A \div E = 1/0.09 = 11.11$; $(A \div E) - 1 = 10.11$; $D_A^* = 2.0$; $D_L^* = 1.5$; and $\Delta i/\Delta y = 0.85$. Therefore, the modified duration of shareholders' capital is: $D_E^* = (11.11 \times 2) - (10.11 \times 1.50) \times 0.85 = 9.33$
- **Solution 2:**
  - With this less leveraged balance sheet, $A \div E = 1/0.1 = 10$; $(A \div E) - 1 = 9$; and the duration of shareholders' equity is:

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

Banks & Insurers: Balance Sheet Management

- Volatility is defined here as standard deviation, where $\sigma_{\Delta E/E}, \sigma_{\Delta A/A}$ and $\sigma_{\Delta L/L}$ represent the standard deviations of the percentage changes in market value of equity capital, asset holdings, and liability claims, respectively.
  - Furthermore, $-1 \le \rho \le 1$ denotes the correlation between percentage value changes of assets and liability claims.

资产的权重为**A/E;**
负债的权重为**–(A/E - 1)**

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

- It also incorporates the concept of correlation, which is an essential element of liability-driven investing.
  - The volatility of the financial institution's equity capital decreases as the correlation between asset and liability value changes (ρ) increases toward +1.0.

Banks & Insurers: Balance Sheet Management

Strategy	Impact on Factor	Impact on $\sigma_{\Delta E/E}$	Comments
Hold diversified fixed-income investments	Lowers σ_A	Falls	Diversified fixed income has a lower standard deviation than other riskier asset classes.
Hold high-quality fixed-income investments	Lowers σ_A	Falls	There's a lower chance of significant loss in asset value.
Maintain similar asset and liability durations, and match asset/liability exposure to borrower and claimant options	Increases ρ	Falls	Regulators penalize institutions with high asset/liability mismatches.
Hold common stock investments	Increases σ_A; Lowers ρ	Rises	Most regulators require reserves of 100% to be held against investments in common stock.
Derivatives transparency and collateralization	Lowers σ_A and σ_L; Increases ρ	Falls	The more understood and protected against counterparty default the institution is, the less chance there is of unexpected losses.
Hold more liquid portfolio investments	Lowers σ_A	Falls	

Banks & Insurers: Balance Sheet Management

Strategy	Impact on Factor	Impact on $\sigma_{\Delta E/E}$	Comments
Surrender penalties for insurance contracts	Lowers σ_A	Falls	Penalties cushion losses when policyholders cash in after interest rates have risen.
Prepayment penalties on debt investments	Increases ρ	Falls	Prepayments will occur in a low interest rate environment. Penalties on prepayments help offset rising liabilities in a falling rate environment.
Catastrophic insurance risk	Increases σ_{L}	Rises	Such losses are large and unpredictable and will cause regulators to demand higher reserves, investment in more liquid assets, and more robust reinsurance agreements.
Predictability of underwriting losses	Decreases σ_L	Falls	Total insurance liabilities are less uncertain.
Diversifying insurance business	Decreases σ_L	Falls	Total insurance liabilities are less uncertain.
Variable annuities	Increases ρ	Falls	Asset investment gains and losses are passed through to policyholders due to the nature of the contract.

Banks & Insurers: Asset Allocation

- In the case of banks and insurers, optimal investment management simultaneously focuses on the investment portfolio and the liabilities of the business, all within the context of external economic conditions and regulatory reserve requirements.
- The investment manager also needs to be conscious of the factors that affect the volatility of shareholders' equity and optimal levels of leverage as discussed previously.

It's not an end but just the beginning.

The greatest test of courage on earth is to bear defeat without losing heart.

世界上对勇气的最大考验是忍受失败而不丧失信心。

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    - ✓ 所在班级（eg.1912CFA一级长线无忧班）
    - ✓ 问题所在科目（若未知科目，请提供章节、知识点）和页码
    - ✓ 您对问题的详细描述和您的见解
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Case Study in PM : Institutional

CFA三级培训项目

讲师：Bob Hong

Topic in CFA Level III

Session	Content
Study Session 1-2	ETHICS & PROFESSIONAL STANDARDS (1)&(2)
Study Session 3	BEHAVIORAL FINANCE
Study Session 4	CAPITAL MARKET EXPECTATIONS【NEW】
Study Session 5	ASSET ALLOCATION AND RELATED DECISIONS IN PORTFOLIO MANAGEMENT
Study Session 6	DERIVATIVES AND CURRENCY MANAGEMENT 【NEW】
Study Session 7-8	FIXED-INCOME PORTFOLIO MANAGEMENT (1)&(2)
Study Session 9-10	EQUITY PORTFOLIO MANAGEMENT (1)&(2)
Study Session 11	ALTERNATIVE INVESTMENTS FOR PORTFOLIO MANAGEMENT 【NEW】
Study Session 12-13	PRIVATE WEALTH MANAGEMENT (1)&(2) 【NEW】
Study Session 14	PORTFOLIO MANAGEMENT FOR INSTITUTIONAL INVESTORS 【NEW】
Study Session 15	TRADING, PERFORMANCE EVALUATION, AND MANAGER SELECTION 【NEW】
Study Session 16	**CASES IN PORTFOLIO MANAGEMENT AND RISK MANAGEMENT 【NEW】**

Reading 37

Case Study in Portfolio Management : Institutional

Framework

Institutional

- Managing Liquidity Risk
  - Liquidity Profiling and Time-to-Cash Tables
  - Rebalancing and Commitments
  - Stress Testing
  - Derivatives
- Earning an Illiquidity Premium
- QUINCO Case
  - QUINCO Investment Strategy
  - Strategic Asset Allocation
  - Liquidity Management
  - Asset Manager Selection
  - Tactical Asset Allocation
  - Asset Allocation Rebalancing

1. Managing Liquidity Risk

- Liquidity risk refers to a portfolio having to dispose of illiquid securities **at a deep discount** during troubled markets.
- **Four key methods** to manage liquidity risk include
  1. liquidity profiling and time-to-cash tables,
  2. rebalancing and commitment strategies,
  3. stress testing analyses,
  4. derivatives.

1.1 Liquidity Profiling and Time-to-Cash Tables

- **For an endowment**, the potential cash inflows and outflows must be determined.
  - Cash outflows include distributions to the university and meeting capital call requirements for illiquid investments.
    - ✓ For example, real assets, private equity, hedge funds, and structured products).
  - Cash inflows would typically include donations and investment income earned from the portfolio.
- **The next step** is to establish a timeline that involves constructing a liquidity classification schedule (time-to-cash table).
- That schedule would **have three distinct components:**
  1. amount of time needed to convert assets to cash (**Time to Cash**),
  2. liquidity classification level (**Liquidity Classification**),
  3. **liquidity budget**.

1.1 Liquidity Profiling and Time-to-Cash Tables

- **Time-to-Cash Table and Liquidity Budget.**

Time to Cash	Liquidity Classification	Liquidity Budget (% of portfolio)
< 1 week	Highly liquid	At least 10%
< 1 quarter	Liquid	At least 35%
< 1 year	Semi-liquid	At least 50%
> 1 year	Illiquid	Up to 50%

1.1 Liquidity Profiling and Time-to-Cash Tables

- **The liquidity classification** is closely linked to the amount of time it takes to liquidate an investment without having a major impact on markets.
  - The latter would be demonstrated by a minimal differential in the expected market price immediately before and after a sell transaction.
  - In addition, an investment that takes over one year to exit would likely be considered illiquid.
- **The time to cash** may include a full range of periods beyond those illustrated in the aforementioned Time-to-Cash table, depending on whether they correspond to the investor's cash outflows.
- **The liquidity budget** will then provide minimum or maximum percentage allocations for the different time periods.

1.1 Liquidity Profiling and Time-to-Cash Tables

- To develop the liquidity budget, there must be preliminary work performed in observing the liquidity traits of the investments over a reasonable time period.
  - Within a specific asset class, the various investments could have very diverse liquidity characteristics.
    - ✓ For example, exchange-traded funds (ETFs) may be more liquid than commingled funds.
  - ✓ Additionally, the same type of investment (e.g., commingled fund) may offer different levels of liquidity; one may offer semiannual liquidity because it is focused on small-cap foreign stocks, while the other may offer monthly liquidity because it is focused on large-cap foreign stocks.
  - ✓ That is why it is important to analyze the investments in greater detail.

1.1 Liquidity Profiling and Time-to-Cash Tables

- An excerpt of **a liquidity profiling for a portfolio**

Asset Class	Asset Class Allocation (% of portfolio)	Investment Allocation (% of overall portfolio)	Investment Vehicle	Liquidity Classification			
				Highly Liquid	Liquid	Semi-Liquid	Illiquid
Fixed income	14%	5%	Separate account	100%	0%	0%	0%
		8%	Commingled fund	100%	0%	0%	0%
		1%	Futures	100%	0%	0%	0%
Domestic equity	17%	8%	Commingled fund	0%	50%	50%	0%
		8%	Separate account	0%	100%	0%	0%
		1%	Futures	100%	0%	0%	0%

1.2 Rebalancing and Commitments

- In addition to managing liquidity, it is necessary to maintain the overall risk profile within a desired (quantitative) range because over time and during times of market stress, asset values will change — sometimes very dramatically — thus greatly altering the desired balances in each asset class.
- It is important to have sufficient liquid assets and rebalancing mechanisms in place. Rebalancing mechanisms include the following.
  - **Systematic rebalancing policies**. Rebalancing disciplines, such as calendar rebalancing and percent-range rebalancing, are intended to control risk relative to the strategic asset allocation.
  - **Automatic adjustment mechanisms.** These are mechanisms designed to maintain a stable risk profile when exposure drifts from targeted exposure.

1.2 Rebalancing and Commitments

- **Multi-year funding strategies for private markets** that incorporate a steady pace of commitments to reach a target allocation and/or to keep the allocation close to target over time are other means to ensure the portfolio remains consistent with desired risk objectives.
  - Investing in private market funds makes it more difficult for the portfolio to keep a stable or specific allocation level in the long term because within a given fund, the timing and frequency of when the committed capital is drawn and the return of capital distributions are beyond the control of the investor.
  - By investing in multiple funds, however, the timing and frequency becomes more stable.
- **The objective of a multi-year funding strategy** is to design a commitment-pacing strategy that will result in the desired portfolio exposure to the asset class over time.
- Additionally, **the use of scenario analysis** can take the analysis further to account for various market conditions. Over time, the level of annual commitments will need to be adjusted as needed.

1.3 Stress Testing

- Stress testing explicitly considers how the liquidity needs of a portfolio will change during a period of market stress. The idea is to conduct analysis to assume "worst case" or very extreme market conditions and the impact on both assets and liabilities at the same time.
- The stress tests can be based on any combination of the following: **history, statistical models, and scenario analysis**.

1.4 Derivatives

- **Derivatives** require far less cash than investing in underlying assets, which makes derivatives an ideal method for rebalancing.
  - ✓ In addition, a futures overlay allows for rebalancing of many (but not all) asset classes without altering any of the asset allocations determined by the external active managers.
- With leverage, taking a long futures position requires only minimal cash requirements for margin.

2. Earning an Illiquidity Premium

- It is often the case that relatively illiquid investments such as private equity and real estate will earn an additional return (over the market return) for taking on the risk of holding up capital for an unknown amount of time. This is known as the illiquidity (or liquidity) premium earned.
  - ✓ Studies have shown that the illiquidity premium increases with the amount of time (think of an upward—sloping yield curve, for example).
- A different way to model the illiquidity premium is to think of it **as the value of a put option** where the strike price is the marketable price (a theoretically estimated price, as if it were freely traded) of the illiquid asset when it was purchased.
  - ✓ That leads to the computation of the price of the illiquid asset as follows:

illiquid asset price = marketable asset price - put price

2. Earning an Illiquidity Premium

- Using the marketable and the illiquid prices, we can derive the expected returns for both, and the difference in expected returns would be the illiquidity premium in percentage terms as follows:

illiquidity premium (%) = expected return on illiquid asset (%) - expected return on marketable asset (%)

- There are a substantial number of studies to support **the positive correlation** between illiquidity and expected returns for publicly traded stocks.

Example

- A portfolio analyst makes the following two statements:

  Statement 1: The illiquidity premium is relatively easy to determine accurately.

  Statement 2: Calendar and percent-range rebalancing are examples of automatic adjustment mechanisms.

  How many of the analyst's statements are correct?

  A. Zero.

  B. One.

  C. Two.

Example

- **Answer: A**

  Statement 1 is incorrect. In practice, the illiquidity premium is challenging to accurately determine given all the other factors that interact in determining equity returns. In addition, broad market indexes are used to estimate illiquidity premiums, even though the typical investor is not likely to have such a breadth of investment exposure.

  Statement 2 is incorrect. Calendar and percent-range rebalancing are examples of systematic rebalancing policies.

Example

- **Describe** how futures and options can be used for leverage and liquidity purposes.

- **Answer:**

  Taking a long futures position requires only minimal cash requirements for margin, which is a form of a leveraged investment. Therefore, any cash not required for margin can be used to invest in other assets with differing levels of liquidity, or to meet other liquidity requirements.

  Options can be purchased at premiums that are often only a fraction of the cost of the underlying asset, thereby serving as a form of leverage. Or, options can be sold to earn premium income that helps to generate liquidity.

3. QUINCO Case

- The Quadrivium University (QU) endowment was set up many years ago with the purpose of offering financial assistance to undergraduate students. The current value of the endowment is $8 billion, and about 75% of that amount has unrestricted use, with the other 25% being subject to donor-specified use restrictions.
- QU's annual operating budget is $583 million, and 70% of that amount covers the remuneration of faculty and administrative staff. In addition, the budget is to cover debt payments, maintenance costs, and provide funds related to research and financial aid. The endowment makes annual distributions to fund about 60% of QU's operating budget, and the dollar amounts have been increasing for each of the past five years. Greater stability in the distributions has been requested by the board of the university, so in that regard, the spending rule was changed after the financial crisis over 10 years ago.

3. QUINCO Case

- Pre-crisis, a simple spending rule existed based on 5% of the market value of the endowment at the beginning of the year.
- Post-crise, the spending rule incorporates geometric smoothing (the Yale formula) and is expressed as follows:

Spending for current fiscal year = (66% × spending for previous fiscal year) + 34% × (5% × endowment market value at the end of the previous fiscal year)

- To compute the QU endowment's spending for the current year, the previous year's spending was $358.1 million and the endowment's market value at the end of the previous fiscal year was $7,002.3 million.

Spending for current fiscal year = (66% × $358.1 million) + 34% × (5% × $7,002.13 million) = $355.4 million

3. QUINCO Case

- The QU endowment's investment objective is to earn a sufficient return over the long term to cover the annual spending and to maintain the real value of the endowment.
- At an annual 5% spending rate, 2% - 3% annual inflation applicable to universities, and annual donations of 1%, the endowment has an annual nominal return requirement of 8% - 9%. The risk objective is between a 12% and 14% annual standard deviation of portfolio returns.
- A board of trustees ("the Trustees") oversees the activities of QU. The Quadrivium University Investment Company (QUINCO) is the university investment office and is responsible for managing the QU endowment.
- Aaron Winter is the president of QUINCO, and he reports to the university president and to the QUINCO board of directors ("the Board"). The Board consists of 11 members appointed by the Trustees, and the Board deals with approving investment policy and guidelines. QUINCO staff are charged with implementing the investment policy.

3. QUINCO Case

- QUINCO's 13 investment professionals are officially employed by QU. QUINCO's investment model involves implementation of investment strategy by external managers instead of having in-house investment management.
- Instead, internal staff deal with asset allocation, risk management, manager selection, and continuation decisions regarding the external managers.
- Assets are invested in (1) fixed income, (2) public equity, (3) private equity, (4) real assets (composed of primarily private real estate and natural resources), and (5) diversifying strategies (primarily hedge fund strategies targeting high absolute returns with low correlations to traditional asset classes like public equity and fixed income).
- The last three categories comprise alternative investments. Each of the five categories is managed by a senior portfolio manager and an analyst.

3. QUINCO Case

- In addition, the team includes a portfolio strategist in charge of asset allocation and risk management, also supported by an analyst, and the president of the office who acts as the chief investment officer (CIO).
- The portfolio strategist has ongoing duties involving rebalancing, overlays, and tactical asset allocation (TAA) tilts. Any decisions made by external investment managers and TAA deviations require the approval of the internal investment committee. Winter leads that committee, which includes all senior portfolio managers and the portfolio strategist.
- Finally, the Board must provide final approval for the hiring of any external managers.

3.1 QUINCO Investment Strategy

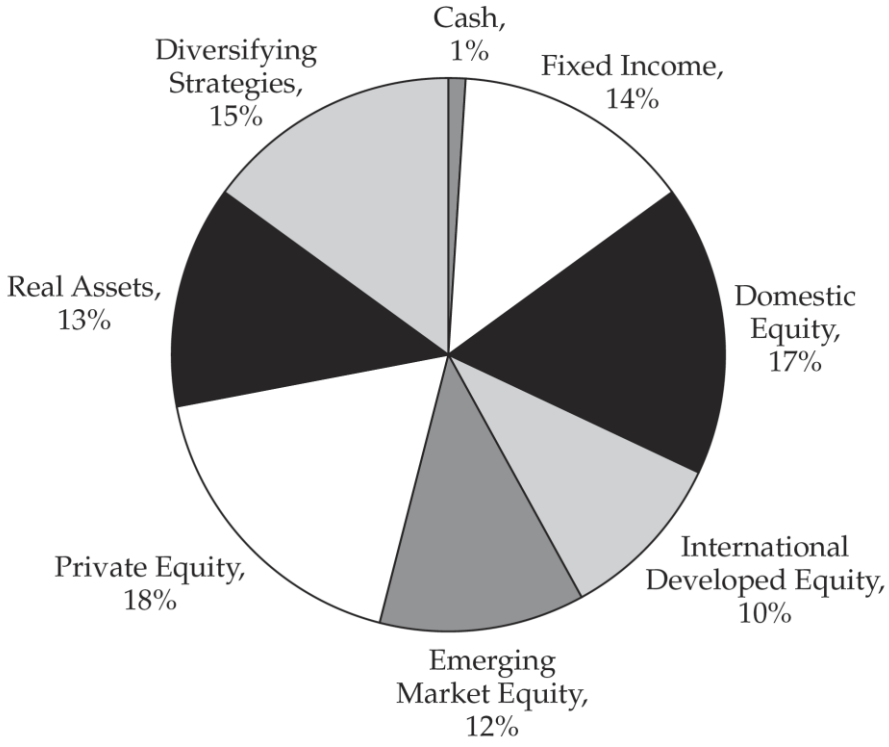
- QUINCO's investment strategy is concerned primarily with the long term. Its connections with QU alumni networks in the industry has allowed the endowment to benefit from the knowledge of the best-in-class managers.
- Initially, its investment universe was confined to traditional publicly traded stocks and bonds. With growth of the endowment, the long-term strategy began to include alternative investments, which may allow for greater diversification and higher risk-adjusted returns (in particular, private equity and real assets).
- Alternative investments have helped to boost the endowment's returns over the past 20 years, although QU's allocation to alternative investments is still below average compared to other comparable endowments.

3.1 QUINCO Investment Strategy

- Spanning an over 20-year period from 1996 to 2017, the QU endowment asset allocation has changed as follows:
  - Cash allocation has remained constant at 1%.
  - Traditional stocks (domestic) and bonds initially accounted for almost 70% of assets but have been reduced to about 30%.
  - International equity (developed markets) initially accounted for almost 25% of assets but have been reduced to 10%.
  - Emerging market equity initially accounted for 0% and has increased to 10% - 15%.
  - Private equity initially accounted for less than 5% and has increased to 15% - 20%.
  - Real assets initially accounted for less than 5% and have increased to 10% - 15%.
  - Diversifying strategies initially accounted for 0% and have increased to 10% - 15%.

3.1 QUINCO Investment Strategy

- During the most recent **strategic asset allocation (SAA)** review by the QUINCO Board two years ago, they resolved to increase the allocation to alternative investments and decrease the allocation to developed market equities (domestic and international).
- **Current Strategic Asset Allocation**



3.1 QUINCO Investment Strategy

- Winter has worked at QUINCO for five years and became the president and CIO one year ago. He will be performing his first asset allocation review. Winter has a portfolio strategy team to assist him with the review. The team includes Julia Thompson, the team lead, as well as her asset allocation analysis plus the senior portfolio managers for fixed income and public equities. After consulting with the Board, Winter advises the team to deal with the following matters pertaining to the review:
  - An optimal liquidity profile and liquidity management plan for the endowment.
  - The SAA in context of the investment outlook; there is an expectation of lower future returns in most traditional asset classes.
  - The use of TAA as a complement to SAA to improve risk-adjusted returns.
  - The QU endowment's underperformance compared to its peers.

3.2 Strategic Asset Allocation

- The strategy team have finished the work requested and will be making a presentation to the Board.
- As part of their economic analysis, they used unsmoothing methods for private equity (a relatively illiquid asset class) due to the smoother reported returns resulting from the lack of frequency of pricing data.
- The unsmoothing methods resulted in an upward adjustment to the reported volatility of private equity.

3.2 Strategic Asset Allocation

- Long-Term Expected Return (Net of Fees) and Volatility Assumptions

Asset Class	Expected Real Return (annual geometric mean, next 10 years)	Expected Nominal Return (annual geometric mean, next 10 years)	Standard Deviation of Returns (annual)	Sharpe Ratio
Cash	0.9%	3.4%	1.7%	
Fixed income	1.8%	4.3%	6.3%	0.14
Domestic equity	5.0%	7.6%	18.1%	0.23
International developed equity	4.8%	7.4%	19.7%	0.20
Emerging market equity	6.0%	8.7%	26.6%	0.19
Private equity	8.5%	11.2%	24.0%	0.32
Real assets	4.5%	7.1%	13.3%	0.27
Diversifying strategies	4.0%	6.6%	10.0%	0.31

3.2 Strategic Asset Allocation

- With some research, it was determined that **the primary reasons** for the QU endowment's underperformance relative to its peers was the lower amount of risk taken and the lower allocation to illiquid investments, especially private equity.
- Therefore, the current and proposed allocations are as follows:

	Current	Proposed
Cash	1%	1%
Fixed income	14%	9%
Domestic equity	17%	15%
International developed equity	10%	9%
Emerging market equity	12%	12%
Private equity	**18%**	**23%**
Real assets	**13%**	**16%**
Diversifying strategies	15%	15%

Note: Inflation assumed to be 2.5% p.a.

3.2 Strategic Asset Allocation

➢ Proposed vs. Current SAA: Expected Risk/Return Properties

Portfolio Characteristic	Current SAA	Proposed SAA
Expected nominal return (annual average, geometric, next 10 years)	7.5%	7.8%
Expected real return (annual average, geometric, next 10 years)	5.0%	5.3%
Standard deviation of returns (annual)	12.5%	13.2%
Sharpe ratio	0.33	0.34
Probability of 25% erosion in purchasing power over 20 years with 5% spending rate	35%	30%

Note: The probability of erosion in purchasing power was derived based on a Monte Carlo simulation with a 20-year investment horizon, assuming expected return and volatility characteristics will be the same as for the next 10 years.

- There is also some reporting of Monte Carlo simulation results to bring attention to the potential erosion in purchasing power. The Board is willing to accept an annualized standard deviation of returns between 12% and 14%.

3.2 Strategic Asset Allocation

- Thompson is aware the proposed asset allocation implies **a small increase** in the overall risk profile of the endowment as measured by the volatility of portfolio returns (13.2% for the proposed SAA versus 12.5% for the current portfolio). She believes that the increase in risk is justified by:
  - Lower future returns expected for all asset classes will necessitate taking on more risk to maintain the same level of returns.
  - QU's endowment takes on less risk than its peers.
  - The estimated Sharpe ratio for fixed-income investments (less risky) means that there should not be as much allocation to less risky assets.
  - Monte Carlo simulations have indicated that in the long term, the proposed asset allocation has a better chance of earning the desired real return and preserving purchasing power.

3.3 Liquidity Management

- Given the increasing complexity in the investment portfolio and the university's reliance on regular distributions from the endowment, QUINCO needs a robust framework for managing liquidity.
- As part of their management duties, Thompson's team performs cash flow modeling over several time horizons and under normal and stressed market conditions. Thompson is worried that liquidity may deteriorate significantly during stressed market conditions for the following reasons.
  - **Capital calls** in private markets exceeding capital distributions.
  - **Activation of gates**.
  - **The smoothing effect**.

3.3 Liquidity Management

- Accordingly, Thompson's team has prepared a summary of liquidity profiles as follows:
  - Existing portfolio liquidity profile
    - ✓ **Normal conditions:** highly liquid (19%), liquid (26%), semi-liquid (22%),illiquid (33%)
    - ✓ **Stress conditions:** highly liquid (15%), liquid (26%), semi-liquid (20%), illiquid (39%)
  - Proposed portfolio liquidity profile:
    - ✓ **Normal conditions:** highly liquid (14%), liquid (24%), semi-liquid (23%),illiquid (39%)
    - ✓ **Stress conditions:** highly liquid (11%), liquid (25%), semi-liquid (21%), illiquid (43%)

Example

- **Discuss** three reasons why the QU endowment should increase its allocation to illiquid investments.

- **Answer:**

1. The QU endowment has a long-term investment focus, which increases its ability to invest in illiquid investments. Therefore, the addition of such assets to the QU endowment's investment opportunities may allow the efficient frontier to be shifted upward so that it achieves a higher return for a stated level of risk.

Example

- **Answer:**

2. The QU endowment has consistently earned positive returns with its illiquid (alternative) investments over the past 20 years. After such a long time period, the illiquid investments portion of the portfolio is clearly established and diversified. With a team of industry experts at their disposal, including best-in-class managers, the endowment should expect to continue earning strong returns in the future, which justifies increasing the allocation to illiquid investments.
3. Compared to its peers, the QU endowment is underinvested in illiquid investments. Therefore, an increased allocation is justified to overcome its past underperformance compared to its peers.

Example

- **Discuss** one concern with increasing the allocation to illiquid assets and describe how that concern can be mitigated.

- **Answer:**

  The increased allocation to illiquid assets (especially private equity and real assets) introduces more unsystematic risk. Therefore, placing smaller amounts in a larger number of investments will reduce much of that unsystematic risk.

Example

- Using the information in the aforementioned table, **discuss** two reasons that support Thompson's proposed asset allocation.

- **Answer:**

  The proposed asset allocation has a better risk-return relationship than the existing SAA, as illustrated in the aforementioned table by the increase in Sharpe ratio from 0.33 to 0.34.

  The proposed asset allocation has a higher chance of earning the target return in the long term. Using the Monte Carlo simulation results, there is a 70% probability of having at least 75% of the purchasing power for the next 20 years; the result in the aforementioned table explicitly states 30% probability of a 25% erosion. Under the existing SAA, there is only a 65% probability of having at least 75% of the purchasing power.

Example

- **Discuss** two tradeoffs involved with implementing the proposed asset allocation.

- **Answer:**

  One tradeoff of the proposed asset allocation is the increase in portfolio volatility — annual standard deviation rises 0.7% to 13.2%. However, given the expectation of lower returns for all asset classes, greater risk must be taken to earn the same level of returns.

  Another tradeoff is the transaction costs, since private equity and real assets are most likely to have higher investment management and performance fees than traditional public stock and bond investments. However, the return amounts in the aforementioned table, are on a net-of-fees basis, so they account for the increased fees.

Example

- **State** two items that Thompson should confirm before implementing the proposed asset allocation.

- **Answer:**

  She should confirm that the metrics in the aforementioned table such as the standard deviation of returns (increased from 12.5% to 13.2%) and the 30% probability of ta 25% erosion in purchasing power are acceptable within the endowment's risk appetite.

  She should confirm that after increasing the illiquid assets allocation, the new asset allocation continues to meet all the portfolio liquidity requirements.

Example

- **Discuss** how a current spending policy could impact liquidity needs when market conditions deteriorate.

- **Answer:**

  Spending policies have a built-in countercyclical impact, so spending rates end up being less than 5% during stronger market conditions and more than 5% during weaker market conditions. As a result, the endowment's liquidity needs are amplified during stressed market conditions.

Example

- **Discuss** three tools for QUINCO to use for liquidity management — specifically, (1) cash flow forecasting and commitment pacing models, (2) liquidity budgets, and (3) stress tests.

- **Answer:**

  Cash flow forecasting and commitment pacing. models can be used to estimate the increased allocation to private equity and real assets. For example, cash outflows need to be estimated for future commitments in private equity; capital calls are legal obligations. Also, during market downturns, such cash outflows may become more onerous as inflows from prior investments could be curtailed or completely stopped due to a lack of cash as investments may not be liquidated due to low valuations. Liquidity budgets can be created after accounting for the endowment's cash inflows and outflows.

Example

- **Answer:**

  Stress tests can be performed using both historical information and hypothetical assumptions within the framework of sensitivity analysis to determine how much variance in liquidity may occur and still be within the liquidity budget constraints.

Example

- **Describe** the impact on QU's liquidity resulting from the proposed asset allocation.

- **Answer:**

  There will be a noticeable increase in more illiquid investments and a noticeable decrease in highly liquid investments. For example, in normal conditions, highly liquid assets will decrease by 5% (from 19% to 14%) and illiquid assets will increase by 6% (from 33% to 39%). In stressed conditions, highly liquid assets will decrease by 4% (from 15% to 11%) and illiquid assets will increase by 4% (from 39% to 43%). QU's overall liquidity profile will become more illiquid due to the increased investment in private equity and real assets, both of which are the most illiquid asset classes.

Example

- **Describe** any follow-up actions Thompson needs to take with respect to the proposed asset allocation.

- **Answer:**

  Thompson must be certain that the endowment will be able to meet all its liquidity needs (e.g., distributions and rebalancing) for the proposed allocation and do so in stressed market conditions. Monitoring at key times when there is increased risk of not being able to meet its liquidity needs, as well as regular stress tests, would be suitable follow-up items to perform.

3.4 Asset Manager Selection

- Three months later, the process of hiring more external managers to implement the proposed asset allocation changes has begun. A request for proposal (RFP) for a private equity manager was issued, and one of the responses came from Genex Venture Capital (GVC) with a proposal to invest in its venture capital fund called "GVC Fund II." GVC is owned and operated by Virginia Hall, CFA, who is on the QU endowment board and has been a **long-time and highly supportive donor** to the university.
- Therefore, both the university treasurer and president are strongly in support of GVC's proposal and have indicated so to Winter. Winter, on the other hand, believes that **Hall asked the two individuals in advance to support her proposal**. Through the process of elimination, the two finalists are GVC and another venture capital fund that is a direct competitor of GVC, called Beacher Venture Investments (Beacher).

3.4 Asset Manager Selection

- GVC and Beacher are requested to present to QUINCO's investment committee. Jason Allen, **a former colleague of Winter**, is GVC's managing director, and he gives the GVC presentation.
- However, Winter knows that the presentation **contains confidential information that is not publicly available**, which was possibly obtained from the university treasurer.
- In addition, GVC's historical returns are presented with amounts materially greater than those reported elsewhere by third parties. Beacher is the more established pick of the two firms, **despite some problems with the performance of its previous fund**. But some concerns were raised about GVC's short existence to date.
- Ultimately, Bud Davis, one of QUINCO's senior portfolio managers in private equity, is asked to make a recommendation on which firm to go with.

3.4 Asset Manager Selection

- Davis states that GVC is finding it difficult to raise the targeted $300 million for Fund II since Fund I only raised $100 million. Investors are worried about the threefold expansion and the uncertainty whether GVC can achieve its goal.
- However, Davis **tempers that point with strong, positive comments** about GVC's manager and GVC's investment approach.
- In addition, Davis confirms that GVC's investment management fee will be lowered. Based on Davis's comments, the investment committee agrees with Davis's recommendation to go with GVC.
- Afterward, Winter speaks with Allen to convey the news. During the conversation, Allen states that Davis's spouse, Andrea, is Hall's daughter. When Winter confronted Davis with that knowledge, Davis **simply** stated that it was well known and **assumed** that everyone on the investment committee **already** knew of the relationship.

Example

- **Discuss** ethical issues and potential violations of the Code and Standards by **Winter, Hall**, the QU president and QU treasurer, **Allen**, and **Davis**. (Note: The citation of specific standard numbers and names is not necessary.)

- **Answer:**

  Aaron Winter, QUINCO CIO

  - Standard VI(A): **Disclosure of Conflicts**. Winter should have disclosed to the Board that the owner of GVC is already very closely associated with the university.

Example

- **Answer:**
- Aaron Winter, QUINCO CIO
  - Standard I(B): **Independence and Objectivity**. Winter is under pressure from some members of the university to award the position to GVC, which would impact his independence and objectivity. Winter should have disclosed that GVC's managing director is a former colleague as that it could potentially impair Winter's independence and objectivity.
  - Standard lll(E): **Preservation of Confidentiality**. Winter suspected that GVC used confidential information in its presentation, and he should have disclosed his concerns to the university.

Example

➢ **Answer:**

Aaron Winter, QUINCO CIO

- Standard I(C): **Misrepresentation** and Standard III(D): **Performance Presentation**. Winter is suspicious as to the precision of the historical results provided.
- Standard V(A): **Diligence and Reasonable Basis**. Winter did not confirm or dispel his suspicions by doing any subsequent research or probing with GVC.

Example

➢ **Answer:**

Virginia Hall, QU trustee, owner of GVC

- Standard VI(A): **Disclosure of Conflicts**. If Hall is trying to influence the hiring decision in favor of her company, then there is a conflict of interest. Hall's position as a QU trustee and her ownership of GVC is also a conflict as GVC is one of the finalists. to be considered for hiring as an external portfolio manager for the QU endowment.
- Standard IV(A): **Loyalty**. By potentially putting her own business interests ahead of the best interests of the university (she is a QU trustee), Hall would be in violation of her duty of loyalty.
- Standard III(E): **Preservation of Confidentiality**. Hall may have obtained confidential information and used it in GVC's presentation to improve GVC's chances of being hired.

Example

- **Answer:**

  QU president and QU treasurer (both are members of the QU Board)

  - Standard IV(A): **Loyalty**. Both the president and treasurer must act in the university's best interests by hiring only the best portfolio manager. They are violating Standard IV(A) by pressuring Winter to hire GVC given Hall's close association with the university.
  - Standard III(E): **Preservation of Confidentiality**. They may also be in violation of Standard III(E) if they were the culprits who provided the confidential information in the GVC presentation.
  - Standard VI(A): **Disclosure of Conflicts** and Standard I(B): **Independence and Objectivity**. For example, they should have disclosed their bias toward Hall given her past generosity to the university. Furthermore, they should have abstained from any voting decisions on the external manager given their lack of independence and objectivity.

Example

➢ **Answer:**

Jason Allen, GVC's managing director

- Standard I(C): **Misrepresentation** and Standard III(D): **Performance Presentation**. Allen may have used incorrect information, unknowingly or knowingly, in his presentation.

Bud Davis, QUINCO senior portfolio manager

- Standard VI(A): **Disclosure of Conflicts** and Standard I(B): **Independence and Objectivity**. Davis needs to make an objective evaluation of GVC in context of a hiring decision. The fact that his spouse is the daughter of GVC's owner presents a serious impairment to his independence and objectivity, and he should have disclosed the relationship.

3.5 Tactical Asset Allocation

- The Board has approved a much larger active risk budget for QUINCO's proposed TAA plan. The annual tracking error limit was specifically increased from 100 bps to 250 bps to try to increase overall portfolio returns. Winter and his staff are completely responsible for implementing the new TAA plan, and they have the authority to use 150 bps of the 250 bps budget to do so.
- Additionally, because the use of derivatives in the implementation would result in increased leverage, the Board approved a maximum leverage position of 5% of the portfolio value.
- Winter thinks that the TAA plan will allow for overweight and underweight positions in acceptable asset classes and allow for investing in assets beyond the policy portfolio benchmark universe that are still consistent with the investment policy. In implementing the plan, Winter began with fair value and mean reversion by creating fair value models for the portfolio assets. Relevant economic and financial data known to have predictive power were gathered and used to estimate future risk and return for periods ranging from one to three years.

3.5 Tactical Asset Allocation

- The output from the models (i.e., theoretically correct fair value) is then compared to actual prices to assess whether any variances are significant enough to be exploited, after considering the costs involved in doing so. Subsequent and thorough backtesting revealed that the models worked well.
- Specifically, large-cap U.S. equities were priced far below their fair value and mean reversion would occur in about a year. Thompson uses that information and proposes to overweight U.S. equities by 1% using either a total return swap, equity futures, or ETFs. The objective is to minimize use of cash and transaction costs.

3.5 Tactical Asset Allocation

- Cost Comparison Assuming a Fully-Funded Mandate

Cost Component	ETF	Futures	Total Return Swap
Commission (round trip)	4.00	2.00	5.00
Management fee (annual)	9.50	0.00	0.00
Bid/offer spread (round trip)	2.50	2.00	6.00
Price impact (round trip)	15.00	10.00	0.00
Mispricing (tracking error, annual)	4.00	8.00	0.00
Cost to roll the futures contract	0.00	20.00	0.00
Funding cost	0.00	0.00	40.00
Total cost	**35.00**	**42.00**	**51.00**

Notes: The exhibit shows the team's cost comparison for the three implementation options — ETFs, futures, and total return swaps——for an $80 million notional exposure to the S&P 500 Index (assuming a fully funded mandate) over a one-year investment horizon. All numbers are in basis points (bps) unless otherwise indicated.

3.5 Tactical Asset Allocation

- Thompson feels that ETFs require too much up-front cash (100% of the value) or that the 50% permitted margin would provide only limited leverage opportunities ($80 million investment with $40 million provided in cash and $40 million borrowed). She realizes that using futures and total return swaps to obtain $80 million exposure would require far less cash than the $40 million required if using ETFs.
- On the other hand, **ETFs and futures** are more liquid - they are widely traded and have low transaction costs. Both instruments allow for early termination, should market conditions warrant it, and Thompson has made it known that the flexibility is important to her. **Total return swaps** are traded over the counter (OTC) in that the terms are negotiated and features are customized between the counterparties. However, with futures, Thompson does not like the daily margin monitoring tasks. Additionally, she has concerns over interest rate and counterparty credit risk.
- The overlay will be performed on the assumption of a leverage level of 4, meaning 25% of the investment is provided in cash and 75% borrowed. Financing costs are based on a 2% 3-month LIBOR rate for futures and swaps, with an additional 0.5% financing cost for ETFs.

3.6 Asset Allocation Rebalancing

- It is now three months after the overweight position in U.S. equities, and the position has done well. Fixed income has not performed well due to a large rise in interest rates.
- As a result, there has been **noticeable drift** in the QU endowment asset allocation. Rebalancing of the portfolio is performed quarterly for cost control reasons; however, the portfolio drift from the SAA is checked on a monthly basis. At the end of each quarter, if a relatively liquid asset class moves outside the rebalancing corridor, then it is systematically rebalanced back to either the target allocation or to the edge of the corridor.
- For more illiquid asset classes, high transaction costs mean that rebalancing is done more implicitly by altering the commitments and reinvestments when allocations drift to the either end of the corridor.

3.6 Asset Allocation Rebalancing

➢ SAA, Rebalancing Corridors, and Current (Actual) Allocations

	Target Allocation (SAA)	Corridor	Min/Max Target	Current Allocation
Cash	1%	±1%	0% - 2%	0.8%
Fixed income	9%	±3%	6% - 12%	6.5%
Domestic equity	15%	±2.5%	12.5% - 17.5%	17.3%
International developed equity	9%	±2%	7% - 11%	11.5%
Emerging market equity	12%	±2%	10% - 14%	13.9%
Private equity	23%	±5%	18% - 28%	19.2%
Real assets	16%	±3%	13% - 19%	13.8%
Diversifying strategies	15%	±3%	12% - 18%	17.1%
Total	**100.0%**			**100.0%**

3.6 Asset Allocation Rebalancing

- Thompson notices the following:
  - International developed equity at a current allocation of 11.5% has exceeded the top end of the corridor (11%) by 0.5%.
  - Fixed income at a current allocation of 6.5% is off significantly from the target of 9% but still within the acceptable range of 6% - 12%.
  - Private equity at a current allocation of 19.2% is near the low end of the corridor (18%).
  - Real assets at a current allocation of 13.8% is near the low end of the corridor (13%).
- As an immediate action, Thompson wishes to reduce the international developed equity allocation and increase the fixed income allocation by 0.5%. That will take the former back to the top edge of its corridor. The question is whether to perform the transaction through the cash market or the derivatives market. She is aware that implementation will take more time in the cash market but is necessary for larger or more important adjustments.

3.6 Asset Allocation Rebalancing

- Upon further research, Thompson finds out that the 0.5% rebalancing transaction over a three-month investment horizon will incur 30 bps of transaction costs in the cash market (bid/offer spread of 5 bps, price impact of 5 bps, and cash drag of 20 bps). The cash drag includes the impact of timing delays and disruptions to active manager portfolios.
- The same rebalancing transaction will incur 24 bps of transaction costs in the futures market (bid/offer spread of 3 bps, price impact of 4 bps, and mispricing of 17 bps).

3.6 Asset Allocation Rebalancing

- With additional consultations within the team, Thompson then opts to rebalance international developed equity back to the 9% allocation, so that involves a 2.5% decrease to equity as well as a 2.5% increase to fixed income.
- Now, the investment horizon is one year and will incur 60 bps of transaction costs in the cash market (bid/offer spread of 5 bps, price impact of 5 bps, and cash drag of 50 bps). For the futures market, there will be 82 bps of transaction costs (bid/offer spread of 4 bps, price impact of 4 bps, cash drag of 68 bps, and cost of rolling futures contracts of 6 bps).

Example

- On the assumption of no leverage employed, **identify** the most appropriate method for Thompson to use to implement the overweight to U.S. equities. **Justify** your response with three reasons, including cost, logistical, and risk considerations.

- **Answer:**

  With respect to costs, the ETF is the lowest at 35 bps, with 70% of it due to price impact (buying and selling the position) and the management fee. Futures are more costly at 42 bps, with rolling costs (due to upward-sloping yield curve) constituting about half of the costs. Price impact and tracking error constitute most of the remaining costs. The total return swap is the highest at 51 bps. On cost considerations alone, the ETF should be chosen.

Example

- **Answer:**

  Logistically, futures require quarterly rollover and daily monitoring of margin, so in that regard, futures are less appealing for Thompson. ETFs are managed by the ETF manager. There are no real logistical issues for total return swaps. On logistical considerations, either the ETF or the total return swap should be chosen.

  From a tracking error (risk) perspective, ETFs face tracking error for reasons such as cash drag and mandatory diversification. Futures face tracking error for reasons such as liquidity and interest rate differentials. Total return swaps have no tracking error since the receipt is the S&P 500 Index return. On tracking error considerations, the total return swap should be chosen.

Example

- **Answer:**

  Furthermore, Thompson worries about interest rate risk, which would be prevalent with futures and the total return swap. She also worries about counterparty credit risk, which would occur with futures. On risk considerations, the ETF should be chosen.

  Overall, the best choice is the ETF because it has the lowest cost, no logistical issues, and no exposure to interest rate and counterparty credit risks.

Example

- Assuming a leverage level of 4, **determine** whether Thompson would change her mind in terms of investment vehicle for implementation purposes. **Identify** one issue unrelated to cost. (Note: Ignore any additional return that could be earned by investing the 75% of cash that is not required for the investment.)

- **Answer:**

  ETF financing cost = $80 million × 75% × 2.5% = $1.5 million (1.875%)

  futures financing cost = $80 million × 75% × 2% = $1.2 million (1.5%)

  swaps financing cost = $80 million × 75% × 2% = $1.2 million (1.5%)

Example

- **Answer:**

  Taking into account the costs from the aforementioned table:

  ETF total cost = 0.35% + 1.875% = 2.225%

  futures total cost = 0.42% + 1.5% = 1.92%

  swaps total cost = 0.51% + 1.5% = 2.01%

  On the basis of costs with the assumption of a leverage level of 4, Thompson may change her mind and elect to implement using futures because it is the lowest-cost option by 9 bps.

  However, Thompson must consider the incremental work to be performed with monitoring the futures (e.g., margin) and rolling over the contracts every quarter.

Example

- **Discuss** the issues of cash drag in rebalancing in the cash market and tracking error in rebalancing in the derivatives market.

- **Answer:**

  In the cash market, cash drag (in the form of timing delays and disruptions to active manager portfolios) comprises two-thirds of the total costs. A sufficient amount of investments from international developed equity managers would need to be liquidated, and the cash would be taken from those managers and transferred to existing or new fixed income managers. Doing so results in transaction costs as well as cash drag, since there will be some delay in getting the funds to the fixed income managers and having the funds invested.

Example

- **Answer:**

  In the derivatives market, tracking error comprises more than 70% of the total costs. The transaction would involve a short position in equity futures to reduce exposure and a long position in fixed-income futures to increase exposure. The use of multiple futures contracts will increase tracking error; it is 17 bps for two contracts compared to 8 bps for one contract, as noted earlier in the following aforementioned table.

Example

- **Discuss** how implementation speed and rebalancing size would impact the method of implementation.

- **Answer:**

  Rebalancing with derivatives is most likely to be implemented more quickly, and with no impact on the active managers. That is on the assumption of reasonably high levels of liquidity in the equity futures market, for example.

  If the rebalancing transaction is larger, then the transaction is likely to be more permanent in nature rather than merely a short-term adjustment that could easily be reversed later.

Example

- Assuming the 2.5% reallocation is performed, **evaluate** the implementation options and **select** the most appropriate one for Thompson to use.

- **Answer:**

  From a cost perspective, transacting in the cash markets is preferable given the savings of 22 bps compared to transacting in the derivatives markets.

  Should a faster implementation time be required, transacting in the derivatives market is preferable.

Example

- **Answer:**

  Given the larger size of the rebalancing (2.5% now vs. 0.5%, discussed earlier), there is an implied longer time horizon that supports transacting in the cash markets.

  Overall, with a 2.5% reallocation, the most appropriate option would be to transact in the cash markets.

It's not an end but just the beginning.

"There are only two creatures," says a proverb, "who can surmount the pyramids-the eagle and the snail."

俗话说："能登上金字塔的生物，只有两种------鹰和蜗牛。"

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