

# Equity Portfolio Management

## CFA三级培训项目

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## Topic in CFA Level III

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# Framework

## Equity Portfolio Management

- **SS7: Equity Portfolio Management (1)**
  - R15 Overview of Equity Portfolio Management
  - R16 Passive Equity Investing
- **SS8: Equity Portfolio Management (2)**
  - R17 Active Equity Investing: Strategies
  - R18 Active Equity Investing: Portfolio Construction



# Reading 15

## Overview of Equity Portfolio Management

# Framework

1. Introduction and the Role of Equities in a Portfolio
2. Equity Investment Universe
3. Income and Cost Associated with an Equity Portfolio
4. Shareholder Engagement
5. Passive\Active Management

# 1.1 The Roles of Equities in a Portfolio

## ➤ Capital appreciation

- The main driver of **long-term equity returns** is capital (or price) appreciation.

## ➤ Dividend income

- Dividend yield tends to be **more stable** than return due to price change.

## ➤ Diversification

- Equity securities offer diversification benefits due to **less than perfect correlation** with other asset classes.
- During a financial crisis correlations tend to increase, limiting the diversification benefit.

## ➤ Inflation hedge

- E.g. **Commodity-producing companies** (e.g., oil producer) .

## 1.2 Client Investment Considerations

- The decision to include equities or the kinds of equities to include in a portfolio also depends on client investment considerations as outlined in the investment policy statement (IPS).
  - **Risk & return objective** : risk and return measurement (e.g., in absolute or relative terms); specific objectives.
  - **Liquidity requirement**
  - **Time horizon** (e.g., short term, long term, or some combination of the two).
  - **Tax concerns** (e.g., dividends may be taxed at a different rate than capital gains.)
  - **Legal and regulatory factors**
  - **Unique circumstances**: may include environmental, social, and governance (ESG) issues or religious preferences.



## 1.3 ESG Considerations

- ESG considerations in equities often determine the suitability of certain sectors or individual company stocks for designated investor portfolios.
- **ESG approaches:**
  - **Negative screening** (i.e., exclusionary screening), which excludes companies or sectors that do not meet client standards.
  - **Positive screening** (i.e., best-in-class screening), which seeks to uncover companies or sectors that rank most favorably with clients.
  - **Thematic investing**, which screens equities based on a specific theme, such as climate change.
    - ✓ A related approach is **impact investing**, which aims to meet investor objectives by becoming more actively engaged with company matters and/or directly investing in company projects.



## 2. Equity Investment Universe

- The three main **segmentation** approaches.
  - Segmentation by size and style
  - Segmentation by geography
  - Segmentation by economic activity

## 2.1 Segmentation by size and style

- **Size (market capitalization):** large cap, mid-cap, or small-cap companies.
- **Style:** growth, value companies or blend (core).

Large Cap value	Large Cap core	Large Cap growth
Mid Cap value	Mid Cap core	Mid Cap growth
Small Cap value	Small Cap core	Small Cap growth

- **Advantages**
  - Address client investment considerations in terms of risk and return characteristics.
  - Greater diversification benefits by investing across sectors or industries.
  - Construct performance benchmarks for specific size/style segments.
  - Analyze how company characteristics change over time.
- The **disadvantages** are that the categories may change over time and may be defined differently among investors.

## 2.2 Segmentation by Geography

- This approach categorizes international markets by **stage of economic development**, such as developed markets, emerging markets, and frontier markets.
- **Advantage**
  - Investors with significant domestic market exposure can better understand how to diversify across international markets.
- **Disadvantage**
  - International equity markets may subject investors to currency risks.
  - Overestimation of the diversification benefit.

## 2.3 Segmentation by Economic Activity

### ➤ Segmentation by Economic Activity

- A **market-oriented approach** segments companies by **markets served**.
  - ✓ E.g. Global Industry Classification Standard (GICS).
- A **production-oriented approach** segments companies by **products manufactured and inputs required** during the production process.
  - ✓ E.g. Industrial Classification Benchmark (ICB).

### ➤ Advantage

- Allow to construct benchmarks based on specific sectors/industries.
- Diversification benefits are enhanced when investments span different sectors/industries.

### ➤ Disadvantage to this approach is that some companies, especially larger firms, may have business operations that are not easily assigned to **one** specific sector or industry.

## 2.4 Segmentation of Equity Indexes

- **Equity market indices** and equity portfolio benchmarks can be constructed based on a combination of size/style and geographic segmentation.
  - For example, the MSCI Europe Large Cap Value Index and the MSCI China Small Cap Index combine elements from both size/style and geographic classifications.
- **Economic activity** can also be used to subdivide equity indices by sector or industry.
  - For example, the MSCI World Energy Index and the S&P Global Natural Resources Index track global companies categorized by sector/industry.
- **Equity indices** can also track unique client considerations, such as ESG practices.

## 3.1 Income Associated with an Equity Portfolio

### ➤ 1. Dividend income:

- The **primary source of income** for equity portfolios.
- **Optional stock dividend:** allows investors to choose between cash payments or stock dividends.
- **Special dividend:** a one-time cash payment to investors.
- **Dividend tax:** income and/or with holding tax.

### ➤ 2. Securities lending income

- Securities lending fees from the borrower
  - ✓ Approximately 0.2–0.5% annually in DMs, higher in EMs.
  - ✓ Dividends on loaned stock are compensated by the borrower.
- Reinvestment return of cash collateral received.
  - ✓ **Related risks:** market risk, credit risk, liquidity risk, and operational risk.
- Index funds are frequent stock lenders.

## 3.1 Income Associated with an Equity Portfolio

### ➤ 3. Dividend capture

- An investor
  - ✓ 1. buys a stock right before its ex-dividend date,
  - ✓ 2. holds that stock through the ex-dividend date (entitling the investor to receive the dividend payment),
  - ✓ 3. sells the stock.
- The strategy is premised on and will be profitable if the stock price declines by less than the amount of the dividend.

### ➤ 4. Writing options (i.e., selling options) to earn option premiums.

- A **covered call**: writing a call option and holding the stock.
  - ✓ The writer then loses the upside of the security if the price increases above the strike price.
- **Cash-covered put** (also known as a **cash-secured put**): selling a put option and buying bond whose face value equals to the exercise price.



## 3.2 Costs Associated with an Equity Portfolio

- **1. Management fees** compensate the manager, pay research and analysis, computer hardware and software, compliance, and processing trades.
- **2. Performance fees (i.e., incentive fees).** Fees earned when the portfolio outperforms a stated return objective. These fees are more common for hedge funds and alternative managers.
  - The use of **high-water marks** protects clients from paying twice for the same performance.
- **3. Administration fees.**
  - Functions provided by internal management team(**part of the management fee**).
  - Functions provided by external parties(**in addition to management fees**)
    - ✓ **Custody fees:** charged for having a custodian hold assets independent of the portfolio manager.
    - ✓ **Depository fees:** charged to assist custodians with segregating portfolio assets and for verifying portfolio compliance with investment limits, such as leverage and cash requirements.
    - ✓ **Registration fees:** registering ownership of mutual fund shares.

## 3.2 Costs Associated with an Equity Portfolio

- 4. Some firms also charge separate **marketing and distribution fees**.
- 5. **Trading costs** (i.e., transaction costs) refer to costs associated with buying and selling securities.
  - **Explicit costs** include broker commissions, stock exchange fees, and taxes.
  - **Implicit costs** include bid-ask spreads, price impact from the transaction, and delay costs (i.e., slippage costs) from not completing an entire trade due to illiquidity.

## 3.2 Costs Associated with an Equity Portfolio

### ➤ Investment Approaches and Effects on Costs

- Passive strategies may face a “hidden” cost from **predatory trading**.
  - ✓ Purchasing (or selling short) shares prior to their effective inclusion (or deletion) from an index.
- Some active investing approaches “**demand liquidity**” from the market(e.g. a momentum strategy).
- Some active investing approaches are more likely to “**provide liquidity**” to the market(e.g. deep value strategies).
- Investment strategies that involve frequent trading and demand liquidity are likely to **have higher trading costs** than long-term, buy-and-hold investment strategies.

## 4. Shareholder Engagement

- **Shareholder engagement** refers to investors and managers interacting with companies in ways to potentially favorably impact the stock price.
- **Benefits of Shareholder Engagement**
  - Can help developing a more effective corporate governance culture which may lead to better company performance.
  - Investors may obtain more information about companies or the sectors (e.g. company's strategy/culture/competitive environment).
  - **Active and larger investors** are more likely to do so.
  - Successful engagement benefits all shareholders, including “**free riders**” .
  - Some non-financial interests(e.g. ESG considerations) may also benefit from shareholder engagement.

## 4. Shareholder Engagement

### ➤ Limitations of Shareholder Engagement

- Can be time consuming and costly for both shareholders and companies
- Focus on short-term goals such as increasing cash flows or stock prices at the expense of the company's long-term goals.
- Lead to the acquisition of material, non-public information which could increase the risk of insider trading.
- Create potential conflicts of interest.
  - ✓ For instance, an engaged portfolio manager may support company management because the management also invests in the manager's fund.


## 4. Shareholder Engagement

### ➤ Role of an equity manager in shareholder engagement

- Activist investing
  - ✓ Propose shareholder resolutions and launch media campaigns to influence the vote.
  - ✓ Seek representation on the company's board of directors.
    - ◆ Launch proxy fights to win to achieve their goals. A proxy fight means seeking to persuade other shareholders to support their proposals.
- Voting
  - ✓ The participation of shareholders in general meetings (general assemblies) ;
  - ✓ Exercise of their voting rights.

## 5. Active/Passive Management

- **Passive investors** seek to reach an equity market index or benchmark.
- **Active managers** seek to outperform the benchmark and add value.
  
- **Rationales for choosing active management**
  - Confidence to outperform the benchmark.
  - Client preferences (primary consideration).
  - Mandates from clients.
- **Rationales for choosing passive management**
  - **Narrow limited benchmarks** don't give the manager much room to deviate and are likely to support a more passive approach.
  - Passive management is **cheaper** to implement.
  - **Potential risks of active management**
    - ✓ Reputation risk; Key person risk.
  - **Tax**
    - ✓ **For active strategies, higher portfolio turnover** can lead to higher tax burdens.



# Reading 16

## Passive Equity Investing



# Framework

1. Indexes as a Basis for Investment
2. Index construction
3. Factor-Based Strategies
4. Approaches to Passive Equity Investing
5. Portfolio Construction
6. Tracking Error Management
7. Source of return and risk

# 1. Indexes as a Basis for Investment

- An index used as a benchmark for equity investment strategies must be:
  - **Rules-based:** The rules for including and excluding stocks in the portfolio, the weighting scheme, and the rebalancing frequency must be consistent, objective, and predictable so investors can replicate the investment performance of the index.
  - **Transparent:** The rules underlying the index are public, clearly stated and understandable to investors.
  - **Investable:** Investors can replicate the return and risk performance of the index.
    - ✓ Policies intended to limit stock migration problems and keep trading costs low:
      - ◆ **Buffering** involves establishing ranges around breakpoints that define whether a stock belongs in one index or another.
      - ◆ **Packeting** involves splitting stock positions into multiple parts.

# 1.1 Considerations in choosing a Index

## ➤ Determine market exposures (Based on IPS)

- **Market segment:** For example, the investor has a choice of broad market exposure versus focused exposure to certain sectors, between domestic or international exposure, and among developed, emerging, or frontier markets.
- **Capitalization** (the size factor): Markets are also segmented by capitalization, typically large-cap, mid-cap, and small-cap. Small-cap stocks generally have higher risk and higher expected returns than large-cap stocks.
- **Growth versus value** (the style factor): Investors can choose exposure to growth stocks (high price-to-earnings (P/E) and high price-to-book (P/B) ratios) or value stocks (low P/E and low P/B ratios).
- **Other risk factors** include the momentum factor, the liquidity factor, the volatility factor, and the quality factor.



## 2. Index Construction

### ➤ 2.1 Stock inclusion methods

- **Exhaustive** stock inclusion strategies are those that select every constituent of a universe.
  - ✓ eg. CRSP U.S. Total Market Index
- **Selective approaches** target only those securities with certain characteristics.
  - ✓ eg. S&P 500

## 2. Index Construction

### ➤ 2.2 Weighting methods

- **Market-cap weighting** (most common)

- ✓ **Liquidity-weighted.** Because more heavily weighted large-cap stocks tend to have higher liquidity and greater capacity to handle investor flows at a manageable cost.
- ✓ The most common example is **free-float weighting**: excluding closely-held shares not available to market participants.
- ✓ **Mean–variance efficient**: offers the highest return for a given level of risk.

## 2. Index Construction

### ➤ 2.2 Weighting methods (cont.)

- **Price weighting** (e.g. Dow Jones Industrial Average/ Nikkei 225)
  - ✓ **Hold the same number of shares in each stock** and weight each stock by its price.
  - ✓ Higher priced stocks are more heavily weighted in the index.
  - ✓ Affected by stock splits.
- **Equal weighting** weights each stock equally.
  - ✓ **Advantage:**
    - ◆ Produce the **least-concentrated portfolios**(constituent weights of  $1/n$ ).
    - ◆ Slow changing sector exposures.
  - ✓ **Disadvantage:**
    - ◆ **Higher volatility** due to its small-cap bias.
    - ◆ Require **regular rebalancing**.
    - ◆ **Limited investment capacity**.



## 2. Index Construction

### ➤ 2.2 Weighting methods (cont.)

#### ● Fundamental weighting

- ✓ Weight stocks by fundamental factors(e.g., sales, income, or dividends).
- ✓ Believe that the market price will eventually converge to a level implied by the fundamental attributes.

## 2. Index Construction

### ➤ 2.2 Weighting methods (cont.)

- **Tax-exempt** institutional investors could experience **superior returns from equal weighting** than cap-weighted index.
- **Market-cap-weighted indexes and fundamentally weighted indexes**
  - ✓ **Shared characteristics:** low cost, rules-based construction, transparency, and investability.
  - ✓ **Different philosophies**
    - ◆ **Market-cap-weighted** portfolios are based on the efficient market hypothesis,
    - ◆ **Fundamentally weighted** indexes look to exploit possible inefficiencies in market pricing.



## 2. Index Construction

### ➤ 2.3 Rebalancing and Reconstitution

- **Reconstitution** of an index frequently involves the addition and deletion of index constituents.
- **Rebalancing** refers to the periodic reweighting of those constituents.
- Index reconstitution and rebalancing create **turnover and transaction costs**.
  - ✓ The **turnover** for **developed-market, large-cap indexes** that are infrequently reconstituted tends to be low,
  - ✓ **Benchmarks** constructed using stock selection rather than exhaustive inclusion have higher turnover.

## 2. Index Construction

### ➤ 2.4 Index construction: Concentration

- **Effective number of stocks:** an indication of **portfolio concentration**.

$$\text{Effective number of stocks} = 1/\text{HHI} = \frac{1}{\sum_{i=1}^n \omega_i^2}$$

✓ where, Herfindahl–Hirschman index (HHI) refers to the sum of the squared weights of the individual stocks in the portfolio.

- **Equal weighted index:** Effective number of stocks = number of stocks.
- **Market-cap weighted index:** Effective number of stocks < number of stocks.

## Example



- A market-cap-weighted index contains 50 stocks. The five largest-cap stocks have weights of 0.089, 0.080, 0.065, 0.059, and 0.053. The bottom 45 stocks represent the remaining weight of 0.654, and the sum of the squares of those weights is 0.01405. What are the portfolio's Herfindahl–Hirschman Index and effective number of stocks held?

# Example



## ➤ Solution:

Stock	Weight	Squared Weight
1	0.089	0.00792
2	0.080	0.00640
3	0.065	0.00423
4	0.059	0.00348
5	0.053	0.00281
stocks 6–50	0.654	Sum of squared weights for Stocks 6–50: 0.01405
<b>Total for stocks 1–50</b>	1.000	0.03889

- The HHI is shown in the final row: 0.03889.
- Effective number of stocks is  $1/0.03889 = 25.71$ .
- Thus, the 50 stocks in the index had a concentration level that can be thought of as being equivalent to approximately 26 stocks held in equal weights.

### 3. Passive Factor-Based Strategies

- **Passive factor-based strategy (smart beta).**
  - **Use passive rules**, but frequently involve **active** decision making:  
Decisions on the timing and degree of factor exposure are being made.
  - **Difference** with conventional active management:
    - ✓ Active management takes place up front rather than continuously.
  - **Goal:** improve performance of the market-cap-weighted index.

### 3. Passive Factor-Based Strategies

- There are many passive investment vehicles and indexes that allow access to the following factors.

Factor	Description
Growth	stocks with high P/E, high P/B and above-average net income growth.
Value	stocks of mature companies with low P/E, low P/B, stable net income, and/or high dividend yield.
Size	stocks with low floating-adjusted market caps.
Yield	high dividend-yield stocks may provide higher excess returns in low interest rate.
Momentum	stocks with recent above-average returns.
Quality	stocks with consistent earnings and dividend growth, high cash flow-to-earnings and low debt-to-equity.
Volatility	stocks with low standard deviation of returns.

### 3. Passive Factor-Based Strategies

- There are **three** types of passive factor-based strategies:
  - **1. Return-oriented strategies :**
    - ✓ Dividend yield strategies (e.g. dividend growth/absolute dividend yield)
    - ✓ Momentum strategies (e.g. 12-month price performance)
    - ✓ Fundamentally weighted strategies
  - **2. Risk-oriented strategies**
    - ✓ Volatility weighting: constituents weighted by the inverse of their relative price volatility.
    - ✓ Minimum-variance investing, where portfolios are selected that minimize portfolio variance, subject to constraints.
    - ✓ **Advantages**: simple and provide risk reduction.
    - ✓ **Disadvantages**: past return data may not reflect future conditions.

## 3. Passive Factor-Based Strategies

- There are **three** types of passive factor-based strategies:
  - **3. Diversification-oriented strategies** include equally-weighted portfolios and maximum diversification strategies (achieved by maximizing the ratio of the weighted average volatility of the individual stocks to the portfolio volatility).



### 3. Passive Factor-Based Strategies

#### ➤ Advantage

- Can provide nearly pure exposure to specific market segments.
- Typically less costly than active management
- Offers the investor factor exposure based on the investor's view of the market (which is known as **factor rotation**).

#### ➤ Disadvantage

- Concentrate risk exposures.
- Passive factor-based strategies often use multiple benchmarks, including both factor based and market-cap-weighted indexes. This increases tracking error.
- Relative to passive cap-weighted investing, management fees and trading commissions are higher.

## 4. Approaches to Passive Equity Investing

- Three common approaches to **passive equity** investing involve the use of
  - Pooled investments;
  - Derivatives-based strategies;
  - Separately-managed index-based portfolios.

## 4.1 Pooled investments

- **Pooled investments** include open-end mutual funds and exchange traded funds (ETFs).
  - The advantages of **open-end mutual funds** are the low costs and the convenience of the fund structure.
  - The **advantages** of **ETFs** include that they can handle shareholder redemptions more cheaply and efficiently than open-end mutual funds through in-kind delivery of stock.
    - ✓ The **disadvantages** of **ETF** include higher transaction costs from commissions and the bid-ask spread, as well as illiquidity in some ETF secondary markets.

## 4.2 Derivatives based strategies

- **Derivatives** are typically used to adjust a pre-existing portfolio to move closer to meeting its objectives. These **derivative positions** are often referred to as an **overlay**.
  - **Completion overlays** can move the portfolio back to the risk exposure of the index, for example, by adjusting the portfolio's beta to match the index beta.
  - **Rebalancing overlays** can efficiently and cheaply match the reconstitution of the index as securities are added and dropped.
  - **Currency overlays** adjust the foreign exchange risk of portfolio holdings denominated in a foreign currency.

## Example



- In one month, Winthrop will receive a performance bonus of USD5,750,000. He believes that the US equity market is likely to increase during this timeframe. To take advantage of Winthrop's market outlook, he instructs Tong to immediately initiate an equity transaction using the S&P 500 futures contract with a price of 2,464.29 while the policy weight of S&P 500 is 15%. The S&P 500 futures contract multiplier is 250, and the S&P 500 E-mini multiplier is 50. In preparation for receipt of the performance bonus, Tong should immediately:
  - A. buy two US E-mini equity futures contracts.
  - B. sell nine US E-mini equity futures contracts.
  - C. buy seven US E-mini equity futures contracts.
- **Solution: C.**
  - The number of futures contracts is  $(5,750,000 \times 15\%) / (2464.29 \times 50) = 7$ .

## 4.2 Derivatives based strategies

### ➤ Advantage

- Derivatives can quickly, efficiently and cheaply adjust exposure of the portfolio
- Derivatives trade in liquid markets
- Easy to leverage the portfolio.

### ➤ Disadvantage

- Derivative positions have finite expirations so have to be rolled over.
- Some contracts have position limits.
- Portfolio needs might not be met by the existing offering of exchange-traded derivative contracts.
- OTC derivatives introduce counterparty risk.
- Basis risk can increase tracking error.

## 4.3 Separately managed equity index-based portfolios

- **Separately managed equity index-based portfolios** hold all of the constituent stocks in the index or a representative sample.
  - They require regularly updated data on the index, sophisticated trading and accounting systems; well-established broker relationships to facilitate program trading and lower trading commissions; and compliance systems to ensure compliance with laws, regulations, and internal company policies.
  - **Program trading** is a strategy of buying or selling many stocks simultaneously.

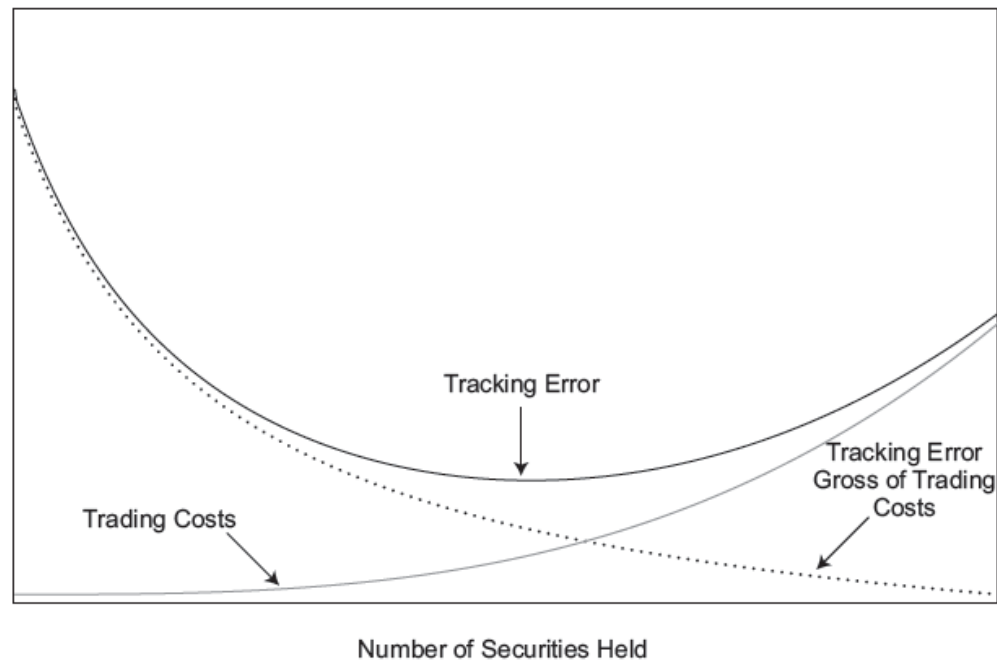
## 5. Portfolio Construction

- Passively-managed index-based equity portfolios can be constructed by:
  - **Full Replication:** full replication (hold all of the securities in the index)
  - **Stratified Sampling:** hold a sample of the securities based on stratified sampling
  - **Optimization:** use more complex optimization to maximize desirable characteristics while minimizing undesirable characteristics.
  - **Blended Approach:** in practice a blend of these approaches may be used.



## 5.1 Full replication

- The **advantage** of full replication is that it closely matches the index return (before transaction costs).
- **Disadvantage**
  - Can be costly when there are large numbers of stock and liquidity is limited.
  - The portfolio must be regularly reconstituted and rebalanced.



## 5.2 Stratified Sampling

- **Stratified sampling**, holds a **subset** of the constituent stocks.
  - To implement stratified sampling, the manager creates **strata** across the constituent stocks that are **mutually exclusive** and **exhaustive**.
  - Stratified sampling is most frequently used when:
    - ✓ the portfolio manager wants to track indexes that have many constituents
    - ✓ dealing with a relatively **low** level of assets under management.
- **Advantages**
  - Avoid the high cost of full replication
  - Straight forward and technically unsophisticated.
- **Disadvantages**
  - The manager must consider size of the sample used.
  - Higher **tracking error**.

## 5.3 Optimization

- **Optimization** uses the tools of modern portfolio theory to address the problem of **minimizing tracking error**.
  - E.g: An indexed portfolio subjects to the constraint that the portfolio holds 50 constituent securities or fewer.
    - ✓ The desired output is identification of the 50 securities and their weights that results in the lowest possible tracking error.
- **Advantages**
  - typically exhibit lower tracking error than stratified sampling.
  - explicitly account for the covariance among constituent stocks.
- **Drawbacks**
  - based on historical relationships and those can change.
  - Maintain the optimization as the data change can be costly.
  - Create mean–variance inefficient portfolios.
    - ✓ The solution is to add a constraint that total portfolio variance is equal to the volatility of the benchmark.

## 5.4 Blended Approach

### ➤ Blended Approach

- **Full replication** is preferred for indexes with **small numbers** of **liquid stocks**
- **Stratified sampling or optimization** is preferable for indexes with **lots of** heterogeneous, thinly traded stocks.
- **Blended approach** is suitable for large indexes like the Wilshire 5000.
  - ✓ Since the constituent stocks run the gamut from large and liquid to small and thinly traded.

## 6. Causes of Tracking Error

- An index that contains a **large number of constituents** will tend to create higher tracking error than one with fewer constituents.
- **Fees and trading costs**
  - Management fees, commissions or bid-asked spread.
  - The addition of less liquid securities results in higher transaction costs.
  - Higher expense ratio contribute to higher tracking error.
- **Cash drag** in the portfolio.
- **The use of intra-day trading to manage the portfolio.**
  - The price levels used to report index returns are struck at the **close** of the trading day.
  - The effect of intra-day trading can be positive or negative for a portfolio's returns compared to its benchmark index.

## 6. Tracking Error

- In a no cost world, **full replication produces the lowest tracking error.**
- But minimizing real world tracking error requires trade-offs between the benefits of larger sample size versus the increase in costs.
  
- **Control tracking error by**
  - minimizing trading costs,
  - netting investor cash inflows and redemptions,
  - Using equitization tools like derivatives to compensate for cash drag.

## 7. Sources of return and Risks

### ➤ 1. Attribution Analysis

**Exhibit 1 Trailing 12-Month US Large-Cap Returns and Foundation/  
Benchmark Weights**

<b>Sector</b>	<b>Sector Returns</b>	<b>Foundation Sector Weights</b>	<b>Benchmark Sector Weights</b>
Information technology	10.75%	18.71%	19.06%
Consumer staples	12.31%	16.52%	16.10%
Energy	8.63%	9.38%	9.53%
Utilities	−3.92%	8.76%	8.25%
Financials	7.05%	6.89%	6.62%

- Which US large-cap sector is the primary contributor to the portfolio's underperformance relative to the benchmark?

## 7. Sources of return and Risks

### ➤ 1. Attribution Analysis

Sector	Sector Return (A)	US Large-Cap Core Portfolio		Large-Cap Benchmark		Attribution Analysis
		Sector Weight (B)	Contribution to Return (C) = (A) × (B)	Sector Weight (D)	Contribution to Return (E) = (A) × (D)	Difference (F) = (C) – (E)
Information technology	10.75%	18.71%	2.01%	19.06%	2.05%	–0.04%
Consumer staples	12.31%	16.52%	2.03%	16.10%	1.98%	0.05%
Energy	8.63%	9.38%	0.81%	9.53%	0.82%	–0.01%
Utilities	–3.92%	8.76%	–0.34%	8.25%	–0.32%	–0.02%
Financials	7.05%	6.89%	0.49%	6.62%	0.47%	0.02%

- **US large-cap portfolio's information technology sector** is the primary contributor to the portfolio's disappointing equity returns because it provided the largest negative differential relative to the benchmark, with a differential of –0.04%.



# 7. Sources of return and Risks


## ➤ 2. Security lending

- The **securities-lending income** can be a valuable addition to portfolio returns, thus reducing tracking error resulted from trading costs.
- However, securities lending carries risks that can offset the benefits.
  - ✓ credit quality of the borrower (credit risk) ; the value of the posted collateral (market risk); liquidity risk and operational risk.

## 7. Sources of return and Risks

### ➤ 3. Investor Activism and Engagement

- For passive investors, a goal of activism is to increase returns.
  - ✓ If the efficiency improvements produce higher returns to index-constituent stocks, the performance of an index-tracking portfolio rises.
- Forms of activism can include:
  - ✓ expressing views to company boards or management on executive compensation, operational risk, board governance, and other value-relevant matters.
- Potential conflicts of interest may limit investors' propensity to challenge company management.



# Reading 17

## Active Equity Investing: Strategies

# Framework

1. Approaches to Active Management
  - Fundamental VS. Quantitative
    - ✓ Process
    - ✓ Pitfalls
2. Types of Active Management Strategies
3. Style Classification

# 1. Approaches to Active Management

- Active strategies can be divided into two broad categories: **fundamental and quantitative**.
- **Fundamental approaches** are based on research into companies, sectors, or markets and involve the application of analyst discretion and judgment.
- **Quantitative approaches** are based on quantitative models of security returns that are applied systematically with limited involvement of human judgment or discretion.
- The labels fundamental and quantitative are an imperfect shorthand:
  - Fundamental approaches often make use of valuation models, quantitative screening tools, and statistical techniques (e.g., regression analysis).
  - Quantitative approaches often make use of variables that relate to company fundamentals.
  - Some investment disciplines may combine elements of both fundamental and quantitative disciplines.

# 1.1 Fundamental Approach

- **Fundamental approaches** are **subjective** in nature, relying on analyst **discretion and judgment**.
- **Investment Process**
  - 1. Define the investment universe and the market opportunity (investment thesis).
  - 2. Prescreen the investment universe to obtain a **manageable (small)** set of securities for further, more detailed analysis.
  - 3. Understand the industry and business.
    - ✓ Industry and competitive analysis.
    - ✓ Financial reports analysis.
  - 4. Forecast company performance.
  - 5. Convert forecasts to valuations and identify ex ante profitable investments.

# 1.1 Fundamental Approach

## ➤ Investment Process

- 6. Portfolio construction and rebalance:
  - ✓ Based on the judgment and conviction of forecasts.
  - ✓ Comply with the desired risk profile.
  - ✓ Monitor the portfolio's holdings continuously.
  - ✓ Rebalance the portfolio with buy and sell disciplines

# 1.1 Fundamental Approach

## ➤ Pitfalls in fundamental investing

### ● Behavioral biases

- ✓ Cognitive error (confirmation bias/illusion of control/ availability bias)
- ✓ Emotional bias (loss aversion/ overconfidence bias/ regret aversion bias)

### ● **Value trap.** A stock appears to be attractive (e.g. low P/E multiple) due to a significant price fall but that may still be overpriced given its worsening future prospects.

- ✓ Value investors should conduct thorough research before investing in any company that appears to be cheap.

### ● **Growth trap.**

- ✓ The company's growth results may fall short of expectations and negatively affect stock performance.
- ✓ The company may deliver growth results in line with expectations, but the share price may have been overpriced at the time of the purchase.



## 1.2 Quantitative Approach

- **Quantitative approaches** are **objective** in nature, relying on models that **generate systematic rules** to select investments.
- Involve analyst judgment at the design stage.
- Replace human judgment and discretion with systematic processes that are often dependent on computer programming for execution.
- **Investment Process**
  - 1. Define the market opportunity.
  - 2. Acquire and process data.
  - 3. Back-test the strategy.
  - 4. Evaluate the strategy.
  - 5. Construct the portfolio.

## 1.2 Quantitative Approach

### ➤ Investment Process

- 1. Define the Market Opportunity (Investment Thesis): Using factors to build their return-forecasting models.
  - ✓ It is up to the manager to identify the opportunity.
- 2. Acquire and Process Data: Use historical (large) data to identify relationships between returns and variables (factors). Sources of data:
  - ✓ **Company mapping:** Tracking many companies over time and across data vendors.
  - ✓ **Company fundamentals** include company demographics, financial statements, and other market data (e.g., price, dividends, stock splits, trading volume).
  - ✓ **Survey data.**
  - ✓ **Unconventional data, or unstructured data.**

## 1.2 Quantitative Approach

### ➤ Investment Process

- 3. Back-testing the Strategy: A simulation of real-life investing.

- ✓ Quantitative investors construct models by back-testing past data.

- ✓ **3.1 Information Coefficient (IC):**

- ◆ **Pearson IC:**  $\rho (S_{t+1}, R_{t+1})$ , value is between  $-1$  and  $+1$ .

- Rule of thumb: For US equities related factors, average monthly IC of 5%–6% is considered very strong.

- Sensitive to outliers.

- ◆ **Spearman rank IC:** the Pearson IC between the ranked factor scores and ranked forward returns.

- More robust and preferred by practitioners.

- ◆ The **higher** the IC, the **higher the predictive power** of the factor.

- ✓ **3.2 Creating a Multifactor Model:** Factor selection and weighting.

## 1.2 Quantitative Approach

### ➤ Information Coefficient (IC):

Stock	(Pearson) IC		Spearman rank IC	
	Factor Score	Subsequent Month Return (%)	Rank of Factor Score	Rank of Return
A	-1.45	-3.00%	9	8
B	-1.16	-0.60%	8	7
C	-0.60	-0.50%	7	6
D	-0.40	-0.48%	6	5
E	0.00	1.20%	5	4
F	0.40	3.00%	4	3
G	0.60	3.02%	3	2
H	1.16	3.05%	2	1
I	1.45	-8.50%	1	9
Mean	0.00	-0.31%		
Standard deviation	1.00	3.71%		
Pearson IC		-0.80%		
Spearman rank IC				40.00%
Long/short tercile portfolio return				0.56%

## 1.2 Quantitative Approach

### ➤ Investment Process

- 4. Evaluating the Strategy: Out-of-sample testing.
  - ✓ If use the same set of data to build and test model, it will suffer from data-mining bias.
- 5. Portfolio Construction: Portfolio optimization is used to set weights in the portfolio that maximize expected portfolio alpha or information ratio.
  - ✓ **Risk models:** Directly estimating the variance–covariance matrix using sample return data may suffer from significant estimation errors.
  - ✓ **Trading costs:** Both explicit and implicit costs are considered.
  - ✓ The quantitative manager automatically rebalances according to the systematic rules of the strategy at predetermined intervals such as monthly or quarterly.

## 1.2 Quantitative Approach

### ➤ Pitfalls in quantitative investing

- **Survivorship bias:** If back-tests are only applied to existing companies, then they will overlook companies that have failed in the past.
- **Look-ahead bias:** Results from using information in the model to give trading signals at a time when the information was not available.
  - ✓ E.g: Using financial accounting data at a point in time before the data were actually released by the company.
- **Data-mining/overfitting:** Excessive search analysis of past financial data to find data that shows a strategy working.
- **Constraints on turnover** may constrain the manager's ability to follow a strategy.
- **Lack of availability of stock to borrow.**
- **Transaction costs:** This can quickly erode the returns of a strategy that looked good in back-testing.
- **Quant overcrowding:** This can occur if many quantitative managers are following similar strategies.

## 1.3 Fundamental V.S. Quantitative Approaches

	Fundamental	Quantitative
Style	Subjective	Objective
Decision-making process	Discretionary	Systematic, non-discretionary
Primary resources	Human skill, experience, judgment	Expertise in statistical modeling
Information used	Research	Data and statistics
Analysis focus	Conviction (high depth) in stock-, sector-, or region-based selection	A selection of variables, applied over a large number of securities
Orientation to data	Forecast future corporate parameters	Draw conclusions from historical data
Portfolio construction	Use judgment and conviction within permissible risk parameters	Use optimizers
Risk	See risk at company level	See risk at portfolio level
Rebalance	Monitor portfolio continuously	More regular intervals



## Example: Fundamental vs. Quantitative



- Consider two equity portfolios with the same benchmark index, the MSCI Asia ex Japan. The index contains 627 stocks as of December 2016. One portfolio is managed using a fundamental approach, while the other is managed using a quantitative approach. The fundamental approach-based portfolio is made up of 50 individually selected stocks, which are reviewed for potential sale or trimming on an ongoing basis. In the fundamental approach, the investment universe is first pre-screened by valuation and by the fundamental metrics of earnings yield, dividend yield, earnings growth, and financial leverage. The quantitative approach-based portfolio makes active bets on 400 stocks with monthly rebalancing. The particular approach used is based on a five-factor model of equity returns.





## Example: Fundamental vs. Quantitative



- Contrast fundamental and quantitative investment processes with respect to the following:

1. Constructing the portfolio

### **Solution to 1:**

- Fundamental: Construct the portfolio by overweighting stocks that are expected to outperform their peers or the market as a whole. Where necessary for risk reduction, underweight some benchmark stocks that are expected to underperform. The stocks that fell out in the pre-screening process do not have explicit forecasts and will not be included in the portfolio.
- Quantitative: Construct the portfolio by maximizing the objective function (such as portfolio alpha or information ratio) with risk models.



## Example: Fundamental vs. Quantitative

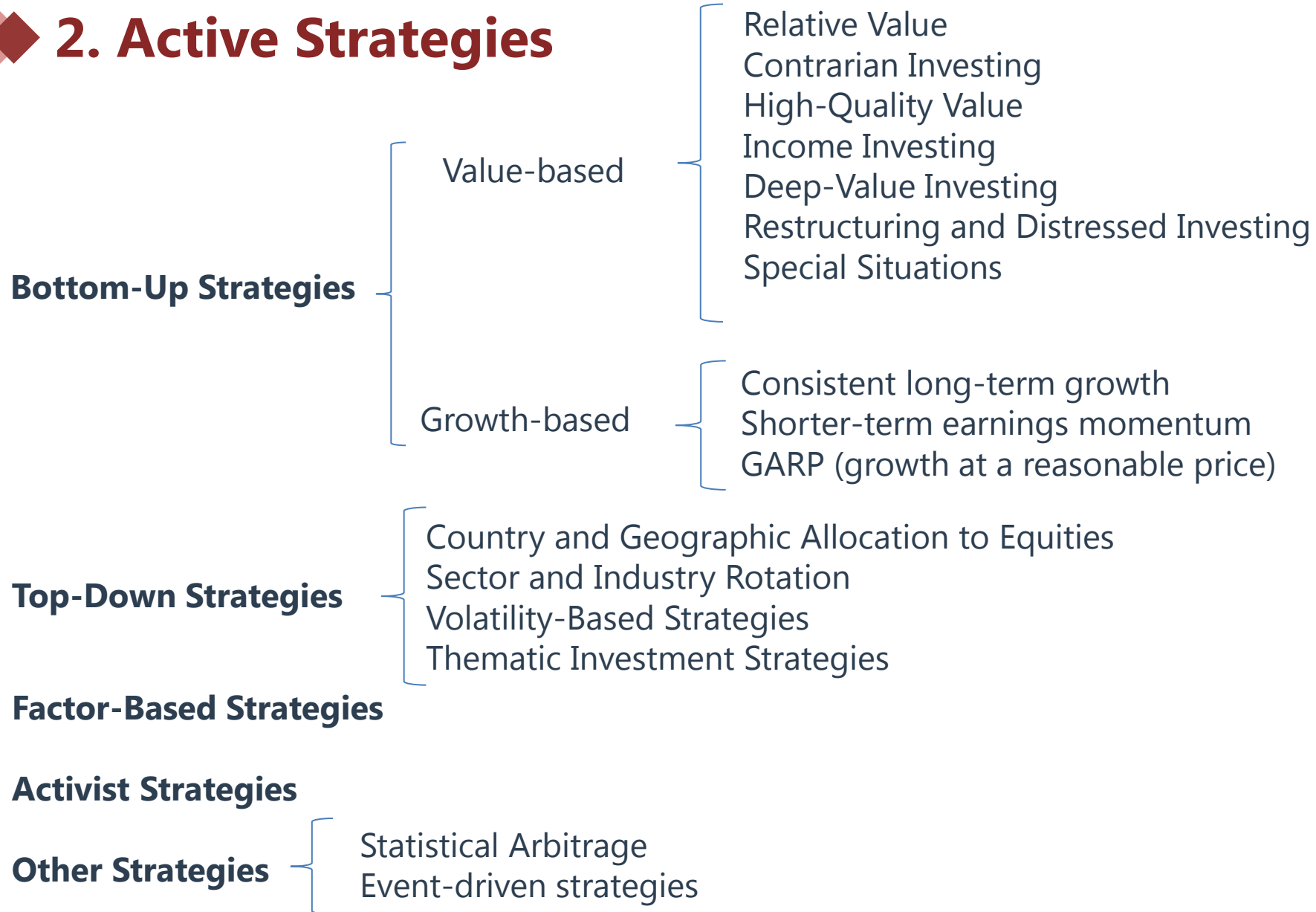


- Contrast fundamental and quantitative investment processes with respect to the following:
  2. Rebalancing the portfolio

### **Solution to 2:**

- Fundamental: The manager monitors each stock continuously and sells stocks when their market prices surpass the target prices (either through appreciation of the stock price or through reduction of the target price due to changes in expectations).
- Quantitative: Portfolios are usually rebalanced at regular intervals, such as monthly.

## 2. Active Strategies



# Top-down V.S. Bottom-up

- **Both fundamental and quantitative managers** can be further categorized as either **bottom-up or top-down strategies**.
  - **Bottom-up strategies** use information about individual companies such as profitability or price momentum to build portfolios by selecting the best individual investments.
  - **Top-down strategies** use information about variables that affect many companies such as the macroeconomic environment and government policies to build portfolios by selecting the best markets or sectors.
- **Blend** of bottom-up and top-down approaches.
  - A top-down strategist sets target country or sector weights, and then bottom-up portfolio managers select the best investments consistent with these weights.
  - The bottom-up managers could drive the portfolio construction process through selecting the best individual investments, with a top-down-based **derivatives overlay** added to remove unintended macro exposures.

## 2.1 Bottom-up Strategies

- **Quantitative bottom-up managers** look for quantifiable relationships between company level information and expected return that will persist into the future.
  - E.g. P/E ratio.
- **Fundamental bottom-up managers** incorporate both quantifiable and qualitative characteristics of individual companies into their analysis
  - E.g. Business model and branding, competitive advantage, and quality of company management and corporate governance.
- **Types of bottom-up strategies**
  - Value-based;
  - Growth-based.

## 2.1 Bottom-up Strategies: Value-based

- **1. Value-based approaches** attempt to identify securities that are trading below their estimated intrinsic value.
  - **Relative value:** An undervalued company has an inexplicably low multiple relative to the industry average.
    - ✓ Valuation multiple of the stock may be high relative to historical levels.
  - **Contrarian investing:** Purchasing or selling securities against prevailing market sentiment.
    - ✓ Often invest in companies with low or negative earnings or low dividends(e.g. depressed cyclical stocks ) and expect stock prices to rebound when company's earnings recover.
    - ✓ **Contrarian VS. Non-contrarian Value :**
      - ◆ Non-contrarian value investors rely on fundamental metrics, while contrarian investors rely more on market sentiment and sharp price movements to make their decisions.

## 2.1 Bottom-up Strategies: Value-based

### ➤ 1. Value-based approaches

- **High-quality value:** Equal emphasis is placed on both intrinsic value and evidence of financial strength, high quality management, and demonstrated profitability (the “Warren Buffet” approach).
- **Income investing:** Focus is on high dividend yields and positive dividend growth rates.
- **Deep-value investing:** Focus is on **extremely low valuations** relative to assets (e.g., low P/B), often due to financial distress.
- **Restructuring and distressed debt investing:** Investing prior to or during an expected bankruptcy filing.
  - ✓ Opportunities in restructuring and distressed investing are generally counter cyclical (weaker economy, more distressed companies).
- **Special situations:** Identifies mispricing due to corporate events such as divestitures, spin-offs, or mergers.

## 2.1 Bottom-up Strategies: Growth-based

- **2. Growth-based approaches** attempt to identify companies with revenues, earnings, or cash-flows that are expected to grow faster than their industry or the overall market.
  - Less concerned about high valuation multiples, but
  - More concerned about the source and persistence of the growth rates.
- **Growth-based approaches**
  - **Consistent long-term growth.**
  - **Shorter-term earnings momentum.**
  - **GARP** (growth at a reasonable price); looking for growth at a reasonable valuation.
    - ✓ E.g. **P/E-to-growth (PEG)** ratio= stock's P/E ratio divided by expected earnings growth in percentage terms.



## Example



➤ The following table provides information on four stocks.

Company	Price	12-Month Forward EPS	3-Year EPS Growth Forecast	Dividend Yield	Industry Sector	Sector Average P/E
A	50	5	20%	1%	Industrial	10
B	56	2	2%	0%	Information technology	35
C	22	10	-5%	2%	Consumer staples	15
D	32	2	2%	8%	Utilities	16

➤ Using only the information given in the table above, for each stock, determine which fundamental investment discipline would most likely select it.

# Example



## ➤ Solution:

- **Company A** is a good candidate for **GARP**.
  - ✓ PEG of A =  $P/E/g = 50/5/20 = 0.5$  is relatively, compared with PEG of B =  $56/2/2 = 14$  and PEG of D =  $32/2/2 = 8$ .
- **Company B** is a good candidate for the **relative value approach**.
  - ✓ Company B's forward P/E is  $56/2 = 28$ , which is lower than the average P/E of 35 for its sector peers.
- **Company C** is a good candidate for the **deep-value approach**.
  - ✓ Company C's forward P/E is  $22/10 = 2.2$ , which is considered very low in both absolute and relative terms.
- **Company D** is a good candidate **for income investing**.
  - ✓ Company D has a higher dividend yield of 8%.

## 2.2 Top-Down Strategies

- **Both fundamental and quantitative managers** could use a **top-down** approach.
- Managers typically use **broad market ETFs and derivatives** to overweight the best markets and underweight the least attractive markets.
- **Types of top-down strategies:**
  - **Country/Geography allocation**
  - **Industry sector rotation**
  - **Thematic investment strategies:** Focus on opportunities presented by new technologies, changes in regulations, and economic cycles.
    - ✓ Themes could be long term and structural such as the shift to cloud computing, blockchain technology, or short-term in nature.
  - **Volatility-based strategies:** Volatility trading can be conducted through VIX futures, variance swaps, or option volatility strategies such as straddles.



## Example: Volatility-Based Strategies



- An investor predicts a major market move, not anticipated by others, in the near term. The investor does not have an opinion on the direction of the move and only expects the index volatility to be high. What strategy can be used to capitalize on the investor's view?

- **Solution:**

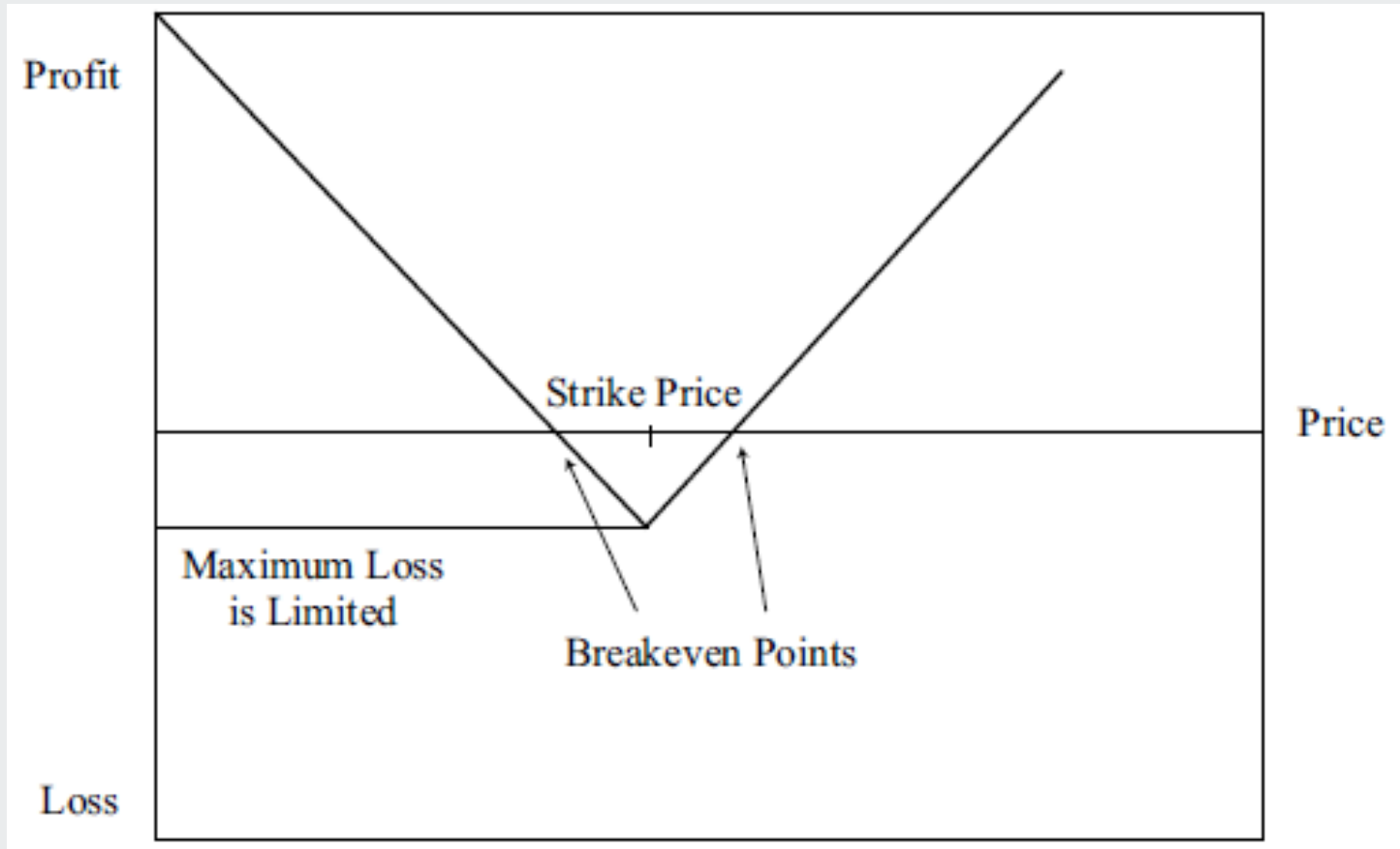
The investor can use an index straddle strategy to capitalize on his or her view. Entering into an index straddle position involves the purchase of call and put options (on the same underlying index) with the same strike price and expiry date. The success of this long straddle strategy depends on whether or not volatility turns out to be higher than anticipated by the market; the strategy incurs losses when the market stays broadly flat. The maximum loss of the long straddle is limited to the total call and put premiums paid.

(Payoff Pattern of this strategy is on the next page)

# Example



## ➤ Payoff Pattern of a Classic Long Straddle Strategy



## 2.3 Factor-Based Strategies

- A factor is a variable or characteristic with which **asset returns** are correlated.
  - Can be any variable that is believed to be valuable in ranking stocks for investment and in predicting future returns or risks.
  - $R_p = b_0 + b_1 F_1 + b_2 F_2 + \dots + b_k F_k + \varepsilon$
- **Rewarded factors.** Some factors have been shown to be positively associated with a long-term return premium.
  - E.g. size, value, momentum, and quality
- **Unrewarded factors.** Factors that have **not been** empirically **proven** to offer a persistent return premium.
  - Such as regional exposure, sector exposure, the price of commodities, or even security selection.

## 2.3 Factor-Based Strategies

### ➤ 1. Hedged portfolio approach (Fama French)

$$R = R_F + \beta_i^{\text{mkt}} \times (R_{\text{mkt}} - R_F) + \beta_i^{\text{size}} \times (R_{\text{small}} - R_{\text{big}}) + \beta_i^{\text{value}} \times (R_{\text{HBM}} - R_{\text{LBM}})$$

#### ● Construction process

- ✓ 1. Rank the investable stock universe by the factor (e.g. size).
- ✓ 2. Divide the universe into quantiles.
- ✓ 3. Long the best quantile and short the worst quantile.

Smallest 10%  
Long

Largest 10%  
Short

- ✓ 4. The performance of this long/short portfolio is tracked over time.

#### ● Drawbacks to the hedged portfolio approach

- ✓ The information in middle quantiles is lost in this approach.
- ✓ Any **nonlinear relationship** between factors and performance will not be captured by the approach.
- ✓ Portfolios built using this approach tend to be concentrated.
- ✓ Assume no short limitations.
- ✓ The hedged portfolio is **not** a “pure” factor portfolio.

## 2.3 Factor-Based Strategies

- **2. Factor-tilting portfolio:** long-only portfolio with exposures to a given factor can be built with controlled tracking error.
- **3. Factor-mimicking portfolio** (FMP) is a theoretical implementation of a pure factor portfolio.
  - An FMP is a theoretical long/short portfolio that is dollar neutral with a unit exposure to a chosen factor and no exposure to other factors.
    - ✓ Very expensive to trade, trading liquidity and short availability constraints are usually added.
- **4. Factor Timing:** A common subcategory of factor investing is **equity style rotation**, where the manager believes that different factors work well at different times.
  - These strategies allocate to portfolios that represent factor exposures when that particular style is expected to outperform.



## 2.4 Activist Strategies

- Activist investors specialize in taking stakes in listed companies and **pushing for companies to make changes** that are expected to enhance the value of the activist's stake.
  - Activist investors aim to achieve their goals with smaller stakes, typically of less than 10%.
  - Activist investors' time horizon is often shorter than that of buy-and-hold investors, but the whole process can last for a number of years.
- **The characteristics of activist target companies:**
  - Slower revenue and earnings growth than the market,
  - suffer negative share price momentum, and
  - have weaker-than-average corporate governance.

## 2.4 Activist Strategies

### ➤ Tactics Used by Activists

- Seeking board representation (once attained this can be used to change management).
- Writing open letters to management detailing the changes, meeting with management and engaging with other shareholders to court support in a proxy contest.
- Proposing changes at an annual general meeting (AGM).
- Proposing financial restructuring including increased dividends and share buybacks.
- Reducing extravagant management compensation.
- Launching legal proceedings against management for breach of fiduciary duties.
- Launching a media campaign against existing management.
- Breaking up a large inefficient conglomerate.

## Example: Activist Strategies



- Kendra Cho is an analyst at an investment firm that specializes in activist investing and manages a concentrated portfolio of stocks invested in listed European companies. Cho and her colleagues hope to identify and buy stakes in companies with the potential to increase their value through strategic, operational, or financial change. Cho is considering the following three companies:
- **Company A** is a well-established, medium-sized food producer. Its profitability, measured by operating margins and return on assets, is ahead of industry peers. The company is recognised for its high corporate governance standards and effective communication with existing and potential investors. Cho's firm has invested in companies in this sector in the past and made gains on those positions.

## Example: Activist Strategies



- **Company B** is a medium-sized engineering business that has experienced a significant deterioration in profitability in recent years. More recently, the company has been unable to pay interest on its debt, and its new management team has recognized the need to restructure the business and negotiate with its creditors. Due to the company's losses, Cho cannot use earnings-based price multiples to assess upside potential, but based on sales and asset multiples, she believes there is significant upside potential in the stock if the company's current difficulties can be overcome and the debt can be restructured.
- **Company C** is also a medium-sized engineering business, but its operating performance, particularly when measured by the return on assets, is below that of the rest of the industry. Cho has identified a number of company assets that are underutilised. She believes that the management has significant potential to reduce fixed-asset investments, concentrate production in fewer facilities, and dispose of assets, in line with what the company's peers have been doing. Such steps could improve asset turnover and make it possible to return capital to shareholders through special dividends.

## Example: Activist Strategies



- Identify the company that is most appropriate for Cho to recommend to the fund managers:

- **Solution:**

Company C is the most appropriate choice. The company offers upside potential because of its ability to improve operating performance and cash payout using asset disposals, a strategy being implemented by other companies in its sector.

Neither Company A nor Company B offers an attractive opportunity for activist investing: Company A is already operating efficiently, while Company B is more suitable for investors that focus on restructuring and distressed investing.

## 2.5 Other Strategies

- **1. Statistical Arbitrage (stat arb.):** Make extensive use of technical stock price and volume data to **exploit pricing inefficiencies**.
  - Aim to profit from **mean reversion** or opportunities created by market microstructure issues.
  - **1.1 Market microstructure-based arbitrage strategies** take advantage of mispricing opportunities occurring due to imbalances in supply and demand that are expected to only last for a few milliseconds.
    - ✓ **High-frequency trading.**
  - **1.2 Pairs trading.** Pairs trading identifies two securities in the same industry that are historically **highly correlated** with each other and aims to profit from taking advantage of a temporary breakdown in this relationship (bet on a mean-reversion).
  - E.g. Use the ratio of two related stock prices (spread).
    - ✓ The **risk** is that the breakdown of the observed previous relationship is long term in nature.

## 2.5 Other Strategies

- **2. Event-driven strategies** exploit market inefficiencies that may occur around corporate events such as:
  - mergers and acquisitions;
  - earnings or restructuring announcements;
  - share buybacks, special dividends, and spin-offs.
  - **Risk arbitrage manager should estimate:**
    - ✓ **Risk of Deal fails to close**, which could cause large losses to the manager.
    - ✓ **Deal duration**
    - ✓ **Associated annualized premiums** offered by stock prices.



## 3. Style Classifications

➤ **Three types of style classification**

- Holding-based approach
- Return-based approach
- Self-identification



# 3. Style Classifications

## ➤ 1. Holdings-based approach

- look at the attributes of each individual stock in a portfolio
- aggregates these attributes to conclude the overall style of the portfolio.
- **Morningstar and Thomson Reuters Lipper**
  - ✓ **An individual stock** can only be defined as **one style**.
    - ◆ A stock's attribute for a specific style is 1 if it is included in that style index; otherwise, it is 0.
- **MSCI and FTSE Russell**
  - ✓ Assume that **a stock** can have characteristics **of two styles**.
    - ◆ such as value and growth, at the same time.

Value	Blend	Growth	
			Size Large
			Mid
			Small

## 3. Style Classifications

- **2. Returns-based approach.** Compare the returns of the employed strategy to those of a set of **style indexes**.

$$r_t = \alpha + \sum_{s=1}^m \beta^s R_t^s + \varepsilon_t$$

- $R_t^s$  = the return of style index  $s$  in the same period
- $\beta^s$  = the fund exposure to style  $s$  (with constraints  $\sum_{s=1}^m \beta^s = 1$  and  $\beta^s$  : manager's allocation to that style during the period).
- $\alpha$  = value added by the fund manager
- $\varepsilon_t$  = the residual return that cannot be explained by the styles.

➤ **3. Manager Self-Identification**

- The fund's investment strategy is usually **self-described** by the manager.

### 3. Style Classifications

#### ➤ Holdings-based approach vs. Returns-based approach

	Advantages	Disadvantages
<b>Returns-based</b>	<ul style="list-style-type: none"><li>• Requires minimal information<ul style="list-style-type: none"><li>✓ Can be executed quickly</li><li>✓ Cost effective</li></ul></li><li>• More widely applied</li></ul>	<ul style="list-style-type: none"><li>• May be ineffective in characterizing current style</li><li>• Difficult to detect more aggressive positions(e.g. deep value/micro cap)</li></ul>
<b>Holdings-based</b>	<ul style="list-style-type: none"><li>• More accurate than returns-based</li><li>• Comparisons of individual positions</li><li>• Capture changes in style more quickly</li></ul>	<ul style="list-style-type: none"><li>• More data intensive than returns-based analysis</li><li>• Less effective for funds with substantial positions in derivatives.</li></ul>



# Reading 18

## Active Equity Investing: Portfolio Construction

# Framework

1. Building Blocks Used in Portfolio Construction
2. The Implementation Process
  - Portfolio Construction Approaches
  - Objectives and Constraints
  - Active Share and Active Risk
3. Allocating the Risk Budgeting
4. Determining the Appropriate Level of Risk
5. Risk Constraints
6. The Well-Constructed Portfolio
7. Portfolio Construction: long-only vs. long/short

# 1. Building Blocks: Active Return

- Active equity portfolios aim to outperform a benchmark after all costs.
- In the simplest terms, the excess return above a benchmark (active return) will be positive if the manager
  - overweights securities that outperform the benchmark, and
  - underweights securities that underperform the benchmark.

$$R_A = \sum_{i=1}^N \Delta W_i R_i$$

- ✓  $R_i$  is the return from security  $i$
- ✓  $\Delta W_i$  is the active weight, the difference between portfolio and benchmark weight for security  $i$ .

# 1. Building Blocks: Active Return

➤ **Source of active return**  $R_A = \sum(\beta_{pk} - \beta_{bk}) \times F_k + (\alpha + \varepsilon)$

● **1. Return from factor weightings**  $= \sum(\beta_{pk} - \beta_{bk}) \times F_k$

✓  $\beta_{pk}$  = the sensitivity of the portfolio to each rewarded factor (k)

✓  $\beta_{bk}$  = the sensitivity of the benchmark to each rewarded factor

✓  $F_k$  = the return of each rewarded factor

✓ **Strategic long-term** exposures to rewarded factors.

● **2. Return from identifying mispricing = alpha ( $\alpha$ )**

● **3. Idiosyncratic return**  $= \varepsilon$

✓ Noise or **luck** (good or bad) .

✓ Active return **not** due to market risk exposure or value-added alpha.

● In practice, it is very difficult to distinguish between  $\alpha$  and  $\varepsilon$ .

Return  
**unexplained** by  
rewarded factors

# Example



- Discuss the drivers of return for Managers A and B.

	Manager A	Manager B	Factor Returns
<b>Monthly performance in excess of the risk-free rate</b>	0.65%	0.65%	
<b>“Alpha” (monthly)</b>	0.00%	0.20%	
<b>Beta to:</b>			
<b>Market</b>	0.99	1.05	0.45%
<b>Size</b>	0	-0.2	0.20%
<b>Value</b>	0.15	0.05	0.35%
<b>Momentum</b>	0.25	0	0.60%
<b>R-squared</b>	0.99	0.78	



# Example



## ➤ **Solution:**

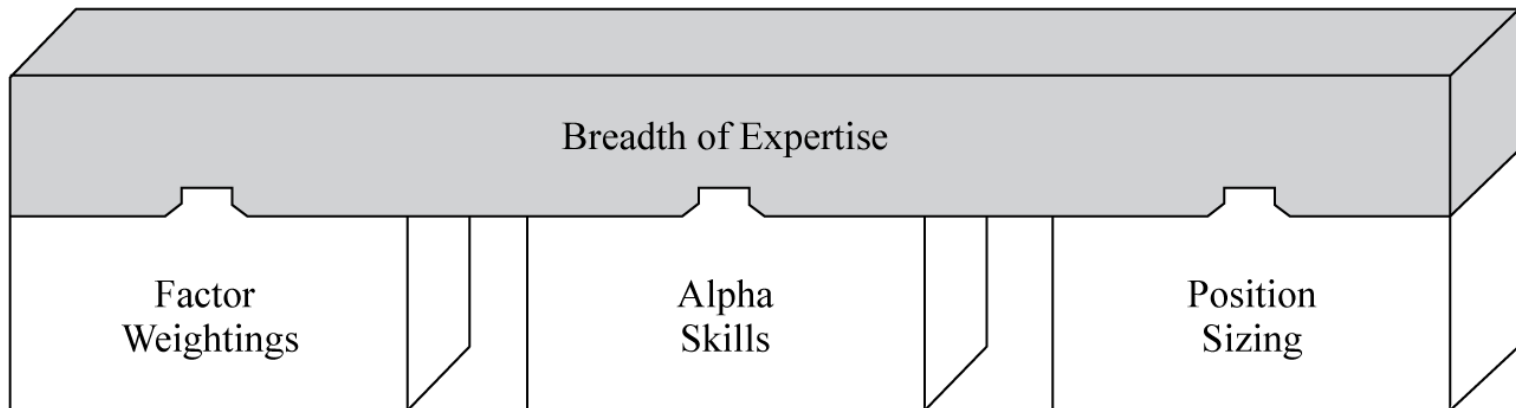
- Both managers generated the same absolute return, but they achieved their performance in very different ways.
- All of Manager A's performance can be explained from exposure to rewarded factors. There is no alpha, and the high  $R^2$  shows that the four factors explain much of the monthly variability in returns.
- Manager A did outperform the Market factor by 20 bps ( $0.65\% - 0.45\%$ ). The excess return can be attributed to the significant exposure (0.25) to the strong-performing Momentum factor (0.60%). Exposure to the Value factor explains the balance.
- Manager B generated significant alpha (20 bps per month). The relatively low  $R^2$  indicates that much of the variability of returns is unexplained by the factors. Manager B's performance must, therefore, be attributed to either her alpha skills or idiosyncratic risks that favored the manager's investment approach during the period.

# 1. Building Blocks

## ➤ Three building blocks

- Factor weightings
- Alpha Skills
- Sizing Positions

➤ These three building blocks are integrated into a successful portfolio construction process through a fourth component: **breadth of expertise**.



# 1. Building Blocks

- **1. Factor weightings: overweight/underweight rewarded factors**
  - Active return due to **differences in beta of rewarded factors**.
- **2. Alpha skills** are sourced from skillful timing of exposure to rewarded factors and unrewarded factors.
  - **Factor timing**: which is the skill in identifying when a rewarded factor might outperform/underperform its average return.
  - **Timing exposure to unrewarded factors**(*thematic exposures*).
    - ✓ E.g. correctly anticipating the decline in the price of oil (June 2014-March 2016) and reducing exposure to the energy sector.

Alpha skill

$$R_A = \underbrace{\sum (\beta_{pk} - \beta_{bk}) \times F_k}_{\text{Factor weighting}} \underbrace{+ \alpha}_{\text{Alpha skill}} + \varepsilon$$

Factor weighting

# 1. Building Blocks

- **3. Sizing Positions:** balances confidence in alpha and factor insights while mitigating idiosyncratic risks.
- Managers' choices with respect to position sizing are influenced by their investment approach and the level of confidence on their analytic work.
  - **A factor-orientated manager** who spreads their portfolio across many assets is likely to minimize the impact of idiosyncratic risk.
  - **A stock-picker**, with higher confidence in her analysis of individual securities, is likely to hold more concentrated positions and assume a higher degree of idiosyncratic risk.
  - Affect idiosyncratic return most.

Alpha skill

$$R_A = \sum (\beta_{pk} - \beta_{bk}) \times F_k + \alpha + \varepsilon$$

Factor weighting

Sizing Positions

- Affect  $\varepsilon$  most

# 1. Building Blocks

## ➤ 4. breadth of experience (BR)

- A manager with broader expertise is more likely to generate consistent active returns.

## ➤ This can be seen in the **fundamental law of active management**:

$$E(R_A) = IC\sqrt{BR}\sigma_{R_A}TC$$

- IC = Expected information coefficient of the manager —the extent to which a manager's forecasted active returns correspond to the managers realized active returns
- BR = Breadth—the number of truly independent decisions made each year
- TC = Transfer coefficient, or the ability to translate portfolio insights into investment decisions without constraint (a truly unconstrained portfolio would have a transfer coefficient of 1)
- $\sigma_{R_A}$  = the manager's active risk

## Example



- Manager A has \$250 million in assets under management (AUM), an active risk of 5%, an information coefficient of 0.15, and a transfer coefficient of 0.40. Manager A's portfolio has a 2.5% expected active return this year. The number of truly independent decisions Manager A would need to make in order to earn her expected active portfolio return this year is *closest* to:

- A. 8.
- B. 11.
- C. 69.

- **Solution: C.**

$$E(R_A) = IC\sqrt{BR}\sigma_{R_A}TC$$

$$2.5\% = 0.4 \times 0.15 \times \sqrt{BR} \times 5\%$$

$$BR = 69.44$$

## 2.1 Portfolio Construction Approaches

- **The majority of investment approaches can be classified as:**
- **Systematic or discretionary:** The degree to which the manager follows a set of systematic rules, rather than using discretionary judgment.
  - **Bottom-up or top-down:** The degree to which the manager use bottom-up stock specific information, rather than macroeconomic information.

Systematic	Top-Down		Discretionary
	<ul style="list-style-type: none"><li>● Emphasizes macro factors</li><li>● Factor timing</li><li>● Diversified</li></ul>	<ul style="list-style-type: none"><li>● Emphasizes macro factors</li><li>● Factor timing</li><li>● Diversified or concentrated depending on strategy and style</li></ul>	
	<ul style="list-style-type: none"><li>● Emphasizes security specific factors</li><li>● No factor timing</li><li>● Diversified</li></ul>	<ul style="list-style-type: none"><li>● Emphasizes firm specific characteristics or factors</li><li>● Potential factor timing</li><li>● Diversified or concentrated depending on strategy and style</li></ul>	
	Bottom-Up		

## 2.1 Portfolio Construction Approaches

### ➤ A Summary of the Different Approaches

- Exposure to rewarded factors can be achieved with either a systematic or discretionary approach.
- Bottom-up managers first emphasize security-specific factors, whereas top-down managers first emphasize macro factors.
- Factor timing is more likely to be implemented among discretionary managers, especially those with a top-down approach.
- Systematic managers are unlikely to run concentrated portfolios. Discretionary managers can have either concentrated or diversified portfolios, depending on their strategy and portfolio management style.
- In principle, a systematic top-down manager would emphasize macro factors and factor timing and would have diversified portfolios. However, there are few managers in this category.



## 2.2 Objectives and Constraints

- **Portfolio construction** can be viewed as an **optimization problem**(an objective function + a set of constraints).
- Objectives and constraints may be stated in absolute terms or relative to a benchmark.

	<b>Absolute Framework</b>	<b>Relative Framework</b>
<b>Objective Function</b>	Maximize Sharpe Ratio	Maximize Information Ratio
<b>Constraints</b>		
Sector/security weights	Maximum size in portfolio	Maximum deviation from benchmark
Risk	Volatility	tracking error (active risk)
Market capitalization	Maximum/minimum set by mandate	

## Example



- Manager A uses a scoring process and seeks to maximize the portfolio score based on the factor characteristics of individual securities. His purpose is not to time factor exposure but to achieve an appropriate diversification of factor risks. His approach is fully systematic, and he has a tracking error constraint of less than 4%. No one position can be greater than 2%, irrespective of its benchmark weight.
- Discuss Manager A's implementation approach, security selection approach, portfolio concentration, objective function, and constraints.

# Example



## ➤ Solution:

- Manager A is best characterized as a systematic, bottom-up manager. Implementation approach. An implementation approach that is fully quantitative (allocations are unaffected by a portfolio manager's judgment) is systematic.
- Security selection approach. A scoring process that ranks individual securities based on their factor characteristics is a bottom-up approach.
- Concentration. Although the limit of no more than 2% of the portfolio in any single position means the portfolio could hold as few as 50 securities, the tracking error constraint of 4% indicates that the portfolio is likely diversified.
- Objective function. A process that aims to maximize the portfolio's score based on the factor characteristics of single securities is an example of an explicit objective function.
- Constraints. The tracking error constraint of less than 4% is a relative constraint function. The limit on any single position to no more than 2% of the portfolio is an absolute—not a relative—constraint. It does not depend on benchmark weights.

## 2.3 Benchmark-Relative Risk: Active Share

- There are two measures of benchmark-relative risk: **Active Share** and **active risk**.
- **Active Share** measures the degree to which the number and sizing of the **positions in a manager's portfolio are different from those of a benchmark**.

$$\text{Active Share} = \frac{1}{2} \sum_{i=1}^N | \text{Weight}_{\text{portfolio},i} - \text{Weight}_{\text{benchmark},i} |$$

- **% of portfolio assets deployed the same as benchmark = 1-active share.**
  - i.e., Active share of 80% = 20% of the portfolio capital was invested in a similar way as the index.

## 2.3 Benchmark-Relative Risk: Active Share

- Active Share takes a value **between 0 and 1**.
  - Active share is 0 for a portfolio that matches the benchmark;
  - Active share is 1 for a portfolio that shares no investments with those of the benchmark.
- **Two sources of Active Share:**
  - Holding securities in the portfolio that are in the benchmark but at **weights different than** the benchmark weights.
  - Including **securities** in the portfolio that are not in the benchmark.
    - ✓ If two portfolios with the same benchmark invest only in benchmark securities, the portfolio with the **fewer securities** and therefore **higher degree of concentration** in positions will have a **higher level of Active Share**.
- **Active share does not consider the correlations between stocks.**

## 2.3 Benchmark-Relative Risk: Active Risk

- **Active risk** (tracking error): the standard deviation of active returns.
- Source of active risks:

$$\sigma_{R_A} = \sqrt{\underbrace{\sigma^2(\sum(\beta_{pk} - \beta_{bk}) \times F_k)}_{\text{attributed to factor exposure}} + \underbrace{\sigma_e^2}_{\text{attributed to idiosyncratic risk}}}$$

- **Active Share vs. Active Risk**
  - High net exposure to a risk factor will lead to a high level of active risk, irrespective of the level of idiosyncratic risk;
  - A portfolio with **neutralized factor exposure** will have active risk attributed entirely to Active Share.
  - Active risk attributed to Active Share will be **smaller** if the **number of securities is large** and/or average **idiosyncratic risk is small**.

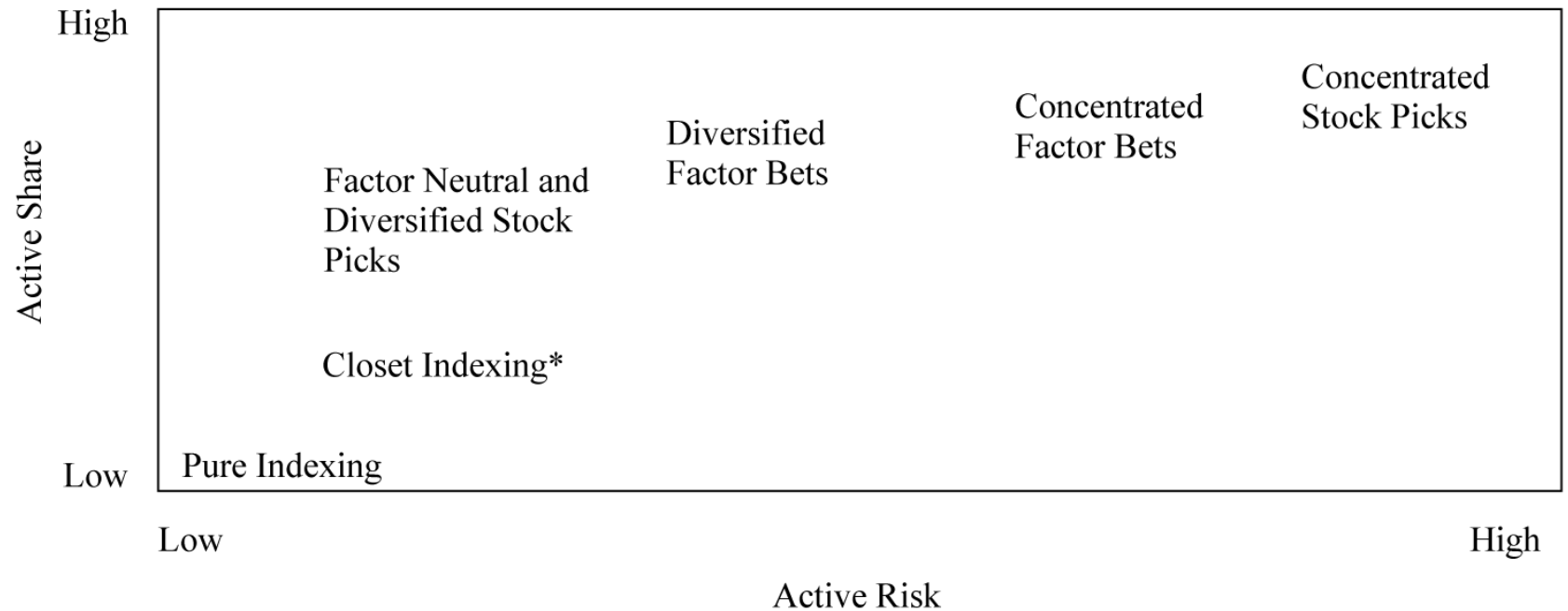
## 2.3 Benchmark-Relative Risk: Active Risk

### ➤ Active Share vs. Active Risk

- The level of active risk will rise with an **increase in factor and idiosyncratic volatility** (such as occurred in 2008).
- **Active risk** is affected by the degree of cross correlation, but **Active Share is not**.
  - ✓ E.g. Although overweighting or underweighting GM relative to Ford will generate some Active Share, it will typically not generate much active risk( stocks in the same sector have higher correlation).

## 2.3 Active Share and Active Risk

### ➤ Investment Styles, Active Share, and Active Risk





## Example



- Based on the information provided below regarding four managers benchmarked against the MSCI World Index, identify the manager most likely to be a:
- a) closet indexer.
  - b) concentrated stock picker.
  - c) diversified multi-factor investor.
  - d) sector rotator.
- Justify your response.

<b>Manager Constraints:</b>	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>
Target active risk	10%	1%	4%	7%
Max. sector deviations	0%	3%	10%	15%
Max. risk contribution, single security	5%	1%	1%	3%

# Example



## ➤ Solution:

- Manager B is a closet indexer. The low targeted active risk combined with the narrow sector deviation constraint indicates that the manager is making very few active bets.
- Manager A is likely a concentrated stock picker. The 10% active risk target indicates a willingness to tolerate significant performance deviations from the market. The 5% limit on a single security's contribution to portfolio risk indicates he is willing to run a concentrated portfolio. The unwillingness to take sector deviations combined with the high tolerance for idiosyncratic risk indicates that the manager likely focuses on stock selection and is, therefore, a stock picker.
- Manager C limits single-security risk contribution to no more than 1%, which implies a highly diversified portfolio. The significant sector deviations despite this high diversification are often indicative of a multi-factor manager. The relatively low tracking error further supports the argument that Manager C is a multi-factor manager.
- Manager D has characteristics consistent with a sector rotator. The significant active risk and high tolerance for sector deviations and security concentration are what one would expect to find with a sector rotator.

### 3. Allocating the Risk Budgeting

- **Risk budgeting** is a process by which the total risk of a portfolio is allocated to constituents of the portfolio in the most efficient manner. It is an integral part of an effective risk management process. An effective risk management process has the following four steps:
  - Determine which type of risk measure is appropriate given the fund mandate.
    - ✓ **Absolute risk measures** are appropriate when the investment objective is expressed in terms of total returns.
    - ✓ **Relative risk measures** are appropriate when the investment objective is to outperform a market index.
  - Understand how each aspect of the strategy contributes to risk.
  - Determine what level of **risk budget** is appropriate.
  - Properly allocate risk among individual positions/factors.

### 3. Allocating the Risk Budgeting

#### ➤ Causes and Sources of Absolute Risk

- If a manager **adds a new asset** (such as a security) to his portfolio that has a **higher covariance with the portfolio** than most current securities, **total portfolio risk will rise**. (A high covariance with the existing portfolio can be driven by a high variance or a higher correlation of the new security with the portfolio.)
- If a manager **replaces an existing security** with another security that has a **higher covariance** with the portfolio than that of the security being replaced, **total portfolio risk will rise**.

### 3. Allocating the Risk Budgeting

#### ➤ Causes and Sources of Absolute Risk

- Absolute risk measures focus on the size and composition of absolute portfolio variance. The calculation of total portfolio variance ( $V_p$ ):

$$V_P = \sum_{i=1}^n \sum_{j=1}^n x_i x_j C_{ij}$$

- In other words, the portfolio variance is the sum of each asset's contribution to portfolio variance. The contribution of asset  $i$  to portfolio variance ( $CV_i$ ) is given by the equation:

$$CV_i = \sum_{j=1}^n x_i x_j C_{ij} = x_i C_{ip}$$

- ✓  $x_j$  = asset  $j$ 's weight in the portfolio
- ✓  $C_{ij}$  = the covariance of returns between asset  $i$  and asset  $j$
- ✓  $C_{ip}$  = the covariance of returns between asset  $i$  and the portfolio



## Example: Absolute risk attribution



- A portfolio has the following characteristics

	Portfolio Weight	Standard Deviation
Asset A	40%	20%
Asset B	50%	12%
Asset C	10%	6%
Portfolio	<b>100%</b>	<b>11.92%</b>

	Covariance		
	Asset A	Asset B	Asset C
Asset A	0.040000	0.009600	0.002400
Asset B	0.009600	0.014400	0.001440
Asset C	0.002400	0.001440	0.003600

- Calculate the absolute contribution to portfolio variance of asset A.
- Given that the total variance is 0.014212, calculate the proportion of total portfolio variance contributed by Asset A.



## Example: Absolute Risk Attribution



- 1. Covariance of returns between asset A and the portfolio:

---

Weight of Asset A × Weight of Asset A × Covariance of Asset A with Asset A	$0.40 \times 0.40 \times 0.04$
+ Weight of Asset A × Weight of Asset B × Covariance of Asset B with Asset A	$0.40 \times 0.50 \times 0.0096$
+ Weight of Asset A × Weight of Asset C × Covariance of Asset C with Asset A	$+ 0.40 \times 0.10 \times 0.0024$
= Asset A's contribution to total portfolio variance	$= 0.008416$

---

- 2. The proportion of total portfolio variance contributed by Asset A is, therefore,  $0.008416/0.014212 = 59.22\%$ .



## Example: Factor-based risk budgeting



- An equity fund analyst is asked to evaluate an actively managed equity Fund 1. Selected data for Fund 1 is presented in the following table:

Factor	Market	Size	Value	Momentum
Coefficient	1.080	0.098	−0.401	0.034
Variance of the market factor return and covariances with the market factor return	0.00109	0.00053	0.00022	−0.00025
Portfolio's monthly standard deviation of returns				3.74%

- Calculate the portion of total portfolio risk that is explained by the market factor in Fund 1's existing portfolio is closest to: .



## Example: Absolute Risk Attribution



- The portion of total portfolio risk explained by the market factor is calculated in two steps. The first step is to calculate the contribution of the market factor to total portfolio variance as follows:

$$CV_{\text{market factor}} = \sum_{j=1}^n x_{\text{market factor}} x_j C_{mf,j}$$

- $CV_{\text{market factor}} = (1.080 \times 0.00109 \times 1.080) + (1.080 \times 0.00053 \times 0.098) + (1.080 \times 0.00022 \times -0.401) + (1.080 \times -0.00025 \times 0.034)$
  - $CV_{\text{market factor}} = 0.001223$
- The second step is to divide the resulting variance attributed to the market factor by the portfolio variance of returns, which is the square of the standard deviation of returns:
- Portion of total portfolio risk explained by the market factor =  $0.001223 / (0.0374)^2 = 87\%$

### 3. Allocating the Risk Budgeting

#### ➤ Causes and Sources of Relative/Active Risk

- Relative risk becomes an appropriate measure when the manager is concerned with her performance relative to a benchmark. One measure of relative risk is the variance of the portfolio's active return ( $AV_p$ ):

$$AV_P = \sum_{i=1}^n \sum_{j=1}^n (x_i - b_i)(x_j - b_j) RC_{ij}$$

- ✓  $x_i$  = the asset's weight in the portfolio
- ✓  $b_i$  = the benchmark weight in asset  $i$
- ✓  $RC_{ij}$  = the covariance of relative returns between asset  $i$  and asset  $j$
- The contribution of each asset to the portfolio active variance ( $CAV_i$ ) is

$$CAV_i = (x_i - b_i) RC_{ip}$$

- ✓  $RC_{ip}$  is the covariance of relative returns between asset  $i$  and the portfolio.

### 3. Allocating the Risk Budgeting

- The important points to note are:
  - Contribution to active variance is a function of **active risk** not absolute standard deviation.
    - ✓ E.g. Add cash (a low-risk asset—in an absolute sense) to an equity portfolio that tracks the benchmark. **Cash has higher active risk** because it has a **low correlation** with the equity benchmark.
- Relative risk attribution can be conducted on a country, sector or factor level.
- **Active portfolio variance** can also be segmented into
  - **variance explained** by active factor exposures
  - **unexplained active variance** associated with idiosyncratic risks.

## 4. Determining the Appropriate Level of Risk

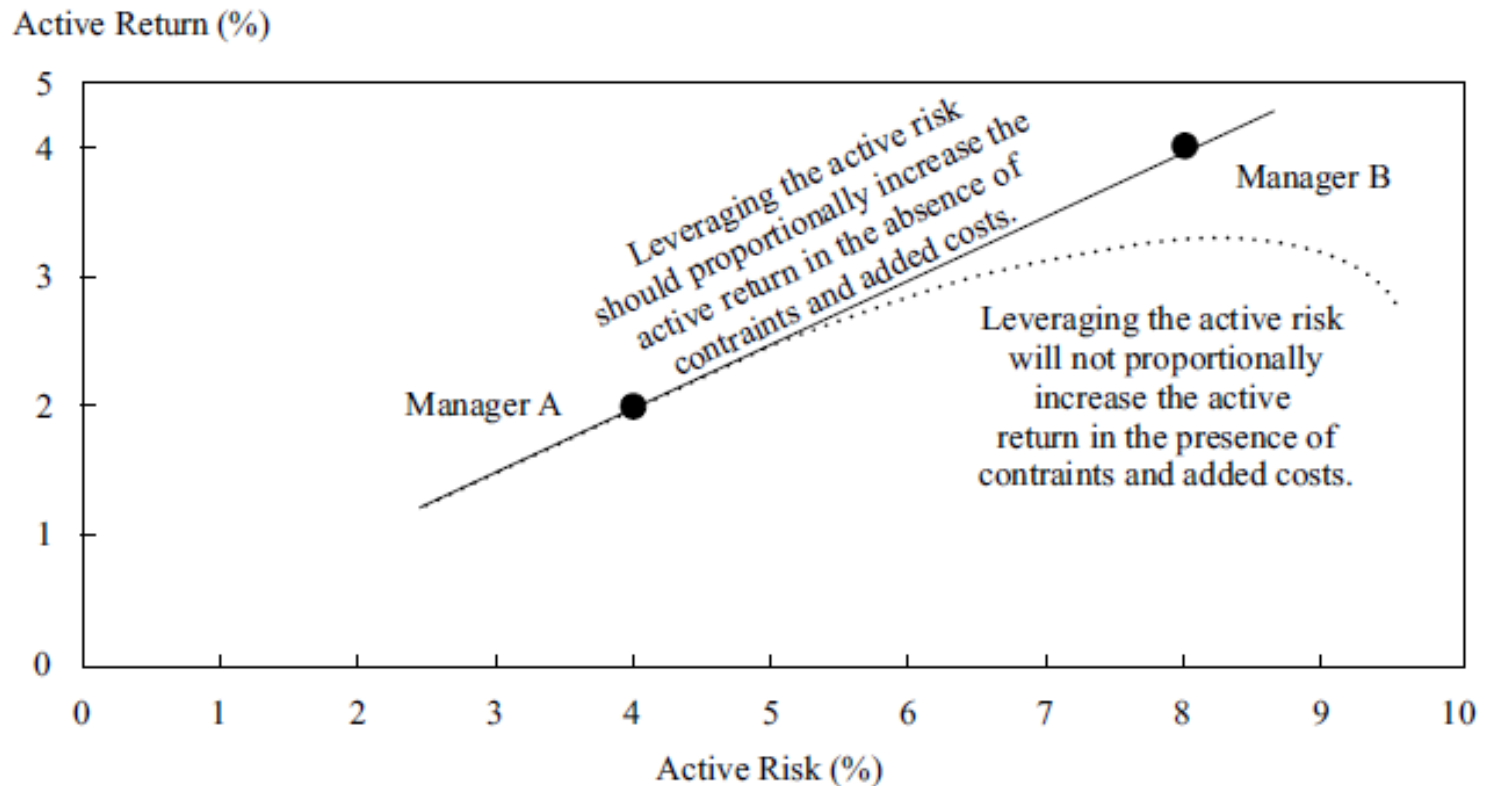
### ➤ Examples of risk targets for different mandates

- **Market-neutral hedge fund:** targeting an absolute risk of 10%,
- **Closet indexer :** targeting an active risk of something less than 2%
- **Benchmark agnostic manager:**
  - ✓ targeting active risk of 6%–10%
  - ✓ targeting an absolute risk equal to 85% of the index risk

## 4. Determining the Appropriate Level of Risk

### ➤ Implementation constraints.

- Constraints on short positions or on leverage may limit the manager's ability to under/overweight, thus the **information ratio may degrade** if active risk increases beyond a specific level.



## 4. Determining the Appropriate Level of Risk

### ➤ **Limited diversification opportunities.**

- We know from basic portfolio theory that increasing risk leads to decreasing marginal increases in expected returns (this gives rise to the concave efficient frontier of Markowitz).
- Portfolios with higher risk/return targets eventually run out of high-return investment opportunities and lose the ability to diversify efficiently, thereby reducing the Sharpe ratio.

## 4. Determining the Appropriate Level of Risk

### ➤ Leverage and its implications for risk.

- While leverage could allow the portfolio to move up the linear capital allocation line, rather than follow the curved efficient frontier in a single period, too much leverage will eventually bring a reduction of expected compounded return in a multi-period setting.
  - ✓ This comes from the fact that the geometric compounded returns ( $R_g$ ) of a portfolio are approximately related to arithmetic non-compounded returns ( $R_a$ ) and portfolio volatility  $\sigma$  as follows:

$$R_g = R_a - \frac{\sigma^2}{2}$$

- Leverage increases both  $R_a$  and  $\sigma$ , but the squaring of  $\sigma$  in the expression means there will be a point where **increasing leverage** will **lower expected geometric compounded returns** over time.

## 5. Risk Constraints

- **1. Heuristic risk constraints** are based on experience or general ideas of good practice.
  - **Liquidity constraint**
    - ✓ **Liquidity** issues may increase costs (mainly implicit), leading to a degradation of the information ratio.
    - ✓ Liquidity constraint = Dollar value of stock traded daily × Liquidity threshold (%)
      - ◆ Dollar value of stock traded daily = stock's market cap × Average daily trading volume (ADV)
  - **Allocation Constraint**
    - ✓ Allocation constraint = AUM × Maximum position size threshold (%)
  - **Index Weight Constraint**
    - ✓ The maximum position weight  $\leq 10 \times$  security's weight in the index.
    - ✓ Index weight constraint = AUM × (Index weight × 10)



## Example: Issues of Scale



- Andrew Isaac runs a \$100 million diversified equity portfolio (about 200 positions) using the Russell 1000 as his investable universe. The total capitalization of the index is approximately \$20 trillion. Isaac's strategy is very much size agnostic. He consistently owns securities along the entire size spectrum of permissible securities. The strategy was designed with the following constraints:
  - No investment in any security whose index weight is less than 0.015% (approximately 15% of the securities in the index);
  - Maximum position size equal to the lesser of  $10\times$  the index weight or the index weight plus 150 bps;
  - No position size that represents more than 5% of the security's average daily trading volume (ADV) over the trailing three months;
  - The smaller securities in Isaac's permissible universe trade about 1% of shares outstanding daily. At what level of AUM is Isaac's strategy likely to be affected by the liquidity and concentration constraints?

## Example: Issues of Scale



### ➤ **Solution:**

- Based on the index capitalization of \$20 trillion, the size constraint indicates that the smallest stocks in his portfolio will have a minimum market cap of about \$3 billion ( $0.015\% \times \$20 \text{ trillion}$ ). The ADV of the stocks at the lower end of his capitalization constraint would be about \$30 million ( $1\% \times \$3 \text{ billion}$ ). Because Isaac does not want to represent more than 5% of any security's ADV, the maximum position size for these smaller-cap stocks is about \$1.5 million ( $5\% \times \$30 \text{ million}$ ). It appears that Isaac's strategy will not be constrained until the portfolio reaches about \$1 billion in size ( $\$1.5 \text{ million} \div 0.15\% = \$1 \text{ billion}$ ). If the level of AUM exceeds \$1 billion, his position size constraints will require the portfolio to hold a larger number of smaller-cap positions. There is room to grow this strategy.

## 5. Risk Constraints

- **2. Formal risk constraints** are often statistical in nature. **Examples include limits on**
  - volatility,
  - active risk,
  - skewness,
  - drawdowns,
  - VaR-based measures including:
    - ✓ **Conditional VaR:** expected loss given VaR has been exceeded.
    - ✓ **Incremental VaR:** change in VaR from adding a new position to a portfolio.
    - ✓ **Marginal VaR:** impact of a very small change in position size on VaR.
- **A key distinction between formal and heuristic risk** measures is that formal risk measures require forecasts of return distributions, which introduces estimation error.

## 5. Risk Constraints

- **Other points of note regarding risk constraints include:**
  - **Leverage** magnifies the negative impact of incorrect risk estimations.
  - **Unexpected increases in volatility.**
    - ✓ Managers may tighten risk controls in more volatile periods to protect the portfolio from losses.
  - **Risk measures** used depend on the **style of management**.
    - ✓ E.g. A benchmark-agnostic manager with an absolute return philosophy is **less likely** to be concerned with statistical measures such as active risk and **more concerned** with more practical measures such as portfolio drawdown.
  - Portfolios with **fewer positions** will have **higher estimation errors** due to the random specific risks of concentrated positions, hence using formal risk measures is likely to be more difficult.

## 6. Market Impact Costs

- The **market impact cost** of a single trade is often measured by “slippage.”
  - **Slippage** = execution price - midpoint of the quoted market bid/ask spread at the time the trade was first entered.
- **Factors that affect market impact costs include:**
  - **1. Assets under management (AUM) versus market capitalization of securities.** The lower absolute level of trading volume for smaller cap securities can be a liquidity barrier to managers with higher AUM.
  - **2. Higher portfolio turnover and shorter investment horizons** generally lead to **higher market impact costs.**
  - **3. Managers whose trades include “information”** (where the trades act as a signal to the market that investment conditions have changed and encourage other market participants to carry out similar trades) will likely have **higher market impact costs.**

## 7. The Well-Constructed Portfolio

- A **well-constructed portfolio** should deliver the characteristics promised to investors in a cost-efficient and risk-efficient way. This involves:
  - A clear investment philosophy and a consistent investment process.
  - Risk and structural characteristics as promised to investors.
  - Achieving desired risk exposures in the **most efficient manner**.
  - Reasonably **low operating costs**, given the strategy.

## 7. The Well-Constructed Portfolio

- The desired portfolios has following characteristics:
  - Portfolios that can **achieve desired risk exposures with fewer positions** are likely to have more focus on risk management in the portfolio construction process.
  - If two portfolios have similar risk factor exposures, the **product with the lower absolute volatility and lower active risk** will likely be **preferred** (assuming similar costs).
  - If two portfolios have similar active and absolute risks, similar costs, similar manager alpha skills, then the portfolio with **the highest Active Share is preferable** because this will leverage the alpha skill of the manager and have higher expected return.
  - Well-constructed portfolios should **have low idiosyncratic (unexplained)** risk relative to total risk.

## 8.1 Long-only Investing

- **The Merits of Long-Only Investing:** An investor's choice between following long-only or long/short strategies is influenced by several factors:
- **Long-term risk premiums**, such as the market risk premium, are earned by investors going net long securities. Investors that short-sell securities over the long term will therefore suffer negative returns.
  - The **capacity and scalability** of a long-only strategy is set by the liquidity of the underlying securities. Capacity of short-selling strategies is set by the availability of securities to borrow to facilitate short-selling.
  - Due to **limited legal liability laws**, the maximum a long investor can lose is the amount they paid for the security (if the security falls to zero). The potential loss to a short-seller is unlimited.
  - **Regulations** allow some countries to ban short-selling in the interests of financial market stability.



## 8.2 Long/Short Investing

- **Long/Short Portfolio Construction:** There are many different styles of long/short strategies, defined by their gross and net exposure.
  - **Gross exposure = Long positions + |Short positions|**
    - ✓ Long positions or Short positions = % of investor's capital.
  - **Net exposure = Long positions - Short positions**
    - ✓ Net exposure > 0, net long exposure;
    - ✓ Net exposure < 0, net short exposure.
- **Example:**
  - **Long extension portfolios:** long/short strategies typically constrained to have a net exposure of 100%.
    - ✓ 130/30 fund: A long position of 130% and a short position of 30%.
  - **Market-neutral portfolios** aim to remove market exposure through their long and short exposures.

## 8.2 Long/Short Investing

### ➤ The Benefits of Long/Short Strategies

- Greater ability to **express negative ideas** than a long-only strategy.
- Ability to **use the leverage** generated by short positions to gear into high-conviction long ideas.
- Ability to **remove market risk** and act as a diversifying investment against other strategies.
- Greater ability to **control exposure to risk factors**.
  - ✓ Because most rewarded factors (size, value, momentum, etc.) are obtained through a long/short portfolio, being able to short-sell allows managers to better control their exposure to these factors.

## 8.2 Long/Short Investing

- **The drawbacks of Long/short Investing**
  - **Transactional complexity is higher** for a long/short fund.
  - **Costs** are likely to be **higher for long/short funds** than long-only funds both in terms of management fees and operational expenses.
  - The **personal ideology** of an investor might cause them to object to short-selling. This may be because they find the concept of profiting from the failure of others morally wrong.
  - Investors may find the **leverage** involved in some long/short strategies **unacceptable**.
- Losses on the short position will increase collateral demands from stock lenders, particularly if leverage has been used.
  - **Short squeeze.** A sudden rise in the price of a heavily-short security forces short-sellers to cover positions, buy back shares and potentially force the share price higher.

## 8.2 Long/Short Investing

### ➤ Costs and benefits of Long/short investing

Benefits	Costs
Short positions can reduce market risk.	Short positions might reduce the market return premium.
Shorting potentially expands benefits from other risk premiums and alpha.	Shorting may amplify the active risk.
The combination of long and short positions allows for a greater diversification potential.	There are higher implementation costs and greater complexity associated with shorting and leverage relative to a long-only approach.

## **It's not the end but just beginning.**

Always believe that good things are possible, and remember that mistakes can be lessons that lead to discoveries. Take your fear and transform it into trust; learn to rise above anxiety and doubt. Turn your "worry hours" into "productive hours". Take the energy that you have wasted and direct it toward every worthwhile effort that you can be involved in. You will see beautiful things happen when you allow yourself to experience the joys of life. You will find happiness when you adopt positive thinking into your daily routine and make it an important part of your world.

请坚信，美好的降临并非不可能，失误也许是成功的前奏。将惶恐化作信任，学会超越担忧和疑虑。让“诚惶诚恐”的时光变得“富有成效”。不要挥霍浪费精力，将它投到有意义的事情中去。当你下意识品尝生命的欢愉时，美好就会出现。当你积极地看待生活，并以此作为你的日常准则时，你就会找到快乐的真谛。

## 问题反馈

- 如果您认为金程课程讲义/题库/视频或其他资料中存在错误，欢迎您告诉我们，所有提交的内容我们会在最快时间内核查并给与答复。
- 如何告诉我们？
  - 将您发现的问题通过电子邮件告知我们，具体的内容包含：
    - ✓ 您的姓名或网校账号
    - ✓ 所在班级（eg.2111CFA三级长线无忧班）
    - ✓ 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
  - 请发送电子邮件至：[academic.support@gfedu.net](mailto:academic.support@gfedu.net)
- 非常感谢您对金程教育的支持，您的每一次反馈都是我们成长的动力。后续我们也将开通其他问题反馈渠道（如微信等）。