2025 CFA®
Exam Prep

SchweserNotes™
Portfolio Management

Level III

KAPLAN SCHWESER

Portfolio Management

SchweserNotes™ 2025

Level III CFA®

SCHWESERNOTES™ 2025 LEVEL III CFA® PORTFOLIO MANAGEMENT

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LEARNING OUTCOME STATEMENTS (LOS)

P1. Index-Based Equity Strategies

The candidate should be able to:

a. compare factor-based strategies to market-capitalization-weighted indexing.
b. compare different approaches to index-based equity strategies.
c. compare different approaches to index-based equity investing.
d. compare the full replication, stratified sampling, and optimization approaches for the construction of index-based equity portfolios.
e. discuss potential causes of tracking error and methods to control tracking error for index-based equity portfolios.
f. explain sources of return and risk to an index-based equity portfolio.

P2. Active Equity Investing: Strategies

The candidate should be able to:

a. compare fundamental and quantitative approaches to active management.
b. analyze bottom-up active strategies, including their rationale and associated processes.
c. analyze top-down active strategies, including their rationale and associated processes.
d. analyze factor-based active strategies, including their rationale and associated processes.
e. analyze activist strategies, including their rationale and associated processes.
f. describe active strategies based on statistical arbitrage and market microstructure.
g. describe how fundamental active investment strategies are created.
h. describe how quantitative active investment strategies are created.
i. discuss equity investment style classifications.

P3. Active Equity Investing: Portfolio Construction

The candidate should be able to:

a. describe elements of a manager's investment philosophy that influence the portfolio construction process.
b. discuss approaches for constructing actively managed equity portfolios.
c. distinguish between Active Share and active risk and discuss how each measure relates to a manager's investment strategy.
d. discuss the application of risk budgeting concepts in portfolio construction.
e. discuss risk measures that are incorporated in equity portfolio construction and describe how limits set on these measures affect portfolio construction.
f. discuss how assets under management, position size, market liquidity, and portfolio turnover affect equity portfolio construction decisions.
g. evaluate the efficiency of a portfolio structure given its investment mandate.
h. discuss the long-only, long extension, long/short, and equitized market-neutral approaches to equity portfolio construction, including their risks, costs, and effects on potential alphas.

P4. Liability-Driven and Index-Based Strategies

The candidate should be able to:

a. evaluate strategies for managing a single liability.
b. compare strategies for a single liability and for multiple liabilities, including alternative means of implementation.
c. evaluate liability-based strategies under various interest rate scenarios and select a strategy to achieve a portfolio's objectives.
d. explain risks associated with managing a portfolio against a liability structure.
e. discuss bond indexes and the challenges of managing a fixed-income portfolio to mimic the characteristics of a bond index.
f. compare alternative methods for establishing bond market exposure passively.
g. discuss criteria for selecting a benchmark and justify the selection of a benchmark.

P5. Yield Curve Strategies

The candidate should be able to:

a. describe the factors affecting fixed-income portfolio returns due to a change in benchmark yields.
b. formulate a portfolio positioning strategy given forward interest rates and an interest rate view that coincides with the market view.
c. formulate a portfolio positioning strategy given forward interest rates and an interest rate view that diverges from the market view in terms of rate level, slope, and shape.
d. formulate a portfolio positioning strategy based upon expected changes in interest rate volatility.
e. evaluate a portfolio's sensitivity using key rate durations of the portfolio and its benchmark.
f. discuss yield curve strategies across currencies.
g. evaluate the expected return and risks of a yield curve strategy.

P6. Fixed-Income Active Management: Credit Strategies

The candidate should be able to:

a. describe risk considerations for spread-based fixed-income portfolios.
b. discuss the advantages and disadvantages of credit spread measures for spread-based fixed-income portfolios, and explain why option-adjusted spread is considered the most appropriate measure.
c. discuss bottom-up approaches to credit strategies.
d. discuss top-down approaches to credit strategies.
e. discuss liquidity risk in credit markets and how liquidity risk can be managed in a credit portfolio.
f. describe how to assess and manage tail risk in credit portfolios.
g. discuss the use of credit default swap strategies in active fixed-income portfolio management.
h. discuss various portfolio positioning strategies that managers can use to implement a specific credit spread view.
i. discuss considerations in constructing and managing portfolios across international credit markets.
j. describe the use of structured financial instruments as an alternative to corporate bonds in credit portfolios.
k. describe key inputs, outputs, and considerations in using analytical tools to manage fixed-income portfolios.

P7. Trade Strategy and Execution

The candidate should be able to:

a. discuss motivations to trade and how they relate to trading strategy.
b. discuss inputs to the selection of a trading strategy.
c. compare benchmarks for trade execution.
d. recommend and justify a trading strategy (given relevant facts).
e. describe factors that typically determine the selection of a trading algorithm class.
f. contrast key characteristics of the following markets in relation to trade implementation: equity, fixed income, options and futures, OTC derivatives, and spot currency.
g. explain how trade costs are measured and determine the cost of a trade.
h. evaluate the execution of a trade.
i. evaluate a firm's trading procedures, including processes, disclosures, and record keeping with respect to good governance.

P8. Case Study in Portfolio Management: Institutional

The candidate should be able to:

a. discuss tools for managing portfolio liquidity risk.
b. discuss capture of the illiquidity premium as a long-term investment strategy.
c. analyze asset allocation and portfolio construction in relation to liquidity needs and risk and return requirements and recommend actions to address identified needs.
d. demonstrate the application of the Code of Ethics and Standards of Professional Conduct regarding the actions of individuals involved in manager selection.
e. analyze the costs and benefits of derivatives versus cash market techniques for establishing or modifying asset class or risk exposures.

f. demonstrate the use of derivatives overlays in tactical asset allocation and rebalancing.
g. discuss ESG considerations in managing long-term institutional portfolios.

READING P1

INDEX-BASED EQUITY STRATEGIES

EXAM FOCUS

This reading starts with a discussion regarding the various approaches to index-based equity investing that seek to replicate the performance of an index (e.g., S&P 500 Index). The focus then shifts to the construction of index-based portfolios from full replication to optimization. The reading concludes with a brief discussion on tracking error and attribution analysis.

MODULE P1.1: FACTOR-BASED STRATEGIES

Video covering this content is available online.

LOS P1.a: Compare factor-based strategies to market-capitalization-weighted indexing.

The CAPM is a single-factor model in which the only risk factor that drives returns is the return on the market portfolio, and the risk of individual securities is measured by beta (market risk). Multifactor models consider multiple risk factors, and returns on individual securities are the result of their exposures to, and the returns to, these risk factors. Fama and French (2015) identified five risk factors that can be used to explain the variation in (total) returns across equity securities. These five factors are:

- Market risk premium (based on beta, standardized covariance of returns with the return on the market).
- Firm size (market value of equity).
- Book-to-market ratio (shareholders' equity divided by market value of equity).
- Operating profitability (operating income divided by beginning shareholders' equity).
- Investment intensity (growth rate of total assets).

Indexes with a high exposure to a specific risk factor are created to allow investors to augment or replace a market-cap-weighted index based on their beliefs about future returns to the various risk factors. Available indexes with greater or less exposure to a factor than broad-based index funds are typically structured as **exchange-traded funds (ETFs)**.

Factor-weighted portfolios are rules-based, so they have lower operating costs than traditional actively managed funds but typically have higher costs than large-cap-

weighted index funds. Factor-based index funds themselves are considered *passive*, as they are rules-based and typically transparent and replicable. However, emphasizing some factors and de-emphasizing others relative to the overall market portfolio is a form of active portfolio management.

Returns-oriented indexes and strategies include the following:

- Momentum-based indexes typically overweight stocks that have outperformed a benchmark index over the most recent period of a specified length.
- Dividend yield strategies often overweight stocks with relatively high dividends, or dividend growth rates.
- Fundamental-weighted index strategies are based on company fundamentals such as dividends, sales, and income.

Factor-based strategies frequently involve an element of active decision-making by altering the risk factor exposures and exploiting out-of-favor factors in an attempt to increase returns relative to a market-cap-weighted portfolio. Decisions regarding factor selection, weighting, and rebalancing tend to be transparent, allowing other investors to mimic the strategy. This can reduce or eliminate the opportunity for higher returns. The buy-sell actions of investors may move prices and reduce or eliminate the opportunity for increased factor returns.

There are three types of factor-based strategies: (1) return oriented, (2) risk oriented, and (3) diversification oriented.

Return-oriented strategies include dividend yield, momentum, and fundamentally weighted strategies, as noted previously.

Risk-oriented strategies include volatility weighting (where the weights are the inverse of price volatility) and minimum-variance investing (using the traditional Markowitz framework), where portfolios are selected that minimize portfolio variance, subject to constraints (such as maximum or minimum sector or country weights). The advantages of risk-oriented strategies are that they are simple and provide risk reduction. However, they are based on past return data, and as such may not reflect future conditions and outcomes.

Diversification-oriented strategies include equally weighted portfolios (as discussed previously) and maximum diversification strategies (achieved by maximizing the ratio of the weighted average volatility of the individual stocks to the portfolio volatility).

Portfolio managers who employ factor-based strategies often use multiple benchmarks, including both factor-based and market-cap-weighted indexes, which can increase tracking error.

The advantage of factor-based investing is that it is typically less costly than active management but still allows for different factor exposures based on the investor's view of future factor returns. A disadvantage is that, relative to market-cap weighted strategies, management fees and trading commissions are typically higher.

MODULE QUIZ P1.1

1. A small-cap, high P/E factor-based investment strategy is *best* classified as:

A. risk oriented.
B. return oriented.
C. diversification oriented.

MODULE P1.2: APPROACHES TO INDEX-BASED INVESTING

Video covering this content is available online.

LOS P1.b: Compare different approaches to index-based equity strategies.

LOS P1.c: Compare different approaches to index-based equity investing.

Three common approaches to index-based equity investing involve the use of (1) pooled investments, (2) derivatives-based strategies, and (3) separately managed index-based portfolios.

Pooled investments include open-end mutual funds and ETFs. The advantages of open-end mutual funds are low transaction costs and the convenience of the fund structure. The advantages of ETFs are that they trade intraday (not just at market close each day) and they do not have to sell stocks in response to shareholder redemption requests. This eliminates taxable gains from portfolio stock sales that shareholders are exposed to with open-end mutual funds. The disadvantages include higher transaction costs from commissions and the bid-ask spread, as well as possible illiquidity in some ETF secondary markets.

Derivatives-based strategies use derivatives (options, futures contracts, and swap contracts) to recreate the risk/return performance of an index. Derivative positions used to adjust the existing portfolio risk and return exposures may be called *overlay positions*, reflecting that they are used to modify the underlying portfolio positions. *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.

Advantages of using equity index derivatives (options, futures, and swaps) over cash-based portfolio construction techniques are that derivatives

- can be used to quickly adjust a portfolio's factor exposures at low cost,
- trade in liquid markets, and
- make it easy to leverage the portfolio.

Disadvantages include the following:

- Derivative positions have finite expirations, so they must be rolled over at or near expiration.
- Some contracts have position limits.
- Specialty portfolio needs might not be met by the existing offerings of exchange-traded derivative contracts.

- OTC derivatives introduce counterparty risk.
- Basis risk can increase tracking error.

Separately managed equity index-based portfolios hold all 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.

LOS P1.d: Compare the full replication, stratified sampling, and optimization approaches for the construction of index-based equity portfolios.

Index-based equity portfolios can be constructed by (1) full replication (hold all of the securities in the index), (2) holding a sample of the securities based on stratified sampling, or (3) using more complex optimization to maximize desirable characteristics while minimizing undesirable characteristics. In practice, a blend of these approaches may be used.

Full Replication

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

Stratified Sampling

To reduce the costs of full replication but still approximate the factor exposures of the underlying index, a manager may use **stratified sampling**. With stratified sampling, index stocks are divided into strata (subsets) based on key risk characteristics. Random samples of stocks within each strata are selected for inclusion in the portfolio. The weight of the stocks selected for each strata are such that the portfolio risk factor exposures match those of the index portfolio.

The strata of the constituent stocks must be mutually exclusive and exhaustive. The strata are often formed across multiple dimensions; for example, one strata may contain large capitalization stocks that have high-dividend yields and low momentum. Industry sector and country of domicile are also candidates for the characteristics of strata. The more criteria used in constructing strata, the smaller the tracking error—the degree to which the portfolio performance deviates from the index.

The manager must consider size of the sample used (i.e., how closely to approach full replication). Initially, tracking error declines as the size of the sample is increased. The manager will naturally first purchase the largest, most liquid, lowest cost stocks. But as more stocks are added and the portfolio approaches full replication, the added stocks will be less liquid, increasing the effect of transaction costs on tracking error.

Optimization

Optimization uses mean-variance analysis to minimize tracking error. The optimization typically maximizes a desirable result (e.g., returns) or minimizes an undesirable characteristic (e.g., variance), subject to one or more constraints. For an index portfolio, optimization seeks to minimize tracking error relative to the underlying index, and constraints may include a minimum number of stocks, a style tilt that matches that of the underlying index, or a minimum capitalization, among other possibilities. Optimization can be combined with stratified sampling, with optimization performed on each strata of a stratified sample.

A drawback of optimization is that it is based on historical relationships, which will change over time. Maintaining the optimal weights as these relationships change can be costly. Additionally, minimization of tracking error can result in portfolios that are not mean-variance efficient.

The advantages of optimization techniques are reduction of tracking error relative to stratified sampling and that they explicitly account for the covariances of constituent stock returns, rather than relying on a characteristic, such as industry sector, in constructing the portfolio.

Blended Approach

Full replication is preferred for indexes with small numbers of similar liquid stocks, while stratified sampling or optimization is preferable for indexes with many heterogeneous, thinly traded, small-capitalization stocks. For indexes with a large number of stocks—ranging from large and liquid to small and thinly traded, such as the Wilshire 5000—the manager may use a blended approach, with full replication for large liquid index stocks and stratified sampling or optimization for index stocks that are thinly traded.

MODULE QUIZ P1.2

1. **Discuss** the advantages and disadvantages of using ETFs to implement an index-based equity investing strategy.

2. **Discuss** *two* advantages and *two* disadvantages of using equity index derivatives versus cash-based strategies for index-based equity investing.

3. As the number of constituent stocks in an index increases, the tracking error of an index-based portfolio that uses the index as a benchmark will *most likely*:

   A. increase.
   B. decrease.

C. first decrease and then eventually increase.

MODULE P1.3: TRACKING ERROR, RETURN, AND RISK

Video covering this content is available online.

LOS P1.e: Discuss potential causes of tracking error and methods to control tracking error for index-based equity portfolios.

Causes of Tracking Error

Tracking error refers to the standard deviation of the differences between index portfolio returns and published index returns. Differences between portfolio returns and index returns are caused by:

- Management fees.
- Commissions on trades.
- Sampling—compared to full replication, sampling typically increases tracking error.
- Intraday trading because index returns are based on closing prices.
- Cash drag—portfolios may hold cash balances that reduce returns in rising markets and increase returns in falling markets, as cash returns differ from index returns.

Controlling Tracking Error

Reducing tracking error involves a tradeoff between the higher trading costs of full replication and the increased potential for tracking error that comes with sampling. Nonetheless, an index-based fund must do some trading in response to cash inflows and outflows and to reinvest dividends. Derivative positions in index futures can be used to reduce cash drag.

LOS P1.f: Explain sources of return and risk to an index-based equity portfolio.

Attribution Analysis

The manager of an index-based equity portfolio needs to understand the sources of returns in order to effectively manage a portfolio intended to replicate index returns. **Attribution analysis** can be used to help the manager identify the sources of tracking error and hopefully reduce them.

PROFESSOR'S NOTE
Attribution analysis is covered in more detail in the Core readings within the Performance Measurement Topic area in the Portfolio Performance Evaluation reading.

Securities Lending

Investors with large equity portfolios can lend securities to generate additional income, which can offset management fees (and other costs as well if management fees are quite low), thereby reducing tracking error.

Proxy Voting

Even index fund managers have a fiduciary duty to vote the proxies of portfolio stocks in the best interests of their investors. By voting in ways that improve operations, better manage risk, or provide better board oversight and corporate governance, returns to index stocks may be increased. Voting proxies effectively can be a costly undertaking for an index fund manager who must research a myriad of corporate issues across a broad portfolio of companies. Because of that, many index fund managers use proxy-voting services.

MODULE QUIZ P1.3

1. **Explain** cash drag and how it results in tracking error.

2. **Explain** why tracking error is a better measure of an index-based equity manager's skill than excess return.

3. **Explain** how securities lending can reduce tracking error in index-based portfolios.

KEY CONCEPTS

LOS P1.a

The return/risk characteristics of an index can be replicated by creating a portfolio with the same exposures to a set of risk factors as the index. This strategy is called a factor-based strategy.

Common factors are growth, value, size, yield, momentum, quality, and volatility.

There are three types of factor-based strategies: (1) return oriented, (2) risk oriented, and (3) diversification oriented.

LOS P1.b, LOS P1.c

Three common approaches to index-based equity investing involve the use of (1) pooled investments, such as open-end mutual funds and ETFs, (2) derivatives-based strategies, and (3) separately managed index-based portfolios.

LOS P1.d

The three methods of constructing index-based equity portfolios are (1) hold and match the weights of all the securities in the index (full replication), (2) select a more liquid sample of securities to replicate the index (stratified sampling, often based on cell matching), (3) use a more technical and quantitative approach (optimization) to maximize desirable characteristics, and/or minimize undesirable characteristics. Blended approaches using a combination of these methods are also common.

LOS P1.e

Tracking error initially declines as sample size increases but then increases as costs (transaction, management, and illiquidity) outweigh the gains of increasing sample size. Intraday trading and cash drag also create tracking error.

Reducing tracking error requires a continuing evaluation of the tradeoff between the benefits of larger sample size and increasing costs. Derivatives can be used to reduce the effects of cash drag.

LOS P1.f

Attribution analysis is a key tool in helping the manager identify the sources of tracking error.

Securities lending can generate fee income to offset some of the costs of managing the portfolio and reduce tracking error.

Corporate governance and investor activism are important for both index fund managers and active investors.

ANSWER KEY FOR MODULE QUIZZES

Module Quiz P1.1

1. **B** Fundamentally weighted factor exposure strategies are considered to be return oriented because such strategies focus on the factors that have determined differences in return. (LOS P1.a)

Module Quiz P1.2

1. Advantages: ETFs handle shareholder redemptions more cheaply and efficiently than open-end mutual funds through in-kind delivery of stock. This reduces taxable gains and losses that would otherwise be passed on to shareholders.

   Disadvantages: Transaction costs from commissions and the bid-ask spread as well as illiquidity in some ETF secondary markets. (LOS P1.b)

2. Advantages of Derivatives: (1) a quick, efficient, and cheap way to adjust exposure and (2) trade in liquid markets.

   Disadvantages of Derivatives: (1) have finite expirations and so have to be rolled over, (2) some contracts have position limits, (3) specialty portfolio needs might not be met by the existing offering of exchange-traded derivative contracts, (4) OTC derivatives have counterparty risk, and (5) basis risk can increase tracking error. (LOS P1.c)

3. **C** Adding to the sample size with liquid stocks first reduces tracking error; but as less liquid stocks are added, the costs and tracking error increase. (LOS P1.d)

Module Quiz P1.3

1. Even index-based portfolios have some cash flows and some cash holdings, while indexes represent theoretical fully invested performance. Over time the cash is a low return asset, reducing the portfolio's return. The underperformance increases tracking error. (LOS P1.e)

2. The goal is to consistently match the index's performance and zero (or low) tracking error indicates a perfect (or close) match. (LOS P1.e)

3. Large equity portfolios can lend their stocks to generate fee income (or return on collateral) and cover expenses. This can produce a better match of index performance, lowering tracking error. (LOS P1.f)

READING P2

ACTIVE EQUITY INVESTING: STRATEGIES

EXAM FOCUS

This reading focuses on active equity management strategies. We will cover factor-based, activist, statistical arbitrage, fundamental, and quantitative strategies. The reading concludes with style classification based on holdings-based versus returns-based analysis. You need to know the vocabulary and understand the output, pros, and cons of the processes covered here.

MODULE P2.1: FUNDAMENTAL VS. QUANTITATIVE APPROACHES

Video covering this content is available online.

LOS P2.a: Compare fundamental and quantitative approaches to active management.

Active equity investing seeks to outperform a passive benchmark. At the broadest level, these approaches can be divided into two categories: *fundamental* and *quantitative*.

Fundamental approaches are *subjective in nature*, relying on analyst discretion and judgment. An analyst will carry out and collate research on companies, markets, and economies; then using their skill and experience to estimate the intrinsic value of securities. The research will typically use the company's financial statements as well as insight into its business model, management team and industry positioning to establish a valuation of the company's shares.

These fundamental insights are used to generate forecasts. Higher conviction ideas will receive a larger weight in the portfolio, subject to risk parameters set out in fund mandates. Compared to the quantitative approach, there are likely to be fewer positions in the portfolio and the allocation to each will be larger. Risks to the strategy lie at the individual company level if the analyst has misestimated intrinsic value, or that the market fails to recognize the mispricing and the security remains mispriced. The fundamental manager continuously monitors stock positions and rebalances at any time according to their current opinion.

Quantitative approaches are *objective in nature*, relying on models that generate systematic rules to select investments. Expertise is required in statistical modeling, typically using large amounts of data. Historical data is analyzed to identify

relationships between equity returns and variables (called *factors*) that have predictive power. These variables could relate to valuation (e.g., P/E ratio), size (e.g., market capitalization), financial strength (e.g., debt-to-equity ratio), and industry sector or price related attributes (e.g., price momentum).

Quantitative managers focus on identifying relationships between returns and factors across a large group of securities, spreading their factor bets across smaller positions in a larger number of holdings. Portfolio optimization is used to set weights in the portfolio that maximize expected portfolio alpha or information ratio. Risks to the strategy lie at the portfolio level if the factors do not deliver the performance as predicted by the model. The quantitative manager automatically rebalances according to the systematic rules of the strategy at predetermined intervals such as monthly or quarterly.

PROFESSOR'S NOTE

Do not be overly rigid with these definitions. A fundamental manager could use quantitative techniques such as free cash flow modeling, screening, or regression to help establish their opinion. Likewise, quantitative models can be based on data relating to fundamental company information found in their financial statements. The key takeaway is that when it comes to the decision to invest, fundamental investing is based more on an opinion and quantitative investing is based more on rules derived from data-driven modeling.

Types of Active Management Strategies: Bottom-Up vs. Top-Down

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LOS P2.b: Analyze bottom-up active strategies, including their rationale and associated processes.

LOS P2.c: Analyze top-down active strategies, including their rationale and associated processes.

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.

Managers can use a blend of bottom-up and top-down approaches. For example, a top-down strategist sets target country or sector weights, and then bottom-up portfolio managers select the best investments consistent with these weights. Or 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.

Bottom-Up Strategies

Quantitative bottom-up managers look for quantifiable relationships between company-level information (e.g., P/E ratio) and expected return that will persist into the future.

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).

PROFESSOR'S NOTE

The key takeaway is that fundamental bottom-up managers are looking for companies with strong business models, high brand quality and loyalty, strong competitive advantage, and good management teams with solid corporate governance because these companies may be best positioned to outperform their peers in the future.

Types of bottom-up strategies include both value-based and growth-based approaches, the sub-styles of which are summarized below:

Value-based approaches attempt to identify securities that are trading below their estimated intrinsic value. Sub-styles of value investing include the following:

- **Relative value:** Comparing price multiples such as P/E and P/B to peers. An undervalued company has an inexplicably low multiple relative to the industry average.
- **Contrarian investing:** Purchasing or selling securities against prevailing market sentiment. For instance, buying the securities of depressed cyclical stocks with low or negative earnings.
- **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. The goal is to release value through restructuring the distressed company or through the company having sufficient assets in liquidation to generate appropriate returns.
- **Special situations:** Identifies mispricings due to corporate events such as divestures, spin-offs, or mergers.

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. Analysts will be less concerned about high valuation multiples and more concerned about the source and persistence of the growth rates of the company. Focus could be on:

- Consistent long-term growth.
- Shorter-term earnings momentum.
- **GARP** (growth at a reasonable price); looking for growth at a reasonable valuation. Often this strategy will use the P/E-to-growth (PEG) ratio, which is calculated as the stock's P/E ratio divided by expected earnings growth in percentage terms.

EXAMPLE: Bottom-up strategy securities selection

Company	Share Price	Price to Book Value Ratio	Price to 12-Month Forward EPS	5-Year EPS Growth Forecast	Dividend Yield	Sector Average P/E
TW	3	0.75	1.5	–10%	–0.00%	8
NB	15	7.50	15.0	10%	1.0%	12
SO	30	10.00	20.0	2%	2.0%	30
TO	12	3.00	13.6	4%	9.0%	14

Based on the information in the table, **determine** which bottom-up investment strategy would most likely select each security. You must choose from the following list and each choice must be used only once.

- Deep value (of assets) investing
- GARP
- Income investing
- Relative value investing

Answer:

TW has the lowest P/B ratio 0.75. This low valuation of assets suggests a deep value approach would be appropriate, provided the analyst addresses reasons for the low valuation.

NB has the lowest PEG ratio of 15 / 10 = 1.5, which is substantially lower than the PEG ratio of the other stocks with positive earnings. This suggests GARP strategies might select this security.

SO has the lowest P/E of 20 versus its sector average of 30; a ratio of only 0.67. This suggests a relative value strategy might select this security, provided there are no obvious reasons why the valuation discount might exist. Note that TW has an even lower P/E versus its sector average P/E at 1.5 / 8 and would also appeal to a relative value strategy. But TW is the only security trading at a P/B below 1 and would be the only security likely to appeal to a deep discount strategy. TW must be selected for deep discount to meet the direction to use each strategy only once.

TO has the highest dividend yield of 1.08 / 12 = 9% which is substantially higher than the other securities. This suggests this company is a good candidate for income investing approaches.

Top-Down Strategies

Both fundamental and quantitative managers could use a top-down approach focusing on the overall macroeconomic environment and broad market variables rather than information relating to individual investments.

Top-down managers typically use broad market ETFs and derivatives to overweight the best markets and underweight the least attractive markets according to the following dimensions:

- Country/geography.
- Industry sector.
- Volatility: Volatility trading can be conducted through VIX futures, variance swaps, or option volatility strategies such as straddles.
- 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 clean energy. Themes might also be shorter term in nature such as the impact on the value of a currency of a major political vote.

The top-down allocation to country/geography and industry sector could be complemented by further insights from a fundamental bottom-up approach, which values a market through aggregation of the individual companies.

The proliferation over recent years of structured products and focused ETFs has provided managers with greater flexibility in implementing passive factor investing (sometimes referred to as "smart beta" products), allowing the manager to target a specific style or sector at a time when they believe it will outperform.

PROFESSOR'S NOTE

Smart beta is just another example of a new term for an old idea. In original CAPM theory, beta is the systematic risk of the market, and investors should earn a return based on their level of systematic risk exposure. Then CAPM expanded to include other priced risk factors such as market cap and value/growth. Now, smart beta expands that idea by suggesting you identify factors (betas) that are related to systematic return and rotate your portfolio exposures into those betas (factors) that are expected to outperform. So, a smart beta approach is a form of top-down that identifies basic drivers of return as opposed to a bottom-up approach of identifying individual security misvaluations.

MODULE QUIZ P2.1

1. Screening stock markets to identify companies with low price-to-book ratios for subsequent in-depth analysis is a process that could be used by:

   A. quantitative managers only.
   B. fundamental manager only.
   C. both fundamental and quantitative managers.

2. An active bottom-up manager aims to identify companies that have securities that are undervalued relative to the amount that would likely be received in a bankruptcy

liquidation situation. This manager's strategy can be *best* described as:

A. relative value.
B. restructuring and distressed debt investing.
C. deep value.

3. Which of the following active equity fund managers is *least likely* following a top-down investment approach?

A. A manager that uses generalized autoregressive conditional heteroskedasticity (GARCH) models to forecast the volatility of U.S. market with the aim of buying options in times of low implied volatility and selling options in times of high implied volatility.
B. A manager that aims to identify growth at a reasonable price (GARP) for individual components of the S&P 500.
C. A manager that aims to identify subsectors of the energy and industrial goods sector that are likely to suffer due to changes to global climate change regulation.

MODULE P2.2: TYPES OF ACTIVE MANAGEMENT STRATEGIES

Video covering this content is available online.

Factor-Based Strategies

LOS P2.d: Analyze factor-based active strategies, including their rationale and associated processes.

A *factor* is a variable or characteristic with which asset returns are correlated. Typical examples are the size and value factors introduced by Fama and French (1993) in their multifactor model. They noticed that smaller companies tend to offer higher returns than larger companies (the *size* factor), and stocks with higher book values relative to market values also tended to outperform (the *value* factor). When such factors are identified, they can be used to rank stocks for investment with the aim of predicting future returns or risks.

Factors that are shown to have a positive association with a long-term positive risk premium are referred to as *rewarded* factors. Care must be taken when identifying factors to avoid factors that do not offer a persistent return (so-called *unrewarded* factors). It is very important that a factor makes intuitive sense. If not, aggressive backtesting of historical data will likely find spurious relationships that will not persist into the future.

PROFESSOR'S NOTE

These factors are the raw ingredients of quantitative (rule-driven) strategies but are also key ideas behind fundamental (judgment based) approaches we have already discussed. Once again, remember that the difference between the fundamental and quantitative approaches is not the rationale for outperformance, but how the decision to invest is made: fundamental is more subjectively driven by the managers and analysts, while quantitative is driven more by rules derived from historical data.

Identifying Factor Performance: The Hedged Portfolio Approach

Pioneered by Fama and French, the hedged portfolio approach follows the following process:

- Rank the investable stock universe by the factor (e.g., for the size factor, rank by market capitalization).
- Divide the universe into quantiles. A quantile is a defined percentage proportion of the universe. For example, the top 10% quantile for the size factor comprise the smallest 10% companies. Typical quantiles are deciles (10%) or quintiles (20%).
- Form a long/short portfolio by going long the best quantile and shorting the worst quantile. For the size factor based on deciles, this portfolio would buy the smallest 10% of the stock universe and short sell the largest 10% of the stock universe.
- The performance of this long/short portfolio is tracked over time and represents the performance of the factor.

Drawbacks to the hedged portfolio approach include:

1. The information in middle quantiles is lost in this approach. It could be that the best performing companies are not in the top quantile, but in a middle quantile. By going long and short the extreme quantiles this would be overlooked in construction of the factor.
2. It is assumed that the relationship between the factor and stock return is linear. In other words, as the factor increases, expected returns increase by a constant amount. Any nonlinear relationship between factors and performance will not be captured by the approach.
3. Portfolios can appear diversified when the manager uses multiple factors to select securities. But if the factors are highly correlated with each other, the diversification is likely to be less than expected.
4. The approach assumes the manager can short stocks to create the hedged portfolio.
5. The hedged portfolio is not a "pure" factor portfolio because it will typically have significant exposures to other risk factors.

A *factor mimicking portfolio* is a theoretical long/short portfolio that is dollar neutral with a unit (i.e., one-for-one) exposure to a chosen factor and an exposure of zero to other factors. These theoretical portfolios tend to be spread across a broad array of stocks. Managers may encounter liquidity and short selling constraints when attempting to construct them.

Investors who are restricted to long-only positions can tilt the portfolio toward factors that are expected to outperform the overall benchmark. If the tilts are modest the portfolio will still have low tracking error and could be considered an enhanced indexing strategy.

Types of Style Factor

Remember that factors can be constructed in any way that the manager chooses. The real value added is in identifying which factors will be predictive of the future.

Factor	Construction	Rationale for Risk Premium
Size	Long: small cap stocks Short: large cap stocks	Small companies at more risk of failure than large established companies
Value	Long: cheap; stocks with high book values to market values, high cash flows and/or low-price multiples Short: expensive companies with the opposite attributes	Could be explained by cheaper companies being more likely to be in financial distress—could also be explained by behavioral biases of market participants
Price momentum	Long: stocks that have recently outperformed Short: stocks that have recently underperformed	Behavioral biases such as belief in momentum that lead to an expectation that recent performance trends will continue
Growth	Long: companies with high historical or expected growth rates in earnings, revenues, and/or cash flows Short: companies with the opposite low growth prospects	Higher than average growth considered an indicator for strong future stock price performance
Quality	Long: companies with high quality earnings, evidenced by low non-cash accrual earnings and/or measures relating to changes in debt levels, profitability, stability or management efficiency measures; market sentiment measures based on analyst revisions could also be used; recent developments include natural language processing (NLP), which gauges sentiment through analysis of the type of language used in news stories Short: companies with low earnings quality with the opposite attributes to the long portfolio	Companies with higher quality earnings or improvement in sentiment are likely to outperform those with low quality earnings and deteriorating sentiment
Unstructured data	Uses big data, which includes both conventional market data and new forms of alternative unstructured data (e.g., satellite images, textual data, credit card data, or social media comments)	Various rationales exist based on the nature of the big data used

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.

Having constructed factors of interest, an analyst might want to investigate what market conditions lead to the factor outperforming. This could involve regressing

factor performance against a variable, which is suspected to be a key driver of factor performance. This process is considered in the next example.

EXAMPLE: Establishing drivers of style factor performance

A quantitative manager is investigating whether central bank interest rate decision surprises are a key variable in driving equity style factor performance. They are particularly interested in the three factors of the Fama and French model: market risk, size, and value.

The manager collects monthly performance data for the three style factors and regresses these factor returns against a custom defined variable, $ISurprise_t$ that measures the extent of the surprise of an interest rate decision in a given month *t*. The variable is calculated by comparing the actual interest rate decision of the central bank with the expectations priced into Eurodollar futures contracts the day before the decision.

- A high value for $ISurprise_t$ indicates that the central bank decision was to target rates that were higher than that expected by market participants.
- A low value of $ISurprise_t$ indicates the central bank announced a target policy rate that was below market expectations.

The analyst explores possible contemporaneous and lagged relationships by performing two regressions using the current month's and the next month's factor returns respectively against the variable $ISurprise_t$:

$$f_{i,t} = \beta_{i,0} + \beta_{i,1} ISurprise_t + \varepsilon_{i,t}$$

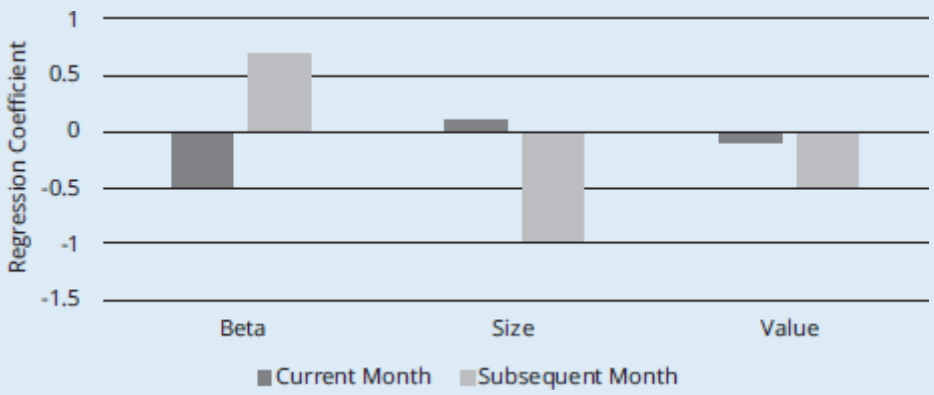
and:

$$f_{i,t+1} = \beta_{i,0} + \beta_{i,1} ISurprise_t + \varepsilon_{i,t}$$

where $f_{i,t}$ is the return of style factor *i* at time *t* and $f_{i,t+1}$ is the subsequent (next) month's return for style factor *i*.

The regression coefficients are presented in Figure P2.1.

Figure P2.1: Interest Rate Surprises and Style Factor Returns



Based on the data in Figure P2.1, answer the following questions:

1. **Discuss** the main factor rotation timing implications from the regression.

2. **Discuss** practical issues in using the model to time factor rotation.

Answers:

1. For the current month:
   - The negative regression coefficient of 0.5 indicates that higher beta stocks underperform in the month of an upward surprise in interest rates, or outperform for a downward surprise.
   - Size and value provide no meaningful signal.

   For the subsequent month:
   - The strongest effect is the negative 1.0 regression coefficient indicating small companies underperform the month after higher than expected interest rates. Value companies also underperform for an upward surprise in rates while high beta stocks outperform with a roughly 0.7 positive regression coefficient.
2. Further analysis is needed in relation to the timing of the beta effect because the coefficient is negative for the current but positive for the subsequent month. For example, suppose there is a positive (upward surprise in rates) on the 20th of the month. How long will the negative effect on high beta stock performance last and when will it turn positive?

Activist Strategies

LOS P2.e: Analyze activist strategies, including their rationale and associated processes.

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. The changes could be nonfinancial in nature (e.g., related to environmental, social, or governance issues). One prominent activist is American hedge fund manager Carl Icahn, who has taken high-profile stakes in U.S. technology and pharmaceutical companies in recent years.

Typical Activist Investing Process

The investment process of an activist investor typically involves:

- Screening and analysis of activist opportunities.
- Buying an initial stake in the target company (typically less than 10% of voting rights).
- Submitting a public proposal for changes to the company, usually in the form of an open letter to the company.
- If no agreement, threatening a *proxy contest* (a proxy contest is a shareholder vote to force the proposed changes on the company).
- If no agreement, launching a proxy contest.
- Continuing to negotiate with management, but with no agreement eventually taking the matter to a proxy contest.

Popularity of Shareholder Activism

The foundations of activism go back to *corporate raiders* in the 1970s and 1980s who took large stakes in companies in order to influence operations and enhance value. Activist investing as a hedge fund style has seen assets under management more than double between 2007 and 2015. The number of public announcements of activist campaigns has increased four-fold in this period.

Tactics Used by Activists

These include:

- 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.

The typical defenses that are used by management resisting the activist's proposed changes include:

- Use of multi-class share structures, which grant multiple votes to founders.
- "Poison pill" clauses, which allow existing shareholders to purchase more shares in the target company at a discount, diluting the stake of the activist.
- Staggered board provisions, which mean the board is re-elected partially each year, and hence, cannot be replaced simultaneously.

Target Companies

Target companies tend to feature slower earnings and revenue growth than the market, negative share price momentum, and weak corporate governance. This poor track record is evidence that changes need to be made and makes it more likely the activist will garner support from other disgruntled shareholders in a proxy contest.

Impact

Studies show that activism does lead to improvements in growth, profitability, and corporate governance; however, it also leads to higher debt levels. The added performance of activist funds has been modest with hedge fund data showing Sharpe ratios slightly above the broad stock market.

Investors have generally reacted positively to activism announcements; data shows positive stock price outperformance for periods leading up to the announcement, with

strongest outperformance on the day of the announcement, and modest outperformance over the following month.

MODULE QUIZ P2.2

1. An analyst is attempting to construct a hedged portfolio to represent the value factor in their domestic stock market. They use the following process:
   1. Rank securities in the domestic market in order of book value of equity in relation to market value of equity (book-to-market ratio).
   2. Purchase the quartile of securities with lowest book-to-market, short sell the quartile of securities with highest book-to-market ratio to create a dollar-neutral portfolio.
   3. Track the performance of the long/short portfolio over time.

   Which of the following statements *most accurately* describes an error in this process?

   A. Stage 1 is incorrect because price-to-book ratio should be used instead of book-to-market ratio.
   B. Stage 2 is incorrect because the top and bottom deciles of securities should be used to construct the dollar-neutral portfolio instead of the top and bottom quartile.
   C. Stage 2 is incorrect because the long/short portfolio should be constructed by purchasing the securities with the highest book-to-market and short selling the securities with the lowest book-to-market.
2. Which of the following strategies would *least likely* be used as part of the investment process of an activist investor?
   A. Buying a majority stake in the company to enforce value-enhancing changes on company management.
   B. Submit public proposal for changes to investee company, usually in the form of an open letter to the company.
   C. Launch a proxy contest against the current management team.

MODULE P2.3: OTHER STRATEGIES

Video covering this content is available online.

LOS P2.f: Describe active strategies based on statistical arbitrage and market microstructure.

Two other active equity strategies discussed are **statistical arbitrage** and **event-driven** strategies. Both are usually quantitative strategies, though they could incorporate judgment from a fundamental manager.

Statistical Arbitrage

Statistical arbitrage, or "stat arb" strategies, make extensive use of technical stock price and volume data to exploit pricing inefficiencies. Typically, they aim to profit from mean reversion in related share prices or by taking advantage of opportunities created by market microstructure issues.

Pairs trading is an example of a popular statistical arbitrage strategy. 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. The strategy buys the underperforming security while shorting the