

Capital Market Expectations

CFA三级培训项目

讲师：TOM

101% Contribution Breeds Professionalism



- 金程教育资深培训师
- 美国特许金融分析师（CFA）、注册会计师（CPA）、美国注册财务策划师（RFP）、量化金融分析师（AQF）、注册金融风险管理师（CFRM）
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Topic in CFA Level III

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Study Session 16	CASES IN PORTFOLIO MANAGEMENT AND RISK MANAGEMENT

◎ Framework

Applications of Capital Market Expectations

➤ SS4: Capital Market Expectations

- R10 Capital Market Expectations, Part 1: Framework and Macro Considerations
- R11 Capital Market Expectations, Part 2: Forecasting Asset Class Returns



Reading 10

Capital Market Expectations, Part 1: Framework and Macro Considerations

Framework

1. Challenges when formulating CME
2. The trend rate of growth
3. Approaches to economic forecasting
4. The business cycle
5. Monetary policy and fiscal policy



Framework and Challenges

- Capital market expectations are risk and return expectations regarding classes of assets.
 - Investors should establish **long-term** expectations for each allowable asset class specified in the investment policy statement (**IPS**). Although projecting asset class returns may be subject to forecasting errors, investors should ensure that portfolios are internally consistent.
 - ✓ **Cross-sectional consistency** refers to consistency across asset classes regarding portfolio risk and return characteristics.
 - ✓ **Intertemporal consistency** refers to consistency over various investment horizons regarding **portfolio decisions over time**.
 - They can also create **short-term** expectations for making **active investment** decisions.

A Framework for Developing CME

- The following is a **framework** for a disciplined approach to setting CME.
 1. Specify the set of **expectations needed**, including the time horizon(s) to which they apply.
 2. Research the **historical record**.
 3. Specify the **method(s)** and/or model(s) to be used and their information requirements.
 4. Determine the best **sources for information** needs.
 5. Interpret the current investment environment using the selected data and methods, applying experience and judgment.
 6. Provide the set of **expectations needed**, documenting conclusions.
 - 7. Monitor** actual outcomes and compare them with expectations, providing feedback to improve the expectations-setting process.



1. Challenges in Forecasting

➤ 1. Limitations to using economic data

- The **time lag** between collection and distribution is often quite long.
The International Monetary Fund, for example, reports data with a lag of as much as two years.
- Data are often **revised** and the revisions are not made at the same time as the publication. Additionally, data definitions and methodology change over time.
- **Data indexes** are often **rebased** over time (i.e., the base upon which they are calculated is changed). Although a rebasing is not a substantial change in the data itself, the unaware analyst could calculate changes in the value of the indexes incorrectly if she does not make an appropriate adjustment.

Challenges in Forecasting

➤ 2. Data measurement errors and biases

- **Transcription errors** are the misreporting or incorrect recording of information and are most serious if they are biased in one direction.
- **Survivorship bias** commonly occurs if a manager or a security return series is deleted from the historical performance record of managers or firms. Deletions are often tied to poor performance and bias the historical return upward.
- **Appraisal data** for illiquid and infrequently priced assets makes the path of returns appear **smoother** than it actually is.
 - ✓ This biases **downward** the calculated standard deviation and makes the returns seem less correlated (closer to 0) with more liquid priced assets. This is a particular problem for some types of alternative assets such as real estate.

Challenges in Forecasting

➤ 3. Limitations of historical estimates

- Values from historical data must often be adjusted going forward as economic, political, regulatory, and technological environments change. This is particularly true for volatile assets such as equity.
- These changes are known as **regime changes** and result in **nonstationary data**.
 - ✓ For example, the global financial crisis in 2007-2009 resulted in returns data that were markedly different than those from the previous five years.
 - ✓ **Nonstationarity** would mean different periods in the time series have different statistical properties and create problems with standard statistical testing methods.

Challenges in Forecasting

➤ 3. Limitations of historical estimates (con't)

- A long time period is preferable for several reasons:
 - ✓ It may be **statistically required**: To calculate historical covariance (and correlation), the number of data points must exceed the number of covariance to be calculated.
 - ✓ A **larger data set** (time period) provides more precise statistical estimates with smaller variance to the estimates.
 - ✓ Using a short time period creates a temptation to use more frequent data, such as weekly data, rather than monthly data points in order to have a larger sample size.
 - ◆ Unfortunately, more frequent data points are often more likely to have missing or outdated values (this is called **asynchronous data**) and can result in lower, distorted correlation calculations.

Challenges in Forecasting

➤ 4. Ex Post risk as a biased risk measure of Ex Ante risk

- Using ex post data (after the fact) to determine ex ante (before the fact) risk and return can be problematic.
 - ✓ The analyst would **underestimate the risks** that equity investors face and **overestimate their potential returns**.
- If our data series includes even one observation of a rare event, we may substantially overstate the likelihood of such events happening in the future.
 - ✓ As a simple example, there were 21 trading days in July 2018. On 26 July, the price of Facebook stock closed down 19%. Based on this sample, the (interpolated) daily 5% VaR on Facebook stock is 17.3%.

Challenges in Forecasting

➤ 5. Biases in Analysts' Methods

- Using historical data, analysts can also uncover patterns in security returns that are unlikely to occur in the future and can produce biases in the data.
 - ✓ **Data-mining:** Just by random chance, some variables will appear to have a relationship with security returns, when, in fact, these relationships are unlikely to persist.
 - ✓ **Time-period bias** relates to results that are time period specific. Research findings are often found to be sensitive to the selection of starting and/or ending dates.

Challenges in Forecasting

➤ 5. Biases in Analysts' Methods

- How to avoid these biases:

- ✓ First, an analyst should first ask if there is any economic basis for the variables found to be related to stock returns.
- ✓ Second, he should scrutinize the modeling process for susceptibility to bias.
- ✓ Third, the analyst should test the discovered relationship with out-of-sample data to determine if the relationship is persistent.
 - ◆ This would be done by estimating the relationship with one portion of the historical data and then reexamining it with another portion.



Challenges in Forecasting

➤ 6. Failure to account for conditioning information

- The relationship between security returns and economic variables is not constant over time.
- Historical data reflect performance over many different business cycles and economic conditions. Thus, analysts should account for current conditions in their forecasts.

Challenges in Forecasting

➤ 7. Misinterpretation of Correlations

- The observed correlation alone does not allow us to distinguish among these situations.
 - ✓ Consequently, correlation relationships should not be used in a predictive model without **investigating the underlying linkages**.
- Although apparently significant correlations can be spurious, it is also true that lack of a strong correlation can be misleading.
 - ✓ A negligible measured correlation may reflect a strong but **nonlinear relationship**. Analysts should explore this possibility if they have a solid reason for believing a relationship exists.

Challenges in Forecasting

➤ 8. Psychological biases

- **Anchoring bias:** the first information received is overweighted.
- **Status quo bias:** predictions are highly influenced by the recent past.
- **Confirmation bias:** only information supporting the existing belief is considered, and such evidence may be actively sought while other evidence is ignored.
- **Overconfidence bias:** past mistakes are ignored, the lack of comments from others is taken as agreement, and the accuracy of forecasts is overestimated.
- **Prudence bias:** forecasts are overly conservative to avoid the regret from making extreme forecasts that could end up being incorrect.
- **Availability bias:** what is easiest to remember (often an extreme event) is overweighted.

Challenges in Forecasting

➤ 9. Model uncertainty

- **Model uncertainty:** refers to selecting the correct model.
- **Parameter uncertainty:** refers to estimation errors in model parameters.
- **Input uncertainty:** refers to knowing the correct input values for the model.

Analysis of Economic Growth

- The economic growth **trend** is the **long-term** growth path of GDP.
- Economic trends exist independently of the cycle but are related to it.

Business cycles take the economy through an alternating sequence of slow and fast growth, often including recessions and economic booms.

- Many **shocks** and their impact on capital markets **cannot be predicted**.
 - ✓ For example, turmoil in the Middle East may change the long-term trend for oil prices, inflation, and economic growth in the developed world.
- **Shocks** may also arise through the **banking system**.
 - ✓ An extreme example is the U.S. banking crisis of the 1930s, when a severe slowdown in bank lending paralyzed the economy.

Exogenous Shocks to Growth

- **Exogenous shocks** are unanticipated events that occur outside the normal course of an economy. Because the events are **unanticipated**, they are not already built into current market prices, whereas normal trends in an economy, which would be considered endogenous, are built into market prices.
 - Note that the impact of these events will likely produce **statistical regime** changes.

Exogenous Shocks to Growth

- Exogenous shocks can be caused by several factors:
 - **Changes in government policies**
 - ✓ Government policies that can encourage long-term growth include sound fiscal policy, minimal government interference with free markets, facilitating competition in the private sector, development of infrastructure and human capital, and sound tax policies.
 - **Political events**
 - ✓ Geopolitical tensions that divert resources to less productive uses may lead to decreases in growth. Conversely, cuts in defense spending due to higher levels of world peace may lead to increases in growth.

Exogenous Shocks to Growth

- **Technological progress**

- ✓ The creation of new and innovative markets, products, and technologies has the potential to improve growth.

- **Natural disasters**

- ✓ Natural disasters likely reduce short-term growth, but may (arguably) encourage long-term growth if more efficient capacity replaces previous capacity.

- **Discovery of natural resources**

- ✓ Production of new natural resources or the introduction of new ways to recover existing resources can enhance growth.

- **Financial crises**

- ✓ Shocks to the financial system will lead to a crisis of confidence among market participants. Financial crises may reduce the level of economic output in the short term and may also decrease the trend rate of growth.

Application of Growth Analysis to CME

- The trend rate of growth is an important input when setting capital market expectations. Some of the key considerations of economic growth trend analysis are as follows:
 - Forecasting returns with DCF models incorporate the trend rate of growth.
 - Higher trend growth rates may lead to higher stock returns assuming the growth is not already reflected in stock prices.
 - When we speak of higher trend growth rates, we mean the economy can grow at a faster pace before inflation becomes a major concern. This consideration influences monetary policy and the level of bond yields.
 - Higher trend growth rates tend to generate higher government bond yields.

Decomposition of GDP Growth

- **The trend growth in GDP is the sum of the following:**
 - Growth from labor inputs
 - ✓ growth in potential labor force size
 - ✓ growth in actual labor force participation
 - Growth from labor productivity
 - ✓ growth from capital inputs
 - ✓ total factor productivity (TFP) growth (i.e., growth from increase in the productivity in using capital inputs)

Economic Growth Trends



➤ **Forecasting GDP Trend Growth**

- If we have the following assumptions:
 - ✓ The size of the Canadian labor force will grow at 1 percent per year based on population projections.
 - ✓ Labor force participation will grow at 0.25 percent per year.
 - ✓ Growth from capital inputs will be 1.5 percent per year.
 - ✓ Total factor productivity growth will be 0.75%.
- Forecast the trend growth in Canadian GDP.

➤ **Correct Answer:**

- The trend growth in GDP = growth in potential labor force size + growth in actual labor force participation + growth from capital inputs + total factor productivity growth = 1% + 0.25% + 1.5% + 0.75% = 3.5%.

2. Anchoring Asset Returns to Trend Growth

- **The trend growth rate also provides an anchor for long-run equity appreciation.**
 - We can express the aggregate market value of equity, V^e , as the product of three factors: the level of nominal GDP, the share of profits in the economy, S^k (earnings/GDP), and the P/E ratio (PE).

$$V_t^e = GDP_t \times S_t^k \times PE_t$$

- ✓ As a result, in the long run, the growth rate of the total value of equity in an economy is linked to the growth rate of GDP.
- ✓ Over finite horizons, the way in which the share of capital and the P/E multiple are expected to change will also affect the forecast of the total value of equity, as well as its corresponding growth rate over that period.

Example



➤ Long-Run Equity Returns and Economic Growth

In January 2000, Alena Bjornsdottir, CFA, was updating her firm's projections for US equity returns. The firm had always used the historical average return with little adjustment. Bjornsdottir was aware that historical averages are subject to large sampling errors and was especially concerned about this fact because of the sequence of very high returns in the late 1990s. She decided to examine whether US equity returns since World War II had been consistent with economic growth. For the period 1946–1999, the continuously compounded (i.e., logarithmic) return was 12.18% per annum, which reflected the following components:

Real GDP Growth	Inflation	EPS/GDP (Chg)	P/E (Chg)	Dividend Yield
3.14%	4.12%	0.00%	0.95%	3.97%

Example



- **Questions 1.** What conclusion was Bjornsdottir likely have drawn from this analysis?

- **Correct Answers:**
 - Bjornsdottir is likely have concluded that the post-war stock return exceeded what would have been consistent with growth of the economy.
 - In particular, the rising P/E added 0.95% of “extra” return per year for 54 years, adding 51.3% ($= 54 \times 0.95\%$) to the cumulative, continuously compounded return and leaving the market 67% ($e^{51.3\%} = 1.67$) above “fair value.”

Example



- **Questions 2.** If she believed that in the long run that the US labor input would grow by 0.9% per annum and labor productivity by 1.5%, that inflation would be 2.1%, that the dividend yield would be 2.25%, and that there would be no further growth in P/E, what is likely to have been her baseline projection for continuously compounded long-term US equity returns?

- **Correct Answer:**
 - Her baseline projection is likely to have been $6.75\% = 0.9\% + 1.5\% + 2.1\% + 2.25\%$.

Example



- **Questions 3.** In light of her analysis, how might she have adjusted her baseline projection?

- **Correct Answer:**
 - She is likely to have adjusted her projection downward to some degree to reflect the likelihood that the effect of the P/E would decline toward zero over time. Assuming, for example, that this would occur over 30 years would imply reducing the baseline projection by $1.71\% = (51.3\%/30)$ per year.

3. Approaches to Economic Forecasting

- Three approaches to economic forecasting are **econometric modeling, use of economic indicators, and a checklist approach.**
- **1. Econometric analysis** uses statistical methods to explain economic relationships and formulate forecasting models.
 - Structural models are based on economic theory while reduced-form models are compact versions of structural approaches.
 - ✓ **Structural models** specify functional relationships among variables based on economic theory. The functional form and parameters of these models are derived from the underlying theory.
 - ✓ **Reduced-form models** have a looser connection to theory.



Approaches to Economic Forecasting

- **Advantages of Econometric Analysis**

- ✓ Modeling can incorporate many variables.
- ✓ Once the model is specified, it can be reused.
- ✓ Output is quantified and based on a consistent set of relationships.

- **Disadvantages of Econometric Analysis**

- ✓ Models are complex and time-consuming to construct.
- ✓ The data may be difficult to forecast and the relationships can change.
- ✓ Output may require interpretation or be unrealistic.
- ✓ It does not work well to forecast turning points.

Approaches to Economic Forecasting

- **2. Economic indicators** are available from governments, international organizations, and private organizations.
 - The most useful indicators are **leading indicators** that move ahead of the business cycle with a reasonable stable lead time. These can be used to predict what will happen next.
 - ✓ The leading indicators can be used individually or as a **composite**.
 - ✓ A composite can also be interpreted as a **diffusion index** by observing the number of indicators pointing toward expansion versus contraction in the economy.
 - There are also **coincident** and **lagging indicators** that move with and after changes in the business cycle. These can be used to confirm what is happening in the economy.



Approaches to Economic Forecasting

- **Advantages of Economic Indicators**

- ✓ Economic indicators are simple, intuitive, and easy to interpret.
- ✓ Data are often readily available from third parties.
- ✓ Indicator lists can be tailored to meet specific forecasting needs.

- **Disadvantages of Economic Indicators**

- ✓ Forecasting results have been inconsistent.
- ✓ Economic indicators have given false signals.
- ✓ Indicators are revised frequently, which can make them appear to fit past business cycles better than they did when the data were first released.

Approaches to Economic Forecasting

➤ **3. A checklist approach** is more subjective. In this approach, an analyst considers a series of questions.

- **Advantages of Checklist Approach**

- ✓ Less complex than econometrics.
- ✓ Flexible in mixing objective statistical analysis with judgment to incorporate changing relationships.

- **Disadvantages of Checklist Approach**

- ✓ Subjective.
- ✓ Time-consuming.
- ✓ Complexity must be limited due to manual process.

4. Business Cycle Analysis

- Fluctuations in economic growth over short to intermediate time horizons are often associated with the **business cycle**.
- A fundamental reason why economic activity is cyclical is the nature of business decisions. Decision makers allocate resources to what they believe are their highest valued uses, but can only do so with imperfect information. Adjustments to unexpected events take time to implement and reversing incorrect decisions can be costly.
- Business cycle analysis is most useful for identifying opportunities within the time horizon of a typical business cycle.

Business Cycle Analysis

- Understanding business cycle phases is important for forming capital market expectations, but their relationship is not straightforward for the following reasons:
 - Business cycles vary in duration and intensity, and their turning points are difficult to predict. Their variations may be thought of as resulting from the interactions of many subcycles with a wide range of frequencies.
 - Although we typically think of and model economic activity in terms of cycles fluctuating around a long-term trend, it can be difficult to distinguish which effects result from shorter-term factors that arise from the business cycle and which are related to longer-term factors that affect the trend rate of economic growth.
 - Returns in the capital market are strongly related to activity in the real economy, but they also depend on factors such as investors' expectations and risk tolerances.

Business Cycle Phases

➤ The business cycle can be subdivided into five phases:

- **1. Initial recovery**

- ✓ Duration of a few months.
- ✓ Business confidence rising.
- ✓ Government stimulus provided by low interest rates and/or budget deficits.
- ✓ **Falling inflation.**
- ✓ Large (negative) output gap.
 - ✓ $\text{output gap} = \text{actual GDP} - \text{potential GDP}$
- ✓ **Low or falling short-term interest rates.**
- ✓ Bond yields bottoming out.
- ✓ Rising stock prices.
- ✓ Cyclical, riskier assets such as small-cap stocks and high yield bonds doing well.



Business Cycle Phases

➤ The business cycle can be subdivided into five phases:

- 2. Early expansion

- ✓ Duration of a year to several years.
- ✓ Increasing growth with low inflation.
- ✓ Increasing confidence.
- ✓ **Rising short-term interest rates.**
- ✓ Output gap is narrowing.
- ✓ Stable or rising bond yields.
- ✓ Rising stock prices.



Business Cycle Phases

➤ The business cycle can be subdivided into five phases:

- 3. Late expansion

- ✓ High confidence and employment.
- ✓ Output gap eliminated and economy at risk of overheating.
- ✓ **Increasing inflation.**
- ✓ Central bank limits the growth of the money supply.
- ✓ **Rising short-term interest rates.**
- ✓ Rising bond yields.
- ✓ Rising/peaking stock prices with increased risk and volatility.



Business Cycle Phases

➤ The business cycle can be subdivided into five phases:

- 4. Slowdown

- ✓ Duration of a few months to a year or longer.
- ✓ Declining confidence.
- ✓ **Inflation still rising.**
- ✓ **Short-term interest rates at a peak.**
- ✓ Bond yields peaking and possibly falling, resulting in rising bond prices.
- ✓ Possible inverting yield curve.
- ✓ Falling stock prices.



Business Cycle Phases

➤ The business cycle can be subdivided into five phases:

- **5. Contraction**

- ✓ Duration of 12 to 18 months.
- ✓ Declining confidence and profits.
- ✓ Increase in unemployment and bankruptcies.
- ✓ **Inflation topping out.**
- ✓ **Falling short-term interest rates.**
- ✓ Falling bond yields, rising prices.
- ✓ Stock prices increasing during the latter stages, anticipating the end of the recession.

Inflation Implications

- **Inflation** means generally rising prices. For example, if the CPI increases from 100 to 105, inflation is 5%. Inflation typically accelerates late in the business cycle (near the peak).
- **Disinflation** means a deceleration in the rate of inflation. For example, if the CPI then increases from 105 to 108, the rate of inflation decreases to approximately 3%. Inflation typically decelerates as the economy approaches and enters recession.
- **Deflation** means generally falling prices. For example, if the CPI declines from 108 to 106, the rate of inflation is approximately —2%.

Inflation Implications

- Deflation is a severe threat to economic activity for the following reasons:
 - It encourages default on debt obligations.
 - ✓ Consider a homeowner who has a home worth \$100,000 and a mortgage of \$95,000; the homeowner's equity is only \$5,000.
 - ✓ A decline of more than 5% in home prices leads to negative equity and can trigger panic sales (further depressing prices), defaulting on the loan, or both.

Inflation Implications

- Deflation is a severe threat to economic activity for the following reasons:
 - With negative inflation, interest rates decline to near zero and this limits the ability of central banks to lower interest rates and stimulate the economy.
 - ✓ Following the financial crisis of 2007-2009 and the resulting very low interest rates, several central banks tried a new monetary policy of **quantitative easing (QE)** to stimulate the economies of their countries.
 - ✓ QE was different from open market operations in that it was larger in scale, the purchases included other security types such as mortgage-backed securities and corporate bonds, and the intent was a long-term increase in bank reserves.

Inflation Implications

- Monetary policy and inflation levels will vary over the business cycle.
 - In general, moderate levels of inflation only create moderate costs for the economy.
 - As a result, central banks tend to target a slightly positive inflation rate. Investors generally expect that equity and bond prices will reflect some level of positive inflation.

Inflation Implications

- The following figure summarizes the relationship of inflation to the business cycle.

Business Cycle	Inflation	Economic Policy	Markets
Initial recovery	Initially declining inflation	Stimulative	<ul style="list-style-type: none">✓ Short-term rates low or declining✓ Long-term rates bottoming and bond prices peaking✓ Stock prices increasing
Early expansion	Low inflation and good economic growth	Becoming less stimulative	<ul style="list-style-type: none">✓ Short-term rates increasing✓ Long-term rates bottoming or increasing with bond prices beginning to decline✓ Stock prices increasing

Inflation Implications

Business Cycle	Inflation	Economic Policy	Markets
Late expansion	Inflation rate increasing	Becoming restrictive	<ul style="list-style-type: none">✓ Short-term and long-term rates increasing with bond prices declining✓ Stock prices peaking and volatile
Slowdown	Inflation continues to accelerate	Becoming less restrictive	<ul style="list-style-type: none">✓ Short-term and long-term rates peaking and then declining with bond prices starting to increase✓ Stock prices declining
Contraction	Real economic activity declining and inflation peaking	Easing	<ul style="list-style-type: none">✓ Short-term and long-term rates declining with bond prices increasing✓ Stock prices begin to increase later in the recession

Inflation Implications

- To assess the effect of inflation on asset classes, we must consider both the cash flows and the discount rates. We consider **cash equivalents, bonds, equity, and real estate**.

Inflation within expectations	<ul style="list-style-type: none">✓ Cash equivalents: Earn the real rate of interest✓ Bonds: Shorter-term yields more volatile than longer-term yields✓ Equity: No impact given predictable economic growth✓ Real estate: Neutral impact with typical rates of return
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Inflation Implications

Inflation above or below expectations	<ul style="list-style-type: none">✓ Cash equivalents: Positive (negative) impact with increasing (decreasing) yields✓ Bonds: Longer-term yields more volatile than shorter-term yields✓ Equity: Negative impact given the potential for central bank action or falling asset prices, though some companies may be able to pass rising costs on to customers✓ Real estate: Positive impact as real asset values increase with inflation
Deflation	<ul style="list-style-type: none">✓ Cash equivalents: Positive impact if nominal interest rates are bound by 0%✓ Bonds: Positive impact as fixed future cash flows have greater purchasing power (assuming no default on the bonds)✓ Equity: Negative impact as economic activity and business declines✓ Real estate: Negative impact as property values generally decline



Monetary Policy

- Most central banks strive to balance price stability against economic growth. The ultimate goal is to keep growth near its **long-run sustainable rate**, because growth faster than the long-run rate usually results in increased inflation.
- The equilibrium interest rate in a country (the rate at which a balance between growth and inflation is achieved) is referred to as **the neutral rate**.
 - It is generally thought that the neutral rate is composed of an **inflation component** and a **real growth component**.
 - **The neutral rate** is the rate that most central banks strive to achieve as they attempt to balance the risks of inflation and recession. If inflation is too high, the central bank should increase short-term interest rates. If economic growth is too low, it should decrease interest rates.

Monetary Policy

- The Taylor rule determines the target interest rate using the neutral rate, expected GDP relative to its **long-term trend**, and expected inflation relative to its targeted amount. It can be formalized as follows:

$$i^* = r_{neutral} + \pi_e + 0.5(\hat{Y}_e - \hat{Y}_{trend}) + 0.5(\pi_e - \pi_{target})$$

- ✓ i^* = target nominal policy rate
- ✓ $r_{neutral}$ = real policy rate that would be targeted if growth is expected to be at trend and inflation on target
- ✓ π_e, π_{target} = respectively, the expected and target inflation rates
- ✓ $\hat{Y}_e, \hat{Y}_{trend}$ = respectively, the expected and trend real GDP growth rates

Monetary Policy

- The rule can be re-expressed in terms of the **real, inflation-adjusted target rate** by moving the expected inflation rate to the left-hand side of the equation.

$$i^* - \pi_e = r_{neutral} + 0.5(\hat{Y}_e - \hat{Y}_{trend}) + 0.5(\pi_e - \pi_{target})$$

- From this rearrangement, we see that the real, inflation-adjusted policy rate deviates from neutral by one-half the amount by which growth and inflation deviate from their respective targets.

Negative Interest Rates

- Negative interest rates complicate the process of forming capital market expectations:
 - The risk-free rate is the starting point for buildup models used to estimate long-run returns for asset classes. When the risk-free rate is negative, a sustainable expected risk-free rate, such as the policy neutral rate in the Taylor rule, is more appropriate as that starting point.
 - ✓ That rate is generally **not** regarded as **fully risk free**, so a modest default premium can be removed.
 - Forming capital market expectation over shorter time horizons is further complicated by a need to forecast the time path over which negative rates will converge to a long-run sustainable risk-free rate.
 - ✓ Multiple path projections should be considered to allow for uncertainty regarding how the convergence will occur.



Negative Interest Rates

- Another approach to shorter-term projections of asset class returns is to interpret negative risk-free rates as being consistent with contraction or early recovery stages of the business cycle.
- Using historical data as a starting point for forecasting is more problematic because few comparable periods exist, and the negative rates suggest significant structural economic changes are occurring.
 - ✓ This kind of regime change makes statistics based on historical data less reliable, requiring more subjective assessments. Anticipating the effects of negative rates when combined with less-tested QE makes forecasting even more challenging.



Fiscal Policy

- Another tool at the government's disposal for managing the economy is **fiscal policy**.
 - If the government wants to stimulate the economy, it can implement loose fiscal policy by decreasing taxes or increasing spending, thereby increasing the budget deficit.
 - If they want to rein in growth, the government does the opposite to implement fiscal tightening.
- There are **two important aspects** to fiscal policy.
 - First, it is not the level of the budget deficit that matters—it is **the change in the deficit**.
 - Second, changes in the deficit that occur naturally over the course of the business cycle are **not stimulative or restrictive**.

The Monetary and Fiscal Policy Mix

- The following figure summarizes the impact of persistent policy mixes on the level of real and nominal rates.

		Fiscal Policy	
		Loose	Tight
Monetary Policy	Loose	High Real Rates + High Expected Inflation = High Nominal Rates	Low Real Rates + High Expected Inflation = Mid Nominal Rates
	Tight	High Real Rates + Low Expected Inflation = Mid Nominal Rates	Low Real Rates + Low Expected Inflation = Low Nominal Rates

The Yield Curve

- The yield curve demonstrates the relationship between interest rates and the maturity of debt securities. The curve is sensitive to government actions as well as current and expected economic conditions.
- In all cases, there are likely implications for the yield curve:
 - If both policies are stimulative, the yield curve is steep and the economy is likely to grow.
 - If both policies are restrictive, the yield curve is inverted and the economy is likely to contract.
 - If monetary policy is restrictive and fiscal policy is stimulative, the yield curve is flat and the implications for the economy are less clear.
 - If monetary policy is stimulative and fiscal policy is restrictive, the yield curve is moderately steep and the implications for the economy are less clear.

International Considerations

- **Macroeconomic links** can produce convergence in business cycles among economies. **International trade** produces one such link, as a country's exports and economy are depressed by a slowdown in a trading partner's economy and level of imports. **International capital flows** produce another link if cross-border capital investing by a trading partner declines as its economy contracts.
 - A country's current account and capital account are measures of macroeconomic linkages.
 - The current account largely consists of a country's net exports while the capital account reflects net investment flows.
 - The two accounts are opposites of each other in that a surplus in one account will produce a deficit in the other.

Interest Rate/Exchange Rate Linkages


- A useful relationship for understanding how the current account influences economic activity is the following formula:

$$\text{net exports} = \text{net private saving} + \text{government surplus}$$

- Interest rates and currency exchange rates can also create linkages. A strong link is created when a smaller economy “pegs” its currency to that of a larger and more developed economy.
 - The peg is a unilateral declaration by the pegging country to maintain the exchange rate. The linkage between the business cycles of the two economies will increase, as the pegged currency country must follow the economic policies of the country to which it has pegged its currency.
 - The interest rates of the pegged currency will exceed the interest rates of the currency to which it is linked, and the interest rate differential will fluctuate with the market’s confidence in the peg.

Interest Rate/Exchange Rate Linkages

- In the absence of pegging, the relationship of interest rate differentials and currency movement can reflect several factors:
 - If a currency is substantially overvalued and expected to decline, bond interest rates are likely to be higher to compensate foreign investors for the expected decline in the currency value.
 - Relative bond yields, both nominal and real, increase with strong economic activity and increasing demand for funds.
 - Savings and investment decisions as well as capital productivity drive the level of real rates. Although real rates may differ across countries, there is a tendency for them to move up and down together given that global savings and investing are linked through the current account.



Reading 11

Capital Market Expectations, Part 2: Forecasting Asset Class Returns

Framework

1. Forecasting fixed income returns
2. Forecasting equity returns
3. Forecasting real estate returns
4. Forecasting exchange rate
5. Volatility forecasting

Approaches to Forecasting CME

- Forecasting returns requires not only assessing expected returns, variances and correlations, but also understanding that **time horizons** are important.
 - Investment opportunities, and therefore investment decisions, can change over time.
- At their core, investment techniques assume that investments tend to return to their fundamental levels over time, known as **central tendency**.
- There are **three approaches** to forecasting capital market expectations:
 - Formal tools;
 - Surveys;
 - Judgments.

Formal tools

- The formal tools we examine are **statistical methods, discounted cash flow models, and risk premium models**.
- 1. **Statistical methods** involve sample statistics, shrinkage estimation, and time series estimation.
 - **Sample statistics** use well-known data, including means, variance, and correlation, to forecast future data. This is the clearest approach in forecasting, but it can be imprecise.
 - **Shrinkage estimate** can be applied to the historical estimate if the analyst believes simple historical results do not fully reflect expected future conditions.
 - ✓ A shrinkage estimate is a **weighted average estimate** based on history and some other projection.
 - **Time series estimate** forecasts a variable using lagged values of the same variable and combines it with lagged values of other variables, which allows for incorporating dynamics (volatilities) into the forecasts.



Formal tools

2. Discounted cash flow models express the intrinsic value of an asset as the present value of future cash flows.

- The advantage of these models is their correct emphasis on the future cash flows of an asset and the ability to back out a required return.

3. Risk premium approaches can be used for both fixed income and equity. The approach starts with a risk-free interest rate and then adds compensation for priced risks, or risks for which an investor would want to be compensated.

- Risk premium models include equilibrium models (e.g., the Capital Asset Pricing Model), a factor model, and building blocks.

Surveys and Judgment

- Capital market expectations can also be formed using **surveys**, which can be the most useful ways to gauge consensus. In this method, a poll is taken of market experts, such as economists and analysts, for their opinions regarding the economy or capital market.
 - For example, the U.S. Federal Reserve Bank of Philadelphia conducts an ongoing survey regarding the U.S. consumer price index and GDP.
- **Judgment** can also be applied to project capital market expectations by using qualitative information based on experience.
 - Although quantitative models provide objective numerical forecasts, there are times when an analyst must adjust those expectations using experience and insight to improve upon those forecasts.

1. Forecasting Fixed Income Returns

- Forecasting fixed income returns can be done through the **discounted cash flow (DCF) method**, the **risk premium approach**, the **equilibrium model**.
- **The DCF analysis** of fixed income securities is useful when there are **known** future cash flows, or when cash flows can be **estimated accurately**.
 - The DCF analysis supports the use of yield to maturity (YTM) as an estimate of expected return. The YTM is the discount rate that makes the present value of future bond cash flows equal to the bond's price. The YTM like any IRR calculation, it will be the realized return earned if the cash flows are **reinvested at the YTM** and the bond **is held to maturity**.
 - ✓ For bond portfolios, the YTM is the weighted average of the portfolio bonds' individual YTM.

Forecasting Fixed Income Returns

- Even if all expected cash flows are received, there are several reasons why the bond's realized return may deviate from the initial YTM.
 - First, an investor may **sell the bond prior to maturity**, generating a capital gain or loss.
 - Second, rising or falling interest rates may result in not only changing bond prices, but changing **reinvestment returns**.
 - ✓ For example, falling (rising) interest rates will decrease (increase) reinvestment returns. The overall gain or loss to the investor will depend on the investment horizon.
 - ✓ For an **investment horizon** longer than the **Macaulay duration**, the reinvestment risk dominates, meaning that falling (rising) interest rates will result in a lower (higher) realized return.

Forecasting Fixed Income Returns

- **The risk premium (building block) approach** starts with a risk-free rate and then adds compensation for additional risks.
 - The required return will include the one-period default-free rate, a term premium, a credit premium, and a liquidity premium.
 - The short-term default-free rate
 - ✓ The short-term default-free rate matches the forecast horizon and is calculated from **the most liquid instrument**. As a result, it is closest to the **government zero-coupon yield** and is closely tied to the central bank policy rate.
 - ✓ The observed risk-free rate is typically sufficient as the default-free rate, although it may be necessary to normalize this rate.
 - ✓ **Futures contract rates** provide useful proxies for this expected path of short-term interest rates.

Forecasting Fixed Income Returns

- **Term premium**

- ✓ While the rates implied from the spot yield curve gives us useful information about the term premium, the real term premium cannot be derived from the yield curve alone. Empirical evidence suggests that the term premiums are **positive** and are **related to duration**. There are four primary drivers of the term premium:
- ✓ **Inflation uncertainty:** Higher inflation levels typically correspond to higher inflation uncertainty, causing nominal yields to rise and the term premium to increase.
- ✓ **Recession hedge:** When inflation is caused by strong aggregate demand, nominal bond returns are negatively correlated with growth, corresponding to low term premiums.
 - ◆ When inflation is caused by strong aggregate supply, nominal bond returns are positively correlated with growth, corresponding to higher term premiums.

Forecasting Fixed Income Returns

- ✓ **Supply and demand:** The relative supply of short- and long-term default-free bonds determines the slope of the yield curve, which influences the level of term premiums.
- ✓ **Business cycles:** The slope of the yield curve and level of term premiums are also related to the business cycle.
- ✓ Other indicators also influence the term premium forecasts:
 - ◆ Ex ante (forecast) real yield.
 - ◆ Cochrane and Piazzesi curve factor:
 - ◆ Kim and Wright premium: a three-factor model of the term structure.
 - ◆ Slope of the yield curve.
 - ◆ Supply indicator: proportion of debt maturity greater than 10 years.
 - ◆ Cyclical proxies: corporate profit-to-GDP ratio, business confidence, unemployment rate.



Forecasting Fixed Income Returns

- **Credit premium**

- ✓ The credit premium compensates for the **expected level of losses** and for the **risk of default losses**, both of which are parts of the credit spread.
- ✓ The yield spread is typically not considered a good predictor of future default rates. Spreads are affected primarily by financial market conditions and credit premium, but only to a lesser extent by expected default losses.

- **Liquidity premium**

- ✓ Securities with the **highest liquidity** are the newest sovereign bond issues, current coupon mortgage-backed securities, and some high quality corporate bonds.
- ✓ Liquidity is higher for bonds that are (1) issued at close to par or market rates, (2) new, (3) large in size, (4) issued by a frequent and well-known issuer, (5) simple in structure, and (6) of high credit quality.

Emerging Market Bond Risk

- Many emerging countries also have **unstable political and social systems**. Their undiversified nature makes them susceptible to **volatile capital flows** and **economic crises**.
- Signs that an emerging market is more susceptible to risk include:
 - Wealth concentration.
 - Greater dominance of cyclical industries, including commodities and less pricing power.
 - Restrictions on capital flows and trade; currency restrictions.
 - Inadequate fiscal and monetary policies.
 - Poor workforce education and infrastructure and weak technological advancement.
 - Large amounts of foreign borrowing in foreign currencies.
 - Less developed and smaller financial markets.
 - Exposure to volatile capital flows.

Emerging Market Bond Risk

- Potential bond investors should look at these factors before committing to invest funds in these markets:
 - To gauge fiscal policy, most analysts examine the **deficit-to-GDP ratio**. Ratios greater than 4% indicate substantial credit risk. Most emerging countries borrow short term and must refinance on a periodic basis. A buildup of debt increases the likelihood that the country will not be able to make its payments. The debt-to-GDP ratio of 70% to 80% has been troublesome for emerging countries.
 - To compensate for the higher risk in these countries, investors should expect a **real growth rate** of at least 4%. Growth rates less than that may indicate that the economy is growing slower.
 - A **current account deficit** exceeding 4% of GDP has been a warning sign of potential difficulty.

Emerging Market Bond Risk

- Emerging countries are dependent on foreign financing for growth, when **foreign debt levels** greater than 50% of GDP indicate that the country may be overleveraged. Debt levels greater than 200% of the current account receipts also indicate high risk.
- **Foreign exchange reserves** relative to short-term debt is important, when reserves less than 100% of short-term debt is a sign of trouble.
- The government's stance regarding **structural reforms** and **property rights** is important. When the government is committed to responsible fiscal policies, competition, and the privatization of state-owned businesses, there are better prospects for growth.
 - ✓ Coalition governments are also seen as riskier because of the inherent political, and therefore policy, instability.

2. Forecasting Equity Returns

- When looking at a very long time horizon—over 100 **years-mean real returns** of equity markets in various countries do not show statistically meaningful differences.
 - These sample averages tend to be imprecise, unless the volatility of the data is small. As we saw, **shrinkage estimators** are typically more reliable as predictors of equity returns.
- A second tool for setting capital market expectations is **DCF models**.
 - These models say that the intrinsic value of an asset is the present value of future cash flows. The advantage of these models is their correct emphasis on the future cash flows of an asset and the ability to back out a required return. The models are most suitable for **long-term** valuation.

Forecasting Equity Returns

- Grinold and Kroner (2002) take this model one step further by including a variable that adjusts for **stock repurchases**——which companies use to transfer cash to shareholders——and changes in **market valuations** as represented by changes in the price-earnings (P/E) ratio.

$$E(R_e) = \frac{D}{P} + (\% \Delta E - \% \Delta S) + \% \Delta P/E$$

- ✓ $E(R_e)$ = the expected rate of return on equity
 - ✓ D/P = the expected dividend yield
 - ✓ $\% \Delta S$ = the expected percentage change in shares outstanding
 - ✓ $\Delta P/E$ = the expected percentage change in the P/E ratio
- Expected cash flow (“income”) return: $D/P - \% \Delta S$
 - Expected nominal earnings growth return: $\% \Delta E$
 - Expected repricing return: $\% \Delta P/E$

Forecasting Equity Returns

- 1. The **expected cash flow return** (income return):

$$D/P - \% \Delta S = \text{income return}$$

- 2. The **expected nominal earnings growth** is the real growth in earnings plus expected inflation:

$$\text{expected nominal earnings growth return} = \% \Delta E$$

- 3. The **expected repricing return** is captured by the expected change in the P/E ratio:

$$\text{expected repricing return} = \% \Delta (P/E)$$

- It is helpful to view the Grinold-Kroner model as the sum of the (1) expected cash flow return, (2) expected nominal earnings growth rate, and (3) expected repricing return.

$$E(Re) \approx (D/P - \% \Delta S) + (\% \Delta E) + (\% \Delta P/E)$$

Forecasting Equity Returns

- It is important to understand that the assumptions of the Grinold-Kroner model may lead to irrational results.
- Because the model assumes an **infinite time horizon**, it ignores an investor's time horizon.
 - For example, an investor may assume that the P/E ratio would revert to its long-term average. However, by selecting any positive growth rate for the P/E ratio, the model would assume an infinitely rising P/E ratio, an implausible result. For very long-term time horizons, the theoretically appropriate $\% \Delta P/E = 0$ (and also $\% \Delta S = 0$).
- It is relatively easy to observe the inputs of the model, which can be obtained from **published statistical data**.

The Risk Premium Approach

- The Grinold–Kroner model and similar models are sometimes said to reflect the “**supply**” of equity returns since they outline the sources of return. In contrast, risk premiums reflect “**demand**” for returns.
- The financial equilibrium approach assumes that financial models will value securities correctly.
 - The Singer–Terhaar model is based on two versions of the international Capital Asset Pricing Model (CAPM): one in which global asset markets are **fully integrated**, and another in which markets are **fully segmented**.
 - The model then looks at the expectations of actual segmentation/integration and takes a weighted average of the two assumptions to calculate returns.

The Risk Premium Approach

- The Singer-Terhaar approach begins with the CAPM, the basic CAPM pricing relationship:

$$RP_i = \beta_{iM} RP_M$$

- ✓ where $RP_i = [E(R_i) - RF]$ is the risk premium on the i th asset,
- ✓ RP_M is the risk premium on the market portfolio
- ✓ $\beta_{i,M}$ —asset i 's sensitivity to the market portfolio

The Risk Premium Approach

- We can manipulate this formula to solve for the risk premium on a debt or equity security using the following steps:

- **Step 1:**

$$\beta_{i,M} = \frac{Cov(R_i, R_M)}{Var(R_M)} = \rho_{i,M} \left(\frac{\sigma_i}{\sigma_M} \right)$$

- **Step 2:** Under the assumption of full integration, every asset is priced relative to the global capitalization-weighted market portfolio.
 - ✓ The global market portfolio by “GM,” the **first component** of the Singer–Terhaar model is

$$RP_i^G = \beta_{i,GM} RP_{GM} = \rho_{i,GM} \sigma_i \left(\frac{RP_{GM}}{\sigma_{GM}} \right)$$

- ✓ A superscript “G” has been added on the asset’s risk premium to indicate that it reflects the global equilibrium. The term in parentheses on the far right is the Sharpe ratio for the global market portfolio, the risk premium per unit of global market risk.

The Risk Premium Approach

- **Step 3:** Now consider the case of completely segmented markets. The risk premium for each asset will be determined in isolation without regard to other markets or opportunities for diversification.
 - ✓ Formally, we can simply set β equal to 1 and ρ equal to 1 in the previous equations since each asset is perfectly correlated with itself.
 - ✓ Using a superscript “S” to denote the segmented market equilibrium and replacing the global market portfolio with asset i itself, the segmented market equilibrium risk premium for asset i is :

$$RP_i^S = 1 \times RP_i^S = 1 \times \sigma_i \left(\frac{RP_i^S}{\sigma_i} \right)$$

- ✓ This is the **second component** of the Singer–Terhaar model.

The Risk Premium Approach

- ✓ Note that the first equality in equation is an identity; it conveys no information. It reflects the fact that in a completely segmented market, the required risk premium could take any value.

$$RP_i^S = 1 \times RP_i^S$$

- ✓ The second equality is more useful because it breaks the risk premium into two parts: the risk of the asset (σ_i) and the Sharpe ratio (i.e., compensation per unit of risk) in the segmented market.

$$RP_i^S = 1 \times \sigma_i \left(\frac{RP_i^S}{\sigma_i} \right)$$

The Risk Premium Approach

- **Step 4:** The final Singer–Terhaar risk premium estimate for asset i is a weighted average of the two component estimates

$$RP_i = \varphi RP_i^G + (1 - \varphi) RP_i^S$$

- ✓ To implement the model, the analyst must supply values for the Sharpe ratios in the globally integrated market and the asset's segmented market.
 - ◆ φ : the degree to which the asset is globally integrated;
 - ◆ σ_i : the asset's volatility;
 - ◆ the asset's β with respect to the global market portfolio.
- A pragmatic approach to specifying the Sharpe ratios for each asset under complete segmentation is to assume that compensation for non-diversifiable risk (i.e., “market risk”) is the same in every market. That is, assume all the Sharpe ratios equal the global Sharpe ratio.

Example



- Stacy Adkins believes the equity market in one of the emerging markets that she models has become more fully integrated with the global market. As a result, she expects it to be more highly correlated with the global market. However, she thinks its overall volatility will decline. Her old and new estimates are as follows:

	Previous Data	New Data
Volatility (σ_i)	22.0%	18.0%
Correlation with global market ($\rho_{i,M}$)	0.50	0.70
Degree of integration (φ)	0.55	0.75
Sharpe ratio (global and segmented markets)	0.30	0.30

- If she uses the Singer–Terhaar model, what will the net impact of these changes be on her risk premium estimate for this market?

Example



➤ Correct Answer:

- The segmented market risk premium will decline from 6.6% (calculated as $22.0\% \times 0.30 = 6.6\%$) to 5.4% ($= 18\% \times 0.30$).
- The fully integrated risk premium will increase from 3.30% ($= 0.50 \times 22.0\% \times 0.30$) to 3.78% ($= 0.70 \times 18.0\% \times 0.30$).
- The weighted average premium will decline from 4.79% [$= (0.55 \times 3.30\%) + (0.45 \times 6.60\%)$] to 4.19% [$= (0.75 \times 3.78\%) + (0.25 \times 5.40\%)$], so the net effect is a decline of 60 bps.

Risks in Emerging Market Equities

- Most of the issues underlying the risks of emerging market bonds also present risks for emerging market equities: more fragile economies, less stable political and policy frameworks, and weaker legal protections.
- Emerging markets are generally less fully integrated into the global economy and the global markets. Hence, local economic and market factors exert greater influence on risk and return in these markets than in developed markets.
- Emerging market equity investors need to focus on the many ways that the value of their ownership claims might be expropriated by the government, corporate insiders, or dominant shareholders.

Risks in Emerging Market Equities

- Political, legal, and regulatory weaknesses affect emerging market equity investors in various ways.
 - The standards of corporate governance may allow interested parties to manipulate the capital structure of companies and to misuse business assets.
 - Accounting standards may allow management and other insiders to hide or misstate important information.
 - Weak disclosure rules may also impede transparency and favor insiders.
 - Inadequate property rights laws, lack of enforcement, and weak checks and balances on governmental actions may permit seizure of property, nationalization of companies, and prejudicial and unpredictable regulatory actions.

Risks in Emerging Market Equities



- Bill Dwight has been discussing investment opportunities in Belvia with his colleague, Peter Valt. He is aware that Valt declined to buy the recently issued government bond, but he believes the country's equities may be attractive. He notes the rapid growth, substantial investment spending, free trade agreement, deregulation, and strong capital inflows as factors favoring a strong equity market. In addition, solid global growth has been boosting demand for Belvia's natural resources. Roughly half of the public equity market is represented by companies in the natural resources sector. The other half is a reasonably diversified mix of other industries. Many of these firms remain closely held, having floated a minority stake on the local exchange in the last few years. Listed firms are required to have published two years of financial statements conforming to standards set by the Belvia Public Accounting Board, which is made up of the heads of the three largest domestic accounting firms. With the help of a local broker, Dwight has identified a diversified basket of stocks that he intends to buy.
- Discuss the risks Dwight might be overlooking.

Risks in Emerging Market Equities



➤ Correct Answer:

- Dwight might be overlooking several risks. He is almost certainly underestimating the vulnerability of the local economy and the vulnerability of the equity market to local developments. The economy's rapid growth is being driven by a large and growing fiscal deficit, in particular, rapidly rising redistributive social payments, and investment spending financed by foreign capital. Appreciation of the currency has made industries other than natural resources less competitive, so the free trade agreement provides little support for the economy. When the government is forced to tighten fiscal policy or capital flows shrink, the domestic economy is likely to be hit hard.

Risks in Emerging Market Equities



➤ **Correct Answer:**

- Political risk is also a concern. A return to the prior regime is likely to result in a less pro-growth, less business-friendly environment, which would most likely result in attempts by foreign investors to repatriate their capital. Dwight should also have serious concerns about corporate governance, given that most listed companies are closely held, with dominant shareholders posing expropriation risk. He should also be concerned about transparency (e.g., limited history available) and accounting standards (local standards set by the auditing firms themselves).

3. Forecasting Real Estate Returns

- Unlike traditional asset classes real estate is generally immobile and illiquid, and each property is part of a **heterogeneous** group with its unique characteristics. Managing real estate also requires maintenance and, therefore, operating costs can be significant.
- Calculating returns is often done through **appraisals**, which are subject to time lags and data smoothing given that they are done infrequently, so appraised values may differ significantly from market values.

Forecasting Real Estate Returns

- **Real Estate Cycles:** As a general asset class, real estate values are subject to business cycle movements, but they also drive business cycles. **High quality properties** tend to fluctuate less with business cycles, while **low quality properties** will show more cyclical activity.
 - **Boom:** Increased demand will drive up property values and lease rates, which induces construction activity. This higher activity translates to stronger economic activity.
 - **Bust:** Falling demand leads to overcapacity and overbuilding, driving values and lease rates down. Because leases lock in tenants for longer terms and moving costs are high, excess supply can't be quickly absorbed.

Forecasting Real Estate Returns

- The **capitalization rate**, or cap rate for short, is a commercial real estate property's earnings yields, and is calculated by dividing current **net operating income (NOI)** by the property value. When an infinite time period is assumed, the cap rate can be calculated as:

$$cap\ rate = E(R_{re}) \sim NOI\ growth\ rate$$

$$E(R_{re}) = Cap\ rate + NOI\ growth\ rate$$

- If an investor has a **finite time period**, the formula changes by subtracting from expected return the change in the cap rate:

$$E(R_{re}) = cap\ rate + NOI\ growth\ rate - \% \Delta cap\ rate$$

- As you likely observed, this formula has similarities with the Grinold-Kroner model, noting that NOI growth is also a **nominal** measure, incorporating real growth plus inflation.



Forecasting Real Estate Returns

- Similar to the expected return net of growth rate for equities, the cap rate is used as a **long-term** discount rate for real estate property valuations.
- Cap rates are **positively** related to changes in interest rates and vacancy rates. They are **inversely related** to the availability of credit and the availability of debt financing. Credit spreads, which are countercyclical, mitigate the cyclical sensitivity of cap rates.

Forecasting Real Estate Returns

- Real estate assets require several **risk premiums** to compensate for their higher risk.
 - **Term premium** for holding long-term assets;
 - **Credit premium** to compensate for the risk of tenant nonpayment;
 - **Equity risk premium** above corporate bond returns for the fluctuation in real estate values, leases and vacancies.
- Once the appropriate risk premiums are calculated, real estate can be used in equilibrium models including Singer-Terhaar. However, analysts must make two adjustments:
 - Impact of **smoothing** must be removed from the data
 - Analyst should **adjust for illiquidity** by incorporating a liquidity premium. The local, rather than global, nature of real estate should also be considered.

Forecasting Real Estate Returns

- Wealthy individuals and **large institutional investors** can create diversified real estate portfolios. **Investors** with less wealth can choose publicly traded real estate, including REITs, to benefit from diversification.
 - REITs are generally strongly correlated with equities in the **short term**, while direct real estate shows low correlation. However, the low correlation is partly due to the **smoothing** of return data.
 - Over **long time horizons**, REITs have a relatively high correlation with direct real estate.
- Given that REITs use **significant leverage**, their returns and risks must be first unlevered to provide the appropriate comparison with direct real estate holdings.
 - When adjusted for leverage, REITs as an asset class historically show **higher returns** and **lower volatility** than direct real estate.

Forecasting Real Estate Returns

- **Residential real estate** is the largest class of developed properties, accounting for 75% of global values.
 - Overall, residential real estate outperformed equities on an inflation-adjusted basis with lower volatility. Nevertheless, their return performance differed before and after World War II, with relatively weaker postwar returns.
 - The strongest postwar period returns were during 1950—1980 when residential real estate generally outperformed equities, but had comparably weaker returns during 1980-2015.
 - However, and important for diversification, residential real estate returns were uncorrelated across countries after the war, while equity returns showed rising correlations.

4. Forecasting Exchange Rate

- Currency exchange rate forecasting is particularly difficult, causing investment managers to either **fully hedge** currency exposure, or **accept the volatility**.
- Trade in goods and services affects exchange rates through (1) trade flows, (2) purchasing power parity, and (3) competitiveness and sustainability of the current account.
 - **Trade flows:** The impact of net trade flows (gross trade flows less exports) tends to be relatively small on exchange rates assuming they can be financed. Large trade flows without large financing flows in foreign exchange markets likely indicates a crisis.

Forecasting Exchange Rate

- **Purchasing power parity (PPP):** PPP implies that the prices of goods and services in different countries should reflect changes in exchange rates. As a result, the expected exchange rate movement should follow the expected inflation rate differentials.
 - ✓ PPP does not work well in explaining **short-term** exchange rate changes, but works better in the **long term** and when inflation differences are large and are determined through money supply.
- **Current account and exchange rates:** Current account balances will have the largest influence on exchange rates when they are persistent and sustained.
 - ✓ Structural imbalances in the current account can exist from (1) fiscal imbalances that persist over time, (2) demographics and trade preferences that impact savings decisions, (2) how abundant or scarce resources are, (4) availability (or lack) of viable investment opportunities, and (5) the terms of trade.

Forecasting Exchange Rate

- Adjustments to capital flows will place substantial pressure on exchange rates. There are three important considerations:
 - **Capital mobility:** The expected percentage change in the exchange rate can be computed as the difference between nominal short-term interest rates and the risk premiums of the domestic portfolio over the foreign portfolio:

$$E(\% \Delta S_{d/f}) = (r_d - r_f) + (Term_d - Term_f) + (Credit_d - Credit_f) \\ + (Equity_d - Equity_f) + (Liquid_d - Liquid_f)$$

- ✓ When there is a relative improvement in investment opportunities in a country, the currency initially tends to see significant appreciation but “**overshoot**”.

Forecasting Exchange Rate

- **Uncovered interest rate parity (UIP):** UIP states that exchange rate changes should equal differences in nominal interest rates. Carry trades are considered to be successful because they include a risk premium, confirming the validity of the risk premiums in the equation.
 - ✓ When capital flows into a country given exchange rate differentials, this is referred to as **hot money**. Hot money creates monetary policy issues.
 - ◆ First, central banks' ability to use monetary policy effectively is limited.
 - ◆ Second, firms use short-term financing to fund long-term investments, which increases financial market risk.
 - ◆ Third, exchange rates tend to overshoot, creating business disruption.



Forecasting Exchange Rate

- **Portfolio balance and composition:** Strong economic growth in a country tends to correspond to an increasing share of that country's currency in the global market portfolio. However, a few factors could mitigate this impact:
 - ✓ Investors tend to have a strong home country bias, which leads them to absorb a larger share of the new assets.
 - ✓ If growth is due to productivity gains, investors may fund it with financial flows and foreign direct investment.
 - ✓ Countries that experience high trend rates tend to be smaller, emerging markets.
- Similarly, large current account deficits also weaken exchange rates, but several mitigating factors exist:
 - ✓ Current account deficits due to large investment spending are easier to finance if they are expected to be profitable.
 - ✓ Small current account deficits in global reserve currencies, including the U.S. dollar, help provide global liquidity and are beneficial to the financial system.

5. Volatility Forecasting

- Estimating variances for many assets is more complex, and requires the use of a **variance-covariance (VCV) matrix** or other forecasting tools.
- **Sample VCV Matrix:** Estimating a constant VCV matrix can most easily be done from deriving variances and covariances from sample statistics.
However, choosing the appropriate sample size for large portfolios will be critical.
 - ✓ If the sample size is small relative to the number of assets, the outcomes may be meaningless; for example, it may show that a large portfolio is riskless. It is recommended that the number of observations should be at least 10 times larger than the number of portfolio assets.

Volatility Forecasting

- **Factor-Based VCV Matrices:** The main advantage of using multifactor models for VCV matrices is that it significantly reduces the number of required observations.
 - Correlations can be estimated from a few common factors, while variances require factors related to specific assets. The return of the i th asset in a multifactor model can be calculated as:

$$r_i = \alpha_i + \sum_{k=1}^K \beta_{ik} F_K + \varepsilon_i$$

- ✓ K represents the number of common factors
- ✓ α_i is the intercept
- ✓ β_{ik} is the i th asset's sensitivity to the k th factor
- ✓ F_K is the k th factor return
- ✓ ε_i is a factor term unique to asset i with a zero mean.

Volatility Forecasting

- The variance of the i th asset can be derived as:

$$\sigma_i^2 = \sum_{m=1}^K \sum_{n=1}^K \beta_{im} \beta_{in} \rho_{mn} + v_i^2$$

◆ ρ_{mn} is the covariance between the m th and n th factors

◆ v_i^2 is the variance of the ε_i unique factor.

- The last step is to look at the covariance between the i th and j th asset:

$$\sigma_{ij} = \sum_{m=1}^K \sum_{n=1}^K \beta_{im} \beta_{jn} \rho_{mn}$$

- ✓ Assuming these factors are not redundant and do not have zero terms will help us ensure that the matrix outcomes are not meaningless and that portfolios do not incorrectly appear riskless.
- ✓ The factor model also helps simplify the number of calculations used in the VCV matrix.

Volatility Forecasting

- Despite their significant advantages, **factor-based VCV matrices** have several **shortcomings**:
 - **The matrix is biased:** Matrix inputs need to be estimated and will be misspecified. As a result, the matrix will be biased, meaning it will not be a predictor of the true returns, not even on average.
 - **The matrix is inconsistent:** As the sample size increases in the factor-based VCV matrix, the model does not converge to the true matrix.
- In contrast, the **sample VCV matrix** will be both consistent and unbiased.

Shrinkage Estimates

- Combining information in the sample VCV matrix with a **target matrix** will result in more precise data and reduced estimation error.
- The **shrinkage estimate** is a combination of the sample and target (e.g., factor-based) matrix, with the same weights used for all elements of the matrix, including the variance and covariance factors.
- Even though shrinkage estimates may be biased, more precise target matrices will result in greater improvement.
 - For example, suppose that the sample covariance between two assets is 180 and the target (from a factor-based model) estimated covariance is 220. If the analyst weights the historical covariance by 60% and the target by 40%, the shrinkage estimate would be 196 ($= 180 \times 0.60 + 220 \times 0.40$). If conditions of the model and weights are well chosen, the shrinkage estimate covariances are likely to be more accurate.

Smoothed Returns to Estimate Volatility

- **Smoothing** of data leads to underestimating risk and overstating returns and diversification benefits. Not adjusting for smoothing tends to lead to distorted portfolio analysis and suboptimal asset allocation decisions.
- **Portfolio return:** $R_t = (1 - \lambda)r_t + \lambda R_{t-1}$
 - current true return r_t (unobservable)
 - previous observed return R_{t-1}
 - λ is a weight between 0 and 1
- **Portfolio variance:** $var(r) = \left(\frac{1+\lambda}{1-\lambda}\right) var(R) > var(R)$
 - the true variance, $var(r)$;
 - variance of the observed data $var(R)$.
- **One shortcoming** of this model is that the true return is not directly observable. Proxies for estimating the true return include using asset index.

ARCH Models

➤ These volatilities can be addressed through autoregressive conditional heteroskedasticity (**ARCH**) models.

- ARCH models can be used for portfolios with multiple assets in VCV matrix estimations. The simplest ARCH formula can be written as:

$$\sigma_t^2 = \gamma + \alpha\sigma_{t-1}^2 + \beta\eta_t^2$$

- where α , β , and γ are non- negative parameters
- $(\alpha + \beta) < 1$
- The term η_t is the unexpected component of return in period t ; that is, it is a random variable with a mean of zero conditional on information at time $(t - 1)$.

ARCH Models

- Rearranging the equation as in the second line shows that $(\eta_t^2 - \sigma_{t-1}^2)$ can be interpreted as the “shock” to the variance in period t .

$$\sigma_t^2 = \gamma + \alpha\sigma_{t-1}^2 + \beta\eta_t^2 = \gamma + (\alpha + \beta)\sigma_{t-1}^2 + \beta(\eta_t^2 - \sigma_{t-1}^2)$$

- Thus, the variance in period t depends on the variance in period $(t - 1)$ plus a shock. The parameter β controls how much of the current “shock” feeds into the variance. In the extreme, if $\beta = 0$, then variance would be deterministic.
- The quantity $(\alpha + \beta)$ determines the extent to which the variance in future periods is influenced by the current level of volatility.
- The higher $(\alpha + \beta)$ is, the more the variance “remembers” what happened in the past and the more it “clusters” at high or low levels. The unconditional expected value of the variance is $[\gamma/(1 - \alpha - \beta)]$.

Example



- Assume that $\gamma = 0.000002$, $\alpha = 0.9$, and $\beta = 0.08$ and that we are estimating daily equity volatility. Given these parameters, the unconditional expected value of the variance is 0.0001, implying that the daily standard deviation is 1% (0.01).
- Suppose the estimated variance at time $(t - 1)$ was 0.0004 ($= 0.02^2$) and the return in period t was 3% above expectations ($\eta_t = 0.03$). Then the variance in period t would be

$$\sigma_t^2 = 0.000002 + (0.9 \times 0.0004) + (0.08 \times 0.03^2) = 0.000434$$

- which is equivalent to a standard deviation of 2.0833%. Without the shock to the variance (i.e., with $\eta_t^2 = \sigma_{t-1}^2 = 0.0004$) the standard deviation would have been 1.9849%.
- Even without the shock, the volatility would have remained well above its long-run mean of 1.0%. Including the shock, the volatility actually increased. Note that the impact on volatility would have been the same if the return had been 3% below expectations rather than above expectations.

Global Portfolio Adjustments

- The main focus here is how to **adjust a portfolio** rather than get caught up in the particular forecast details.
- The analyst can use country-specific and global expectations through VCV matrices to adjust the allocations between equities and bonds.
- As markets become more integrated globally, required returns will fall. We saw this relationship in the **Singer-Terhaar model**. The analyst should increase allocations towards emerging markets that are expected to see increased integration, and away from those markets that are already highly integrated.

Global Portfolio Adjustments

- When the economy is at the **trough** of the business cycle, equities perform well, and valuation ratios and earnings growth are expected to increase.
 - The analyst could also use the Grinold- Kroner model to compute the required equity risk premium and increase the portfolio's equity weights.
 - At this stage, the yield curve is steep with high credit and term premiums. The expectation of rising interest rates means that bonds tend to underperform, and the analyst should reduce the portfolio's bond allocation.
 - ✓ If the economy is at its peak, the reverse strategy should be followed (i.e., reduce the equity exposure and increase bond exposure and durations).



Global Portfolio Adjustments

- **Monetary and fiscal policy changes** can also be important considerations. The analyst should focus less on monetary and fiscal policy activities, which are expected to be already reflected in asset values, but rather on structural changes in policy direction.
- **Current account balances** fluctuate with business cycles. It is the long-term trend in current account balances that is more important in setting portfolio expectations. Rising current account balances tend to be associated with rising required returns (and therefore falling asset prices), and increased capital flows to the deficit country to fund its deficit. Capital flows also influence currencies.

It's not an end but just the beginning.

Take time to deliberate, but when the time for action has arrived, stop thinking and go.

事前考虑清楚，可是一旦到了该行动的时候，
就要毫不犹豫，放手一搏。

Equity Portfolio Management

CFA三级培训项目

讲师：TOM

101% Contribution Breeds Professionalism




Topic in CFA Level III

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

Framework

Equity Portfolio Management

- **SS9: Equity Portfolio Management (1)**
 - R22 Overview of Equity Portfolio Management
 - R23 Passive Equity Investing
- **SS10: Equity Portfolio Management (2)**
 - R24 Active Equity Investing: Strategies
 - R25 Active Equity Investing: Portfolio Construction



Reading 22

Overview of Equity Portfolio Management

Framework

1. Equity Investment Roles
2. How to select appropriate stocks
3. Equity Investment Segmentation
4. Income and Costs in an Equity Portfolio
5. Shareholder Engagement
6. Passive\Active Management

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) .

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).
 - **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.



3. Equity Segmentation

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

3.1 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 different sectors or industries.
 - Construct relevant benchmarks
 - Analyze how company characteristics change over time.
- The **disadvantage** is that the categories are not stable over time.

3.2 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.

3.3 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.

3.4 Role of Segmentations

- **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.

4.1 Income in an Equity Portfolio

- **1. Dividend income is the most obvious and often the largest.**
 - **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**
 - E.g. operating fees; reinvestment return of collateral or cash; dividends or interests from the lending securities.
 - **Related risks:** credit risks and collateral risks.

4.1 Income in 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.

4.2 Costs in an Equity Portfolio

- **1. Management fees** compensate the manager and 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** associated with corporate activities.
 - **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.

4.2 Costs in an Equity Portfolio

- **4. 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.
 - ✓ **E.g. Investment strategy costs** are an implicit cost related to the chosen investment strategy.
 - ◆ This additional cost stems from predatory traders purchasing (selling) shares that are soon to be added (removed) from an equity index. These transactions will create price impact costs for the fund and a profit for the predatory trader.
- **5.** Some firms also charge separate **marketing and distribution fees**.

5. Shareholder Engagement

- **Shareholder engagement** refers to investors and managers interacting with companies in ways to potentially favorably impact the stock price.
- Shareholder engagement is **not free** because it requires an investment of time and resources.
 - **Active and larger investors** are more likely to do so.
 - Successful engagement benefits all shareholders, including “**free riders**” .
- **Limitations of Shareholder Engagement**
 - 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;
 - Increasing 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.

5. Shareholder Engagement


➤ Role of 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.

6. 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 of** the manager's skills.
 - **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.
 - **Potential risks of active management**
 - ✓ Reputation risk; Key person risk.
 - **Tax**
 - ✓ **For active strategies, higher portfolio turnover** can lead to higher tax burdens.



Reading 23

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

- 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.
 - ✓ **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.

2. Index Construction

➤ 2.1 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

➤ 2.2 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

➤ 2.3 Index construction: weighting

- **Market-cap weighting** (most common)
 - ✓ **Liquidity-weighted.** Because **large-cap stocks**, which tend to have higher liquidity, are more heavily.
 - ✓ The most common example is **free-float weighting**: excluding closely-held shares not available to market participants.
- **Price weighting holds the same number of shares in each stock and** weights 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**.
 - ✓ **Disadvantage:** Because it has a small-cap bias, it is **more highly volatile and requires regular rebalancing**.
- **Fundamental weighting** weights stocks by fundamental factors.

2. Index Construction

➤ 2.3 Index construction: weighting (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

➤ 2.4 Index construction: 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

➤ 2.5 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
Total for stocks 1–50	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.
 - **Goal:** improve performance of the market-cap-weighted index.

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** include dividend yield, momentum and fundamentally weighted strategies.
 - **2. Risk-oriented strategies**
 - ✓ Volatility weighting: the weights are the inverse of 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. 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

- 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

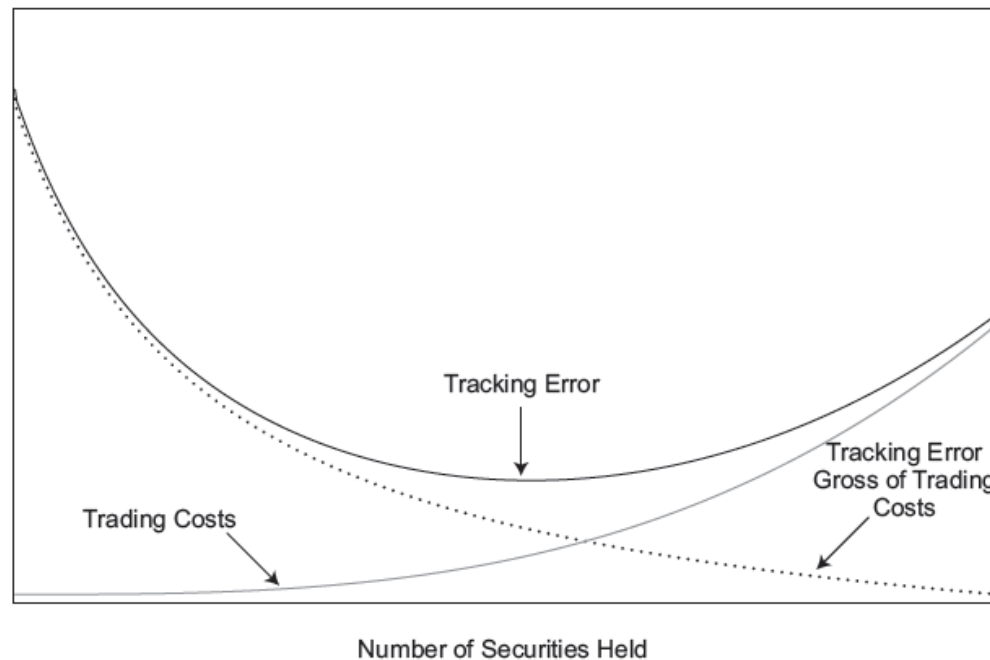
- **Separately managed equity index-based portfolios** hold all of the constituent stocks in the index or a representative sample.
 - They require regularly updated data on the index, sophisticated trading and accounting systems; well-established broker relationships to facilitate program trading and 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 **transaction cost** and **tracking error**.

5.3 Optimization

- **Optimization** uses the tools of modern portfolio theory to address the problem of **minimizing 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**

Sector	Sector Returns	Foundation Sector Weights	Benchmark Sector Weights
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.

➤ 3. Investor Activism and Engagement

- Forms of activism can include:
 - ✓ expressing views to company boards or management on executive compensation, operational risk, board governance, and other value-relevant matters.



Reading 24

Active Equity Investing: Strategies

Framework

1. Fundamental and Quantitative approaches
 - Process
 - Pitfalls
2. Types of Active Management Strategies
3. Style Classification

1.1 Fundamental Approach

- **Fundamental approaches** are **subjective** in nature, relying on analyst **discretion and judgment**.
- 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.
- 4 Forecast company performance.
- 5 Convert forecasts to valuations and identify ex ante profitable investments.
 - **Look-ahead bias:** build model with data unavailable to the public at present.
- 6 Construct a portfolio with the desired risk profile.
 - Analyze risk at company level.
- 7 Monitor the portfolio continuously and **rebalance**.



1.2 Quantitative Approach

- **Quantitative approaches** are **objective** in nature, relying on models that **generate systematic rules** to select investments.
 - 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

- **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). **Source 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

➤ 3. Back-testing the Strategy

- Quantitative investors construct models by back-testing past data.
- **Information Coefficient (IC): ρ (Score t , R_{t+1}).**
 - ✓ The **higher** the IC, the **higher the predictive power** of the factor.

Stock		Factor Score	Subsequent Month Return (%)	Spearman rank IC	
				Rank of Factor Score	Rank of Return
A	(Pearson) IC ←	-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

1.2 Quantitative Approach

- **4. Evaluating the Strategy:** Out-of-sample testing.
 - If the model use same database to build and test, 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.
- **6.** The quantitative manager **automatically rebalances** according to the systematic rules of the strategy **at predetermined intervals** such as monthly or quarterly.

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 (Look-ahead bias)	Historical data (back-testing)
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

1.4 Pitfalls in Fundamental Investing

➤ Pitfalls in fundamental investing

- **Behavioral biases**

- ✓ Confirmation bias, the illusion of control, availability bias, loss aversion.

- **Value trap.** A stock appears to be attractive due to a significant price fall.

- **Growth trap.** Growth stocks generally trade at a high P/E, and even modest shortfalls in growth can lead to significant declines in stock price.

1.4 Pitfalls in Quantitative Investing

➤ 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.
- **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.

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.
 - **Contrarian investing:** Purchasing or selling securities against prevailing market sentiment.
 - **Income investing:** Focus is on high dividend yields and positive dividend growth rates.
 - **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).
 - **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.
 - **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**
 - **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.

2.3 Factor-Based Strategies

- A factor is a variable or characteristic with which **asset returns** are correlated.
 - $R_p = b_0 + b_1 F_1 + b_2 F_2 + \dots + b_k F_k + \varepsilon$
- **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 do **not** offer a persistent return.

2.3 Factor-Based Strategies

➤ 1. Hedged portfolio approach (Fama French)

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

● Construction process

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

Smallest 10%
Short

Largest 10%
Long

- ✓ 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 can appear diversified when the manager uses multiple factors to select securities.
- ✓ 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.
- **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.
- **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.

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**.
 - **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.
 - ✓ 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
- β^s = the fund exposure to style s (with constraints $\sum_{s=1}^m \beta^s = 1$ and β^s : manager's allocation to that style during the period).
- α = value added by the fund manager
- ε_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
Returns-based	<ul style="list-style-type: none">• Requires minimal information<ul style="list-style-type: none">✓ Can be executed quickly✓ Cost effective• More widely applied	<ul style="list-style-type: none">• May be ineffective in characterizing current style• Difficult to detect more aggressive positions
Holdings-based	<ul style="list-style-type: none">• More accurate than returns-based• Comparisons of individual positions• Capture changes in style more quickly	<ul style="list-style-type: none">• More data intensive than returns-based analysis• Less effective for funds with substantial positions in derivatives.



Reading 25

Active Equity Investing: Portfolio Construction

Framework

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

1. Building Block: 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
- ✓ ΔW_i is the active weight, the difference between portfolio and benchmark weight for security i .

1. Building Block: Active Return

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

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

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

✓ β_{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 (α)**

● **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 α and ε .

Return
unexplained by
rewarded factors

Example



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

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

Example



➤ Solution:

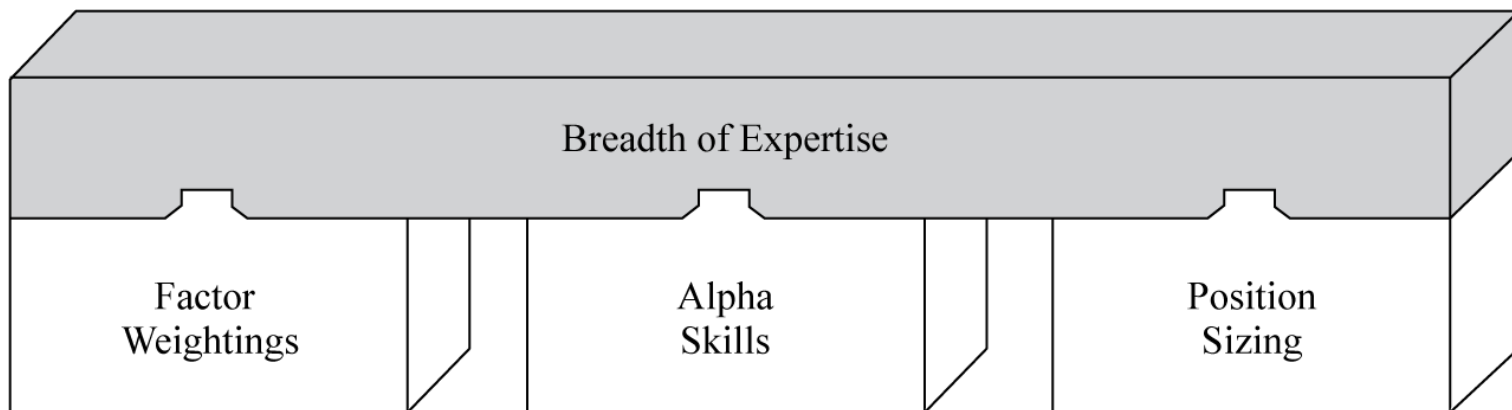
- Both managers generated the same absolute return, but they achieved their performance in very different ways.
- All of Manager A's performance can be explained from exposure to rewarded factors. There is no alpha, and the high R^2 shows that the four factors explain much of the monthly variability 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 Block

➤ 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 Block

- **1. Factor weightings. Overweight/Underweight Rewarded Factors**
 - Active return due to **differences in beta of rewarded factors.**
- **2. Alpha Skills are sourced from**
 - **Factor timing:** which is skill in identifying when a factor might outperform/underperform its average return.
 - **Timing exposure to unrewarded factors.**
- **3. Sizing Positions:** balances alpha and factor insights+ mitigating idiosyncratic risks.
 - **A factor-orientated manager** who spreads their portfolio across many assets is likely to minimize the impact of idiosyncratic risk.
 - **A stock-picker** is likely to hold more concentrated positions and assume a higher degree of idiosyncratic risk.
 - Affect idiosyncratic return most.

Alpha skill

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

Sizing Positions

- Affect ε most

Factor weighting

85-115

1. Building Block

➤ 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)
- σ_{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.**

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

$$2.5\% = 0.4 * 0.15 * \sqrt{BR} * 5\% \quad BR = 69.44$$

2. Approaches to Portfolio Construction

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

2. Approaches to Portfolio Construction

- **Portfolio construction** can be viewed as an **optimization** problem with a goal and a set of constraints. Objectives and constraints may be stated in absolute terms or relative to a benchmark.

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

3. Active Share

- **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.**

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

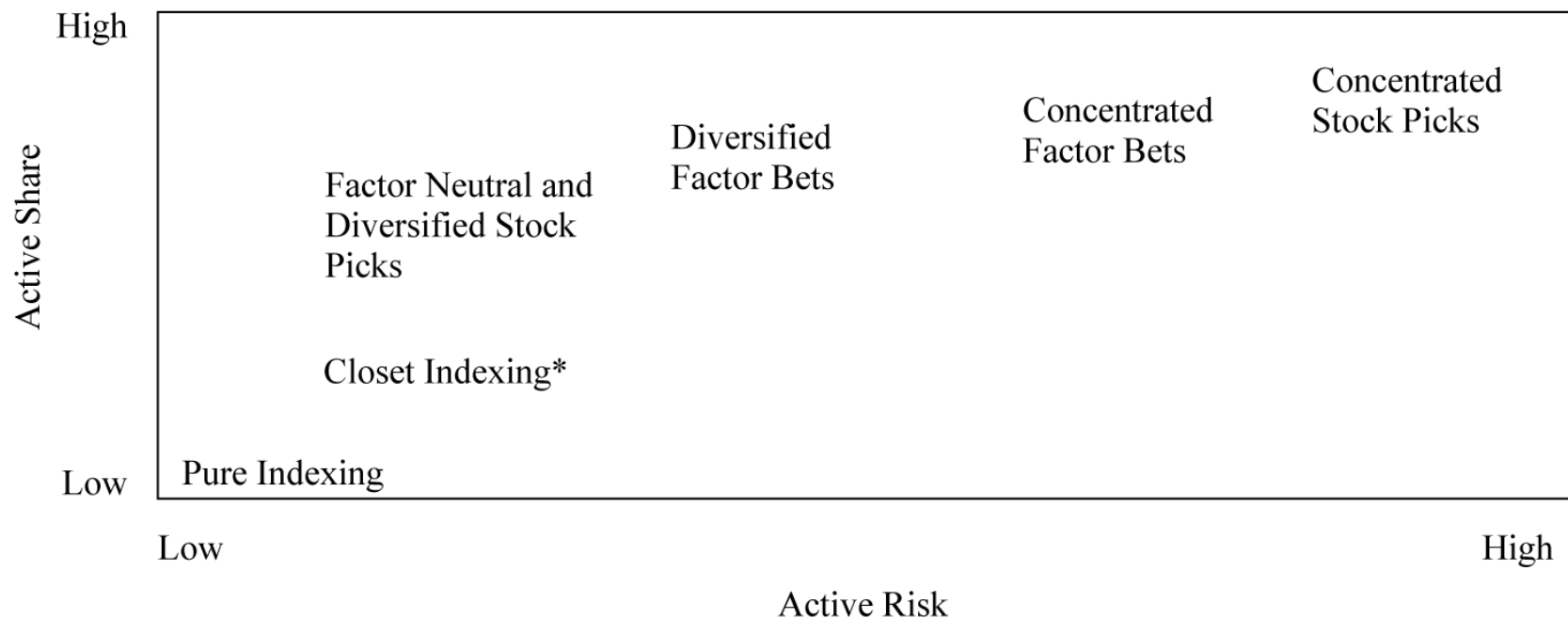
- Active Share takes a value **between 0 and 1**.
 - Active share is 0 for a portfolio that matches the benchmark;
 - Active share is 1 for a portfolio that shares no investments with those of the benchmark.
- **% of portfolio assets deployed the same as benchmark = 1-active share.**
 - i.e., Active share of 80% = 20% of the portfolio capital was invested in a similar way as the index.
- 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**.

3. Active Risk

- **Active risk** (tracking error): the standard deviation of active returns.
- Source of active risks: $\sigma_{R_A} = \sqrt{\sigma^2(\sum(\beta_{pk} - \beta_{bk}) \times Fk) + \sigma_e^2}$
- Research **conclusions** on the composition of active return include:
 - **Active risk increases** as factor and idiosyncratic risk levels increase.
- **Active Share vs. Active Risk**
 - A portfolio with **no net factor exposure** will have active risk attributed entirely to Active Share.
 - Active risk attributable to Active Share is **inversely** proportional to the number of securities in the portfolio.
 - **Active risk** is affected by the degree of cross correlation, but **Active Share is not**.

3. Active Share and Active Risk

➤ Investment Styles, Active Share, and Active Risk



4. 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.

4. 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	100%	11.92%

	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	$0.40 \times 0.40 \times 0.0096$
+ 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:

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

- $CV_{\text{market factor}} = (1.080 \times 0.00109 \times 1.080) + (1.080 \times 0.00053 \times 0.098) + (1.080 \times 0.00022 \times -0.401) + (1.080 \times -0.00025 \times 0.034)$
 - $CV_{\text{market factor}} = 0.001223$
- 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 = $0.001223 / (0.0374)^2 = 87\%$

4. 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.

4. 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. While cash has a very **low standard deviation**, it has an active risk **twice** that of the indexes comprising the benchmark due to the low correlation of cash versus the benchmark. This leads to cash contributing to 100% of the active variance.
- **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.

5. Determining the Appropriate Level of Risk

➤ **Implementation constraints.**

- Constraints on short positions or on leverage may limit the manager's ability to under/overweight.

➤ **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.

5. Determining the Appropriate Level of Risk

➤ Leverage and its implications for risk.

- While leverage could be used to solve issue number two in a single period (allowing the portfolio to move up the linear capital allocation line, rather than following the curved efficient frontier), 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 σ as follows:

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

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

6. 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)

6. 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.

6. 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.



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
- 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）。

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- 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
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