Capital Market Expectations

CFA三级培训项目

讲师：Irene

101% Contribution Breeds Professionalism

Irene

- **工作职称：**金程教育高级培训师
- **教育背景：**上海财经大学经济学学士，美国约翰霍普金斯大学金融学硕士，通过CFA三级。
- **工作背景：**金程教育CFA全职研究员，主要研究数量组合及职业道德。一次性以高分通过CFA考试，对于考试重点和应试技巧有自己的心得。学术背景深厚，在硕士学习期间，主要研究投资组合管理方向，曾独立撰写NWL公司财务状况分析报告，参与校园基金投资政策声明项目。本科期间曾赴德参加学术交流项目，获得上海市理财规划大赛一等奖。
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Framework

Applications of Capital Market Expectations

- **SS2: Capital Market Expectations**
  - R3 Capital Market Expectations, Part 1: Framework and Macro Considerations
  - R4 Capital Market Expectations, Part 2: Forecasting Asset Class Returns

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

1. 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.

1.1 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.

1.2 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.

2. 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.

2.1 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 my reduce the level of economic output in the short term and may also decrease the trend rate of growth.

2.2 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.

2.3 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%.

2.4 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 × 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**
  - ✓ Models can be quite robust, with many factors included to approximate reality.
  - ✓ New data may be collected and consistently used within models to quickly generate output.
  - ✓ Delivers quantitative estimates of impact of changes in exogenous variables.
  - ✓ Imposes discipline/consistency on analysis.
- **Disadvantages of Econometric Analysis**
  - ✓ Complex and time-consuming to formulate.
  - ✓ Data inputs not easy to forecast.
  - ✓ Relationships not static. Model may be mis-specified.
  - ✓ May give false sense of precision.
  - ✓ Rarely forecasts turning points well.

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**
  - ✓ Usually intuitive and simple in construction.
  - ✓ Focuses primarily on identifying turning points.
  - ✓ May be available from third parties. Easy to track.
- **Disadvantages of Economic Indicators**
  - ✓ History subject to frequent revision.
    - ◆"Current" data not reliable as input for historical analysis.
    - ◆Overfitted in-sample. Likely overstates forecast accuracy.
  - ✓ Can provide false signals.
  - ✓ May provide little more than binary (no/yes) directional guidance.

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**
  - ✓ Limited complexity.
  - ✓ Flexible.
    - ◆ Structural changes easily incorporated.
    - ◆ Items easily added/dropped.
    - ◆ Can draw on any information, from any source, as desired.
  - ✓ Breadth: Can include virtually any topics, perspectives, theories, and assumptions.
- **Disadvantages of Checklist Approach**
  - ✓ Subjective. Arbitrary. Judgmental.
  - ✓ Time-consuming.
  - ✓ Manual process limits depth of analysis. No clear mechanism for combining disparate information.
  - ✓ Imposes no consistency of analysis across items or at different points in time. May allow use of biased and/ or inconsistent views, theories, assumptions.

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.

4.1 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.
      - ✓ Output gap=actual GDP – 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.

4.2 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	✓ 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	✓ 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	✓ Short-term and long-term rates increasing with bond prices declining ✓ Stock prices peaking and volatile
Slowdown	Inflation continues to accelerate	Becoming less restrictive	✓ 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	✓ 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	✓ 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

Inflation Implications

Inflation above or below expectations	✓ 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	✓ 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

5. 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.

5.1 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.

5.2 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

5.3 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.

6. 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:

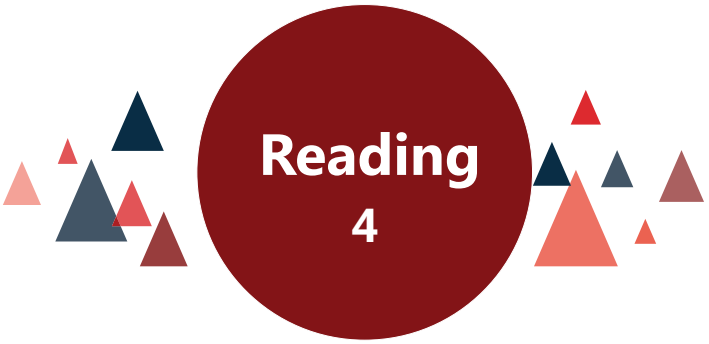
$$net\ exports = net\ private\ saving + government\ surplus$$

- 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

- One of the linkages of greatest concern to investors involves interest rates and exchange rates. The two are inextricably linked. This fact is perhaps most evident in the proposition that a country cannot simultaneously
  - allow unrestricted capital flows;
  - maintain a fixed exchange rate; and
  - pursue an independent monetary policy.

- If a currency is linked to another without full credibility, then bond yields in the weaker currency are nearly always higher.



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, knows 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 YTMs.

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 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 counties 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
  - ✓ %ΔS = the expected percentage change in shares outstanding
  - ✓ ΔP/E = the expected percentage change in the P/E ratio

- Expected cash flow ("income") return: D/P – %ΔS
- Expected nominal earnings growth return: %ΔE
- Expected repricing return: %ΔP/E

Forecasting Equity Returns

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

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

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

$$expected\ nominal\ earnings\ growth\ return = \%\Delta E$$

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

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

- 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 %ΔP/E = 0 (and also %ΔS = 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 $RP_i = [E(Ri) - RF]$ 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:**

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

  - **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 :

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

  - ✓ 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.

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

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% × 0.30 = 6.6%) to 5.4% (= 18% × 0.30).
  - The fully integrated risk premium will increase from 3.30% (= 0.50 × 22.0% × 0.30) to 3.78% (= 0.70 × 18.0% × 0.30).
  - The weighted average premium will decline from 4.79% [= (0.55 × 3.30%) + (0.45 × 6.60%)] to 4.19% [= (0.75 × 3.78%) + (0.25 × 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 cyclicality.
  - **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 restate 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 scare 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:

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

  - ✓ 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 kth factor
  - ✓ F_K is the kth 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:

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

  - ✓ 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 ×0.60 + 220 × 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
  - (α + β) < 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.

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

  - 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 β = 0, then variance would be deterministic.
  - The quantity (α + β) determines the extent to which the variance in future periods is influenced by the current level of volatility.
  - The higher (α + β) 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 [γ/(1 – α – β)].

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。

问题反馈

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