LM01 Capital Market Expectations Part 1: Framework and Macro Considerations

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1. Introduction & Framework for Developing Capital Market Expectations

In this reading, the focus is on a framework for developing capital market expectations and the use of macroeconomic analysis in setting expectations. The second reading builds on this foundation and covers capital market expectations for specific asset classes such as stocks, bonds, commodities, real estate, and currencies.

Investment decisions are forward-looking; therefore, analysts need to forecast the expected returns and expected risks of various asset classes. These forecasts constitute capital market expectations.

Sections 1 and 2 of this reading present a framework for setting capital market expectations and cover the challenges in forecasting. Sections 3-11 cover the use of macroeconomic analysis in setting expectations.

1.1 Framework and Challenges

Capital market expectations help formulate strategic as well as tactical asset allocation. Consider a portfolio consisting of stocks and bonds. To decide how much to allocate between the two asset classes, an investor will have to forecast the expected return and expected risk of stocks and bonds. Long-term forecasts will help determine the strategic asset allocation, whereas short-term forecasts will help determine the tactical asset allocation.

Asset allocation is the main determining factor of long-run portfolio performance. For example, an aggressive portfolio with 60% stocks and 40% bonds may outperform a conservative portfolio with 10% stocks and 90% bonds in the long run. Therefore, given the importance of asset allocation in determining long-run portfolio performance, capital market expectations must be forecasted correctly.

However, forecasting is not an exact science. No matter how precise or elaborate the forecasting methods are, there will always be some forecasting errors.

To reduce forecast errors, we should focus on:

- **Cross-sectional consistency**: Our forecasting assumptions should be consistent across asset classes. For example, while forecasting the expected returns of two asset classes, such as stocks and bonds, our assumptions about expected inflation should be the same. We do not have cross-sectional consistency if we use one value of expected inflation for stocks and another value of expected inflation for bonds.
- **Intertemporal consistency**: Our forecasting assumptions should be consistent over various time horizons. Assumptions should not be changed unless we have a solid reason to do so.

A Framework for Developing Capital Market Expectations

The following framework can be used to set CME.

1. **Specify the set of expectations needed, including the time horizon(s) to which they apply**. In this step, we create a list of asset classes and decide on an appropriate

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time horizon (e.g., 3 years, 5 years, 10 years) for forecasts. The list of asset classes should not be too small or too large. It should be sufficient to cover the types of investments that the client is likely to make.

2. **Research the historical record**. For a given asset class, historical records can provide useful information about the asset's investment characteristics and help create a possible range for future returns. Historical records can also be used to determine the main return drivers of an asset class. In this step, we will slice data into multiple dimensions, such as:
   - Geography: global, regional, individual countries, etc.;
   - Major asset classes: equity, fixed income, real assets;
   - Sub-asset classes:
     - Equities: styles, sizes, sectors, etc.
     - Fixed income: maturities, credit quality, fixed versus floating, etc.;
     - Real assets: real estate, commodities, timber, etc.
3. **Specify the method(s) and/or model(s) to be used and their information requirements.** The methods and models should be explicit and have a proven track record. They should also be appropriate for the time horizon selected. For example, we need to use different models to forecast currencies (or exchange rates) depending on whether the forecast is long-term or short-term.
4. **Determine the best sources for information needs**. The sources should be credible, reliable, and give timely information. Data obtained from these sources should be of high quality, and we should fully understand it before use. Using incorrect or misunderstood data can lead to inaccurate CME.
5. **Interpret the current investment environment using the selected data and methods, applying experience and judgment**. The first four steps lay the foundation for step 5, which is the heart of the process. In this step, we apply our experience and judgment to come up with CME. We can also label this step as 'implement your investment/research process.'
6. **Provide the set of expectations needed, documenting conclusions**. In Step 6, we correctly document the work done in Step 5. We can also label this step as 'at designated times, synthesize, document, and defend your views.'
7. **Monitor actual outcomes and compare them with expectations, providing feedback to improve the expectations-setting process**. We should measure our CME against actual results to determine the level of accuracy. Any systematic error observed in the forecasts should be fixed. The process for improving the quality of forecasts involves both quantitative methods and judgment.

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Generally, good forecasts are:

- unbiased, objective, and well-researched;
- efficient, in the sense of minimizing the size of forecast errors; and
- internally consistent, both cross-sectionally and intertemporally.

2. Challenges in Forecasting

Challenges in forecasting include:

2.1 Limitations of Economic Data

- Lack of timeliness: Economic data may be reported with a lag. For example, the IMF sometimes reports data for developing economies with a lag of two years or more. Such stale data can compromise the quality of our forecasts. Further, data is revised often. We should be aware that using revised data may lead to unreliable forecasts.
- Changing definitions and calculations: Sometimes, the definitions and calculations of an economic variable (e.g., consumer price index) may change after a few years. These changes make comparisons with previous periods problematic.

2.2 Data Measurement Errors and Biases

- Transcription errors: These are errors in collecting and recording data.
- Survivorship bias: This bias occurs if a data series only contains entities that survived to the end of the period. Due to survivorship bias, the historical return will be tilted upwards. E.g., hedge fund indexes.
- Appraisal (smoothed) data: This issue occurs when the market for an asset is not liquid, and appraisal values are used instead of actual transaction values. Appraised values tend to be less volatile than market-determined values. Therefore, the volatility and correlation with other assets tend to be understated. E.g., real estate.

2.3 Limitations of Historical Estimates

- Regime changes: Historical estimates are not necessarily precise estimates of what may happen in the future. A primary reason for this is changing technological, political, legal, and regulatory environments; disruptions such as wars and other calamities; and changes in policy stances. Such changes are known as regime changes, and they give rise to the statistical problem of nonstationarity.

  Two questions can be used to decide which time period to select for the analysis:

  1. Is there any reason to believe that the entire longer sample period is no longer relevant? i.e., has there been a fundamental regime change during the sample period?
  2. Does the data support the hypothesis that such a change has occurred?

  If the answer to both questions is yes, the analyst should use only that part of the time series that is still relevant.

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- Asynchronous observations: Sometimes, data for different variables may not exactly be from the same period even though it is labeled so. For example, daily data from different countries is usually asynchronous because of time zone differences. Correlations measured using asynchronous data are distorted and include lead-lag relationships that may not exist if the data were measured synchronously.
- Normal distribution considerations such as fat tails and skewness: Care should be taken when assuming the normality of data. Using models that assume normality of data for asset classes that exhibit fat tails and skewness in returns will lead to inaccurate forecasts.

2.4 Ex Post Risk Can Be a Biased Measure of Ex Ante Risk

- High *ex post* returns that reflect fears of adverse events that did not materialize provide a poor estimate of *ex ante* expected returns.
- This challenge is also called the 'peso problem.' The following extract (Blue Box Example) from the curriculum explains this problem.
  "In the mid-1970s, the Mexican peso was pegged to the US dollar, but peso-denominated interest rates were persistently well above corresponding dollar rates because investors feared the Mexican government would devalue the peso. In 1976, the peso was indeed devalued by nearly 50%, but data from before that event would suggest that holding the peso was a high-expected-return, low-risk strategy."

2.5 Biases in Analysts' Methods

- Data-mining bias: This bias occurs if a data set is repeatedly searched until a statistically significant pattern is found. Such patterns will not have good predictive power. A warning sign of data-mining bias is the lack of an economic rationale to explain the pattern.
- Time-period bias: This bias occurs when results found are period-specific. Often model outputs are sensitive to the selection of specific starting and/or ending dates. The following extract from the curriculum explains this bias.
  "Evidence suggesting that small-cap stocks outperform large-cap stocks over time (the so-called small firm effect) is very sensitive to the choice of the sample period. From 1926 through 1974, US small-cap stocks outperformed large caps by 0.43% per year, but if we skip the Great Depression and start in 1932, the differential becomes 3.49% per year. Similarly, small caps outperformed by 4.5% per year from 2000 through 2010 but underperformed by –2.8% per year from 2010 through 2020."

2.6 Failure to Account for Conditioning Information

- An asset's risk and return characteristics depend on the economic environment or the market environment. Ignoring these conditional relationships can result in forecasting errors.
- Example 3 from the curriculum illustrates how an analyst may use conditioning information.

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"Noah Sota uses the CAPM to set capital market expectations. He estimates that one asset class has a beta of 0.8 in economic expansions and 1.2 in recessions. The expected return on the market is 12% in an expansion and 4% in a recession. The risk-free rate is assumed to be constant at 2%. Expansion and recession are equally likely. Sota aims to calculate the unconditional expected return for the asset class. The conditional expected returns on the asset are 10% = 2% + 0.8 × (12% – 2%) in an expansion and 4.4% = 2% + 1.2 × (4% – 2%) in a recession. Weighting by the probabilities of expansion and recession, the unconditional expected return is 7.2% = [(0.5 × 10%) + (0.5 × 4.4%)]."

2.7 Misinterpretation of Correlations

- If variable A is found to have a significant correlation with another variable B, then there are at least four possible explanations:
  1. A predicts B.
  2. B predicts A.
  3. A third variable, C, predicts both A and B.
  4. The relationship is spurious.

  Correlations should not be used for predictions without examining the underlying linkages.
- Sometimes lack of a strong correlation can also be misleading. Two variables that show a negligible correlation may have a strong nonlinear relationship that is not captured by the correlation number.

2.8 Psychological Biases

Several psychological biases can influence the forecasting process. These biases have been discussed in detail in behavioral finance.

- Anchoring bias: This bias arises from giving undue weight to the first information received or the first number projected. To avoid anchoring bias, analysts should avoid making premature conclusions.
- Status quo bias: This bias is similar to anchoring bias and arises from the tendency to avoid making changes and accepting a default option or preserving the status quo.
- Confirmation bias: This bias arises from the tendency to seek and overweight information that confirms one's existing or preferred beliefs and to discount information that contradicts those beliefs. To mitigate this bias, an analyst can discuss the model or forecasts with his peers, who can provide counterviews justifying them with good arguments.
- Overconfidence bias: This bias results from overconfidence in one's own reasoning, judgment, knowledge, or ability. The bias can lead an analyst to overestimate the accuracy of his forecasts and/or fail to consider an adequately wide range of possible outcomes.

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- Prudence bias: This bias results from the tendency to temper forecasts so that they do not appear extreme. The bias can be mitigated by consciously identifying probable scenarios that would give rise to more extreme outcomes and giving appropriate weight to such scenarios in the forecast.
- Availability bias: This bias results from the tendency to be overly influenced by events that have left a strong impression and/or are easy to recall. This bias can be mitigated by basing our conclusions on objective evidence and analytical procedures.

2.9 Model Uncertainty

There are three kinds of uncertainty when using models for forecasting.

- Model uncertainty: Refers to whether a selected model is structurally and/or conceptually correct. For example, the model may be misspecified if a critical variable is omitted.
- Parameter uncertainty: Refers to situations when the model parameters are incorrect. This issue can be mitigated by examining the estimation errors.
- Input uncertainty: Refers to situations when the input data is incorrect.

Amongst the three, model uncertainty is the most serious issue because the wrong model will lead to fundamentally incorrect conclusions.

3. Economic and Market Analysis: The Role of Economic Analysis and Analysis of Economic Growth: Exogenous Shocks to Growth

3.1 The Role of Economic Analysis

Investment outcomes depend heavily on the economy. Even average investments tend to do well when the economy is strong. However, when the economy is weak, even suitable investments may not perform well. Therefore, economic analysis plays an important role in developing CME.

Analysts need to understand the relationship between economic variables (such as inflation rates, interest rates, GDP growth rates, unemployment rates, etc.) and capital market returns. A good forecaster should be familiar with the direction, strength, and lead-lag relationships of the economic variables. If an analyst understands which economic variables are the most relevant in a given market environment, he will have a competitive edge.

Economic output has both cyclical and trend growth components. Trend growth is helpful in setting long-term return expectations for different asset classes. Cyclical variation affects short-term return expectations. In the following sections, we will cover trend growth, business cycles, the role of monetary and fiscal policies, and international interactions.

3.2 Analysis of Economic Growth

The economic growth trend is the long-term average growth path of GDP around which the economy experiences semi-regular business cycles.

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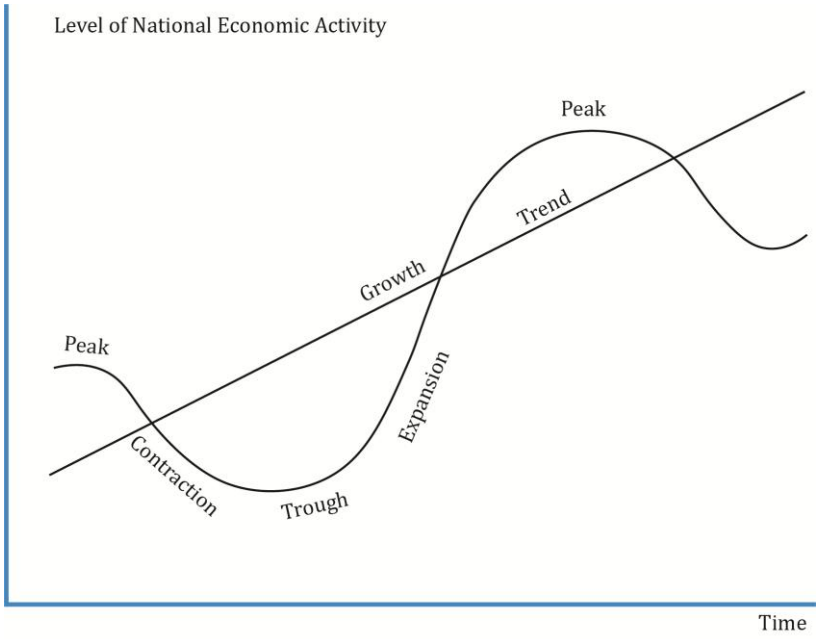

The trend growth rate is not constant; it keeps changing. Therefore, forecasting trend growth rates is relevant for investment analysis.

- Some trend growth rate changes are easy to forecast because they are driven by slowly evolving and easily observable factors such as demographics. For example, if the economy's labor force is growing at 2% every year, it is easy to factor the impact of this growth rate on the economy's trend growth rate.
- However, trend changes arising from exogenous shocks are almost impossible to forecast. It is also difficult to identify, assess, and quantify the impact of these shocks on the economic growth rate until the change is well-established.

Exogenous Shocks to Growth

Exogenous shocks can originate from within the economy or be transmitted from other countries. Some shocks negatively impact growth while others enhance it.

The most important sources of shocks are:

- Policy changes: Analysts should examine and determine whether the policy changes are pro-growth or not. Elements of pro-growth government policies include sound fiscal policy, minimal intrusion on the private sector, encouraging competition within the private sector, support for infrastructure and human capital development, and sound tax policies. If the policies are pro-growth, the economic trend growth rate will likely be high and vice versa.
- New products and technologies: New products and technologies enhance economic growth. Examples from the past include the steam engine, printing press, telephone, internet, satellites, etc.

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- Geopolitics: Geopolitics can either have a positive or a negative impact on growth. For example, geopolitical conflicts reduce growth because resources are diverted to less economically productive uses such as accumulating and maintaining weapons. On the other hand, some geopolitical events can positively impact growth; for example, the fall of the Berlin Wall, which led to Germany's reunification, boosted growth as the governments cut defense spending and used resources productively.
- Natural disasters: Natural disasters such as floods or earthquakes have a short-term negative effect on economic growth as productive capacity is destroyed. However, there could also be a long-run positive impact if old capacity is replaced with newer, more efficient facilities.
- Natural resources/critical inputs: Discovery of new natural resources or new recovery methods can boost economic growth. For example, oil reserves, copper reserves, fracking, etc.
- Financial crises: Financial systems allow economies to channel resources to their most efficient use. Financial crises occur when market participants lose faith in others' ability to meet their obligations. They stop funding, first to specific counterparties and then more broadly as the crises deepen. A financial crisis can impact both the level of output and the trend growth rate.
  Example 6 from the curriculum describes three types of financial crises:
  - *Type 1*: A persistent (permanent, one-time) decline in output level, but the subsequent trend rate of growth is unchanged.
  - *Type 2*: No persistent decline in output level, but the subsequent trend rate of growth is reduced.
  - *Type 3*: Both a persistent decline in output and a reduction in the subsequent trend rate of growth.

4. Applying Growth Analysis to Capital Market Expectations

- The expected trend rate of economic growth is an essential input to DCF models of the form: $\mathrm{P} = \frac{\mathrm{D_1}}{\mathrm{r-g}} \rightarrow r = \frac{\mathrm{D_1}}{\mathrm{P}} + \mathrm{g}$
- A country with a higher growth rate can offer a good return to equity investors if that growth has not already been priced into the market. In the above formula, a higher value of 'g' will reduce the denominator and increase prices.
- A high trend rate of economic growth allows actual growth (real growth) to be faster before accelerating inflation becomes a significant problem.
- Theoretically, real government bond yields on average are linked to the trend growth rate. Faster trend growth means higher average real yields.

4.1 A Decomposition of GDP Growth and Its Use in Forecasting

GDP growth can be split into the following components:

- Growth from labor inputs, consisting of

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  - growth in potential labor force size and
  - growth in actual labor force participation, plus
- Growth from labor productivity, consisting of
  - growth from increasing capital inputs and
  - growth in total factor productivity.

Each of these components can be forecasted separately and summed up to arrive at the forecasted trend growth rate.

4.2 Anchoring Asset Returns to Trend Growth

Fixed Income: The average level of real government bond yields is linked to the trend rate of economic growth. Bond yields will be pulled toward this level over time. Therefore, the trend growth rate provides an important anchor for estimating long-term bond returns. Intertemporal consistency requires that this anchor should also be factored into short-term forecasts.

Equity: The trend growth rate also provides an anchor for long-run equity appreciation. The aggregate value of equity V^e can be expressed as:

Aggregate market value of equity = Nominal GDP x share of profits in economy x P/E ratio, i.e.,

$$V^e = \text{GDP} \times \frac{\text{E}}{\text{GDP}} \times \frac{\text{P}}{\text{E}}$$

Over long periods, capital's share of profit in the economy and the P/E ratio cannot continually increase or decrease (these variables are mean-reverting). Therefore, in the long run, the total value of equity depends on GDP's growth rate.

The above formula applies to the capital appreciation component of equity returns. To estimate the dividend yield, we can use the following formula:

$$\text{Dividend yield (annual dividends/market value)} = \frac{\text{Dividend payout ratio (dividends/profit)}}{\text{Profit multiple(market value/profit)}}$$

An analyst should recognize that high economic growth does not necessarily imply high equity returns because:

- Economic growth estimates might already be priced.
- Return on invested capital may be slowing down.

Example: Long-Run Equity Returns and Economic Growth
(*This is based on Example 8 from the curriculum.*)

An analyst has decided to examine whether US equity returns since World War II had been consistent with economic growth. For the period 1946–2020, the continuously compounded (i.e., logarithmic) return was 10.7% per annum, which reflected the following components:

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Real GDP Growth	Inflation	EPS/GDP (Chg)	P/E (Chg)	Dividend Yield
2.9%	3.5%	0.00%	0.9%	3.4%

1. What conclusion will the analyst most likely have drawn from this analysis?
2. If she believed that in the long run 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?
3. In light of her analysis, how might she have adjusted her baseline projection?

Solution to 1:

The analyst would likely have concluded that the post-war stock return exceeded what would have been consistent with the growth of the economy. In particular, the rising P/E added 0.9% of "extra" return per year for 74 years, adding 67% (= 74 × 0.9%) to the cumulative, continuously compounded return and leaving the market 95% (exp[67%] = 1.95) above "fair value."

Solution to 2:

Her baseline projection is likely to have been 6.75% = 0.9% + 1.5% + 2.1% + 2.25%.

Solution to 3:

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 2.2% = (67%/30) per year.

5. Approaches to Economic Forecasting

In the previous section, we focused on the long-term trend growth rate, which depends on the economy's supply side. In this section, we will focus on the business cycle fluctuations around the long-term trend growth. These fluctuations primarily depend on aggregate demand and, to some extent, on short-term aggregate supply. Three types of models can be used for forecasting business cycles:

- Econometric models.
- Econometric indicators.
- Checklist approach.

5.1 Econometric Models

Econometrics is the application of statistical methods to model relationships among economic variables. Econometric models are expressed in the form of equations, where an output variable is predicted based on input variables. These models vary from simple models with few equations to large, complex models with many equations.

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Econometric models can be further classified into:

- Structural models that specify functional relationships among variables based on economic theory. They tend to be complex.
- Reduced-form models are more compact versions of the underlying structural models. They tend to be simple, the number of variables used is lower, and the assumptions are less restrictive.

5.2 Econometric Indicators

Economic indicators are economic statistics published by official agencies and/or private organizations. They provide information about an economy's activity and help identify its position in the business cycle.

- Lagging indicators reflect past economic activity.
- Coincident indicators reflect current economic activity.
- Leading indicators move ahead of the business cycle and reflect future economic activity.

Most analysts focus on leading indicators because they can be used in economic forecasts. Individual leading indicators can be combined into a 'diffusion index,' which measures how many indicators are pointing up and how many pointing down. For example, if 7 out of 10 indicators are pointing up, then there is a high probability that the economy is growing.

5.3 Checklist Approach

This method is subjective and involves putting together information that is considered relevant by the analyst. An analyst can then assess whether the measures indicate an equilibrium state or an extreme state for the economy.

5.4 Economic Forecasting Approaches: Summary of Strengths and Weaknesses

Exhibit 4 from the curriculum summarizes the advantages and disadvantages of the three models.

Strengths	**Weaknesses**
Econometric Models Approach	
• 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.	• 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.

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Leading Indicator-Based Approach	

• Usually intuitive and simple in construction.
• Focuses primarily on identifying turning points.
• May be available from third parties. Easy to track.
	• 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.

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.
	• 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.

6. Business Cycle Analysis, Phases of the Business Cycle and Market Expectations and the Business Cycle

Business Cycle Overview

Business cycles vary in duration and intensity. It is the result of many intermediate frequency cycles. These cycles collectively generate variations in aggregate economic activity (GDP) around the trend.

The business cycle reflects decisions that:

a. are made based on imperfect information and/or analysis with the expectation of future benefits,
b. require significant current resources and/or time to implement, and
c. are difficult and/or costly to reverse.

Business cycles are also impacted by exogenous factors such as technological changes, geopolitical issues, policy changes, etc.

Several variables can be used to monitor the business cycle. Examples include GDP growth, industrial production (IP), employment/unemployment, purchasing managers' indexes, orders for durable goods, the output gap, and leading indicator indexes.

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6.1 Phases of the Business Cycle

There are several ways to define phases of the business cycle. The curriculum defines the following five phases:

Phase	Capital market effects
Initial Recovery Business confidence rises, stimulative policies are in place. Recovery supported by upturn in spending on housing and consumer durables.	Short-term interest rates and bond yields are low. Stock markets may rise strongly. Cyclical/riskier assets perform well.
Early Expansion Economy gaining momentum, unemployment starts to fall, output gap remains negative. Consumer demand rises. Business production and investment rise. Demand for housing and consumer durables is strong.	Short rates are moving up. Longer-maturity bond yields are stable or rising slightly. Yield curve starts to flatten. Stocks trend up.
Late Expansion Output gap closed. Boom mentality. Low unemployment. Strong profits. Wages and inflation continue rising. Investment spending is up from capacity pressures. Debt ratios may deteriorate.	Interest rates rise, and the yield curve continues to flatten. Stock markets often rise but may be volatile. Bond yields rise slowly. Cyclical assets may underperform, but inflation hedges outperform.
Slowdown Economy approaches peak level in response to rising interest rates, fewer investment opportunities, and accumulated debt. Business confidence wavers. Inflation continues to rise.	Short-term interest rates are high, but likely to peak. Government bond yields peak but may then decline sharply. The yield curve is likely to invert. Credit spreads widen, and stocks may fall. Interest-sensitive stocks and "quality" stocks with stable earnings perform best.
Contraction Firms cut production sharply. Central banks ease monetary policy once a recession is confirmed. Profits drop. Tightening credit magnifies downward pressure on the economy. Unemployment rises.	Interest rates and bond yields drop. The yield curve steepens. Credit spreads widen and remain elevated until clear signs of a cycle trough emerge. The stock market drops initially but usually starts to rise well before the recovery emerges.

6.2 Market Expectations and the Business Cycle

Making predictions about the business cycle is challenging because:

- Phases of the cycle vary in length and amplitude.
- It is not easy to differentiate between cyclical forces and secular forces. For example, during the recovery following the 2007 – 2009 global financial crisis, interest rates and inflation went far lower and remained low for longer than anyone with a purely cyclical view could have predicted.
- How, when, and by how much the markets respond to the business cycle is uncertain.

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Due to these reasons, market expectations based on a business cycle analysis will have a high level of uncertainty.

- Business cycle analysis generates noisy signals to potential opportunities.
- Signals are reliable over horizons within the range of likely expansion and contraction phases. Beyond this range, turning points are likely to occur, which may be challenging to forecast.

7. Inflation and Deflation: Trends and Relations to the Business Cycle

Deflation means falling prices. Deflation damages the economy because it undermines debt-financed investments and the power of central banks. Most central banks, therefore, like to maintain a moderate level of inflation.

Inflation is procyclical:

- It accelerates in the later stages of the business cycle when the output gap has closed.
- It decelerates during a recession or right after the recession. This puts downward pressure on wages and prices.

Given the cyclical pattern of inflation, inflation expectations are also procyclical. However, it is important to consider the time horizon over which inflation expectations are being projected. Very long-term inflation expectations will be practically unaffected by business cycles. Short-term inflation expectations will tend to move with actual inflation.

Effects of Inflation on Asset Classes

To evaluate the effect of inflation on asset classes, we must consider both the cash flows and the discount rates. The following table summarizes the effects of inflation on cash, nominal bonds, stocks, and real estate.

Asset class	Effects of Inflation
Cash: Short-term interest-bearing instruments	Cash earns a floating real rate if short-term interest rates adjust with expected inflation. Therefore, essentially a zero-duration, inflation-protected asset. Cash is attractive in a rising rate environment.
Bonds	Bond values are calculated as the present value of future cash flows. If inflation rises, the discount rate rises, which reduces the PV of future cash flows. Therefore, rising inflation leads to capital losses. If inflation remains within an expected range, short-term yields rise/fall more than longer-term yields; it has less price impact because of shorter duration. If inflation moves out of expected range, longer-term yields rise/fall more sharply as investors reassess the long-run average level of inflation. Persistent deflation benefits highest-quality bonds because it increases the purchasing power of the cash flows.

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Stocks	If inflation stays within the expected cyclical range, there is little effect on stocks because inflation expectations are already built into stock prices. However, unexpectedly, high inflation may cause the central bank to slow the economy and impact stocks. Also, low/falling inflation might imply a recession and a decline in stock prices. High inflation is beneficial for companies that can pass on inflation. Whereas deflation is detrimental for asset-intensive, commodity-producing, and/or highly leveraged firms.
Real Estate	If inflation stays within an expected cyclical range, renewal of leases will increase rental income, and property values will rise with inflation. Higher-than-expected inflation will lead to high demand for real estate. Lower-than-expected inflation (or deflation) will put downward pressure on expected rental income and property values.

8. Analysis of Monetary and Fiscal Policies

Generally, fiscal policy is focused on the long term. However, some aspects of the fiscal policy can be used to counteract cyclical fluctuations in the economy (i.e., some aspects of the fiscal policy do impact short-term business cycles). These features are also called automatic stabilizers, and the curriculum provides two examples:

- Progressive tax regimes: The effective tax rate on the private sector rises as the economy expands and falls as the economy contracts.
- Means-based transfer payment: Government spending in the form of unemployment benefits and other social security benefits rises when the economy contracts and falls when the economy expands. This helps to reduce variations in disposable income for the most vulnerable households.

Unlike fiscal policy, which is focused on the long term, monetary policy is used explicitly as a mechanism for intervention in the business cycle. In most economies, the objective of monetary policy is to maintain price stability and/or growth consistent with the economy's potential. However, the impact of monetary policy suffers from 'long and variable lags.' It takes time for the impact to materialize, and there is a fair amount of uncertainty about how the impact will pan out. Therefore, the central bank's ability to fine-tune the economy using monetary policy is limited. This is particularly the case at the top of the business cycle, when the central bank may overestimate the economy's momentum and/or underestimate the effects of restrictive policies.

8.1 Monetary Policy

The **Taylor Rule** is a useful tool for assessing a central bank's stance and for predicting how that stance is likely to evolve. It links a central bank's target short-term nominal interest rate to the expected growth rate of the economy and inflation, relative to trend growth and the central bank's inflation target.

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

where:

i^* = target nominal policy rate

$r_{neutral}$ = real policy rate that would be targeted if growth is expected to be at a trend rate and inflation on target

π_e, π_{target} = expected and target inflation rates, respectively

$\hat{Y}_e, \hat{Y}_{trend}$ = expected and trend real GDP growth rates, respectively

If the inflation and GDP growth rate are too high and the economy is overheating, then the central bank will set a high-interest rate to cool down the economy and vice versa. An analyst can look at the policy rate to infer the central bank's stance on the economy. A low policy rate implies that the central bank's stance is to stimulate the economy because it believes that the economy is slowing down.

For example, suppose the neutral real policy rate is 2.25%, the target inflation rate is 2%, and the trend growth rate is estimated to be 2.5%. If growth is expected to be 3.5% and inflation is expected to be 3%. Using the Taylor rule, the nominal policy rate can be calculated as:

2.25% + 3% + 0.5 (3.5% – 2.5%) + 0.5 (3.0% – 2.0%) = 6.25%

The Taylor rule may appear simple to use; however, there is considerable subjectivity in the process. For example, whose estimate of trend growth is to be used? What is the appropriate neutral real policy rate? Over what horizon(s) do the expectations apply?

9. What Happens When Interest Rates Are Zero or Negative? And Implications of Negative Rates for Capital Market Expectations

Before the 2007 – 2009 global financial crisis, it was generally believed that interest rates had a floor of zero and that central banks could not successfully implement negative interest rate policies. However, after the crisis, several economies implemented negative interest rates for substantial periods. Therefore, analysts now also need to consider the impact of zero or negative interest rate scenarios.

In theory, negative nominal rates stimulate the economy. Businesses and consumers will be encouraged to hold fewer deposits. Investors will be encouraged to seek higher returns. Even banks will be more willing to lend. Businesses will be encouraged to invest in profitable projects.

However, in reality, for this to work, consumers, investors, businesses, and banks must believe that they will be adequately rewarded. In a negative interest rate environment, the level of uncertainty is high, which undermines this belief. Therefore, the effectiveness of expansionary monetary policy is weaker at low and negative interest levels than at higher interest rate levels, and the economy may not necessarily get a stimulus.

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9.1 Implications of Negative Interest Rates for Capital Market Expectations

Negative interest rates, and the environment that gives rise to them, make the task of setting capital market expectations even more complex than usual.

This is because:

- It is difficult to justify negative rates as a 'risk-free rate' to which risk premiums can be added to establish long-term equilibrium asset class returns.
- Historical data and quantitative methods are less likely to be reliable. There may not be sufficient comparable historical data available for instances of negative interest rates. Negative policy rates can be classified as a regime change, and quantitative methods developed involving previous regimes may not be applicable.
- Effects of other monetary policy measures such as quantitative easing, which occur simultaneously, may distort market relationships such as the shape of the yield curve or the performance of specific sectors (e.g., banking).

10. The Monetary and Fiscal Policy Mix and the Shape of the Yield Curve and the Business Cycle

Exhibit 5 from the curriculum summarizes the combined impact of monetary and fiscal policy on the average level of interest 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

Fiscal policy impacts real interest rates. A loose fiscal policy where government spending is high and taxes are low will result in higher real interest rates. On the other hand, a tight fiscal policy will result in lower real interest rates.

Monetary policy impacts expected inflation. A loose monetary policy where the central bank is trying to stimulate the economy will result in high expected inflation. In comparison, a tight monetary policy will result in low expected inflation.

Rates, Policy, and the Yield Curve over the Business Cycle

Exhibit 6 from the curriculum summarizes the main points about the evolution of rates, policy, and the yield curve over various business cycle phases.

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Cycle Phase	Monetary Policy & Automatic Stabilizers	Money Market Rates	Bond Yields and the Yield Curve
Initial Recovery	Stimulative stance. Transitioning to tightening mode.	Low/bottoming. Increases expected over progressively shorter horizons.	Long rates bottoming. Shortest yields begin to rise first. Curve is steep.
Early expansion	Withdrawing stimulus	Moving up. Pace may be expected to accelerate.	Yields rising. Possibly stable at longest maturities. Front section of yield curve steepening, back half likely flattening.
Late expansion	Becoming restrictive	Above average and rising. Expectations tempered by eventual peak/decline.	Rising. Pace slows. Curve flattening from longest maturities inward.
Slowdown	Tight. Tax revenues may surge as accumulated capital gains are realized	Approaching/reaching peak.	Peak. May then decline sharply. Curve flat to inverted.
Contraction	Progressively more stimulative. Aiming to counteract downward momentum	Declining.	Declining. Curve steepening. Likely steepest on cusp of Initial Recovery phase.

10.1 The Shape of the Yield Curve and the Business Cycle

Changes in the slope of the yield curve are largely driven by the evolution of short-term rate expectations, which are driven mainly by the business cycle and policies.

The slope of the curve may also be affected by debt management. For example, suppose a government runs a substantial fiscal deficit. The government's approach to financing the fiscal deficit will also impact the slope of the yield curve.

The slope of the yield curve is useful as a predictor of economic growth and an indicator of where the economy is in the business cycle. For example, at the bottom of the business cycle, the short-term rates are likely to be the lowest, and the yield curve will be the steepest.

11. International Interactions

11.1 Macroeconomic Linkages

Macroeconomic linkages between countries are expressed through their respective current and capital accounts.

- A current account represents the net export of goods and services, net investment income inflows, and unilateral transfers.
- A capital account represents net investment flows, including FDI (foreign direct investment) and PI (portfolio investment).

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The current account and capital account must balance each other out. For example, if an economy has a current account surplus, it must also have an equal amount of capital account deficit. If the current account surplus increases, then the capital account deficit will increase by the same amount.

Instructor's Note: Think of the capital account and current account as mirror images of each other.

An economy's net exports must always equal net private savings plus government surplus. This can be expressed as:

$$(X - M) = (S - I) + (T - G)$$

where:
X = exports
M = imports
S = private saving
I = private investment
T = government's tax revenues
G = government's expenditures

There are four primary mechanisms by which the current and capital accounts are kept in balance: changes in income (GDP), relative prices, interest rates, asset prices, and exchange rates. In the short run, interest rates, exchange rates, and financial asset prices must adjust to keep the capital account balanced with the more slowly evolving current account. The current account, in combination with real output and the relative prices of goods and services, reflects secular trends and the pace of the business cycle.

11.2 Interest Rate/Exchange Rate Linkages

There is a strong relationship between interest rates and currency exchange rates. Assuming unrestricted capital flows, if interest rates in an economy are lowered, capital will flow out of the country, putting downward pressure on the exchange rate. On the other hand, if interest rates are increased, then capital will flow into the economy, and the exchange rate will go up. This example also illustrates that if a country has an independent monetary policy (i.e., it can control interest rates), it cannot fix the exchange rate. Similarly, if a country decides to fix the exchange rate, then it cannot have an independent monetary policy.

With fixed exchange rates, two countries will share a default-free yield curve if and only if there is perfect capital mobility and the exchange rate is credibly fixed forever. However, if there is a lack of credibility about fixed exchange rates, the yield curves will not have a perfect correlation across markets.

With floating exchange rates, the link between interest rates and exchange rates depends on expectations. Interest rates should be higher in a currency expected to depreciate and lower in a currency expected to appreciate.

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An investor is concerned about the real return that he expects to earn in his own currency. Therefore, when investing in foreign assets, an investor looks at the nominal return in the foreign currency and also considers the change in the exchange rate.

Although real interest rates around the world need not be equal, they are linked through the requirement that global savings must always equal global investment. Hence, real exchange rates around the world tend to move together.

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Summary

LO. Discuss the role of, and a framework for, capital market expectations in the portfolio management process.

The following framework can be used to set capital market expectations.

1. Specify the set of expectations that are needed, including the time horizon(s) to which they apply.
2. Research the historical record.
3. Specify the method(s) and/or model(s) that will 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 and document the conclusions.
7. Monitor outcomes, compare to forecasts, and provide feedback.

LO. Discuss challenges in developing capital market forecasts.

The challenges in developing capital market forecasts include:

- Limitations of economic data – lack of timeliness, changing definitions, and calculations
- Data measurement errors and biases – transcription errors, survivorship bias, appraisal data
- Limitations of historical estimates – regime changes, asynchronous observations, distributional considerations such as fat tails and skewness
- *Ex post* risk can be a biased measure of *ex ante* risk- such as when historical returns reflect expectations of a low-probability event that did not occur or capture a low-probability event that did happen to occur
- Biases in analysts' methods – data-mining bias, time period bias
- Failure to account for conditioning information
- Misinterpretation of correlations
- Psychological biases – anchoring bias, status quo bias, confirmation bias, overconfidence bias, prudence bias, availability bias
- Model uncertainty, parameter uncertainty, input uncertainty

LO. Explain how exogenous shocks may affect economic growth trends.

Growth trend changes arising from exogenous shocks are impossible to forecast. It is also difficult to identify, assess, and quantify the impact of these shocks on the trend growth rate until the change is well-established.

The most important sources of exogenous shocks are:

- Policy changes

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- New products and technologies
- Geopolitics
- Natural disasters
- Natural resources/critical inputs
- Financial crises

LO. Discuss the application of economic growth trend analysis to the formulation of capital market expectations.

Fixed Income: The average level of real government bond yields is linked to the trend economic growth. Bond yields will be pulled toward this level over time. Therefore, the trend growth rate provides an important anchor for estimating long-term bond returns.

Equity: The trend growth rate also provides an anchor for long-run equity appreciation. The aggregate value of equity V^e can be expressed as:

$$V^e = \text{GDP} \times \frac{\text{E}}{\text{GDP}} \times \frac{\text{P}}{\text{E}}$$

Over long periods, capital's share of income and the P/E ratio cannot continually increase or decrease. Therefore, in the long run, the total value of equity depends on GDP's growth rate.

LO. Compare major approaches to economic forecasting.

The major approaches to economic forecasting include:

- Econometric models - Structural models that specify functional relationships among variables based on economic theory. Reduced-form models are more compact versions of the underlying structural models.

  These models impose a discipline on forecasts, are robust enough to approximate reality, and can readily forecast the impact of exogenous variables. However, they can be complex and time-consuming to formulate, and they rarely forecast turning points well.

- Econometric indicators - They provide information about an economy's activity and help identify its position in the business cycle. Types include lagging, coincident, and leading indicators. Individual leading indicators can be combined into a 'diffusion index.'

  This approach is the simplest. However, it can generate false signals and is vulnerable to revisions that may overfit past data.

- Checklist approach - This method is subjective and involves putting together information that the analyst considers relevant. This approach is the most flexible but also the most subjective.

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LO. Discuss how business cycles affect short- and long-term expectations.

Phase	Capital market effects
Initial Recovery Business confidence rises, stimulative policies are in place. Recovery supported by upturn in spending on housing and consumer durables.	Short-term interest rates and bond yields are low. Stock markets may rise strongly. Cyclical/riskier assets perform well.
Early Expansion Economy gaining momentum, unemployment starts to fall, output gap remains negative. Consumer demand rises. Business production and investment rise. Demand for housing and consumer durables is strong.	Short rates are moving up. Longer-maturity bond yields are stable or rising slightly. Yield curve starts to flatten. Stocks trend up.
Late Expansion Output gap closed. Boom mentality. Low unemployment. Strong profits. Rising wages and inflation. Capacity pressures boost investment spending. Debt ratios may deteriorate.	Interest rates rise, and the yield curve continues to flatten. Stock markets often rise but may be volatile. Cyclical assets may underperform. Inflation hedges outperform.
Slowdown Economy approaches peak level in response to rising interest rates, fewer investment opportunities, and accumulated debt. Business confidence wavers. Inflation continues to rise.	Short-term interest rates are at or nearing a peak. Government bond yields peak but may then decline sharply. The yield curve may invert. Credit spreads widen, especially for weaker credits. Stocks may fall. Interest-sensitive stocks and "quality" stocks with stable earnings perform best.
Contraction Firms cut production sharply. Central banks ease monetary policy. Profits drop. Tightening credit magnifies downward pressure on economy. Unemployment rises.	Interest rates and bond yields drop. The yield curve steepens. Credit spreads widen and remain elevated until clear signs of a cycle trough emerge. The stock market drops initially but usually starts to rise well before the recovery emerges.

LO. Explain the relationship of inflation to the business cycle and the implications of inflation for cash, bonds, equity, and real estate returns.

Inflation is procyclical.

- It accelerates in the later stages of the business cycle when the output gap has closed.
- It decelerates during a recession or right after the recession. This puts downward pressure on wages and prices.

Given the cyclical pattern of inflation, inflation expectations are also procyclical.

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Effects of Inflation on Asset Classes

Asset class	Effects of Inflation
Cash: Short-term interest-bearing instruments	Cash earns a floating real rate if short-term interest rates adjust with expected inflation. Therefore, essentially a zero-duration, inflation-protected asset. Cash is attractive in a rising rate environment.
Bonds	Bond values are calculated as the present value of future cash flows. If inflation rises, the discount rate rises, which reduces the PV of future cash flows. Therefore, rising inflation leads to capital losses. If inflation remains within an expected range, short-term yields rise/fall more than longer-term yields; it has less price impact because of shorter duration. If inflation moves out of expected range, longer-term yields rise/fall more sharply as investors reassess the long-run average level of inflation. Persistent deflation benefits highest-quality bonds because it increases the purchasing power of the cash flows.
Stocks	If inflation stays within the expected cyclical range, there is little effect on stocks because inflation expectations are already built into stock prices. However, unexpectedly high inflation may cause the central bank to slow the economy and will impact stocks. Also, low/falling inflation might imply a recession and a decline in stock prices. High inflation benefits companies that can pass on inflation. Whereas deflation is detrimental for asset-intensive, commodity-producing, and/or highly leveraged firms.
Real Estate	If inflation stays within an expected cyclical range, renewal of leases will increase rental income, and property values will rise with inflation. Higher than expected inflation will lead to high demand for real estate. Lower than expected inflation (or deflation) will put downward pressure on expected rental income and property values.

LO. Discuss the effects of monetary and fiscal policy on business cycles.

Generally, fiscal policy is focused on the long term. However, some aspects of fiscal policy can be used to counteract cyclical fluctuations in the economy. For example, progressive tax regimes and means-based transfer payments.

Unlike fiscal policy, which is focused on the long term, monetary policy is specifically used as a mechanism for intervention in the business cycle. However, the impact of monetary policy suffers from 'long and variable lags.' Therefore, the central bank's ability to fine-tune the economy using monetary policy is limited. This is particularly the case at the top of the business cycle.

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The Taylor Rule is a useful tool for assessing a central bank's stance and for predicting how that stance is likely to evolve.

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

LO. Interpret the shape of the yield curve as an economic predictor and discuss the relationship between the yield curve and fiscal and monetary policy.

The slope of the yield curve is useful as a predictor of economic growth and an indicator of where the economy is in the business cycle. For example, at the bottom of the business cycle, the short-term rates are likely to be the lowest, and the yield curve will be the steepest.

Changes in the yield curve slope are largely driven by the evolution of short-rate expectations, driven mainly by the business cycle and policies.

Cycle Phase	Monetary Policy & Automatic Stabilizers	Money Market Rates	Bond Yields and the Yield Curve
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Slowdown	Tight. Tax revenues may surge as accumulated capital gains are realized	Approaching/reaching peak.	Peak. May then decline sharply. Curve flat to inverted.
Contraction	Progressively more stimulative. Aiming to counteract downward momentum	Declining.	Declining. Curve steepening. Likely steepest on cusp of Initial Recovery phase.

LO. Identify and interpret macroeconomic, interest rate, and exchange rate linkages between economies.

Macroeconomic Linkages

- Macroeconomic linkages between countries are expressed through their respective current and capital accounts.

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- There are four primary mechanisms by which the current and capital accounts are kept in balance: changes in income (GDP), relative prices, interest rates, asset prices, and exchange rates.
- In the short run, interest rates, exchange rates, and financial asset prices must adjust to keep the capital account balanced with the more slowly evolving current account. The current account, in combination with real output and the relative prices of goods and services, reflects secular trends and the pace of the business cycle.

Interest Rate/Exchange Rate Linkages

- There is a strong relationship between interest rates and currency exchange rates.
- With fixed exchange rates, two countries will share a default-free yield curve if and only if there is perfect capital mobility and the exchange rate is credibly fixed forever. However, if there is a lack of credibility about fixed exchange rates, the yield curves will not have a perfect correlation across markets.
- With floating exchange rates, the link between interest rates and exchange rates depends on expectations. Interest rates should be higher in a currency expected to depreciate and lower in a currency expected to appreciate.

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