Asset Allocation

Learning Module 1
Capital Market Expectations, Part 1: Framework and Macro Considerations

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

LOS: Discuss challenges in developing capital market forecasts.

LOS: Explain how exogenous shocks may affect economic growth trends.

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

LOS: Compare major approaches to economic forecasting.

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

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

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

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

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

A Framework for Developing Capital Market Expectations

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

LOS: Discuss challenges in developing capital market forecasts.

The expected risk and return properties of investor-defined asset classes are known as **capital market expectations** (CME). CME are a critical input to an investor's strategic asset allocation; therefore, analysts must properly form the CME set with realistic risk and return projections to help investors reach their goals.

The technology bubble of the 1990s showed how using risk and return projections based on historical data can result in overoptimistic CME inputs that can put investor goals at risk. As a result, most institutions now use forward-looking rather than historical estimation for developing CME.

Although it's not always possible to have precise estimates of the future, it's important to ensure internal consistency across asset classes (**cross-sectional consistency**) and over time (**intertemporal consistency**) in order to best determine the strategic asset allocation likely to achieve risk–return objectives.

The following approach helps add discipline to setting CME:

1. Specify the expectations set (i.e., asset classes) and time horizons.
2. Research the historical record to develop some possible ranges for future results.
3. Specify the methods/models and their required inputs.
4. Determine the best information sources.
5. Implement the research and investment process. Apply experience and judgment to interpret the current investment environment. Make sure to apply consistent assumptions, compatible methods, and consistent judgments to ensure cross-sectional and intertemporal consistency.
6. Provide the necessary expectations set along with documented conclusions.
7. Use actual outcomes as feedback to the expectations-setting process.

While several cycles may be necessary to validate longer-term conclusions, the actual data may inform the current expectations-setting cycle.

Asset classification detail should guide formation of the input set for CME, but some general ways to slice the data include:

- Geographic, regional or country; political; economic bloc (e.g., European Union)
- Major asset class and subclasses
  - Equity—style, size, sector, industry
  - Fixed income—issuer, maturity, credit quality, securitization, fixed versus floating, nominal versus inflation-protected
  - Real assets—real estate, commodities, timber
  - Other alternative assets

Longer time horizons generally suggest using a discounted cash flow approach. Analysts should make sure to seamlessly integrate shorter-period estimates with longer time frame projections in order to maintain intertemporal consistency.

Good forecasts are generally:

- Objective, unbiased, and well researched;
- Efficient in minimizing forecast errors; and
- Cross-sectionally and intertemporally consistent.

Limitations of the Data Used

Analysts need to understand the limitations of the data they use with respect to accuracy, timeliness, variable definition, and series construction.

Data from some sources may be reported at **lags** of up to two years, impairing its usefulness for assessing current market conditions. Analysts must also be careful when using data that was subsequently subject to revision—models should not assume that the revision was known when the data was initially released, as this can lead to spurious relationships. Analysts must be aware of when indexes are **rebased** (i.e., resetting the index constituents and value to a particular time period) and should be careful not to compare data relating to different base periods. Data may also be subject to **survivorship bias**, in which only successful entities are included in the reporting, or **smoothing**, in which the use of appraisal-based data in illiquid markets understates true asset price volatility.

It is generally assumed that the more data used in analysis, the better the resulting forecast. However, this can be problematic when using historical data for forecasting. The further back in time an analyst goes in the collection of data, the less relevant the data is likely to be to current market conditions. Changes in

risk/return relationships (known as **non-stationarity**) due to shifts in technological, political, or regulatory environments are referred to as a change in **regime** and are more likely to occur over longer time periods. An analyst should use as much data as possible, but only data that is unlikely to have experienced a regime change with respect to current market conditions (e.g., a policy switch to negative interest rates or emergency monetary policy such as quantitative easing).

Using more *frequent* observations in a particular time period tends to improve variance, covariance, and correlation estimates; it does *not* necessarily result in greater forecast accuracy for the sample mean. For statistical reasons, the number of observations required to estimate covariance must exceed the number of variables (e.g., assets) in the analysis. In cases with many variables, **factor models** may be used to reduce the number of variables to keep data requirements reasonable. For example, the returns of 30 assets being explained by three or four systematic factors plus an uncorrelated idiosyncratic (asset-specific) factor for each asset requires only that correlations of factors be estimated rather than the pairwise correlations that exist between all 30 assets.

Increasing the frequency of observations increases the chance that data becomes **asynchronous**, meaning that data for different variables labeled as relevant to the same period may not truly relate to the same time period. For example, data for the same day may not overlap due to the variables relating to different time zones.

Ex post (historical) risk/return may be very different than **ex ante** (expected) risk/return. For example, historical analysis of central bank monetary policy decisions might observe a decision to keep interest rates unchanged which led to a market rally. However, the market rallied because *prior* to the decision, the market expected (ex ante) the central bank to raise rates. Ignoring this expectation of a negative event would lead to overestimating current ex ante returns. Conversely, historical data that includes a crash may be overly pessimistic for the current period if a similar event is not likely to occur.

When using risk measures that only consider the subset of worst case outcomes, data that includes rare events can overstate the likelihood of such events happening in the future. For example, the decline in the shares of Facebook (not Meta) during March 2020 (related to COVID-19) overstate the probability of similar downturns occuring in the future.

Biases in Methods Employed

Analysts should be wary of looking through a data set in search of relationships that have no economic rationale (**data mining bias**). Analysts should also be aware that relationships may be time-period specific (**time-period bias**), and should check that any forecasted relationship works well on data that was *not* used to establish the model (“out of sample” data).

Forecasts should reflect **conditioning information**, that is, how relationships are likely to behave in the current period, given the current market conditions. For example, it may be assumed that the average beta for a security over a full market cycle is 1. However, it is also well established by the data that the beta is 1.2 in falling markets and 0.8 in rising markets. An analyst who ignores the fact that the current period is expected to see a rising market would overestimate the beta, and the returns, of the security.

Analysts should be aware that correlation does not always equal **causation**. Conversely, a lack of correlation may not indicate a complete lack of relationship between two variables since correlation only measures the strength of *linear* relationships. There may still exist a *nonlinear* relationship between variables that exhibit zero correlation.

Psychological Biases of Individuals Involved

Behavioral biases that could lead to forecast errors include:

- **Anchoring bias**—Giving too much weight to initial information with insufficient adjustment when new information is received.
- **Availability bias**—Overemphasizing recent or extreme events because they have a stronger impression than other possible outcomes.

- **Confirmation bias**—Seeking and overweighting evidence that confirms existing or preferred beliefs.
- **Status quo bias**—Perpetuating initial information through a desire to avoid errors involved with change.
- **Overconfidence bias**—Overestimating the ability to understand and use information, which often results in failing to consider all possible outcomes, especially in the "unknown unknowns" category.
- **Prudence bias**—Avoiding forecasts that appear extreme so as not to damage one's reputation if the forecast is wrong. This may lead to underweighting the expectation of a non-consensus outcome.

Uncertainty

Forecasts generally are subject to three kinds of uncertainty:

1. **Model uncertainty**—Choosing the conceptually and structurally incorrect model. For example, an analyst could choose to model expected returns through a single factor model such as CAPM, when in reality there are multiple relevant factors that explain an asset's return.
2. **Input uncertainty**—Related to the errors in the underlying data. For example, if the analyst chooses to use the CAPM, he or she needs to estimate the market risk premium as an input to the model.
3. **Parameter uncertainty**—Related to the errors in estimated parameters. For example, the analyst using CAPM must estimate the relative systematic risk (i.e., beta) of the security being analyzed.

Economic and Market Analysis (Part 1)

LOS: Explain how exogenous shocks may affect economic growth trends.

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

LOS: Compare major approaches to economic forecasting.

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

LOS: Explain the relationship of inflation to the business.

Trends are related to long-term rates of change; cycles are shorter-term fluctuations around the longer-run trend. Some series, such as demographic trends, may be easy to forecast based on slowly evolving data. However, trends may be interrupted by regime change, described earlier, or by some other exogenous shock.

Exogenous shocks involve changes from outside the existing system, such as policy changes, geopolitics, natural disasters, or financial crises. For our purposes, exogenous shocks may also include disruptive changes in technology or impacts to a supply chain.

Financial crises may be grouped into three types:

- Type 1—A permanent, one-time decline with resumption of the trend rate after the initial shock.
- Type 2—No persistent one-time decline but continuing at a lower trend rate.
- Type 3—Both a permanent, one-time decline and continuation at a lower trend rate.

In some cases, policy missteps result in the one-time shock whereas new structural considerations may contribute to continuation at a lower trend rate.

Long-term economic trend analysis is generally based on the *inputs* to economic growth:

- Labor input growth
  - Increase in hours worked
  - Increase in labor force size (population growth)
  - Increase in labor force participation rate
- Labor productivity growth
  - Increase in capital inputs
  - Total factor productivity (TFP) increase (i.e., technology improvement)

These components of growth can be summed together to attain an estimate of the long-term trend real growth rate of an economy. Expected inflation would be added to this to estimate the long-term nominal growth rate of the economy.

Default-free bond rates (e.g., U.S. Treasuries) are both theoretically and empirically observed to be linked to the trend rate of GDP growth. That is, countries with high trend growth tend to also have high bond yields.

Similarly, aggregate equity market value is also directly related to long-term trend GDP growth. This is best demonstrated by viewing the value of the stock market (V_e) as a combination of GDP, corporate earnings as a percentage of GDP (E/GDP), and the price-to-earnings multiple (P/E) as follows:

$$V_e = GDP \times \frac{E}{GDP} \times \frac{P}{E}$$

The key insight here is that corporate earnings as a percentage of GDP (E/GDP) and the price-earnings multiple (P/E) *cannot* continually rise over the long term (it would not make sense for workers to work in a world where all GDP wealth flowed to corporate earnings (E/GDP), or for valuations (P/E) to increase without bound). Hence, the only way the value of the stock market can increase over the long term is through long-term growth in GDP. Note that this analysis explains the long-term *capital appreciation* of the stock market; expected dividend yield would need to be added to this to estimate the total returns of the equity market.

Example 1

An analyst compiles the following estimates for her domestic economy:

- Labor input growth = 1.4%
- Labor productivity growth = 1.5%
- Inflation = 3.0%
- Dividend yield = 2.5%

The analyst considers the current market to be significantly overvalued due to unsustainable central bank actions. She forecasts that a recent expansion in P/E of 20% on a continuously compounded basis, which occurred over the last 5 years, will likely be followed by a 20% fall over the next 10 years.

What is the analyst's projection for annual continuously compounded domestic market equity returns over the next 10 years?

Solution

Real long-term trend GDP growth = Labor input growth + Labor productivity growth = 1.4% + 1.5% = 2.9%.

Nominal GDP growth = Real GDP growth estimate + Expected inflation = 2.9% + 3.0% = 5.9%.

The analyst also expects P/E ratios to fall by 20% over the next 10 years on a continuously compounded basis. This implies an annual contraction in P/E ratios of −20% ÷ 10 = −2%.

Capital appreciation of stock market = Nominal GDP + (E/GDP) + P/E = 5.9% + 0% − 2% = 3.9%.

Note that with no mention of change in earnings as a share of GDP, this would be assumed to be zero.

Annual domestic market equity returns = Capital appreciation + Dividend yield = 3.9% + 2.5% = 6.4%.

There are three distinct approaches to forecast economic change (illustrated in Table 1):

1. **Econometrics**—Uses statistical methods to model relationships among economic variables
   - **Structural models**—Use underlying economic theory to develop a functional form and parameters for the model. For example, a structural credit risk model would theorize that borrowers default when their assets fall below the payments required on their debt, and attempt to model the likelihood of this happening.
   - **Reduced-form models**—Less closely tied to economic theory and more driven by empirical data. For example, a reduced-form credit risk model would model relationships between market conditions and default probabilities based on historical data.
2. **Economic indicators**—Economic statistics representing information on an economy's past (**lagging economic indicator**), concurrent, or likely future activity (**leading economic indicator**). A diffusion index compiles many leading economic indicators and determines a direction based on how many point up and how many point down.
3. **Checklist approach**—A more subjective approach in which an analyst examines a broad spectrum of economic data and checks which data point in one direction or the other.

Table 1: Strengths and weaknesses of economic forecasting approaches

Forecast Type	Strengths	Weaknesses
Econometric	• Many factors help represent reality; robust (valid statistical relationship) • Quickly updated using new data • Provides quantitative estimates • Imposes analytical discipline/ consistency	• Complex, time-consuming to formulate • Forecasting inputs difficult • Model may be misspecified due to changing relationships • False precision impression • Turning points hard to forecast

Leading indicators	• Intuitive and simple
	• Focuses on turning points
	• Available from third parties
	• Easy to track
		• Can provide false signals
		• Binary (yes/no) directional guidance
		• Subject to frequent revision
		  ○ Current data might not be relevant to historical returns
		  ○ Overstates accuracy due to overfitting in sample

Forecast Type	Strengths	Weaknesses

Checklist approach	• Not overly complex
	• Can include a wide variety of check points (breadth)
	• Flexible
	  ○ Easily incorporates structural changes
	  ○ Items easily added/dropped
		• Arbitrary, judgmental, and subjective
		• Manual process that limits ability to combine different types of information
		• Time consuming

A **business cycle** results from short- to medium-term cycles that cause oscillations around the longer-term trend growth rate of an economy. Business cycles represent differences between expectations underlying business decisions and what really happens that affects investment outcomes. The business cycle is not well defined; it varies in both intensity and duration and thus turning points become difficult to forecast.

Business cycles are often characterized into expansion and contraction phases marked by changes in direction at the peak or trough of the phase. Changes in capital market expectations tend to correlate with the economic indicators present during each phase (see Table 2).

Table 2: Phases of the business cycle

Phase	Economic Features	Capital Market Features
Initial recovery (a few months)	• After the low point, the output gap is large, inflation is decelerating, stimulative policies remain in place, and the economy starts to grow.	• S-T and L-T government bond yields are likely to be bottoming but may still decrease. • Stock markets may begin to rise quickly as recession fears subside. • Riskier small-cap stocks, high-yield bonds, and emerging market securities start to do well.
Early expansion	• Output gap remains negative, but unemployment starts to fall. • Consumers start to borrow to spend; housing and consumer durable demand increases. • Businesses step up production; profits begin to expand rapidly. • Central bank begins to remove stimulus.	• Short rates begin to increase; long rates remain stable or increase slightly. • Flattening yield curve. • Stock prices trend upward.

Phase	Economic Features	Capital Market Features
Late expansion	• Positive output gap and danger of inflation; capacity pressures boost investment spending. • Low unemployment, strong profits, rising wages and prices (inflation). • Debt coverage ratios may deteriorate as business borrows to fund growth. • Monetary policy becomes more restrictive.	• Private sector borrowing causes rates to rise. • Yield curve continues to flatten as short rates rise faster than long rates. • Stocks are volatile as investors watch for deceleration. • Inflation hedges (e.g., commodities) may begin to outperform other cyclical assets.
Slowdown	• Fewer viable investment projects and overleveraging cause slowing growth; business confidence wavers. • Inflation continues to rise as business pricing attempts to outpace rising input costs. • The economy is vulnerable to shocks.	• L-T bonds may top but S-T rates continue to rise or may peak; yield curve may invert. • Credit spread widens, depressing bond prices for lower credit issues. • Stocks may fall; utilities and quality stocks are likely to outperform.

Contraction (12 to 18 months)	• Firms cut investment spending, then decrease production; unemployment can rise quickly (which hinders household formation).
	• Profits drop sharply; credit markets tighten, accounting transgressions are uncovered, and bankruptcies can result.
		• S-T and L-T rates begin to fall; yield curve steepens
		• Credits spread widens; remains wide until trough.
		• Stock market
		  ○ Early phase—Declining
		  ○ Late phase—Begins to rise

Forecasting the market based on economic cycles is not as easy as this may suggest. While the relationship between the real economy and capital markets is strong, different investors tend to have different viewpoints on the outlook for the phase of the business cycle.

While business cycle analysis sometimes sends a noisy signal, it is likely to be strongest during the one to three years of the expansion or contraction phase. Beyond that range, returns increasingly reflect averaging of an expectation of a turning point.

Deflation (falling prices) is widely considered damaging to the economy because it increases the real value of fixed-rate corporate debt, whilst at the same time corporate income flows are likely to be falling. Also, in periods of persistent deflation it is likely that interest rates fall to very low levels close to (or even below) zero, removing a key monetary policy tool of the central bank to stimulate the economy.

In contrast, moderate inflation imposes only small costs while allowing the flexibility for the economy to grow. Central banks, then, target low inflation and investors consider this in their capital market expectations. Credible central bank targets will tend to result in larger output gaps during the beginning of a recession and greater inflation as the peak approaches, with average inflation near the target over the cycle.