Capital Market Expectations, Part 1: Framework and Macro Considerations

Formulating Capital Market Expectations

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Formulating Capital Market Expectations

1. Determine the **capital market expectations (CME)** that are needed given the investor's **time horizon**, **allowable asset classes**, and other relevant factors.
2. Determine the **historical performance and driving factors** of the asset classes.
3. Identify the **valuation models and methods** that will be used.
4. Identify the **best sources of data possible to make better investment decisions**.

Formulating Capital Market Expectations (cont.)

5. Use **experience and judgment** to interpret current investment conditions.
6. Formulate and document the necessary **CME.**
7. **Monitor results and refine** the process.

Capital Market Expectations

Forecasts should be as follows:

- Objective, unbiased, and well supported
- Efficient in minimizing forecasting errors
- Consistent in terms of
  - **Cross-sectional consistency**
  - **Intertemporal consistency**

Challenges to Forecasting

Limitations in the economic data

- Data is available with time lags and is subject to revision.
- Inconsistent data definitions and methodology calculation methods change among sources.
- Indices can be **rebased** (i.e., the period upon which they are based can change).

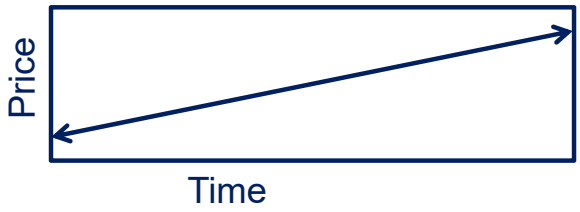
Challenges to Forecasting (cont.)

Data measurement errors and biases in the data

- Transcription errors—numbers are entered wrong
- Survivorship bias—overstating return and understating risk
- Appraisal (smoothed) data for illiquid assets

Smoothing Consequences

- Illiquid assets are infrequently traded and priced.



- Resulting analysis implicitly assumes a continuous price change between the two pricing points.
- Risk calculations are understated, and correlation is closer to 0.

Challenges to Forecasting

- *Ex post* may understate *ex ante* risk
  - Future can always be worse than the past—lower return and higher risk
- Limitations of using historical-based estimates
  - Future can be different from the past
  - Can be subject to **regime change** when fundamental driving factors change, leading to **nonstationarity** (statistical characteristics differ by time period)

Selecting the Time Period

- Longer time periods or more frequent observations (e.g., daily rather than quarterly) increase the quantity of the data
  - More frequent data may be *asynchronous* across markets
- Shorter periods are less likely to include regime changes.
- Use longer periods unless (1) there is a reason to believe fundamentals have changed, or (2) statistical analysis of subperiods reveals non-stationarity.

Challenges to Forecasting

- Analyst biases
  - Data mining—keep analyzing the data until a pattern emerges, even if it is not predictive
  - Time-period bias—relationship holds in one period but not another
- Failure to condition data
  - E.g., ignoring changing beta vs. market conditions

Challenges to Forecasting (cont.)

- Mistaking *correlation* for *causation*. If 'A' and 'B' are correlated does this mean:
  - A → B?
  - B → A?
  - C → A and B?
  - Relation is spurious?
- Zero correlation does *not* imply no *non-linear* relationship.

Challenges to Forecasting (cont.)

Psychological biases

- Anchoring bias
- Status quo bias
- Confirmation bias
- Overconfidence bias
- Prudence bias
- Availability bias

Challenges to Forecasting (cont.)

Model risk

- **Model uncertainty**—selecting the wrong model
- **Parameter uncertainty** —estimating incorrect coefficients for model
- **Input uncertainty**—using the wrong inputs

Capital Market Expectations, Part 1: Framework and Macro Considerations

The Trend Rate of Growth

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The Trend Rate of Economic Growth

- Economic growth **trend rate** = long-term average growth rate around which business cycle revolves
  - Trend rate is not constant
    - Some changes easy to forecast (e.g. demographic changes)
    - Some changes are more difficult to forecast, e.g. **exogeneous shocks:** unanticipated events outside the normal course of the economy; not built into current market prices.

The Trend Rate of Economic Growth (cont.)

- Exogeneous shocks be caused by several factors:

1. **Changes in government policy**—can encourage long-term growth, including sound fiscal policy, minimal government interference, encouraging competition, supporting infrastructure and human capital, and sound tax policy

The Trend Rate of Economic Growth (cont.)

2. **Political events**—geopolitical tensions divert resources to less productive uses, which may decrease growth
3. **Technological progress**—new, innovative technology has potential to increase growth
4. **Natural disasters**—likely reduce short-term growth but could encourage long-term growth if more efficient capacity replaces previous capital

The Trend Rate of Economic Growth (cont.)

5. **Discovery of natural resources**—new supply / more efficient production can increase growth
6. **Financial crisis**—(i.e., 2007 and 2008) can impact both output levels and growth rates:
   - Type 1 crisis: Output down but growth rate unchanged
   - Type 2 crisis: growth rate reduced but no reduction in output level
   - Type 3 crisis: both output level and growth rate reduced

The Importance of Economic Growth Trends

- Forecasting returns with DCF models incorporates earnings growth rates consistent with the trend rate of growth in the economy.
- Higher trend growth rates may lead to higher stock returns.
- Higher trend growth means that the economy can grow at a faster pace before inflation becomes a major concern.
- Higher trend growth rates generate higher real bond yields.

Forecasting the Economic Growth Rate

The trend growth rate can be split into the following components:

- Growth in labor input, based on
  - growth in the labor force size
  - growth in labor force participation
- Growth in labor productivity, based on
  - increasing capital per worker ('capital deepening')
  - growth in total factor productivity, reflected in technological progress and changes in government policy

Trend Growth vs. Asset Returns

can not increase indefinitely

$$V^e = GDP \times \frac{Earnings}{GDP} \times PE\ ratio$$

=> long-term growth in equity = long-term growth in GDP

Economic Forecasting

Major approaches:

1. Econometrics
2. Economic indicators
3. Checklists

Economic Forecasting: Econometrics

Statistical models of economic relationships

- **Structural models:** based on economic theory
- **Reduced form models:** based more on data, less on theory

Economic Forecasting: Econometrics

Pros:

- Can simulate the effect of changes in key variables
- Internally consistent
- Objective: imposes discipline

Cons:

- Finding data
- Complex and time consuming
- Measurement and model errors
- Unstable relationships
- False sense of precision
- Poor at forecasting turning points

Economic Forecasting: Economic Indicators

Use of **leading indicators** which turn before the economy.

Pros:

- Simple and intuitive
- Makes no assumptions about variables
- Focuses on turning points
- Can be combined into *diffusion index*

Cons:

- Revisions to data causing 'look-ahead' bias
- Can provide false signals
- Little more than binary yes/no output

Economic Forecasting: Checklist

This is a list of factors the forecaster considers—essentially, a series of questions to consider in forming conclusions.

Pros:

- Straightforward and simple
- Flexible: mixes objective statistical analysis with judgment regarding changing relationships

Cons:

- Time-consuming
- Subjective
- Relies on manual interpretation of the information
- Potentially inconsistent

Capital Market Expectations, Part 1: Framework and Macro Considerations

The Business Cycle

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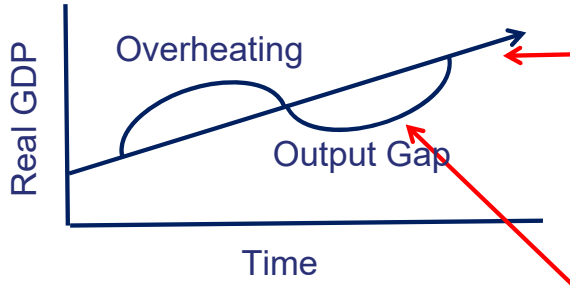
The Business Cycle and Growth



The slope represents the trend rate of growth over time.

There is variation around the trend due to the business cycle.

The Business Cycle

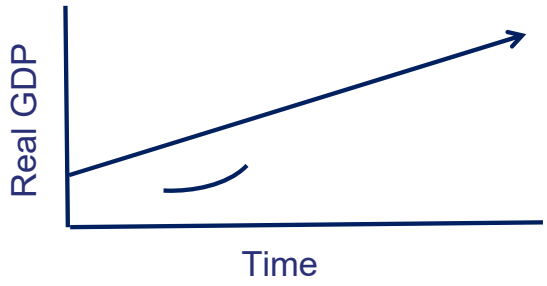
- A fundamental reason why economic activity is cyclical is the nature of business investment decisions.
  - Made on imperfect information
  - Require significant time/resources to implement
  - Difficult to reverse

The Business Cycle (cont.)

It is important to form capital market expectations (CME), but understanding the business cycle is difficult for various reasons:

- Business cycles vary in duration and intensity, and their turning points are difficult to predict.
- It is difficult to separate cyclical forces from secular longer-term forces.
- Returns in capital markets are strongly related to activity in the real economy, but they are also affected by investors' attitudes toward risk and return over all horizons

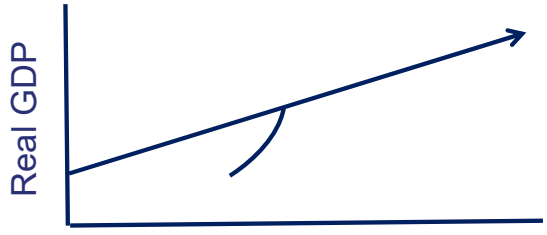
The Business Cycle: Initial Recovery



The economy exits recession; government policy stimulative; improving business confidence; inflation declining

- ST rates low or declining
- LT rates bottoming and bond prices peaking
- Stocks and cyclical assets do well

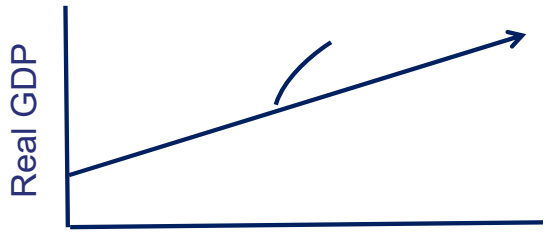
The Business Cycle: Early Expansion



Economy grows faster than trend and the output gap shrinks; policy less stimulative; increasing consumer spending and business investment

- ST rates increasing
- LT rates bottoming or increasing; bond prices begin declining, yield curve flattens
- Stock prices increasing

The Business Cycle: Late Expansion



GDP above trend but growth slowing; unemployment low; low capacity boosts investment; inflation increasing

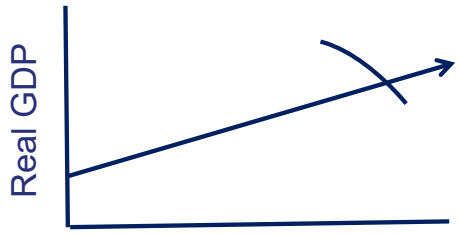
- ST rates increasing with restrictive monetary policy
- LT rates increasing with bond prices declining, yield curve continues to flatten
- Deteriorating credit conditions, stocks volatile and peaking

The Business Cycle: Slowdown

GDP growth slowing; policy turning neutral; high debt levels; confidence wavers; inflation still increasing

- ST rates peaking
- LT rates high - may decline sharply; bond returns favorable. Yield curve may invert.
- Stocks decline; ‘quality’ outperforms. Credit spreads widen.

The Business Cycle: Recession/Contraction



Investment falls; policy easing; profits falling; unemployment rising; duration of 12–18 months

- ST and LT rates fall; bonds do well. Yield curve steepens
- Stocks decline but rise later in the recession
- Credit spreads widen, bankruptcies and fraud cases emerge

Inflation Implications

- Inflation is pro-cyclical (high when late in the cycle)
- Disinflation (falling inflation rate) frequently occurs as an economy enters a recession.
- Deflation (negative inflation) problematic since:
  - Increases real value of debt
  - Central banks struggle to control cycle
- Central banks generally target low, moderate inflation

Inflation Expectations

- Shorter-term inflation expectations will be pro-cyclical
- Long-term inflation expectations should be unaffected by cycle (as long as central bank is credible)
  - counter-cyclical 'horizon structure' of inflation expectations
  - Yield curve slope is counter-cyclical
    - Steep in recession, flat/inverted in expansions

Inflation Expectations and Asset Classes

- Cash
  - If ST rates move in line with expected inflation => attractive in high-inflation environments
  - Attractive in deflationary environment if lower bound exists on ST rates

Inflation Expectations and Asset Classes

- Bonds
  - Rising inflation increases bond yields causing losses
  - Persistent deflation benefits high-quality bonds
- Stocks
  - High inflation => higher ST rates, negative for most stocks (positive if company can pass on inflation)
  - Low inflation => decline in asset prices, negative for most stocks (particularly leveraged firms)

Inflation Expectations and Asset Classes

- Real Estate
  - High inflation likely coincides with high demand for real estate, increasing rents and property values
  - Low inflation/deflation bad for lower quality properties that may have to cut rents

Capital Market Expectations, Part 1: Framework and Macro Considerations

Monetary and Fiscal Policy

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Monetary Policy

- Central banks intervene in business cycle in counter-cyclical way
- Increase/decrease the money supply to lower/increase ST rates and stimulate/slow the economy.

The Taylor Rule

$$n_{target} = r_{neutral} + inflation_{expected} + 0.5(GDP_{expected} - GDP_{trend}) + 0.5(inflation_{expected} - inflation_{target})$$

- Used as an active management tool to anticipate changes in central bank policy and interest rates.

The Taylor Rule: Example

Neutral real rate	3.00%
Inflation target	2.00%
Expected inflation	4.00%
GDP long-term trend	2.00%
Expected GDP	0.00%

Target nominal short-term rate:
3 + 4 + 0.5(0 – 2) + 0.5(4 – 2) = 7%

Negative Interest Rates

- *Negative interest rates* were generally considered a hypothetical curiosity before the 2007–2009 financial crisis.
  - Conventional wisdom assumed individuals would rather hold cash than be subject to negative rates.
- In response to financial crises, some central banks began targeting negative rates to stimulate growth
- Central banks also began programs of buying bonds funded by newly created currency to directly increase the money supply *('Quantitative Easing')*

Negative Interest Rates (cont.)

Negative interest rates complicate the process of forming capital market expectations (CME).

- The risk-free rate is the starting point for buildup models used to estimate long-run returns for asset classes, and throws off normal valuation methods.
- Analysts must now estimate when (and how) negative rates will converge to a long-run sustainable risk-free rate.

Negative Interest Rates (cont.)

- Some forecasting methods interpret negative risk-free rates as being consistent with contraction or early recovery stages of the business cycle.
- It is not generally possible to use historical data, as few comparable periods exist—and the negative rates suggest significant structural economic changes are occurring.

Government: Fiscal Policy

- Another tool at the government's disposal for managing the economy is *fiscal policy* (taxing and spending)
- To stimulate the economy—implement loose fiscal policy by lowering taxes and/or increasing spending.
- **Persistent loose fiscal policy** => high deficits and **high real rates** to attract the saving required for government borrowing
- **Persistent loose monetary policy** => high inflation, ultimately leading to **high nominal rates**

Yield Curve Shape vs. Business Cycle

- *Shape* of the yield curve primarily driven by short rate expectations

Cycle Phase	Money Market Rates	Yield Curve
Initial recovery	Low/bottoming	Steep and low
Early expansion	Increasing	Rising and flattening
Late expansion	High and rising	Rising and flattening
Slowdown	Peaking	Peaking, flat/inverted
Contraction	Declining	Declining and steepening

International Considerations

- Business cycles tend to converge with globalization.
  - Larger, more diversified economies are less affected.
- A useful relationship for understanding how the current account influences economic activity is the following formula:

  net exports = net private saving + government surplus

International Considerations (cont.)

Interest rate/currency linkages

- Countries that peg their currency value must generally follow the economic policies of the country to which they peg.
- Pegging country interest rates typically exceed those of the country to which they peg.
- The interest rate differential fluctuates with the market's degree of confidence in the peg.

International Considerations (cont.)

- In the absence of currency pegs, the following occur:
  - If a currency is perceived as overvalued and expected to decline, interest rates must generally be higher to compensate investors for the expected decline.
  - Relative nominal and real bond yields are increased by strong economic activity.
    - Real rates can differ across markets

Capital Market Expectations

Capital Market Expectations, Part 2:
Forecasting Asset Class Returns

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Forecasting Capital Market Expectations (CME)

- Forecasting returns requires not only assessing expected returns, variances, and correlations, but also understanding that time horizons are important.

There are three approaches to forecasting CME:

1. Surveys
2. Judgments
3. Formal tools

Surveys and Judgment

- CME can be formed using **surveys**, which can be the most useful ways to gauge consensus.
- **Judgment** can also be applied to project CME 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.

Formal Tools

1. Statistical methods

- Using *sample statistics*—sample mean, variance, and correlations (issue: sampling error)
- Applying a *shrinkage estimate* to historical data—take weighted average (e.g., 60% of historical return and 40% of a model estimated return)
- Applying *time series analysis*—based on lagged values of the variable being forecast and selected other lagged variables

Formal Tools (cont.)

2. **Discounted cash flow (DCF)**
   - Gordon growth model (DDM) at Level II and Grinold-Kroner model at Level III
3. **Risk premium model**
   - Can be used for both equities and fixed income
   - Starts with risk-free rate and then adds compensation for risks (e.g., CAPM, factor model, building blocks)

Forecasting Fixed-Income Returns

Forecasting fixed-income returns can be done through the following:

- **Discounted cash flow (DCF) method**
- **Risk premium (building block) approach**

DCF Analysis

- For bonds, use yield to maturity (YTM).
  - YTM assumes reinvestment rate on all cash flows is at the initial IRR.
  - If investment horizon > duration => reinvestment risk dominates (losses when rates ↓)
  - If investment horizon < duration => price risk (losses when rates ↑)
- *Recall Macaulay duration = Modified Duration × (1 + YTM)*

Risk Premium (Building Block) Approach

- The 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.

Risk Premium (Building Block) Approach (cont.)

1. Short-term default-free rate

- The short-term default-free rate matches the forecast horizon and uses the most liquid asset.
- As a result, it is the closest to the government zero-coupon yield, and is closely tied to the central bank policy rate.

Risk Premium (Building Block) Approach (cont.)

2. Term premium

- Rates implied from the spot yield curve give us useful information about the term premium.
- The real term premium cannot be derived from the yield curve alone. It is driven by the following: inflation uncertainty, the ability to act as a recession hedge, supply and demand, and business cycles.

Risk Premium (Building Block) Approach (cont.)

3. Credit premium

- Compensates for the expected level of losses and for the risk of default losses, both of which are components of the credit spread
- Yield spread is typically not a good predictor of future default rates because premiums earned tend to be uneven and subject to significant clustering of persistent high and low spreads

Risk Premium (Building Block) Approach (cont.)

4. Liquidity premium

Generally, liquidity is higher for bonds that are as follows:

- Newly issued at close-to-par or market rates
- Large in size and issued by a well-known issuer
- Simple in structure and of high credit quality

Capital Market Expectations, Part 2: Forecasting Asset Class Returns

Emerging Market Bond Risk

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Emerging Market Bond Risk

- They offer higher return than developed country bonds due to enhanced risk relating to:
  - *economic risks (ability to pay)*
  - *political and legal risks (willingness to pay)*

Emerging Market Bond Risk

- **Economic risks/ability to pay**
  - Less diverse tax base
  - Restrictions on trade flow, capital flows and currency
  - Poor fiscal/monetary discipline
  - Less educated workforce/poor infrastructure
  - Reliance on foreign borrowing in 'hard' currency
  - Smaller financial institutions
  - Susceptible to 'capital flight'

Emerging Market Economies

- Key issues and warning signs:

1. Irresponsible fiscal and monetary policies

   Government deficit/GDP ratio > 4%

   Debt/GDP > 70-80%

2. Insufficient real economic growth to 'catch up' with developed economies

   Growth < 4%

Emerging Market Economies (cont.)

3. Lack of competitiveness

   Current account deficit > 4% of GDP

4. Excessive foreign-denominated debt

   Foreign debt/GDP ratio > 50%

   Foreign debt > 2 × current account receipts

Emerging Market Economies (cont.)

5. Inadequate short-term liquidity to service foreign debt

   Foreign currency reserves/ST foreign currency debt ratio < 100%

Emerging Market Bond Risk

- **Political/legal risks/willingness to pay**
- Warning signs:
  - Weak property rights/ineffective contract law
  - Expropriation of property/corruption
  - Unresolved historical international disputes
  - Questioning of the integrity of the judicial system
  - Weak coalitions/non-peaceful transition of power
  - Capital/currency conversion controls

Capital Market Expectations, Part 2: Forecasting Asset Class Returns

Forecasting Equity Returns

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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.
  - Sample averages tend to be imprecise, unless the volatility of the data is small.
  - Shrinkage estimators are typically more reliable as predictors of equity returns.

Discounted Cash Flow Approach (DCF)

- A tool for setting CME is **DCF models**.
  - These models calculate the intrinsic value of an asset as the PV of future cash flows.
  - Any DCF model (from Level II) can be adapted to project return.
  - The most common application of DCF models is the Gordon growth model, or constant growth model.

Forecasting Equity Returns

- Grinold-Kroner is a key model on the exam, and it is an adaptation of the Gordon growth DCF model:

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

where:

- $E(R_e)$ = expected equity return
- D/P = dividend yield
- %ΔE = expected percentage change in total earnings
- %ΔS = expected percentage change in shares outstanding ('net share repurchases' = -%ΔS)
- %ΔP/E = expected percentage change in the P/E ratio

Grinold-Kroner Model

- The model can be regrouped into three components:
  - The **expected cash flow return** (**income return)**:

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

  - The **expected nominal earnings growth** is the real growth in earnings plus expected inflation: $\%\Delta E$
  - The **expected repricing return** is the expected change in the P/E ratio: $\%\Delta P/E$

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

Grinold-Kroner Model Example

- Suppose an analyst uses the Grinold-Kroner model to estimate the stock market return. The analyst estimates a 2.1% dividend yield, real earnings growth of 4.0%, long-term inflation of 3.1%, a 0.5% increase in shares outstanding, and an expansion of the P/E multiple of 0.3%.
- **Calculate** the implied return on the stock market given these assumptions.