Chapter 5

Factors Affecting Bond Yields and the Term Structure of Rates

Term Structure of Rates

Base Interest Rate - corresponding Treasury rate

Risk Premium - yield above Treasury rate for non-Treasury bond

Types of Issuers (market sectors)
  U.S. government
  U.S. agencies
    municipal governments
    credit (domestic and foreign corporations)
    foreign governments

Spread between rate in two different sectors is an intermarket sector spread

Quality or Credit Spread - spread between Treasury and non-Treasury

  Factors affecting spread
    Options
    Taxability
    Liquidity
    Financeability - collateral, repos

Yield Curve

  Shapes of Yield Curves
    Normal
    Inverted
    Flat
Determinants of Yield Curve Shapes

   - Expectations Theories
     - Pure Expectations
     - Liquidity Preference
   - Market Segmentation Theory

Why Yield Curve is inappropriate for finding yields to discount bond cash flows

Consider two 5-year Treasuries: 12% coupon and 6% coupon

Pattern of cash flows from each should not be discounted at same rate
Discount each cash flow at appropriate spot rate for that maturity

Appropriate discount rate is Treasury rate plus an appropriate risk premium

Constructing Theoretical Spot Rate Curve for Treasuries (Yield Curve)

   - On-the-run Treasury issues
   - On-the-run Treasury issues and selected off-the-run Treasury issues
   - All Treasury coupon securities
   - Treasury coupon strips

Treasury strips require no special treatment

On-the-run Treasury issues:

   - par coupon curve
     - Have yields on only five or six different on-the-run Treasuries
     - 6-month, 1, 2, 5, 10, 10-year
     - Must interpolate between those yields
     - Linear interpolation = \[ \frac{\text{yield at high maturity} - \text{yield at lower maturity}}{\text{number of six month periods between two}} \]
Theoretical Spot Rate Curve Using Bootstrapping

Using the rates from the par yield curve calculated using available rates and interpolation
If you know the 6-month spot rate, the 1-year spot rate and the 1.5-year spot rate

6-month spot = 5.25
1-year spot = 5.50

\[
100 = \frac{2.875}{1.02625} + \frac{2.875}{1.0275^2} + \frac{102.875}{x^3}
\]

1.5-year spot rate would be 5.76% (.028798 x 2)

Using On-the-Run Issues plus 20-year and 25-year Off-the-Run
Using all Treasury Coupons and Exponential Spline fitting
Using Treasury Coupon Strips

Why Strips don’t automatically give unbiased spot rate estimates

Using Theoretical Spot Rate Curve to Price Treasury Bond

What forces Treasury to be priced based on spot rates? Arbitrage

Forward Rates

\[
z_t = [(1+z_1)(1+f_1)(1+f_2)(1+f_3)\ldots(1+f_t-1)]^{1/t} - 1
\]