Chapter 7

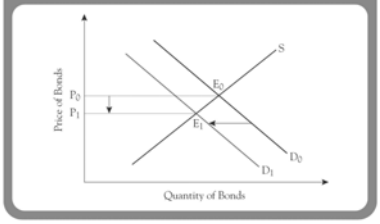
The Risk and Term Structure of Interest Rates

McGraw-Hill/Irwin

Bond Ratings and Risk

Figure 7.1 The Effect of an Increase in Risk on Equilibrium in the Bond Market

Increased risk reduces the demand for the bond at every price, shifting the demand curve to the left from D_0 to D_1. The result is a decline in the equilibrium price and quantity in the market. Importantly, the price falls from P_0 to P_1, so the yield on the bond must rise.



Bond Ratings and Risk

Increased Risk reduces Bond Demand. The resulting shift to the left causes a decline in equilibrium price and an increase in the bond yield.

Risk spread (premium)

Bond Yield = U.S. Treasury Yield
+ Default Risk Premium

Term Structure of Interest Rates

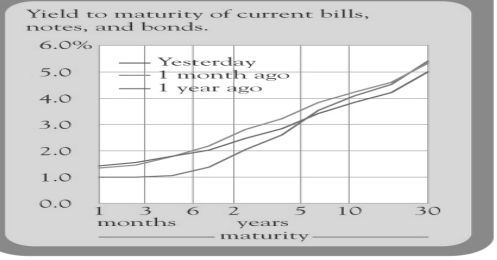
The relationship among bonds with the same risk characteristics but different maturities is called the term structure of interest rates.

A plot of the term structure, with the yield to maturity on the vertical axis and the time to maturity on the horizontal axis, is called the yield curve.

Term Structure of Interest Rates

Figure 7.4 The U.S. Treasury Yield Curve

The figure plots the yields on Treasury bills and bonds for August 27, 2004.



Term Structure of Interest Rates

Term Structure “Facts”

- Interest Rates of different maturities tend to move together
- Yields on short-term bond are more volatile than yields on long-term bonds
- Long-term yields tend to be higher than short-term yields.

Term Structure of Interest Rates

Expectations Hypothesis

- Bonds of different maturities are perfect substitutes for each other.

An investor with a two-year horizon.

- Buy a 2 year bond or
- Buy a one year bond and another one year bond in one year.

Term Structure of Interest Rates

Total return from 2 year bonds over 2 years

$$(1+i_{2y})(1+i_{2y})$$

Return from one year bond and then another one year bond

$$(1+i_{1y})(1+i^{e}_{1y})$$

Term Structure of Interest Rates

If one and two year bonds are perfect substitutes, then:

$$(1+i_{2y})(1+i_{2y})=(1+i_{1y})(1+i^{e}_{1y})$$

Or

$$i_{2y}=\frac{i_{1y}+i^{2}_{1y}}{2}$$

Term Structure of Interest Rates

•Or in general terms

$$i_{nt} = \frac{i_{1t} + i^e_{1t+1} + i^e_{1t+2} + ... + i^e_{1t+n-1}}{n}$$

Term Structure of Interest Rates

Expectations Theory can not explain why long-term rates are usually above short term rates.

Term Structure of Interest Rates

Liquidity Premium Theory

The yield curve's upward slope is explained by the fact that long-term bonds are riskier than short-term bonds. Bondholders face both inflation and interest-rate risk. The longer the term of the bond, the greater both types of risk.

Term Structure of Interest Rates

Liquidity Premium Theory

$$i_{nt} = rp_n + \frac{i_{1t} + i^e_{1t+1} + i^e_{1t+2} + ... + i^e_{1t+n-1}}{n}$$

Chapter 7

End of Chapter