BESLEY + BRIGHAM



CORPORATE FINANCE



CHAPTER 5 THE COST OF MONEY (INTEREST RATES)

Learning Outcomes

- LO.1 Describe the cost of money and factors that affect the cost of money.
- LO.2 Describe how interest rates are determined.
- LO.3 Describe a yield curve and discuss how a yield curve might be used to forecast future interest rates.

Learning Outcomes (cont.)

- LO.4 Discuss how government actions and general business activity affect interest rates.
- LO.5 Describe how changes in interest rates (returns) affect the values of stocks and bonds.

Realized Returns (Yields)

 $Yield = \frac{Dollar return}{Beginning value} = \frac{Dollar income + Capital gains}{Beginning value}$

Dollar income + (Ending value - Beginning value)

Beginning value

Factors that Affect the Cost of Money

- Production opportunities
- Time preferences for consumption
- O Risk
- O Inflation

Interest Rate Levels

O Interest Rates as a Function of Supply and Demand



Interest Rate Levels



Rate of Return (Interest Rate)



Determinants of Market Interest Rates



"Real" versus "Nominal" Rates

- r = the nominal rate of any investment, which might include a risk premium (RP)
- r* = the real risk-free rate of return, which does not include inflation
- r_{RF} = nominal risk-free rate, which includes an inflation premium, IP, that is equal to the *average* inflation rate expected during the life of the investment

$$\circ$$
 r_{RF} = r* + IF

$$\circ$$
 r = r_{RF} + RP

Premiums Added to r* for Different Types of Debt

- IP = Inflation premium
- O DRP = Default risk premium
- O LP = Liquidity premium
- O MRP = Maturity risk premium

 $r = r_{RF} + [DRP + LP + MRP]$ $r = (r^* + IP) + [DRP + LP + MRP]$

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Premiums Added to r* for Different Types of Debt

Short-Term (S-T) Treasury: only IP for S-T inflation
Long-Term (L-T) Treasury: IP for L-T inflation, MRP
S-T corporate: Short-Term IP, DRP, LP
L-T corporate: IP, DRP, MRP, LP

The Term Structure of Interest Rates

- Term structure—the relationship between interest rates (or yields) and maturities
- Yield curve—a graph of the term structure.

U.S. Treasury Bond Interest Rates on Different Dates

Term to	Interest Rates					
Maturity	July 2006	February 2007	September 2008			
3 months	5.0%	5.2%	0.9%			
1 year	5.1	5.0	1.9			
5 years	5.1	4.7	2.9			
10 years	5.1	4.7	3.7			
20 years	5.3	4.9	4.3			

Source: Federal Reserve, http://www.federalreserve.gov

U.S. Treasury Bond Interest Rates on Different Dates (Yield Curves)



Three Explanations for the Shape of the Yield Curve

- O Liquidity Preference Theory
- O Market Segmentation Theory
- O Expectations Theory

Liquidity Preference Theory

- Everything else equal, investors (lenders) prefer S-T securities to L-T securities because S-T securities are subject to less interest rate risk, thus are more easily bought and sold in the market.
- As a result, S-T rates should be lower than L-T rates, and the yield curve should be slope upward.

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Market Segmentation Theory

- Borrowers and lenders have preferred maturities, generally either S-T or L-T.
- Slope of yield curve depends on supply and demand for funds in both the L-T and S-T markets (curve could be flat, upward, or downward sloping).

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Expectations Theory

- Shape of the yield curve depends on investors' expectations about future inflation rates.
- If inflation is expected to increase, S-T rates will be lower than L-T rates—the yield curve will slope upward (a normal yield curve).
- If inflation is expected to decrease, S-T rates will be higher than L-T rates—the yield curve will slope downward (an inverted yield curve).

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Forecasting Interest Rates: Expectations Theory

 $\begin{array}{l} \text{Inflation} \\ \text{premium} = \text{IP}_{n} = \frac{\text{Infl}_{1} + \text{Infl}_{2} + \ldots + \text{Infl}_{n}}{n} \\ \text{Infl}_{t} = \text{inflation expected in Year t} \end{array}$

Forecasting Interest Rates: Expectations Theory

Yield (%) on an $= \frac{R_1 + R_2 + ... + R_n}{n - year bond}$

 $R_{t} = one-year interest rate in Year t$ $= (r^{*} + IP_{t}) + [DRP + LP + MRP]$

Forecasting Interest Rates: Example

• Following are investors' inflation expectations for the next three years:

	Expected Annua (One-Year)	al Expec Rate f	ted Average Inflation From Jan 2 of Year 1
Year	Inflation Rate	to Dec	. 31 of Indicated Year
1	2.0%	$IP_1 =$	(2%)/1 = 2.0%
2	4.0	$IP_2 =$	(2% + 4%)/2 = 3.0%
3	6.0	$IP_3 = (2\%)$	6 + 4% + 6%)/3 = 4.0%

Forecasting Interest Rates: Example

• Suppose the real risk-free rate, r*, is 3%:

Bond Type	Real Risk-Free Rate (r*)	2	Inflation Premium $IP_t = Average$ Expected Inflation	ſ	Nominal Rate for Each Type of Bond, r _{RF}
1-year	3.0%	+	2.0%	=	5.0%
2-year	3.0	+	3.0%	=	6.0%
3-year	3.0	+	4.0%	=	7.0%

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Other Factors That Influence Interest Rate Levels

- Federal Reserve Policy
- Federal deficits
- International Business (Foreign Trade Balance)
- O Business Activity

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Interest Rate Levels and Stock Prices

- The higher the rate of interest, the lower a firm's profits.
- Interest rates affect the level of economic activity, and economic activity affects corporate profits.

The Cost of Money as a Determinant of Value (Preview of Asset Valuation!)



CF_t = the cash flow that the asset is expected to generate in Period t

= the cost of funds; the required rate of return