CHAPTER 7
Bonds and Their Valuation

- Key features of bonds
- Bond valuation
- Measuring yield

7-1

What is a bond?

- A long-term debt instrument in which a borrower agrees to make payments of principal and interest, on specific dates, to the holders of the bond.

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Bond markets

- Primarily traded in the over-the-counter (OTC) market.
- Most bonds are owned by and traded among large financial institutions.
- Full information on bond trades in the OTC market is not published, but a representative group of bonds is listed and traded on the bond division of the NYSE.

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Key Features of a Bond

- Par value – face amount of the bond, which is paid at maturity (assume $1,000).
- Coupon interest rate – stated interest rate (generally fixed) paid by the issuer. Multiply by par to get dollar payment of interest.
- Maturity date – years until the bond must be repaid.
- Issue date – when the bond was issued.
- Yield to maturity - rate of return earned on a bond held until maturity (also called the "promised yield").

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Effect of a call provision

- Allows issuer to refund the bond issue if rates decline (helps the issuer, but hurts the investor).
- Borrowers are willing to pay more, and lenders require more, for callable bonds.
- Most bonds have a deferred call and a declining call premium.

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What is a sinking fund?

- Provision to pay off a loan over its life rather than all at maturity.
- Similar to amortization on a term loan.
- Reduces risk to investor, shortens average maturity.
- But not good for investors if rates decline after issuance.

7-6

Other types (features) of bonds

Convertible bond ± may be exchanged for common stock of the firm, at the holder's option.

Warrant ± long-term option to buy a stated number of shares of common stock at a specified price.

Putable bond ± allows holder to sell the bond back to the company prior to maturity.

Income bond ± pays interest only when interest is earned by the firm.

Indexed bond ± interest rate paid is based upon the rate of inflation.

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Using a financial calculator to value a bond

This bond has a $1,000 lump sum due at t = 10, and annual $100 coupon payments beginning at t = 1 and continuing through t = 10, the price of the bond can be found by solving for the PV of these cash flows.

	N	I/YR	PV	PMT	FV
INPUTS	10	10		100	1000
OUTPUT			-1000		

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An example: Increasing inflation and k_d

Suppose inflation rises by 3%, causing k_d = 13%. When k_d rises above the coupon rate, the bond's value falls below par, and sells at a discount.

	N	I/YR	PV	PMT	FV
INPUTS	10	13		100	1000
OUTPUT			-837.21		

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An example: Decreasing inflation and k_d

Suppose inflation falls by 3%, causing k_d = 7%. When k_d falls below the coupon rate, the bond's value rises above par, and sells at a premium.

	N	I/YR	PV	PMT	FV
INPUTS	10	7		100	1000
OUTPUT			-1210.71		

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What is the YTM on a 10-year, 9% annual coupon, $1,000 par value bond, selling for $887?

Must find the k_d that solves this model.

$$V_B = \frac{INT}{(1+k_d)^1} + \ldots + \frac{INT}{(1+k_d)^N} + \frac{M}{(1+k_d)^N}$$

$$\$887 = \frac{90}{(1+k_d)^1} + \ldots + \frac{90}{(1+k_d)^{10}} + \frac{1{,}000}{(1+k_d)^{10}}$$

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Using a financial calculator to find YTM

Solving for I/YR, the YTM of this bond is 10.91%. This bond sells at a discount, because YTM > coupon rate.

	N	I/YR	PV	PMT	FV
INPUTS	10		- 887	90	1000
OUTPUT		10.91			

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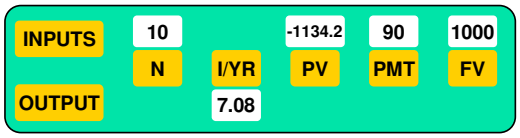
Find YTM, if the bond price was $1,134.20.

- Solving for I/YR, the YTM of this bond is 7.08%. This bond sells at a premium, because YTM < coupon rate.



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Definitions

$$\text{Current yield (CY)} = \frac{\text{Annual coupon payment}}{\text{Current price}}$$

$$\text{Capital gains yield (CGY)} = \frac{\text{Change in price}}{\text{Beginning price}}$$

$$\text{Expected total return} = \text{YTM} = \left(\begin{matrix}\text{Expected}\\ \text{CY}\end{matrix}\right) + \left(\begin{matrix}\text{Expected}\\ \text{CGY}\end{matrix}\right)$$

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What is reinvestment rate risk?

- Reinvestment rate risk is the concern that k_d will fall, and future CFs will have to be reinvested at lower rates, hence reducing income.

  EXAMPLE: Suppose you just won $500,000 playing the lottery. You intend to invest the money and live off the interest.

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Conclusions about interest rate and reinvestment rate risk

	Short-term AND/OR High coupon bonds	Long-term AND/OR Low coupon bonds
Interest rate risk	Low	High
Reinvestment rate risk	High	Low

- CONCLUSION: Nothing is riskless!

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