A Bond is a security that is issued in connection with a borrowing arrangement.

- The borrower issues (sells) a bond to the lender for some amount of cash.
- The bond is in essence the “IOU” of the borrower.
- The arrangement obligates the issuer to make specified payments to the bondholder on specified dates.
- A typical coupon bond obligates the issuer to make semi-annual payments of interest, called coupon payments, to the bondholder for the life of the bond.
- When the bond matures, the issuer repays the debt by paying the bondholder the bond’s Par Value (or equivalently, its Face Value).
- The coupon rate of the bond serves to determine the interest payment. It is simply a bond’s annual payment per dollar of par value.
- The coupon rate, maturity date, and par value of the bond are part of the bond indenture, which is the contract between the issuer and the bondholder.

**Example:**

Par Value: 1,000 USD
Coupon rate: 8%

- Then, the issuer pays 80USD per year to the bondholder for the stated life of the bond (i.e. 30 years).
- The 80USD payment typically comes in two semiannual installments of 40USD each.
- At the end of 30 years, the issuer also pays the 1,000USD par value to the bondholder.

There are also zero-coupon bonds that have no coupon payments. In this case, investors do not receive any interest payments, they only receive par value at the maturity. The bond has a coupon rate of zero.

But these bonds are issued at prices considerably below par value, and the investor’s return comes solely from this difference.
CHAPTER 9. BOND PRICES AND YIELDS

Treasury Bonds and Notes

Treasury Notes: Range up to 10 years
Treasury Bonds: Range from 10 to 30 years

The major distinction between T-notes and T-Bonds is that, in the past, some T-Bonds were callable for a given period, usually during the last 5 years of the bond’s life.

Callable Bonds are those that may be repurchased by the issuer at a specified call price during the call period.

Figure 9.1 p. 297: Highlighted Bond

Maturity: October 2006
Coupon rate: 6.5%
Par Value: 1,000USD

Interest Payment: 65USD per year
Two semi-annual installments: 32.5USD in April and October each year

Bid Price: 109:08 $109 + 8/32 = 109.25% of par value$ $= 109.25\% \times 1,000 = 1,092.25USD$

Ask Price: 109:11 $109 + 11/32 = 109.344\% \times 1,000 = 1,093.44 \text{ USD}$

Case 1. Show how bond is issued when rate is $7^{58}/8$ in Feb 07 of Figure 1.

Accrued Interest and Quoted Bond Prices

The bond prices in the financial pages are not actually the prices that investors pay for the bond. This is because the quoted price does not include the interest between coupon payment dates.
CHAPTER 9. BOND PRICES AND YIELDS

Corporate Bonds

- Like the government, corporations borrow money by issuing bonds.
- Like Treasury Bonds, corporate bonds trade in increments of 1/32 point.

$$\text{Current yield} = \frac{\text{Annual coupon payment}}{\text{bond price}}$$

Current yield only measures the annual interest income the bondholder receives as a percentage of the price paid for the bond. It ignores the fact that an investor who buys the bond for 997.50 USD will be able to redeem it for 1,000 USD on the maturity date.

Current yield for AT&T = \frac{81.25 USD}{997.50 USD} = 8.1\% \quad \text{Figure 9.2}

Prospective price appreciation or depreciation does not enter the computation of the current yield.

Trading volume shows that 300 bonds are traded on that day in Figure 9.2 for AT&T.

The last column shows the change from yesterday's closing price.

Like government bonds, corporate bonds sell in units of 1,000 USD par value but are quoted as a percentage of par value.

Call Provisions on Corporate Bonds

While the Treasury no longer issues callable bonds, some corporate bonds are issued with call provisions.

This allows the issuer to repurchase the bond at a specified call price before the maturity date.

For example,

If a company issues a bond with a high coupon rate when market interest rates are high, and interest rates later fall, the firm might like to retire the high coupon debt and issue new bonds at a lower coupon rate to reduce interest payments. The proceeds from the new bond issue are used to pay for the repurchase of the existing higher coupon bonds at the call price. This is called Refunding.
CHAPTER 9. BOND PRICES AND YIELDS

Convertible Bonds

Convertible bonds give bondholders an option to exchange each bond for a specified number of shares of common stock of the firm.

Thus, conversion ratio gives the number of shares for which each bond may be exchanged.

Example:

Par Value of Convertible Bond: 1,000USD

Convertible into 40 shares of common stock of the firm.

If the current stock price is 20USD, then conversion is NOT PROFITABLE since the value of stocks will be 800 USD (40 x 20).

If price increases to 30 USD, then, it will be PROFITABLE since its value will be 1,200 USD (40 x 30).

If the bond is currently selling at 950USD, its premium will be 950-800 = 150USD.

So, the conversion premium is the excess of bond value over its conversion value.

Puttable Bonds

These are the bonds that the holder may choose either to exchange for par value at some date or to extend for a given number of years.

For example, if the bond’s coupon rate exceeds market yields, then, the bondholder may choose to extend the bond’s life otherwise to claim its principal, which can be invested at current yields.

Floating Rate Bonds

These are the bonds with coupon rates periodically reset according to a specified market rate.

The risk associated with these bonds is that if yields get higher and company deteriorates over the years, this will be bad for the company. In this case, the price of the bond would fall.
CHAPTER 9. BOND PRICES AND YIELDS

Preferred Stocks

- They are considered to be equity
- Included in the fixed income universe
- Promises to pay a specified stream of dividends, mainly a fixed dividend.
- Unlike corporate bonds, the failure to pay those dividends does not result in corporate bankruptcy.
- Only, owed dividends cumulate and common stockholders do not receive any dividends until preferred stockholders are paid.

Bond Pricing

Bond Value = PV of Coupons + PV of Par Value

\[
\text{Bond Value} = \sum_{t=1}^{T} \frac{\text{Coupon}}{(1+r)^t} + \frac{\text{Par Value}}{(1+r)^T}
\]

When coupon rates are equal to market interest rates, the bond price equals par value; otherwise, it would not sell at its par value.

Example:

- Coupon rate: 8% p.a.
- Market interest rate: 8% p.a.
- \( T = 30 \) yrs
- Par Value = 1,000USD
- Semiannual coupon payments: \((1000 \times 0.08) / 2 = 40USD\)

- Then, the value of the bond is:

\[
\text{Price} = \sum_{t=1}^{60} \frac{40}{(1.04)^t} + \frac{1000}{(1.04)^{30}}
\]

Price = $904.94 + $95.06 = $1,000
CHAPTER 9. BOND PRICES AND YIELDS

But, what if market interest rates rise to 10% p.a.? Then,

\[
\text{Price} = \sum_{t=1}^{60} \frac{\$40}{(1.05)^t} + \frac{\$1,000}{(1.05)^{60}}
\]

Price = $757.17 + $53.54 = $810.71

Then, the bond’s price would fall by $189.29 to $810.71 due to the fact that at a higher interest rate, PV of the payments to be received by the bondholder is lower; therefore, the bond price will fall as market rates increase.

- So, there is inverse relationship between bond prices and market interest rates.
- See Figure 9.3

BONDS: Yield to Maturity

YTM is the discount rate that makes the PV of a bond’s payments equal to its price.

Example:

A bond is selling at $1,276.76

Coupon rate is 8%

Maturity is 30 years making semiannual payments.

Then, YTM is:

\[
$1,276.76 = \sum_{t=1}^{60} \frac{\$40}{(1 + r)^t} + \frac{\$1,000}{(1 + r)^{60}} \quad r = 3\% \times 2 = 6\% \text{ p.a.}
\]

Semianual rate is 6% as seen in newspapers etc..

But effective annual yield is compounded rate which is \((1 + 0.03)^2 = 1.0609 = 6.09\% \text{ p.a.}\)

YTM can only be calculated in financial calculators and softwares (MS Excel).