



CORPORATE FINANCE 1

BFC2140

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Notes

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Valuation of Bonds and Equities

Valuation of Financial Assets

- Basic principle of valuation:

Value of financial asset = PV of expected future cash flows

Information required for valuation:

- Expected future cash flows
 - Shares – Dividends
 - Bonds – Coupon payments and principal
- Required rate of return or discount rate

Features of Bonds

Bond: Certificate showing that a borrower owes a specified sum.

- Tradable

Cash flows associated with a debt investment (debentures, bonds) are:

- Interest
- Face value at maturity

Coupon rate: Rate the company promises to pay on a regular basis – $\text{Coupon Payment} / \text{Face Value}$.

Coupon payment: The stated interest payments – $\text{Coupon Rate} \times \text{Face Value}$.

- Usually payable every year or half-yearly

Face value (par value): The principal amount repayable at maturity.

Maturity: The specified date at which the principal amount is payable.

Yield to Maturity (YTM):

- The average rate of return obtained by investors if:
 - The bond is purchased now and held until maturity; and
 - If there is no default on any of the promised payments
- The interest rate required in the market on a bond
- Discount rate used in PV formula

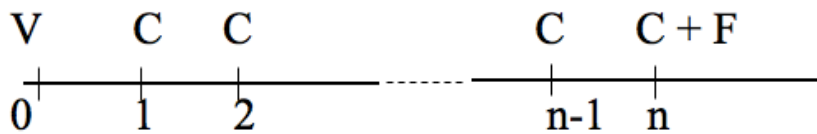
Bond issuer: Person or company who issues the bond.

- The borrower
- Responsible for coupon payment (if applicable) and face value at maturity

Bond holder: Person who **holds** to bond certificate.

- The **lender**
- Will receive coupon payment (if applicable) and face value at maturity

Cash Flows of a Typical Bond:



V = Bond value

C = Coupon

F = Face value / Principal Repayment at maturity

n = Time to maturity

Valuation of Bonds

$$P_B = \sum_{t=1}^n \frac{C_t}{(1+i)^t} + \frac{F_n}{(1+i)^n}$$

P_B = Present value of bond

C_t = Interest payment at time t

F_n = Face value (principal repayment) at maturity

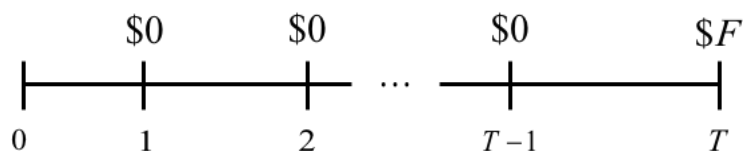
n = Number of periods to maturity

i = Market interest rate (yield to maturity)

Types of Bonds

Pure Discount Bonds

Pure Discount Bonds: Bonds which pay **no coupons** – only Face Value is returned at maturity.



$$P_B = \frac{F}{(1+i)^n}$$

P_B = Present value of bond

F = Face value (principal repayment) at maturity

n = Number of periods to maturity

i = Market interest rate (yield to maturity)

Level Coupon Bonds

Level Coupon Bonds: Bonds which pay **both coupons and Face Value** at maturity.

Value of a Level Coupon Bond = PV_{Annuity} of coupon payment + PV of face value

$$P_B = \frac{C}{i} \left[1 - \frac{1}{(1+i)^n} \right] + \frac{F}{(1+i)^n}$$

P_B = Present value of bond

C = Interest payment at time t

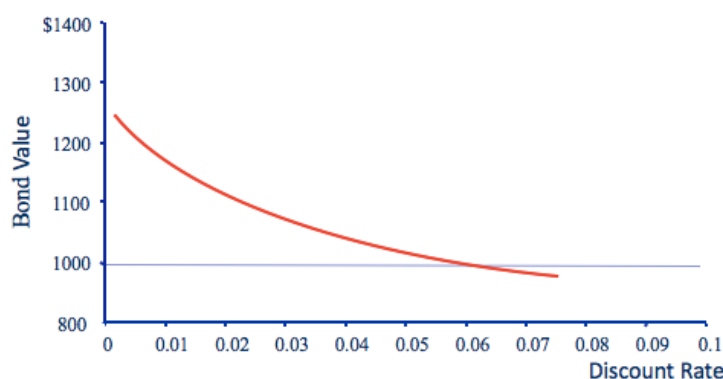
F = Face value (principal repayment) at maturity

n = Number of periods to maturity

i = Market interest rate (yield to maturity)

Yield to Maturity and Bond Value

- When Coupon Rate (C) = Yield to Maturity (i): **Bond Price = Par Value**
- When Coupon Rate (C) > Yield to Maturity (i): **Bond Price > Par Value (Premium Bond)**
- When Coupon Rate (C) < Yield to Maturity (i): **Bond Price < Par Value (Discount Bond)**



Interest Rates and Bond Value

- There is an **inverse relationship** between interest rates and bond value
 - **Interest rates ↑: Value of bond ↓**
 - **Interest rates ↓: Value of bond ↑**

Interest Rate Risk and Bonds

Interest rate risk: The **chance that interest rates will change** in the future, thereby **changing the value** of the asset.

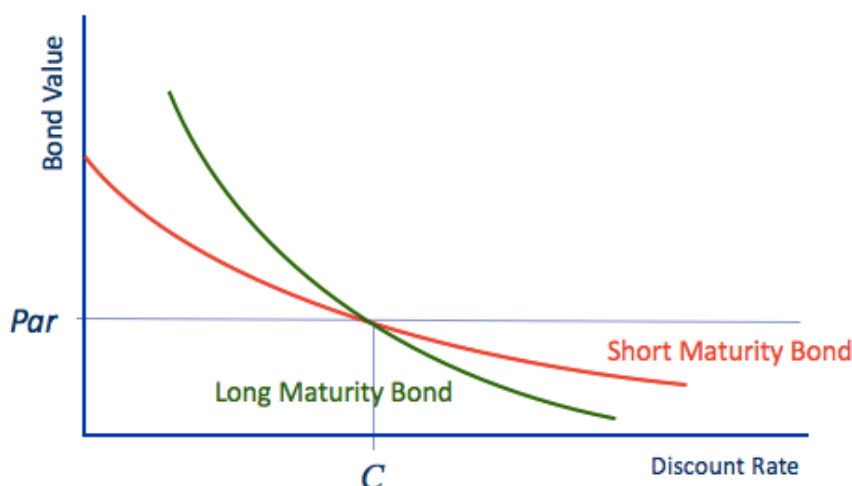
Reasons:

- **Price effects:** Valuation of CFs being carried out using a new market interest rate
→ different price
- **Reinvestment effects:** The coupons can be invested at the new market interest rate

Determinants of Interest Rate Risk

1. Term to maturity

- Longer bonds are usually more price-sensitive to interest rates
→ Longer term to maturity: Greater effect of new interest rate through compounding



2. Level of coupon

- Lower coupon bonds are usually more price sensitive to interest rates
→ Lower coupon rate: Greater effect of new interest rate on bond price



3. Default risk

- **Default risk:** The chance that the bond issuer will **fail to make a coupon or principal payment**.
- **Default risk ↑: Value of bond ↓**
- The **financial health** of a company is assessed to determine the **chance** of such a default
- These assessments are summarised by **credit ratings**, provide by rating agencies such as S&P and Moody's
- The **higher** the market's assessment of the **probability of default**, the **higher** the **required rate of return** (or expected yield) on the debt

Shares

Shares / Equity Securities: A company's certificates of ownership.

Secondary Markets

- Outstanding shares of a company are bought and sold among investors in the secondary markets
- From an investor's perspective, secondary markets provide **marketability at a fair price** for shares
- An active secondary market enables companies to sell their new debt or equity issues at lower funding costs

Share Valuation

- Valuation of shares is similar to valuation of bonds – it involves the calculation of the **PV of future cash flows**
- However, share valuation is more complex because:
 - **Uncertainty** of promised cash flows
 - Shares have **no maturity**
- The expected cash flows to be received from a share are **all future dividends**
 - It is important to consider **dividend growth** in share valuation

Methods of Share Valuation

Valuation based on dividends: **Dividends are discounted to a present value** to provide a share valuation.

Valuation based on earnings (EPS): **Earnings are capitalised into a share value** using a **price-earnings ratio**.

Dividend Based Share Valuation

Three methods:

- Constant Dividend Valuation
- Constant Dividend Growth Valuation
- Variable Dividend Growth Valuation

Constant Dividend Valuation

- In share valuation, the constant dividend assumption is the simplest that can be made, where $D_0 = D_1 = D_2 = D_3 \dots$
- Valuation applies the **perpetuity formula**:

$$P_0 = \frac{D}{R}$$

P_0 = Today's share price

D = Dividend amount

R = Discount rate

- This model can be applied for shares that pay a **constant dividend** e.g. preference shares

For non-perpetuating preference shares:

Preference Share Price = PV(Dividend Payments) + PV(Par Value)

$$PS_0 = \frac{C}{i} \left[1 - \frac{1}{(1+i)^n} \right] + \frac{P}{(1+i)^n}$$

PS_0 = Preference share price

D = Annual preference share dividend payment

P = Stated (par) value

n = Number of periods to maturity

i = Yield to maturity

Constant Dividend Growth Valuation

- It is more realistic to assume that dividends will **grow**
- If dividends are expected to grow at a constant rate:

$$P_0 = \frac{D_0(1+g)}{(R-g)}$$

P_0 = Today's share price

D_0 = Dividend amount in Period 0 – note $D_0(1 + g) = D_1$

R = Discount rate

g = Expected constant growth rate in dividend per share

Variable Dividend Growth Valuation

- Allows for **different growth rates**
- It is possible for dividends to grow at a high rate for a number of years but not indefinitely
- This model assumes dividends will grow at a constant rate some time in the future
- Uses a mixture of the Constant Dividend Growth Valuation model and other discounting techniques

Earnings Based Share Valuation

- **Price-earnings ratio** is often used to value shares

Share Value = P/E x EPS

P/E = Price/earnings ratio

EPS = Earnings per share

Earnings and Dividends

- Earnings and dividends are related
- A company's after-tax earnings (profit) must be either **retained** or **paid out as dividends**:

$$D_t = (1 - b)E_t$$

D_t = Dividend amount in Pe

b = Proportion of earnings retained

E_t = Period t earnings per share

- Earnings tend to be **more volatile** than dividends, requiring skill and experience to forecast

Factors Influencing P/E Ratio

- **Growth opportunities**: The **greater** the opportunities for growth, the **higher** the P/E ratio

- Risk: The riskier the investment, the lower the P/E ratio

Summary

- The price of debt securities varies inversely with the interest rate
- Interest rate risk on a bond depends on bond maturity, level of coupon and default risk
- Financial assets such as shares are streams of cash flows that can be valued by summing the present value of these cash flows
- Ordinary shares can be valued based on:
 - Expected dividend growth; and
 - Earnings