

# Valuation of securities

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# SECURITY

- According to the Securities Contract Regulation Act 1956 A **security** is a fungible, negotiable financial instrument representing financial value.
- Securities are broadly categorized into debt securities and equity securities.
- debt securities - banknotes, bonds and debentures.
- equity securities- common stocks and derivative contracts.
- Physically it can be in a paper form or can be in electronic form.
- These assets are traded in the capital markets

# Valuation

- It is a systematic process through which the price to sell the security is established.
- Also referred to as intrinsic value (present value) of the security
- Every financial assets depends on its future cash flows that come with it, for its value.
- The present value of all the future cash flows of a security is the value of that security.
- **Value is what an asset is worth today in terms of its potential benefits.**

# Concept of Value

- 1. Book Value:** It is an accounting concept in which assets are valued at historical cost and are depreciated over the years.
- Book value = cost of equipment - Accumulated depreciation.
  - Book value of a share = Net worth / no. of equity shares outstanding.
  - Net worth = equity shares capital (paid-up) + resources (reserve & surplus)
- or
- Net worth = book value of assets - book value of liabilities


- Book values are useful to help track profits & losses. Means if you have owned an investment for a long period of time, the difference between book value & market value indicates the profit or loss incurred.
- The book value of an investment is the price paid for a security or debt investment when the stock is sold. i.e,  $SP - BV =$  capital gain or loss.

# Capital gain or loss

- A **capital gain** is a profit that results from investments into a capital asset, such as *stocks*, *bonds* or *real estate*, which exceeds the purchase price.
- It is the difference between a higher selling price and a lower purchase price, resulting in a financial gain for the investor .
- Capital gains may refer to "investment income" .
- A capital loss arises if the proceeds from the sale of a capital asset are less than the purchase price.

## 2. Liquidation Value:

- The amount that can be realised if the company closes down its operation.
- The actual amount that can be realised when an asset is sold.
- The liquidation value of a equity stock is the actual amount that would be received if all the firms equity shares were sold at their market value, liabilities were paid.
- Liquidation value per share =  $(\text{sales proceeds realized} - \text{liquidation expenses} - \text{liabilities}) / \text{no. of equity shares outstanding}$ .



**3. Going concern value:** it is the value that a firm can realize if it is sold its business as a continuing operating condition.

**4. Market Value:** The current market price at which the assets can be bought or sold in market. Market price (value) per share is always higher than book value for growing firms.



## **5. Intrinsic value:-**

- Value of bond & equity stock is computed based on the intrinsic value approach.
- It is the present value of the future cash inflows expected from a security over its holding period.
- Present value is computed by discounting future cash inflows at an appropriate rate of interest is called intrinsic value .
- It is also called economic value.

## **6. Replacement value-**

Replacement value is the amount that a company would be required to spend if it were replace its existing assets in the current condition.

# RETURN

- A) EXPECTED RATE OF RETURN
  
- B) REQUIRED RATE OF RETURN

## A) EXPECTED RATE OF RETURN

- It is the rate of return expected on an asset or a portfolio.
- It is the return what you expect the return to be.
- There is no guarantee that it will be actual return.
- Expected rate of return depends on the level of risk associated with the given investment.
- If Risk more then expected rate of return will be more & vise-versa.

## B) REQUIRED RATE OF RETURN

- It is the minimum rate of return that an investment must provide or must be expected to provide in order to cover its cost of capital.
- Required rate of return varies from investment to investment.

# BOND


- In general, fixed-income securities are classified according to the length of time before maturity. These are the three main categories:

**Bills** - debt securities maturing in less than one year.

**Notes** - debt securities maturing in one to 10 years.

**Bonds** - debt securities maturing in more than 10 years.

- **A bond** is a long term contract under which a borrower (issuer) agrees to make payments of interest and principal, on specific dates, to the holder of the bond.
- It is a long-term debt instrument issued by a corporation or government.
- The current value of a bond is defined as the **Present Value** of all the future cash flows to be received by the bondholder.

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- Bonds are sometimes called **fixed income securities**.
  - More specifically, *bonds* mature in more than 10 years.
  - All of the future payments to be made on the bond are fixed or predetermined, as stated in the bond contract.

# BONDS

## Features:-

- ❖ Face value - Value written on the bond.
- ❖ Fixed / floating interest rate
- ❖ Specified maturity date
- ❖ Stated redemption value
- ❖ Traded in the stock market



# Bond Terminology

- There are several terms with which you must be familiar to solve bond valuation problems:
  - 1.Face Value or Par value-** This is the principal amount (nominally, the amount that was borrowed) stated on the face of the bond. This is the amount that will be repaid at maturity.
  - 2.Coupon Rate or Nominal rate -** This is the stated rate of interest on the bond. It is fixed for the life of the bond.bond holder receives a fixed rate of interest (per year) on par or face value of bond.

**3.Maturity Date** - This is the date after which the bond no longer exists. It is also the date on which the loan is repaid and the last interest payment is made.

**4.Default risk:** Risk that issuer will not make interest or principal payments.

**5. Required rate of return :** It is the minimum rate of return that an investment must provide or must be expected to provide in order to cover its cost of capital. Required rate of return varies from investment to investment.

# DIFFERENT TYPES OF BOND

- 1. Government bond
- 2. Municipal bond
- 3. Corporate bond

# Government Bonds

- Governments are the largest issuers of bonds in the world .
- Government bonds have a more or less zero risk of default and this, combined with the massive volume issued.
- government bonds , or Treasury bonds, means they can be easily bought and sold – they are what is called, liquid.

# Municipal Bond

- Municipal bonds, known as "munis".
- The major advantage to munis is that the returns are free from federal tax.
- Because of these tax savings, the yield on a 'munis' is usually lower than that of a taxable bond.
- issued by cities, states, and other local government entities. As a result, they generate dividends that are free from federal income taxes.

# Corporate Bonds

- A company can issue bonds just as it can issue stock.
- Generally, a short-term corporate bond is less than 5 years; intermediate is 5 to 12 years, and long term is over 12 years.
- Corporate bonds are characterized by higher yields because there is a higher risk of a company defaulting than a government.
- The upside is that they can also be the most rewarding fixed-income investments because of the risk the investor must take on.
- The company's credit quality is very important: the higher the quality, the lower the interest rate the investor receives.

## Other variations on corporate bonds include-

1. convertible bonds- which the holder can convert into stock.
2. callable bonds- which allow the company to redeem an issue prior to maturity.
3. Junk bond- Junk bonds are high-yield instruments with a significant probability of default.
  - In the bond markets the credit rating agencies actually assign a credit rating to each bond .
  - You know what level of credit risk is attached to a particular corporate bond because the rating agency's rating tells you.
  - The higher the risk, the higher the return. And once you get involved with high yield bonds formally known as 'junk bond' now known as 'non-investment grade', that is a lot of risk.


#### 4. zero-coupon bond –

- A debt security that doesn't pay interest (a coupon) but is traded at a deep discount, rendering profit at maturity when the bond is redeemed for its full face value.
- Also known as an "accrual bond" & also 'deep discount bond'
- This is a type of bond that makes no coupon payments but instead is issued at a considerable discount to par value.
- For example, let's say a zero-coupon bond with a \$1,000 par value and 10 years to maturity is trading at \$600; you'd be paying \$600 today for a bond that will be worth \$1,000 in 10 years .



# NOTES

1. Bond issued by Government do not have any risk of default.
2. Bonds of the public sector companies in India are generally secured, but are not free from the risk of default.
3. Private sectors companies issued bonds called debentures in India.
4. Company in India can issue secured & unsecured bond.
5. Unsecured bonds are called **debentures** .

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6. Risk in holding a Government bond is less than risk associated with a debenture (Bond) issued by a company.
  7. Federal government bonds, however, are unsecured.
  8. U.S. Government securities are very popular among investors.
  9. Interest rate e.i, coupon rate which are tax deductible.
  10. Most municipal bonds (bonds issued by cities and states) pay interest that is federally tax-free .

# Bonds Values and Yields

- It is relatively easy to determine the present value of a bond since its cash flows and the discount rate can be determined without much difficulty.
- If there is no risk of default, then there is no difficulty in estimating the cash flows associated with a bond
- The expected cash flows consist of annual interest payments plus repayment of principals.

# Bond with maturity

- The present value of a bond(debenture) is the discounted value of its cash flows; that is the annual interest payments plus bond's terminal, or maturity value. The discount rate is the interest rate that the investor could earn on bonds.
- By comparing the present value of bond with its current market value, it can be determined whether the bond is over valued or undervalued.
- **Note:**
- **Redeemable bond**
- The bond having maturity period is known as a Redeemable bond.

- Since most bonds involve payment of an annuity (equal interest payment each year) and principal at maturity, we can use the following formula to determine the value of a bond
- Bond value = Present value of interest payment + present value of maturity value

$$V_0 = \sum_{t=1}^n \frac{I}{(1+k)^t} + \frac{F}{(1+k)^n}$$

where I is the annual coupon payment.

k is the required rate of return.

F is the principal payable at maturity.

n is the maturity period of the bond.

- As the interest payments are made regularly and are constant in amount, they can be treated as an annuity.
- Therefore,  $V_0 = I (PVIFA_{k\%,n}) + F (PVIF_{k\%,n})$
- **Question**
- An investor purchases a bond whose face value is Rs.1,000, maturity period is 5 years and the nominal (coupon) rate of interest is 7%. The required rate of return is 8%. What should he be willing to pay now to purchase the bond if it matures at par?

Annual interest payable for 5 years = Rs.70

Principal repayable amount at the end of 5 years =  
Rs.1,000

Therefore, The intrinsic value or the present value of the bond=

$$\begin{aligned} & \text{Rs.70(PVIFA8\%, 5yrs.)} + \text{Rs.1,000(PVIF8\%,5 yrs.)} \\ & = \text{Rs.70} \times 3.993 + \text{Rs.1,000} \times 0.681 \\ & = 279.51 + 681 = \text{Rs.960.51} \end{aligned}$$

**Conclusion-** The above implies that the bond of Rs.1,000 is worth Rs.960.51 today if the required rate of return is 8%. The investor would not be willing to pay more than Rs.960.51 for the bond today.

# Relationship between Coupon Rate, Rqrd Rate and Price or value of the bond

- This bond has a \$1,000 lump sum for 10, at annual 10% coupon payments
- **AN EXAMPLE: IF 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 or issue at a discount.
- **AN EXAMPLE : IF 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.



# Relationship between Coupon Rate, Rqrd Rate and Price or value of the bond

- The basic property of a bond is that its price or value varies inversely with yield.
- Bond issue value is equals to par value when interest rate (coupon) & required return is same.
- Bond issue value is less than par value when required return is higher than the interest rate (coupon)..
- Bond issue value is more than par value when required rate is less than the interest rate (coupon).
- Coupon rate  $>$  Required Yield; Price  $>$  Par (Premium)
- Coupon rate = Required Yield; Price = Par
- Coupon rate  $<$  Required Yield; Price  $<$  Par (Discount)

## When required rate=coupon rate

- Issued 12% bond with face value of Rs. 1,000 for 6 yrs.  
required rate= 12%. Value of bond?

$$V_0 = 120(\text{PVIFA}_{6\text{yrs } 12\%}) + 1,000(\text{PVIF}_{6\text{yrs } 12\%})$$

$$(120 \times 4.111) + (1000 \times 0.507)$$

$$= 493.32 + 507$$

$$= 1000.$$

Conclusion- bond value or price = par or face value

## When required rate > coupon rate

- When required rate is 15% instead of 12% .

$$V_0 = 120(\text{PVIFA}_{6\text{yrs } 15\%}) + 1,000(\text{PVIF}_{6\text{yrs } 15\%})$$

$$(120 \times 3.784) + (1000 \times 0.432)$$

$$= 454.08 + 432$$

$$= 886.08$$

Conclusion- bond value or price is less than par or face value. (discount rate)

## When required rate < coupon rate

- When required rate is 10% instead of 12% .

$$V_0 = 120(\text{PVIFA}_{6\text{yrs } 10\%}) + 1,000(\text{PVIF}_{6\text{yrs } 10\%})$$

$$(120 \times 4.355) + (1000 \times 0.564)$$

$$= 522.60 + 564$$

$$= 1086.60$$

Conclusion- bond value or price is more than par or face value. (premium bond)

Consider a bond of KenStar Intermediaries Ltd. with the following features:

Par value : Rs.100

Coupon rate : 12%

Years to maturity: 5 years.

Find out the value of KenStar's bond

If the required rate of return is 12%.

If the required rate of return is 14%

If the required rate of return is 10%

- If the required rate of return is 12% (same as the coupon rate) the value of the bond is

$$\begin{aligned}V &= I(\text{PVIFA}_{kd, n}) + F(\text{PVIF}_{kd, n}) \\&= 12(\text{PVIFA}_{12\%, 5}) + 100(\text{PVIF}_{12\%, 5}) \\&= 12(3.605) + 100(0.567) \\&= 43.26 + 56.7 = 99.96 = 100.\end{aligned}$$

- If the required rate of return is 14% (greater than the coupon rate), then the value of the bond is

$$\begin{aligned}V_0 &= I(\text{PVIFA}_{kd, n}) + F(\text{PVIF}_{kd, n}) \\&= 12(3.433) + 100(0.519) \\&= 41.196 + 51.9 \\&= 93.1\end{aligned}$$

- If the required rate of return is 10% (less than the coupon rate), then the value of the above bond is

$$\begin{aligned}V_0 &= I(\text{PVIFA}_{kd,n}) + F(\text{PVIF}_{kd,n}) \\&= 12(\text{PVIFA}_{10\%,5}) + 100(\text{PVIF}_{10\%,5}) \\&= 12(3.791) + 100(0.621) \\&= 45.492 + 62.1 \\&= 107.59.\end{aligned}$$

# Bond Value with semi-annual interest

- The value of the bonds paying interest semi-annually

$$V_0 = \sum_{t=1}^{2n} \frac{I/2}{(1+k_d)^t} + \frac{F}{(1+k_d)^{2n}}$$

(Or)  $I / 2 (PVIFA k_d / 2, 2n) + F(PVIF k_d/2, 2n)$

where, V= value of the bond

I/2 = semi-annual interest payment

F = par value of the bond payable at maturity

$k_d/2$  = required rate of return for the half-year period

2n = maturity period expressed in half-yearly periods



- A bond of Rs.1,000 value carries a coupon rate of 10% and a maturity period of 6 years. Interest is payable semi-annually. If the required rate of return is 12%, calculate the value of the bond.

### **Solution**

$$= \text{Rs.}50(\text{PVIFA}_{6\%, 12 \text{ yrs.}}) + 1,000(\text{PVIF}_{6\%, 12\text{yrs.}})$$

$$= \text{Rs.}50(8.384) + 1,000 (0.497)$$

$$= \text{Rs.}419.2 + 497$$

$$= \text{Rs.}916.20$$

# Irredeemable bond value

- The bond having no maturity period is known as irredeemable bond
- Also know as **perpetual bond** , it may be treated as equity, not as debt.
- The formula is: 
$$V_0 = \frac{I}{k_d}$$
- Where  $V_0$  = the value of the bond
- $k_d$  = Required rate of return
- $I$  = Annual interest payable in Rs.

A company has issued 12 % perpetual bond of Rs. 1,000 each. Determine value of the bond assuming 15 % cost of debt.

$$\begin{aligned}\text{Solution- } I &= 120, k_d = 15\% \\ &120 / 0.15 \\ &= 800\end{aligned}$$

## CONCLUSION

**CORPORATIONS USE THE RRR TO DECIDE IF THEY SHOULD PURSUE A NEW PROJECT OR BUSINESS EXPANSION.**