Block

2

CORPORATE FINANCIAL MANAGEMENT

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BLOCK 2: CORPORATE FINANCIAL MANAGEMENT

The primary objective of *Corporate Financial Management* is to maximize shareholder value. Maximizing shareholder value requires managers to be able to balance capital funding between investments in projects that increase the firm's long-term profitability and sustainability, along with paying excess cash in the form of dividends to shareholders. This block covers valuation of securities, sources of long-term finance, cost of capital, capital structure theories, dividend policy, capital expenditure decisions and financial forecasting.

Unit 6: Valuation of Securities deals with the various approaches for computing the value of shares and bonds. The unit also discusses the bond value theorems, valuation of warrants and convertibles and the dividend capitalization and ratio approaches of equity valuation

Unit 7: Sources of Long term Finance describes the various sources from which long-term finances can be procured. Achieving the goals of corporate financial management requires that any investment be financed appropriately with a right mix between debt and equity. Management must identify the "optimal mix" of financing which results in the minimization of the cost of financing.

Unit 8: Cost of Capital and Capital Structure Theories discusses the costs associated with the various sources of finance. The computation of individual cost of each source of finance and the calculation of weighted average cost of capital is detailed in the unit. The unit describes the effect of cost of capital on the capital structure of a firm. It also explains the various theories of capital structure and the optimum capital structure.

Unit 9: Capital Expenditure Decisions deal with the process of capital budgeting (or capital expenditure), appraisal of project from various angles and the different methods of appraisal. The various types of discounting and non-discounting appraisal techniques are discussed in the unit.

Unit 10: Dividend Policy deals with the dividend decisions of a firm. It is concerned with policies regarding the payment of a cash dividend in the present, paying an increased dividend at a later stage, or investing cash in the business to achieve further growth. The various theories of dividend policy are explained.

Unit 11: Financial Forecasting describes the need for and the benefits of financial forecasting. The popular forms of forecasting such as pro-forma statements and budgets are outlined in the unit. The unit also discusses the concepts of external funding requirement, sustainable growth rate and earnings guidance. The limitations that surround the forecasting process are also taken up for discussion.

Unit 6

Valuation of Securities

Structure

"The inescapable fact is that the value of an asset, whatever its character, cannot over the long term grow faster than its earnings do."

– Warren Buffett

6.1 Introduction

Does this maxim apply to securities too? Let's find out by learning the valuation of securities. The ultimate goal of any individual or a firm is maximization of profits or rate of return or the market value of one's investments. Thus, investment management is an on-going process that needs to be constantly monitored by way of information as this may affect the value of securities or rate of returns of such securities. Therefore, a finance manager needs to have basic knowledge and understanding of the framework of security valuation, which is essentially based on conceptual understanding of time value of money and risk-return relationship. Hence, while making valuation judgments about securities, the analyst constantly applies a process, which may achieve the following:

a. A true picture of a company over a representative time span

b. An estimation of current normal earning power and dividend payout

c. Estimate of future profitability and growth and the reliability of such expectations.

d. Translation of all these estimates into valuation of the company and its securities.

The concepts of time value of money studied in Unit 3 provide a fundamental background for the valuation of bonds and stocks.

6.2 Objectives

After reading through the unit, you should be able to:

- Identify the various concepts and measures of valuation of securities – both equity and debt - that aid in financial decision making
- Define the terms associated with bonds to understand their usage in bond valuation
- Apply the bond value theorems to analyse the factors that affect valuation of bonds
- Analyze warrants and convertibles as alternative investment options
- Derive investment decisions by using various equity valuation models

6.3 Valuation Concept

An investor, who subscribes to the shares or securities of a company, has two main objectives:

- To ensure that his investment in the company grows
- To ensure that he receives a reasonable return on his investment

Valuation of securities is essential to check whether the above objectives are being realized or not. It also becomes the basis for the decision to buy, hold or sell the securities. This concept is also equally significant for a finance manager as knowledge of the values of stocks and bonds is a precursor to achieving the objective of maximization of the value of the firm.

A security can be regarded simply as a series of dividends or interest payments receivable over a period. Therefore, value of any security can be defined as the present value of these future cash streams i.e., the intrinsic value of an asset is equal to the present value of the benefits associated with it. Symbolically, it can be represented as:

$$V_0 \text{ (or } P_0) \text{ i} = \frac{C_1}{(1+k)^1} + \frac{C_2}{(1+k)^2} + \ldots + \frac{C_n}{(1+k)^n}$$

$$= \sum_{t=1}^{n} \frac{C_t}{(1+k)^t} \qquad \ldots\ldots(1)$$

where, V_0 = Value of the asset at time zero

P_0 = Present value of the asset

C_t = Expected cash flow at the end of period t

k = Discount rate of or required rate of return on the cash flows

n = Expected life of an asset.

Example: RIL's Market Capitalization

Market capitalization of Reliance Industries touched a record high of ₹ 17.46 lakh crore following several months of consolidation and the company's stock gained 23% as on 6th October, 2021. This includes ₹ 16,62,835.93 crore at the record high price, and the partly paid-up stock is ₹ 83,159.83 crore. The market value of the company's shares was ₹ 2,623 on the BSE, being the highest.

Source: https://www.moneycontrol.com/news/business/markets/reliance-industries-stock-touches-record-high-market-cap-hits-rs-17-46-lakh-crore-7549861.html dated 6th October 2021

Illustration 6.1

Calculate the value of an asset if the annual cash inflow is ₹ 2,000 per year for the next 7 years and the discount rate is 18%.

Solution

The value of an asset can be calculated as:

$$V_0 = \sum_{t=1}^{n} \frac{C_t}{(1+k)^t} = \sum_{t=1}^{7} \frac{2,000}{(1+0.18)^t}$$

$$= \sum_{t=1}^{7} \frac{2,000}{(1+0.18)^t} = ₹\ 2,000\ (PVIFA_{18\%,\ 7yrs})$$

$$= ₹\ 2,000 \times 3.812 = ₹\ 7,624.$$

6.3.1 Different Measures of Value

There are various usages of the term 'value' depending upon the purpose for which it is ascertained. These measures of value aid in financial decision making. For instance, replacement value of an asset is considered to arrive at the decision as to whether the existing asset should be replaced or not. These various measures of value are:

- **Book Value** is an accounting concept. Assets are recorded at historical costs and they are depreciated over the years. Book value may include intangible assets at acquisition cost minus amortized value. The book value of debt is stated as the outstanding amount. The difference between the book value of assets and liabilities is equal to the shareholder's funds or net worth (which is equal to paid-up equity capital plus reserves and surplus).

- **Replacement Value** is the amount that a company would be required to spend if it were to replace its existing assets in the current condition.
- **Liquidation Value** is the amount that a company could realize if it sold its assets after having terminated its business. It is generally a minimum value that a company might accept if it sells its business.
- **Going Concern Value** is the amount that a company could realize if it sold its business as an operating one. Its value would always be higher than the liquidation value, the difference accounting for the usefulness of assets and value of intangibles.
- **Market Value** of an asset or security is the current price at which the asset or the security is being sold or bought in the market.

6.4 Valuation of Bond

Bonds are negotiable promissory notes which are used by individuals, business firms, governments or government agencies. Bonds issued by the government or public sector companies in India are generally secured. Private sector companies may issue secured or unsecured bonds. However, unsecured bonds can be issued by private companies only to their shareholders/directors and relatives. In case of the bond, the rate of interest is fixed and known to investors. A bond is redeemable after a specific period. The expected cash flows consist of annual interest payments plus repayment of principal. Before going into the valuation of bonds, it is necessary to familiarize oneself with certain bond-related terms.

Example: Green Bonds Valuation

The supply of green bonds reached a record high in 2021 in the US market. Companies have issued premium bonds globally amounting to more than $200 billion in the first half of the year. German government issued two green bonds on a 10-year bond issued in September 2020 and the yield difference increased to 7 bps from an initial 1.5 bps. Similarly, on a five-year bond issued in November 2020, the yield increased to almost 5 bps from 1 bps thus confirming the volatility in interest rates. These bonds were performing well in the secondary market. Green bonds are premium bonds whose yield increases even if there is interest volatility in the market.

Source: https://www.spglobal.com/marketintelligence/en/news-insights/latest-news-headlines/green-bond-premium-justified-by-strong-secondary-market-performance-flexibility-66696509 dated 23rd September 2021

6.4.1 Face Value

This is the value stated on the face of the bond and is also known as par value. It represents the amount of borrowing by the firm that it specifies to repay after a specific period, i.e., the time of maturity. A bond is generally issued at face value or par value, which is usually ₹ 100 and may sometimes be ₹ 1,000. A bond can also be issued at a discount to face value.

6.4.2 Coupon Rate of Interest

A bond carries a specific rate of interest, which is also called the coupon rate. The interest rate payable is simply the par value of the bond multiplied by the coupon rate. Interest paid on a bond is tax deductible.

6.4.3 Maturity

A bond is issued for a specific period. It is repaid on maturity. Typically, corporate bonds have a maturity period of 7-10 years, whereas government bonds have a maturity period up to 20-25 years.

6.4.4 Redemption Value

The value that a bondholder gets on maturity is called redemption value. A bond may be redeemed at par, at a premium (more than par) or at a discount (less than par value).

6.4.5 Market Value

A bond may be traded in a stock exchange. Market value is the price at which the bond is usually bought or sold. Market value may be different from par value or redemption value.

6.4.6 Premium Bond

A bond trading above its par value is known as premium bond. Investors are willing to pay the premium amount because it offers a coupon rate higher than the existing interest rates being offered for new bonds.

6.4.7 Discount Bond

A bond currently trading for less than its par value is known as a discount bond. Investors will pay less for a discount bond as it offers a coupon rate that is lower than prevailing interest rates

6.4.8 Basic Bond Valuation Model

With the above background, it is quite clear that the holder of a bond receives a fixed annual interest payment for a certain number of years and a fixed principal repayment (equal to par value) at the time of maturity. Therefore, the intrinsic value or the present value of a bond can now be written as:

$$V_0 \text{ (or } P_0) = \sum_{t=1}^{n} \frac{C_t}{(I + k_d)^t} + \frac{F}{(I + K_d)^n}$$

$$V_0 = I(PVIFAk_{d,\,n}) + F(PVIFk_{d,\,n}) \qquad \text{.....(2)}$$

where, V_0 = Intrinsic value of the bond

P_0 = Present value of the bond

I = Annual interest payable on the bond

F = Principal amount (par value) repayable at the maturity time

n = Maturity period of the bond

k_d = Required rate of return.

Illustration 6.2

A bond whose par value is ₹ 1,000 bears a coupon rate of 12% and has a maturity period of 3 years. The required rate of return on the bond is 10%. What is the present value of this bond?

Solution

Annual interest payable = ₹ 1000 x 12% = ₹ 120

Principal repayment at the end of 3 years = ₹ 1,000

∴ The value of the bond will be:

V_0 = ₹ 120 ($PVIFA_{10\%, 3 yrs.}$) + ₹ 1,000 ($PVIF_{10\%, 3yrs.}$)

= ₹ 120 x (2.487) + ₹ 1,000(0.751)

= ₹ 298.44 + ₹ 751

= ₹ 1,049.44.

Illustration 6.3

Consider the case where an investor purchases a bond whose face value is ₹ 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?

Solution

Annual interest payable for 5 years = ₹ 70

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

∴ The intrinsic value or the present value of the bond

= ₹ 70 ($PVIFA_{8\%, 5yrs.}$) + ₹ 1,000($PVIF_{8\%,5 yrs.}$)

= ₹ 70 x 3.993 + ₹ 1,000 x 0.681

= ₹ 279.51 + ₹ 681 = ₹ 960.51

The above implies that the bond of ₹ 1,000 is worth ₹ 960.51 on the day of purchase if the required rate of return is 8%. The investor would not be willing to pay more than ₹ 960.51 for purchasing the bond.

6.4.9 Bond Values with Semi-Annual Interest

Some of the bonds carry interest payment semi-annually. As half-yearly interest amounts can be reinvested, the value of such bonds would be more than the value

of the bonds with annual interest payments. Hence, the bond valuation equation can be modified as:

i. Annual interest payment, i.e., I, must be divided by two (I/2) to obtain interest payment semi-annually.

ii. Number of years to maturity will have to be multiplied by (n x2) two to get the number of half-yearly periods.

iii. Discount rate has to be divided by two (K_d /2) to get the discount rate for half-yearly period.

Thus, with the above modifications, the bond valuation equation becomes:

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

$$= I/2\ (PVIFAk_d/2,2n) + F(PVIFk_d/2, 2n) \quad .....(3)$$

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

Illustration 6.4

A bond of ₹ 1,000 face 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

$$V_0 = \sum_{t=1}^{12} \frac{100/2}{(1+0.12/2)^t} + \frac{1,000}{(1+0.12/2)^{12}}$$

$$= ₹\ 50(PVIFA_{6\%,\ 12\ yrs.}) + ₹\ 1,000(PVIF_{6\%,\ 12yrs.})$$

$$= ₹\ 50\ (8.384) + ₹\ 1,000\ (0.497)$$

$$= ₹\ 419.2 + ₹\ 497$$

$$= ₹\ 916.20$$

6.4.10 Bond-Yield Measures

The bond yield can be computed as follows:

One Period Rate of Return

If a bond is purchased and then sold one year later, its rate of return over this single holding period can be defined as one period rate of return.

$$= \frac{\begin{pmatrix}\text{Price gain or loss}\\ \text{during holding period}\end{pmatrix} + \begin{pmatrix}\text{Coupon interest}\\ \text{if paid}\end{pmatrix}}{\begin{pmatrix}\text{Purchase price at the beginning of}\\ \text{the holding period}\end{pmatrix}} \quad \text{.....(4)}$$

The holding period can be calculated on a daily, monthly or annual basis. If the bond price falls by an amount that exceeds coupon interest, the rate of return assumes negative values.

Illustration 6.5

X purchased ₹ 1,000 par value bond for ₹ 900. The coupon payment on this bond is ₹ 80 i.e., 8%. One year later, he sells the bond for ₹ 800. What is the rate of return of Mr. X for one year period?

Solution

$$\text{Holding period return} = \frac{(800 - 900) + 80}{900}$$

$$= \frac{-100 + 80}{900}$$

$$= \frac{-20}{900} = -2.22\%$$

Current Yield

Current yield measures the rate of return earned on a bond if it is purchased at its current market price and if the coupon interest is received.

$$\therefore \text{ Current Yield} = \frac{\text{Coupon Interest}}{\text{Current Market Price}} \quad \text{.....(5)}$$

In the example cited above, if the current market price of the bond is also ₹ 800, then the

$$\text{Current Yield} = \frac{80}{800} = 10\%.$$

Coupon rate and current yield are two different measures. Coupon rate and current yield will be equal if the bond's market price equals its face value.

Yield to Maturity (YTM)

It is the rate of return earned by an investor who purchases a bond and holds it until maturity. The YTM is the discount rate that equals the present value of promised cash flows to the current market price/purchase price.

Illustration 6.6

Consider a ₹ 1,000 par value bond whose current market price is ₹ 850. The bond carries a coupon rate of 8% and has a maturity period of 9 years. What would be the rate of return that an investor earns if he purchases the bond and holds until maturity?

Solution

The rate of return earned also referred to as yield to maturity, is the value of k_d in the following equation.

$$P_0 = \sum_{t=1}^{n} \frac{I}{(1+k_d)^t} + \frac{F}{(1+K_d)^n}$$

$$₹\ 850 = \sum_{t=1}^{9} \frac{80}{(1+k_d)^t} + \frac{F}{(1+k_d)^9}$$

$$= ₹\ 80\ (PVIFAk_{d\%,\ 9\ yrs}) + ₹\ 1,000\ (PVIFk_{d,\ 9\ yrs.})$$

To find out the value of k_d in the above equation, several values of k_d will have to be tried out in order to reach the input value. Therefore, to start, consider a discount rate of 12% for k_d for which the expression becomes equal to

$$₹\ 80\ (PVIFA_{\ 12\%,\ 9\ yrs}) + ₹\ 1,000\ (PVIF_{\ 12\%,\ 9\ yrs.})$$

$$= ₹\ 80 \times 5.328 + ₹\ 1,000\ (0.361)$$

$$= ₹\ 426.24 + ₹\ 361 = ₹\ 787.24$$

Since, the above value is less than ₹ 850, we have to try a less value for k_d. So, let $k_d = 10\%$, then the equation becomes:

$$₹\ 80\ (PVIFA_{10\%,\ 9\ yrs.}) + ₹\ 1,000\ (PVIF_{10\%,\ 9\ yrs.})$$

$$= ₹\ 80 \times 5.759 + ₹\ 1,000 \times 0.424$$

$$= ₹\ 460.72 + ₹\ 424 = ₹\ 884.72$$

From the above it is clear that k_d lies between 10% and 12%. Now we have to use linear interpolation in the range of 10% and 12%. Using it, we find that k_d is equal to the following:

$$10\% + (12 - 10\%) \times \frac{884.72 - 850}{884.72 - 787.24}$$

$$= 10\% + 2\% \times \frac{34.72}{97.48}$$

$$= 10\% + 2\% \times 0.356$$

$$= 10\% + 0.71$$

$$= 10.71\%$$

$\therefore$ The yield to maturity is 10.71%

An Approximation: As trial and error method calculations are too tedious, the following approximation formula can be employed to find out the approximate YTM on a bond.

$$YTM = \frac{I + (F - P)/n}{0.4F + 0.6P} \quad \text{or} \quad \frac{I + (F - P)/n}{(F + P)/2} \qquad .....(6)$$

where,

YTM = Yield to maturity

I = Annual interest payment

F = Par value or redemption value of the bond

P = Current market price of the bond

N = Years to maturity.

Illustration 6.7

The bond of Zeta Industries Ltd. with a par value of ₹ 500 is currently traded at ₹ 435. The coupon rate is 12% and it has a maturity period of 7 years. What is the yield to maturity?

Solution

$$YTM = \frac{I + (F - P)/n}{0.4F + 0.6P}$$

$$= \frac{60 + (500 - 435)/7}{0.4 \times 500 + 0.6 \times 435}$$

$$= \frac{60 + 9.285}{200 + 261} = \frac{69.285}{461} = .150$$

$$= 15\%$$

6.5 Bond Value Theorems

Based on the bond valuation model, several bond value theorems have been derived which state the effect of the following factors on bond values:

I. Relationship between the required rate of return and the coupon rate

II. Number of years to maturity

III. Yield to maturity

I. The following are the theorems, which show the effect on the bond values influenced by the relationship between the required rate of return and the coupon rate.

   i. When the required rate of return is equal to the coupon rate, the value of the bond is equal to its par value.

i.e., If k_d = Coupon rate;

then, Value of a Bond = Par value

Illustration 6.8.a

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

Par value : ₹ 100

Coupon rate : 12%

Years to maturity : 5 years.

Find out the value of Ken Star's bond if the required rate of return is 12%.

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

$V = I(PVIFAk_{d,n}) + F(PVIFk_{d,n})$

$= ₹ 12(PVIFA12\%, 5) + ₹ 100(PVIF12\%, 5)$

$= ₹ 12(3.605) + ₹ 100(0.567)$

$= ₹ 43.26 + ₹ 56.7 = ₹ 99.96 = ₹ 100.$

ii. When the required rate of return (k_d) is greater than the coupon rate, the value of the bond is less than its par value.

If k_d > coupon rate;

then, Value of bond < Par value.

Illustration 6.8.b

Consider the same bond as above except that its required rate of return is 14%. Find out the value of the bond.

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

$V_0 = I(PVIFAk_{d,n}) + F(PVIF\ k_{d,n})$

$= ₹ 12(3.433) + ₹ 100(0.519)$

$= ₹ 41.196 + ₹ 51.9$

$= ₹ 93.1$

iii. When the required rate of return is less than the coupon rate, the value of the bond is greater than its par value.

i.e. if k_d < coupon rate;

then, Value of bond > Par value.

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

V_0 = $I(PVIFAk_{d,n}) + F(PVIFk_{d,n})$

= ₹ $12(PVIFA_{10\%, 5}) + ₹ 100(PVIF_{10\%, 5})$

= ₹ 12(3.791) + ₹ 100(0.621)

= ₹ 45.492 + ₹ 62.1

= ₹ 107.59

II. The following theorems show the effect of the number of years to maturity on bond values.

a. When the required rate of return (k_d) is greater than the coupon rate, the discount on the bond declines as maturity approaches.

Illustration 6.9

To illustrate the above bond theorem, consider a bond of Enucon Ltd. with the following features:

Par value : ₹ 1,000

Coupon rate : 11%

Years to maturity : 7

If the required rate of return is 13%, then the value of the bond is

V = $I(PVIFAk_{d, n}) + F(PVIFk_{d,n})$

= ₹ $110(PVIFA_{13\%,7}) + ₹ 1,000(PVIF_{13\%,7})$

= ₹ 110(4.423) + ₹ 1,000(0.425)

= ₹ 486.53 + ₹ 425 = ₹ 911.53.

One year from now, when the maturity period will be 6 years, the value of the bond will be:

V = ₹ $110(PVIFA_{13\%,6}) + ₹ 1,000(PVIF_{13\%,6})$

= ₹ 110(3.998) + ₹ 1,000(0.480)

= ₹ 439.78 + ₹ 480 = ₹ 919.78

For a required rate of return of 13%, the value of the bond will increase with the passage of time, i.e., until its maturity.

Years to maturity	Bond value (₹)
5	929.87
4	940.14
3	952.71
2	966.48
1	982.35
0	1,000.00

b. When the required rate of return (k_d) is less than the coupon rate, the premium on the bond declines as maturity approaches.

If the required rate of return on the bond of Enucon Limited is 9%, it will have a value of

V = ₹ 110($PVIFA_{9\%, 7}$) + ₹ 1,000($PVIF_{9\%, 7yrs.}$)

= ₹ 110(5.033) + ₹ 1,000(0.547)

= ₹ 553.63 + ₹ 547 = 1,100.63

One year hence, when the maturity period will be 6 years the value of the bond will be

V = ₹ 110($PVIFA_{9\%, 6}$) + ₹ 1,000($PVIF_{9\%, 6}$)

= ₹ 110(4.486) + ₹ 1,000(0.596)

= ₹ 493.46 + ₹ 596 = ₹ 1,089.46.

For a required rate of return of 9%, the value of the bond decreases with the passage of time, i.e. until maturity.

Years to maturity	Bond value (₹)
5	1077.90
4	1064.40
3	1050.41
2	1035.49
1	1017.87
0	1000.00

III. As YTM determines a bond's market price and vice-versa, we can say that the bond's price will fluctuate in response to the change in market interest rates in the following ways:

i. A bond's price moves inversely proportional to its yield to maturity.

The present value principle states that the present value of a cash flow varies in inverse proportion to the interest rate used as a discount rate. As such, if the YTM of the bond rises, the bond's market price drops and if the YTM falls, the bond's market price rises.

Illustration 6.10

The YTM of a ₹ 1,000 par value bond bearing a coupon rate of 10% and maturing in 10 years is 12%. Thus, the market value of the bond is

= ₹ 100 ($PVIFA_{12\%, 10}$) + ₹ 1000 ($PVIF_{12\%, 10}$)

= ₹ 100 x 5.650 + ₹ 1000 x 0.322

= ₹ 887

If the YTM increases to 14%, the market value of the bond will drop to ₹ 791.60, as calculated below

= ₹ 100 ($PVIFA_{14\%,10}$) + ₹ 1000 ($PVIF_{14\%,10}$)

= ₹ 100 x 5.216 + ₹ 1,000 x 0.270

= ₹ 791.60.

If the YTM of the same bond comes down to 8%, then the market value of the bond rises to ₹ 1,134.

ii. For a given difference between YTM and coupon rate of the bonds, the longer the term to maturity, the greater will be the change in price with change in YTM. It is so because, in case of long maturity bonds, a change in YTM is cumulatively applied to the entire series of the coupon payments and the principal payment is discounted at the new rate for the entire number of years to maturity; whereas in case of short-term maturity bonds, the new YTM is applied to comparatively fewer coupon payments; and also, principal payment is discounted for only a short period of time. Thus, long-term bonds are more prone to changes in interest rates than short-term bonds.

Illustration 6.11

Let us take two hypothetical bonds differing only in term to maturity.

Particulars	**A**	**B**
Face Value	₹ 1000	₹ 1000
Coupon Rate	10%	10%
YTM	11%	11%
Years to Maturity	3	6
Market Value at YTM of 10%	₹ 1000	1000
Market Value at YTM of 11%	100 $PVIFA_{11\%,3}$ + 1,000 $PVIF_{11\%,3}$ = ₹ 975	100 $PVIFA_{11\%,6}$ + 1000 $PVIF_{11\%,6}$ = ₹ 958
Change in Price	2.5%	4.2%

The market value of the bonds when the YTM was equal to coupon rate was equal to the face value of the bonds i.e., ₹ 1,000. When, however the YTM increased to 11%, the market value of the bond with shorter maturity period dropped by only 2.5% to ₹ 975 whereas the market value of the bond with longer maturity period of 6 years has dropped by 4.2% to ₹ 958. Thus, the long-term bonds are characteristically more sensitive to interest rate changes than short-term bonds.

iii. Given the maturity, the change in bond price will be greater with a decrease in the bond's YTM than the change in bond price with an equal increase in the bond's YTM. That is, for equal sized increases and decreases in the YTM, price movements are not symmetrical.

Illustration 6.12

Take ₹ 1,000 par value bond with a coupon rate of 10% and maturity period of 5 years. Let the YTM be 10%. Market price of the bond will be equal to ₹ 1,000. A 1% increase in YTM to 11% changes price to ₹ 962.6 (100 $PVIFA_{11\%,5}$ + 1,000 $PVIF_{11\%,5}$), a decrease of 3.74%. A decrease of 1% YTM to 9% changes the price to ₹ 1,039 (₹ 100 $PVIFA_{9\%,5}$ + ₹ 1,000 $PVIF_{9\%,5}$) an increase of 3.9%.

Thus, an increase in bond's yield caused a price decrease that is smaller than the price increase caused by an equal-size decrease in yield.

iv. For any given change in YTM, the percentage price change in case of bonds of high coupon rate will be smaller than in the case of bonds of low coupon rate, other things remaining the same.

Consider two bonds A and B with the par value of ₹ 1,000, maturing in 4 years and YTM of 10%. Bond A bears coupon rate of 10% whereas bond B bears coupon rate of 12%.

	Bond A	**Bond B**
Market price at YTM of 10% (₹)	1,000.0	1,063.40
Market price at the changed YTM of 12% (₹)	939.7	1,000.44
Change in price	6.03%	5.92%

Change in the price with the change in YTM in case of bond B carrying a higher coupon rate of 12% is only 5.92%, whereas in case of bond A with a coupon rate of 10% the change in the price is 6.03%.

v. A change in the YTM affects the bonds with a higher YTM more than it does bonds with a lower YTM.

Consider a ₹ 1,000 par value ABC bond with a coupon rate of 12%, maturity period of 6 years and YTM of 10%. The market value of the bond will be ₹ 1,087.

Consider another identical bond XYZ but with differing YTM of 20%. The market value of this bond will be ₹ 734.

Suppose there is an increase in YTM by 20% i.e. YTM of bond ABC rises to 12% (10 x 1.2) and bond XYZ rises to 24% (i.e. 20 x 1.2). Then the market value of both bonds will change to –

Bond ABC: 120 $PVIFA_{12\%,6}$ + 1,000 $PVIF_{12\%,6}$ = ₹ 1,000

Bond XYZ: 120 $PVIFA_{24\%,6}$ + 1,000 $PVIF_{24\%,6}$ = ₹ 637.4

Market value of ABC bond with a lower YTM decreased by 8% whereas in case of XYZ bond with a higher YTM the decrease is 13.2%.

Example: Why Bond Prices and Yields Move in Opposite Directions?

It is always interesting to note that bond prices are inversely proportional to yield as they move in opposite directions similar to a seesaw which means that when the yield on bond yields moves north, the prices go south and vice versa. Bond buyers are attracted when the rates rise while the price of the bonds goes down. Similarly, when the rates go south, the prices are driven back up. This also indicates that a downward move in the bond's interest rate signifies positive market performance thus leading to more investors putting money on bonds. Bonds are traded on the open market where prices and yields continually change. At one point, the yields converge where the investors realise the amount which is similar to yield for the same level of risk. This explains the relationship between the required rate of return and the coupon rate.

Let us look at the relationship in case of bonds issued by Mahindra and Mahindra Finance Ltd to prove the theorem.

Bond Particulars	Yield in %	Trading Price	Face Value
Mahindra & Mahindra Financial Services Ltd 8.7%	9.48	₹ 985.80	₹ 1000
Mahindra & Mahindra Financial Services Ltd 7.9%	10.26	₹ 892.40	₹ 1000
Mahindra & Mahindra Financial Services Ltd 8.53%	8.51	₹ 1020	₹ 1000

It is observed that higher the trading price, lower is the yield and lower the trading price, higher is the yield.

Sources: 1. https://www.thebalance.com/why-do-bond-prices-and-yields-move-in-opposite-directions-417082 dated 22nd February 2022

2. https://www.icicidirect.com/fd-and-bonds/mahindra-mahindra-financial-services-ltd-905/ine774d07ss7 dated 18th April 2022

Check Your Progress - 1

1. Arjuna Limited sold its block of assets in the month of April 20xx, fetching a yield of ₹ 2,20,000, when the market value of such block of assets was ₹ 7,00,000 on the date of sale. The book value of the assets stood at ₹ 4,80,000 after charging depreciation of 20% p.a. using straight line method. When valuation of assets is done based on its historical cost, it is referred to as_____

   a. Liquidation Value
   b. Book Value
   c. Market Value
   d. Replacement Value
   e. Going Concern Value

2. What term is used to refer to a value that an investor gets, at the time of maturity of an investment issued either at par premium or at discounted value?

   a. Face value

   b. Market Value

   c. Liquidation Value

   d. Redemption Value

   e. Coupon rate

3. A bond carrying a face value of ₹ 1,000 is currently traded at ₹ 1,234. The coupon rate of interest is at 12% and has a maturity period of 10 years. How would you compute the required rate of return that the bond will fetch at the time of maturity?

   a. $I(PVIFAk_{d, n}) + F(PVIFk_{d, n})$

   b. [Gain or loss during holding period + Coupon interest] / Purchase price

   c. [I + (F-P)/n] / (F+P) /2

   d. Coupon Interest / Current Market Price

   e. $I/2(PVIFAk_{d/2, 2n}) + F(PVIFk_{d/2, 2n})$

4. Identify the statement that is conflicting to the fundamental factors of the bond value theorems.

   a. If k_d > coupon rate; then, Value of bond > Par value

   b. When the required rate of return (k_d) is greater than the coupon rate, the bond value increases with the passage of time

   c. A bond's price moves inversely proportional to its yield to maturity

   d. The long-term bonds are characteristically more sensitive to interest rate changes than short-term bonds

   e. A change in the YTM affects the bonds with a higher YTM more than it does bonds with a lower YTM

5. What will be the bond's current yield that holds a market price of ₹ 500 at a coupon rate of ₹ 75?

   a. 16%

   b. 10%

   c. 12%

   d. 15%

   e. 11%

6.6 Valuation of Warrants and Convertibles

The above section dealt with bond valuation and the various concepts associated with such valuation. The next section will cover the concept of equity valuation. However, besides bonds or debts and equity, there are other forms of financing too. Two such important forms of financing and their valuation are discussed below:

6.6.1 Warrants and Convertibles

Warrants and convertible debentures are commonly used instruments of financing all over the world. The wide usage of these instruments is explained with different concepts focusing on cheaper debt, matching cash flows, financial synergy and lower agency costs, etc.

Definition

A warrant is a call option to buy a stated number of shares. They are like calls to the extent that they entitle the holder to buy a fixed number of shares at a predetermined price during some specified period. It gives the holder the right to subscribe to the equity shares of a company. Like call options, warrants may expire at a certain date. They may also be perpetual warrants, which never expire. Most warrants are detachable from the bond or preferred stock to which they were attached at the time of issue. If detached, warrants can be traded as independent securities, like call options.

Warrants are distributed to stockholders in lieu of a stock or cash dividend or sold directly as a new security issue. Sometimes, the companies issue preference shares or debentures with less favorable terms (than those investors would get otherwise). Hence, to compensate, it issues warrants to "sweeten" the offer. For example, the company along with warrants may sell a debenture or a bond.

Warrant Price

The exercise price of a warrant is what the holder must pay to purchase the stated number of shares.

A warrant holder (investor) has no rights unlike a shareholder. A warrant holder neither receives dividends nor holds voting rights. The terms are specified for number of shares that can be purchased for each warrant, based on the exercise (purchase) price per share, and the expiry date of warrant. Usually, the ratio is 1:1, i.e., one share for each warrant.

When a warrant is issued, the exercise price is always greater than the current market price. This price may be fixed for the entire life of the warrant or increased periodically.

The existence of the positive premium on a warrant means that it will be more beneficial for the warrant holder to sell his warrant, thus realizing its

theoretical value plus premium, when he exercises it. The premium associated with a warrant will shrink as the expiry date approaches. The actual value of the warrant will be equal to the theoretical value on the expiry date.

6.6.2 Convertible Debentures

A financial instrument that can be converted into a different security of the same company under specific conditions is referred to as convertible security.

A convertible debenture, as the name suggests, is a debenture that is convertible partly or fully, into equity shares. If it is partially converted, it is referred to as 'partly convertible debenture' and if the debentures are converted fully into equity shares at the end of maturity, it is referred to as 'fully convertible debentures'. The option of conversion is either at the discretion of investor i.e., optional or compulsory (if it is specified).

Convertible bond or a preferred stock is converted into specified number of shares. Usually, in this conversion, no cash is involved; simply, the old security is traded and an appropriate number of new securities are issued in turn.

Companies Act, 2013 Provisions for Issue of Convertible Debentures

These provisions are contained in Section 71 of the Act:

71. (*1*) A company may issue debentures with an option to convert such debentures into shares, either wholly or partly at the time of redemption, provided such conversion is approved by a special resolution passed at a general meeting.

(*2*) No company shall issue any debentures carrying any voting rights.

(*3*) Secured debentures may be issued by a company subject to such terms and conditions as may be prescribed.

(*4*) Where debentures are issued by a company under this section, the company shall create a debenture redemption reserve account out of the profits of the company available for payment of dividend and the company only for the redemption of debentures shall utilize the amount credited to such account.

(*5*) A company shall not issue a prospectus or make an offer or invitation to the public or to its members exceeding five hundred for the subscription of its debentures, unless the company has, before such issue or offer, appointed one or more debenture trustees.

(*6*) A debenture trustee shall take steps to protect the interests of the debenture holders and redress their grievances in accordance with such rules as may be prescribed.

(*7*) Any provision contained in a trust deed, shall be void, if it has the effect of exempting a trustee thereof from, or indemnifying him against, any

liability for breach of trust, where he fails to show the degree of care and due diligence required of him as a trustee, having regard to the provisions of the trust deed conferring on him any power, authority or discretion.

(*8*) A company shall pay interest and redeem the debentures in accordance with the terms and conditions of their issue.

(*9*) Where at any time the debenture trustee comes to a conclusion that the assets of the company are insufficient or are likely to become insufficient to discharge the principal amount as and when it becomes due, the debenture trustee may file a petition before the Tribunal. The Tribunal may, after hearing the company and any other person interested in the matter, by order, impose such restrictions on the incurring of any further liabilities by the company as it may consider necessary in the interests of the debenture-holders.

(*10*) If a company fails to redeem the debentures on the date of their maturity or fails to pay interest on the debentures when it is due, the Tribunal may, on the application of any or all of the debenture holders, or debenture direct the company to redeem the debentures forthwith on payment of principal and interest due thereon.

6.6.3 Conversion Ratio and Conversion Value

As said above, the conversion ratio gives the number of shares of stock received for each convertible security. If only the conversion ratio is given, the par conversion price can be obtained by dividing the conversion ratio multiplied by the face or par value of the convertible security.

The conversion value represents the market value of the convertible, if it were converted into stock; this is the minimum value of the convertible based on the current price of the issuer's stock.

Conversion value is obtained by multiplying the conversion ratio by the stock's current market price. For example, consider a convertible bond with ₹ 1,000 (par value) converted into 20 equity shares. If the market price of the share is, say, ₹ 55, then the conversion value of the bond is ₹ 1,100 (20 x 55). If the conversion price of the bond is, say, ₹ 1,200, then conversion premium of the bond is ₹ 1,200 – 1,100, i.e., 100.

As the converted stock is affected by tax, corporate investors are less keen to invest, whereas the individual investors are attracted towards converted securities, as they need not have to pay tax.

Convertible securities have great complexity in their maturities. Some may be converted only after an initial period. Some may be converted up to the bond's maturity date and others only for stated, shorter periods. Some securities may have different conversion ratios for different years.

Illustration 6.13

Let us consider the following example.

M/s. AMA Ltd. has issued fully convertible debentures at a face value of ₹ 200 with coupon rate of 15% p.a., which is converted into 4 equity shares (at a price of ₹ 50 each) at the end of 3 years.

An investor, Vinay, wanted to buy debentures in the secondary market after a year of issue. Let us find out the value of the convertible, if his required rate of return is 18% and price of share is expected to be ₹ 60 at the end of 3 years.

Solution

The value of convertible is determined as:

$$\sum_{t=1}^{n} \frac{C}{(1+r)^t} + \frac{P_n \text{ x Conversion Ratio}}{(1+r)^n}$$

where,

C = Coupon rate

r = Required rate of return

P_n = Expected price of equity share on conversion

n = No. of years to maturity

$$= \frac{30}{(1.18)^1} + \frac{30}{(1.18)^2} + \frac{60 \text{ x } 4}{(1.18)^2}$$

$$= 25.42 + 21.54 + \frac{240}{(1.18)^2}$$

$$= 25.42 + 21.54 + 172.36$$

= ₹ 219.32

Thus, the value of the convertible is approximately ₹ 220.

The investors preferring to minimize the risk can opt for warrants, as they act like a call option unlike convertible preferred stocks or bonds, for they combine the benefits of fixed income by investing with the option of sharing the price appreciation benefits normally reserved for the common stockholders.

Activity 6.1

1. A bond has a face value of ₹ 1000 and coupon rate of 8%. The maturity of the bond is 9 years and the required rate of return is 10%. What will be the fair value of the bond, if it is redeemed at a premium of ₹ 100?

2. The bonds of Sigma Ltd. are presently selling at a premium of 5 percent against its face value as well as the maturity value of ₹ 100. The current yield on these bonds is 9.52 percent. The coupons are paid yearly. If the bonds are to mature 3 years hence, what should be the annualized yield to an investor of today by the approximation method?

6.7 Equity Valuation: Dividend Capitalization Approach

People hold common stocks or equity in their portfolios for two reasons; (i) A representative group of common stocks (like growth stocks and blue chips) bought at a reasonable price level can be counted to provide a higher total return than bonds; (ii) Common stocks can be held as a protective measure during inflation because unlike equity, a bond's value declines as inflation rises. However, the safety and attractiveness of common stock investment would be jeopardized if stocks were bought at an excessively high general market value or too much was paid for the promising prospects of favored issues. Thus, there should be a standard value for judging whether a stock is under or overpriced in the market place. We call this standard value the intrinsic value.

Example: Intrinsic Value of Tata Motors Shares

The shares of the global auto giant and a large cap, Tata Motors Ltd with a market cap of ₹ 144415.59 crore as of 31st March 2022 is expected to perform extremely well in the current fiscal as per the Emkay Global. As against the current market price of ₹ 430, Emkay Global has buy call with a target price of ₹ 530 in one year which indicates a growth rate of over 23%. This is based on various factors such as products, revenue and sale of services, dividends, management and prospects which indicate the intrinsic value of the stock.

Source: https://economictimes.indiatimes.com/markets/stocks/recos/buy-tata-motors-target-price-rs-530-emkay-global/articleshow/91116246.cms dated 27th April 2022

Intrinsic value is the value of a stock that is justified by assets, earnings, dividends, definite prospects and the factor of the management of the issuing company.

The major components of intrinsic value are:

a. Earning power and profitability of the management in the employment of assets;
b. Dividends paid and the ability to pay such dividends in the future;
c. Estimates of the growth of earnings;
d. Stability and predictability of these quantitative and qualitative projections.

Thus, in essence, the intrinsic value of a firm's shares is its economic value as a going concern, taking account of its characteristics, the nature of its business and the investment environment.

According to the dividend capitalization approach, which is a conceptually sound approach, the value of an equity share is the discounted present value of dividends received plus the present value of the resale price expected when the equity share is sold. Therefore, to apply this approach to the valuation of equity stock the following assumptions are to be made:

i. Dividends are paid annually, which is a common practice for business firms in India, and

ii. The 1st payment of dividend is to be made one year after the equity share is bought.

6.7.1 Single Period Valuation Model

This model is for an equity share wherein an investor holds it for one year. The price of such equity share will be:

$$P_0 = \frac{D_1}{(1+k_e)} + \frac{P_1}{(1+k_e)} \qquad .....(7)$$

where,

P_0 = Current market price of the share

D_1 = Expected dividend a year hence

P_1 = Expected price of the share a year hence

k_e = Required rate of return on the equity share

Illustration 6.14

Mercury India Ltd. is expected to declare a dividend of ₹ 2.50 and reach a price of ₹ 35.00 a year hence. What is the price at which the share would be sold to the investors now if the required rate of return is 13 percent?

Solution

$$\text{The current price } P_0 = \frac{D_1}{(1+k_e)} + \frac{P_1}{(1+k_e)}$$

$$= \frac{2.50}{(1+0.13)} + \frac{35.00}{(1+0.13)}$$

$$= \frac{2.50}{1.13} + \frac{35.0}{1.13}$$

$$= ₹\ 2.21 + ₹\ 31.00$$

$$= ₹\ 33.21$$

6.7.2 Multi-Period Valuation Model

Since there is no maturity period for equity share, the value of an equity share of infinite duration is equal to the discounted value of the stream of dividends of infinite duration.

Thus,

$$P_0 = \frac{D_1}{(1+k_e)^t} + \frac{D_2}{(1+k_e)^2} + \ldots + \frac{D_\infty}{(1+k_e)^\infty} = \sum_{t=1}^{\infty} \frac{D_t}{(1+k_e)^t} \qquad \ldots\ldots(8)$$

where,

P_0 = Current market price of the equity share

D_1 = Expected dividend a year hence

D_2 = Expected dividend two years hence

D_∞ = Expected dividend at infinite duration

k_e = Expected rate of return or required rate of return

The above equation is the valuation for an equity share of infinite duration. The same can be applied to the valuation of an equity share with a finite duration provided the investor holds the same for n years and then sells it at a price P_n. The value of an equity share of finite duration would thus be:

$$P_0 = \frac{D_1}{(1+k_e)^1} + \frac{D_2}{(1+k_e)^2} + \ldots + \frac{D_n}{(1+k_e)^n} + \frac{P_n}{(1+k_e)^n}$$

$$= \sum_{t=1}^{n} \frac{D_t}{(1+k_e)^t} + \frac{P_n}{(1+k_e)^n} \qquad \ldots\ldots(9)$$

Using the dividend capitalization principle, the value of P_n in the above equation (9) would be the present value of the stream of dividend beyond the nth period, which is evaluated at the end of nth year. Therefore

$$P_n = \frac{D_{n+1}}{(1+k_e)} + \frac{D_{n+2}}{(1+k_e)^2} + \ldots + \frac{D_\infty}{(1+k_e)^{\infty-n}} \qquad \ldots\ldots(10)$$

Substituting the value of P_n in the above equation (9) and simplifying it, we get

$$P_0 = \sum_{t=1}^{\infty} \frac{D_t}{(1+k_e)^t} \qquad \ldots\ldots(11)$$

The above is the same as eqn (8) which is regarded as a generalized multi-period formula used for rising, declining, constant or randomly fluctuating dividend stream. Three such instances are discussed below:

i. Constant dividends

ii. Constant growth of dividends

iii. Changing growth rates of dividends

i. **Valuation with Constant Dividends:** Assume that the dividend per share is constant year after year, whose value is D, then eqn. (10) becomes

$$P_0 = \frac{D_1}{(1+k_e)^1} + \frac{D_2}{(1+k_e)^2} + \ldots + \frac{D_\infty}{(1+k_e)^\infty}$$

On simplification the above equation becomes

$$P = \frac{D}{k_e} \qquad \text{.....(12)}$$

ii. **Valuation with Constant Growth in Dividends:** It is assumed that dividends tend to increase over time because business firms usually grow over time. Therefore, if the growth of the dividends is at a constant compound rate then:

$$D_t = D_o(1+g)^t$$

where,

D_t = Dividend for year t

D_o = Dividend for year 0

g = Constant compound growth rate

The valuation of the share where dividend increases at a constant, compound rate is given as

$$P_0 = \frac{D_1}{(1+k_e)} + \frac{D_1(1+g)}{(1+k_e)^2} + \frac{D_1(1+g)^2}{(1+k_e)^3} + \ldots$$

On simplification

$$P_0 = \frac{D_1}{k_e - g} \qquad \text{.....(13)}$$

Illustration 6.15

Shetkani Solvents Ltd. is expected to grow at the rate of 7% per annum and dividend expected a year hence is ₹ 5.00. If the rate of return is 12%, what is the price of the share today?

Solution

$$\text{The price would be } P_0 = \frac{5.00}{0.12 - 0.07} = \frac{5.00}{0.05} = ₹\ 100$$

iii. **Valuation with Variable Growth in Dividends:** Some firms have a super normal growth rate followed by a normal growth rate. If the dividends move in line with the growth rate, the price of the equity share of such firm would be

$$P_0 = \frac{D_1}{(1+k_e)} + \frac{D_1(1+g_a)}{(1+k_e)^2} + \cdots \frac{D_1(1+g_a)^{n-1}}{(1+k_e)^n}$$

$$+ \frac{D_n(1+g_n)}{(1+k_e)^{n+1}} + \frac{D_n(1+g_n)^2}{(1+k_e)^{n+2}} + \cdots\cdots$$

Where

P_0 = Price of the equity share

D_n = $D_1 (1 + g_a)^{n-1}$

D_1 = Expected dividend a year hence

g_a = Super normal growth rate of dividends

g_n = Normal growth rate of dividends

For computation of P_0 in the above equation, the following procedure may be adopted.

1. Expected dividend stream during the supernormal period of the super normal growth is to be specified and the present value of this dividend stream is to be computed for which the equation to be used is

$$= \sum_{t=1}^{n} \frac{D_t}{(1+k_e)^t}$$

2. The value of the share at the end of the initial growth period is calculated as follows:

$$P_n = \frac{D_{n+1}}{k_e - g_n} \text{ (as per the constant growth model)}$$

It is then discounted to the present value. The discounted value therefore is

$$\frac{D_{n+1}}{k_e - g_n} \times \frac{1}{(1+k_e)^n}$$

3. Then add both the present value composites to find the value (Po) of the share, which is

$$P_0 = \sum_{t=1}^{n} \frac{D_t}{(1+k_e)^t} + \frac{D_{n+1}}{K_e - g_n} \times \frac{1}{(1+k_e)^n} \quad \text{.....(14)}$$

Illustration 6.16

Consider the equity share of Venus Lab Limited.

D_0 = Current dividend per share = ₹ 3.00

n = Duration of the period of super normal growth = 5 years

g_a = Growth rate during the period of super normal growth = 25%

g_n = Normal growth rate after super normal growth period is over = 7%

k_e = Investor's required rate of return = 14%

The following are the steps involved.

1. Dividend stream during super normal growth period:

D_1 = ₹ 3.00 (1.25)

D_2 = ₹ 3.00 $(1.25)^2$

D_3 = ₹ 3.00 $(1.25)^3$

D_4 = ₹ 3.00 $(1.25)^4$

D_5 = ₹ 3.00 $(1.25)^5$

The present value of the above stream of dividends is

$$= \frac{3.00\,(1.25)}{(1.14)} + \frac{3.00\,(1.25)^2}{(1.14)^2} + \frac{3.00\,(1.25)^3}{(1.14)^3} + \frac{3.00\,(1.25)^4}{(1.14)^4} + \frac{3.00\,(1.25)^5}{(1.14)^5}$$

= ₹ 3.29 + 3.61 + 3.96 + ₹ 4.34 + ₹ 4.76

= ₹ 19.96.

2. The price of the share at the end of 5 years, applying the constant growth model at that point of time will be:

$$P_5 = \frac{D_6}{k_e - g_n} = \frac{D_5(1+g_n)}{k_e - g_n}$$

$$= \frac{3.00\,(1.25)^5\,(1.07)}{0.14 - 0.07} = \frac{9.8}{0.07} = ₹\ 140$$

The discounted value of this price is

$$= \frac{140.00}{(1.14)^5} = ₹\ 72.71$$

3. The sum of the above components is:

P_0 = ₹ 19.96 + ₹ 72.71

= ₹ 92.67

∴ The value of the share P_0 = ₹ 92.67.

6.7.3 Impact of Growth on Price, Returns and P/E Ratio

Different companies have varied expected growth rates. While some companies remain stagnant, other companies show normal growth and still others grow at a

super normal growth rate. Assuming a constant required rate of return, varying growth rates mean difference in stock prices, dividend yields, capital gain yield and price earnings ratio.

To illustrate the above, three cases can be considered.

	Growth rate (%)
Firm with no growth	0
Firm with normal growth rate	6
Firm with super normal growth rate	10

The expected earnings per share and dividend per share of each of the above firms are ₹ 5.00 & ₹ 4.00 respectively. The required rate of return from equity investments is 16%.

We can calculate the stock price, dividend yield, capital gain yield and price-earnings ratio for all the above cases with the given information.

Price, Dividend yield, Capital gains yield, & Price-earnings ratio under differing growth assumption for 16% required rate of return.

Price	Dividend Yield $\left(\frac{D_1}{P_0}\right)$	Capital Gain Yield $\left(\frac{P_1 - P_0}{P_0}\right)$	P/E Ratio (P/E)
No growth firm $P_0 = \frac{D_1}{K}$ $\frac{₹\ 4.00}{0.16} = ₹\ 25$	16%	0%	5
Normal growth firm $P_0 = \frac{D_1}{K-g}$ $\frac{₹\ 4.00}{0.16 - 0.06} = ₹\ 40$	10%	6%	8
Super normal growth $P_0 = \frac{D_1}{K-g}$ $\frac{₹\ 4.00}{0.16 - 0.10} = ₹\ 67$	6%	10%	13.4

Looking at the table, we can say that:

1. Other things being equal, as the expected growth in dividend increases, the expected return, i.e., (the total return = dividend yield + capital gain yield) depends more on the capital gain yields, less on the dividend yield.
2. Other things being equal, the price-earnings ratio increases as the expected growth rate in dividend increases.

3. High dividend yield and low price earnings ratio imply limited growth prospects.
4. Low dividend yield and high price earnings ratio imply considerable growth prospects.

Activity 6.2

1. Alfa Ltd., which is experiencing constant growth rate, has generated earnings per share of ₹ 18.50 and ₹ 24.00 in the previous and current year respectively. The company follows a dividend payout ratio of 28%, which is expected to remain at the same level. What would be the price of the share, if the required rate of return is 35% p.a?

2. The face value of the equity share of Blue Line Ltd. is ₹ 10 and the current market price of the share is ₹ 8. The company is expected to declare a dividend of 20% during the current year. If the dividends are expected to decline at the rate of 10% p.a., then, what will be the expected rate of return on the shares?

6.8 Equity Valuation: Ratio Approach

The ratio approach that is rather simple to use is followed by most practitioners. Some of the ratios employed in the context of valuation are discussed hereunder.

a. Book value
b. Liquidation value
c. Price/Earnings ratio

6.8.1 Book Value

The book value per share is the net worth of the company (paid-up equity capital plus reserves and surplus) divided by the number of outstanding equity shares.

Book Value = Net worth (Paid equity capital + reserves + surplus) ÷ Number of outstanding equity shares.

Example: Ratio Approach

TCS, the global IT giant, in their annual report as of 31st March, 2022 reported the net worth at ₹ 89,846 crore which comprised paid up equity share capital of ₹ 366 crore and reserves and surplus at ₹ 89,480 crore. The number of equity shareholders of the company stood at 3,659,051,373 (365.91 crore) as on 31st March, 2022. Thus the book value of equity share was ₹ 244.54.

Most of the practitioners adopt the ratio approach for valuation and one such ratio is Book Value approach and is given by the equation - Book Value = Net worth (Paid equity capital + reserves + surplus) / Number of outstanding equity shares.

Sources: i) https://www.tcs.com/content/dam/tcs/pdf/discover-tcs/investor-relations/corporate-actions/2021-22/financial-results-for-the-quarter-and-year-ended-march-31-2022-and-recommendation-of-final-dividend.pdf dated 11th April 2022.

ii) https://www.tcs.com/investor-relations#:~:text=As%20of%20March%2031%2C%202022%2C%20TCS%20had%203%2C659%2C051%2C373%20shares%20outstanding dated 11th April 2022.

6.8.2 Liquidation Value

Liquidation value per share is equal to:

$$\frac{\left(\text{Value realized from liquidating all the assets of the firm}\right) - \left(\text{Amount to be paid to all the creditors and preference shareholders}\right)}{\text{No. of outstanding equity shares}}$$

This is more realistic than the book value. However, it has two obstacles (1) It would be difficult to estimate the amount realized from liquidation of various assets (2) Liquidation value does not reflect earning capacity.

6.8.3 Price-Earnings Ratio

Financial analysts have used this P/E model more frequently than other models. According to this, the intrinsic value of the share is:

Expected earnings per share x Appropriate price – Earnings ratio.

The expected earnings per share is:

$$\frac{\text{Expected PAT} - \text{Preference dividend}}{\text{Number of outstanding equity shares}}$$

Preference dividends and the number of outstanding equity shares can be defined, but the expected PAT is quite difficult to estimate. Therefore, factors like sales, gross profit margin, depreciation, interest burden and tax rate will have to be considered to arrive at an appropriate figure for PAT.

To establish an appropriate price-earnings ratio for a given share, to start with, the price-earnings ratio for the market as a whole and also for the industry will

have to be considered. Then the P/E ratio applicable to the particular share under consideration should be judged for which the following factors are to be considered.

1. Growth rate
2. Stability of earnings
3. Size of the company
4. Quality of management
5. Dividend pay-out ratio

The impact of the above factors in P/E ratio is rather difficult to quantify. However, qualitative observation can be made.

The higher the growth rate, the higher the P/E ratio; the greater the stability of earnings, the higher the P/E ratio; the larger the size of the company, the higher the P/E ratio; and the higher the dividend pay-out ratio, the higher the P/E ratio.

6.8.4 E(P/E) Ratio

The Expected P/E ratio E(P/E) ratio is formed by dividing the present value of the share by the expected earnings per share denoted by E(EPS).

$$\therefore E(P/E) = \frac{PV\ per share}{E(EPS)}$$

Substituting the present value per share with the present value formula as per dividend discount model, we get

$$E(P/E) = \frac{D}{k-g} \times \frac{1}{E(EPS)} \text{ or } \frac{D/E(EPS)}{(k-g)}$$

Where, the numerator is the expected dividend pay-out ratio. It is also known as the forward P/E ratio.

6.8.5 Comparing Expected and Actual P/E Ratios

Step 1: Estimate the stock's expected price-earning ratio, E (P/E), by studying fundamental facts about the firm.

Step 2: Observe the stock's current P/E by checking price and earnings data in newspapers or investment periodicals.

Step 3: Compare the stock's actual P/E with its E(P/E) and then consult the investment decision rules below:

a. If the E(P/E) exceeds the actual P/E, the stock is currently underpriced and this is the time to buy.

b. If the E(P/E) is less than the actual P/E, the stock is currently overpriced and this is the time to sell (or sell short).

c. If the E(P/E) equals the actual P/E, the stock is correctly priced – neither buying nor selling is desirable.

Check Your Progress - 2

6. "A warrant entitles the holder to buy a fixed number of shares at an exercise price that can be traded as independent securities, like call option". Which of the following is true with respect to this financial instrument?
   a. Perpetual warrants may expire at a certain date
   b. A warrant holder (investor) has rights unlike a shareholder
   c. A warrant holder receives dividends and holds voting rights
   d. Warrants are distributed to stockholders in lieu of a stock or cash dividend or sold directly as a new security issue
   e. When a warrant is issued, the exercise price is less than the current market price
7. Which of the following is not a component of intrinsic value of the firm?
   a. Profitability of management in employment of assets
   b. Ability to pay present and future dividends
   c. Estimates of the growth of earnings
   d. Stability in quantitative and qualitative projections
   e. Values stock based on trader ability to pay the premium price
8. Which valuation model would you use to ascertain the current market price of a share for a given required rate of 12 percent with an expected dividend and share price after a year at ₹ 5 and ₹ 50?
   a. Basic Valuation Model
   b. Single Period Valuation
   c. Multi-Period Valuation
   d. Yield to Maturity
   e. Current Yield
9. What is the current price of share of M/s Shantiniketan, if the required rate of return is 10% with an expected growth rate of 7% per annum and dividend expected a year hence is ₹ 6?
   a. ₹ 100
   b. ₹ 200
   c. ₹ 85
   d. ₹ 120
   e. ₹ 60

10. P/E Model is the most frequently used model in valuation of equity stocks. Identify the factor that is **not** considered in calculation of price earnings ratio.

    a. Growth rate

    b. Stability of earnings

    c. Dividend pay-out ratio

    d. Management quality

    e. Liquidity value

6.9 Summary

- The concept of time value of money provides a fundamental background for the valuation of bonds and stocks. Value of any security can be defined as the present value of its future cash streams i.e.,

$$V_0 = \frac{C_1}{(1+k)^1} + \frac{C_2}{(1+k)^2} + ... + \frac{C_n}{(1+k)^n} = \sum_{t=1}^{n} \frac{C_n}{(1+k)^t}$$

  Where

  V_0 = Value of the asset at time zero,

  P_0 = Present value of assets,

  C_t = Expected cash flow at the end of period t,

  k = Discounted rate of required rate of return on the cash flow,

  n = Expected life of an asset.

- Face value of a bond is the value stated on the bond. A bond carries a rate of interest, which is called coupon rate. Bond is issued for a specific period, which is called maturity of the bond. The value that a bondholder gets on maturity is called redemption value.
- Yield of a bond can be measured using several methods viz. single period rate of return, current yield and yield to maturity.
- When the required rate of return is equal to the coupon rate, the value of bond is equal to its par value.
- When the required rate of return is greater than the coupon rate, the value of bond is less than its par value.
- When the required rate of return is less than the coupon rate, the value of bond is greater than its par value.
- When the required rate of return is greater than the coupon rate, the discount on the bond declines as maturity approaches.
- When the required rate of return is less than the coupon rate, the premium on the bond declines as maturity approaches.
- A bond's price moves inversely proportional to its yield to maturity.

- For a given difference between YTM and coupon rate of the bonds, the longer the term to maturity, the longer will be the change in price with change in YTM.
- Given the maturity, the change in bond price will be greater with a decrease in the bond's YTM than the change in bond price with an equal increase in the bond's YTM.
- For any given change in YTM, the percentage price change in case of bonds of high coupon rate will be smaller than in the case of bonds of low coupon rate, other things remaining the same.
- A change in the YTM affects the bonds with a higher YTM more than it does bonds with lower YTM.
- The value of a convertible is determined as:

$$V_0 = \sum_{t=1}^{n} \frac{C}{(1+r)^t} + \frac{(P^n) \text{ x Conversion ratio}}{(1+r)^n}$$

- The book value, liquidation value and Price/Earnings ratio are the three frequently used values of equity shares.
- The Expected P/E ratio E(P/E) ratio is formed by dividing the present value of the share by the expected earnings per share denoted by E(EPS).

6.10 Glossary

Bond is an instrument for long-term debt.

Book Value is an accounting concept. Assets are recorded at historical costs and they are depreciated over the years. Book value may include intangible assets at acquisition cost minus amortized value.

Book Value per Share is the net worth of the company (paid-up equity capital plus reserves and surplus) divided by the number of outstanding equity shares.

Conversion Ratio gives the number of shares of stock received for each convertible security.

Conversion Value represents the market value of the convertible, if it were converted into stock. This is the minimum value of the convertible based on the current price of the issuer's stock.

Convertible Debenture is a debenture that is convertible partly or fully, into equity shares.

Convertible security is a financial instrument that can be converted into a different security of the same company under specific conditions.

Coupon Rate is the stated interest rate on a bond.

Current Yield is the annual interest or dividend currently received divided by the current market price.

E(P/E) Ratio is formed by dividing the present value of the share by the expected earnings per share denoted by E(EPS).

Face Value is the par value of the bond that a firm assures to repay at the time of maturity.

Fully Convertible Debentures are debentures which are converted to equity or preference shares after a specific period of time.

Going Concern Value is the amount that a company could realize if it sold its business as an operating one. Its value would always be higher than the liquidation value, the difference accounting for the usefulness of assets and value of intangibles.

Liquidation Value is the amount that a company could realize if it sold its assets after having terminated its business. It is generally a minimum value that a company might accept if it sells its business.

Market Value is the price at which the bond is usually bought or sold.

Partly Convertible Debenture is a type of convertible debenture which is partly redeemed after a specific period of time and the other part is convertible to equity shares or preference shares or a new type of debentures.

Pay-out Ratio is the proportion of earnings paid out by way of dividends.

Price/Earnings (P/E) Ratio is the ratio of market price per share to earnings per share.

Redemption Value is the value that a holder gets on maturity which is redeemed either at par or premium or discount.

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

Required Rate of Return is the rate of return required by investors on their investment.

Shareholder's Funds or Net worth is the difference between the book value of assets and liabilities is equal to the (which is equal to paid-up equity capital plus reserves and surplus).

Warrant is the call option to buy a stated number of shares.

Warrant Price is the exercise price of a warrant that the holder must pay to purchase the stated number of shares.

6.11 Self-Assessment Test

1. Give a brief note on valuation concept.
2. Calculate the value of a bond with a given par value of ₹ 500, bearing a coupon rate of 8% and that has a maturity period of 3 years. The required rate of return on the bond is 6 %.

3. Write a short note on different parameters based on which the bonds are valued.
4. Describe the ways in which the bond yields are measured.
5. Briefly explain the factors the bond value theorems are derived from with necessary examples.
6. Enumerate on equity valuation based on dividend capitalization approach.
7. Explain the ratio approach employed by practitioners for bond valuation.

6.12 Suggested Readings / Reference Material

1. Brealey Myers (2020). Principles of Corporate Finance, 13th edition, USA: McGraw-Hill Companies Inc.
2. Prasanna Chandra (2019). Financial Management – Theory and Practice, 10th edition, New Delhi: Tata McGraw-Hill.
3. I.M. Pandey (2021). Financial Management, 12th edition, New Delhi: Pearson Education.
4. Francis Cherunilam (2020). International Business — Text and Cases, 6th Edition, PHI Learning.
5. P.G. Apte (2020). International Financial Management, 8th Edition, McGraw Hill Education (India) Private Limited.
6. John Tennent (2018). The Economist Guide to Financial Management. Economist Books.

6.13 Answers to Check Your Progress Questions

1. (b) Book Value

Book value is an accounting concept. Assets are recorded at historical costs and they are depreciated over the years.

2. (d) Redemption value

The value that a bondholder gets on maturity is called redemption value. A bond may be redeemed at par, at a premium (more than par) or at a discount (less than par value).

3. (c) [I + (F-P)/n] / (F+P) /2

The required rate of return (k_d) is the return that an investor will receive on maturity by purchasing a bond.

4. (a) If k_d > coupon rate; then, Value of bond > Par value

When the required rate of return (k_d) is greater than the coupon rate, the value of the bond is less than its par value

5. (d) 15%

Current Yield = Coupon Rate / Current Market Price

= 75 / 500 = 15%

6. (d) Warrants are distributed to stockholders in lieu of a stock or cash dividend or sold directly as a new security issue.

A warrant is a call option to buy a stated number of shares. Warrants are distributed to stockholders in lieu of a stock or cash dividend or sold directly as a new security issue.

7. (e) Values stock based on trader ability to pay the premium price

Values stock based on trader ability to pay the premium price is not a component of the intrinsic value of a firm.

8. (b) Single Period Valuation

This model is for an equity share wherein an investor holds it for one year. The price of such equity share will be:

$$P_0 = \frac{D_1}{(1+k_e)} + \frac{P_1}{(1+k_e)}$$

9. (b) ₹ 200

The price would be $P_0 = 6.00 / (0.10 – 0.07) = ₹ 100$

10. (e) Liquidity Value

Liquidity Value is not a factor considered in calculation of the P/E valuation model.

Unit 7

Sources of Long-term Finance

Structure

"To contract new debts is not the way to pay old ones."

~ George Washington

7.1 Introduction

The financial needs of an organization can be broadly classified into two heads: Short-term financial needs and long-term financial needs. Both these needs are financed either by short-term funds or by long-term funds. It is prudent for an organization to meet its long-term fund requirement from long-term sources of finance rather than short-term sources.

The long-term decisions of a firm involve setting up of the firm, expansion, diversification, modernization and other similar capital expenditure decisions. All these decisions involve huge investment, the benefits of which will be seen only in the long-term. These decisions are also irreversible in nature. By nature of these projects, long-term sources of funds become the best suited means of financing. The long-term sources comprise shares, debentures and other long-term loans. A finance manager thus has to decide which of these sources is to be tapped to fund the company's long term investments as each of these sources have costs and benefits associated with them. This unit explains the various sources of long-term finance, their features and how to analyse the costs and benefits of these long term sources.

7.2 Objectives

After reading through the unit, you should be able to:

- Explain how long-term financing is needed to maintain proper asset-liability management
- Analyze the various sources of long term finance to select an appropriate financing option
- Recognize the various types of issue of securities in primary market to comprehend the risk-return and capital appreciation benefits
- Explore the other forms of long term finance to enable selection of an appropriate source of finance

7.3 Types of Capital

One of the most important considerations for an investment and financing decision is proper asset-liability management. Companies will have to face a severe asset-liability mismatch if the long-term requirements are funded by the short-term sources of funds. Such a mismatch will lead to an interest rate risk thereby enhancing the interest burden of the firm. It will also lead to a liquidity risk with the short-term funds being held up in long-term projects. Thus, it is important to fund long term projects with long term sources of finance.

Let us consider the following examples of costs and means of finance of a few projects:

Illustration 7.1

Ponni Sugars & Chemicals Ltd. is setting up a new sugar mill in Orissa, the details of the cost of the project and the means of financing are given below.

	Particulars	₹ in lakh
Cost of the Project		
1.	Land and Site Development	102
2.	Buildings	543
3.	Plant and Machinery	2,959
4.	Miscellaneous Fixed Assets	176
5.	Fees for Consultants	55
6.	Preliminary and Pre-operative Expenses	445
7.	Provision for Contingencies	210
8.	Margin Money for Working Capital	60
Total		**4,550**

	Particulars	₹ in lakh
Means of Financing		
1.	Equity Capital:	
	– Promoters	208
	– Rights to Shareholders	605
2.	Partly Convertible Debentures:	
	– Rights Issue	605
	– Public Issue	1,600
3.	Rupee Term Loan from Financial Institution	1,250
4.	Internal Accruals	282
Total		**4,550**

Illustration 7.2

Bhilwara Spinners Ltd., a closely held company belonging to the Bhilwara Group, engaged in the manufacture of various types of yarns and sewing threads, has gone in for a modernization program, the cost and the means of finance for the same are given below.

Cost of the Project

Sl. No.	Particulars		Total Cost (₹ in lakh)
A. Capital Expenditure For Modernization Program			
I.	Machinery Equipments		
	i. Cards	279.84	
	ii. Ring frames with 2 overhead cleaners	71.14	
	iii. TFO VL150		
	TFO VTS 09	155.67	
	iv. Uster	14.00	
	v. Ring Data System	9.51	
	vi. Draw Frame	14.89	
	vii. Condenser LVS	5.65	
	viii. Blender	5.15	
	ix. Accessories and other necessary machines	22.67	578.52
II.	Building		
	i. Construction of yarn godown	6.48	6.48
	Total (I) + (II)		585.00
B.	**Long-term working capital requirement**		708.00
C.	**Public issue expenses**		50.00
			1,343.00

Means of Finance

Particulars			₹ in lakh
	Nominal Value	Share Premium	Total Amount
A. Equity Capital			
a. Promoters, directors, their friends and relatives	50.00	50.00	100.00
b. Public issue	375.00	375.00	750.00
			850.00
B. Term Loan			
IFCI – Rupee term loan			
– Under Equipment Finance Scheme	275.00		
– Under Equipment Credit Scheme	178.00		453.00
C. Internal Accruals			40.00
			1,343.00

Illustration 7.3

Arvind Polycot Ltd. has started a project with the latest spinning & weaving machineries for the manufacture of 100% cotton high value fabrics to capture the international textile market in a big way. The cost and means of finance of the project, which has been appraised by a term lending institute, is as follows.

Cost of the Project

Particulars		₹ in lakh
Land		75
Building		1,050
Plant and Machinery		
Imported	2,866	
Indigenous	1,612	
Erection, Installation	150	4,628
Miscellaneous Fixed Assets		1,068
Preliminary & Pre-operative Expenses		600
Contingencies		816
Working Capital Margin		426
		8,663

Contd….

Means of Finance	
(i) Issue of Debentures to Public	3,732
(ii) Issue of Debentures to Arvind Mills Ltd.	2,371
(iii) Issue of Debentures on Rights Basis	2,560
	8,663
Other Requirement of Funds	
Other requirement of funds as appraised by ICICI is as under:	
Long-Term Working Capital Requirements	870
	870
Means of Finance	
(i) Issue of Debentures to Public	529
(ii) Cash Accruals	341
	870

In all the above cases, the sources of long-term financing for firms are generally issue of securities, term loans, internal accruals, supplier's credit scheme and equipment financing. In addition to these, firms have the option of funding their projects by way of deferred credit, unsecured loans and deposits and venture capital financing. Some important and popular sources of long-term financing are discussed here.

Firms can issue three types of capital – equity, preference and debenture capital. These three types of capital distinguish amongst themselves in the risk, return and ownership pattern.

Example: Indian Companies Raise Over ₹ 9 lakh crore through Equity, Debt Issuances in 2021

In the financial year 2021 till the third quarter ended December 2021, Indian companies raised more than ₹ 9 lakh crore. The amount of ₹ 9 lakh crore comprises

Debt - ₹ 5.53 lakh crore

Equity - ₹ 2.1 lakh crore

*REITs and InvITs - ₹ 30,840 crore

Overseas route - ₹ 1.06 lakh crore

The funds so raised were for the purpose of meeting business expansion needs (both organic and inorganic) such as acquisition of long term assets, working capital needs, acquisition of other companies and debt payment.

Capital comprises equity and debt and is necessary for setting up of new projects and expansion of the existing projects.

Contd….

* REITs refer to Real Estate Investment Trusts which are companies engaged in owning or financing income producing real estate. InvITs are Infrastructure Investment Trusts that operate similar to mutual funds by pooling money from several investors to be invested in income generating assets.

Source: https://www.hindustantimes.com/business/indian-companies-raise-over-9-lakh-crore-through-equity-debt-issuances-in-2021-101640518178107.html Dated 26th December 2021

7.3.1 Equity Capital

Equity Shareholders are the owners of the business. They enjoy the residual profits of the company after having paid the preference shareholders and other creditors of the company. Their liability is restricted to the amount of share capital they contributed to the company. Equity capital provides the issuing firm the advantage of not having any fixed obligation for dividend payment but offers permanent capital with limited liability for repayment. However, the cost of equity capital is higher than other capital. The cost of equity capital is high because firstly, the equity dividends are not tax-deductible expenses and secondly, costs of issue are high. In addition to this since the equity shareholders enjoy voting rights, excess of equity capital in the firms' capital structure will lead to dilution of effective control.

7.3.2 Preference Capital

Preference shares have some attributes similar to equity shares and some to debentures. Like in the case of equity shareholders, there is no obligatory payment to the preference shareholders; and the preference dividend is not tax deductible (unlike in the case of the debenture holders, wherein interest payment is obligatory). However, similar to the debenture holders, the preference shareholders earn a fixed rate of return for their dividend payment. In addition to this, the preference shareholders have preference over equity shareholders to the post-tax earnings in the form of dividends; and assets in the event of liquidation.

Other features of the preference capital include the call feature, wherein the issuing company has the option to redeem the shares, (wholly or partly) prior to the maturity date and at a certain price. In accordance with the provisions of Section 43(2) of the Companies Act, 2013, preference shareholders have voting rights in the following cases:

i. On the resolutions placed before the company
    - Which directly affects the rights attached to the preference shareholders
    - Pertaining to the winding up of the company
    - Pertaining to the repayment or reduction of the equity or preference share capital

    Such a voting right shall be in proportion to the share in the preference share capital of the company.

ii. On all resolutions placed before the company, if there are arrears in dividends for two or more years in case of any class of preference shares

Types of Preference Capital: Preference shares can be of two types in three categories.

i. Cumulative or Non-cumulative preference shares

ii. Redeemable or Irredeemable or Perpetual preference shares

iii. Convertible or Non-convertible preference shares

For cumulative preference shares, the dividends will be paid on a cumulative basis, in case they remain unpaid in any financial year due to insufficient profits. The company will have to pay up all the arrears of preference dividends before declaring any equity dividends. While on the other hand, the non-cumulative shares do not enjoy such right to dividend payment on cumulative basis.

Redeemable preference shares will be redeemed after a given maturity period while the perpetual preference share capital will remain with the company forever.

Provisions of Companies Act, 2013

The provisions of Companies Act, 2013, regarding issue of redeemable preference shares are as follows:

(1) A company limited by shares, after the commencement of this Act, cannot issue any preference shares which are irredeemable.

(2) A company limited by shares may, if so authorised by its articles, issue preference shares which are liable to be redeemed within a period not exceeding 20 years from the date of their issue subject to the following conditions: (a) No such shares shall be redeemed except out of the profits of the company which would otherwise be available for dividend or out of the proceeds of a fresh issue of shares made for the purposes of such redemption;

(b) No such shares shall be redeemed unless they are fully paid;

(c) Where such shares are proposed to be redeemed out of the profits of the company, there shall, out of such profits, be transferred, a sum equal to the nominal amount of the shares to be redeemed, to a reserve, to be called the Capital Redemption Reserve Account.

(d) (i) In case of such class of companies, as may be prescribed and whose financial statement comply with the accounting standards prescribed for such class of companies under Section 133, the premium, if any, payable on redemption shall be provided for out of the profits of the company, before the shares are redeemed. (ii) In a case not falling under sub-clause (i) above, the premium, if any, payable on redemption shall be provided for out of the profits of the company or out of the company's securities premium account, before such shares are redeemed.

(3) Where a company is not in a position to redeem any preference shares or to pay dividend, if any, on such shares in accordance with the terms of issue, it

may, with the consent of the holders of three-fourths in value of such preference shares and with the approval of the Tribunal, issue further redeemable preference shares equal to the amount due, including the dividend thereon.

Activity 7.1
1. Detail the features of any issues of preference shares in the recent past by any two companies. Discuss the differences or similarities of the issues.
2. Should a prospective investor choose equity shares or preference shares? Justify your answer.

7.3.3 Debenture Capital

A debenture is a marketable legal contract whereby the company promises to pay its owner, a specified rate of interest for a defined period and to repay the principal at the specific date of maturity. Debentures are usually secured by a charge on the immovable properties of the company.

A trustee usually represents the interest of the debenture holders and this trustee (which is typically a bank or an insurance company or a firm of attorneys) is responsible for ensuring that the borrowing company fulfills the contractual obligations embodied in the contract. If the company issues debentures with a maturity period of more than 18 months, then it has to create a Debenture Redemption Reserve (DRR), which should be at least half of the issue amount before the redemption commences. The company can also attach call and put options. With the call option, the company can redeem the debentures at a certain price before the maturity date and similarly the put option allows the debenture holder to surrender the debentures at a certain price before the maturity period.

Types of Debentures

Debentures can be classified based on the conversion and security. A few types of debentures are discussed below:

Non-Convertible Debentures (NCDs)

These debentures cannot be converted into equity shares and will be redeemed at the end of the maturity period.

Fully Convertible Debentures (FCDs)

These debentures will be converted into equity shares after a specified period of time at one stroke or in installments. These debentures may or may not carry interest till the date of conversion. In the case of a fully established company with an established reputation and good, stable market price, FCD's are very attractive to the investors as their bonds are getting automatically converted to shares which may at the time of conversion be quoted much higher in the market compared to what the debenture holders paid at the time of FCD issue.

Partly Convertible Debentures (PCDs)

These are debentures, a portion of which will be converted into equity share capital after a specified period, whereas the non-convertible (NCD) portion of the PCD will be redeemed as per the terms of the issue after the maturity period. The non-convertible portion of the PCD will carry interest right up to redemption whereas the interest on the convertible portion will be only up to the date immediately preceding the date of conversion.

Illustration 7.4

Let us look at the example 7.1 given earlier on Ponni Sugars and Chemicals in greater detail. The company is offering PCDs worth ₹ 2,205 lakh of which ₹ 605 lakh is being offered to the existing share-holders. The issue is for 14,70,000 16% Secured Redeemable PCDs of ₹ 150 each. Out of this, 4,06,630 PCDs is by way of Rights Issue, in the ratio of one PCD for every 10 equity shares held. The balance of 10,63,370 PCDs are offered to the public. Of the total face value of ₹ 150, the convertible portion will have a face value of ₹ 60 and the non-convertible portion, a face value of ₹ 90. A 'tradeable warrant' will be issued in the ratio of one warrant for every 5 fully paid PCDs. Each such warrant will entitle the holder to subscribe to one equity share at a premium which will not exceed ₹ 20 per share within a period of 3 years from the date of allotment of the PCDs. This is not included in the conversion at the rate of 1:10. The tradeable warrants will also be listed in stock exchanges to ensure liquidity. Interest at 16% on the paid-up value of the PCD allotted shall accrue from the date of allotment, but interest on the convertible portion of the PCD will be paid only up to the date immediately preceding the date of conversion. The non-convertible portion of the PCD will be redeemed in three stages at the end of the 6th, 7th and 8th year from the allotment of the PCD.

Secured Premium Notes (SPNs)

This is a kind of NCD with an attached warrant that was first introduced by TISCO (now Tata Steel) which issued SPNs aggregating ₹ 346.50 crore to existing shareholders on a rights basis. Each SPN is of ₹ 300 face value. No interest will accrue on the instrument during the first three years after allotment.

Subsequently, the SPN will be repaid in four equal installments of ₹ 75 each from the end of the fourth year together with an equal amount of ₹ 75 with each installment. This additional ₹ 75 can be considered either as interest (regular income) or premium on redemption (capital gain) based on the tax planning of the investor.

The warrant attached to the SPN gives the holder the right to apply for and get allotment of one equity share for ₹ 100 per share through cash payment. This right has to be exercised between one and one-and-half year after allotment, by which time the SPN will be fully paid-up.

Besides the above-mentioned sources of capital, several new instruments have come up in the recent past. A summary of such new instruments is as follows:

- **Non-voting Shares:** Useful for companies seeking to bolster net worth without losing management control. Similar in every respect to equity, the sole exception being the absence of voting rights.
- **Detachable Equity Warrants:** Issuable with Non-convertible Debentures (NCDs) or other debt or equity instruments. Ideal for firms with growth prospects, which would prefer equity coupons to convertible debentures (CDs).
- **Participating Debentures:** These are unsecured corporate debt securities, which participate in the profits of a company. Potential issuers will be existing dividend-paying companies. Could appeal to investors willing to accept risk for higher returns.
- **Participating Preference Shares:** Quasi-equity instrument to bolster net worth without loss of management control. Pay-outs linked to equity dividend, and also eligible for bonus. Will appeal to investors with an appetite for low risk.
- **Convertible Debentures with Options:** A derivative of the convertible debentures with an embedded option, providing flexibility to the issuer as well as the investor to exit from the terms of the issue. The coupon rate is specified at the time of the issue.
- **Third Party Convertible Debentures:** Debt with a warrant allowing the investor to subscribe to the equity of a third firm at a preferential price vis-á-vis the market price. Interest rate here is lower than pure debt on account of the conversion option.
- **Mortgage-Backed Securities:** A synthetic instrument, otherwise known as the Asset-Backed Security (ABS), for securitization of debt. Pooled assets like mortgages, credit card receivables, and the like back an ABS.
- **Convertible Debentures Redeemable at Premium:** Convertible debenture issued at face value with a "put" option entitling investors to sell the bond later to the issuer at a premium. Serves a similar purpose as that of convertible debt, but risks to investors is lower.

- **Debt-equity Swaps:** An offer from an issuer of debt to swap it for common stock (equity). The risks: it may dilute earnings per share in the case of the issuer; the expected capital appreciation may not materialize in the case of the investor.
- **Zero-Coupon Convertible Note:** A Zero-Coupon Convertible Note (ZCCN) converts into common stock. If investors choose to convert, they forgo all accrued and unpaid interest. The risk: ZCCN prices are sensitive to interest rates.

7.4 Issue of Securities

A firm can raise capital from the primary market (both domestic & foreign) by issuing securities in the following ways:

- Public Issue
- Rights Issue
- Private Placement
- BODs
- Euro-Issues

The apex body regulating the Indian securities market and the companies raising finance from it is the Securities and Exchange Board of India (SEBI). Since the Capital Issues Control Act, 1947, was repealed in May, 1992, SEBI was given the statutory power to regulate the Securities Market.

Example: LIC IPO - 2022

LIC, the insurance behemoth and a Government of India company, came out with its IPO of ₹ 21,008.58 crore and the subscription was open to public on 4th May, 2022 and bidding ended on 9th May, 2022. The government planned to dilute 3.5% of its stake in Life Insurance Corporation of India and raise funds through the IPO. The IPO status stood as follows:

The IPO was subscribed 1.79 times in retail investors category, similar quantum in non-institutional investors category, 2.83 times in qualified institutional buyers category, 4.36 times in the employees category, and 6.06 times in the policy holders category. Overall, the public issue was subscribed 2.94 times.

The lead managers of the IPO of the issue were Goldman Sachs (India) Securities, Citigroup Global Markets India, Nomura Financial Advisory and Securities India, SBI Capital Market, JM Financial, Axis Capital, BofA Securities, JP Morgan India and ICICI Securities.

Public issue is the most popular way to raising capital by issuing shares of the company to the public.

Source: https://www.bajajfinservsecurities.in/product/upcoming-ipo/lic-ipo dated 9th May 2022

7.4.1 Public Issue

Companies issue securities to the public in the primary market and get them listed on the stock exchanges. These securities are then traded in the secondary market. The major activities involved in making a public issue of securities are as follows:

Appointment of the Lead Manager

Before making a public issue of securities, the firm should appoint a SEBI registered Category-I Merchant Banker to manage the issue. The Lead Manager will be responsible for all the pre and the post-issue activities, liaison with the other intermediaries, statutory bodies like SEBI, Stock Exchanges and the Registrar of Companies (ROC), and finally ensures that the securities are listed on the stock exchanges.

Preparation of the Prospectus

The lead manager is responsible for the preparation of the prospectus. The prospectus is a document that disseminates all the information about the company, the promoters, and the objectives of the issue and has the contents as specified by the Company Law. The final prospectus has to be forwarded to SEBI and the listing Stock Exchange.

Appointment of Intermediaries

The other intermediaries who are involved in the public issue of securities are underwriters, registrars, bankers to the issue, brokers and advertising agencies. Apart from these, it also involves promotion of the issue, printing and dispatch of prospectus and application forms, obtaining statutory clearances, filing the initial listing application, final allotment and refund activities. The cost of a public issue ranges between 12-15% of the issue size and can go up to 20% in bad market conditions.

7.4.2 Rights Issue

Under Section 62 of the Companies Act, 2013, when a firm issues additional equity capital, it has to first offer such securities to the existing share-holders on a pro rata basis. The rights offer should be kept open for a period of 60 days and should be announced within one month of the closure of the books. The shareholders can also renounce their rights in favor of any other person at market-determined rate. The cost of floating of rights issue will be comparatively less than the public issue, since these securities are issued to the existing shareholders, thereby eliminating the marketing costs and other relevant public issue expenses. The rights issue will also be priced lower than the public issue since it will be offered to the existing shareholders.

Ex-rights Value of a Share

The value of a share, after the rights issue, is

$$\frac{NP_0 + S}{N + 1}$$

Where

N = Number of existing shares required for a rights share

P_0 = Cum-rights price per share

S = Subscription price at which rights shares are issued.

If a company issues one share for every 3 shares held at a price of ₹ 25 per share, and the existing price is ₹ 30 per share, the ex-rights price of the share would be

$$= \frac{3 \times 30 + 25}{3 + 1}$$

= ₹ 28.75 per share.

Value of a Right

The theoretical value of a right is

$$\frac{P_0 - S}{N + 1}$$

In the above example, it would be

= (30 – 25) / 4 = ₹ 1.25

7.4.3 Private Placement

The private placement method of financing involves direct selling of securities to a limited number of institutional or high net worth investors. This avoids the delay involved in going public and also reduces the expenses involved in a public issue. The company appoints a merchant banker to network with the institutional investors and negotiate the price of the issue. The major advantages of privately placing the securities are:

- Easy access to any company
- Fewer procedural formalities
- Lower issue cost
- Access to funds is faster

7.4.4 Bought-Out Deals

Buy-out is a process whereby an investor or a group of investors buy-out a significant portion of the equity of an unlisted company with a view to sell the equity to public within an agreed time frame. The company places the equity shares, to be offered to the public, with a sponsor. At the right time, the shares will be off loaded to the public through the OTCEI route or by way of a public issue. The Bought-Out Deal (BOD) route is relatively inexpensive, funds accrue without much delay (in a public issue funds reach the company only after a period of 2-3 months from the date of closure of the subscription list). In addition to this,

it affords greater flexibility in terms of the issue and matters relating to off-loading with proper negotiations with the sponsor or the merchant banker involved. Major advantages of entering into a bought-out deal are:

- Companies, both existing and new, which do not satisfy conditions laid down by SEBI for premium issues, may issue at a premium through the BOD method
- The procedural complexities are reduced considerably and the funds reach the firm upfront. Added to this there is a cut in the issue costs
- An advantage accruing the investor is that the issue price usually reflects the company's intrinsic value

7.4.5 Euro-Issues

The Government has allowed Indian companies to float their stocks in foreign capital markets. The Indian corporates, which face high rates of interest in the domestic markets are now free to tap the global capital markets for meeting resource requirements at less costs and administrative problems. The instruments which the company can issue are Global Depository Receipts (GDRs), Euro-Convertible Bonds (ECBs), Foreign Currency Convertible Bonds (FCCBs). These instruments are issued abroad and listed and traded on a foreign stock exchange. Once they are converted into equity, the underlying shares are listed and traded on the domestic exchange.

Check Your Progress - 1

1. Companies need finance mainly, to fund their long-term decisions and to suffice their working capital requirements. From the given financing types, identify the long-term source of finance.
   a. Commercial paper
   b. Treasury bills
   c. Cash credit
   d. Factoring
   e. Debentures
2. Equity shareholders are called as the _____
   a. Creditors of the company
   b. Owners of the company
   c. Executives of the company
   d. Guardians of the company
   e. Partners of the company

3. Equity shareholders enjoy certain rights that are not attributed to preference shareholders. Which of the following is not a feature of equity capital?
   a. There is an obligation to pay fixed rate of dividend
   b. Have limited liability restricted to amount of share capital
   c. Cost of equity capital is higher than other capital
   d. Equity dividends are not tax-deductible expenses
   e. Enjoys voting rights
4. A debenture instrument is said to be an acknowledgement of debt, issued by the company at a specified rate of interest. How are debentures classified?
   a. Capital of permanent nature
   b. Capital of fluctuating nature
   c. Loan capital of the company
   d. Retained earnings of the company
   e. Short term credits of the company
5. Financial instruments issued with security to debts are called as _____
   a. Detachable equity warrants
   b. Convertible debentures with options
   c. Mortgage backed securities
   d. Debt – equity swaps
   e. Convertible debentures redeemable at premium

7.5 Other Sources of Long Term Finance

A business needs to analyze the various sources of long-term finance before arriving at its financing decision. Such an analysis is required to ensure that the source of finance selected is in congruence with its risk profile, expected returns from the investment for which the finance is procured and the desired ownership pattern.

Equity, preference and debenture capital represent the principal sources of long-term finance. However, while taking the financing decision, the business may look into other forms of financing too such as term loans, internal accruals, deferred credit etc. The previous section outlined the features of the principal sources of finance. Let us now look into the other forms of financing:

7.5.1 Term Loans

Term loans constitute one of the major sources of debt finance for a long-term project. Term loans are generally repayable in more than one year but less than 10 years. These term loans are offered by the All India Financial Institutions viz.,

IDBI, ICICI etc. and by the State Level Financial Institutions. The salient features of the term loans are the interest rates, security offered and the restrictive covenants.

The interest rate on the term loans will be fixed after the financial institution appraises the project and assesses the credit risk. Generally, there will be a floor rate fixed for different types of industries. The interest and the principal installment payment are obligatory for the company and any defaults, in this regard will attract a penalty. The company will generally be given 1-2 years of moratorium period, and they will be asked to repay the principal in equal semi-annual installments.

Term loans, which can be either in rupee or foreign currency, are generally secured through a first mortgage or by way of depositing title deeds of immovable properties or hypothecation of movable properties. In addition to the security, financial institutions also place restrictive covenants while granting the term loan. These depend mostly on the nature of the project and can include placing the nominees of the financial institution on the company's board, refrain the company from undertaking any new project without their prior approval, disallow any further charges on the assets, maintain the debt-equity ratio to a certain level, etc.

The major advantage of this source of finance is its post-tax cost, which is lower than the equity/preference capital and there will be no dilution of control. However, the interest and principal payments are obligatory and threaten the solvency of the firm. The restrictive covenants may, to a certain extent, hinder the company's future plans.

Example: HDFC Bank Clocks 21% Loan Growth at Rs 13.69 Trillion in FY22

HDFC Bank, the largest private sector bank, increased its loan portfolio by 20.9 per cent growth on year-on-year (YoY) basis to Rs. 13.69 trillion in FY22. In this growth process of loans, the retail loans grew by around 15 per cent, the commercial & rural banking loans grew at 30.5 per cent and the corporate & other wholesale loans grew by around 17.5 per cent over March 31, 2021. It is said that the prime reason for this growth was attributed to economic growth post pandemic and many companies expanded their production capacity by availing loans from the banks. Term loans, apart from equity and internal accruals, are the main source of funds to corporates and MSMEs.

Source: https://www.business-standard.com/article/finance/hdfc-bank-clocks-21-loan-growth-at-rs-13-69-trillion-in-fy22-122040300758_1.html dated 3rd April 2022

7.5.2 Internal Accruals

Financing through internal accruals can be done through the depreciation charges and the retained earnings. While depreciation amount will be used for replacing

an old machinery etc., retained earnings on the other hand can be utilized for funding other long-term objectives of the firms. The major advantages the company gets from using this as a source of long-term finance are its easy availability, elimination of issue expenses and the problem of dilution of control. However, the disadvantage is that there will be limited funds from this source. In addition to this ploughing back of retained earnings implies foregoing of dividend receipts by the investors which may actually lead to higher opportunity costs for the firm.

7.5.3 Deferred Credit

The deferred credit facility is offered by the supplier of machinery, whereby the buyer can pay the purchase price in installments spread over a period of time. The interest and the repayment period are negotiated between the supplier and the buyer and there are no uniform norms. Bill Rediscounting Scheme, Supplier's Line of Credit, Seed Capital Assistance and Risk Capital Foundation Schemes offered by financial institutions are examples of deferred credit schemes.

7.5.4 Leasing and Hire Purchase

The other sources of finance for companies are the leasing and hire purchase of assets. These two types of financing options, which are supplementary to the actual long-term sources, are offered by financial institutions, Non-Banking Finance Companies, banks and manufacturers of equipment/assets. Leasing is a contractual agreement between the lessor and the lessee, wherein companies (lessee) can enter into a lease deal with the manufacturer of the equipment (lessor) or through some other intermediary. This deal will give the company the right to use the asset till the maturity of the lease deal and can later return the asset or buy it from the manufacturer. During the lease period the company will have to pay lease rentals, which will generally be at negotiated rate and payable every month. Very similar to leasing is hire purchase, except that in hire purchase the ownership will be transferred to the buyer after all the hire purchase installments are paid-up. With the mushrooming of Non-Banking Finance Companies (NBFC) offering the leasing and hire purchase of equipments, many companies are opting for this route to finance their assets. The cost of such financing generally lies between 20-25%.

7.5.5 Government Subsidies

The central and state governments provide subsidies to industrial units in backward areas. Some such subsidies or incentives are:

Government of India introduced Transport Subsidy Scheme (TSS) in the year 1971 to develop industrialization in the remote, hilly and inaccessible areas. Under the scheme, subsidy on the transport cost for transportation of raw material

and finished goods to and from the location of the unit and the designated rail-head was reimbursed for a period of 5 years from the date of commencement of commercial production. For North Eastern states, subsidy is 90%. However, for the movement of goods within NER, the subsidy is 50% on finished goods and 90% on raw material. The Scheme has been discontinued with effect from 22.11.2016. However, industrial units registered under the scheme prior to the date of issue of DIPP's notification dated 22.11.2016 will be eligible for the benefits of the residual period under the scheme. Since Inception of the scheme, an amount of Rs.6138.92 crore has been released to the states/UTs[1].

A subsidy at the rate of 15% of the investment in plant and machinery is given under capital investment subsidy scheme.

A subsidy of interest relief is also provided at the rate of 3% for new industrial units in some areas.

The capital investment subsidy scheme for north-eastern region is limited to ₹ 5 crores for manufacturing units and ₹ 3 crores for service sector units. There is an automatic approval of subsidy to the tune of 30% of investment in plant and machinery upto ₹ 1.5 crore.

The state governments also offer cash subsidies to promote widespread dispersal of industries within their states.

7.5.6 Sales Tax Deferments and Exemptions

To attract industries, the state provides incentives, *inter alia*, in the form of sales tax deferments and sales tax exemptions.

Under the sales tax deferment scheme, the payment of sales tax on the sale of finished goods may be deferred for a period ranging between five to twelve years. Essentially, it implies that the project gets an interest-free loan, represented by the quantum of sales tax deferment period.

Under the sales tax exemption scheme, some states exempt the payment of sales tax applicable on purchase of raw materials, consumables, packing, and processing materials from within the state, which are used for manufacturing purposes. The period of exemption ranges from three to nine years depending on the state and the specific location of the project within the state.

Thus, with a definite increase in the variety of sources for long-term funds rising, an efficient Finance Manager will be the one who devises the optimum financing mix. The funding process should be a trade-off between the cost of funding, the risk involved and the returns expected, so that a reasonable spread is maintained for the firm.

[1] https://www.dcmsme.gov.in/publications/papers/nebgnd.htm

Check Your Progress - 2

6. In the year 20xx, XYZ Power Company Limited, offered 33.22 crores equity shares with a face of Re.1 each, for an issue price of ₹ 60, to its shareholders for funding its expansion plans. It had allotted 7 equity shares for every 50 shares held by the investors. What is the term used to refer to this type of issue?
   a. Public issue
   b. Right issue
   c. Private placement
   d. Buy out deals
   e. Euro issues
7. Which form of finance provide a credit facility where the amount is repayable in more than one year but less than 10 years?
   a. Internal accruals
   b. Deferred credit
   c. Term loans
   d. Leasing
   e. Hire purchase
8. _____ is a form of source of finance that provides financial support to domestic industry by the government to promote the social, economic and technological upgradation to a specific sector.
   a. Deferred credit
   b. Subsidies
   c. Term loans
   d. Tax deferments
   e. Exemptions
9. Subsidies given to encourage agricultural exports without providing harm to domestic economy is referred to as _____
   a. Input subsidy
   b. Export subsidy
   c. Infrastructure subsidy
   d. Price subsidy
   e. Agricultural subsidy

10. Which of the following enables the purchaser of raw material to make tax-free purchases within the states?
    a. Sales tax deferments
    b. Sales tax exemption
    c. Income tax exemption
    d. Property tax
    e. Wealth tax

7.6 Concept of Finance for Government

Governments borrow long-term funds to invest in public sector institutions of production or to build social infrastructure like educational institutions, hospitals, roads etc. The government on the other hand may borrow funds for the short-term due to the temporary shortfall in revenue generation. The government instead of cutting back on its spending may borrow funds from outside to tide over cash crunch in the revenue and the expenditure as predicted in the budget. These borrowings form parts of 'public debt' or 'government debt'.

Example: Calendar for Auction of Government of India Treasury Bills (for the Quarter Ending March 2022

For the quarter ended March 2022, the following are the auction schedules released by the RBI.

(Amount ₹ in crore)

Date of Auction	Date of Issue	91 Days	182 Days	364 Days	Total
January 05, 2022	January 06, 2022	5,000	10,000	11,000	26,000
January 12, 2022	January 13, 2022	5,000	10,000	11,000	26,000
January 19, 2022	January 20, 2022	5,000	10,000	11,000	26,000
January 25, 2022	January 27, 2022	5,000	10,000	11,000	26,000
February 02, 2022	February 03, 2022	5,000	10,000	11,000	26,000
February 09, 2022	February 10, 2022	5,000	10,000	11,000	26,000
February 16, 2022	February 17, 2022	5,000	10,000	11,000	26,000
February 23, 2022	February 24, 2022	5,000	10,000	11,000	26,000
March 02, 2022	March 03, 2022	5,000	10,000	11,000	26,000
March 09, 2022	March 10, 2022	5,000	10,000	10,000	25,000
March 16, 2022	March 17, 2022	5,000	10,000	10,000	25,000
March 23, 2022	March 24, 2022	5,000	10,000	10,000	25,000
March 30, 2022	March 31, 2022	5,000	10,000	10,000	25,000
Total		65,000	1,30,000	1,39,000	3,34,000

The schedule indicated that the government will raise ₹ 3.34 lakh crore during the quarter January–March 2022.

Source: https://www.rbi.org.in/scripts/BS_PressReleaseDisplay.aspx?prid=53022 dated 31st December 2021

Each and every country adopts different debt management techniques depending upon its broader objectives like:

a. Attracting adequate funds into government coffers

b. Minimizing interest costs

c. Achieve proper debt structure with regard to maturity and

d. Maintain and achieve economic and social targets

In the Indian context, Indian government uses different sources of finance to achieve its public debt target.

The public debt can be categorized into a) internal debt and b) external debt. The internal debt obligations of the central government as on date are:

- **Market loans:** These loans have a maturity of 12 months or more at the time of issue. The government sells openly its securities through Reserve Bank of India.
- **Bonds:** This category consists of bonds such as gold bonds, rural development bonds or infrastructure bonds etc.
- **Treasury Bills:** These are short-term debt obligations created to bridge a gap between revenue and expenditure.
- **Ways and Means Advances from RBI:** These are advances taken from Reserve Bank of India to meet short-term obligations. This debt is purely temporary in nature and usually paid within three months.
- **Securities against small savings:** Under this mechanism, substantial part of small securities is converted into central government securities.
- **Small savings from Public:** Through innovative schemes such as National Saving Scheme etc., government mobilizes funds on a continuous basis through post offices.
- **Provident funds:** These are retirement savings for which employees and employers contribute.
- **Reserve Funds and deposit funds:** These are funds deposited with the central pool of funds by Railways and other public sector undertakings.

The external debt obligations of the central government as on date are:

1. Foreign currency loans from developed countries like USA, UK, France, Former USSR, Germany, Japan etc.
2. Foreign currency loans from international financial institutions like IMF and IBRD etc.

At this juncture, one has to understand that Reserve Bank of India plays a pivotal role in mobilizing debt and repayment of public debt on behalf of the government.

Reserve bank indirectly uses the government debt instruments and T-Bills in its open market operations (OMOs) of buying and selling these securities to achieve price stability in the economy by controlling the money supply in the economy.

These open market operations are also taken up to see that bond yields in the economy are normal or to see that a yield curve is normal. A yield curve is a line that plots the interest rates with different maturities having equal credit quality. The central banks usually want to see that longer maturity bonds have a higher yield compared to shorter bonds due to the risks connected with time. (In a normal yield curve, the slope will move upward to depict higher yields often associated with long-term bonds).

With regard to financial institutions, and banks, they borrow long term funds to increase their balance sheet size and borrow short term funds to tide over liquidity mismatches between cash inflows and cash outflows. The liquidity is all about the ability of the institution to meet its liabilities exactly when they are due. Long-term funds are needed for growth and short-term funds are needed for liquidity and short-term solvency.

Activity 7.2

1. Visit the Ministry of Finance website and download the latest quarterly public debt management report. Analyze the report to identify the various components of public debt.

2. Company XYZ, which had concentrated its operations in India only, is now all set to be a global company. So, it is planning to raise additional funds. The company has already 4,50,000 equity shares. It is planning to sell 1,50,000 new equity shares. XYZ would issue share at a price of ₹ 25 per share, and the existing price is ₹ 30 per share. Calculate the value of right share.

7.7 Summary

- Long-term finance is absolutely essential for any operating concern. Any company needs to have a lot of money for investing in long-term assets such as land and buildings, plant and machinery, technical know-how and working capital margin. Hence, it (the company) needs long-term sources of funds to finance these investments as usage of short-term funds will only result in asset-liability mismatch and make the firm illiquid.

- There are three main sources of long-term funds – equity shares, preference shares and debentures.
- Equity share-holders are the owners of the company and enjoy residual profits after having paid all the commitments including preference share dividend. Companies have no fixed obligation to pay dividends, and hence equity offers perpetual capital with limited liability for repayment. However, since the equity share-holders assume a lot more risk than others, cost of equity is higher than the cost of other sources of finance. In addition, since equity share-holders enjoy voting rights, too much of equity capital can dilute the control of the management.
- Preference shares are similar to equity, in that there is no obligatory payment and the dividends are not tax deductible. However, preference share-holders earn a fixed rate of return for their investments and have a preference over equity share-holders to post-tax earnings in the form of dividends and assets in case of liquidation.
- Preference shares can be classified into three types: cumulative and non-cumulative, redeemable and perpetual and convertible and non-convertible.
- Debentures are marketable contracts where-in the company promises to pay the holder a specified rate of interest for a certain period and repay the principal on maturity. These instruments are generally secured by a charge on immovable properties of the companies.
- Interest paid on debentures is tax deductible and debenture holders have the first right to assets in case of liquidation. Debentures can be classified into non-convertible, partly convertible and fully convertible debentures.
- A company can raise money using any of these instruments by going to the capital market. There are many ways of doing it. A company can go for a public issue, a rights issue, private placement, buyout deals or euro-issues for raising finances.
- With a definite increase in the variety of sources for long-term fund raising, an efficient Finance Manager will be the one who devises the optimum financing mix. The funding process should be a trade-off between the cost of funding, the risk involved and the returns expected, so that a reasonable spread is maintained for the firm.
- Governments borrow long-term funds to invest in public sector institutions of production or to build social infrastructure like educational institutions, hospitals, roads etc. These borrowings are referred to as public debt.
- The public debt can be categorized into a) internal debt and b) external debt.

- The internal debt obligations of the central government as on date are market loans, bonds, treasury bills, ways and means advances from RBI, securities against small savings, small savings from public, provident funds and reserve funds and deposit funds
- The external debt obligations comprise of foreign currency loans from developed countries and foreign currency loans from international financial institutions.

7.8 Glossary

Bought Out Deal: Buy out is a process whereby an investor or a group of investors buy out a significant portion of the equity of an unlisted company with a view to sell the equity to public within an agreed time-frame.

Debenture: It is a marketable legal contract whereby the company promises to pay its owner, a specified rate of interest for a defined period of time and to repay the principal at the specific date of maturity.

Equity Capital: It is the capital raised from equity share-holders. Equity share-holders are the owners of the business. They enjoy the residual profits of the company after having paid the preference share-holders and other creditors of the company.

Internal Accruals: The internal sources of finance represented by depreciation charges and retained earnings.

Leasing: It is a contractual agreement between the lessor and the lessee, wherein companies (lessee) can enter into a lease deal with the manufacturer of the equipment (lessor) or through some other intermediary.

Open Market Operations refers to the practice of buying and selling of government securities in the open market as a method of controlling the money supply in the economy.

Preference Capital: Preference shares have some attributes similar to equity shares and some to debentures. Like in the case of equity shareholders, there is no obligatory payment to the preference share-holders; and the preference dividend is not tax deductible.

Provident Fund is an investment fund or a retirement fund. The employers and employees contribute specific amounts to this regularly from which a lumpsum amount is contributed to any employee on his/her retirement.

Public Debt also known as government debt refers to the government's borrowing long-term funds to invest in public sector institutions of production or to build social infrastructure like educational institutions, hospitals, roads etc.

Sales Tax Deferment: Under the sales tax deferment scheme, the payment of sales tax on the sale of finished goods may be deferred for a period ranging between five to 12 years.

Sales Tax Exemption: Under the sales tax exemption scheme, some states exempt the payment of sales tax applicable on purchase of raw materials, consumables, packing, and processing materials from within the state which are used for manufacturing purposes.

Secured Premium Notes (SPN): This is a kind of Non-Convertible Debentures (NCD) with an attached warrant.

Term Loans: Term loans constitute one of the major sources of debt finance for a long-term project. Term loans are generally repayable in more than one year but less than 10 years.

Treasury Bills are short-term debt obligations created to bridge a gap between revenue and expenditure.

Ways and Means Advances are advances taken from Reserve Bank of India to meet short-term obligations. This debt is purely temporary in nature and usually paid within three months.

Yield Curve is a line that plots the interest rates with different maturities having equal credit quality. The central banks usually want to see that longer maturity bonds have a higher yield compared to shorter bonds due to the risks connected with time.

7.9 Self-Assessment Test

1. Why there is a need for long-term financing for businesses. Give examples.
2. Distinguish between shares and debentures.
3. Explain the types of debenture capital issued in the market with necessary examples.
4. Write a note on new financial instruments rolled out in the market for raising finances by businesses.
5. Describe the ways and means in which the securities can be issued both in domestic and foreign market.
6. What are term loans? State its characteristics.
7. How do government subsidies act as a financial source to the business?

7.10 Suggested Readings / Reference Material

1. Brealey Myers (2020). Principles of Corporate Finance, 13th edition, USA: McGraw-Hill Companies Inc.
2. Prasanna Chandra (2019). Financial Management – Theory and Practice, 10th edition, New Delhi: Tata McGraw-Hill.
3. I.M. Pandey (2021). Financial Management, 12th edition, New Delhi: Pearson Education.

4. Francis Cherunilam (2020). International Business — Text and Cases, 6th Edition, PHI Learning.
5. P.G. Apte (2020). International Financial Management, 8th Edition, McGraw Hill Education (India) Private Limited.
6. John Tennent (2018). The Economist Guide to Financial Management. Economist Books.

7.11 Answers to Check Your Progress Questions

1. (e) Debentures

Debenture is one of the source of long-term finance. All the other options given – treasury bills, commercial paper, certificate of deposits, cash credit and factoring are short term sources of finance.

2. (b) Owners of the company

Equity share-holders are the owners of the business and enjoy the residual profits of the company after having paid the preference share-holders and other creditors of the company.

3. (a) There is an obligation to pay fixed rate of dividend

Equity capital provides the issuing firm the advantage of not having any fixed obligation for dividend payment.

4. (c) Loan capital of the company

A debenture is a marketable legal contract whereby the company promises to pay its owner, a specified rate of interest for a defined period of time and to repay the principal at the specific date of maturity.

5. (c) Mortgage backed securities

A synthetic instrument, otherwise known as the Asset-Backed Security (ABS), for securitization of debt. An ABS is backed by pooled assets like mortgages, credit card receivables, and the like.

6. (b) Right issue

Under Section 62 of the Companies Act, 2013, when a firm issues additional equity capital, to the existing shareholders on a pro rata basis, it is referred to as right issue.

7. (c) Term loans

Term loans constitute one of the major sources of debt finance for a long-term project. Term loans are generally repayable in more than one year but less than 10 years.

8. (b) Subsidies

The central and state governments provide subsidies to industrial units and promote economic welfare of a specific sector.

9. (b) Export Subsidy

Subsides provided to encourage exports are referred as export subsidies.

10. (b) Sales tax exemption

The sales tax exemption scheme allows some states exempt the payment of sales tax applicable on purchase of raw materials, consumables, packing, and processing materials from within the state which are used for manufacturing purposes.

Unit 8

Cost of Capital and Capital Structure Theories

Structure

"Returns matter a lot. It's our capital."

- Abigail Johnson

8.1 Introduction

Now that we are familiar with the different sources of long-term finance, let us find out what it costs the company to raise these various types of finance. The cost of capital to a company is the minimum rate of return that it must earn on its investments in order to satisfy the various categories of investors who have made investments in the form of shares, debentures or term loans. Unless the company earns this minimum rate, the investors will be tempted to pull out of the company, let alone participate in any further capital investment in that company. For example, equity investors expect a minimum return as dividend depending on their perception of the risk undertaken based on the company's past performance or on the returns, they are getting from shares they have of other companies.

This unit discusses the computation of the cost of capital of various sources of finance and explains the various theories of capital structure. Capital structure refers to the appropriate combination of debt and equity in long-term financing. Capital structure theories determine this optimal debt-equity mix with the help of cost of capital.

8.2 Objectives

After reading through the unit, you should be able to:

- Explain the meaning of Cost of Capital and its application in the field of finance
- Compute the costs for each of the different sources of finance to determine the overall cost of capital to the firm
- Determine the weighted average and weighted marginal costs of capital to arrive at optimal debt-equity mix
- Study the determinants and theories of capital structure to derive an optimal capital structure for a firm

8.3 Meaning of Cost of Capital

The weighted arithmetic average of the cost of different financial resources that a company uses is termed as its cost of capital. Let us look at a simple example. A company has a total capital base of ₹ 500 lakh in the ratio of 1:1 of debt-equity[2] i.e., divided equally between debt and equity, ₹ 250 lakh of debt and ₹ 250 lakh of equity. If the post-tax costs of debt and equity are 7% and 18% respectively, the cost of capital to the company will be equal to the weighted average cost i.e.,

$$\frac{250}{500} \text{ x } 7\% + \frac{250}{500} \text{ x } 18\% = 12.5\%.$$

Thus, 12.5% is the minimum return that providers of capital will expect from the company. This minimum return is the cost of capital for the company. The concept of capital has extensive applications in the field of finance such as in evaluation of investment projects, for determining the capital structure, for assessing leasing proposals etc.

Assumptions

Given this definition of cost of capital, it must be noted that the use of this measure for appraising new investments will depend upon two important assumptions:

(a) The risk characterizing the new project under consideration is not significantly different from the risk characterizing the existing investments of the firm, and

(b) The firm will continue to pursue the same financing policies.

Put differently, there will be no deviation from the debt-equity mix presently adopted by the firm.

[2] This text is called the Debt-Equity Ratio which will be covered in detail later in this chapter.

Example: Capital Structure of RIL

The capital structure of Reliance Industries as on 31st March 2021 was as follows:

(₹ in crore)

Shareholders' funds	4,74,483.00
Secured loans	16,332.00
Unsecured loans	2,05,366.00
Total debt	2,21,698.00
Total capital base	6,96,181.00

Let us assume that the post-tax costs of debt and equity are 6% and 12% respectively, the cost of capital to the company will be equal to the weighted average cost which is as follows:

(4,74,483 / 6,96,181) x 12 / 100 + (2,21,698 / 6,96,181) x 6/100 = (0.68 x 0.12) + (0.32 x 0.06)

= 0.0816 + 0.0192 = 0.1008 = 10.08%

Thus the weighted average cost of capital for Reliance Industries was 10.08%.

Source: https://www.capitalmarket.com/Company-Information/Financials/Balance-sheet/Reliance-Industries-Ltd/476 dated 11th May 2022.

8.4 Costs of Different Sources of Finance

For calculating the cost of capital of the firm, we have to first define the cost of various sources of finance[3] used by it. The sources of finance that are typically tapped by a firm are (a) debentures (b) term loans (c) preference capital (d) equity capital, and (e) retained earnings. The mechanics involved in computing the costs of these sources of finance are discussed below:

8.4.1 Cost of Debentures

The cost of a debenture is defined as the discount rate, which equates the net proceeds from issue of debentures to the expected cash outflows in the form of interest and principal repayments, i.e.

$$P = \sum_{t=1}^{n} \frac{I(1-t)}{(1+k_d)^t} + \frac{F}{(1+k_d)^n} \quad \text{.....(1)}$$

[3] The cost of a source of finance is defined as the rate of discount which equates the present value of the expected payments to that source of finance with the net proceeds received from that source of finance. The formulae discussed in this section for obtaining the costs of the different sources have been derived using this definition.

where,

k_d = Post-tax cost of debenture capital

I = Annual interest payment per debenture capital

t = Corporate tax rate

F = Redemption price per debenture

P = Net amount realized per debenture and

n = Maturity period.

The interest payment (I) is multiplied by the factor (1 – t) because interest on debt is a tax-deductible expense and only post-tax costs are considered.

An approximation formula as given below can also be used:

$$k_d = \frac{I(1-t)+\frac{F-P}{n}}{\frac{F+P}{2}} \qquad \text{.....(2)}$$

Note: When the difference between the redemption price and the net amount realized can be written off evenly over the life of the debentures and the amount so written-off is allowed as a tax-deductible expense, the above two equations can be changed as follows:

Equation (1) becomes

$$P = \sum_{t=1}^{n} \frac{I(1-t)-\frac{(F-P)t}{n}}{(1+k_d)^t} + \frac{F}{(1+k_d)^n}$$

Equation (2) becomes

$$k_d = \frac{I(1-t)+\left(\frac{F-P}{n}\right)(1-t)}{\frac{F+P}{2}}$$

The following illustration shows the application of this formula.

Illustration 8.1

Ajax Limited has recently made an issue of non-convertible debentures for ₹ 400 lakh. The terms of the issue are as follows: each debenture has a face value of ₹ 100 and carries a rate of interest of 14 percent. The interest is payable annually and the debenture is redeemable at a premium of 5 percent after 10 years.

If Ajax Limited realizes ₹ 97 per debenture and the corporate tax rate is 50 percent, what is the cost of the debenture to the company?

Solution

Given I = ₹ 14, t = 0.5, P = ₹ 97, and n = 10 years, F = ₹ 105, the cost per debenture (k_d) will be:

$$k_d = \frac{14(1-0.5)+\frac{105-97}{10}}{\frac{105+97}{2}} = 7.7 \text{ percent}$$

8.4.2 Cost of Term Loans

The cost of the term loans will be simply equal to the interest rate multiplied by (1 – tax rate). The interest rate to be used here will be the interest rate applicable to the new term loan. The interest is multiplied by (1 – tax rate) as interest on term loans is also tax deductible.

$$k_t = I(1-t)$$

Where,

I = Interest rate

t = Tax rate

Example: Cost of Term Loans

Moneycontrol.com dated 11th May, 2022 exhibited the financial information of Tata Steel and the following were the figures of long term liabilities of the company as on 31.03.22:

(Amount- ₹ in crore)

Long term borrowings	24,017.71
Other long term liabilities	8,097.35

The following are the assumptions made for arriving at the cost of term loan:

a. The entire long term borrowings were from banks.

b. The average pricing of the loans was 7.5%.

c. Corporate tax - 33.6% inclusive of surcharge.

Cost of term loan is given by the formula - kt = I (1– t) Where, I = Interest rate and t = Tax rate

Based on the above, the cost of term loan of Tata Steel kt = 7.5 x (1 - 0.336) = 7.5 x 0.664 = 4.98%

Source: https://www.moneycontrol.com/financials/tatasteel/balance-sheetVI/TIS.

8.4.3 Cost of Preference Capital

The cost of a redeemable preference share (k_p) is defined as that discount rate which equates the proceeds from preference capital issue to the payments associated with the same i.e. dividend payment and principal payments, which can be

$$P = \sum_{t=1}^{n} \frac{D}{(1+k_p)^t} + \frac{F}{(1+k_p)^n} \quad \text{.....(3)}$$

where,

k_p = Cost of preference capital

D = Preference dividend per share payable annually

F = Redemption price

P = Net amount realized per share

n = Maturity period

An approximation formula as given below can also be used.

$$k_p = \frac{D + \frac{F-P}{n}}{\frac{F+P}{2}} \quad \text{.....(4)}$$

Illustration 8.2

The terms of the preference share issue made by Color-Dye-Chem are as follows: Each preference share has a face value of ₹ 100 and carries a dividend rate of 14 percent payable annually. The share is redeemable after 12 years at par. If the net amount realized per share is ₹ 95, what is the cost of the preference capital?

Solution

Given that D = 14, F = 100, P = 95 and n = 12

$$k_p = \frac{14 + \frac{100-95}{12}}{\frac{100+95}{2}} = 0.148 \text{ or } 14.8 \text{ percent}$$

8.4.4 Cost of Equity Capital

Measuring the rate of return required by the equity shareholders is a difficult and complex exercise because the dividend stream receivable by the equity shareholders is not specified by any legal contract (unlike in the case of debenture holders). Several approaches are adopted for estimating this rate of return like the dividend forecast approach, capital asset pricing approach, realized yield approach, earnings-price ratio approach, and the bond yield plus risk premium approach.

Example: Cost of Equity Capital of Adani Green Energy Ltd. (AGEL)

As per Moneycontrol.com dated 11th May, 2022, the equity share price of Adani Green Energy Ltd. (AGEL) at the close of the day was ₹ 2,648.

Assume that the dividend expected / share is ₹ 1,000 and the expected growth is 12%.

The cost of equity of AGEL worked out as follows:

Cost of equity based on dividend forecast approach is given by the formula $k_e = \frac{D_1}{P_e} + g$ where k_e is the cost of equity, P_e is the price per equity share and D_1 is the expected dividend per share at the end of year one and g is the expected growth of dividend / share.

In case of AGEL, k_e = (1,000 / 2,648) + 0.12 = 0.38 + 0.12 = 0.50 or 5%

Source: https://www.moneycontrol.com/india/stockpricequote/power-generationdistribution/adanigreenenergylimited/ADANI54145 dated 11th May 2022

Dividend Forecast Approach

According to the dividend forecast approach, the intrinsic value of an equity stock is equal to the sum of the present values of the dividends associated with it, i.e.

$$P_e = \sum_{t=1}^{n} \frac{D_t}{(1+k_e)^t} \quad \text{.....(5)}$$

where,

P_e = Price per equity share

D_t = Expected dividend per share at the end of year one, and

k_e = Rate of return required by the equity shareholders.

If we know the current market price (P_e) and can forecast the future stream of dividends, we can determine the rate of return required by the equity shareholders (ke) from equation (5) which is nothing but the cost of equity capital.

In practice, the model suggested by equation (5) cannot be used in its present form because it is not possible to forecast the dividend stream completely and accurately over the life of the company. Therefore, the growth in dividends can be categorized as nil or constant growth or super normal growth and the equation (5) can be modified accordingly. How to value a security given the required rate of return and pattern of growth, has already been discussed in Unit 6 'Valuation of Securities'. Cost of equity from the company's point of view is nothing but the rate at which the intrinsic value of the market price of the share is equal to the discounted value of the dividends. For instance, assume a constant growth rate

(g) in Dividend Per Share (DPS). Assuming a constant growth rate in dividends, the equation (5) can be simplified as follows:

$$P_e = \frac{D_1}{k_e - g} \quad \text{.....(6)}$$

If the current market price of the share is given (P_e), and the values of D_1 and g are known, then the equation (6) can be rewritten as

$$k_e = \frac{D_1}{P_e} + g$$

The following illustration shows the application of this formula.

Illustration 8.3

The market price per share of Mobile Glycols Limited is ₹ 125. The dividend expected per share a year hence is ₹ 12 and the DPS is expected to grow at a constant rate of 8 percent per annum. What is the cost of the equity capital to the company?

Solution

The cost of equity capital (k_e) will be:

$$k_e = \frac{D_1}{P_e} + g = \frac{12}{125} + 0.08 = 17.6 \text{ percent}$$

Realized Yield Approach

According to this approach, the past returns on a security are taken as a proxy for the return required in the future by the investors. The assumptions behind this approach are that (a) the actual returns have been in line with the expected returns, and (b) the investors will continue to have the same expectations from the security. As these assumptions generally do not hold good in real life, the results of this approach are normally taken as a starting point for the estimation of the required return.

The realized return over n-year period is calculated as $(W_1 \times W_2 \times \ldots\ldots W_n)^{1/n} - 1$

Where

W_t, referred to as the wealth ratio, is calculated as $\frac{D_t + P_t}{P_{t-1}}$ and t = 1, 2.... n.

D_t = Dividend per share for year t payable at the end of year

P_t = Price per share at the end of year t

Illustration 8.4

Year	1	2	3
DPS (₹)	1.50	2.00	1.50
Price per share at the end of the year	12.00	11.00	12.00

Solution

The wealth ratios are -

If the price per share at the beginning of the year 1 is ₹ 10:

Year	1	2	3
Wealth ratio	1.35	1.08	1.23

Realized yield $= (1.35 \times 1.08 \times 1.23)^{1/3} - 1$

$= 0.2149$ or 21.5%

Capital Asset Pricing Model Approach

According to this approach, the cost of equity is reflected by the following equation:

$$k_i = R_f + \beta_i (R_m - R_f) \quad \text{.....(7)}$$

where,

k_i = Rate of return required on security i

R_f = Risk-free rate of return

β_i = Beta of security i

R_m = Rate of return on market portfolio.

Activity 8.1

The cost of capital to a company is the minimum rate of return expected by the investors who have made investments in either shares or debentures. How does the cost of debentures differ from cost of preference capital?

Answer:

Bond Yield plus Risk Premium Approach

The logic behind this approach is that the return required by the investors is directly based on the risk profile of a company. This risk profile is adequately

reflected in the return earned by the bondholders. Yet, since the risk borne by the equity investors is higher than that by the bondholders, the return earned by them should also be higher. Hence, this return is calculated as:

Yield on the long-term bonds of the company + Risk premium.

This risk premium is a very subjective figure, which is arrived at after considering the various operating and financial risks faced by the firm. Though these risks are already factored in the bond yield, since by nature equity investment is riskier than investments in bonds and is exposed to a higher degree of the firm's risks, they also have an impact on the risk-premium.

For example, let us take two companies A and B, A having a net profit margin of 5% and B of 10% with other things being equal. Since company B faces less downside risk compared to company A, it will have to pay less interest to its bondholders. Hence, the risk of a company is already accounted for in the bondholders' return. Yet, when it comes to estimating the equity holders' risk premium, these risks are considered all over again because the equity holders are going to bear a larger part of these risks. Hence, the equity holders of company A will receive a higher risk premium than those of company B.

Earnings Price Ratio Approach

According to this approach, the cost of equity can be calculated as:

E_1/P

where,

E_1 = Expected EPS for the next year

P = Current market price per share

E_1 can be arrived at by multiplying the current EPS by (1 + growth rate).

This ratio assumes that the EPS will remain constant from the next year onwards.

There are two parameters, which have to be analyzed to see if this approach will provide an accurate result, or not. They are dividend pay-out ratio and the rate of return the firm is capable of earning on the retained earnings. The results are accurate in the following two scenarios:

a. When all the earnings are paid out as dividends. Here the rate of return the firm is capable of earning becomes irrelevant, or,

b. The dividend pay-out ratio is less than 100 percent and retained earnings are expected to earn a rate of return equal to the cost of equity.

In all other cases there is scope for this approach not to give an accurate estimate. The option (a) is not normally seen in real life situations, while it is difficult to foresee the option (b). This approach should hence be used with caution.

8.4.5 Cost of Retained Earnings and Cost of External Equity

Earnings of a firm can be reinvested or paid as a dividend to the shareholder. If the firm retains part of its earnings for future growth of the firm, the shareholder will demand compensation from the firm for using that money. As a result, the cost of retained earnings simply represents a shareholder's expected return from the firm's common stock. Viewing retained earnings as fully subscribed issue of additional common stock, we can set the firm's cost of retained earnings K_r to the cost of equity capital.

i.e. $k_r = k_e$

The cost of retained earnings is always less than the cost of new issue of common stock due to the absence of floatation costs when projects are financed with retained earnings.

Cost of external equity comes into the picture when there are certain floatation costs involved in the process of raising equity from the market. It is the rate of return that the company must earn on the net funds raised, in order to satisfy the equity holders' demand for return. Under the dividend capitalization model, the following formula can be used for calculating the cost of external equity:

$$K'_e = \frac{D_1}{P_0\,(1-f)} + g$$

where,

K'_e = Cost of external equity

D_1 = Dividend expected at the end of year 1

P_0 = Current market price per share

g = Constant growth rate applicable to dividends

f = Floatation costs as a percentage of the current market price.

For all other approaches, there is no particular method for accounting for the floatation costs. The following formula can be used as an approximation in such cases:

$$K'_e = k_e/(1 - f)$$

where,

k_e = Rate of return required by the equity investors

K'_e = Cost of external equity

f = Floatation costs as a percentage of the current market price.

Illustration 8.5

Gamma Asbestos Limited has got ₹ 100 lakh of retained earnings and ₹ 100 lakh of external equity through a fresh issue, in its capital structure. The equity investors expect a rate of return of 18%. The cost of issuing external equity is 5%.

Solution

The cost of retained earnings and the cost of external equity can be determined as follows:

Cost of retained earnings:

$k_r = k_e$ i.e., 18%

Cost of external equity raised by the company:

$$\text{Now } K'_e = \frac{k_e}{1-f} = \frac{0.18}{1-0.05} = 18.95\%$$

8.5 Weighted Average Cost of Capital

In the beginning of the Unit, we have seen that the calculation of cost of capital is based on the weighted arithmetic average of the costs of the various components of capital. Applying this method required the ascertainment of costs of various components of capital which are explained in the previous sub–topic. Once the cost of capital of various components is known, the next step is to assign weights.

To illustrate the calculation of the Weighted Average Cost of Capital (WACC), let us consider the following illustration.

Illustration 8.6

Ventura Home Appliances Ltd. has the following capital structure:

(₹ in lakh)

Equity Capital (10 lakh shares at par value)	100
12 percent preference capital (10,000 shares at par value)	10
Retained earnings	120
14% Non-convertible Debentures (70,000 debentures at par value)	70
14% term loan from APSFC	100
Total	**400**

The market price per equity share is ₹ 25. The next expected dividend per share (DPS) is ₹ 2.00 and the DPS is expected to grow at a constant rate of 8 percent. The preference shares are redeemable after 7 years at par and are currently quoted at ₹ 75 per share on the stock exchange. The debentures are redeemable after 6 years at par and their current market quotation is ₹ 90 per share. The tax rate applicable to the firm is 50 percent. Calculate the weighted average cost of capital.

Solution

We will adopt a three-step procedure to solve this problem.

Step 1: Determine the costs of the various sources of finance. We shall define the symbols k_e, k_r, k_p, k_d and k_i to denote the costs of equity, retained earnings, preference capital, debentures, and term loans respectively.

$$k_e = \frac{D_1}{P_0} + g$$

$$= \frac{2.00}{25} + 0.08 = 0.16$$

$$k_r = k_e = 0.16$$

$$k_p = \frac{D + \frac{F - P}{n}}{\frac{F + P}{2}}$$

$$= \frac{12 + \frac{100 - 75}{7}}{\frac{100 + 75}{2}} = 0.1780$$

$$k_d = \frac{I(1 - t) + \frac{F - P}{n}}{\frac{F + P}{2}}$$

$$= \frac{14\,(1 - 0.5) + \frac{100 - 90}{6}}{\frac{100 + 90}{2}} = 0.0912$$

$$k_t = 0.14\,(1 - 0.5) = 0.07$$

Note: Market price can be taken as a close substitute of the net amount realizable per share or debenture.

Step 2: Determine the weights associated with the various sources of finance.

One issue to be resolved before concluding this section relates to the system of weights that must be adopted for determining the weighted average cost of capital. The weights can be used on (i) book values of the sources of finance included in the present capital structure (ii) present market value weights of the sources of finance included in the capital structure and (iii) proportions of financing planned for the capital budget to be adopted for the forthcoming period.

Let us assume the book value approach. The weight of a source of fund, according to the book value approach is equal to the book value of that particular source divided by the total of the book values of all sources. In other words, the weight given to equity would be equal to book value of equity divided by book value of equity, retained earnings, debt and preference shares (if any). Similarly, the weight according to the market value approach is equal to the market value of a particular source divided by the market value of all sources. For instance, weight attached to equity is equal to the market value of equity divided by the market value of equity, debt and preference shares, if any.

We shall denote the symbols W_e, W_r, W_p, W_d and W_t to denote the weights of equity, retained earnings, preference shares, debt and term loans

$$W_e = \frac{100}{400} = 0.25$$

$$W_r = \frac{120}{400} = 0.30$$

$$W_p = \frac{10}{400} = 0.025$$

$$W_d = \frac{70}{400} = 0.175$$

$$W_t = \frac{100}{400} = 0.25$$

Step 3: Multiply the costs of the various sources of finance with the corresponding weights and add these weighted costs to determine the weighted average cost of capital (WACC). Therefore,

$WACC = W_ek_e + W_rk_r + W_pk_p + W_dk_d + W_tk_t$

= (0.25 x 0.16) + (0.30 x 0.16) + (0.025 x 0.1780) + (0.175 x 0.0912) + (0.25 x 0.07)

= 0.1259 or 12.59 percent

Example: Computing WACC of Tata Motors

The capital structure of Tata Motors as on 31st March 2021 was as follows (₹ in crore)

Equity share capital	766
Retained earnings	18,290
Long term debt	19,752
Total	38,808

Weight of each component of capital

We = 766 / 38,808 = 0.02

Wr = 18,290 / 38,808 = 0.47

Wt = 19,752 / 38,808 = 0.51

Assumptions:

Cost of equity capital and retained earnings - 13%
Average cost of long term debt - 8%

Weighted average cost of capital of Tata Motors = Weke + Wrkr + Wtkt

= 0.02 x 0.13 + 0.47 x 0.13 + 0.51 x 0.08 = 0.0026 + 0.061 + 0.041 = 0.1046 = 10.46%

Source: https://www.tatamotors.com/wp-content/uploads/2021/06/28075755/annual-report-2020-21.pdf dated April 21, 2022

Check Your Progress - 1

1. Which of the following is not an approach to calculate cost of equity?
   a. Dividend yield approach
   b. Realized yield approach
   c. CAPM approach
   d. Bond yield plus risk premium approach
   e. Earning price ratio approach
2. Alloy steels Ltd issued ₹ 10,00,000, 12% redeemable debentures at a discount of 5%. The cost of floatation amounted to ₹ 20,000. The debentures are redeemable after 5 years. Calculate before tax cost of debt, assuming a tax rate of 50%.
   a. 11.89%
   b. 13.94%
   c. 12.92%
   d. 6.77%
   e. 7.18%
3. Beta Limited issued 2,000, 8% Preference shares of ₹ 100 each at a premium of 15% redeemable after 5 years at par. Compute the cost of preference capital.
   a. 8.57%
   b. 9.42%
   c. 9.30%
   d. 10.23%
   e. 11.43%
4. Ventura Limited plans to issue 1000 new shares of ₹ 100 each at par. The company pays a dividend of ₹ 12 per share initially and the growth in dividends is expected to be 5%. What would be the cost of new issue of equity shares?
   a. 15%
   b. 17%
   c. 14%
   d. 18%
   e. 19%

5. A firm's return available to shareholders is 15%, the average tax rate of shareholders is 40% and it is expected that 2% is brokerage cost that shareholders will have to pay while investing their dividends in alternative securities. What is the cost of retained earnings?

   a. 3.2%

   b. 5.88%

   c. 6.0%

   d. 5.2%

   e. 8.82%

8.6 Weighted Marginal Cost of Capital

At the time of developing the concept of cost of capital, we assumed that the risk profile and financing policy of the firm do not change. Now the question that arises is if these assumptions hold, does the weighted average cost of capital remain unchanged irrespective of the magnitude of financing? It does not. Normally, the WACC increases with the level of financing required. The suppliers of capital generally require a higher return as they supply more capital. A schedule showing the relationship between additional financing and the weighted average cost of capital is referred to as the weighted marginal cost of capital schedule.

8.6.1 Determining the Weighted Marginal Cost of Capital Schedule

The following steps have to be followed for determining the weighted marginal cost of capital schedule:

1. The cost of each individual source of finance for various levels of usage has to be estimated.
2. Given the ratio of different sources of finance in the new capital structure, find out the levels of total new financing at which the cost of various sources would change. These levels, called breaking points, can be found out as:

   Breaking Point on account of a Source

   $$= \frac{\text{Total new financing from that source at the breaking point}}{\text{Proportion of that financing source in the capital structure}}$$

3. Calculate the weighted average cost of capital for various ranges of total financing between the breaking points.
4. List out the weighted average cost of capital for each level of total new financing. This is the weighted marginal cost of capital schedule.

We can illustrate the preparation of the weighted marginal cost of capital schedule with the help of an illustration. Consider the following illustration:

Illustration 8.7

Crypton Limited is planning to raise equity, preference and debt capital in the following proportions:

Equity : 0.50
Preference : 0.20
Debt : 0.30

The cost of the three sources of finance for different levels of usage has been estimated as below:

Source of Finance	Range of new financing from the source (₹ in lakh)	Cost %
Equity	0-15 15-25 25 and above	16.00 17.00 18.00
Preference	0-3 3 and above	14.00 15.00
Debt	0-20 20 and above	8.00 10.00

Calculation of Breaking Point

Source of Finance	Cost %	Range of new Financing (₹ in lakh)	Breaking Point (₹ in lakh)	Range of Total new Financing (₹ in lakh)
Equity	16.00 17.00 18.00	0-15 15-25 25 and above	15/0.5 = 30 25/0.5 = 50 –	0-30 30-50 50 and above
Preference	14.00 15.00	0-3 3 and above	3/0.2 = 15 –	0-15 15 and above
Debt	8.00 10.00	0-20 20 and above	20/0.3 = 66.67 –	0-66.67 66.67 and above

Weighted Average Cost of Capital for Various Ranges of Total New Financing

Range of Total New Financing (₹ in lakh)	Source of Finance	Proportion	Cost (%)	Weighted Cost (%)
0-15	Equity	0.5	16	8.00
	Preference	0.2	14	2.80
	Debt	0.3	8	2.40

Contd….

	Weighted Average Cost of Capital			**13.20**
15-30	Equity	0.5	16	8.00
	Preference	0.2	15	3.00
	Debt	0.3	8	2.40
	Weighted Average Cost of Capital			**13.40**
30-50	Equity	0.5	17	8.50
	Preference	0.2	15	3.00
	Debt	0.3	8	2.40
	Weighted Average Cost of Capital			**13.90**
50-66.67	Equity	0.5	18	9.00
	Preference	0.2	15	3.00
	Debt	0.3	8	2.40
	Weighted Average Cost of Capital			14.40
66.67 and above	Equity	0.5	18	9.00
	Preference	0.2	15	3.00
	Debt	0.3	10	3.00
	Weighted Average Cost of Capital			**15.00**

Weighted Marginal Cost of Capital Schedule

Range of Total New Financing (₹ in lakh)	Weighted Marginal Cost of Capital (%)
0-15	13.2
15-30	13.4
30-50	13.9
50-66.67	14.4
66.67 and above	15.0

Example: Calculation of WMCC of Omega Industries

Omega Industries Pvt. Ltd. has a capital structure and the after-tax cost as given below from different sources of funds.

Capital	Amount (₹ in crore)	Proportion	Cost after tax
Equity	100.00	45%	12%
Debt	120.00	55%	8%
Total	220.00	100%	

Contd….

Let us assume that the company wants to raise the capital of ₹ 170 crore further as it is planning to expand its project. The details of the sources from which the money is raised is given below. Let us further assume after-tax cost of debt will remain the same as it is in the existing capital structure.

Capital	Amount (₹ in crore)	Proportion	Cost after tax
Equity	70.00	41%	12%
Debt	100.00	59%	8%
Total	170.00	100%	

The weighted marginal cost of capital for the additional finance is (proportion of $source_1$ x after cost of capital + proportion of $source_2$ x after cost of capital)

(41% x 12%) + (59% x 8%) = 4.92% + 4.72% = 9.64%

Source: https://www.wallstreetmojo.com/marginal-cost-of-capital/ dated April 22, 2022

8.7 Capital Structure

The capital structure of a company refers to the mix of the long-term finances used by the firm. It is the financing plan of the company.

Example: Capital Structure of Asian Paints Ltd

The capital structure of Asian Paints Ltd. as on 31st March, 2021 was as follows:

Share Capital	No. of shares	Amount (₹ in crore)
Authorised Share capital: Equity shares of ₹ 10 each	99,50,00,000	99.50
Issued, subscribed and fully paid up	95,91,97,790	95.92

Source: https://economictimes.indiatimes.com/asian-paints-ltd/capitalstructure/companyid-14034.cms dated April 22, 2022

8.7.1 Importance of the Capital Structure Decision

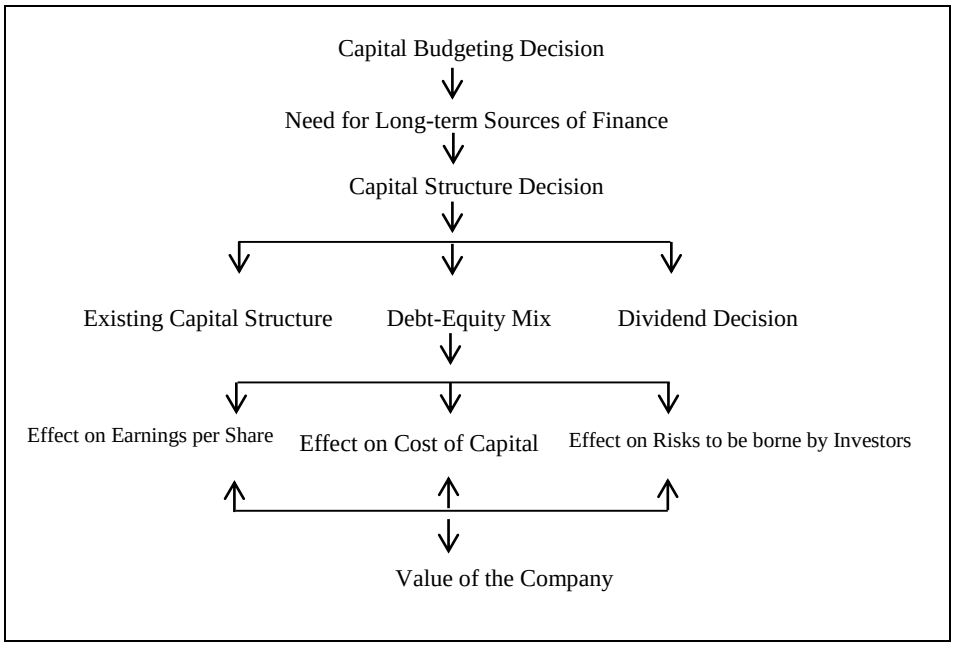
The objective of any company is to mix the permanent sources of funds used by it in a manner that will maximize the company's market price. In other words, companies seek to minimize their cost of capital. This proper mix of funds is referred to as the Optimal Capital Structure.

The capital structure decision is a significant managerial decision, which influences the risk and return of the investors. The company will have to plan its capital structure at the time of promotion itself and also subsequently whenever it has to raise additional funds for various new projects. Wherever the company

needs to raise finance, it involves a capital structure decision because it has to decide the amount of finance to be raised as well as the source from which it is to be raised.

The capital structure decision process can be represented diagrammatically as shown in Figure 8.1:

Figure 8.1: Process of Capital Structure Decisions



Source: ICFAI Research Center

8.7.2 Factors Affecting Capital Structure

The capital structure decision is based on the following factors:

Leverage: The use of fixed charge sources of funds such as preference shares, debentures and term loans along with equity capital in the capital structure is described as financial leverage or trading on equity. The term trading on equity is used because it is the equity that is used as a basis for raising debt. Financial institutions while sanctioning long-term loans insist that companies should generally have a debt-equity ratio of 2:1 for medium and large-scale industries and 3:1 for small-scale industries. A debt-equity ratio of 2:1 indicates that for every one unit of equity the company has, it can raise two units of debt. The ratio is calculated using the formula $\frac{\text{Debt}}{\text{Equity}}$.

Increased use of leverage increases the fixed commitments of the company in the form of interest and repayments and thus increases the risk of the equity shareholders as their returns are affected.

The other factors that should be considered whenever a capital structure decision is taken are:

a. Cost of capital

b. Cash flow projections of the company

c. Size of the company

d. Dilution of control

e. Floatation costs

8.7.3 Features of an Optimal Capital Structure

An optimal capital structure should have the following features:

- **Profitability** – The company should make maximum use of leverage at a minimum cost.
- **Flexibility** – The capital structure should be flexible to be able to meet the changing conditions. The company should be able to raise funds whenever the need arises and also retire debts whenever it becomes too costly to continue with that particular source.
- **Control** – The capital structure should involve minimum dilution of control of the company.
- **Solvency** – The use of excessive debt threatens the solvency of the company. In a high interest rate environment, Indian companies are beginning to realize the advantage of low debt. Companies are now launching public issues with the sole purpose of reducing debt.

Activity 8.2
1. X Ltd's equity shares are priced at ₹ 100 per share. The company earned a dividend of ₹ 6 per share. The finance manager calculates cost of equity as 6%. Is he correct? What are the other factors that influence this calculation?
2. Analyze the inter-linkage between a capital budgeting and capital structure decision.

8.8 Capital Structure Theories

Equity and debt capital are the two important sources of long-term finance for a firm. What should be the proportion of equity and debt in the capital structure of a firm, i.e. how much financial leverage should a firm employ? The answer is quite difficult and is based on an understanding of the relationship between the financial leverage and firm valuation or financial leverage and cost of capital. First of all, one should know whether there is any relationship between the financial leverage and firm valuation. To understand this, many approaches have been propounded, some say that there exists a relationship between the two and some state that there is no relation.

Assumptions and Definitions

The following are some of the common assumptions made to understand the relationship between financial leverage and cost of capital:

i. There is no income tax, corporate or personal.

ii. The firm has a policy of paying its earnings as dividend, i.e. a 100% dividend pay-out ratio is assumed.

iii. Investors have identical subjective probability distributions of net operating income (earnings before income and taxes) for each company.

iv. The net operating income is not expected to grow or decline over time.

v. Without incurring transaction costs, a firm can change its capital structure instantaneously.

Based on the above assumptions and some more stated as and when required, the cost of debt, equity and the firm are derived as follows:

Assuming that the debt capital is perpetual, k_d represents the cost of debt, which is the discount rate at which discounted future constant interest payments are equal to the market value of debt i.e.

$$B = \sum_{t=1}^{\infty} \frac{F}{(1+k_d)^t} \text{ or}$$

$$k_d = \frac{F}{B} = \frac{\text{Annual Interest Charges}}{\text{Market Value of Debt}} \qquad \text{.....(8)}$$

Based on the assumption of 100% dividend pay-out and constant earnings, cost of equity is the discount rate at which the discounted future dividend (or earnings) is equal to the MV of equity, i.e.

$$S = \sum_{t=1}^{¥} \frac{E}{(1+k_e)^t} \text{ or}$$

$$k_e = \frac{E}{S} = \frac{\text{Equity Earnings}}{\text{Market Value of Equity}} \quad \text{.....(9)}$$

Given the net operating income to be constant, the cost of capital of the firm, k_o is the discount rate at which the present value of net operating income is equal to the market value of the firm (i.e., sum of the market values of debt and equity). Hence,

$$k_0 = \frac{O}{V} = \frac{\text{Net Operating Income}}{\text{Market Value of the Firm}}$$

Where V = B + S and k_o is the overall capitalization rate for the firm. Since it is the weighted average cost of capital, it may be expressed as

$$k_o = k_d\, B/(B + S) + k_e\, S/(B + S) \quad \text{.....(10)}$$

Where,

k_o = Cost of Capital of the firm

B = Market value of debt

S = Market value of equity

V = Market value of the Firm

k_d = Cost of debt

k_e = Cost of equity

Measured by the ratio B/S, what happens to k_d, k_e and k_o when financial leverage changes? The answer to this question is discussed below:

8.8.1 Net Income Approach

According to this approach, the cost of equity capital (k_e) and the cost of debt capital (k_d) remain unchanged when B/S, the degree of leverage varies. This means that k_o, the average cost of capital, measured as

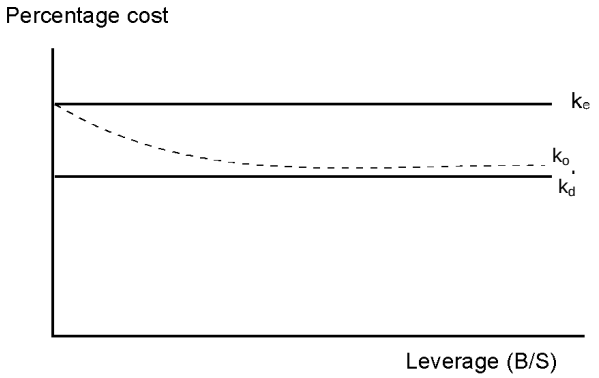
$$k_o = k_d B/(B + S) + k_e S/(B + S)$$

declines as B/S increases. This happens because when B/S increases, k_d, which is lower than k_e, receives a higher weight in the calculation of k_o.

The Figure 8.2 is the graphical representation of the net income approach. B/S, the degree of leverage is plotted on the x-axis, k_e, k_d, and k_o are plotted on the y-axis.

From the graph, it is clear that as B/S increases, k_o decreases because the proportion of debt, the cheaper source of finance, increases in the capital structure.

Figure 8.2: Graphical Representation of Net Income Approach



Source: Adapted from Prasanna Chandra (2019). Financial Management – Theory and Practice, 10th edition, New Delhi: Tata McGraw-Hill

Illustration 8.8

The net income approach may be illustrated with a numerical illustration. Consider two firms X and Y, which are identical in all respects except in the degree of leverage employed by them. The following is the financial data for these firms.

	Firm X	**Firm Y**
Net Operating Income (O)	₹ 20,000	₹ 20,000
Interest on Debt (F)	₹ 0	₹ 5,000
Equity Earnings (E)	₹ 20,000	₹ 15,000
Cost of Equity Capital (k_e)	12%	12%
Cost of Debt Capital (k_d)	10%	10%
Market Value of Equity ($S = E/k_e$)	₹ 1,66,667	₹ 1,25,000
Market Value of Debt (B)	₹ 0	₹ 50,000
Total Value of Firm (V)	₹ 1,66,667	₹ 1,75,000

Solution:

The average cost of capital for firm X:

$$10\% \text{ x } \frac{0}{1{,}66{,}667} + 12\% \text{ x } \frac{1{,}66{,}667}{1{,}66{,}667} = 12\%$$

The average cost of capital for firm Y:

$$10\% \text{ x } \frac{50{,}000}{1{,}75{,}000} + 12\% \text{ x } \frac{1{,}25{,}000}{1{,}75{,}000} = 11.43\%$$

8.8.2 Net Operating Income Approach

According to the net operating income approach, the overall capitalization rate and the cost of debt remain constant for all degrees of leverage. Therefore, in the following equation k_o and k_d are constant for all degrees of leverage.

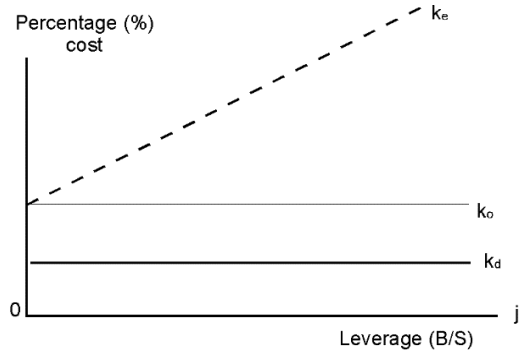
$$k_o = k_dB/(B + S) + k_eS/(B + S)$$

Therefore, the cost of equity can be expressed as:

$$k_e = k_o + (k_o - k_d)(B/S) \quad .....(11)$$

The behavior of k_d, k_e and k_o in response to changes in B/S is shown graphically in Figure 8.3:

Figure 8.3: Effect of Change in Leverage



Source: Adapted from Prasanna Chandra (2019). Financial Management – Theory and Practice, 10th edition, New Delhi: Tata McGraw-Hill

The critical assumption with this approach is that k_o is constant, regardless of the degree of leverage. The market capitalizes the value of the firm as a whole and therefore, the breakdown between debt and equity is unimportant. An increase in the use of supposedly "cheaper" debt funds is compensated exactly by the increase in the required equity return, k_e. Therefore, the weighted average of k_e and k_d remains unchanged for all degrees of leverage. As the firm increases its degree of leverage, it becomes more risky. Investors penalize the stock by raising required equity return with the view of increase in the debt-to-equity ratio. As long as k_d remains constant, k_e is a constant linear function of the debt-to-equity ratio. Because the cost of capital of the firm, k_o, cannot be altered through leverage, the net operating income approach implies that there is no optimal capital structure.

The net operating income position has been advocated eloquently by David Durand. According to him, the market value of a firm depends on its net operating income and business risk. The change in the degree of leverage employed by a firm cannot change these underlying factors. Changes take place in the distribution of income and risk between debt and equity, without affecting the total income and risk, which influence the market value of the firm. Hence, the degree of leverage cannot influence the market value or the average cost of capital of the firm.

Illustration 8.9

Consider two firms MN and XY that are similar in all respects other than the degree of leverage employed by them. The following is the financial data of both these firms.

	Firm MN	Firm XY
Net Operating Income (O)	₹ 15,000	₹ 15,000
Overall Capitalization Rate (k_o)	0.17	0.17
Total Market Value (V)	₹ 88,235	₹ 88,235
Interest on Debt (F)	₹ 1500	₹ 3,500
Debt Capitalization Rate (k_d)	0.12	0.12
Market Value of Debt (B = F/k_d)	₹ 12,500	₹ 29,167
Market Value of Equity (S = V – B)	₹ 75,735	₹ 59,068
Degree of Leverage (B/S)	0.165	0.494

Solution:

The equity capitalization rates of firms MN and XY are:

Firm MN:

$$\frac{\text{Equity Earnings}}{\text{Market Value of Equity}} = \frac{13,500}{75,735} = 17.83\%$$

Firm XY:

$$\frac{\text{Equity Earnings}}{\text{Market Value of Equity}} = \frac{11,500}{59,068} = 19.47\%$$

The equity capitalization rates for the above firms can also be calculated by using equation (11) i.e.

$$k_e = k_o + (k_o - k_d)B/S$$

Firm MN: $k_e = 0.17 + (0.17 - 0.12)(0.165) = 17.83\%$

Firm XY: $k_e = 0.17 + (0.17 - 0.12)(0.494) = 19.47\%$

8.8.3 Traditional Approach

The traditional approach has the following propositions:

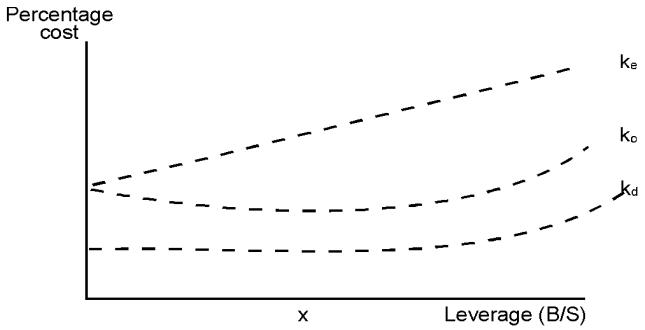
i. The cost of debt capital, k_d, remains more or less constant up to a certain degree of leverage but rises thereafter at an increasing rate.

ii. The cost of equity capital, k_e, remains more or less constant or rises only gradually up to a certain degree of leverage and rises sharply thereafter.

iii. The average cost of capital, k_o, as a consequence of the above behavior of k_e and k_d (a) decreases up to a certain point; (b) remains more or less unchanged for moderate increases in leverage thereafter, and (c) rises beyond a certain point.

The following Figure 8.4 is the graphical representation of the traditional approach.

Figure 8.4: Traditional Approach



Source: Adapted from Prasanna Chandra (2019). Financial Management – Theory and Practice, 10th edition, New Delhi: Tata McGraw-Hill

The principal implication of the approach is that the cost of capital is dependent on the capital structure and there is an optimal capital structure, which minimizes the cost of capital. In the above graph, it is the point X which is the optimal capital structure. At the optimal capital structure, the real marginal cost of debt and equity is the same. Before the optimal point, the real marginal cost of debt is less than the real marginal cost of equity and beyond the optimal point, the real marginal cost of debt is more than the real marginal cost of equity. Thus, the traditional approach implies that the cost of capital is not independent of the capital structure of the firm and that there is an optimal capital structure.

Illustration 8.10

The following is a numerical illustration of the traditional approach. This table shows the average cost of capital for a firm which has a net operating income of ₹ 1,25,000 that is split variously between interest and equity earnings depending on the degree of leverage employed by the firm.

Solution

F ₹	E ₹	k_d (%)	k_e (%)	B ₹	S ₹	V ₹	k_o (%)
0	1,25,000	6.0	10.5	0	11,90,476	11,90,476	10.50
25,000	1,00,000	6.0	10.5	4,16,667	9,52,381	13,69,048	9.13
35,000	90,000	6.5	11.0	5,38,462	8,18,182	13,56,664	9.21
45,000	80,000	6.5	11.0	6,92,308	7,27,273	14,19,581	8.81
55,000	70,000	7.0	11.5	7,85,714	6,08,696	13,94,410	8.96
65,000	60,000	7.5	12.0	8,66,667	5,00,000	13,66,667	9.15
75,000	50,000	9.0	14.0	8,33,333	3,57,143	11,90,476	10.50
85,000	40,000	11.0	16.0	7,72,727	2,50,000	10,22,727	12.22
95,000	30,000	15.0	18.0	6,33,333	1,66,667	8,00,000	15.63
1,05,000	20,000	18.0	20.0	5,83,333	1,00,000	6,83,333	18.29

8.8.4 Miller and Modigliani Approach

Modigliani and Miller in their paper have stated that the relationship between leverage and the cost of capital is explained by the net operating income approach in terms of three basic propositions. They argue against the traditional approach by offering behavioral justification for having the cost of capital, k_o, remain constant throughout all degrees of leverage. It is therefore essential to spell out the assumptions underlying their analysis.

1. Capital markets are perfect. Information is costless and readily available to all investors. There are no transaction costs, and all securities are infinitely divisible.
2. Investors are assumed to be rational and behave accordingly, i.e., choose a combination of risk and return that is most advantageous to them.
3. The average expected future operating earnings of a firm are subjected to random variables. It is assumed that the expected probability distribution values of all the investors are the same. The MM theory implies that the expected probability distribution values of expected operating earnings for all future periods are the same as present operating earnings.
4. Firms can be grouped into "equivalent return" classes on the basis of their business risks. All firms falling into one class have the same degree of business risk.
5. There is no corporate or personal income tax.

Basic Propositions

MM derived the following three propositions based on the above assumptions.

Proposition I: The total market value of the firm which is equal to the total MV of debt and market value of equity. It is independent of the degree of leverage and is equal to its expected operating incomes discounted at the rate appropriate to its risk class.

Symbolically, it is represented as:

$$V_j = S_j + B_j = O_j/\rho_k \qquad \text{.....(12)}$$

where,

V_j = Total market value of the firm j

S_j = Market value of the equity of the firm j

B_j = Market value of the debt of the firm j

O_j = Expected operating income of the firm j

ρ_k = Discount rate applicable to the risk class k to which the firm j belongs.

Proposition II: The expected yield on equity, i_j, is equal to ρ_k plus a premium which is equal to the debt-equity ratio times the difference between k and the yield on debt, r.

Symbolically it is represented as

$$i_j = \rho_k + (\rho_k - r)Bj/Sj \quad \text{.....(13)}$$

Proposition III: The manner in which an investment is financed does not affect the cut-off rate for the investment decision-making for a firm in a given risk class. The proposition emphasizes the point that average cost of capital is not affected by the financing decisions as both investment and financing decisions are independent.

Proof of MM Argument – The Arbitrage Mechanism

To prove their argument, MM suggested an Arbitrage mechanism. Two firms X and Y, which are in the same risk class and same expected operating incomes but with varying financial leverages, are considered.

	X	**Y**
Expected Operating Income	O	O
Market Value of Equity	S_x	S_y
Market Value of Debt	–	B_y
Market Value on the Firm	V_x	V_y
Interest Rate on Debt	–	r
Interest Burden	–	rB_y

Consider the case wherein the unlevered firm X has a market value which is less than that of the levered firm Y, (V_x, < V_y). Now if an investor holds S_y rupees worth of equity shares of firm Y, representing a fraction of the total outstanding market value of equity shares of firm Y(S_y)= αS_y), the return he gets is:

$$P_y = \alpha (O - r B_y) \quad \text{.....(14)}$$

If the same investor sells his shares i.e., αS_y worth of shares of firm Y and borrows αBy at an interest rate of r percent on his personal account, then he can purchase α ($S_y + B_y$)/S_x of the equity shares of firm X. (For firm X, $V_x = S_x$ since it is an all-equity firm).

After the above transactions, the return obtained by the investor would be:

$$P_x = \alpha \frac{(Sy + By)}{Sx} O - r\alpha By = \alpha \frac{Vy}{Vx} O - r\alpha By \quad \text{.....(15)}$$

Comparing the above equations (14) and (15) we find that as long as $V_y > V_x$, we have $P_x > P_y$, which means that the equity shareholders of firm Y will sell their shareholding and acquire shares of firm X by resorting to personal leverage since it is profitable to do so. In this process S_y (and hence V_y) will get depressed and

S_x (and hence V_x) will rise till the equality between V_x and V_y is established. Hence, the difference in the values of the levered firm and the unlevered firm would be abolished by the personal leverage of the investors.

Next is the case wherein $V_x > V_y$. Here, let us put $V_x/V_y = \beta > 1$. For instance, if an investor holds equity shares worth S_x of firm X, representing a fraction α_x of the total market value of the outstanding shares, S_x, the return he gets is:

$$P_x = \frac{s_x}{S_x} O = \alpha O \qquad \text{.....(16)}$$

If he sells his shareholding worth αV_x ($V_x = S_x$) he can buy a fraction $\alpha\beta$ of the equity shares and bonds of firm Y because the market value of the firm X is β times the market value of the firm Y which will therefore make his return equal to:

$$P_y = \alpha\beta (O - r B_y) + \alpha\beta (r B_y) = \alpha\beta O \qquad \text{.....(17)}$$

without any change in the level of risk borne by him.

Comparing the above equations (16) and (17), we find that as long as $V_x > V_y$ ($\beta > 1$), we have $P_y > P_x$ which means that equity shareholders of firm X will sell their shareholding and buy a portfolio consisting of shares and bonds of firm Y since it is profitable to do so. In the process, V_x will get depressed and V_y will rise till the equality between V_x and V_y is established. The following is an illustration to show how the arbitrage mechanism works.

Illustration 8.11

Consider two firms P and Q similar in all respects except in their capital structure. Firm P is financed by only equity, firm Q is financed by a mixture of equity and debt. The following are the financial particulars of the two firms.

Particulars	**Firm P (₹)**	**Firm Q (₹)**
Total Capital Employed	20,00,000	20,00,000
Equity Capital	20,00,000	12,00,000
Debt	–	8,00,000
Net Operating Income	2,00,000	2,00,000
Debt Interest (@5%)	–	40,000
Market Value of Debt	–	8,00,000
Equity Earnings	2,00,000	1,60,000
Equity Capitalization Rate	10%	12%
Market Value of Equity	20,00,000	13,33,333
Total Market Value of the Firm	20,00,000	21,33,333
Average Cost of Capital	10%	9.38%
Debt Equity Ratio (in terms of Market Value)	0	0.6

The market value of the levered firm Q is higher than that of the unlevered firm P. MM argue that in such a situation equityholders would sell their equity investment in firm Q and invest in the equity of firm P resorting to personal leverage. For instance, an equity investor who owns 1 percent equity in firm Q would:

1. Sell his equity in firm Q for ₹ 13,333
2. Borrow 1% of the debt of the firm ₹ 8,000 at 5 percent interest on personal account and
3. Buy ₹ 21,333 worth of shares, i.e. 1.0667 percent of the equity of firm P.

The sequence of above transactions would result in:

Income on investment in firm P (1.0667% of ₹ 2,00,000)	2,133.3
Less: Interest (8,000 x 0.05)	400.0
Net Income	1,733.3

This net income is higher than a net income of ₹ 1,600 forgone by selling 1 percent equity of firm Y when the leverage ratio is the same in both the cases.

The action of a number of investors undertaking similar arbitrage transactions result in driving up the price of firm P shares, lower its equity capitalization rate, drive down the price of firm Q, and increase its equity capitalization rate. This process of arbitrage will continue till there is no further opportunity for reducing one's investment outlay and achieving the same return. As a result, the average costs of capital, k_o, would be the same. The principle involved here is simply that investors are able to reconstitute their former positions by offsetting changes in corporate leverage with changes in personal leverage.

Check Your Progress - 2

6. Which of the following approaches states that the cost of capital declines with the increment in debt-equity ratio?
   a. Traditional Approach
   b. Net Operating Income Approach
   c. Net Income Approach
   d. Modigliani & Miller Approach
   e. Realized Yield Approach
7. The Net Operating Income Approach assumes that the value of equity is nothing but the difference between total firm value and the total value of debt. Which of the following is not an assumption of this approach?
   a. Overall Capitalization Rate is constant

b. Market value of a firm is based on Net operating income and business risk

c. There is an optimal capital structure

d. Cheaper debt funds compensate the increase in required equity returns

e. Capitalizes market value of the firm as a whole

8. If the given values of a firm are- the overall cost of capital is 11 %, cost of debt is 8% and the degree of leverage is 0.52, then what is the equity capitalization rate?

a. 12.56%

b. 11.00%

c. 8.72%

d. 9.88%

e. 4.16%

9. Calculate the cost of debt capital holding an annual interest of ₹ 70, 000 and market value of debt is at ₹ 9,50,000.

a. 7.4%

b. 6.5%

c. 6.0%

d. 7.5%

e. 9.0%

10. MM hypothesis states that the cost of capital is independent of a firm's capital structure. Identify the assumption that is contradictory to the MM approach.

a. Capital Markets are perfect

b. Investors are irrational

c. Expecting operating incomes in future periods are same

d. No corporate or personal tax

e. Similar firms are grouped to one category that involves same degree of business risk

11. Which of the following models assumes that the cost of capital and cost of debt remain constant for all degrees of leverage?

a. Traditional Approach

b. Net Operating Income Approach

c. Net Income Approach

d. Modigliani & Miller Approach

e. Realized Yield Approach

Criticism of MM Proposition

The following are the criticisms-

1. **Taxation and Capital Structure:** The irrelevance of the capital structure rests on the absence of market imperfections. Though debt and equity are two different parts there is something called conservation of value, wherein the sum of the parts is always the same. However, in the face of imperfections in the capital markets, the capital structure of a firm may affect the valuation, i.e. the firm's valuations and cost of capital may change with changes in its capital structure.

2. **Corporate taxes:** Presence of taxes is one of the major imperfections. Debt financing is advantageous when taxes are applicable to corporate income. The reason is that the dividends and retained earnings are not deductible for tax purposes, whereas interest on debt is a tax-deductible expense. Hence, the combined income of stockholders and debt holders is greater when debt capital is used.

   Illustration 8.12

   Consider two firms A and B, having an expected net operating income of ₹ 5,00,000, which are similar in all respects except in the degree of leverage employed by them. Firm X employs no debt capital, whereas firm Y has ₹ 20,00,000 in debt capital on which it pays 12 percent interest. The corporate tax rate applicable to both the firms is 50%. The income to stockholders and debt holders of both the firms is shown below.

Particulars	**Firm X (₹)**	**Firm Y (₹)**
Net Operating Income	5,00,000	5,00,000
Interest on Debt	–	2,40,000
Profit before Taxes	5,00,000	2,60,000
Taxes	2,50,000	1,30,000
Profit after Tax (Income available to stockholders)	2,50,000	1,30,000
Combined Income of Debt holders and Stockholders	2,50,000	3,70,000

   It is quite clear from the above table that the combined income of debt holders and stockholders of the levered firm Y is higher than that of the unlevered firm X.

   The explanation for this is: the interest payment of ₹ 2,40,000 made by the levered firm brings a tax shield of ₹ 1,20,000 (₹ 2,40,000 x Tax rate). Therefore, the combined income of the debt holders and stockholders of firm Y is higher by this amount.

The present value of tax shield associated with interest payments, assuming debt perpetual in nature, would be equal to

$$\text{Present value of tax shield} = \frac{t_c B r}{r} = t_c B \quad \text{.....(18)}$$

where,

t_c = Corporate tax rate

B = Market value of debt

r = Interest rate on debt

In the above illustration, for firm Y, the present value of tax shield works out to 0.5(20,00,000) = ₹ 10,00,000 which represents the increase in market value arising from financial leverage.

In general, when corporate taxes are considered the value of the firm that is levered would be equal to the value of the unlevered firm increased by the tax shield associated with debt, i.e.

$$V = \frac{O(1-t_c)}{k} + t_c B \quad \text{.....(19)}$$

From the above equation it is quite clear that other things being equal, the greater the leverage, the greater is the value of the firm. This implies that the optimal strategy of a firm should be to maximize the degree of leverage in its capital structure.

3. **Corporate Taxes and Personal Taxes:** When personal taxes are considered along with corporate taxes and investors pay the same rate of personal taxes on debt returns as well as stock returns, the advantage of corporate tax in favor of debt capital remains intact.

   Consider a 30% personal tax rate to debt as well as stock returns in the above illustration. The income to debt-holders and stockholders after taxes, both corporate and personal is calculated below:

4. **Personal Taxes and Income of Debt-holders and Stockholders**

Particulars	**Firm X (₹)**	**Firm Y (₹)**
Income available to stockholders	2,50,000	1,30,000
Less: Personal taxes at 30%	75,000	39,000
Income available to stockholders after personal tax	1,75,000	91,000
Income to debt-holders	0	2,40,000
Less: Personal taxes at 30%	–	72,000
Income to debt-holders after personal taxes	0	1,68,000
Combined income of stockholders and debt-holders after personal taxes	1,75,000	2,59,000

From the above table, it is clear that although the combined post-tax income to stockholders and debt-holders decreases in both the firms, the proportional advantage of debt remains unaffected because the combined income of stockholders and debt-holders is still higher by 48% in the levered firm.

If the personal tax rate is t_p, the tax advantage of debt becomes $t_cB\ (1 - t_p)$.

Where

t_c is the corporate tax rate; B is the market value of debt and t_p is the personal tax rate.

The above formula is valid when personal tax rate applicable to stock as well as debt income is same as in the above illustration. However, it is not the same in many countries including India. Stock income, which includes dividend income and capital gains is taxed at a lower rate when compared to that of debt income.

When the tax rate on stock income (t_{ps}) differs from the tax rate on debt income (t_{pd}) the tax advantage of debt capital may be expressed as:

$$\left[1-\frac{(1-t_c)(1-t_{ps})}{(1-t_{pd})}\right] \text{x B}$$

t_c = Corporate tax rate

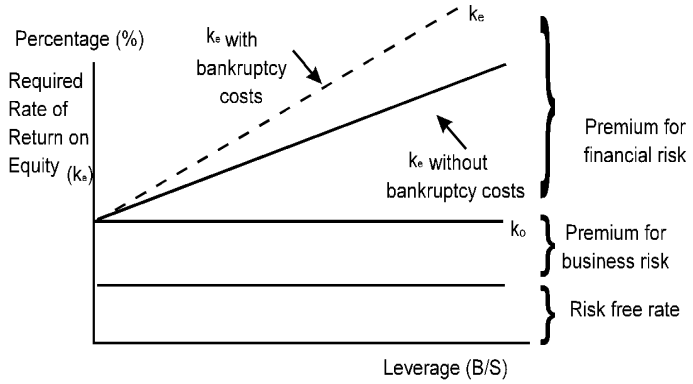
t_{pd} = Personal tax rate on debt income

t_{ps} = Personal tax rate on equity income .....(20)

5. **Bankruptcy Costs:** Existence of bankruptcy costs is another important imperfection affecting the capital structure. Capital Market when perfect, has no costs associated with bankruptcy. Assets of a bankrupt firm can be sold at their economic value and there are no legal and administrative expenses. However, in the real world, there are costs associated with bankruptcy. Under distress conditions, assets are sold at a significant discount below their economic value. Moreover, costs like legal and administrative costs associated with bankruptcy proceedings are high. Finally, an impending bankruptcy entails significant costs in the form of sharply impaired operational efficiency.

   The probability of bankruptcy for a levered firm is higher than for an unlevered firm, other things being equal. Beyond a threshold level, the probability of bankruptcy increases at an increasing rate as the debt-equity ratio increases. This means that the expected cost of bankruptcy increases when the debt-equity ratio increases. Investors expect a higher rate of return from a firm which is faced with the prospect of bankruptcy, as bankruptcy costs represent a loss that cannot be diversified away. The following figure is a graphical representation of the relationship between the required rate of return on equity, k_e, and the leverage ratio, B/S.

Figure 8.5: Impact of Bankruptcy Costs on Return on Equity and Leverage



Source: Adapted from Prasanna Chandra (2019). Financial Management – Theory and Practice, 10th edition, New Delhi: Tata McGraw-Hill

Difference between Corporate and Home-made Leverage

The following are some differences between corporate and personal leverage:

- In the propositions given, MM has stated that the premium of the levered firm over unlevered firm would be abolished by resorting to personal leverage by the investors. However, he had assumed that the rate at which an individual borrows would be the same at which the corporate borrows. In reality, an individual may not be able to borrow on his personal account at the same rate of interest as a company can do. In India, the average rate of interest on personal borrowings is higher than the average rate of interest on corporate borrowings.
- The creditors simply refuse to lend to individuals who want to employ a high leverage ratio. Therefore, an individual cannot adopt leverage as high as a company can do.
- The liability of an individual borrower towards the borrowed amount on his account is unlimited whereas the equity stockholders of a company have limited liability irrespective of the company's level of borrowing.

Agency Costs

Whenever creditors are approached by a firm to obtain debt capital, they impose certain restrictions on the firm in the form of some protective covenants incorporated in the loan contract. They could be in the form of obtaining prior approval of the creditors for matters relating to key managerial appointments, maintenance of current ratio above a certain level, restriction on the rate of dividend during the currency of the loan, constraints on the additional issue of capital, limitation on further investments, etc.

The above said restrictions generally entail legal and enforcement costs, which also impair the operating efficiency of the firm. All these costs referred to as monitoring costs or agency costs, detract from the value of the firm.

Monitoring costs are a function of the level of debt in the capital structure. When the amount of debt is considerably less, then the creditors may limit their monitoring activity. But if the level of debt is high, then they may insist on continuous monitoring which entails substantial costs.

8.9 Summary

- The weighted arithmetic average of the cost of different financial resources that a company uses is termed as its cost of capital.
- For calculating the cost of capital of the firm, we have to first define the cost of various sources of finance used by it. The sources of finance that are typically tapped by a firm are (a) debentures (b) term loans (c) preference capital (d) equity capital, and (e) retained earnings.
- The cost of a debenture is defined as the discount rate, which equates the net proceeds from issue of debentures to the expected cash outflows in the form of interest and principal repayments.
- The cost of the term loans will be simply equal to the interest rate multiplied by
  (1 – tax rate). The interest rate to be used here will be the interest rate applicable to the new term loan.
- The cost of a redeemable preference share (k_p) is defined as that discount rate which equates the proceeds from preference capital issue to the payments associated with the same i.e. dividend payment and principal payments.
- The cost of retained earnings simply represents a shareholder's expected return from the firm's common stock.
- Measuring the rate of return required by the equity shareholders is a difficult and complex exercise because the dividend stream receivable by the equity shareholders is not specified by any legal contract (unlike in the case of debenture holders).
- Several approaches are adopted for estimating this rate of return like the dividend forecast approach, capital asset pricing approach, realized yield approach, earnings-price ratio approach, and the bond yield plus risk premium approach.
- A schedule showing the relationship between additional financing and the weighted average cost of capital is referred to as the weighted marginal cost of capital schedule.
- The capital structure of a company refers to the mix of the long-term finances used by the firm. It is the financing plan of the company.

- The capital structure decision is a significant managerial decision, which influences the risk and return of the investors. The company will have to plan its capital structure at the time of promotion itself and also subsequently whenever it has to raise additional funds for various new projects.
- At one extreme, there is traditional position which states that there exists an optimal capital structure and financial leverage does affect the value of the firm.
- According to Net Income approach, the cost of equity capital (k_e) and the cost of debt capital (k_d) remain unchanged when B/S, the degree of leverage varies.
- According to the net operating income approach, the overall capitalization rate and the cost of debt remain constant for all degrees of leverage. Therefore, in the following equation k_o and k_d are constant for all degrees of leverage.
- At the other end, there is MM approach which states that financial leverage does not have any impact on the value of the firm. However, there are certain imperfections like presence of taxes, bankruptcy costs, agency costs, etc., which go against the latter approach.
- Whenever creditors are approached by a firm to obtain debt capital, they impose certain restrictions on the firm in the form of some protective covenants incorporated in the loan contract. They could be in the form of obtaining prior approval of the creditors for matters relating to key managerial appointments etc. These restrictions entail legal and enforcement costs referred to as monitoring costs or agency costs.
- Legal and administrative expenses that result due to the bankruptcy of an organization are called as bankruptcy costs. The probability of bankruptcy increases at an increasing rate as the debt-equity ratio increases.

8.10 Glossary

Agency Costs are the legal and enforcement costs that arise due to the restrictions imposed by creditors when approached for debt capital.

Bankruptcy Costs are the costs associated with bankruptcy. These costs are the Legal and administrative expenses that result due to the bankruptcy of an organization.

Capital Structure is the composition of a firm's long-term financing consisting of equity, preference capital, and long-term debt.

Cost of Capital is the minimum rate of return the firm must earn on its investments in order to satisfy the expectations of investors.

Cost of Debt is the rate that has to be received from an investment in order to achieve the required rate of return for the creditors.

Cost of Equity measures the rate of return required by equity shareholders.

Cost of External Equity is the rate of return demanded by equity shareholders on the net funds raised by the company. It comes into the picture when there are certain floatation costs involved in the process of raising equity from the market.

Cost of Preferred Stock is the rate of return that must be earned on the preferred stockholders' investment to satisfy their required rate of return.

Cost of Retained Earnings simply represents a shareholder's expected return from the firm's common stock.

Dividend Forecast Approach is a method of estimating the cost of equity capital. According to this approach, the intrinsic value of equity stock is equal to the sum of the present values of dividends associated with it.

External Funds are the funds acquired from external sources by borrowing or issuing additional equity or preference stock.

Financial Leverage refers to the employment of debt capital entailing fixed financial burden.

Leverage is the use of fixed charge sources of funds such as preference shares, debentures and term loans along with equity capital in the capital structure.

Monitoring costs are associated with the costs of monitoring debt by creditors. These costs may increase with level of debt as more debt results in higher level of monitoring.

Optimal Capital Structure is the capital structure that minimizes the firm's composite cost of capital for raising a given amount of funds.

Realized Yield is the required return on an equity stock that is estimated using past returns.

Retained Earnings are the percentage of net earnings that can be reinvested in the business.

Term Loan is a loan that is generally repayable in more than one year and less than ten years.

Weighted Average Cost of Capital is the average required rate of return that the company must earn to satisfy its creditors and shareholders.

Weighted Marginal Cost of Capital Schedule is a schedule that shows the relationship between additional financing and the weighted average cost of capital.

8.11 Self-Assessment Test

1. Bring out the significance of cost of capital.
2. Give a detailed note on the various approaches that can be used to measure the rate of return to equity shareholders.
3. How does one compute the cost of preference capital? Illustrate with an example.
4. A 5-year ₹ 500 debenture of a firm can be sold for a net price of ₹ 496.50. The coupon rate of interest is 12% p.a. and the debenture will be redeemed at 5% premium on maturity. The firm's tax rate is 40%. Compute the after –tax cost of debenture.
5. Explain how cost of Retained Earnings is computed?
6. Define Capital Structure. Explain the factors that influence capital structure.
7. Explain optimal capital structure. How is it achieved?
8. Discuss in detail the reproaches to Modigliani-Millers approach to capital structure.

8.12 Suggested Readings / Reference Material

1. Brealey Myers (2020). Principles of Corporate Finance, 13th edition, USA: McGraw-Hill Companies Inc.
2. Prasanna Chandra (2019). Financial Management – Theory and Practice, 10th edition, New Delhi: Tata McGraw-Hill.
3. I.M. Pandey (2021). Financial Management, 12th edition, New Delhi: Pearson Education.
4. Francis Cherunilam (2020). International Business — Text and Cases, 6th Edition, PHI Learning.
5. P.G. Apte (2020). International Financial Management, 8th Edition, McGraw Hill Education (India) Private Limited.
6. John Tennent (2018). The Economist Guide to Financial Management. Economist Books.

8.13 Answers to Check Your Progress Questions

1. (a) Dividend Yield Approach

The approaches to calculating cost of equity are- dividend forecast approach, realized yield approach, CAPM approach, bond yield plus risk premium approach, and earnings price ratio approach. Hence, the dividend yield approach is not one of the methods of computing the cost of equity.

2. (c) 12.92%

Given that D = 14, F = 100, P = 95 and n = 12

$$k_p = \frac{1,20,000 + \frac{10,00,000 - 9,50,000 - 20,000}{5}}{\frac{10,00,000 + 9,50,000}{2}} = 12.92 \text{ percent}$$

3. (d) 10.23%

[16+ ((230-200)/5)] / [(230+200)/2] = 10.23 percent

4. (b) 17%

$$k_e = \frac{D_1}{P_e} + g = \frac{12}{100} + 0.05 = 17 \text{ percent}$$

5. (e) 8.82%

$k_r = k_e(1-t)(1-b) = 0.15(1-0.4)(1-0.02)$

= 8.82 percent

6. (c) Net Income Approach

According to this approach, the cost of equity capital (ke) and the cost of debt capital (kd) remain unchanged when B/S, the degree of leverage varies.

7. (c) There is an optimal capital structure

The net operating income approach implies that there is no optimal capital structure.

8. (a) 12.56%

$k_e = 0.11 + (0.11-0.08)\ (0.52) = 12.56\%$.

9. (a) 7.4%

$k_d = 70,000 / 9,50,000 = 7.4\%$

10. (b) Investors are irrational

Investors are assumed to be rational and behave accordingly, i.e., choose a combination of risk and return that is most advantageous to them.

11. (b) Net Operating Income Approach

According to the net operating income approach, the overall capitalization rate and the cost of debt remain constant for all degrees of leverage.

Unit 9

Capital Expenditure Decisions

Structure

"In the business world, the rear view mirror is always clearer than the windshield."

- Warren Buffett

9.1 Introduction

Capital expenditure decisions, also referred to as capital budgeting or investment decisions, may be defined as the company's decision to invest its current funds most efficiently in long-term assets in anticipation of an expected flow of benefits over a series of years. Capital expenditure decisions occupy a very important place in corporate finance as they are long-term decisions involving huge outlay.

This unit gives an insight into the nature of capital expenditure decisions, the various steps involved in taking such decisions and the cost-benefit analysis associated with such decisions.

9.2 Objectives

After reading through the unit, you should be able to:

- Outline the features of capital expenditure decisions to analyse the pros and cons of such decisions
- List the steps involved in making a capital expenditure decision
- Evaluate the identification and preliminary screening criteria to select feasible investment opportunities
- Appreciate the project implementation process needed to avoid cost and time overruns.
- Analyse the impact of the costs and benefits of a firm's capital expenditure decision on its business.
- Discuss the procedure for preparing cash flow projections to assess the financial viability of projects

9.3 Nature of Investment Decisions

Capital expenditure decision, also referred to as capital budgeting decision may be defined as the company's decision to invest its current funds most efficiently in long-term assets in anticipation of an expected flow of benefits over a series of years. Capital expenditure decisions occupy a very important place in corporate finance for the following reasons:

– Once the decision is taken, it has far-reaching consequences which extend over a considerably long period, and influences the risk complexion of the firm.

– These decisions involve huge amounts of money.

– These decisions are irreversible, once taken.

– These decisions are among the most difficult to make when the company is faced with various potentially viable investment opportunities.

While capital expenditure decisions are extremely important, managers find it extremely difficult to analyze the pros and cons and arrive at a decision because:

- Measuring costs and benefits of an investment proposal whether it be for a mini-steel plant or a library is difficult because all costs and benefits cannot be expressed in tangible terms.
- The benefits of capital expenditure are expected to occur for a number of years in the future which is highly uncertain.
- Because the costs and benefits occur at different points of time, for a proper analysis of the viability of the investment proposal, all these have to be brought to a common time-frame. Hence, time value of money becomes very relevant here.

The investment decision starts with the identification of investment opportunities and culminates in performance review after the project is implemented and operations are stabilized.

Example: Investment Decisions of Tata Motors

According to the Chairman of Tata group, Tata Motors group, the Indian Automobile MNC planned to invest ₹ 28,900 crore across Indian and international facilities in 2021-22. The investments will go into upgradation of existing plants, infrastructure facilities, acquiring machinery and equipments and hydrogen fuel cell vehicles. Approximately £ 2.5 billion will be used for JLR and ₹ 3,000 crore to ₹ 3,500 crore for Tata Motors. The funds for these long term investments will be raised through equity, debt and internal accruals.

For the proposed electric vehicles (EV) business, funds will be raised separately to ramp up its production facilities as the company expects to capture 25% of the entire sales of the group from EV segment as per the chairman of the group.

Source: https://www.thehindu.com/business/Industry/tata-motors-to-invest-28900-crore-in-fy22-says-chandrasekaran/article35640495.ece dated 30th July 2021

9.4 Identification of Potential Investment Opportunities

Identification of appropriate investment opportunities is a complicated exercise primarily because of the innumerable investment opportunities available to a promoter. To identify such investment opportunities that are *prima facie* feasible and promising, the promoter has to:

- Scan various sources that can throw up promising investment opportunities,
- Understand the governmental regulatory framework and policies that have a bearing on the different investments; and
- Appraise the potential investments in relation to his organization's strengths and weaknesses.

Potential Sources for Project Ideas

The sources that can be tapped for identifying promising investment opportunities are numerous and an attempt has been made here to describe some of the important sources.

Market Characteristics of Different Industries

The supply and demand conditions prevailing in different industries can be analyzed to identify such industries, which have unfulfilled demand. Such industries can be subjected to a further scrutiny to examine the present level of capacity utilization, the profitability of the existing units, and the new projects under implementation.

Product Profiles of Various Industries

A study of the end products (including by-products) of the various industries can throw up new project ideas.

Imports and Exports

The government is keen on promoting export-oriented industries and import-substitution industries. Therefore, the promoter might find it advantageous to analyze the trends in exports and imports over the last five to six years, to identify potential investment opportunities.

While examining the end-products of a particular industry, it may also be worthwhile to analyze whether one can improve upon the product or find new uses for the existing product.

Emerging Technologies

Analyzing the commercial viability of some of the indigenously developed technologies or adapting the imported technologies to suit the local requirements can result in identification of potential investment opportunities.

Example: Identification of Potential Investment Opportunities

Due to volatility of prices of petroleum products and the expected demand for electronic vehicles across the globe, Tata Motors, sensing the huge opportunity, planned to invest ₹ 15,000 crore in the EV segment in the next five years. The company already invested USD 1 billion in funding for the EV manufacturing facilities from private equity major TPG and already emerged as a leader in the newly emerging EV segment with its model Nexon. The company is also planning to develop around 10 more new offerings in the segment and is accelerating the development of the EV ecosystem. Further there is a huge opportunity for setting up charging facilities and the company has already set up a network of nearly 400 charging stations in Maharashtra and plans to expand it in other states as well.

Source: https://economictimes.indiatimes.com/industry/renewables/tata-motors-to-invest-rs-15000-cr-in-ev-segment-in-5-years-plans-to-develop-10-new-products/articleshow/90223463.cms dated 15th March 2022

Social and Economic Trends

An entrepreneur who is quick to spot changes in the social and economic status of the population can identify new opportunities for investment. For instance, there has been a perceptible increase in the demand for readymade garments, and garment units, which have spotted this change rather early, have successfully exploited the opportunity. Likewise, the increase in women working population has led to a number of e-retail stores catering to varied needs such as clothes, electronics, groceries, etc.

Consumption Patterns in Foreign Countries

An analysis of the consumption patterns abroad can provide clues for launching new projects. To give an example, a shift in the food consumption pattern in India with greater emphasis being laid on healthy and organic foods resulted in ITC introducing new variants under its Aashirwad Brand such as multi grain atta, sugar release control atta, etc.

Revival of Sick Units

A sick unit presents a potential investment opportunity to an entrepreneur who has the capability of turning it around.

Backward and Forward Integration

Many units find an opportunity to use their own output to make other products. The advantage is that the output can be captively consumed to make better value-added products. The example given below illustrates the benefit of backward integration.

Chance Factors

Sometimes investment opportunities are identified by sheer chance.

Regulatory Framework and Policies

An entrepreneur scouting for suitable investment opportunities must familiarize himself with those economic legislations, governmental guidelines and policies that have a bearing on the identification and implementation of projects. Some of the legislations to be studied in this regard are: the Industries (Development and Regulation) Act 1951, Income Tax Act, 1961, Foreign Exchange Management Act, 1999, Companies Act, 2013 and the Central Goods and Services Act, 2017. Besides these legislations, the industrial policy statements, the guidelines governing foreign collaboration and investment, the incentives and subsidy schemes of the government and the fiscal policy of the government, also influence the choice of projects.

The entrepreneur will also do well to look for distinct shifts in the priorities of the government in the recent years and assess the implications of such priorities for investments in different industries because other things being equal, a project, which is in line with the governmental priorities, is a better bet than a project, which is not. Several new projects have been announced by companies to take the benefit of the Make in India initiative by the Government of India.

9.5 Preliminary Screening

The list of promising investment opportunities identified from various sources is first subjected to an analysis within the governmental regulatory framework to obtain a set of feasible investment opportunities that merit further consideration. It is a tedious task to undertake a detailed appraisal of each of these opportunities; hence, the list has to be further narrowed down by evaluating the investments

against certain specific criteria and selecting only those investments that are prima facie desirable. The criteria that are typically applied for the preliminary evaluation are:

- Compatibility with the Promoter
- Compatibility with Governmental Priorities
- Availability of Inputs
- Size of the Potential Market
- Reasonableness of Cost
- Acceptability of Risk Level

These criteria are briefly examined here.

Compatibility with the Promoter

Any entrepreneur promoting a new project must ensure that the physical, financial, and human resources available at his disposal are adequate to meet the requirements of the project under review. Many diversification projects have failed because of the incompatibility between the promoter's strengths and the project requirements.

Compatibility with Governmental Priorities

It is preferable that the project under review does not run counter to the governmental priorities. Besides, it is also necessary to ensure that the promoter does not violate any governmental guidelines and/or legislations that have a bearing on the choice of investment. For example, a medium-scale unit cannot embark on a project for manufacturing tooth-powder because it is a product reserved for the small-scale sector. Likewise, a private corporate promoter cannot undertake an activity included in Schedule A of the Industrial Policy Resolution of 1956.

Example: Preliminary Screening

Bajaj Auto, the two wheeler and three wheeler auto giant, planned to invest ₹ 300 crore for their proposed EV cars at Akurdi, Pune. The proposed investment is for new facilities for manufacturing of EV cars, with a factory premises built over an area of half a million square feet with a production capacity of 500,000 EVs a year. Bajaj Auto is well known for its Chetak scooters in 1970-90 period followed by motor vehicle segment such as Boxer, Pulsar etc. Akurdi is the site of the original Chetak scooter factory which will be the site for the proposed EV cars as well. The proposed investment will have the advantage of compatibility both in terms of promoters and government policies as well.

Source: https://www.business-standard.com/article/companies/bajaj-auto-sets-up-rs-300-crore-ev-manufacturing-facility-in-pune-121123000030_1.html dated 30th December 2021

Availability of Inputs

The importance of this factor cannot be over-emphasized because business history is replete with instances of project failures on account of non-availability or scarcity of critical inputs. The required inputs, the availability of which needs to be verified, include raw materials, utilities, the technology involved etc. Apart from the availability of inputs, the costs involved in obtaining these inputs must also be examined because adverse variation in input costs can significantly affect the viability of the project.

Size of the Potential Market

The size of the present domestic and export markets, the projected increase in consumption, the competitors' profiles and their market shares, the barriers to the entry of new units, the availability of substitute-products, and the pace of technological development in the industry concerned, are some of the important factors to be assessed while subjecting the project to a preliminary evaluation.

Reasonableness of Cost

The cost structure of the product must be examined to see whether the desired profit margin can be attained with a competitive price. A breakdown of the product cost in terms of raw materials cost, labor cost, factory overheads, selling and distribution overheads, and after sales service costs is often helpful for this analysis.

Acceptability of Risk Level

The risk characterizing the project must be carefully assessed taking into account the different sources of risk like technological changes, availability of substitutes, competitive forces and cyclical effects.

Activity 9.1
New companies are expanding their target market at the touch of a click in the internet space. In this scenario, discuss what type of potential investment opportunities will be available for Indian small-scale retail start-ups. Also evaluate the cost involved and the preliminary evaluation required to enter into the digital marketing sphere by these start-ups.

9.6 Feasibility Study

Once a project is conceived and is considered acceptable after preliminary screening, a detailed feasibility study has to be undertaken covering marketing, technical, financial, and economic aspects of the project. The study in the form of a Detailed Project Report (DPR) will contain fairly specific estimates of project cost, means of financing, schedules of implementation, estimates of profitability based on projected sales and production costs, estimates of cost and benefit streams in terms of cash flows, debt servicing capability[4] of the project and social profitability. The ultimate decision whether to go in for the project or not and how to finance it, is undertaken after this study which discloses whether the project is technically feasible, economically viable and financially sound.

Example: Feasibility Study

Ola Electric, the Indian electric two-wheeler manufacturer, planned to setup a 100,000 strong network of EV hyper chargers. In the next five years' period, Ola will install the one lakh EV charger network across 400 cities in India and to begin with, it will install 5,000 chargers in the current financial year. The officials further informed that the time taken for the hypercharge to charge from 0-50% capacity of the battery will be 15 to 18 minutes by which the vehicle can run for additional 75 km. The company officials have informed that marketing, technical, financial, and economic study of the project was completed and the hypercharge will start operations from June 2022.

Source: https://economictimes.indiatimes.com/tech/technology/ola-electric-to-set-up-100000-strong-network-of-ev-chargers/articleshow/82195302.cms dated 22nd April 2020

9.7 Implementation

The implementation of a project i.e., translating the investment proposal into a concrete project is a highly complicated, time consuming, fraught with tension and risky affair. Various stages of implementation are:

- Construction of buildings and other civil works, erection and installation of machinery, preparation of blueprints and designs for project and plant engineering, selection of machinery and equipment.
- Negotiating for project finance with various financial institutions, entering into technical know-how agreements if necessary, entering into contracts for construction of buildings, supply of machinery, marketing of the company's products etc.
- Actual construction and installation of equipment.
- Training of engineers, technicians, workers, etc.
- Commissioning of plant and trial run.
- Commercial production.

[4] Debt servicing capability refers to the ability of the project to generate sufficient cash flows to repay the debt taken to finance the project. This includes the principal along with the interest component.

Example: Implementation Cost Runs

There has been a total cost overrun on 445 infrastructure projects to the extent of ₹ 4.4 lakh as per a report of the committee monitoring on infrastructure projects by the Ministry of Statistics and Programme Implementation due to some delay. As per the report of the committee, the original cost of implementation of the 1,673 projects was ₹ 22,23,791.78 crore and their revised estimate is likely to be ₹ 26,64,649.18 crore by the time of completion which reflects overall cost overruns of Rs. 4,40,857.40 and the delay of over 18 months. The report adds that till December 2021, the expenditure incurred on these projects was to the extent of ₹ 13,08,766.65 crore, which was 49.12 per cent of the anticipated cost of the projects.

Source: https://www.business-standard.com/article/economy-policy/445-infrastructure-projects-show-cost-overrun-of-rs-4-4-lakh-crore-122012300224_1.html dated 24th January 2022.

9.7.1 Project Delays

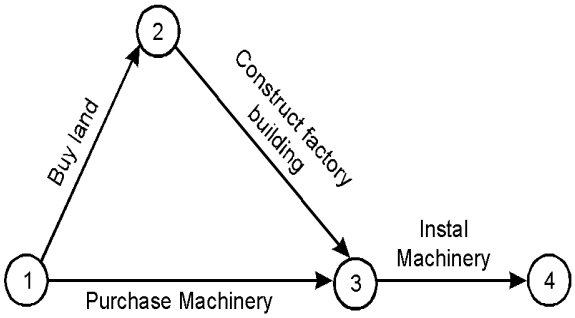
It is quite common for projects in India to be inordinately delayed due to a hoard of reasons like setting a wrong target date, a mistake in tender specifications due to which a lot of equipment cannot be fitted and goes waste, delay in arrival of materials, unskilled labor, etc. Such delays lead to huge cost overruns, subsequent revision of project cost and the search for additional financing over and above the finance already sanctioned, which can in no way meet the cost overruns

For expeditious implementation of projects, it is helpful if,

- The projects are formulated adequately so that all aspects of the project are covered and targets are set on time
- Specific responsibilities are assigned to Project Managers for completing the project within the defined time-frame
- Network techniques like PERT (Program Evaluation Review Technique) and CPM (Critical Path Method) are used. These are ideal tools for project planning and control developed in the late 1950s. While CPM was developed for construction projects, PERT was developed for Research and Development projects. Both PERT and CPM present various activities of a project in the form of a network. A project may be split into various activities which have precedence relationships among them. This means that an activity in the project may require some other activities in it to be completed first before it can be started. Certain other activities can be carried on in tandem. When these activities are set out in the form of a network, it is called a network technique and this establishes the logical relationships between activities and also helps to analyze various project characteristics.

The Figure 9.1 below shows a simple network for the setting up of a plant:

Figure 9.1: Diagrammatic Representation of a Network Technique



Source: ICFAI Research Center

Note: The above network has been designed using four major activities in setting up a plant. Actually, each major activity has to be split up into several activities like calling for quotations, entering into contracts for building, machinery, finance etc., installation of electricity, water supply, etc.

9.8 Performance Review

Once the project has been implemented, the trial run is successful, and commercial production is started, a review of the actual performance with the performance projected in the feasibility study is required. This is an integral and vital part of project management because:

1. It throws light on how realistic were the assumptions underlying the project.
2. It is a valuable tool for decision-making in future.

9.8.1 Aspects of Project Appraisal

The appraisal of a project includes the following types:

- Market appraisal
- Technical appraisal
- Financial appraisal
- Economic appraisal
- Environmental appraisal

Market Appraisal

The market appraisal is attempted to answer two important questions:

- What is the size of the total market for the proposed product or service?
- What will be the project's share of the total market?

Answers to both these questions are equally important because a dominant position in a rapidly shrinking market is certainly not a better proposition than a

meagre share of a large market. To answer these questions, the market analyst compiles and analyzes the data relating to the following aspects[5]:

- Past and present consumption trends
- Present and prospective supply position
- Level of imports and exports
- Structure of competition
- Price and cross-elasticity of demand[6]
- Consumer requirements, and
- Production constraints

Based on the available data, the market analyst estimates the future demand using an appropriate forecasting technique or a combination of forecasting techniques.

Technical Appraisal

As the name suggests, this appraisal is done to ensure that all technical aspects related to the successful commissioning of the project have been taken care of. The important issues considered in this appraisal are:

- Availability of the required quality and quantity of raw materials and other inputs
- Availability of utilities like power, water, etc.
- Appropriateness of the plant design and layout
- Proposed technology vis-à-vis alternative state-of-the-art technologies available
- Optimality of the scale of operations
- Technical specifications of the plant and machinery in relation to the proposed technology; and
- Assembly line balancing

Example: Punjab Power Crisis

Punjab Power Crisis reached an alarming proportion that many large scale industries have been shut down. The Punjab State Power Corporation Limited (PSPCL) imposed the power restrictions on large-scale industries.

Contd….

[5] The list is only illustrative and not exhaustive.

[6] Price-elasticity of demand for a product refers to the responsiveness of the quantity demanded to a given change in its price. Cross-elasticity of demand on the other hand refers to the responsiveness of the quantity demanded of a product to a given change in the price of a related product. Cross-elasticity of demand needs to be analyzed for a product, which has a close substitute, or complementary product. For instance, tea and coffee being substitutes, an increase in the price of tea can result in an increase in the demand for coffee, and vice-versa. Likewise, a steep hike in the price of petrol can have an adverse impact on the demand for cars in general, large cars in particular, and may have some impact even on the demand for tyres.

The industry was asked to use just 50 per cent of the sanctioned load/contracted load by PSPCL. Industrial activity received a major hit and the industry representatives were suffering huge losses in view of the restriction. Even the small sector units are suffering huge losses and survival had become a difficult proposition.

This made the industrial association to review the situation and suggested the industries to look for alternatives as the problem may be recurring.

It is better for the industries to include captive power generation plant wherever they are located, in industrial estates or in clusters.

Source: https://www.news18.com/news/india/punjab-power-crisis-largescale-industries-told-to-stay-shut-till-july-10-3930623.html dated 6th July 2021.

Financial Appraisal

The financial appraisal looks at return and risk characterizing the project, and examines whether the risk adjusted return exceeds the cost of financing the project. For this purpose, the financial analyst compiles data on the cost of project, means of financing, and projected revenues and costs. Based on this data, he works out the net cash flows expected from the project and appraises these cash flows in terms of various criteria of merit like payback, IRR, etc.

Economic Appraisal

In addition to financial appraisal, most of the projects sponsored by government authorities are subjected to a social cost benefit analysis (otherwise known as economic appraisal) to judge whether the project is desirable from the social point of view. Some of the issues considered in this analysis are:

- Impact of the project on the distribution of income in society,
- Impact of the project on the level of savings and investment in the society, and
- Contribution of the project towards socially desirable objectives like self-sufficiency, employment, etc.

Environmental Appraisal

Besides the above mentioned appraisal criteria, an important parameter to be considered is assessing the environmental impact of the project. The environmental appraisal of a project consists of evaluating the environmental effects or consequences of the proposed project as well as sustainable growth of the project. The project also needs to meet the statutory requirements as laid down by the Environment Protection Act, 1986. The project can be rated as per the ISO14000 certification, Global Project Rating, Global Reporting Initiative etc.

The problem of global warming and climate change brought in the concept of Carbon Trading. As per this, the developing countries producing carbon equivalent less than the prescribed limit can sell it to developed countries who may have crossed the carbon limit.

For the successful implementation of a project, each step of the capital budgeting process is equally important. As students of Corporate Finance, we must be aware of all the aspects of Project Management, and be thoroughly proficient in appraising a project in relation to its financial aspects. This is discussed in detail in the next section.

Check Your Progress - 1

1. Which of the following is not a part of project appraisal?
    a. Market appraisal
    b. Technical appraisal
    c. Financial appraisal
    d. Quality appraisal
    e. Economic appraisal
2. From among the following, identify the reason which is not a common reason for a project getting delayed.
    a. Setting wrong target date
    b. Mistakes in tender specifications
    c. Change in economic policies
    d. Unskilled labour
    e. Non-availability of material
3. Identify the activity that forms part of the economic appraisal of a project.
    a. Risk and return analysis of the project
    b. Impact of the project on distribution of income in society
    c. Impact of the project on level of savings in the society
    d. Contribution of the project to socially desirable objectives
    e. Project's contribution to investment in the country
4. Which of the following is not a part of preliminary screening of a project?
    a. Compatibility with the promoter.
    b. Compatibility with governmental priorities.
    c. Quality of raw materials
    d. Size of the potential market
    e. Risk inherent in the project

5. Project delays will result in
    a. Better project management
    b. Improved quality of the project
    c. Cost overruns
    d. Wider reach of the project
    e. Decrease in project implementation cost

9.9 Financial Appraisal of a Project

The financial appraisal of a project can be viewed as a two-step procedure:

Step 1: Define the stream of cash flows (both inflows and outflows) associated with the project.

Step 2: Appraise the cash flow stream to determine whether the project is financially viable or not.

These two steps are covered in greater detail in the sub-sections 9.10 and 9.11 respectively. Determining the stream of cash flows associated with a project involves dealing with the principles underlying measurement of cash flows. Once this step is completed, the next step discusses the criteria employed for appraising the financial viability. But before we discuss these aspects, we should be aware of the two important assumptions that underlie our discussions:

(a) The cash flows occur only once a year

(b) The risk characterizing the project is similar to the risk complexion of the ongoing projects of the firm.

While the first assumption is made to simplify the calculations, the second assumption is made for the sake of expository convenience, which may be relaxed to appraise risky projects.

Example: Cash Flow Issues for Delhi and NCR Region Builders

By the end of 2020, there were 1,132 unfinished residential real estate projects in seven Indian metros that stuck for many reasons. The most important one was the cash flow issue for the builders. The number of such unfinished dwellings accounted for over 5 lakh units valued over Rs. 4 lakh crore according to the real estate consulting firm, Anarock. Almost 75% of these projects were in NCR and the Mumbai Metropolitan Region, 16% in Pune while Bengaluru, Chennai and Hyderabad together have a 10% share. Cash flow was the primary reason for real estate projects getting stalled and it is essential to conduct a proper financial analysis of the projects before starting them, as per Anarock.

Source: https://timesofindia.indiatimes.com/blogs/toi-edit-page/no-homes-for-500000-homebuyers-what-should-be-done-jaypee-suraksha-deal-brings-focus-back-on-lakhs-of-unfinished-flats/ dated 27th June 2021

9.10 Defining Costs and Benefits

The important principles underlying measurement of costs (outflows) and inflows (benefits) are as follows:

- All costs and benefits must be measured in terms of cash flows. This implies that all non-cash charges (expenses) like depreciation which are considered for the purpose of determining the profit after tax must be added back to arrive at the net cash flows for our purpose. (Illustrations 9.1, 9.2 and 9.3 of this unit clarify this aspect.)
- Since the net cash flows relevant from the firm's point of view are what that accrue to the firm after paying tax, cash flows for the purpose of appraisal must be defined in post-tax terms.
- Usually the net cash flows are defined from the point of view of the suppliers of long-term funds[7] (i.e., suppliers of equity capital plus long-term loans).
- Interest on long-term loans must not be included for determining the net cash flows. The rationale for this principle is as follows: Since the net cash flows are defined from the point of view of suppliers of long-term funds, the post-tax cost of long-term funds will be used as the interest rate for discounting. The post-tax cost of long-term funds obviously includes the post-tax cost of long-term debt. Therefore if interest on long-term debt is considered for the purpose of determining the net cash flows, there will be an error of double-counting.
- The cash flows must be measured in incremental terms. In other words, the increments in the present levels of costs and benefits that occur on account of the adoption of the project alone are relevant for the purpose of determining the net cash flows.

Some implications of this principle are as follows:

- If the proposed project has a beneficial or detrimental impact on say, the other product lines of the firm, then such impact must be quantified and considered for ascertaining the net cash flows.
- Sunk costs must be ignored. For example, the cost of existing land must be ignored because money has already been sunk in it and no additional or incremental money is spent on it for the purposes of this project.
- Opportunity costs associated with the utilization of the resources available with the firm must be considered even though such utilization does not entail explicit cash outflows. For example, while the sunk cost of land is ignored, its opportunity cost i.e., the income it would have generated if it had been utilized for some other purpose or project must be considered.
- The share of the existing overhead costs which is to be borne by the end product(s) of the proposed project must be ignored.

[7] Cash flows can also be defined either exclusively from the point of view of equity shareholders or from the view point of the suppliers of both long-term and short-term funds. Suppliers of short-term funds will include commercial banks which provide short-term loans and trade-creditors.

The application of these principles in the measurement of the cash flows of a project is demonstrated by the following illustrations:

Illustration 9.1

Anand, a chemical engineer with 15 years of experience and Prakash, a pharmacy graduate with 18 years of experience are evaluating a pharmaceutical formulation. They have estimated the total outlay on the project to be as follows:

Plant & Machinery	:	₹ 36 lakh
Working Capital	:	₹ 24 lakh
The proposed scheme of financing is:		
Equity Capital	:	₹ 16 lakh
Term Loan	:	₹ 26 lakh
Trade Credit	:	₹ 8 lakh
Working Capital Advance	:	₹ 10 lakh

The project has an expected life of 10 years. Plant & machinery will be depreciated at the rate of $33\frac{1}{3}$ per cent per annum as per the written down value method. The expected annual sales would be ₹ 80 lakh, and the cost of sales (including depreciation but excluding interest) is expected to be ₹ 50 lakh per year. The tax rate of the company will be 50 per cent. Term-loan will carry 14 per cent interest and will be repayable in 5 equal annual installments, starting from the end of the first year. Working capital advance will carry an interest rate of 17 per cent and, thanks to the 'rollover' phenomenon, will have an indefinite maturity.

Define the cash flows for the first three years from the long-term funds point of view.

Solution

Net Cash Flows Relating to Long-term Funds

(₹ in lakh)

Year		0	1	2	3
A.	Investment	(42.00)			
B.	Sales		80.00	80.00	80.00
C.	Operating costs (excluding depreciation)		38.00	42.00	44.67
D.	Depreciation		12.00	8.00	5.33
E.	Interest on working capital advance		1.70	1.70	1.70
F.	Profit before tax		28.30	28.30	28.30
G.	Tax		14.15	14.15	14.15
H.	Profit after tax		14.15	14.15	14.15
I.	Initial flow	(42.00)			
K.	Operating flow (H + D))		26.15	22.15	19.48
L.	Net Cash Flow	(42.00)	26.15	22.15	19.48

Explanatory Notes

The investment outlay has to be considered from the point of view of the suppliers of long-term funds. In the given illustration, we find that ₹ 18 lakh out of the investment of ₹ 24 lakh in current assets is financed by way of trade-credit and working capital advance. The difference of ₹ 6 lakh is called the working-capital margin i.e., the contribution of the suppliers of long-term funds towards working capital. Therefore, the investment outlay relevant from the long-term funds point of view will be equal to investment in plant and machinery + working capital margin = ₹ 42 lakh.

Since depreciation is a non-cash charge which has to be added to the profit after tax, this charge must be disclosed separately in the cash flow statement and not clubbed with other operating costs. Further, the depreciation charge to be considered here will be the tax-relevant charge. In other words, the depreciation must be computed in accordance with the method and rate(s) prescribed by the Income Tax Act, 1961.

While interest on long-term debt must be excluded for reasons discussed earlier, interest on short-term bank borrowings must be included in the cash flow statement.

In the Illustration 9.1 discussed above, we have defined the cash flows only over the first three years of the project's life. But in practice cash flows are defined over the entire project life or over a specified time horizon (if the project life is too long). If the cash flows are defined over the entire life of the project, then the estimated salvage value[8] of the investment in plant and machinery and the working capital must be considered for determining the net cash flow in the terminal year. If the cash flows are defined over a specified time horizon, a notional salvage value is taken into account in the final year of the time horizon.

The following illustration illustrates this point:

Illustration 9.2

A capital project involves the following outlays:

Outlays	(₹ in lakh)
Plant and machinery	180
Working Capital	120

The proposed scheme of financing is as follows:

Model of Financing	(₹ in lakh)
Equity	100
Long-term loans	104
Trade credit	36
Commercial banks	60

[8] Estimating the salvage values of capital equipment is indeed a complicated task given the absence of a secondary market for used capital equipment and the numerous factors that influence the estimation of salvage value which are difficult to predict.

The project has a life of 10 years. Plant and machinery are depreciated at the rate of 15 percent per annum as per the written down value method. The expected annual net sales is ₹ 350 lakh. Cost of sales (including depreciation, but excluding interest) is expected to be ₹ 190 lakh a year. The tax rate of the company is 60 percent. At the end of 10 years, plant and machinery will fetch a value equal to their book value and the investment in working capital will be fully recovered. The long-term loan carries an interest of 14 percent per annum. It is repayable in eight equal annual installments starting from the end of the third year. Short-term advance from commercial banks will be maintained at ₹ 60 lakh; and will carry interest at 18 percent per annum. It will be fully liquidated after 10 years. Trade credit will also be maintained uniformly at ₹ 36 lakh and will be fully paid back at the end of the tenth year.

Calculate the cash flow stream from the long-term funds point of view.

Solution

Cash Flows Relating to Long-Term Funds

(₹ in lakh)

		0	1	2	3	4	5	6	7	8	9	10
A.	Investment	(204.00)										
B.	Sales		350.00	350.00	350.00	350.00	350.00	350.00	350.00	350.00	350.00	350.00
C.	Cost of sales		163.00	167.05	170.49	173.42	175.91	178.02	179.82	181.34	182.64	183.75
D.	Depreciation		27.00	22.95	19.51	16.58	14.09	11.98	10.18	8.66	7.36	6.25
E.	Profit before interest and taxes		160.00	160.00	160.00	160.00	160.00	160.00	160.00	160.00	160.00	160.00
F.	Interest on ST bank borrowing		10.80	10.80	10.80	10.80	10.80	10.80	10.80	10.80	10.80	10.80
G.	Profit before taxes		149.20	149.20	149.20	149.20	149.20	149.20	149.20	149.20	149.20	149.20
H.	Tax		89.52	89.52	89.52	89.52	89.52	89.52	89.52	89.52	89.52	89.52
I.	Profit after tax		59.68	59.68	59.68	59.68	59.68	59.68	59.68	59.68	59.68	59.68
J.	Net salvage value of fixed assets											35.44
K.	Net salvage of current assets											120.00
L.	Retirement of trade credit											(36.00)
M.	Payment of ST bank borrowing											(60.00)
N.	Net Cash Flow = –A+I+D+J+K–L–M	(204.00)	86.68	82.63	79.19	76.26	73.77	71.66	69.86	68.34	67.04	125.37

Explanatory Notes

- Net salvage value of fixed assets will be equal to the salvage value of fixed assets minus any income tax that may be payable on the excess of the salvage value over the book value. Likewise, there will be a tax shield on the loss, if any, incurred at the time of disposing of the fixed assets. According to tax

laws, the net salvage value of any individual item of plant and machinery has lost its significance. Therefore, for our purposes, we will ignore the impact of tax on the salvage value. In other words, we will take only the gross salvage value into consideration.

- The depreciation rate assumed in this problem is not indicative of the current rates in force. (The depreciation rates currently applicable to plant and machinery under the Income Tax Act are 25%, 40%, and 100%).
- In working out the cash flows, deduction available for a new project under Section 80 I of the Income Tax Act has been ignored.
- Our illustrations have so far been focused on estimating cash flows for a new project. The following illustration illustrates estimation of cash flows for a replacement project.

Illustration 9.3

Sandals Inc., is considering the purchase of a new leather cutting machine to replace an existing machine that has a book value of ₹ 3,000, and can be sold for ₹ 1,500. The estimated salvage value of the old machine in four years would be zero. It is depreciated on a straight-line basis. The new machine will reduce costs (before tax) by ₹ 7,000 per year, i.e., ₹ 7,000 cash savings over the old machine. The new machine has a four year life, costs ₹ 14,000, and can be sold for an expected amount of ₹ 2,000 at the end of the fourth year. Assuming straight-line depreciation, and a 40% tax rate, define the cash flows associated with the investment. Assume that the straight-line method of depreciation is used for tax purposes.

Solution

Cash Flows Associated with Replacement Decision

(in ₹)

Year		0	1	2	3	4
1.	Net investment in new machine	(12,500)				
2.	Savings in costs		7,000	7,000	7,000	7,000
3.	Incremental depreciation		2,400	2,400	2,400	2,400
4.	Pre-tax profits		4,600	4,600	4,600	4,600
5.	Taxes		1,900	1,900	1,900	1,900
6.	Post-tax profits		2,700	2,700	2,700	2,700
7.	Initial flow (= (1))	(12,500)				
8.	Operating flow (= (6) + (3))		5,100	5,100	5,100	5,100
9.	Terminal flow					2,000
10.	Net cash flow (= (7) + (8) + (9))	(12,500)	5,100	5,100	5,100	7,100

Working Notes:

Loss on sale of old machine:

Loss on sale = Book value of the machine – Sale value of the machine

= ₹ 3,000 – ₹ 1,500 = ₹ 1,500

Tax shield on account of loss on sale of asset = ₹ 1,500 x 40/100 = ₹ 600

Annual depreciation tax shield = ₹ 600/4 = ₹ 150

Computation of depreciation:

Existing leather-cutting machine

₹ 3,000/4 = ₹ 750 per annum

New leather-cutting machine

₹ 12,000/4 = ₹ 3,000 per annum

Incremental depreciation = ₹ 2,250 per annum.

Add: annual tax shield = ₹ 150 per annum; hence incremental depreciation will be ₹ 2,250 + ₹ 150 = ₹ 2,400

Activity 9.2

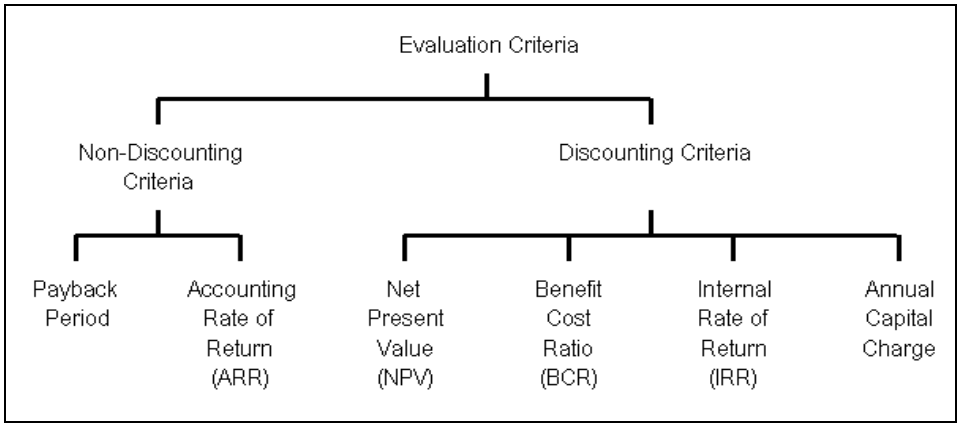
1. A project with an initial investment of ₹ 40,000 has cash flows of ₹ 13,000 each for the first and second years. If the opportunity cost of capital is 12.5%, what will be the minimum cash flow that must be received at the end of third year to make the project acceptable?

Answer:

9.11 Appraisal Criteria

Having defined the costs and the benefits associated with a project, we are now ready to examine whether the project is financially desirable or not. A number of criteria have been evolved for evaluating the financial desirability of a project. These criteria can be classified as shown in Figure 9.2:

Figure 9.2: Evaluation /Appraisal Criteria for a Project



Source: Adapted from Prasanna Chandra (2019). Financial Management – Theory and Practice, 10th edition, New Delhi: Tata McGraw-Hill

9.11.1 Non-Discounting Criteria

Payback Period

The payback period measures the length of time required to recover the initial outlay in the project. For example, if a project with a life of 5 years involves an initial outlay of ₹ 20 lakh and is expected to generate a constant annual inflow of ₹ 8 lakh, the payback period of the project = 20/8 = 2.5 years. On the other hand if the project is expected to generate annual inflows of, say ₹ 4 lakh, ₹ 6 lakh, ₹ 10 lakh, ₹ 12 lakh and ₹ 14 lakh over the 5 year period the payback period will be equal to 3 years because the sum of the cash inflows over the first three years is equal to the initial outlay.

In order to use the payback period as a decision rule for accepting or rejecting the projects, the firm has to decide upon an appropriate cut-off period. Projects with payback periods less than or equal to the cut-off period will be accepted and others will be rejected. The payback period is a widely used investment appraisal criterion for the following reasons:

- It is simple in both concept and application;
- It helps in weeding out risky projects by favoring only those projects which generate substantial inflows in earlier years.

The payback period criterion however suffers from the following serious shortcomings:

- It fails to consider the time value of money, the importance of which has already been discussed at length.
- The cut-off period is chosen rather arbitrarily and applied uniformly for evaluating projects regardless of their life spans. Consequently the firm may accept too many short-lived projects and too few long-lived ones.

- Since the application of the payback criterion leads to discrimination against projects which generate substantial cash inflows in later years, the criterion cannot be considered as a measure of profitability.

To incorporate the time value of money in the calculation of payback period some firms compute what is called the "discounted payback period". In other words, these firms discount the cash flows before they compute the payback period. For instance if a project involves an initial outlay of ₹ 10 lakh, and is expected to generate a net annual inflow of ₹ 4 lakh for the next 4 years, the discounted pay back will be that value of 'n' for which

4x PVIFA (12, n) = 10 .....(1)

Assuming the cost of funds to be 12 percent,

Equation (1) can be re-written as

PVIFA (12, n) = 2.5

From PVIFA Tables, we find that

PVIFA (12,3) = 2.402

PVIFA (12,4) = 3.037

Therefore, 'n' lies between 3 and 4 years and is approximately equal to 3.15 years[9]. We find the discounted pay back period is longer than the undiscounted payback period which will be 2.5 years in this case.

Evaluating the discounted pay back period as an appraisal criterion, we find it to be a whisker better than the undiscounted pay back period. It considers the time value of money and thereby does not give an equal weight to all flows before the cut-off date. But it still suffers from the other shortcomings of the pay back period. This criterion also depends on the choice of an arbitrary cut-off date and ignores all cash flows after that date. In practice, companies do not give much importance to the payback period as an appraisal criterion.

Accounting Rate of Return

The accounting rate of return or the book rate of return is typically defined as follows:

Accounting Rate of Return (ARR) = Average Profit after Tax/Average book value of the investment.

To use it as an appraisal criterion, the ARR of a project is compared with the ARR of the firm as a whole or against some external yard-stick like the average rate of

18 $n = 3 + (4-3) \times \frac{2.500 - 2.402}{(3.037 - 2.402)} = 3.15$

return for the industry as a whole. To illustrate the computation of ARR consider a project with the following data:

(Amount in ₹)

Year	0	1	2	3
Investment	(90000)			
Sales Revenue		120000	100000	80000
Operating expenses (excluding depreciation)		60000	50000	40000
depreciation		30000	30000	30000
Annual Income		30000	20000	10000

$$\text{Average annual income} = \frac{30,000 + 20,000 + 10,000}{3} = ₹\ 20,000$$

$$\text{Average net book value of investment} = \frac{90,000 + 0}{2} = ₹\ 45,000$$

$$\text{Accounting rate of return} = \frac{(20,000)}{(45,000)} \times 100 = 44 \text{ percent}$$

The firm will accept the project if its target average rate of return is lower than 44 percent.

As an investment appraisal criterion, ARR has the following merits:

- Like payback criterion, ARR is simple both in concept and application. It appeals to businessmen who find the concept of rate of return familiar and easy to work with rather than absolute quantities.
- It considers the returns over the entire life of the project and therefore serves as a measure of profitability (unlike the payback period which is only a measure of capital recovery).

This criterion, however, suffers from several serious defects. First, this criterion ignores the time value of money. Put differently, it gives no allowance for the fact that immediate receipts are more valuable than the distant flows and results, giving too much weight to the more distant flows. Secondly, the ARR depends on accounting income and not on the cash flows. Since cash flows and accounting income are often different and investment appraisal emphasizes cash flows, a profitability measure based on accounting income cannot be used as a reliable investment appraisal criterion. Finally, the firm using ARR as an appraisal criterion must decide on a yard-stick for judging a project and this decision is often arbitrary. Often firms use their current book-return as the yard-stick for comparison. In such cases if the current book return of a firm tends to be unusually high or low, then the firm can end up rejecting good projects or accepting bad projects.

9.11.2 Discounting Criteria

The following comes under discounting criteria –

Net Present Value (NPV)

We have already discussed the concept of present value and the method of computing the present value in the unit on time value of money. The net present value is equal to the present value of future cash flows and any immediate cash outflow. In the case of a project, the immediate cash flow will be investment (cash outflow) and the net present value will be therefore equal to the present value of future cash inflows minus the initial investment. The following illustration illustrates this point.

Illustration 9.4

Consider the project described in illustration 9.3. Compute the net present value of the project, if the cost of funds to the firm is 12 percent.

Solution

The net cash flows of the project and their present values are as follows:

Year	1	2	3	4
Net cash flow (₹)	5100	5100	5100	7100
PVIF @ k = 12%	0.893	0.797	0.712	0.636
Present value (₹)	4554	4065	3631	4516

Net present value

= (–12,500) + (4,554 + 4,065 + 3,631 + 4,516)

= ₹ (–12,500 + 16,766)

= ₹ 4,266

The decision rule based on the NPV criterion is obvious. A project will be accepted if its NPV is positive and rejected if its NPV is negative. Rarely in real life situations, we encounter a project with NPV exactly equal to zero. If it happens, theoretically speaking, the decision-maker is supposed to be indifferent to either accepting or rejecting the project. But in practice, NPV in the neighborhood of zero, calls for a close review of the projections made in respect of such parameters that are critical to the viability of the project because even minor adverse variations can mar the viability of such marginally viable projects.

The NPV is a conceptually sound criterion of investment appraisal because it takes into account the time value of money and considers the cash flow stream in its entirety. Since net present value represents the contribution to the wealth of the shareholders, maximizing NPV is congruent with the objective of investment decision making viz., maximization of shareholders' wealth. The only problem in

applying this criterion appears to be the difficulty in comprehending the concept per se. Most non-financial executives and businessmen find 'Return on Capital Employed' or 'Average Rate of Return' easy to interpret compared to absolute values like the NPV.

Example: Appraisal Criteria

The project manager of Prince Polymers Pvt. Ltd. has two new projects on hand with the same amount of investment but with different cash flows. The investments in projects and their cash flow was given hereunder.

Year	Project P-1	Project P-2
Initial Investment	12,00,000	12,00,000
Cash flow at the end of the year 1	5,00,000	3,00,000
Cash flow at the end of the year 2	4,00,000	3.50.000
Cash flow at the end of the year 3	3,70,000	4,50,000
Cash flow at the end of the year 4	3,00,000	5,00,000
Cash flow at the end of the year 5	2,80,000	4,50,000
Residual value of the project	1,35,000	1,23,000

The project manager approached the CFO to suggest the appropriate project among the two. Assuming the cost of capital is 12%, which of the above two projects should the PM choose?

Based on the NPV method for both the projects, the CFO has to decide the best of the two.

The present value interest factors @ 12% ($PVIF_{12}$) for the years 1 to 5 are 0.893, 0.797, 0.712, 0.636 and 0.567 respectively

Step 1 - Calculate the PV of cash flows of project 1

4,46,500 + 3,18,800 + 2,63,440 + 1,90,800 + 1,58,760 + 76,545 = 14,54,845 and NPV = 2,54,845

Step 2 - Calculate the PV of cash flows of project 2

2,67,900 + 2,78,950 + 3,20,400 + 3,18,800 + 2,55,150 + 67,741= 15,08,941 and NPV= 3,08,941

In the above situation though both the projects have positive NPV, project B has higher NPV and can be accepted.

Benefit-Cost Ratio (BCR)

The benefit-cost ratio (or the Profitability Index) is defined as follows:

$$BCR = \frac{PV}{I}$$

where,

BCR = Benefit Cost Ratio

PV = Present Value of Future Cash Flows

and I = Initial Investment.

A variant of the benefit-cost ratio is the Net Benefit-Cost Ratio (NBCR) which is defined as:

$$NBCR = NBCR = \frac{NPV}{I}$$

$$= \frac{PV - I}{I}$$

$$= \frac{PV}{I} - 1$$

$$= BCR - 1$$

The BCR and NBCR for the project described in illustration 9.4 will be:

BCR = 16,766/12,500 = 1.34

NBCR = 4,266/12,500 = 0.34

The decision-rules based on the BCR (or alternatively the NBCR) criterion will be as follows:

If - Decision Rule	
BCR > 1 (NBCR > 0)	Accept the project
BCR < 1 (NBCR < 0)	Reject the project

Since the BCR measures the present value per rupee of outlay, it is considered to be a useful criterion for ranking a set of projects in the order of decreasingly efficient use of capital. But there are two serious limitations inhibiting the use of this criterion. First, it provides no means for aggregating several smaller projects into a package that can be compared with a large project. Secondly, when the investment outlay is spread over more than one period, this criterion cannot be used. The following illustration illustrates the first limitation.

Illustration 9.5

Zeta Limited is considering 4 projects – A, B, C, and D with the following characteristics:

	Initial Investment (Year 0)	Annual Net Cash Flow (Years 1 to 5)
A	(20)	7.5
B	(4.5)	1.5
C	(7)	2.5
D	(8)	3.5

The funds available for investment are limited to ₹ 20 lakh and the cost of funds to the firm is 14 percent. Rank the 4 projects in terms of the NPV and BCR criteria. Which project(s) will you recommend given the limited supply of funds?

Solution

The NPVs of the 4 projects are:

Project	NPV (₹ in lakh)		Rank
A	7.5 x PVIFA(14,5) – 20 = (7.5 x 3.433) – 20	= 5.75	I
B	(1.5 x 3.433) – 4.5	= 0.65	IV
C	(2.5 x 3.433) – 7	= 1.58	III
D	(3.5 x 3.433) – 8	= 4.02	II

The BCR of the 4 projects are:

Project	BCR		Rank
A	25.75/20	= 1.27	II
B	5.15/4.5	= 1.14	IV
C	8.58/7	= 1.23	III
D	12.02/8	= 1.50	I

Based on the NPV and BCR criteria, all 4 projects are acceptable because NPV is positive and BCR is greater than one for each project. But all 4 projects cannot be taken by the firm because of the limited availability of funds. Either Zeta has to accept project A or a package consisting of projects, B, C and D but not both. The decision will depend upon which option maximizes the shareholders' wealth. In this sort of a decision-making situation, the BCR becomes inapplicable because there is no way by which we can aggregate the BCRs of projects B, C and D. On the other hand NPVs of projects B, C, and D can be aggregated and compared with the NPV of project A to arrive at a decision.

NPV (B + C + D) = NPV (B) + NPV (C) + NPV (D) = 0.65 + 1.58 + 4.02 = 6.25 which is more than NPV (A). Therefore the package comprising projects B, C and D must be accepted.

Internal Rate of Return

The internal rate of return is that rate of interest at which the net present value of a project is equal to zero, or in other words, it is the rate which equates the present value of the cash inflows to the present value of the cash outflows. While under NPV method, the rate of discounting is known (the firm's cost of capital), under IRR, this rate which makes NPV zero has to be found out. To illustrate this concept, let us consider the following illustration.

Illustration 9.6

A project has the following pattern of cash flows:

Year	Cash flow (₹ in lakh)
0	(10)
1	5
2	5
3	3.08
4	1.20

What is the IRR of this project?

Solution

To determine the IRR, we have to compute the NPV of the project for different rates of interest until we find that rate of interest at which the NPV of the project is equal to zero or sufficiently close to zero. To reduce the number of iterations involved in this trial and error process, we can use the following short-cut procedure:

Step 1

Find the average annual net cash flow based on the given future net cash flows. In our illustration, the average annual net cash flow will be equal to:

$$(5 + 5 + 3.08 + 1.20)/4 = 3.57$$

Step 2

Divide the initial outlay by the average annual net cash flow i.e., 10/3.57 = 2.801

Step 3

From the PVIFA table find that interest rate at which the present value of an annuity of Re.1 will be nearly equal to 2.801 in 4 years i.e., the duration of the project. In our case, this rate of interest will be equal to 15%.

We use 15% as the initial value for starting the trial and error process and keep trying at successively higher rates of interest until we get an interest rate at which the NPV is marginally above zero and an interest rate at which the NPV is marginally below zero. Now we know that IRR lies between the two rates of interest and using a linear approximation, we can determine the approximate value of the IRR. In the case of our project,

NPV at r = 15% will be equal to:

$$–10 + (5 \times 0.870) + (5 \times 0.756) + (3.08 \times 0.658) + (1.2 \times 0.572) = 0.84$$

NPV at r = 16% will be equal to:

$$–10 + (5 \times 0.862) + (5 \times 0.743) + (3.08 \times 0.641) + (1.2 \times 0.552) = 0.66$$

NPV at r = 18% will be equal to:

$$–10 + (5+9/ \times 0.848) + (5 \times 0.719) + (3.08 \times 0.609) + (1.20 \times 0.516) = 0.33$$

NPV at r = 20% will be equal to:

$$-10 + (5 \times 0.833) + (5 \times 0.694) + (3.08 \times 0.579) + (1.20 \times 0.482) = 0$$

We find that at r = 20%, the NPV is zero and therefore the IRR of the project is 20%.

To use IRR as an appraisal criterion, we require information on the cost of capital or funds employed in the project. If we define IRR as 'r' and cost of funds employed as 'k', then the decision rule based on IRR will be: Accept the project if 'r' is greater than k and reject the project if r is less than k. (If r = k, it is a matter of indifference).

IRR is a popular method of investment appraisal and has a number of merits like:

- It takes into account the time value of money.
- It considers the cash flow stream over the entire investment horizon.
- Like ARR, it makes sense to businessmen who prefer to think in terms of rate of return on capital employed.

This criterion however suffers from the following limitations:

IRR is uniquely defined only for a project whose cash flow pattern is characterized by cash outflow(s) followed by cash inflows (such projects are called simple investments). If the cash flow stream has one or more cash outflows interspersed with cash inflows, there can be multiple internal rates of return. This point can be clarified with the help of the following table where four projects with different patterns of cash flows are given:

(₹ in lakh)

Project	**Cash Flow Stream (₹)**				
	Year 0	Year 1	Year 2	Year 3	Year 4
A	–20	5	10	15	15
B	–10	–10	15	15	15
C	–10	5	–10	20	20
D	–10	15	10	–5	20

- Projects A and B are simple investments and therefore will have unique IRR values. But projects C and D can have multiple internal rates of return because their cash inflows and outflows are interspersed. For such projects, IRR cannot be a meaningful criterion of appraisal.
- The IRR criterion can be misleading when the decision-maker has to choose between mutually exclusive projects that differ significantly in terms of outlays.

In spite of these defects, IRR is still the best criterion today to appraise a project financially. Financial Institutions insist that projects having substantial outlay especially in the medium and large scale sectors must show the computation of IRR in the Detailed Project Report, which they appraise before sanctioning financial assistance.

Annual Capital Charge

This appraisal criterion is used for evaluating mutually exclusive projects or alternatives which provide similar service but have differing patterns of costs and often unequal life spans, e.g., choosing between fork-lift transportation and conveyor-belt transportation.

The steps involved in computing the annual capital charge are as follows:

Step 1: Determine the present value of the initial investment and operating costs using the cost of capital (k) as the discount rate.

Step 2: Divide the present value by PVIFA (k, n) where n represents the life span of the project. The quotient is defined as the annual capital charge or the equivalent annual cost. Once the annual capital charge for the various alternatives is defined, the alternative which has the minimum annual capital charge is selected.

Illustration 9.7

Hindustan Forge Limited is evaluating two alternative systems: A and B, for internal transportation. While the two systems serve the same purpose, system A has a life of 7 years and system B has a life of 5 years. The initial outlay and operating costs (in ₹) associated with these systems are:

Year	A (₹)	B (₹)
0	10,00,000	8,00,000
1	1,00,000	75,000
2	1,25,000	1,00,000
3	1,50,000	1,20,000
4	1,75,000	1,40,000
5	2,00,000	1,00,000
6	2,25,000	
7	2,00,000	

Calculate the annual capital charge associated with these two systems, if the cost of capital is 12 percent. (You can assume that the net salvage values of the two systems at the end of their economic lives will be zero.)

Solution

Present value of costs associated with system A

= ₹ 10,00,000 + (1,00,000 x 0.893) + (1,25,000 x 0.797) (1,50,000 x 0.712) + (1,75,000 x 0.636) + (2,00,000 x 0.567) + (2,25,000 x 0.507) + (2,00,000 x 0.452) = ₹ 17,24,900

Annual capital charge associated with system A

$$= \frac{17,24,900}{\text{PVIFA }(12,7)} = \frac{17,24,900}{4.564} = ₹\ 3,77,936$$

Present value of costs associated with system B

= ₹ 8,00,000 + (75,000 × 0.893) + (1,00,000 × 0.797) + (1,20,000 × 0.712) + (1,40,000 × 0.636) + (1,00,000 × 0.567) = ₹ 11,77,855

Annual capital charge associated with system B

$$= \frac{11,77,855}{\text{PVIFA}\,(12,5)} = \frac{11,77,855}{3.605}$$

= ₹ 3,26,728

Since the annual capital charge associated with system B is lower than that of system A, system B is preferred to system A.

A wide variety of measures are used in practice for appraising investments. But whatever method is used, the appraisal must be carried out in explicit, well-defined, preferably standardized terms and should be based on sound economic logic.

9.12 Infrastructure Decisions and Financing

The capital budgeting decisions are long-term in nature involving huge amount of capital and risk. We have seen the significance of identification of potential investment opportunities, conducting feasibility study (both technical and economic), assessing constraints before implementing and lastly review performance or project appraisal in terms of market, technical, financial and economic aspects during project implementation. Infrastructure means the support services in the real economy. These support services are aids to economic development; they play a vital role in development of the economy and help in sustaining real growth. The capital budgeting decisions in infrastructure are quite complicated as the factors one needs to consider for evaluation are distinctly different when compared to a normal project evaluation. As it involves high risk, low return, huge capital, long gestation period, the entity undertaking the infrastructure project needs to analyze these aspects very carefully.

9.12.1 Reasons for Poor Infrastructure in India

Infrastructure is highly capital-intensive and requires the kind of resources which cannot be generated domestically in the country.

The following are the reasons for the under development of infrastructure in India.

- Since the gestation period is very long and the returns do not commensurate with the high level of risk (not even in a medium-term perspective), active participation of private sector in infrastructure development is usually low.
- Banks with their short-term nature of liabilities are precluded from participating in infrastructural financing due to long gestation period of the projects since it results in Asset-Liability Mismatch.
- Major financial institutions like LIC, GIC and the Provident Funds are not permitted to channelize their funds into infrastructure segment. This becomes a disadvantage both to the institutions and to the infrastructure industry because the institutions are constrained to invest predominantly in government securities in spite of the long-term profile of their liabilities.
- Lack of innovative instruments for financing infrastructure is another major constraint, inhibiting the growth of infrastructure in the country.
- The non-availability of power in relation to its demand has been another dampening factor affecting the development of infrastructure development.
- Lack of proper regulations especially in transportation sector also is hampering the development of the sector.

Implications

- Poor infrastructure distorts the level playing field for Indian corporates and results in a competitive disadvantage when compared to the foreign counterparts.
- Lack of infrastructural facilities leads to delays in project implementation and consequently to time and cost overruns in a project.
- Poor infrastructure forces the consumers to pay more for products than what they should be actually paying.
- Poor infrastructure hinders the flow of Foreign Direct Investment into the country.

9.12.2 Financing Infrastructure

As discussed above, the financing of infrastructure projects is associated with high risk, low returns with a long gestation period. Hence, the financier would look to the optimal combination of debt, equity, securitization, risk sharing and government guarantees.

The need for developing infrastructure in the country was recognized by the government, and a Committee, headed by Dr. Rakesh Mohan, was set up to report on infrastructural conditions in India. The Committee opined that commercialization of infrastructure is the only viable and long-term solution to the problems associated with the traditional methods of infrastructural development. One of the important suggestions given by the Committee is to set up a regulatory body. It also recommended that government participation in private financed infrastructure projects should go beyond mere guarantees and they should also take equity positions in the projects.

Infrastructure Development Finance Corporation

Following the recommendations of the Rakesh Mohan Committee, the Infrastructure Development Finance Corporation (IDFC) was set-up in the year 1997 with a corpus of ₹ 1,600 crore by the Government of India and RBI with other domestic and foreign institutions as equity participants.

Key Activities

IDFC provides underwriting facilities, refinance facilities and take-out financing. Take-out financing involves an institution like IDFC promising to take over the loan extended by another institution after a prescribed time-frame. As a part of its fee-based activities, it also extends loan syndication, partial credit guarantees and fund-management. Apart from the above, its focus is on providing inputs to policy reforms to mitigate constraints faced by infrastructure projects besides extending financial intermediation for such projects.

The classification of IDFC as a public financial institution will help the newly-formed infrastructure institution to access long-term funds from pension funds and insurance companies. The setting up of IDFC is definitely a step in the right direction, but, the small capital base of the institution becomes a constraint in the fund-based financing of infrastructure. If we consider the huge fund requirements in power, telecom and transportation sectors, the fund-based support of IDFC is minuscule to make an impact. A single IDFC can do little to improve the state of infrastructure in India. In 2015, RBI sanctioned bank licence to IDFC thereby enabling the corporation to start banking operations in private sector.

In the year 2005-06, the Government of India also initiated the setting up of a new innovative finance company – the IIFCL

India Infrastructure Finance Company Limited (IIFCL) was incorporated as a Non-Banking Finance Company (NBFC) in 2006. This organization was established to address various regulatory and other restrictions; raise long-term funds from the market at minimum costs and on the scale required; and grant advances to Public-Private Partnership (PPP) projects while keeping the intermediation costs at the bare minimum. In order to achieve the desired objectives, IIFCL implemented a detailed framework to steer its functioning in

mobilisation of resources, selection of projects, mode of lending and the approval processes.

IIFCL was given the authority to raise funds from domestic and overseas markets on the basis of sovereign guarantees. This helped to keep the borrowing costs low.

IIFCL gives financial assistance through various modes, viz., debt financing, subordinate debt and re-financing. Added to this, the exposure of IIFCL to any project is restricted to only 20 per cent of the project costs, which accounts for about 30 per cent of project debt, assuming a debt equity ratio of 70:30. As per the guidelines, one-half of IIFCL lending can also be in the form of subordinated debt that in turn serves as quasi-equity.

PPP projects in India also carry a compulsory buy-back arrangement which enables the Government to take over a project in the event of termination, solely because those kind of projects cannot be abandoned due to the public good that they serve.

To maintain the intermediation costs low, IIFCL was projected as a lean organisation. Hence, all forms lending by IIFCL was to be taken up by a consortium of lenders.

In 2008, IIFCL floated a subsidiary in London to support the infrastructure projects that require considerable imports such as the power generation projects. This subsidiary, called as IIFC (UK) Ltd, provides foreign currency loans to Indian infrastructure projects that were privately financed.

An important feature of IIFCL lending is the longer term of its loans, which helped in extending the average maturity date of the project debt and also encouraged the commercial banks to follow suit. Thus, IIFCL has become a significant player in extending the average tenure of debt for infrastructure projects, thus making them more bankable and financially viable.

Learnings from the initiative:

The establishment of IIFCL and its success story shows how an innovative arrangement helped in leveraging limited public resources for providing the much needed long-tenure debt for PPP projects on a large-scale and at economic costs.

During this entire process, the banks were supported to lend in a commercially viable manner without any Government exposure or interference. This meant that the prudential norms normally applicable to lending by banks were not compromised.

This initiative should be regarded as a resounding success as it played a catalytic role in enabling a three-fold jump in the flow of private capital to infrastructure projects. This not only helped in doubling the total investment in infrastructure between the two Five-Year Plans (10^{th} and 11^{th} five year plans) but also increased its share in GDP from five per cent to seven per cent.

9.12.3 Future of Infrastructure

The infrastructure segment till eighties was considered as government monopoly. Private sector was viewed as having no interest in these projects due to the above discussed reasons. As we are aware, poor infrastructure is the biggest stumbling block for capital investments in India. Experts opine that all developmental plans reach a dead end because of poor infrastructure. Another trend emerging in infrastructure financing is the role of government as a facilitator in infrastructural financing. Broadly, this takes the form of support through venture capital and guarantees in the initial stages, providing a stable regulatory and transparent policy framework as well as developing the domestic capital markets for financing infrastructure. There are two basic issues which need to be addressed.

1. An infrastructure project does not become acceptable to an investor from the finance point of view. However, there are considerable social benefits involved in it and hence government has a significant role in ensuring that a project becomes acceptable.
2. Since the returns are low, the cost of funds also has to be low. The cost of funds becomes high due to the nature of long-term funds required. Hence, a market mechanism needs to be developed for raising short-term funds at cheaper rates which can be used for funding infrastructure projects. However, market making becomes necessary to ensure liquidity for investors to enter and exit at their will. Thus a maturity intermediation is necessary for the same.

Example: ICICI's Infrastructure Bonds

The second largest private sector lender ICICI Bank is raising ₹ 8,000 crore through 10-year infrastructure bonds with a coupon of around 7.25-30 per cent to finance projects in sectors like transport and power and affordable housing. Rating agency, CRISIL, assigned "AAA/Stable". The issue size is Rs. 500 crore with greenshoe option of Rs. 7,500 crore. ICICI Bank has an exposure to road, ports, telecom, urban development and other infrastructure was Rs. 48,981 crore at the end of March 2021 and the proposed capital to be raised through bonds will support the bank for further exposure to infrastructure development in the country.

Source: https://www.business-standard.com/article/finance/icici-bank-to-raise-rs-8-000-cr-via-bonds-for-transport-power-projects-122030701259_1.html dated March 9, 2022

Check Your Progress - 2

6. Which of the following is a non-discounting technique for evaluation of capital budgeting decisions?
   a. Pay back Period
   b. Net Present Value method
   c. Internal Rate of Return Method

d. Benefit Cost ratio

e. Annual Capital charge

7. Which of the following is not a reason for poor infrastructure development in India?

   a. Active participation of private sector is low

   b. Asset Liability mismatch

   c. Lack of innovative instruments for financing infrastructure

   d. high level of risk

   e. high level of participation of private sector leading to higher risk

8. Which appraisal criterion can be used for evaluating mutually exclusive projects or alternatives which provide similar service but have differing patterns of costs and often unequal life spans?

   a. Net Present Value

   b. IRR

   c. Benefit Cost ratio

   d. Annual Capital Charge

   e. Payback period

9. Identify an advantage of IRR from the options given below.

   a. It considers the cash flow streams of the initial years only

   b. It takes into account the time value of money

   c. It gives multiple rates of returns

   d. It is suitable for choosing between projects with different cash outlays.

   e. It does not take into account time value of money.

10. Which one of the following is not a principle for measurement of costs and benefits of a capital expenditure project?

    a. All costs and benefits must be measured in terms of cash flows

    b. Only pre-tax cash flows are to be considered for measurement of NCF

    c. NCF are to be defined from the suppliers of long term funds' point of view

    d. Interest on long term loans must be included in determining NCF

    e. The cash flows must be measured in incremental terms

9.13 Summary

- Capital expenditure decisions occupy an important place in corporate finance. The huge sums involved and the irreversible and long-term nature of the decisions make them very important.

- Investment decisions begin with identification of the investment opportunities, followed by preliminary screening, feasibility study, implementation and performance review.
- Six appraisal criteria are used for evaluating the financial viability of a project. While the first two are simple additive measures, the latter methods make use of discounted cash-low techniques.
- The payback period of an investment enables the manager to calculate the number of years required to recover the initial capital outlay in the project. Although this is a rough measure of liquidity of the project, it makes a poor job of measuring profitability as it ignores cash-flows occurring after the payback period and the time value of money using a crudely determined subjective cut-off point to appraise a project.
- The account rate of return is the ratio of average profit after tax to average book value of the investment. Akin to payback period, the criterion ignores the time value of money.
- The net present value is the present value of the project's net cash flows less the initial outflow. A project is acceptable only when its NPV is greater than or equal to zero.
- Benefit cost ratio measures the present value of a rupee of outflow and is very useful in ranking projects in the order of the efficient usage of capital. If a project's BCR is greater than or equal to 1, the project can be accepted.
- The internal rate of return is the discount rate that equates the present value of the net cash-flows of the project with the initial cash outlay. Any project is acceptable if the internal rate of return is greater than or equal to the required rate of return, usually the company's cost of capital.
- Annual capital charge is used for evaluating mutually exclusive projects or alternatives that are not comparable in terms of life spans or cost patterns. In this case, the project that has a lower annual capital charge is preferable to the one that has a higher charge.

9.14 Glossary

Accounting Rate of Return is the rate of return on an investment defined as profit after tax divided by book value of investment. It is also referred to as average rate of return.

Annual Capital Charge is an appraisal criterion that is used for evaluating mutually exclusive projects or alternatives which provide similar service but have differing patterns of costs and often unequal life spans.

Asset-Liability Mismatch arises due to mismanagement of assets and liabilities. A mismatch occurs when an asset with a short-term maturity is matched with a liability having long-term maturity or vice versa.

Capital Budget is the list of planned capital expenditures prepared usually on an annual basis

Capital Expenditure or Capital Budgeting Decision is a decision that may be defined as the company's decision to invest its current funds most efficiently in long-term assets in anticipation of an expected flow of benefits over a series of years.

Critical Path Method (CPM) is a stepwise planning or sequencing of project network techniques. It determines the shortest possible time to complete the project by identification of critical and non-critical tasks.

FEMA, 1999 is the Foreign Exchange Management Act that replaces FERA. It is a comprehensive legislation pertaining to foreign exchange market operations in India.

Gestation Period is the time taken for a project to start giving returns. The gestation period varies depending upon the nature of projects.

Industrial Corridor is a package of infrastructure allocation to a specific geographical area with the intention of enhancing the development of the area.

Internal Rate of Return is the rate of discount at which the net present value of an investment is zero.

Investment Opportunity is a listing or graphical representation of a firm's investment opportunities arranged in the order of projects' internal rate of return.

Mutually Exclusive Projects are a set of projects that perform essentially the same task, so that acceptance of one will necessarily mean rejection of the others.

Net Present Value is a discounting technique of evaluating capital budgeting decisions that is equal to the present value of future cash flows after deducting any immediate cash outflow. A project with a positive NPV is accepted whereas a project with a negative NPV is rejected.

Opportunity Costs refer to the cost of an alternative foregone. It arises in case of mutually exclusive projects, where acceptance of one alternative results in a cost as the benefit from the other alternatives is not received.

Payback period is a non-discounting evaluation technique that measures the length of time required to recover the initial outlay in the project.

PERT or Performance Evaluation and Review Technique is a statistical performance evaluation technique used for evaluating research and development projects.

Profitability Index also known as benefit-cost ratio measures the present value per rupee of outlay and is useful for ranking projects in the order of decreasingly efficient use of capital.

Required Rate of Return is the rate of return sought by the investors on their investment.

Salvage Value is the estimated value of an asset after completion of its estimated useful life.

Sick Unit is defined by the Sick Industries Companies Act as a unit or company which is in existence for not less than five years and which at the end of a financial year has incurred accumulated losses equal to exceeding its entire net worth. For an MSE (Medium Scale Enterprise) a sick unit is one whose borrowal account has been designated as an NPA for three months or more and which has experienced erosion in the net worth due to accumulated losses to the extent of 50% of its total net worth.

Venture Capital is a form of financing that is provided to early stage, start-up businesses which may have high growth potential.

9.15 Self- Assessment Test

1. What are important sources that can be tapped for identifying promising investment opportunities?
2. What are the important principles underlying measurement of costs (outflows) and inflows (benefits)?
3. Write a short note on 'annual capital charge'.
4. Describe briefly the various components of feasibility study of a project.
5. Analyse the reasons for the poor infrastructure development in India.
6. Differentiate the non-discounting techniques from the discounting techniques for evaluation of capital budgeting decisions.
7. Discuss the shortcomings of payback period as an evaluation criterion.

9.16 Suggested Readings / Reference Material

1. Brealey Myers (2020). Principles of Corporate Finance, 13th edition, USA: McGraw-Hill Companies Inc.
2. Prasanna Chandra (2019). Financial Management – Theory and Practice, 10th edition, New Delhi: Tata McGraw-Hill.
3. I.M. Pandey (2021). Financial Management, 12th edition, New Delhi: Pearson Education.
4. Francis Cherunilam (2020). International Business — Text and Cases, 6th Edition, PHI Learning.
5. P.G. Apte (2020). International Financial Management, 8th Edition, McGraw Hill Education (India) Private Limited.
6. John Tennent (2018). The Economist Guide to Financial Management. Economist Books.

9.17 Answers to Check Your Progress Questions

1. (d) Quality appraisal

Quality appraisal is not a part of project appraisal. It is a part of technical appraisal

2. (c) Change in economic policies

It is quite common for projects in India to be inordinately delayed due to a hoard of reasons like setting wrong target date, mistake in tender specifications due to which a lot of equipment cannot be fitted and goes waste, delay in arrival of materials, unskilled labor, etc. Hence, change in economic policies may not be a common reason for project delays.

3. (a) Risk and return analysis of the project

Economic appraisal of a project involves an assessment of impact of the project on the distribution of income in society, impact of the project on the level of savings and investment in the society, and contribution of the project towards socially desirable objectives like self-sufficiency, employment, etc. Risk and return analysis is a part of financial analysis and not economic analysis.

4. (c) Quality of raw material

The criteria that are typically applied for the preliminary evaluation include, compatibility with the promoter, compatibility with governmental priorities, availability of raw materials and utilities, size of the potential market and reasonableness of cost and risk inherent in the project. The quality of raw material is not a criterion at the stage of preliminary screening.

5. (c) Cost overruns

Project delays will lead to huge cost overruns and subsequent revision of project cost and the search for additional financing over and above the finance already sanctioned, which can in no way meet the cost overruns.

6. (a) Payback Period

Payback period and accounting rate of return are non-discounting techniques while all the others are discounting techniques for capital expenditure evaluation.

7. (e) High level of participation of private sector leading to higher risk

Infrastructure is highly capital-intensive and requires the kind of resources which cannot be generated domestically in the country. Also, since the gestation period is very long, active participation of private sector in infrastructure development is usually low. Hence option (e) is an incorrect statement.

8. (d) Annual Capital Charge

This appraisal criterion is used for evaluating mutually exclusive projects or alternatives which provide similar service but have differing patterns of costs and often unequal life spans, e.g., choosing between fork-lift transportation and conveyor-belt transportation.

9. (b) It takes into account the time value of money

IRR is a popular method of investment appraisal. It has a number of merits like: it takes into account the time value of money, it considers the cash flow stream over the entire investment horizon, and like ARR, it makes sense to businessmen who prefer to think in terms of rate of return on capital employed.

10. (b) Only pre-tax cash flows are to be considered for measurement of NCF

Only post-tax cash flows are to be considered for measurement of net cash flows. Hence, option **b** is incorrect.

Unit 10

Dividend Policy

Structure

I am far from underestimating the importance of dividends, but I rank dividends below human character.

- Theodore Roosevelt

10.1 Introduction

In unit 1, we have observed that one of the important functions of a finance manager is to take the dividend decision. There are, basically, two options that a firm has while utilizing its profits after tax. Firms can either plough back the earnings by retaining them or distribute the same to the shareholders. The first option suits those firms, which need funds to finance their long-term projects. However, such projects should have enough growth potential and sufficient profitability. On the other hand, the second option of declaring cash dividends from the profits after tax may lead to maximization of the shareholders' wealth as it might reduce uncertainty, leading to increase in stock prices. This unit explains the significance of dividend decisions and discusses the various models such as the traditional approach, Walter model, Gordon's dividend capitalization model, the Miller and Modigliani model and the Rational expectations model that are available to study the relationship between dividend decision and the return to equity shareholders.

10.2 Objectives

After reading through the unit, you should be able to

- Study the significance and impact of dividend decisions on the market value of shares
- Examine the inter-relationship between dividend decisions and retained earnings to arrive at optimal dividend pay-out
- Describe the dividend policy models that affect the firm's decisions to meet the investor's expectation
- Distinguish between Relevance and Irrelevance Models of Dividend Policy to analyse the effect of dividend decisions on the market price of shares

10.3 Dividend Decisions - Introduction

The returns to the shareholders by way of either the dividend receipts or capital gains are affected by the dividend policies of the firms. This is mainly because the dividend policy decides the retention ratio and pay-out ratio (dividend as a percent of the profits). The dividend policy of a company is influenced by several factors such as investor preference for dividends, stock prices, capital budgeting decisions, etc. Investors prefer dividends as it is a source of income and also appreciates the market value of their shares. Companies however, have to look into their cash resources and other fund requirements before arriving at dividend decisions.

Furthermore, the dividend policy of the firm gains importance, especially due to unambiguous relationship that exists between the dividend policy and the equity returns. Thus, a firm's decision should meet the investors' expectations. A few models, which studied this relationship and the dividend policies of firms, are given below and discussed:

– Traditional Position
– Walter Model
– Gordon Model
– Miller & Modigliani Position

Example: Infosys Dividend Payout

The Board of IT major Infosys approved paying out a final dividend of ₹ 16 per share on June 1, 2022, as per the regulatory filing by the company. With this, the company will be taking the total dividend for FY22 to ₹ 31 per share which is an increase of 14.8 per cent over the previous year amounting to ₹ 13,000 crore as per the company's officials. The increase of around 15% in dividends by the company to its shareholders can be attributed to increase in net profit by 14.3% to ₹ 22,110 crore and revenue by 21% to ₹ 1,21,641 crore compared to the previous fiscal. Normally increased profits result in increased dividend pay-outs.

Source: https://economictimes.indiatimes.com/markets/stocks/news/infosys-declares-divided-of-rs-16-per-share-sets-june-1-as-record-date/articleshow/90822609.cms dated 13th April 2022

10.4 Traditional Approach

The traditional approach to the dividend policy, which was given by B Graham and D L Dodd, lays a clear emphasis on the relationship between the dividends and the stock market. According to this approach, the stock value responds positively to higher dividends and negatively when there are low dividends.

The following expression, given by traditional approach, establishes the relationship between market price and dividends using a multiplier:

$$P = m (D + E/3) \quad .....(1)$$

where,

P = Market Price

m = Multiplier

D = Dividend per share

E = Earnings per share

Example: Traditional Approach

Traditional approach states that the stock value responds positively to higher dividends and negatively when there are low dividends. Shares of mining firm Hindustan Zinc rose nearly 4% on December 3, 2021 after the company's board declared that it will consider and approve interim dividend on equity shares for FY22. The stock touched an intraday high of ₹ 346.10, rising 3.89% as against previous close of ₹ 333.15. Further Hindustan Zinc stock had risen 43.66% since the beginning of the year and gained 44% in one year and the company officials informed that the raise in stock price coincided with dividend declaration and the market cap of the firm rose to ₹ 1.45 lakh crore on the BSE.

Source: https://www.businesstoday.in/markets/company-stock/story/hindustan-zinc-share-rises-board-to-consider-interim-dividend-on-dec-7-314326-2021-12-03 dated 7th December 2021

10.4.1 Limitations of the Traditional Approach

The traditional approach, further states that the P/E ratios are directly related to the dividend pay-out ratios i.e., a high dividend pay-out ratio will increase the P/E ratio and vice-versa. However, this may not be true in all situations. A firm's share price may rise even in case of a low pay-out ratio if its earnings are increasing. Here the capital gains for the investor will be higher than the cash dividends. Similarly, for a firm having a high dividend pay-out ratio with a slow growth rate, there will be a negative impact on the market price (because of lower earnings). In addition to this there may be a few investors of the company who would prefer the dividends to the uncertain capital gains and a few who would prefer lower taxed capital gains. These conflicting factors that have not been properly explained form the major shortcomings of the dividend policy given by the traditional approach.

10.5 Walter Model

Similar to the traditional approach, the dividend policy set forth by James E Walter also considers that dividends are relevant and they do affect the share price. In this model he studied the relationship between the internal rate of return (r) and the cost of capital of the firm (k), to arrive at a dividend policy that maximizes the shareholders' wealth.

The model studies the relevance of the dividend policy in three situations:

(i) $r > k_e$

(ii) $r < k_e$

(iii) $r = k_e$.

According to the Walter Model, when the return on investment is more than the cost of equity capital, the earnings can be retained by the firm since it has better and more profitable investment opportunities than the investors. It implies that the returns the investor gets when the company re-invests the earnings will be greater than what they earn by investing the dividend income. Firms which have their $r > k_e$ are the growth firms and the dividend policy that suits such firms is the one which has a zero pay-out ratio. This policy will enhance the value of the firm.

In the second case, the return on investment is less than the cost of equity capital and in such situation, the investor will have a better investment opportunity than the firm. This suggests a dividend policy of 100% pay-out. This policy of a full pay-out ratio will maximize the value of the firm.

Finally, when the firm has a rate of return that is equal to the cost of equity capital, the firms' dividend policy will not affect the value of the firm. The optimum dividend policy for such normal firms will range between zero to a 100% pay-out ratio, since the value of the firm will remain constant in all cases.

Assumptions: The relevance of the dividend policy as explained by the Walter's Model is based on a few assumptions, which are as follows:

i. Retained earnings is the only source of finance available to the firm, with no outside debt or additional equity used
ii. r and k are assumed to be constant and thus additional investments made by the firm will not change its risk and return profiles
iii. Firm has an infinite life
iv. For a given value of the firm, the dividend per share and the earnings per share remain constant

According to Walter, the market price of the share is taken as the sum of the present value of the future cash dividends and capital gains. His formula is based on the share valuation model and is arrived at in the following manner:

Step 1: Market per share price of the firm is given as:

$$P = D/(k_e - g) \quad \text{.....(2)}$$

Thus, we have

$$k_e = D/P + g$$

since, $g = \Delta P/P$

we have, $k_e = D/P + \Delta P/P$

but since,

$$\Delta P = \frac{r(E - D)}{k_e}$$

(since retained earnings is the only source of finance), substituting the same, we have,

$$P = \frac{D}{k_e} + \frac{r(E - D)/k_e}{k_e} \quad \text{.....(3)}$$

Where,

P = Market price per share

D = Dividend per share

E = Earnings per share

r = Internal rate of return

k_e = Cost of equity capital

ΔP = Change in the price

g = Growth rate of earnings

Illustration 10.1

Given the following information about ZED Ltd, show the effect of the dividend policy on the market price of its shares, using the Walter's model:

Equity capitalization rate (k_e) = 12%

Earnings per share (E) = ₹ 8

Assumed returns on investments (r) are as follows:

i. r = 15%

ii. r = 10%

iii. r = 12%

Solution

To show the effect of the different dividend policies on the share value of the firm for the three levels of r let us consider the dividend pay-out (D/P) ratios of zero, 25%, 50%, 75% and 100%.

i. $r > k_e$ ($r = 15\%$, $k_e = 12\%$)

a. D/P ratio = 0; dividend per share = zero

$$P = \frac{0 + (0.15/0.12)(8-0)}{0.12}$$

$$= ₹ 83$$

b. D/P ratio = 25%; dividend per share = ₹ 2.00

$$P = \frac{2 + (0.15/0.12)(8-2)}{0.12}$$

$$= ₹ 79$$

c. D/P ratio = 50%; dividend per share = ₹ 4

$$P = \frac{4 + (0.15/0.12)(8-4)}{0.12}$$

$$= ₹ 75$$

d. D/P ratio = 75%; dividend per share = ₹ 6

$$P = \frac{6 + (0.15/0.12)(8-6)}{0.12}$$

$$= ₹ 71$$

e. D/P ratio = 100%; dividend per share = ₹ 8

$$P = \frac{8 + (0.15/0.12)(8-8)}{0.12}$$

$$= ₹ 67$$

Interpretation: From the above calculations, it can be observed that when the return on investment is greater than the cost of capital, there is an inverse relation between the value of the share and the pay-out ratio. Thus, the value of ZED Ltd. is the highest when the D/P ratio is zero (P = ₹ 83) and this goes on declining as the D/P ratio increases. Hence, the optimum dividend policy for a growth firm is a zero dividend pay-out ratio.

ii. $r < k_e$ ($r = 10\%$, $k_e = 12\%$)

a. D/P ratio = 0; dividend per share = zero

$$P = \frac{0 + (0.10/0.12)(8-0)}{0.12}$$

$$= ₹ 56$$

b. D/P ratio = 25%; dividend per share = ₹ 2

$$P = \frac{2 + (0.10/0.12)(8-2)}{0.12}$$

$$= ₹ 58$$

c. D/P ratio = 50%; dividend per share = ₹ 4

$$P = \frac{4 + (0.10/0.12)(8-4)}{0.12}$$

$$= ₹ 61$$

d. D/P ratio = 75%; dividend per share = ₹ 6

$$P = \frac{6 + (0.10/0.12)(8-6)}{0.12}$$

$$= ₹ 64$$

e. D/P ratio = 100%; dividend per share = ₹ 8

$$P = \frac{8 + (0.10/0.12)(8-8)}{0.12}$$

$$= ₹ 67$$

Interpretation: When the return on investment is less than the cost of equity capital, calculations reveal that the firm's value will enhance as the D/P ratio increases. Due to this positive correlation between the share price and the dividend pay-out ratio, firms, which have less return on investment than the cost of equity capital, should prefer a higher dividend pay-out ratio in order to maximize the share value.

iii. $r = k_e$ ($r = 12\%$; $k_e = 12\%$)

a. D/P ratio = 0; dividend per share = zero

$$P = \frac{0 + (0.12/0.12)(8-0)}{0.12}$$

$$= ₹ 67$$

b. D/P ratio = 25%; dividend per share = ₹ 2

$$P = \frac{2 + (0.12/0.12)(8-2)}{0.12}$$

$$= ₹ 67$$

c. D/P ratio = 50%; dividend per share = ₹ 4

$$P = \frac{4 + (0.12/0.12)(8-4)}{0.12}$$

$$= ₹ 67$$

d. D/P ratio = 75%; dividend per share = ₹ 6

$$P = \frac{6 + (0.12/0.12)(8-6)}{0.12}$$

$$= ₹ 67$$

e. D/P ratio = 100%; dividend per share = ₹ 8

$$P = \frac{8 + (0.12/0.12)(8-8)}{0.12}$$

$$= ₹ 67$$

Interpretation: In the final case where the firm has its return on investment equal to the cost of equity capital, the dividend policy does not affect the share price of the firm. The price of the firm remains ₹ 67 for all the given levels of the D/P ratio. However, in actual practice, r and k will not be the same and it can only be a hypothetical case. Excepting the hypothetical cases of $r = k_e$ in other cases where

$r < k_e$ or $r > k_e$, according to Walter model, the dividend policy of a firm, as shown above is relevant for maximizing the share price of the firm.

Example: Walter Model

India's largest insurance company retained its profits to shore up its capital base. Life Insurance Corporation (LIC) did not pay any dividend to the government in the last financial year and used the free reserves to increase its paid-up capital, which has now risen to Rs. 6,325 crore and the government which is the owner of the LIC permitted for future growth. Further, since LIC planned to go for its maiden IPO, the higher capital base can support the IPO as well.

As per Walter model of dividend decision, companies normally retain the earnings if it has better and more profitable investment opportunities than paying the dividend to the investors and in case of LIC, the IPO and the future opportunity to attract investors has prompted the company to retain its dividend.

Source: https://economictimes.indiatimes.com/markets/stocks/news/lic-did-not-pay-dividend-to-govt-in-fy21-used-free-reserves-to-increase-paid-up-capital-karad/articleshow/89434147.cms?from=mdr dated 8th February 2022.

10.5.1 Limitations of the Walter's Model

Most of the limitations of this model arise due to the assumptions made. The first assumption of exclusive financing by retained earnings makes the model suitable only for all-equity firms. Secondly, Walter assumes the return on investments to be constant. This again will not be true for firms making high investments. Finally, Walter's model on dividend policy ignores the business risk of the firm, which has a direct impact on the value of the firm. Thus, k cannot be assumed to be constant.

10.6 Gordon's Dividend Capitalization Model

Yet another model that has given importance to the dividend policy of the firm is the Gordon Model. Myron Gordon used the dividend capitalization approach to study the effect of the firms' dividend policy on the stock price.

Example: Hefty Dividend Payouts by Indian Entities

Investors love to have hefty dividends as they are rational and risk-averse and they prefer current dividends and avoid risk. The year 2021 will be remembered for hefty dividend pay-outs by listed entities due to exceptional rise in stock valuations as well as bumper IPOs. Another aspect is that investors due to volatility in world economy prefer dividends over reinvestment as per global research.

Contd….

Some of the companies which paid hefty dividends include Aurum Proptech, Clariant Chemicals, Bharat Petroleum, Goodyear Tyre and Rubber Co, PNB Gilts, Indian Oil Corporation, Page Industries, Coal India, Satluj Jal Vidyut Nigam, Power Finance Corporation, and Hindustan Petroleum. These consistently made good profits and were consistently getting good results and hence they have rewarded their shareholders with good dividends. Analysts of HDFC securities are of the view that investors see the dividend payment as a sign of a company's strength, a sign of stable company, with positive expectations for future earnings. However, since the investors are rational and risk-averse, they prefer current dividends and avoid risk.

Source: https://www.business-standard.com/article/markets/2021-will-be-remembered-for-hefty-dividend-payouts-by-listed-entities-121112000437_1.html dated 20th November 2021

10.6.1 Assumptions

The following are the assumptions based on which Gordon based the dividend policy model for firms.

i. The firm will be an all-equity firm with the new investment proposals being financed solely by the retained earnings

ii. Return on investment (r) and the cost of equity capital (k_e) remain constant

iii. Firm has an infinite life

iv. The retention ratio remains constant and hence the growth rate also is constant (g = br)

v. k > br i.e. cost of equity capital is greater than the growth rate.

Gordon's Model assumes that the investors are rational and risk-averse. They prefer certain returns to uncertain returns and thus put a premium on the certain returns and discount the uncertain returns. Thus, investors would prefer current dividends and avoid risk. Retained earnings involve risk and so the investor discounts the future dividends. This risk will also affect the stock value of the firm.

Gordon explains this preference for current income by the bird-in-hand argument. Since a bird-in-hand is worth two in the bush, the investors would prefer the income that they earn currently to that income in future which may or may not be available. Thus, investors would prefer to pay a higher price for the stocks that earn them current dividend income and would discount those stocks that either postpone/ reduce the current income. The discounting will differ depending on the retention rate (percentage of retained earnings) and the time.

Gordon's dividend capitalization model gave the value of the stock as:

$$P = \frac{E(1-b)}{k_e - br} \quad \text{.....(4)}$$

where,

P = Share price

E = Earnings per share

b = Retention ratio

(1 – b)= Dividend pay-out ratio

k_e = Cost of equity capital (or cost of capital of the firm)

br = Growth rate (g) in the rate of return on investment

Example: Bajaj Auto's Expansion Plans

Companies which declare dividend, need additional equity for investments when they go for expansion.

The Indian auto two wheeler giant, Bajaj Auto, announced about investing ₹ 300 crores on its EV segment at Akurdi Pune. The company expects to raise capital to the extent of ₹ 250 crores through its dealers. The company expects EVs to grab 15-20% share in 4-5 years. At the same time, Bajaj Auto declared dividends for the year ending March 2022, an equity dividend of 1400.00% amounting to Rs. 140 per share. As per MM model, if the firm declares dividend, then it will have to raise capital for financing its investment decisions.

Source: https://www.financialexpress.com/auto/bike-news/bajaj-auto-to-set-up-rs-300-crore-ev-facility-first-ev-roll-out-by-june-2022/2393064/ dated 29 Dec, 2021

Activity 10.1

The following information is available for a company:

Earnings Per Share – ₹ 3

Internal Rate of Return – 15%

Cost of Capital – 12%

Assuming dividend payout ratio to be 50%, 75% and 100%, calculate the price per share according to Walter's model and Gordon's model.

Illustration 10.2

If k_e = 11%, and E = ₹ 15, calculate the stock value of Swan Ltd. for (i) r = 12% (ii) r = 11% (iii) r = 10% for the various levels of the D/P ratios.

	D/P Ratio (1 – b)	Retention Ratio
a.	10%	90%
b.	20%	80%
c.	30%	70%
d.	40%	60%
e.	50%	50%

Solution

i. $r > k_e$ ($r = 12\%$, $k_e = 11\%$)

a. D/P ratio= 10%

b = 90%

g = br = 0.90 x 0.12 = 0.108

$$P = \frac{E(1-b)}{k_e - br}$$

$$= \frac{15(1-0.9)}{0.11-0.108}$$

= ₹ 750

b. D/P ratio = 20%

= 80%

b = br = 0.80 x 0.12 = 0.096

$$P = \frac{15(1-0.8)}{0.11-0.096}$$

= ₹ 214.28

c. D/P ratio = 30%

b = 70%

g = br = 0.70 x 0.12 = 0.084

$$P = \frac{15(1-0.7)}{0.11-0.084}$$

= ₹ 173.08

d. D/P ratio = 40%

b = 60%

g = br = 0.60 x 0.12 = 0.072

$$P = \frac{15(1-0.6)}{0.11-0.072}$$

= ₹ 158

e. D/P ratio = 50%

b = 50%

g = br = 0.50 x 0.12 = 0.06

$$P = \frac{15(1-0.5)}{0.11-0.06}$$

= ₹ 150

ii. $r = k_e$ ($r = 11\%$, $k_e = 11\%$)

a. D/P ratio = 10%

b = 90%

g = br = 0.90 x 0.11 = 0.099

$$P = \frac{15(1-0.9)}{0.11-0.099}$$

= ₹ 136.36

b. D/P ratio = 20%

b = 80%

g = br = 0.80 x 0.11 = 0.088

$$P = \frac{15(1-0.8)}{0.11-0.088}$$

= ₹ 136.36

c. D/P ratio = 30%

b = 70%

g = br = 0.70 x 0.11 = 0.077

$$P = \frac{15(1-0.7)}{0.11-0.077}$$

= ₹ 136.36

d. D/P ratio = 40%

b = 60%

g = br = 0.060 x 0.11 = 0.066

$$P = \frac{15(1-0.6)}{0.11-0.066}$$

= ₹ 136.36

e. D/P ratio = 50%

b = 50%

g = br = 0.50 x 0.11 = 0.055

$$P = \frac{15(1-0.5)}{0.11-0.055}$$

= ₹ 136.36

iii. $r < k_e$ ($r = 10\%$, $k_e = 11\%$)

a. D/P ratio = 10%

b = 90%

g = br = 0.90 x 0.10 = 0.09

$$P = \frac{15(1-0.9)}{0.11-0.09}$$

= ₹ 75

b. D/P ratio = 20%

b = 80%

g = br = 0.80 x 0.10 = 0.08

$$P = \frac{15(1 - 0.8)}{0.11 - 0.08}$$

= ₹ 100

c. D/P ratio = 30%

b = 70%

g = br = 0.70 x 0.10 = 0.07

$$P = \frac{15(1-0.7)}{0.11-0.07}$$

= ₹ 112.5

d. D/P ratio = 40%

b = 60%

g = br = 0.60 x 0.10 = 0.06

$$P = \frac{15(1-0.6)}{0.11-0.06}$$

= ₹ 120

e. D/P ratio = 50%

b = 50%

g = br = 0.50 x 0.10 = 0.05

$$P = \frac{15(1-0.5)}{0.11-0.05}$$

= ₹ 125

The above illustration explains the relevance of dividends as given by the Gordon's Model. In the given three situations, the firm's share value is positively correlated with the pay-out ratio when $r_e < k_e$ and decreases with an increase in the pay-out ratio when $r > k_e$. Thus, firms with a rate of return greater than the cost of capital should have a higher retention ratio and those firms that have a rate of return less than the cost of capital should have a lower retention ratio. However, the dividend policy of firms, which have a rate of return equal to the cost of capital will not have any impact on its share value.

Check Your Progress - 1

1. When the firm's profits are rolled out in the form of cash or stock to the shareholders of the company, it is referred to as _____

   a. Distribution

   b. Repurchase

c. Dividend
d. Stock Split
e. Capital Profits

2. A Company stated in its Board of Directors meeting held on April 19, 20x1 that a dividend payment of ₹ 5 per equity share of face value of Re. 1 each for the financial year ending March 31, 20x1, will be paid on May 13, 20x1. The term used to refer to this type of dividend payment is _____

a. Interim Dividend
b. Final Dividend
c. Regular Dividend
d. Residual Dividend
e. Stock Dividend

3. Calculate the dividend payout ratio of a firm that distributes regular half-yearly dividend payments of ₹ 2 each for a total annual dividend payment of ₹ 4 per share with reported net earnings per share at ₹ 15.

a. 23.25%
b. 26.67%
c. 13.33%
d. 20.00%
e. 17.50%

4. Calculate the market price of a share when the firm's cost of equity capital is 10% and earnings per share is ₹ 8 with a payout ratio of 25% at an assumed return on investment at 12%.

a. ₹ 92
b. ₹ 69
c. ₹ 83
d. ₹ 115
e. ₹ 172

5. The equity capitalization rate of BCB limited stood at 12%. The earnings per share of the company was ₹ 15. The expected return on investment was 11% with a retention ratio of 80% and payout ratio being 20%. Ascertain the value of company's share price.

a. ₹ 92.75
b. ₹ 93.75
c. ₹ 91.55
d. ₹ 93.50
e. ₹ 94.25

10.7 Miller and Modigliani Model

Miller and Modigliani have propounded the MM hypothesis to explain the irrelevance of a firms' dividend policy. This model, which was based on a few assumptions, sidelined the importance of the dividend policy and its effect thereof on the share price of the firm. According to the model, only the firms' investment policy will have an impact on the share value of the firm and hence, will have to be given more importance.

10.7.1 Critical Assumptions

Before discussing the details of the model let us first look into the assumptions upon which the model is based:

- The first assumption is the existence of a perfect market in which all investors are rational. In perfect market conditions, there is easy access to information and the floatation and the transaction costs do not exist. The securities are infinitely divisible and hence no single investor is large enough to influence the share value.
- Secondly, it is assumed that there are no taxes, implying that there is no differential tax rate for the dividend income and the capital gains.
- The third assumption is constant investment policy of the firm, which will not change the risk complexion, nor the rate of return even in cases where the investments are funded by the retained earnings.
- Finally, it was also assumed that the investors are able to forecast the future earnings, the dividends and the share value of the firm with certainty. This assumption was, however, dropped out of the model.

Based on these assumptions and using the process of arbitrage Miller and Modigliani have explained the irrelevance of the dividend policy. The process of arbitrage balances or completely offsets two transactions that are entered into simultaneously. Arbitrage can be applied to the investment function of the firm. As mentioned earlier, firms have two options for utilizing its after tax profits (i) to retain the earnings and plow back for investment purposes (ii) distribute the earnings as cash dividends. If the firm selects the second option and declares dividend, then it will have to raise capital for financing its investment decisions by selling new shares. Here, the arbitrage process will neutralize the increase in the share value due to the cash dividends by the issue of additional shares. This makes the investor indifferent to the dividend earnings and the capital gains since the share value of the firm depends more on the future earnings of the firm, than on its dividend policy. Thus, if there are two firms having similar risk and return profiles the market value of their shares will be similar in spite of different pay-out ratios.

In the first step, the market price of the share is equal to the sum of the present values of the dividend paid and the market price at the end of the period.

$$P_0 = \frac{1}{(1+k_e)} (D_1 + P_1) \quad \text{.....(5)}$$

where,

P_0 = Current market price of the share (t = 0)

P_1 = Market price of the share at the end of the period (t = 1)

D_1 = Dividends to be paid at the end of the period (t = 1)

k_e = Cost of equity capital

With no external financing, the total value of the firm will be as follows:

$$nP_0 = \frac{1}{(1+k_e)} (nD_1 + nP_1) \quad \text{.....(6)}$$

where,

n = No. of shares outstanding

Now, if the firm finances its investment decisions by raising additional capital issuing n_1 new shares at the end of the period (t = 1), then the capitalized value of the firm will be the sum of the dividends received at the end of the period and the value of the total outstanding shares at the end of the period less the value of the new shares. Since this adjustment is actually adding and reducing the value of the new shares, (6) remains as it is. Thus, we have

$$nP_0 = \frac{1}{(1+k_e)} (nD_1 + (n+n_1)P_1 - n_1P_1) \quad \text{.....(7)}$$

Firms will have to raise additional capital to fund their investment requirements, if its investment requirement is more than its retained earnings, additional equity capital (n_1P_1) after utilizing its retained earnings is as follows:

$$n_1P_1 = I - (E - nD_1) \quad \text{.....(8)}$$

where,

I = Total investment required

nD_1 = Total dividends paid

E = Earnings during the period

$(E - nD_1)$ = Retained earnings.

Simplifying the above equation, we get

$$n_1P_1 = I - E + nD_1 \quad \text{.....(9)}$$

Substitute this value of the new shares in equation (7) to get,

$$nP_0 = \frac{1}{(1+k_e)}\left[(nD_1 + (n+n_1)P_1 - I + E - nD_1)\right]$$

$$= \frac{nD_1 + (n+n_1)P_1 - I + E - nD_1}{(1+k_e)}$$

$$\Rightarrow nP_0 = \frac{(n+n_1)P_1 - I + E}{(1+k_e)} \quad \text{.....(10)}$$

Thus, according to the MM model, the market value of the share is not affected by the dividend policy and this is explicitly shown in equation (10) (dividend does not figure in the equation used, to calculate the share price).

Illustration 10.3

The capitalization rate of A1 Ltd. is 12%. This company has outstanding shares to the extent of 25,000 shares selling at the rate of ₹ 100 each. Anticipating a net income of ₹ 3,50,000 for the current financial year, A1 Ltd. plans to declare a dividend of ₹ 3 per share. The company also has a new project the investment requirement for which is ₹ 5,00,000. Show that under the MM model, the dividend payment does not affect the value of the firm.

To prove that the MM model holds good, we have to show that the value of the firm remains the same whether the dividends are paid or not.

i. The value of the firm, when dividends are paid:

Step 1: Price per share at the end of year 1

$$P_0 = \frac{1}{(1+k_e)}(D_1 + P_1)$$

$$100 = \frac{1}{(1.12)}(3 + P_1)$$

$$P_1 = ₹\ 109$$

Step 2: Amount to be raised by the issue of new shares

$$n_1P_1 = I - (E - nD_1)$$

$$= 5,00,000 - (3,50,000 - 75,000)$$

$$= ₹\ 2,25,000$$

Step 3: Number of additional shares to be issued

$$n_1 = \frac{2,25,000}{109} \text{ shares}$$

Step 4: Value of the firm

$$nP_0 = \frac{(n+n_1)P_1 - I + E}{(1+k_e)}$$

$$= \frac{(25,000 + 2,25,000/109)\,109 - (5,00,000 - 3,50,000)}{1.12}$$

Value of the firm, nP_0 = ₹ 25,00,000

ii. Value of the firm when dividends are not paid.

Step 1: Price per share at the end of the year 1

$$P_0 = \frac{1}{(1+k_e)}(D_1 + P_1)$$

$$100 = P_1/1.12$$

$$P_1 = ₹\ 112$$

Step 2: Amount to be raised from the issue of new shares

n_1P_1 = (5,00,000 – 3,50,000) = ₹ 1,50,000

Step 3: Number of new shares to be issued

n_1 = 1,50,000/112 shares

Step 4: Value of the firm

$$nP_0 = \frac{(n+n_1)P_1 - I + E}{(1+k_e)}$$

$$= \frac{(25{,}000 + 1{,}50{,}000/112)\,112 - (5{,}00{,}000 - 3{,}50{,}000)}{1.12}$$

Value of the firm, nP_0 = ₹ 25,00,000

Thus, the value of the firm, in both the cases, remains the same.

10.7.2 Critical Analysis of the Assumptions

The MM approach to the irrelevance of dividends has been based on a few assumptions, which need to be evaluated critically, especially since a perfect market and the absence of floatation costs and transaction costs are situations, which do not happen in reality. A few assumptions have been critically viewed below.

Tax Effect

This assumption cannot be true, since in the real world the tax rate for the dividend income is higher than the tax rate applicable to the capital gains.

Floatation Costs

The proceeds that the firm gets from the issue of securities will be net off the issue expenses. The total issue expenses which include the underwriting expenses, brokerage and other marketing costs will be around 10-15% of the total issue (in India). With the costs of mobilizing capital from the primary market being high, these costs cannot be ignored.

Transaction Costs

This is an unrealistic assumption, since investors do have to incur certain transaction costs like the brokerage expenses while they dispose of their shares. Thus, if the investors are to equate the capital gains to the dividend income, they

should sell off the shares at a higher price. In addition to this, the inconvenience and the uncertainty involved in the share price movements make the investors prefer current income by way of dividends to plow back of profits.

Market Conditions

Sometimes the market conditions do affect the investment decisions of the firm. For instance, though a firm has profitable investment opportunities, the bad market condition may not allow it to mobilize the funds. In such cases, the firms will have to depend on the retained earnings and have a low dividend pay-out ratio. In still other cases, there may be certain sub-standard investment opportunities in which the firm will invest just because there is an easy access to funds from the market.

Underpricing of Shares

If the company has to raise funds from the market, it will have to sell the shares to the new shareholders at a price that is less than the prevailing market price. Thus, with the shares being underpriced the firm will have to sell more shares to replace the dividend amount.

These points of criticism and the preference for current income, uncertain market conditions, presence of transaction and floatation costs, underpricing, etc. highlight the shortcomings of the Miller & Modigliani's dividend irrelevance policy. Thus, the dividend policy of a company does have an effect on its share value.

10.8 Rational Expectations Model

According to the rational expectations model, there would be no impact of the dividend declaration on the market price of the share as long as it is at the expected rate. However, it may show some adjustments in case the dividends declared are higher or lower than the expected level. For instance, when a firm declares dividends higher than what was expected, it would result in an upward movement of the share price as there would be expectations of higher earnings and similarly low dividends would be taken as a fall in future earnings. Thus, the rational expectations model suggests that alterations in the market price will not be necessary where the dividends meet the expectations and only in case of unexpected dividends, will there be a change in the market price as stated above.

Example: Rational Expectations Model

PTC India, formerly Power Trading Corporation of India, an Indian company, provides power trading solutions, cross border power trading, and consultancy services with operations in Nepal, Bhutan, and Bangladesh. During the quarter, the company's board declared an interim dividend of ₹ 2 per equity share having a face value of ₹ 10 each for the financial year 2021-22.

Contd….

Further the stock was providing a good dividend yield of 7.9% with a dividend pay-out ratio of 48.5%. For the year ended March 2021, PTC India declared dividend of 75% on its face value, which amounts to ₹ 7.5 per share. It is said that the company was paying higher dividend than what was expected. This enabled the share price to move up from ₹ 59.6 to ₹ 94.5, registering a gain of ₹ 35 or around 58.7%. When a firm declares dividends higher than what was expected, it would result in an upward movement of the share price as per rational expectation model.

Source: https://www.ndtv.com/business/heres-a-list-of-top-dividend-paying-smallcap-stocks-in-india-2744955 dated 2nd February 2022

Check Your Progress - 2

6. Which of the following is not a variable for determination of shareholder's wealth?
   a. Higher dividends increase the market value of the share
   b. Declaration of cash dividends out of after tax profits
   c. Capital structure Decisions
   d. Cost of Capital
   e. Decrement in Profit Margins
7. Which of the following models states that the dividend policy of a firm has no effect on the market price of the shares with any expected rates?
   a. Traditional Model
   b. Walter Model
   c. Gordon Model
   d. Miller & Modigliani Model
   e. Rational expectation Model
8. Mr. Ram, the Financial Advisor of an investment bank, was asked to frame out a dividend policy for a manufacturing firm by his Manager. He chose Walter model to frame out an effective policy for the firm as it was an all equity firm, based on its assumptions. Identify the critical assumption factor that impacts the value of the firm, according to Walter Model.
   a. Exclusive financing by retained earnings
   b. Return on investment assumed to be constant
   c. Business risk does not affect the value of the firm
   d. Dividend and earnings per share remain constant
   e. Cost of capital assumed to be constant

9. Which dividend policy approach lays emphasis on retention ratio to assess the growth rate in the rate of investments?
   a. Walter Model
   b. Gordon Model
   c. Miller & Modigliani Model
   d. Rational Expectation Model
   e. Traditional Model
10. Which of the following refers to issue expenses, that are considered to affect the firm's share value according to MM model?
   a. Floatation Cost
   b. Transaction Cost
   c. Rate of Return
   d. Underpricing
   e. Rate of tax

Activity 10.2

Mr. Raj, the Financial Analyst of Sodex Limited is in a position to make an analysis and report on the market value of his company shares to project new investment decisions for the next financial year. The company usually pays 40% of their annual profits as dividends to shareholders and the remaining 60% is retained or used for expansion of their business for the next financial year. The Company has been paying regular annual dividends to its shareholders. The company's dividend policy is based on the irrelevance theory of dividend policy. Assist Mr. Raj in evaluating the advantages and limitations of the irrelevant dividend policy.

Answer:

10.9 Summary

- There are two different schools of thought on the dividend policies of a firm.
- According to one school of thought, in a perfect market situation, investment and financing decisions are independent and thus, the dividend decisions become irrelevant.

- The model given by Miller and Modigliani belongs to this school of thought. They also consider that the share value of the firm is based on the investment opportunities of the firm. However, the imperfect market conditions and the uncertainty prevailing in the future earnings do not provide enough support to this model.
- The second school of thought explains the relevance of the dividend policy and the impact of the same on the share value. However, in spite of these dividend models, it should be noted that investors are risk-averse and prefer current dividend to future earnings. Further, with maximization of shareholder wealth being the most important issue, the dividend policies of a firm will vary, depending on the operational environment.

10.10 Glossary

All-equity firms are firms that have met the capital requirements only through sales of shares in an enterprise without debt financing.

Arbitrage is the process of balancing or offsetting the effect of two transactions that are entered into simultaneously.

Capital Gains are the gains that arise out of the sale of capital assets.

Cost of Capital is the minimum rate of return the firm must earn on its investments in order to satisfy the expectations of investors.

Dividend Capitalization Model is a model proposed by Myron Gordon that studies the effect of firm's dividend policy on its stock price.

Dividend Policy is the company's approach to pay out the profits back to the shareholders in the form of dividends.

Dividends are the payments made in the form of rewards, cash, stocks or scrip made by a company to its shareholders

Floatation Costs are the legal, printing, postage, underwriting brokerage, and other costs of issuing securities.

Growth Rate refers to a variable increase as a percentage change over a specific period.

Internal Rate of Return is the rate of discount at which the net present value of an investment is zero.

Market Value is the price of the stocks or shares that it would normally fetch in the marketplace.

MM Hypothesis is proposed by Miller and Modigliani and explains the irrelevance of a firm's dividend policy on its stock price.

Pay-out Ratio is the proportion of earnings paid out by way of dividends.

Present Value is the value of a future stream of payments or receipts discounted at a given rate to the present time.

Price-Earnings Ratio is the ratio of market price per share to the earnings per share. It is used for valuation of companies stocks.

Retention Ratio refers to that percentage of the net earnings of the company that is plowed back for business activities without paying the shareholders.

Return on Investment is a measure used to evaluate the efficiency and the amount of return on investments relative to its investment costs.

Transaction Costs are the total expenses incurred on buying or selling of securities in the market.

Underpricing refers to a firm selling its shares to new share-holders at a price lower than the prevailing market price.

10.11 Self-Assessment Test

1. Briefly explain the significance of dividend decisions.
2. List out the limitations of traditional approach to dividend policy.
3. Give a detailed note on Walter and Gordon's dividend capitalization model.
4. State the assumptions of Miller and Modigliani approach to dividend policy.
5. Evaluate the pros and cons of regular and irregular dividend policies.
6. State the difference between relevance and irrelevance dividend models.

10.12 Suggested Readings/Reference Material

1. Brealey Myers (2020). Principles of Corporate Finance, 13th edition, USA: McGraw-Hill Companies Inc.
2. Prasanna Chandra (2019). Financial Management – Theory and Practice, 10th edition, New Delhi: Tata McGraw-Hill.
3. I.M. Pandey (2021). Financial Management, 12th edition, New Delhi: Pearson Education.
4. Francis Cherunilam (2020). International Business — Text and Cases, 6th Edition, PHI Learning.
5. P.G. Apte (2020). International Financial Management, 8th Edition, McGraw Hill Education (India) Private Limited.
6. John Tennent (2018). The Economist Guide to Financial Management. Economist Books.

10.13 Answers to Check Your Progress Questions

1. (c) Dividend

A dividend is the payment made by the company to the shareholders of the company out of the company's profits.

2. (a) Interim Dividend

The dividend declaration made and paid before the company has determined its full-year earnings is referred to as Interim Dividend.

3. (b) 26.67%

Dividend Payout ratio = Annual Dividends Per Share / Earnings Per Share

= 4 /15 = 26.67%

4. (a) ₹ 92

$r > k_e$ ($r = 12\%$, $k_e = 10\%$); D/P ratio = 25%; dividend per share = ₹ 2.00

$$P = \frac{2 + (0.12/0.10)(8 - 2)}{0.12}$$

= ₹ 92

5. (b) ₹ 93.75

Retention ratio "b"= 80%, D/P ratio = 20%; br = 0.80 x 0.11 = 0.088

Therefore P = 15 (1-0.8) / 0.12 – 0.088 = ₹ 93.75

6. (e) Decrement in Profit Margins

Decrement in Profit Margins is not a variable to measure maximization of shareholders' wealth, whereas improvement in profits maximizes the shareholders' wealth.

7. (d) Miller & Modigliani Model

According to the model, only the firms' investment policy will have an impact on the share value of the firm and hence shall have to be given more importance.

8. (c) Business risk does not affect the value of the firm

Walter's model of dividend policy ignores the business risk of the firm, which has a direct impact on the value of the firm.

9. (b) Gordon Model

It is based on the assumption that the retention ratio remains constant and hence the growth rate also is constant (g = br). Gordon's Model assumes that the investors are rational and risk-averse.

10. (a) Floatation Cost

Floatation cost refers to those issue expenses that are considered not to affect the firm's share value according to MM hypothesis.

Unit 11

Financial Forecasting

Structure

"If you have to forecast, forecast often."

– Edgar R Fiedler

Financial forecasting is not a one-off event; it is a continuous process.

11.1 Introduction

Financial Forecasting describes the process by which firms think about and prepare for the future. The forecasting process provides the means for a firm to express its goals and priorities. The process will ensure that they are internally consistent. It also assists the firm in identifying the asset requirements and needs for external financing.

Firms also have goals related to Capital Structure (the mix of debt and equity used to finance the firm's assets), Dividend Policy, and Working Capital Management. Therefore, the forecasting process allows the firm to determine if its forecasted sales growth rate is consistent with its desired Capital Structure and Dividend Policy.

11.2 Objectives

After reading through the unit, you should be able to:

- Determine the significance of financial forecasting as an integral part of financial planning
- Identify the steps involved in and the techniques of financial forecasting that aid in evolving an appropriate financial forecast
- Prepare Pro forma income statement and Pro forma balance sheet to project future earnings and financial position of a business
- Evaluate various types of Pro forma Statements to enable preparation of sales, cash and other budgets
- Project the External Funds Requirement (EFR) and Sustainable Growth Rate (SGR) of a business

11.3 Need for Forecasting

Financial forecasting is a planning process with which the company's management positions the firm's future activities relative to the expected economic, technical, competitive and social environment. Financial forecasts are prepared to serve the following objectives:

- To assess the financial viability of a new business venture. It permits a business to construct a model of how the business might perform financially if certain strategies, events and plans are carried out
- To guide the business in the right direction and undertake effective planning and control of cash flow
- To establish a benchmark against which to measure future performance
- To identify potential risks and cash shortfalls to keep the business out of financial trouble
- To estimate future cash needs and whether additional private equity or borrowing is necessary

Example: EV Performance Forecast

The Indian electric vehicle market was valued at USD 1,434.04 billion in 2021, and it was expected to reach USD 15,397.19 billion by 2027, registering a CAGR of 47.09% during the forecast period (2022-2027).

The past performance is the yardstick for forecasting the future growth.

The Asia-Pacific region dominated the global market share in 2020. Demand for EV was high in China, Japan, and India and was expected to witness significant growth in the region.

Contd….

Based on the forecast, several local major players in the country are investing heavily to enhance their production capacity of electric two-wheelers in the country to cater to enhancing the demand in the country. Tata Motors, M&M, MG Motors India, Maruti Suzuki are some of the top auto giants in the fray.

Source: https://www.mordorintelligence.com/industry-reports/global-electric-vehicle-battery-market-industry dated March 10, 2022

11.4 Steps and Techniques in Financial Forecasting

Financial forecasting process involves the following sequential steps:

1. Identifying the economic variables and making assumptions about such variables. These variables can typically be the interest rate, tax rate, inflation rate, exchange rate etc.
2. Any financial forecasting process begins with preparation of sale forecast or budget. Based on the sales estimate, the costs to be incurred for generating the sales can be estimated.
3. Based on the sales estimates and the estimates of costs and expenses, the pro forma statements are prepared.
4. The preparation of pro forma statements, capital requirements can be projected and investment in fixed assets and working capital is planned.
5. Since the financial requirements are known, a comprehensive financial plan can be arrived at spelling out the sources of financing working capital and capital expenditures.

Example: Forecast of Sales, Costs and Profits

Any financial forecasting process begins with preparation of sale forecast. Based on the sales estimate, the costs to be incurred for generating the sales can be estimated.

Let us create a forecast of Tata Steel Ltd on the three areas namely sales, costs to be incurred and net profit based on the past performance.

(₹ in crore)

Particulars	March 2021 (Audited)	March 2022 (Audited)	March 2023 (Forecast)
Total Revenue	63,869.00	1,29,021.65	1,93,531.50
Costs (Expenditure)	50,484.81	86,147.27	1,21,467.27
PAT	13,606.32	33,011.18	52,157.38

Contd…..

Assumptions:

The forecast is based on the growth % achieved in 2022 over 2021 as follows:

Revenue - 50%

Expenditure - 41%

PAT - 58%

Source: https://www.moneycontrol.com/financials/tatasteel/profit-lossVI/TIS#TIS dated May 15, 2022.

11.4.1 Techniques of Financial Forecasting

Business plans normally show strategies and actions for achieving desired short-term, intermediate, and long-term results. These are quantified in financial terms, in the form of projected financial statements (pro forma statements) and a variety of operational budgets. There are three main techniques of financial projections. They are:

1. Pro forma financial statements
2. Cash Budgets, and
3. Operating Budgets.

By developing pro forma statements, a comprehensive look at the likely future financial performance of a company can be obtained. These statements, comprised of a statement of Profit and Loss and a balance sheet, are extended into the future. The pro forma operating statement (statement of profit and loss) represents an "operational plan" for the business as a whole, while the pro forma balance sheet reflects the anticipated cumulative impact of assumed future decisions on the financial condition of the business at a selected point of time. Both statements are prepared by taking the most readily available estimates of future activity and projecting, account by account, the assumed results and conditions. A third statement, a pro forma funds flow statement, adds further insight by displaying the various funds movements expected during the forecast period.

11.5 Pro Forma Financial Statements

The preparation of pro forma statements is explained with an illustration of a hypothetical manufacturing company called Genius Corporation. The company sells two kinds of winter care products. These have a seasonal pattern with a low point of sale during May. The most recent results are available for the first quarter of the year 1. These statements give the initial set of data to project the future statements. The pro forma projection is to be made for the second quarter of the year 1, and the objective is to determine both the level of profit and the amount of additional funds required at the end of the second quarter.

Example: Percentage of Sales Method

The percentage of sales method can be used to project the items on the assets side of the balance sheet except for current liabilities and assets.

Based on the balance sheet figures of Nestle India as on 31.03.2020 and 21, one can forecast the position of certain financials for 2022 as follows. (Current liabilities and assets are excluded.)

(₹ in crore)

Particulars	December 2020	December 2021	Forecast December 2022
Share capital	96.42	96.42	96.42
Reserves and surplus	1922.92	1988.06	2048.64
Non current liabilities	3387.84	3522.21	3627.66
Non current assets	2817.99	3240.20	3979.86
Contingent liabilities	315.40	187.26	59.26

Assumption:

The forecast is based on the growth % achieved in 2021 over 2020 as hereunder:

Reserves and surplus - Up by 3%

Non current liabilities - Up by 3%

Non current assets - Up by 13%

Contingent liabilities - Down by 68%

Source: https://www.moneycontrol.com/financials/nestleindia/balance-sheetVI/NI dated May 15, 2022

11.5.1 Pro Forma Income Statement

The following steps are followed in the preparation of pro-forma income statement:

1. The first step is to project the revenues or the sales. This can be done on the basis of current period sales using methods such as trend line projections or sales forecasts.
2. The second step is to estimate the expenses or costs. There are two popular methods that are used for this estimation – the percentage of sales method where the costs are estimated as a percentage of projected sales or the budgeted expenses methods where the budgeted costs of the future period are estimated individually for each expense.

3. The third step is to estimate the future profits based on the projected figures of revenues and expenses.

The starting point in the preparation of pro forma operating statement, as shown on the first line of the below given Table 11.1 is a projection of the unit and rupee volume of sales. These can be estimated in a variety of ways like trend-line projections to detailed departmental sales forecasts by individual products.

Illustration 11.1

Table 11.1: Pro forma Income Statement

(₹ in thousands) Particulars	Actual quarter ended March 31, 20xx	Pro forma Quarter ended June 30, 20xx	Assumptions
Units sold	14,000	9,800	Second quarter has seasonally low sales; past data show 30% decline from first quarter.
Net sales	1,40,000	98,000	No change in product mix and price.
	100.0%	100.0%	
Cost of goods sold			
Labor	22,960	16,366	20% of cost of goods sold as before.
Materials	25,256	18,002.6	22% of cost of goods sold as before.
Distribution	4,592	3,273.2	4% of cost of goods sold as before.
Overhead	61,992	44,188.2	54% of cost of goods sold as before.
Total	1,14,800	81,830	Increase by 1.5 percentage point simulates operating inefficiencies.
Ratio of cost of goods sold to sales	82.0%	83.5%	
Gross profit	25,200	16,170	
Gross profit margin	18.0%	16.5%	
Expenses: Selling expenses	8,250	7,500	Assuming a drop of ₹ 750 due to lower activity
Gen & Admn.	4,450	3,600	Assuming a drop of ₹ 850
Total	12,700	11,100	
Operating profit	12,500	5,070	
Interest	2,500	2,000	Based on outstanding debt
Depreciation	2,000	2,000	
PBT	7,000	1,070	
Tax @30%	2,100	321	
Net income	4,900	749	
Dividends	900	-0-	No payment of dividends
Retained earnings	4,000	749	Carried to balance sheet
Cash flow after dividends	6,000	2,749	Retained earnings + depreciation

A closer look at the above table shows that the actual operating statement for the first quarter ended March 31, has been taken as a base for the analysis. Company statistics from past years show that during the second quarter a decrease of 29 to 31 percent from first quarter is normal. By taking the mid-point of 30 percent the unit sales figure is obtained by decreasing the first quarter unit sales by 30 percent. After calculating a 30 percent decrease in unit volume, it is further assumed that both the prices and the product mix will remain unchanged. The assumption can be relaxed to have more insights or to test the impact of "what if so and so is changed by some percentage" type of questions.

Next is the estimation of cost of goods sold. For this, percentage of sales method is used. An assumption is made that the future relationship between various elements of costs to sales will be similar to their historical relationship. The actual first-quarter operating statement provides details on the main components (labor, materials, overheads and distribution) in cost of goods sold. As the second quarter is the company's seasonal low point, it is assumed that some inefficiencies are likely to raise the overall cost of goods sold as operations slowdown. Cost of goods sold and gross margin can be calculated directly without a detailed cost breakdown. Selling expense is shown as ₹ 8,250. Given that the second quarter has lower sales activity, a small decrease of ₹ 750 can be assumed. A reduction fully proportional to the 20 percent drop in volume would not be possible as some of the expenses are fixed in nature. Similar is the case with the general and administrative expenses. This method of estimating the value of various items on the basis of expected developments in the future period is called the budgeted expense method.

As a result of the assumptions, the second quarter operating profit falls by over ₹ 5,000 and the profit after-tax drops to less than one fifth of its former level. This is mostly due to the 30 per cent drop in sales volume and the associated profit contribution loss. Interest is charged according to the provisions of the outstanding debt, and this information can be obtained from the company's annual reports. The operating statement will be completed after we calculate the tax rates (assumed here at the rate of 30%). It can be observed that there is a significant decrease in the amount of net profits because of slowdown in operations. One more assumption needs to be made about the dividends to arrive at the retained earnings for the period, to be reflected in the pro forma balance sheet. In Genius Corp's case, it is assumed that no dividends will be declared because of low earnings.

11.5.2 Pro forma Balance Sheet

Pro forma balance sheet is prepared to project the values of assets and liabilities. Such a projection aids in financial planning. It helps in arriving at decisions pertaining to merger or acquisition, taking up new projects, new capital investments, changing capital structure, etc.

The following steps are followed in the preparation of pro forma balance sheet:

1. The percentage of sales method explained above can be used to project the items on the assets side of the balance sheet except for investments and miscellaneous expenditures.
2. The value of investments and miscellaneous expenditures are to be estimated based on their expected values. The expected values can be arrived at through analyzing any specific information available for them.
3. The percentage of sales method can also be used to project current liabilities and provisions.
4. The projected value of reserves can be obtained by addition of retained earnings and surplus taken from the pro forma income statement.
5. Usually the values of equity and preference share capital and long term loans is kept at previous balances only unless a change is warranted.
6. The difference in the totals can be used to determine the external funds requirement (if assets are more than liabilities) or surplus funds (if liabilities exceed assets).

An illustrative pro forma balance is presented below:

Illustration 11.2

Table 11.2: Pro forma Balance Sheet

(₹ in thousands)

	Actual March 31, 20xx	Pro forma June 30, 20xx	Change	Assumptions
LIABILITIES				
A. Share Capital	6,500	7,000	+500	Sale of stock under option
B. Reserves and Surplus Total (C + D)	4,500	5,250	+750	
C. Reserves	500	500	-0-	
D. P&L balance carried forward	4,000	4,750	+750	From P&L
E. Total Shareholders Funds (A + B)	11,000	12,250	+1,250	
F. Total Debt	7,500	7,500	-0-	
G. Total Liabilities (E + F)	18,500	19,750	+1,250	
ASSETS				
H. Gross Block [I + J]	24,000	23,000	–1,000	
I. Land	3,000	3,000	-0-	No change

Contd….

J. Plant & Machinery	21,000	20,000	–1,000	Sale
K. Less: Accum. Depreciation	10,000	9,500	–500	
L. Net Block (H – K)	11,000	10,500	–500	
M. Current Assets, Loans and Advances (N + O)	14,500	16,000	+1,500	Accumulated
N. Inventories	10,500	12,500	+2,000	
O. Cash	4,000	3,500	–500	Cash set at estimated min. balance
Less: Current Liab. & Prov.				
P. Current Liabilities	5,000	4,000	–1,000	
Q. Provisions	2,000	2,000	-0-	
R. Net Current Assets (M – P – Q)	7,500	10,000	+2,500	
S. Total Assets (L + R)	18,500	20,500	+2,000	
Additional funds required (Total assets – Total liabilities)			+750	

Preparation of pro forma balance sheet is illustrated in the Table 11.2. Again specific assumptions have to be made about each item in the statement, working from the actual balance sheet and additional information we can obtain from the management. All the assumptions made are given in the table. The first account (share capital) is expected to increase by ₹ 5,00,000 as stock options are exercised. The retained earnings will increase by the net income of ₹ 7,50,000 as calculated in the pro forma income statement. Totally the amount of shareholder funds has increased by ₹ 12,50,000. Long-term debt is assumed to remain unchanged.

On the assets side, first, fixed assets are considered. In the present case, two types of fixed assets are taken. They are land and, plant and machinery. Land remains unchanged and there is a reduction of ₹ 1,00,000 in the plant and machinery account because of sale of machines. Next is ‘net current assets’. ‘Net current assets’ is obtained by deducting total current liabilities from total current assets. It is assumed that the demand for the products is going to increase from third quarter onwards. So, to meet the excess demand in the next quarter, products are already manufactured and kept in the inventory, though the sales in the present quarter are reduced. Regarding cash, the assumption is that three months hence the company would need to keep only the minimum working balance in its bank accounts. An amount of ₹ 5,00,000 was the minimum balance it has kept over the period. The assumption regarding current liabilities is that most of them are accounts payable and are assumed to decline in response to lower activity in the second quarter.

Finally, when the results are added up, there would be a difference between assets and liabilities amounts. So, assets and liabilities are made equal with a balancing figure, which represents either funds needed or the excess funds of the company on the pro forma balance sheet date. In the case of Genius Corp., the amount came to as ₹ 7,50,000. This figure is called plug figure and serves as a quick estimate of what amount of additional funds the company requires or the additional funds at the company's disposal.

In India, the proforma financial statements have become a regulatory stipulation from 2012. SEBI has made it mandatory for all companies that are going in for an IPO and which have an acquisition/divestment transaction.

The Institute of Chartered Accountants of India released a guidance note in October 2012 to give inputs on the practical implementation of SEBI's stipulation. An extract of this guideline is presented below.

ICAI's Guidance Note on Pro forma Financial Statements

1. The conditions under which Pro forma Financial Statements are required to be prepared and presented by the Issuer in the offer document, under the 2009 Regulations, are as follows:

   (a) An acquisition or divestment is made by the Issuer after the end of the latest disclosed annual financial results in the offer document, due to which certain companies become/cease to be direct or indirect subsidiaries of the Issuer; and

   (b) The financial statements of such acquired or divested entity is material to the financial statements of the Issuer company.

   The financial statements of the acquired or divested entity are considered to be "material" to the financial statements of the Issuer if:

   (i) The total book value of the assets of the acquired/divested entity amounts to more than 20% of the pre-acquisition /pre-divestment book value of the assets of the Issuer; or

   (ii) The total income of the acquired /divested entity amounts to more than 20% of the pre-acquisition/pre-divestment total income of the Issuer.

   Period for which Pro forma Financial Statements are required

   The 2009 SEBI Regulations require the presentation of Pro forma Financial Statements for:

   a. The last completed accounting year, and

   b. The period beginning from the date of the end of the last completed accounting year and ending on the date for which financial statements of the Issuer have been disclosed in the offer document (also referred to as the stub period).

Principles for Preparation of Pro forma Financial Statements

1. The objective of presenting Pro forma Financial Statements is to demonstrate the effect of a transaction on the financial statements of the Issuer company as if the transaction had occurred at an earlier date. The Pro forma Statement of Profit and Loss is prepared as if the transaction/s occurred immediately before the start of the period, and pro forma Balance Sheet is prepared as if the transaction/s occurred at the balance sheet date. It follows that since the Pro forma Statement of Profit and Loss and the Pro forma Balance Sheet are prepared on different bases/ assumptions, there will be inherent inconsistencies between the two.
2. The underlying historical financial information must be derived from a source duly approved by the Board of Directors of the Issuer company, such as statutory accounts, interim financial accounts or other historical financial information such as that prepared in accordance with the requirements of Clause 41 of the Listing Agreement (which might be included in the same document).
3. For the purposes of acquisitions, there is no requirement for the two companies to have co-terminous year ends. The difference between two year-ends, ideally, should not be more than that what is specified in paragraphs 18 and 19 of AS 21, Consolidated Financial Statements, i.e. not exceeding more than six months. However, consideration needs to be given to the possible effects of seasonality and materiality. Whilst this may not be significant or material where full year Statements of Profit and Loss are being aggregated, it may be significant or material where balance sheets are being aggregated. In such cases, as well as generally, adequate and due consideration needs to be given for the effects of material transactions between the dates of period end, of the Issuer and the acquired entity. These adjustments on grounds of materiality should be reflected in the underlying historical financial information with suitable disclosure and should not form part of the pro forma adjustments.

Contents of Pro forma Financial Statements

In order for the Pro forma Financial Statements to meaningfully reflect the effect/s of the transaction(s) that trigger(s) their presentation, the following must, at a minimum, form part of the Pro forma Financial Statements:

a. Pro forma Balance Sheet/s;

b. Pro forma Statement of Profit and Loss; and

c. Notes to the Pro forma Balance Sheet/s and Pro forma Statement of Profit and Loss.

11.6 Other Pro Forma Statements

Besides Pro Forma financial statements, the following other forms of Pro Forma statements are also widely used as techniques of financial forecasting:

11.6.1 Cash Budget

Cash budgets (or cash flow estimates), are very specific planning tools that are prepared every month or even every week. They give the specific details about the incidence of cash receipts and cash payments. The financial manager, who uses the cash budget after observing the changing levels of cash flows, decides the minimum amount of cash that should be kept to allow timely payments of obligations. Cash budgets on the whole, show the cash needs or excesses. The level at the end of the period will match if the cash budget was prepared using the same assumptions employed in generating the pro forma statements.

11.6.2 Operating Budget

The pro forma statements and cash budget provide an overall view of the company's future performance. In big organizations, normally specific operating budgets are prepared for different divisions (sales, production etc.,) in the organizational hierarchy. These form a backdrop for the preparation of pro forma statements and cash flow projections when a higher degree of detail and accuracy is required. There are many types of profit and expense budgets like sales budget, which gives the details of profit contribution, and factory budget, which provides only costs or expenses. For the present discussion, the sales budget is illustrated.

11.6.3 Sales Budget

Sales forecast provides the basis around which the firm's planning process is centered. Important areas of decision-making such as production and inventory scheduling, investment in machinery and other fixed assets, manpower requirements, raw material purchases, cash flow requirements are all dependent on the sales forecast. It, therefore, follows that any significant error in the forecast will have far-reaching and serious consequences. A sales forecast for the coming year would reflect:

- Any past trend in sales that is expected to be continued in the coming year.
- The influence of any events, which might naturally affect that trend.

Sales forecasting is a complex subject which uses a variety of concepts and techniques. These can be broadly classified as being either subjective or objective.

Example: Sales Budget

One of the other pro forma statements is sales budget and the sales budget of Infosys for the period 2022-23 is hereunder:

(₹ in crore)

Particulars	2020-21 (Audited)	2021-22 (Audited)	2022-23 (Forecast)
Sales	88,379.00	1, 07,164.00*	1,25,382.00
Employees cost	45,179.00	51,664.00**	57,864.00
Total expenses	63,902.00	78.669.00***	14,160.00
PAT	18,048.00	21,235.00****	24,420.00

* Growth by 17%

** Up by 12%

*** Up by 18%

**** Up by 15%

Rounded off to 000

Assumption:

The forecast for 2022-23 is based on past performance in terms of percentage of growth or expenses in 2021-22 over 2020-21 as shown above.

Source: https://www.moneycontrol.com/financials/infosys/profit-lossVI/IT#IT dated May 15, 2022

Check Your Progress - 1

1. Which of the following is not a technique of Financial Forecasting?
   a. Pro forma statements
   b. Cash budget
   c. Operational budget
   d. Sales budget
   e. Financial statements
2. The process of financial forecasting begins with_____.
   a. Forecasting material requirements
   b. Forecasting manpower requirements
   c. Forecasting financial requirements
   d. Forecasting sales volume
   e. Forecasting assets requirements

3. The preparation of pro forma financial statements is based on which of the following given information?
   a. Past cost data
   b. Recently prepared financial statements
   c. Financial statements of the first 5 years
   d. Cash budget
   e. Management's Report
4. Operating budget does not consist of one of the following components. Identify the component.
   a. Sales Budget
   b. Cash flow statements
   c. Raw material requirement statement
   d. Production budget
   e. Cash budget
5. The statement that gives a comprehensive look at the likely future financial performance of a company is called as _____
   a. Pro forma statements
   b. Cash budget
   c. Operating budget
   d. Sales budget
   e. Purchase budget

Activity 11.1

Financial forecasts are usually released at the beginning of the accounting period or quarterly or half yearly or just before any important financial events by a company. Such forecasts are also released by financial analyst firms. Collect information about any such forecasts of a company in the last two quarters and compare them with the actual results. Make an analysis of the deviations from the estimates.

Subjective Methods

The word "subjective" is used here, because these methods use the judgments or opinions of knowledgeable individuals within the company, ranging from sales representatives to executives.

Let us take a very brief look at some of the subjective measures commonly applied.

- ***Jury of Execution opinion***

  In this method, each of the member of executives makes an independent forecast of sales for the next period, usually a year, based on factual data at their disposal and using their mature judgmental abilities. Once these independent forecasts are made, the chief executive has to reconcile the differences after a joint discussion with all the executives. While the jury method is simple and represents a number of viewpoints, its chief disadvantage is that it is based on opinions.

- ***Sales Force Estimates***

  For short-term forecasts, it is likely that sales representatives can do a better job than can be done using more sophisticated objective methods. This is because they have the direct "feel" about the market. Sales representatives' knowledge of the probable demand of major accounts for the product (especially industrial products) over the coming months is about the only reliable basis on which a firm can adjust its plans to the dynamics of the market plan. The major disadvantage of using this method is that sales representatives may set targets which are too easily attainable so as to reduce their workload.

Objective Methods

A major drawback of the subjective methods is that they are prone to individual perceptions that may sometimes hamper the forecasting results. Objective methods are statistical methods which range in sophistication from relatively simple trend extrapolations to the use of complicated mathematical models. More and more companies are relying on computers to predict causal relationships as they are based on quantitative data and are not influenced by any judgements or opinions of the forecaster.

Trend Analysis via Extrapolation

A simple objective method of forecasting is the extrapolation of past sales trends. The major assumption is that sales for the coming period will change to the same degree as sales changed from the prior period to the current period. Thus, in this method, the past trend in sales is identified and this trend is projected into the

future. While doing trend analysis, the analyst must keep in mind that the time series of a product's past sales is made up of four major factors:

- *The first factor, long-term trend***,** is the result of basic developments in population, capital formation and technology. This is found by fitting a straight or curved line through past sales.
- *The second factor, cycle,* captures the wave-like movement of sales as a result of swings in general economic activity, which tends to be somewhat periodic. This cyclical component can be useful in intermediate range forecasting.
- *The third factor, seasonal variations,* refers to a consistent pattern of sales movements within the year which may be related to climatic factors, holidays, customs, etc. The seasonal pattern provides a basis for forecasting short range sales.
- *The fourth factor, erratic events*, includes strikes, riots, earthquakes and other unpredictable disturbances. These erratic factors should be removed from past data to see the more normal behavior of sales. While analyzing, the original sales series should be broken up into these components and recombined to produce the sales forecast. Let us take a look at how this is done.

An automobile company sold 60,000 cars during the last year ended 31st December. The company would like to predict sales for the current year ending 31st December. The long-term trend of sales shows a 5 percent growth rate per year. This factor, taken by itself, suggests that sales for the next year will amount to 63,000 cars. However, economists predict a recession next year that will probably result in the company achieving only 80 percent of the expected trend – adjusted sales. This means that sales next year are more likely to be 50,400 cars. Assuming that sales follow a uniform pattern throughout the year (i.e., there is not much seasonal fluctuations), monthly sales would amount to 4,200 cars. However, December seems to be an above-average month for car sales with a seasonal index standing at 1.20. Therefore, in comparison with the other months, December sales will be 5,040 cars. Since erratic events cannot be reasonably predicted anyway, the best estimate of car sales for next December is 5,040 cars.

Regression Analysis

Regression analysis can be used in sales forecasting to measure the relationship between a company's sales (dependent variable) and other independent variables like income, population, etc. For illustration, automobile manufacturers may find that their sales are related to personal income – when income goes up, sales go up and vice-versa. To use this relationship in forecasting car sales, the company must determine the degree of relationship. In other words, this leads to the question, if income rises, by say, 10 percent, will car sales rise by 10 percent, 30 percent, 15 percent, or how much? Using regression analysis, sales (Q), a

dependent variable is expressed as a function of a number of independent variables, X_1, X_2, ...X_n, i.e.,

$$Q = f(X_1, X_2, ...X_n)$$

Various equation forms can be statistically fitted to the data in the search for the best predicting factors and equation. The coefficients of the equation are estimated according to the criterion of least squares. According to this criterion, the best equation is one that minimizes the sum of the squared deviations of the actual from the predicted observations. The equation can be derived using standard formulae.

Regression analysis has the advantage of being more objective than the methods discussed so far.

Next, the price levels for each product are estimated by taking three factors into consideration. They are industry pricing practices, competitive environment and cost effectiveness of company's manufacturing operations. Once price is projected, sales revenue can be calculated. Next, cost of goods sold is estimated. After projecting selling and administrative expenses, gross profit margin is obtained. In this way, the sales budget for different short-term periods is estimated.

11.6.4 Growth and External Financing Requirement

Financial plans force managers to be consistent in their goals for growth, investments, and financing. In the long-term planning, the relationship between the firm's growth objectives and its external financing requirements is very useful. For illustration, ABC company started with ₹ 10 lakh of fixed assets and working capital and forecasts a growth of 10 percent. This higher sales volume required a 10 percent addition to its assets. Thus

New investment = Growth rate x Initial assets

= 0.1 x 10,00,000

= ₹ 1,00,000

Part of the funds to pay for new assets is provided by retained earnings. The remainder must come from external financing.

The external financing requirement can be found out with the help of the following equation:

$$EFR = \frac{A}{S}(\Delta S) - \frac{L}{S}(\Delta S) - mS_1(1 - d)$$

Where

EFR = external financing requirement

A/S = Current assets and fixed assets as a proportion of sales

ΔS = Expected increase in sales

L/S = Spontaneous liabilities as a proportion of sales

m = Net profit margin

S_1 = Projected sales for next year

d = Dividend pay-out ratio

Changing the equation a bit, we get:

$$\frac{EFR}{\Delta S} = \frac{A}{S} - \frac{L}{S} - \frac{m(1+g)(1-d)}{g}$$

where g is the growth rate in sales.

Illustration 11.1

XYZ Company has the following ratios:

A/S = 0.8, ΔS = ₹ 5 lakh, L/S = 0.3,

m = 0.05, S_1 = ₹ 50 lakh, and d = 0.4.

EFR = (0.8) (5) – (0.3) (5) – (0.05) (50) (0.6)

= ₹ 1 lakh.

This equation highlights that the amount of external financing depends on the firm's projected growth in sales. The faster the firm grows, the more it needs to invest and therefore the more it needs to raise new capital.

At low growth rates, the firm generates more funds than necessary for expansion. In this sense, its requirement for further external funds is negative. It may choose to use its surplus to pay-off some of its debt. When growth is zero, no funds are needed for expansion, so all the retained earnings are surplus funds with the firm.

As the firm's projected growth rate increases, more funds are needed to pay for the necessary investments. For high rates of growth the firm must issue new securities to pay for new investments.

A firm with a high volume of retained earnings relative to its assets can generate a higher growth rate without needing to raise more capital.

Without resorting to external financing, maximum sales growth rate (g) that can be financed is given by equating EFR to zero

$$\text{(i.e.)}\ 0 = \left(\frac{A}{S} - \frac{L}{S} - \frac{m(1+g)(1-d)}{g} \right) \text{x}\ \Delta S$$

11.6.5 Sustainable Growth Rate

A firm, though having a desire to grow, may not like to raise external equity due to various reasons like high cost of issue, large degree of underpricing required or unacceptable dilution of control. In such a case, the company would like to

know the rate of growth which it can achieve without resorting to issue of external equity. The following assumptions have to be made in order to find out this rate:

- The assets of the firm will increase proportionally to sales.
- Net profit margin is constant.
- Dividend pay-out ratio and debt-equity ratio will remain constant.
- External issue of equity will not be resorted to.

Now, let

$A = E + D$

i.e., Total Assets = Equity + Total Debt

E = Equity employed by the firm

D = Debt employed by the firm

D/E = Debt-equity ratio

and the other symbols have the same meaning as stated earlier.

Using the above assumptions and symbols, we get:

Next period's income: $mS_1 = mS_0 (1 + g)$

Increase in retained earnings: $mS_0 (1 + g) (1 – d)$

Increase in borrowings: $mS_0 (1 + g) (1 – d) D/E$

Increase in assets: $\Delta A = Ag$

Since increase in assets is equal to increase in retained earnings plus increase in borrowings,

$$Ag = mS_0 (1 + g) (1 – d) + mS_0 (1 + g) (1 – d) D/E$$

Rearranging the equation, we get:

$$g = \frac{m(1-d)A/E}{A/S_0 - m(1-d)A/E}$$

Illustration 11.3

$m = 0.05$, $d = 0.4$, $A/E = 1.5$, $A/S_0 = 0.8$

The rate of growth sustainable with internal equity will be:

$$g = \frac{0.05(1-0.4) \times 1.5}{0.8 - 0.05(1-0.4) \times 1.5} = 5.96\%$$

11.7 The Concept of Earnings Guidance

Companies have frequently been using financial forecasting as tool for measuring future growth prospects, and also for performance review. Various techniques explained above help the companies in taking this up. Nowadays companies have started using these techniques to officially predict their near future profits or

losses or revenues in order to sustain investor confidence and also to push up the market price of their securities. Such a practice is referred by the name earnings guidance or forward looking statements. Usually, companies release earning guidance on quarterly basis.

Earnings guidance estimates greatly benefit the investment decision making process. There is more validity or authenticity to these estimates as they are spelt out directly by the company's management and not by any external financial analysis agency.

The other side of this story relates to the inflated estimates given by management to increase their market value and gain short-term benefits. Some companies have stopped giving these estimates as they feel it increases the volatility of the securities.

Example: Earnings Guidance

The earnings guidance or forward looking statements as per the brokerage firm Yes Securities on Tata Motors predicts that, there will be likely a double digit rise in the topline numbers of Tata Motors due to higher sales and rising prices while the performance of the Jaguar Land Rover (JRL) segment would be key to watch out. The topline is expected to grow at 14 per cent to Rs. 82,020 crore, while JLR revenue is expected to rise 23 per cent on a sequential basis at 5.8 billion pounds for 2022-23. Consequently, the margins are expected to contract to 9 per cent (14.4 per cent in 4QFY21 and 9.4 per cent in 3QFY22) led by about 80 basis points QoQ margins contraction at 11.2 per cent in JLR according to Yes Securities.

As per another brokerage firm, Kotak Institutional Equities, Tata Motors will report an improvement in gross margins and EBITDA margins. In the March quarter, the company saw good margins at 22 per cent, up by 15 basis points from 21.8 per cent, whereas EBITDA margins are likely to jump about 275 basis points to 5.2 per cent in Q4 FY22 from 2.4 per cent in Q3 FY22. Thus it is expected that the estimate standalone business revenues to increase.

Source: https://economictimes.indiatimes.com/markets/stocks/earnings/tata-motors-q4-preview-top-line-growth-likely-in-double-digits-jlr-business-performance-eyed/articleshow/91493730.cms dated 12th May 2022

11.8 Limitations of Financial Forecasting

Preparing financial forecasts in a systematic manner using the tools and techniques discussed above, is a normal practice in the financial system. It has been noticed that very often the analyst compares the projections and the performance of the corporates for various investment decisions. Many a time the forecasts may go wrong. As this can be attributed to certain extent to external economic conditions, a major reason is the inadequacies in the forecasting

process. Such inadequacies arise due to the inherent limitations that financial forecasting suffers from. These limitations can be discussed as follows:

1. **Accuracy of projections** – Financial forecasting techniques (for example pro forma statements) use the data pertaining to historical financial performance of the business, the availability of resources, business requirements, supply demand of the product under reference and general macro-economic conditions. Also, changes in the external market conditions may impact projections but the same may not be factored in the projections based on the past historical financial data.
2. **Time-frame** – The time-frame of the forecast will have impact on the accuracy of forecasts. The longer the time for which projections are made, the greater the chance of deviation from the forecast. The accuracy of projections regarding interest rates, exchange rates, consumption levels and rainfall will be low if the time-frame extends to a longer period.
3. **Macro-economic conditions** – Sudden changes in the government policies may severely impact the financial forecasts. For instance, the demonetization move of the government of India on November 8th 2016, has an impact, though on temporary basis, on the manufacturing and services industry. The vagaries of monsoon will have an impact on the interest rate structure and monetary policies. Projections by the Central Bank on these monetary policy issues are not predictable 2-3 years in advance. Hence, the companies provide a list of assumptions when they make financial forecasting. Generally, these assumptions bear a disclaimer on the projections.
4. **Industry specific factors** – Though the macro economic conditions may be favorable, certain industries may still face problems in achieving their targets due to factors specific to the industry.
5. **Capacity utilization** – Financial forecasts become a reality when the firm works to the projected higher utilization of capacity in the organization. The capacity utilization to the projected levels is dependent on both internal and external factors. Internal factors include, availability of skilled manpower, motivation levels of the employees, management perspective and availability of unutilized machine capacity, whereas external factors like government policies, investors' demands and power supply would play a crucial role in this.
6. **Human factor** – Forecasting is also based on information from different departments who prepare their departmental budgets. There could be a possibility of subjectivity and unprofessional approach in the decision-making while making the projections. Since it is the collective responsibility of employees to achieve the budgeted figures, sometimes it may result in not meeting the forecasts if the concerted efforts are lacking on the part of the employees and management.

7. **Threat of competitors** – As described in the Porter's five forces model, entry of new competitors, change in competitor strategy, underpricing and market penetration by competitors may adversely affect the financial forecasts of a business.

Thus, a business preparing its financial forecasts should do so with caution and taking into account the limitations described above. Only then, financial forecasts will bring in the desired results.

Example: Limitations of Financial Forecasting

There are certain limitations of financial forecasting and one such limitation is the accuracy of projections. The example of Maruti Suzuki not being able to achieve the estimates for quarter ending March 22 is explained hereunder.

As per Centrum Broking, Maruti Suzuki, the auto major, will not be able to achieve the financial estimates as the company was facing stiff challenges due to increase in the price of raw material and thus was reporting a flattish margins in March 2022 quarter. Further, the EBITDA margin will likely be around 8.4 per cent which is expected to be the lowest among its listed peers. The company was constantly losing market share as well and was way off from the estimated level. Another broking company, Kotak Securities, reported that due to the lack of new launches in the SUV segment, increase in competitive intensity in the B+ hatchback segment and decline in the hatchback mix, the company is losing its market share.

Source: https://economictimes.indiatimes.com/markets/stocks/news/as-suv-race-heats-up-has-maruti-suzuki-fallen-far-behind-the-curve/articleshow/90970414.cms dated 22nd April 2022

Activity 11.2

1. If the actual growth rate is higher than the sustainable growth rate of a company, what does it indicate?

2. "While on the surface it might appear that any company would seek to grow as rapidly as possible, the company's analysis may reveal that too high a level of growth may simply not be reasonable or attainable.'' Analyse this statement from the external financing requirement point of view.

Check Your Progress - 2

6. Which of the following decreases the external funds required?
   a. A decrease in the spontaneous liabilities to sales ratio
   b. A decrease in the retention ratio
   c. An increase in the assets turnover ratio
   d. A decrease in the short-term bank borrowings
   e. An increase in sales
7. An official prediction of a company's near future profits or losses by its management is referred to as
   a. Sales budget
   b. Sustainable growth rate
   c. External financing requirement
   d. Earnings guidance
   e. Proforma financial statements
8. Which of the following is a subjective method of sales forecasting?
   a. Trend analysis
   b. Jury of executive opinion
   c. Regression analysis
   d. Common size analysis
   e. Du Pont Analysis
9. Which of the following is **not** an assumption made while computing the sustainable growth rate?
   a. Net profit margin remains constant
   b. Assets will increase in proportion to sales
   c. Dividend payout ratio remains constant
   d. External issue of equity will not be resorted to
   e. Debt-equity ratio will increase in proportion to sales
10. For Mumbai Automobiles Ltd. (MAL), the total assets turnover ratio is 2 and the spontaneous liabilities amount to 20 per cent of total sales. MAL wants to maintain 100 per cent dividend pay-out ratio on its net profit. If it targets to increase the sales by ₹ 7 lakh, what will be the amount of external funds requirement?
    a. ₹ 14 lakh
    b. ₹ 21 lakh
    c. ₹ 35 lakh
    d. ₹ 49 lakh
    e. ₹ 56 lakh

11.9 Summary

- Financial forecasting is the process where a company's management positions the firm's future activities based upon the expected external environment – economic, technical, and social. The strategies and actions that a firm wants to pursue are quantified in financial terms in the form of projected financial statements and different types of operating budgets.
- The three main techniques of financial projections are pro forma financial statements, cash budgets and operating budgets.
- Pro forma financial statements are projected future statements of a company based upon a set of assumptions about future performance relative to the market conditions.
- Cash budgets are specific planning tools prepared periodically (usually a month) that give the details of expected cash receipts and cash payments. By observing the changing level of cash flows, a finance manager can decide upon the minimum balance that should be kept for timely payment of obligations.
- While pro forma statements and cash budget give an overall picture of a company's future performance, operating budgets are prepared for specific divisions such as sales, production, etc., and provide a micro-level view of the company's future operations.
- Sales forecasting can be done using subjective and objective methods. Subjective methods include, Jury of Executive Opinion and Sales Force Estimates
- Trend Analysis via Extrapolation and Regression Analysis are the objective methods.
- Financial plans force managers to be consistent in their goals for growth, investments, and financing. In the long-term planning, the relationship between the firm's growth objectives and its external financing requirements is very useful. To ascertain this, the External Funding Requirement is calculated by the managers.
- On the other hand, a company would like to know the rate of growth which it can achieve without resorting to issue of external equity. This is referred to as sustainable growth rate.
- Many a time the forecasts may go wrong. As this can be attributed to certain extent to external economic conditions, a major reason is the inadequacies in the forecasting process such as accuracy of projections, time frame, industry specific factors, human factor etc.

11.10 Glossary

Budget: A plan expressed usually in financial terms.

Budgeted Expense Method involves estimating the value of various items on the basis of expected developments in the future period is called the.

Business Plans: Business plans show strategies and actions for achieving desired short-term, intermediate, and long-term results.

Cash Budget: A statement showing the forecast of cash receipts, cash disbursements, and net cash balance over a period of time on a roll over basis.

Earning Guidance refers to financial forecasting techniques that are used to officially predict their near future profits or losses or revenues in order to sustain investor confidence and also to push up the market price of their securities.

External Funding Requirement (EFR) is the amount of external financing required to finance a firm's projected growth in sales.

Extrapolation is the action of estimating or concluding something by assuming that existing trends will continue or a current method will remain applicable.

Financial Forecasting: Financial forecasting is a planning process by which the company's management positions the firm's future activities relative to the expected economic, technical, competitive and social environment.

Jury of Execution Opinion is a subjective method of forecasting sales wherein each executive member makes an estimation of sales which are then correlated to arrive at the projected sales of the firm.

Operating Budgets are specific budgets that are prepared for different divisions (sales, production etc.,) in the organizational hierarchy such as sales budget, production budget etc.

Percentage of Sales Method is used for estimating the future expenses and incomes. An assumption is made that the future relationship between various elements of costs to sales will be similar to their historical relationship.

Pro forma Balance Sheet reflects the anticipated cumulative impact of assumed future decisions on the financial condition of the business at a selected point of time.

Pro forma Operating Statement (statement of profit and loss) represents an "operational plan" for the business as a whole.

Pro forma Statements are projected financial statements that provide a comprehensive look at the likely future financial performance of a company.

Regression Analysis can be used in sales forecasting to measure the relationship between a company's sales (dependent variable) and other independent variables like income, population, etc.

Sales Force Estimates are sales forecasts prepared on the basis of sales representatives' knowledge of the probable demand of major accounts for the product (especially industrial products) over the coming months.

Sales Forecast is the forecasting of future sales figures based on historical data. It provides the basis around which the firm's planning process is centered.

Sustainable Growth Rate (SGR) is the rate of growth which a firm can achieve without resorting to issue of external equity.

Trend Analysis is an objective method of forecasting through the extrapolation of past sales trends.

11.11 Self- Assessment Test

1. What is financial forecasting?
2. Explain different methods of sales forecasting.
3. What is operating budget?
4. What does pro forma operating statement depict?
5. What is cash budget?

11.12 Suggested Readings/Reference Material

1. Brealey Myers (2020). Principles of Corporate Finance, 13th edition, USA: McGraw-Hill Companies Inc.
2. Prasanna Chandra (2019). Financial Management – Theory and Practice, 10th edition, New Delhi: Tata McGraw-Hill.
3. I.M. Pandey (2021). Financial Management, 12th edition, New Delhi: Pearson Education.
4. Francis Cherunilam (2020). International Business — Text and Cases, 6th Edition, PHI Learning.
5. P.G. Apte (2020). International Financial Management, 8th Edition, McGraw Hill Education (India) Private Limited.
6. John Tennent (2018). The Economist Guide to Financial Management. Economist Books.

11.13 Answers to Check Your Progress Questions

1. (e) Financial Statements

There are three main techniques of financial projections. They are: Pro forma financial statements Cash Budgets, and Operating Budgets. Sales budget is a form of operating budget. Financial statements are based on actual data and are thus not projected statements.

2. (d) Forecasting sales volume

Sales forecast provides the basis around which the firm's planning process is centered.

3. (b) Recently prepared financial statements

The pro forma financial statements are prepared on the basis of the actual financial statements.

4. (b) Cash flow statements

Cash flow statements are part of financial statements and not part of projected statements. They are based on actual data on cash inflows and outflows.

5. (a) Pro forma statements

By developing pro forma statements, a comprehensive picture of the likely future financial performance of a company can be obtained. On the other hand, operating budgets help in specific projections such as projection of sales, raw material requirement etc.

6. (a) A decrease in the spontaneous liabilities to sales ratio

It will result in reducing the external funds requirement

7. (d) Earnings Guidance

Nowadays companies have started using these techniques to officially predict their near future profits or losses or revenues in order to sustain investor confidence and also to push up the market price of their securities. Such a practice is referred to by the name earnings guidance or forward looking statements.

8. (b) Jury of executive opinion

The subjective methods include, jury of executive opinion and sales force estimates.

9. (e) Debt-equity ratio will increase in proportion to sales

The following assumptions have to be made in order to find out sustainable growth rate:

- The assets of the firm will increase proportionally to sales
- Net profit margin is constant
- Dividend pay-out ratio and debt-equity ratio will remain constant
- External issue of equity will not be resorted to

Hence option e is the incorrect statement.

10. (a) ₹ 14 lakh

$$EFR = \frac{A}{S}(\Delta S) - \frac{L}{S}(\Delta S) - mS_1(1-d) = 2 * ₹\ 7,00,000 = ₹\ 14,00,000$$

Financial Management

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