

ST .JOSEPH'S COLLEGE
FINANCIAL MANAGEMENT SEMESTER –IV

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UNIT - I
FINANCIAL MANAGEMENT

MEANING AND DEFINITION OF FINANCIAL MANAGEMENT

Many authors use business finance and corporate finance as synonym broader than corporate finance, since it covers sole proprietorship, partnership and company business. Corporate finance is restricted to the company finance only and not the other forms of organizations

According to the Encyclopedia of Social Sciences. Corporate finance deals with the financial problems of corporate enterprises. Problems include financial aspects of the promotion enterprises and their administration during early development, the accounting problems connected with the distinction between capital and income, the administrative questions created by growth and expansion and finally, the financial adjustments required for the bolstering upon rehabilitation of a corporation which has come into financial difficulties. Management of all these is financial management. Financial management mainly involves raising funds and their effective utilization with the objective of maximizing shareholders' wealth.

According to Van Horne and Wachowicz, "Financial Management is concerned with the acquisition, financing and management of assets with some overall goal in mind." Financial manager has to forecast expected events in business and note their financial implications.

Financial Management is concerned with three activities:

- (i) anticipating financial needs, which means estimation of funds required for investment in fixed and current assets or long-term and short-term assets
- (ii) acquiring financial resources - once the required amount of capital is anticipated the next task is acquiring financial resources, i.e., where and how to obtain the funds to finance the anticipated financial needs and
- (iii) Allocating funds in business - means allocation of available funds among the best plans of assets, which are able to maximize shareholders' wealth. Thus, the decisions of financial management can be divided into three, viz., investment, financing and dividend decisions.

SCOPE OF FINANCIAL MANAGEMENT

From the above discussion it is evident that financial management as an academic discipline has undergone notable changes over the years in its scope and areas of coverage. At the same time the finance manager's role has also undergone fundamental changes over the years. Study of the changes that have taken place over the years is known as "scope of financial management". In order to have easy understanding and better exposition to the changes, it is necessary to divide the scope into two approaches:

1. The Traditional Approach and
2. The Modern Approach.

1. Traditional Approach

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Financial management emerged as a separate field of study in the early 1900s. The role of financial management is limited to fund raising and administering needed by the corporate enterprises to meet their financial needs. Enterprise requires funds for certain episodic events like merger, formation of new firms, reorganization, and liquidation and so on. To put it simply, the scope of financial management in traditional approach was in the narrow sense. The field of financial management was interrelated with aspects, viz.

- (a) Raising of funds from financial institutions,
- (b) Raising of funds through financial instruments - shares and bonds from the capital markets.
- (c) The legal and accounting relationships between an enterprise and its sources of funds (creditors).

Thus, the traditional approach of financial management is only raising of funds needed by the corporation, externally that also limited the role of the finance manager. Apart from raising the funds externally, the expected functions are: preparation and preservation of financial statements report on the enterprises financial status and managing cash level that is needed to pay day-to-day maturing obligations

Traditional approach to the scope of financial management evolved during 1920 and continued to dominate academic thinking during the forties and through the early fifties. But criticism was stated on this approach in the later fifties due to the following:

Ignored day-to-day Problems:

The traditional approach gives much importance to fundraising for episodic events that are stated in the above discussion. Put in simple words the approach is confined to the financial problems arising in the course of episodic events.

Outsider-looking-in Approach:

This approach equated the function with the issues involved in raising and administering funds. Thus, the subject of finance moved around the suppliers of funds (investors, financial institutions (banks), etc. who are outsiders. It indicates that the approach was outsider-looking-in approach and ignored insider-looking-out approach, since it completely ignored internal decision-making.

Ignored Working Capital Financing:

The approach gave over emphasis on long-term financing problems. It implies that it ignored working capital finance, which is in the purview of the finance function.

Ignored Allocation of Capital:

The main function of this approach is procurement of funds from outside. It did not consider the function of allocation of capital, which is the important one.

The capital issues of financial management were outside the purview of the traditional phase, which was rightly described by Solomon

- (i) Should an enterprise commit capital funds to certain purposes?
- (ii) Do the expected returns meet financial standards of performance?
- (iii) How should these standards be set and what is the cost of capital funds to the enterprise?
- (iv) How does the cost vary with the mixture of financing methods used?

Traditional approach failed to provide answers to the above questions due to narrow scope, but modern approach explained below provide answers to the questions, or it overcomes the shortcomings of traditional approach.

2. Modern Approach

Modern approach was started during mid-1950s. Its scope is wider since it covers conceptual and analytical framework for financial decision-making. In other words, it covers both procurement of funds as well as their allocation. Allocation is not just haphazard allocation, it is efficient allocation among various investments, which will help maximize shareholders' wealth. The main contents of the new approach are:

- (a) What is the total volume of funds an enterprise should commit?
- (b) What specific assets should an enterprise acquire?
- (c) How should the required funds be financed?

The above three questions are related to the three decisions of financial management:

- (i) Financing decision
- (ii) Investment decision
- (iii) Dividend decision.

The shareholders' value maximization focus continuously as we begin the 21st century.

However, two other trends are gaining momentum, viz.

- (a) Increased use of information technology and
- (b) Globalization of business. Both these trends provide companies with new opportunities to reduce risks and thereby, increase profitability. But these trends are also leading to increased competition and new tasks.

FUNCTIONS OF FINANCIAL MANAGEMENT

1. Estimation of capital requirements:

A finance manager has to make estimation with regards to capital requirements of the company. This will depend upon expected costs and profits and future programmes and policies of a concern. Estimations have to be made in an adequate manner which increases earning capacity of enterprise.

2. Determination of capital composition:

Once the estimation has been made, the capital structure has to be decided. This involves short-term and long-term debt equity analysis. This will depend upon the proportion of equity capital a company is possessing and additional funds which have to be raised from outside parties.

3. Choice of sources of funds:

- For additional sources of funds to be procured, a company has many choices like
- a. Choice of Issue of shares and debentures
 - b. Loans to be taken from banks and financial institutions.
 - c. Public deposits to be drawn like in form of bonds.

4. Investment of funds:

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The finance manager has to decide to allocate funds into profitable ventures so that there is safety on investment and regular returns is possible.

5. Disposal of surplus:

The net profits decision has to be made by the finance manager. This can be done in two ways:

- a. Dividend declaration - It includes identifying the rate of dividends and other benefits like bonus.
- b. Retained profits - - The volume has to be decided which will depend upon expansion, innovational, diversification plans of the company.

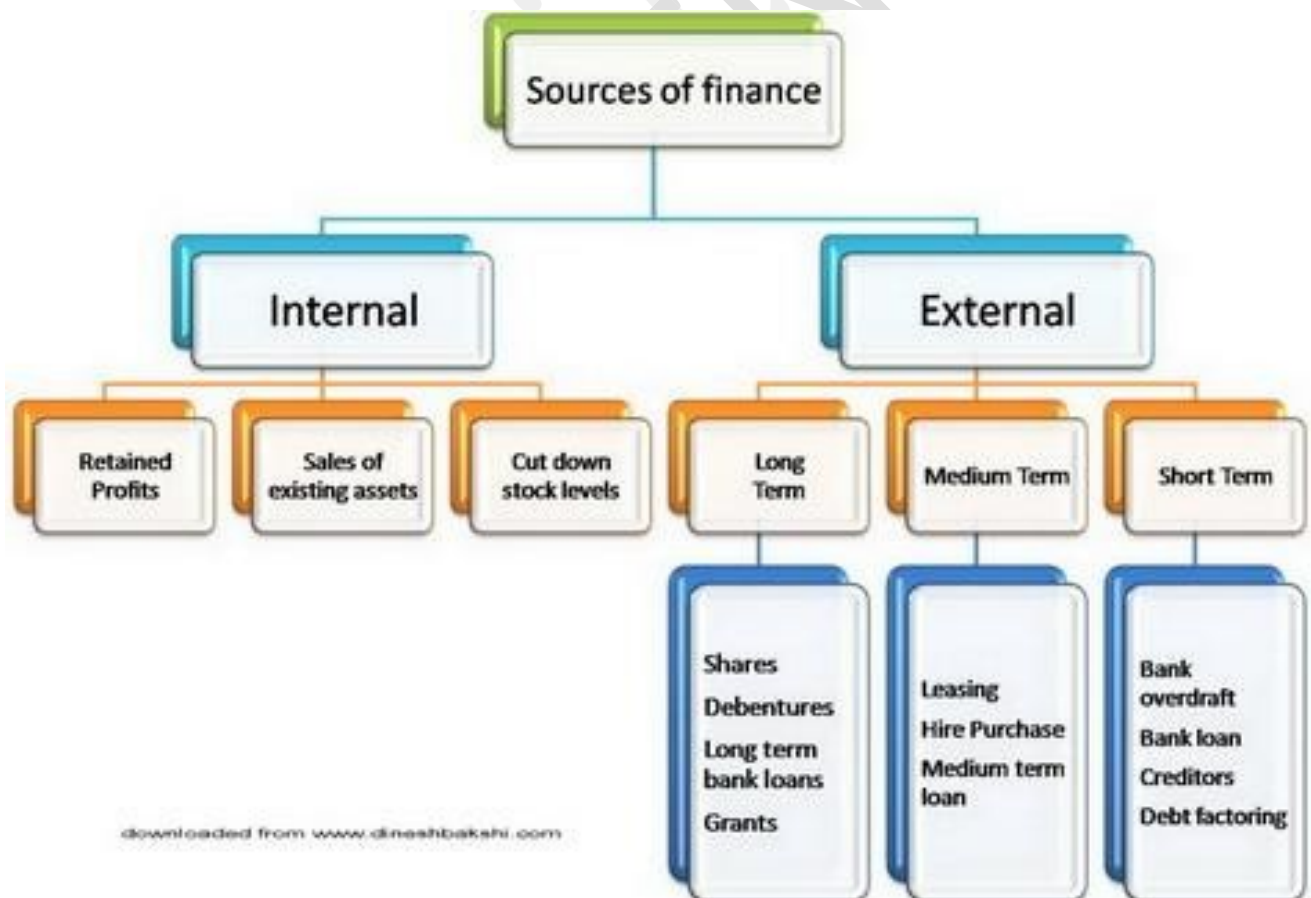
6. Management of cash:

Finance manager has to make decisions with regards to cash management. Cash is required for many purposes like payment of wages and salaries. Water bills, payment to creditors, meeting current liabilities, maintenance of enough stock, purchase of raw materials, etc.

7. Financial controls:

The finance manager has not only to plan, procure and utilize the funds but he also has to exercise control over finances. This can be done through many techniques like Ratio analysis, financial forecasting, cost and profit control, etc.

SOURCES OF FINANCE



PROFIT MAXIMIZATION

Main aim of any kind of economic activity is earning profit. A business concern is also functioning mainly for the purpose of earning profit. Profit is the measuring techniques to understand the business efficiency of the concern. Profit maximization is also the traditional and narrow approach, which aims at, maximizing the profit of the concern.

The Ultimate aim of the business concern is earning profit, hence, it considers always to increase the profitability of the concern. Profit is the parameter of measuring the efficiency of the business concern. So it shows the entire position of the business concern, and hence Profitmaximization objectives help to reduce the risk of the business.

Favorable Arguments for Profit Maximization

The following important points are in support of the profit maximization objectives of the business concern:

- (i) Main aim is earning profit.
- (ii) Profit is the parameter of the business operation.
- (iii) Profit reduces risk of the business concern.
- (iv) Profit is the main source of finance.
- (v) Profitability meets the social needs also.

Unfavorable Arguments for Profit Maximization

The following important points are against the objectives of profit maximization:

- (i) Profit maximization leads to exploiting workers and consumers.
- (ii) Profit maximization creates immoral practices such as corrupt practice, unfair trade practice, etc.,
- (iii) Profit maximization objectives leads to inequalities among the stakeholders such as customers, suppliers, public shareholders, etc.

Drawbacks of Profit Maximization

Profit maximization objective consists of certain drawback also:

- I. It is vague: In this objective, profit is not defined precisely or correctly. It creates some unnecessary opinion regarding earning habits of the business concern.
- II. It ignores the time value of money or the net present value of the time value of money: Profit maximization does not consider the time value of present value of the cash inflow. It leads certain differences between the actual cash inflow and net present cash flow during a particular period.
- III. It ignores risk: Profit maximization does not consider risk of the business concern. Risks may be internal or external which will affect the overall operation of the business concern.

WEALTH MAXIMIZATION

Wealth maximization is one of the modern approaches, which involves latest innovations and in the field of the business concern. The term wealth means shareholder wealth or the wealth of the persons those who are involved in the business concern. Wealth maximization is also known as value maximization or net present worth maximization. This objective is a universally accepted concept in the field of business.

Favorable Arguments for Wealth Maximization

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- I. Wealth maximization is superior to the profit maximization because the main aim of the business concern under this concept is to improve the value or wealth of the shareholders.
- II. Wealth maximization considers the comparison of the value to cost associated with the business concern. Total value detected from the total cost incurred for the business operation. It provides extract value of the business concern.
- III. Wealth maximization considers both time and risk of the business concern.
- IV. Wealth maximization provides efficient allocation of resources.
- V. It ensures the economic interest of the society

Unfavorable Arguments for Wealth Maximization

- (1) The ultimate aim of the wealth maximization objectives is to maximize the profit.
- (2) Wealth maximization can be activated only with concern. So The goal of maximizing the value of different goals we discussed above in a simple language a good financial decisions increase the market owners' equity and poor financial decisions decrease it.

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UNIT - II
COST OF CAPITAL

Cost of capital is an integral part of investment decision as it is used to measure the worth of investment proposal provided by the business concern. It is used as a discount rate in determining the present value of future cash flows associated with capital projects. Cost of capital is also called as cut-off rate, target rate, hurdle rate and required rate of return. When the firms are using different sources of finance, the finance manager must take careful decision with regard to the cost of capital; because it is closely associated with the value of the firm and the earning capacity of the firm.

COST OF CAPITAL - CONCEPT

The term cost of capital is a concept having different meanings. Cost of capital from the three viewpoints is given below.

1. The Investors' View Point - It may be defined as the measurement of the sacrifice made by him/her in order to capital formation. For example, Mr.A an investor invested in a company's equity shares, an amount of 1, 00,000, instead of investing in a bank deposit which pays seven per cent interest. Here investor had sacrificed seven per cent interest for not having invested in the bank.
2. The Firm's View Point - It is the minimum required rate of return needed to justify the use of capital. For example, a firm raised 50 lakhs through the issues of 10 per cent debentures, for justifying this issue it has to earn a 10 per cent minimum rate of return on investment.

Capital Expenditure's View Point - The cost of capital is the minimum required rate of return or the hurdle rate or target rate or cut off rate or any discounting rate used to value cashflows. For example, Firm 'A' is planning to invest in a project, that requires 20 lakhs as an initial investment and it provides cash flows for 5 years period, here for conversion of the future 5 years cash inflows into present values we need cost of capital.

Cost of capital represents the rate of return that a firm must pay to the suppliers of capital for use of their funds. In other words, cost of capital is the weighted average cost of various sources of finance used by the firm in capital formation. The sources are, equity shares, preference shares, long-term debt and short-term debt.

Thus, from the above, we can say that cost of capital is that minimum rate of return, which a firm must and is expected to earn on its investments so as to maintain the market value of its shares. It is also known as Weighted Average Cost of Capital (WACC), composite cost of capital or combined cost of capital. It is expressed in terms of percentage.

IMPORTANCE OF COST OF CAPITAL

The concept of cost of capital is very important and it is useful in the following financial management decisions. The decisions in which it is useful are:

1. Designing Optimal Capital Structure

Cost of Capital is helpful in formulating a sound and economical capital structure for a firm. The debt policy of a firm is significantly influenced by the cost consideration.

Capital structure involves determination of proportion of debt and equity in capital structure where cost of capital is minimum. While designing a firm's capital structure, financial

executives always keep in mind minimization of the overall cost of capital and to maximize value of the firm. The measurement of specific cost of each source of fund and calculation of weighted average cost of capital helps to come to a balanced capital structure. By comparing various sources of finance) specific costs, he/she can choose the best and most economical source of finance and can succeed in designing a sound and viable capital structure.

2. Investment (Capital Budgeting) Evaluation

Wilson R.M.S., states that the cost of capital is a concept, which should be expressed in quantitative terms if it is to be useful, as a cut-off rate for capital expenses. Capital expenditure means investment in long-term projects like investment on new machinery. It is also known as Capital Budgeting expenditure. Capital budgeting decisions require a financial standard (cost of capital) for evaluation. In the net present value (NPV) method, an investment project is accepted, if the present value of cash inflows are greater than the present value of cash outflows.

The present values of cash inflows are calculated by discounting with a discount rate known as Cost of Capital. If a firm has adopted internal rate of return (IRR) as the technique for capital budgeting evaluation, investment proposal should be accepted only when cost of capital is less than the calculated IRR. Hence, the concept of cost of capital is very much useful in capital budgeting decisions, particularly if a firm is adopting discounted cash flow methods of project evaluation.

3. Financial Performance Appraisal

Cost of capital framework can be used to evaluate the financial performance of top management. Financial performance evaluation involves a comparison of actual profitability of the project with the project's overall cost of capital. If the actual profitability rate is more than the projected cost of capital, then the financial performance may be said to be satisfactory and vice versa.

The above discussion clearly shows the role of cost of capital in financial management. Apart from the above areas (decisions) cost of capital is also useful in (distribution of profits) capitalization of profits, issue of rights shares and investment in owner assets.

CLASSIFICATION OF COST

Before going to discuss the computation of specific cost of each source of fund and cost of capital, it is wise to know various relevant costs associated with the problem of measurement of cost of capital. The relevant costs are:

Marginal Cost of Capital:

Marginal cost of capital is the additional cost incurred to obtain additional funds required by a firm. It refers to the change in the total cost of capital resulting from the use of additional funds. The marginal cost of capital is a very important concept in investment decisions (capital budgeting decisions).

Average Cost/Overall Cost:

It is the average cost of various specific costs of the different components (equity, preference shares, debentures, retained earnings) of capital structure at a given time and this is used as the acceptance criteria for (capital budgeting) investment proposals.

Historic Cost (Book Cost):

The book cost has its origin in the accounting system. They are related to the past. It is in common use for computation of cost of capital. For example cost of capital may be computed based on the book value of the components of capital structure. Historical costs act as a guide for future cost estimation.

Future Cost:

It is the cost of capital that is expected to raise funds to finance a capital budget or investment proposal.

Specific Cost:

It is the cost associated with a particular source of finance. It is also known as component cost of capital. For example, cost of equity (K) or cost of preference share (K), or cost of debt (K), etc.

Spot Costs:

These are the costs that are prevailing in the market at a certain time. For example, a few years back cost of bank loans (house loans) was around 18 per cent, now it is at 12 per cent. The 12 per cent is the spot cost.

Opportunity Cost:

The opportunity cost is the benefit that the shareholder foregoes by not putting his/her funds elsewhere because they have been retained by the management. For example, an investor who had invested in a company's equity shares (100 shares each share at 10). The company decided to declare a dividend of 10 per cent on book value of share, but due to capital requirements it has retained to invest on one project that has return on investment (ROI) of four per cent. Outside the project, rate of interest (banks) is at six per cent. Here, the opportunity cost to the investor is (6-4) two per cent.

Explicit Cost: Cost of capital can be either explicit or implicit. Knowing the distinction between explicit and implicit is important from the point of view of computation of cost of capital. An explicit cost of any source of capital is the discount rate that equates the present value of the cash inflows that are incremental to the taking of the financing opportunity with present value of its incremental cash outflows. In other words, the discount rate that equates the present value of cash inflows with present value of cash outflows.

It is also called as internal rate of return. For example, a firm raises 1, 00,000 through the sale of 12 per cent perpetual debentures. There will be a cash outflow of 1, 00,000 and a cash inflow of 12,000 every year for 20 years. The rate that equates the PV of cash outflows (1, 00,000) and PV of cash inflows (12,000 per year) would be the explicit cost. Computation of explicit cost is almost similar to the computation of IRR.

Implicit Cost:

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It is the opportunity cost, which is given up in order to pursue a particular action. It is also known as implicit cost of capital. The implicit cost of capital of funds raised and invested by the firm may, therefore be defined as the rate of return associated with the best investment opportunity for the firm and its shareholders that would be foregone, if the projects presently under consideration by the firm were accepted. The cost of retained earnings is an opportunity cost or implicit cost for a shareholder and is deprived of the opportunity to invest retained earnings elsewhere. Funds raised by any form of financing have implicit capital costs once they are invested.

Thus, in a sense, implicit cost may also be viewed as opportunity costs. This implies that a project should be reflected if it has a negative PV when its cash flow are discounted by the explicit cost of capital.

COST OF DEBT

Companies may raise debt capital through issue of debentures or raise loans from financial institutions or accept deposits from the public. All these resources involve a specific rate of interest. The interest paid on these sources of funds is a charge on the profit & loss account of the company. In other words, interest payments made by the firm on debt issue qualify tax deduction in determining net taxable income. Computation of cost of debenture or debt is relatively easy, because the interest rate that is payable on debt is taxed by the agreement between the firm and the creditors. Computation of cost of debenture or debt capital depends on their nature. The debt/debentures can be perpetual or irredeemable and redeemable, cost of debt capital is equal to the interest paid on that debt, but from company point of view it will be less than the interest payable when the debt is issued at par since the interest is tax deductible. Hence, computation of debt is always after tax cost.

(a) Cost of Irredeemable Debt

Perpetual debt provides permanent funds to the firm, because the funds will remain in the firm till liquidation. Cost of perpetual debt is the rate of return that lender expects (i.e., fixed interest rate). The coupon rate or the market yield on debt can be said to represent an approximation of cost of debt. Bonds/debentures can be issued at (i) par/face value, (ii) discount and (iii) premium. The following formulae as used to compute cost of debentures or debt of bond.

(i) Pre-Tax Cost

$$K_{di} = \frac{I}{P_0} = rNP$$

(ii) Post-Tax Cost

$$K_d = \frac{I(1-t)}{P_0 \text{ or } NP}$$

Where:

K_{di} = Pre-tax cost of debentures

I =

Interest P = Principal amount or face value NP Net sales proceeds T=

Tax rate

Illustration : XYZ Company Ltd., decides to float 12 per cent, perpetual debentures of 100 each. The tax rate is 50 per cent. Calculate cost of debenture (pre and post-tax cost).

Solution:

(i) Pre-Tax Cost

$$K_{di} = \frac{12}{100} = 12\%$$

(ii) Post-Tax Cost

$$K_d = \frac{12(1-0.5)}{100} = 6\%$$

Generally, pre-tax cost of debenture is equal to interest rate, when debenture is issued at par and without taking into tax. Cost will be less than the interest rate when it is

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calculated after considering tax since it is tax deductible, from cost of capital point of view debenture cost is always post-tax cost.

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Sometimes, debentures may be issued at a premium or discount. A company, which has good track record, will issue debenture at premium and a company that is new to the public or running with nominal or poor track record will issue debentures at discount, because no investor would show interest to buy at par value or at discount. Whenever debentures are issued at premium or discount the cost of debenture will be affected, decrease or increase respectively.

Illustration : Rama & Co. has 15 per cent irredeemable debentures of Rs.100 each for Rs. 10, 00,000. The tax rate is 35 per cent. Determine debenture cost assuming it is issued at (i) face value/par value (ii) 10 per cent premium and (iii) 10 per cent discount.

Issued at	Pre-Tax	Post-Tax
(i) Face Value	$\frac{15}{100} = 15\%$	$\frac{15(1-0.35)}{100} = 9.75\%$
(ii) 10% Premium	$\frac{15}{110} = 13.64\%$	$\frac{15(1-0.35)}{110} = 8.86\%$
(iii) 10% Discount	$\frac{15}{90} = 16.67\%$	$\frac{15(1-0.35)}{90} = 10.83\%$

(b) Cost of Redeemable Debt

Redeemable debentures are those having a maturity period or repayable after a certain given period of time. In other words, these type of debentures are under legal obligation to repay the principal amount to its holders either at a certain agreed intervals during the duration of loan or a lump sum amount at the end of maturity period. These type of debentures are issued by many companies when they require capital for temporary needs.

(i) Cost of Redeemable Debentures (lump sum):

$$k_d : NP = \sum_{t=1}^n \left(\frac{NI_t}{(1+k_d)^t} + \dots + \frac{NI_n}{(1+k_d)^n} + \frac{P_n}{(1+k_d)^n} \right)$$

Where: k_d = Cost of debenture

n = Maturity period

NI = Net interest (after tax adjustment)

P_n = Principal repayment in the year 'n'

Illustration : BE Company issues 100 par value of debentures carrying 15 per cent interest. The debentures will be redeemed after 7 years at face value. The cost of issue is 3 per cent and tax rate is 35 per cent. Calculate cost of debenture.

Solution: $7 \frac{15(1-0.35)}{(100-3)} = \sum ($

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$$(1+k)^t + \sum_{t=1}^n \frac{d}{(1+k)^t}$$

Year	Cash Outflow()	DF		PV of Cash Outflow()	
		10%	12%	10%	12%

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1-7	9.75	4.863	4.564	47.414	44.499
7	100	0.513	0.452	51.3	45.2
PV of cash out flows				98.714	86.699
(-) PV of Cash inflows				97.00	97.00
Net present Value				1.714	(-)7.301

Cost of debenture lies between 10 per cent and 12 per cent, because net present value 97 lies between the PV of 10 per cent and 12 per cent. Exact cost can be computed only with the use of interpolation formula:

$$\begin{aligned}
 & \frac{98.714 - 97}{12 - 10} = \frac{98.714 - 97}{kd - 10\%} \\
 & kd = 10\% + 2 \times \frac{98.714 - 97}{12 - 10} \\
 & = 10\% + 0.38 = \mathbf{10.38\%}
 \end{aligned}$$

COST OF EQUITY

Firms may obtain equity capital in two ways (a) retention of earnings, and (b) issue of (additional) equity shares to the public. The cost of equity or the return required by the equity shareholders is the same in both the cases, since in both cases, shareholders are providing funds to the firm to finance firm's investment proposals. Retention of earnings involves an opportunity cost. Shareholders could receive the earnings as dividends and invest the same in alternative investments of comparable risk to earn returns. So, irrespective of whether a firm raises equity finance by retaining earnings or issue of additional equity shares, the cost of equity is the same. But issue of additional equity shares to the public involves a flotation cost whereas there is no flotation cost for retained earnings. Hence, issue of additional equity shares to the public for raising equity finance involves a bigger cost when compared to the retained earnings.

The following discussion details the computation of cost of equity from both sources of point of view (i.e., retained earnings and issue of equity shares to the public).

I. Cost of Retained Earnings (K)

Retained earnings is one of the internal sources of funds to raise equity funds. Retained earnings are those part of (amount) net earnings which is retained by the firm for investing in capital budgeting proposals instead of paying them as dividends to shareholders. Corporate executives and some analysts too normally consider that the retained earnings are cost free, because there is no legal binding for the firm to pay dividends to equity shareholders. But it is not so. They involve opportunity cost. The opportunity cost of retained earnings is the rate of return the shareholder forgoes by not putting his/her funds elsewhere, because the management has retained the funds. The opportunity cost can be well computed with the following formula:

$$k_{re} = \frac{k_e (1 - T_i)}{1 - T_b}$$

Where

k_e = Cost of equity capital [D + P or (E/P) + g]

T - Marginal tax rate applicable to the individuals concerned

D = Expected dividend per share

NP = Net proceeds of equity share or Equity stock price or Book Value

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y = Growth rate (%)

Illustration: A company declared a dividend of 2 per share, market price per share is 20, income tax rate is 60 per cent and expected brokerage is to be 2 per cent. Compute cost of retained earnings.

Solution:

$$k_{re} = \frac{D}{NP} \times \frac{(1-T_i)}{(1-T_b)} \times 100$$
$$= \frac{2}{20} \times$$

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$$(1-0.6) \times 100$$

$$\frac{(1-0.02)}{}$$

$$=0.1 \times 0.408 \times 100 = 4.1\%$$

Illustration: ABC Company's cost of equity (K) is 14 per cent, the average tax rate of an individual shareholder is 40 per cent and it is expected to spend 2 per cent on brokerage cost that shareholders will have to pay while investing their dividends in alternative securities. What is the cost of retained earnings?

Solution:

$$=0.14 \times \frac{(1-0.4) \times 100}{(1-0.02)}$$

$$=0.14 \times 0.612 \times 100 = 8.6\%$$

Illustration: Life Style Garment Manufacturing Co., has a net earnings of 20 lakhs and all of its stockholders are in the tax bracket of 50 per cent. The management estimates that under present conditions stockholder's required rate of return is 10 per cent. 3 per cent is the expected brokerage to be paid if stockholders want to invest in alternative securities. Compute cost of retained earnings.

Solution:

$$=0.1 \times \frac{(1-0.5) \times 100}{(1-0.03)}$$

$$=0.1 \times 0.515 \times 100 = 5.15\%$$

Illustration: BPL Company's equity share is currently selling at 350.75 And it is currently paying a dividend of 5.25 per share. The dividend is expected to grow at a 15 per cent per annum for one year. Income tax rate is 40 per cent and brokerage is 2 per cent, Calculate cost of retained earnings.

Solution:

$$= \frac{5.25}{1-0.4} + 0.15 \times \frac{(1-0.02) \times 100}{(1-0.02)}$$

$$=0.165 \times 0.612 \times 100 = 10.09\%$$

II. Cost of Issue of Equity Shares (K)

Calculation of cost of equity (K) poses a host of problems. It is the most difficult and controversial cost to measure because there is no common basis for computation. For example, calculation of cost of debt (K) is based on interest rate, preference dividend is the basic for calculation of cost of preference shares (K).

Interest on debt and dividend on preference shares is fixed in terms of the stipulations following the issue of such debentures and preference shares, respectively. In contrast, the return on equity shareholders solely depends on the discretion of the company management. Apart from this there is no stipulation for payment of dividend to equity shareholders. They are

ranked at the bottom as claimants on the assets of the company at the time of liquidation. All these show that equity capital does not carry any cost. But this is not true, equity capital has some cost.

The cost of equity capital (K_e), may be defined as the minimum rate of return that a firm must earn on the equity financed portions of an investment project in order to leave unchanged the market price of the shares. The cost of equity is not the out-of-pocket cost of using equity capital as the equity shareholders are not paid dividend at a fixed rate every year.

APPROACHES TO CALCULATE COST OF EQUITY

There are six approaches available to calculate the cost of equity capital, they are:

1. Dividends Capitalization Approach

According to this approach, the cost of equity capital is calculated on the basis of the required rate of return in terms of the future dividends to be paid on the shares. Accordingly, K defined as the discount rate that equates the present value of all expected future dividends per share, with the net proceeds of the sale (or the current market price) of a share. It means investor arrives at a market price for a share by capitalizing dividends at a normal rate of return. The cost of equity capital can be measured with the following formula:

$$k_e = D / \text{CMP or NP}$$

D = Dividends per share

Where: k_e = Cost of equity

D = Dividends per share

CMP = Current market price per share
share

NP = Net proceeds per

This method assumes that investor gives prime importance to dividends and risk in the firm remains unchanged and it does not consider the growth in dividend.

Illustration: XYZ Ltd., is currently earning 1, 00,000, its current market price per share is 100, outstanding equity shares are 10,000. The Company decided to raise an additional capital of 2, 50,000 through issue of equity shares to the public, It is expected to pay 10 per cent as flotation cost. Equity shares are issued at a discount of 10 per cent. The company is interested to pay a dividend of 8 per share. Calculate cost of equity.

Solution:

$$k_{re} = \frac{D}{NP} \times 100$$

k_{re}

$$= \frac{8}{(100 - 10) \times 100} \times 100$$

Limitations of D/CMP Approach

Dividend Capitalization approach, suffers from the following limitations:

- It does not consider future earnings
- It ignores the earnings on refrained earnings
- It ignores the fact that market price rise may be due to retained earnings and not on account of high dividends.
- It does not take into account the capital gains.

2. Earnings Capitalization Approach

According to this approach, cost of equity (K) is the discount rate that equates the present value of expected future earnings per share with the net proceeds (or current market price) of a share.

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The advocates of this approach establishes a relationship between earnings and market price of share. They say that it is more useful than the dividend capitalization approach, due to two reasons, one, the earnings capitalization approach acknowledges that all earnings of the company after payment of fixed dividend to preference shareholders, the remaining amount legally belongs to equity shareholders whether they are paid as dividends or retained for investment, secondly, and the most importantly, determining the market price of equity shares is based on earnings and not dividends. Computation of retained earnings cost separately leads to double the company's cost of capital, this approach is employed under the following conditions, they are:

- a. Constant earnings per share over the future period
- b. There should be either 100 per cent retention ratio or 100 per cent dividendpayout ratio put
- c. Company satisfies the requirements with equity shares and does not employdebt,

Cost of equity can be calculated with the following formula:

$$k_e = \frac{CMP}{NP} \text{ or } \frac{E}{NP}$$

Where:

k_e = Cost of equity

E = Earnings per share

CMP = Current market price per share

NP = Net proceeds per share

Illustration: Well Do Company Ltd is currently earning 15 per cent operating profit on its share capital of 20 lakhs (FV of 200 per share). It is interested to go for an expansion programme, for which the company requires an additional share capital of? 10 lakhs. The Company is raising this amount by issue of equity shares at 10 per cent premium and the expected flotation cost is 5 per cent. Calculate cost of equity.

Solution:

$$k_e = \frac{E}{NP} \times 100 = 14.29\%$$

$$= \frac{30}{(200+20-10)} \times 100$$

Working Notes:

Calculation of EPS

Operating Profit = 20,00,000 x 0.15 = 3,00,000

No. of Equity Shares = 20,00,000 / 200 = 10,000

SharesEPS = 3,00,000 / 10,000 = 30

Net Proceeds (NP) = Face value + premium - Flotation cost.
= 200 + 20 - 10 = 210

Illustration: A firm is currently earning 1,00,000 and its share is selling at a market price of Rs.

90. The firm has 10,000 shares outstanding and has no debt. Compute cost of equity.

Solution:

EPS = Total Earnings ÷ No. of Equity Shares

= 1,00,000 ÷ 10,000

= Rs. 10

$$k_e = \frac{E}{MP} \times 100$$

$$= \frac{10}{90} \times 100 = 11.11\%$$

Limitations of E/CMP Approach

Earnings Capitalization approach has the following limitations:

- All earnings are not distributed to the equity shareholders as dividends.
- Earnings per share may not be constant.
- Share price also does not remain constant.

3. Dividend Capitalization plus Growth Rate Approach

Computation of cost of equity capital based on a fixed dividend rate may not be appropriate, because the future dividend may grow. The growth in dividends may be constant perpetually or may vary over a period of time. It is the best method over dividend capitalization approach, since it considers the growth in dividends. Generally, investors invest in equity shares on the basis of Expected future dividends rather than on current dividends. They expect increase in future dividend. Growth in dividends will have positive impact on share prices.

(a) Cost of Capital under Constant Growth Rate Perpetually. The formula for computation of cost of equity under constant growth rate is:

$$k_e = \frac{D}{NP + g} \times \frac{1}{CMP}$$

Where:

k_e = Cost of equity capital

D = Dividends per share

NP = Net proceeds per share

CMP = Current market price per share

g = Growth rate (%)

Illustration: Equity share of a paper manufacturing company is currently selling at 100. It wants to finance its capital expenditure of ₹ 1 lakh either by retaining earnings or selling new shares. If Company seeks to sell share, the issue price will be 95. The expected dividend for the next year is 4.75 and it is expected to grow at 6 per cent perpetually. Calculate the cost of equity capital (internal and external).

Solution:

Cost of Internal Equity

$$k_e = \frac{4.75}{95 + 6} \times \frac{1}{100} =$$

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+0.06

=

0.048+

0.06=

10.75%

Cost of external equity (Issue of shares)

$$k_e = \frac{MP}{P} + g$$

4.75

95

=

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+0.06=
0.050 +
0.06 =
11 per
cent

(b) Cost of Capital Under variable Growth Rate. Computation of cost of equity after a specific period, is based on the estimation of growth rate in dividends. Expected growth rate will be calculated based on the past trend in dividends. It may not be unreasonable to project the trend into the future, based on the past trend. Financial manager must estimate the internal growth rate in dividends on the basis of long range plans of the company. Expected growth rate in the internal context requires to be adjusted. Compound growth rate in dividends can be computed with the following formula:

$$\text{gr: } D_0(1 + r)^n = D_n$$

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Where:

gr =Growth rate in dividends

D_0 = First year dividend payment

$(1 + r)^n$ =Present value factor for 'n year

D_n = Last year dividend payment

Illustration: From the following dividends record of a company compute expected growth rate.

Year	1996	1997	1998	1999	2000	2001	2002	2003
Dividends per share	21	22	23	24	25	26	27	28

Solution:

$$\text{gr: } D_0(1 + r)^n = D_n$$

$$21(1 + r)^7 = 28$$

$$(1 + r)^7 = 28 \div 21 = 1.333$$

During seven years the dividends has increased by 7 giving a compound factor of 1.334. The growth rate is 4 per cent since the sum of Re. 1 would accumulate to 1.333 in the same year at 4 per cent interest.

Illustration 10: Mr. A an investor purchases an equity share of a growing company for 210. He expects the company to pay dividends of 10.5, 11.025 and 11.575 in years 1, 2 and 3 respectively. He expects to sell the shares at a price of 243.10 at the end of three years.

(a) Determine dividend growth rate.

(b) Calculate the current dividend yield.

(c) What is the required rate of return on Mr. A's equity investment?

Solution: (a) Computation of Growth Rate

$$(\text{gr}) \text{gr: } D_0(1 + r)^n = D_n$$

$$10.5 (1 + r)^2 = 11.575$$

$$(1 + r)^2 = 11.575 \div 10.5 = 1.102$$

$$\text{gr} = 5\%$$

(b) Calculation of the Current Dividend Yield

$$\text{3rd year dividend Rs. } \frac{11.575}{11.575}$$

$$\text{Current Dividend } 10 \times 105 = \text{Rs. } 12.154$$

$$\text{Yield} = \frac{0}{11.575}$$

$$\text{Growth in dividend is } \frac{12.154 - 11.575}{11.575} = 0.579$$

$$\text{Current dividend } 11.57 \times 100 = 5\%$$

$$\text{yield} = \frac{5}{100} = 5\%$$

In simple, current dividend yield is equal to growth rate in dividends.

(c) Mr. A's required rate of return

$$k_e = \frac{D}{\text{Expected sales price } MP} + g$$

$$\frac{12.54}{243.1}$$

=

$$+0.05$$
$$=0.05+0.05=0.1 \times 100=10\%$$

4. Bond Yield plus Risk Premium (BYRP) Approach

According to this approach the rate of return required by the equity shareholder of a company is equal to

$$k_e = \text{Yield on long-term Bonds} + \text{Risk Premium}$$

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The logic of this approach is very simple, equity investors bear a higher risk than bond investors, hence their required rate of return should include a premium for their higher risk, In other words, bondholder and equity shareholder both are providing funds to the company, but the company assures fixed rate of interest to the bondholders and not equity shareholders, hence, there is risk involved due to uncertainty of expected dividends. Therefore, it makes a sense determining the cost of equity on a readily observable cost of debt. The problem involved in this approach is the addition of premium, should it be 1 per cent, 2 per cent, 3 per cent or 'n' per cent. There is no theoretical basis for estimating the risk premium. Most analysts look at the operating and financial risks of the business and arrive at a subjectively determined risk premium that normally ranges between 3 per cent to 5 per cent. Cost of equity capital calculated based on this approach is not a precise, but it is a ball park estimation.

Illustration: XYZ Company is planning to sell equity shares. Mr. A is requesting planning to invest in XYZ Company equity shares. Bond yield of XYZ Company is 12 per cent. Mr. A an investor is requesting you to calculate his required rate of return on equity with 3 per cent risk premium.

Solution: $k_e = \text{Bond yield} + \text{risk premium} = 12\% + 3\% = 15\text{ per cent}$

5. Capital Asset Pricing Model Approach (CAPM)

Capital Asset Pricing Model (CAPM) was developed by William F. Sharpe.

This is another approach that can be used to calculate cost of equity. From cost of capital point of view, CAPM explains the relationship between the required rate of return, and the non-diversifiable or relevant risk, of the firm as reflected in its index of non-diversifiable risk that is beta (B). It shows the relationship between risk and return for efficient and inefficient portfolios. Symbolically,

$$k_e = R_f + (R_{mf} - R_f) \beta$$

Where: k_e = cost of equity capital

R_f = Rate of return required on a risk free security

$(\%) \beta$ = Beta coefficient

R_{mf} = Required rate of return on the market portfolio of assets that can be viewed as the average rate of return on all assets.

Assumptions of CAPM

CAPM approach is based on the following assumptions.

- (A) Perfect Capital Market: All investors have same information about securities
 - a. There are no restrictions on investments (buying and selling).
 - b. Securities are completely divisible.
 - c. There are no transaction costs.
 - d. There are no taxes.
 - e. Competitive market- means no single investor can affect market price significantly.
- (B) Investors preferences: Investors are risk averse
 - a. Investors have homogenous expectations regarding the expected returns, variances and correlation of returns among all securities.
 - b. Investors seek to maximize the expected utility of their portfolios over a single period planning horizon.

Illustration 12: The Capital Ltd., wishes to calculate its cost of equity capital using the Capital Asset Pricing Model (CAPM). Company's analyst found that its risk free rate of return equals 12 per cent, beta equals 1.7 and the return on market portfolio equals 14.5 per cent.

$$k_e = R_f + (R_{mf} - R_f) \beta$$

$$12 + [14.5 - 12] 1.7$$

$$= 12 + 4.25 = 16.25 \text{ per cent}$$

COST OF PREFERENCE SHARES

Preference share is one of the types of shares issued by the companies to raise funds from the public. Preference share is the share that has two preferential rights over equity shares, (i) preference in payment of dividend, from distributable profits, (ii) preference in the payment of capital at the time of liquidation of the company.

The cost of preference share capital is a function of the dividend expected by the investors. Generally preference share capital is issued with an intention (a fixed rate) to pay dividends. In case if dividends are not paid, it will affect the firm's fund raising capacity. For this reason dividends on preference share capital should be paid regularly except when the firm does not make profits.

There are different types of preference shares, cumulative and non-cumulative, redeemable and irredeemable, participating and non-participating and convertible and non-convertible, but there computation of cost of preference share will be only for redeemable and irredeemable.

(a) Cost of Irredeemable (Perpetual) Preference Share:

The share that cannot be paid till the liquidation of the company is called as irredeemable preference shares. The cost is measured by the following formulas.

$$k_e (\text{without tax}) = \frac{D}{CMP \text{ or } NP}$$

Where:

k_e = Cost of preference share

CMP = Current market price per share

D = Dividend per share

NP = Net proceeds

Cost of irredeemable preference stock (with dividend tax)

$$k_e (\text{with tax}) = \frac{D(1+Dt)}{CMP \text{ or } NP}$$

Where Dt = Tax on preference dividend

Illustration: HHC Ltd., issues 12 per cent perpetual preference shares with face value of 200 each. Compute cost of preference share assuming (without tax).

Solution:

$$k_p = \frac{D}{NP} \times 100$$

$$k_p = \frac{24}{200} \times 100 = 12\%$$

Illustration: Sai Ram & Co, is planning to issue 14 per cent perpetual preference shares, face value of 100 each. Flotation cost is estimated to be at 4 per cent. Compute (a) cost of

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preference shares if they are issued at (i) face value, (ii) 10 per cent premium, and (iii) 5 per cent discount, (b) compute cost of preference share in these situation assuming 5 per cent dividend tax.

Without Dividend Tax	With Dividend Tax
(i) Issued at Face Value $k_p = \frac{14}{100-4} = 14.58\%$	(i) Issued at Face Value $k_p = \frac{14(1-0.05)}{100-4} = 15.31\%$
(ii) Issued at 10% Premium $k_p = \frac{14}{110-4} = 13.21\%$	(ii) Issued at 10% Premium $k_p = \frac{14(1-0.05)}{110-4} = 13.87\%$
(iii) Issued at 5% Discount $k_p = \frac{14}{95-4} = 15.38\%$	(iii) Issued at 5% Discount $k_p = \frac{14(1-0.05)}{95-4} = 16.15\%$

(b) Cost of Redeemable Preference Share

Shares that are issued for a specific maturity period or redeemable after a specific period are known as redeemable preference shares. The explicit cost of redeemable preference shares is the discount rate that equates the net proceeds of the sale of preference shares with the present value of the future dividend and principal repayments. In other words, cost of preference share is the discount rate that equates the present value of cash inflows (sale proceeds) with the present value of cash outflows (dividend + principal repayment).

Dividends will be paid at the end of every year, but principal amount will be paid either in lump sum amount at the end of the maturity period or in installments (equal or unequal). If the principal amount is paid in installments, then the cash outflow for each year equal to dividend plus part of principal amount. Cost of preference share when the principal amount is repaid in one lump sum amount.

$$k_p : NP = \sum_{t=1}^n \left(\frac{D_t}{(1+k_p)^t} + \dots + \frac{D_n}{(1+k_p)^n} + \frac{P_n}{(1+k_p)^n} \right)$$

Where: $k_p : NP = (1+k_p)^1 + (1+k_p)^2 + (1+k_p)^3 + \dots + (1+k_p)^n + (1+k_p)^n$

k_p = Cost of preference share NP = Net sales proceeds (after discount, flotation cost)
D = Dividend on preference share P_n = Repayment of principal amount at the end of 'n' years

Illustration 15 (Lump sum repayment): A company issues 1, 00,000, 10 per cent preference shares of 100 each redeemable after 10 years at face value. Cost of issue is 10 per cent. Calculate cost of preference share.

Solution:

$$k_p : NP = \sum_{t=1}^n \left(\frac{D_t}{(1+k_p)^t} + \dots + \frac{D_n}{(1+k_p)^n} + \frac{P_n}{(1+k_p)^n} \right)$$

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$$90 = \sum_{t=1}^{10} \frac{10}{(1+k)^t} + \frac{100}{(1+k)^{10}}$$

For computation of cost of preference share, trial and error method is used here. Computation of cost of preference share.

Year	Cash Outflow()	PV Factor		Present Value()	
		10%	12%	10%	12%
1-10	10	6.145	5.65	61.45	56.5
10	100	0.386	0.322	38.6	32.2
Total PV Cash Outflow				100.05	88.7
(-) PV of Cash inflow				90.00	90.00
Net present Value				10.05	(-) 1.3

In trials PV of cash outflow did not equal to the PV of cash inflow R 90). Hence, cost of preference share is calculated by using interpolation formula.

$$k_p = LDF\% + (HDF - LDF \frac{PVLDF - CIF}{PVLDF - PVHDF})$$

Where

LDF = Lower discounting factor in % PVLDF = PV at lower discounting factor
PVHDF = PV at higher discounting factor COF = Cash outflow

$$k_p = 10\% + ((12 - 10) \frac{100.05 - 90}{100.05 - 88.7})$$

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

11.35

$$=10\%+(2\times 0.0886)=10\%+1.772$$
$$=11.77\%$$

WEIGHTED AVERAGE COST OF CAPITAL (WACC)

A company has to employ a combination of creditors and owners funds. The composite cost of capital lies between the least and most expensive funds. This approach enables the maximization of profits and the wealth of the equity shareholders by investing the funds in projects earning in excess of the overall cost of capital.

The composite cost of capital implies an average of the costs of each of the source of fund employed by the firm properly weighted by the proportion they hold in the firm's capital structure.

Steps involved in computation of WACC

1. Determination of the source of funds to be raised and their individual share in the total capitalization of the firm,
2. Computation of cost of specific source of funds,
3. Assignment of weight to specific source of funds,
4. Multiply the cost of each source by the appropriate assigned weights, and
5. Add individual source weight cost to get cost of capital.

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Once the company decides the funds that will be raised from different sources and the computation of specific cost of each component or source is completed, then the third step in computation of cost of capital is assignment of weights to specific costs, or specific sources of funds. How to assign weights? Is there any base to assign weights? Are there any types of weights?

Assignment of Weights:

The weights to specific funds may be assigned based on the following: (i) **Book Values:**

Book value weights are based on the values found on the balance sheet. The weight applicable to a given source of fund is simply the book value of the source of fund divided by the book value of total funds.

Merits of Book Values Weights

- Calculation of weights is simple,
- Book values provide a base, when firm is not listed or security are not actively traded,
- Book values are easily available from the published records of the firm,
- Analysis of capital structure in terms of debt – equity ratio is based on book value.)

Disadvantages of Book Value Weights

- There is no relation between book values and present economic value of various sources of capital,
- Book value proportions are not consistent with the concept of cost of capital because the latter is defined as the minimum rate of return to maintain the market value of the firm.

(ii) **Capital Structure Weights:** Under this method, weights are assigned to the components of capital structure based on the targeted capital structure. Depending on target, capital structures have some difficulties in using it. They are:

- A company may not have a well-defined target capital structure,
- It may be difficult to precisely estimate the components of capital costs, if the target capital is different from present capital structure,

(iii) **Market Value Weights:** Under this method, assigned weights to a particular component of capital structure is equal to the market value of the component of capital divided by the market value of all components of capital and capital employed by the firm.

Advantages of Market Value Weights

- Market values of securities are closely approximate to the actual amount to be received from their sale,
- Costs of the specific sources of funds that constitute the capital structure of the firm, are recalculated using prevailing market prices.

Disadvantages of Market Value Weights

- Market values may not be available when a firm is not listed or when the securities of the firm are very thinly traded,
- Market value may be distorted when securities prices are influenced by manipulation loading.

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- Equity capital gets greater importance.

Most of the financial analysts prefer to use market value weight because it is theoretically consistent and sound.

Illustration 20: A firm has the following capital structure as the latest statement

Source of Finance	Amount(Rs.)	After Tax Cost (%)
Debt Capital	30,00,000	4.0
Preference share	10,00,000	8.5
Capital Equity Share	20,00,000	11.5
Capital Retained earnings	40,00,000	10.0
Total	100,00,000	

Source of finance	Weights	Specific Cost (%)	Weighted Cost (%)
Debt	0.30	4.0	1.2
Preference share	0.10	8.5	0.85
Equity Share	0.20	11.5	2.3
Retained Earnings	0.40	10.0	4.0
	1.00		8.35

UNIT - III
LEVERAGES

INTRODUCTION

Financial decision is one of the integral and important parts of financial management in any kind of business concern. A sound financial decision must consider the board coverage of the financial mix (Capital Structure), total amount of capital (capitalization) and cost of capital (K_o). Capital structure is one of the significant things for the management, since it influences the debt equity mix of the business concern, which affects the shareholder's return and risk. Hence, deciding the debt-equity mix plays a major role in the part of the value of the company and market value of the shares. The debt equity mix of the company can be examined with the help of leverage.

Meaning of Leverage

The term leverage refers to an increased means of accomplishing some purpose. Leverage is used to lifting heavy objects, which may not be otherwise possible. In the financial point of view, leverage refers to furnish the ability to use fixed cost assets or funds to increase the return to its Shareholders.

Significance of Leverage

Leverage refers to the use of fixed costs in an attempt to increase the profitability. Leverage affects the level and variability of the firm's after tax earnings and hence, the firm's overall risk and return. The study of leverage is significant due to the following reasons.

(I) Measurement of Operating Risk

Operating risk refers to the risk of the firm not being able to cover its fixed operating costs. Since operating leverage depends on fixed operating costs, larger fixed operating costs indicates higher degree of operating leverage and thus, higher operating risk of the firm. High operating leverage is good when sales are rising but badly when they are falling.

(II) Measurement of Financial Risk

Financial risk refers to the risk of the firm not being able to cover its fixed financial costs. Since financial leverage depends on fixed financial cost, high fixed financial costs indicates higher degree of operating leverage and thus, high financial risk. High financial leverage is good when operating profit is rising and bad when it is falling.

(III) Managing Risk

Relationship between operating leverage and financial leverage is multiplicative rather than additive. Operating leverage and financial leverage can be combined in a number of different ways to obtain a desirable degree of total leverage and level of total firm risk.

(IV) Designing Appropriate Capital Structure Mix

To design an appropriate capital structure mix or financial plan, the amount of EBIT under various financial plans, should be related to earning per share. One widely used means of examining the effect of leverage to analyze the relationship between EBIT and earning per share.

(v) Increase Profitability

Leverage is an effort or attempt by which a firm tries to show high result or more benefit by using fixed costs assets and fixed return sources of capital. It insures maximum utilization of capital and fixed assets in order to increase the profitability of a firm, it helps to know the reasons not having more profit by a company.

Types of Leverages

Leverage is of three types:

1. Operating Leverage
2. Financial Leverage
3. Combined Leverage

Financial Leverage:

Financial Leverage is a tool with which a financial manager can maximise the returns to the equity shareholders. The capital of a company consists of equity, preference, debentures, public deposits and other long-term source of funds. He has to carefully select the securities to mobilize the funds. The proper blend of debt to equity should be maintained.

The ratio through which he balances the mix of debt applied on the capital mix offers benefits to the equity shareholders is known as Trading on Equity. As the debt is associated with the cost of interest that can be directly charged to profit and loss account or charged against the profit can reduce the burden of income tax. The benefit so gained will be passed on to the equity shareholders. In such circumstances the EPS will be more.

If the company prefers to raise the amount of debt instead of equity, it will lose the opportunity of charging the interest directly against the profit, as a result of this, it had to pay more tax to the government and in turn earnings available to equity shareholders would reduce. Hence, in other words, financial leverage refers to the use of fixed charge securities in the capitalization of company to produce more gains for the equity shareholders.

Thus, the financial leverage signifies the relationship between the earning power on equity capital and rate interest on borrowed capital. If the earnings of the company has more amount of fixed cost of interest (which would arise due to more debt capital), the overall returns of a company get reduced and financial risk increases. This may be an unfavorable situation for business concern and practically not advocated. The more accepted ratio between debts to equity is 2:1. This ratio favors leverage effect on equity shares and would get higher percentage of earnings.

The two quantifiable tools, viz., operating and financial leverage are adopted to know the earnings per share and also which shows the market value of the share. (Price earningsratio

by EBIT) Thus, financial leverage is a better tool compared to operating leverage. Change in EPS due to changes in EBIT results in variation in market price.

Therefore, financial and operating leverages act as a handy tool to the analyst or to the financial manager to take the decision with regard to capitalization. He can identify the exact relationship between the EPS and EBIT and plan accordingly. High leverage indicates high financial risks which would signal the finance manager to select the securities carefully.

Operating Leverage:

There are two major classification of costs in the organization. They are-(a) fixed cost,
(b) Variable cost.

The operating leverage has a bearing on fixed costs. There is a tendency of the profits to change, if the firm employs more of fixed costs in its production process, greater will be the operating cost irrespective of the size of the production. The operating leverage will be at a low degree when fixed costs are less in the production process.

Operating leverage shows the ability of a firm to use fixed operating cost to increase the effect of change in sales on its operating profits. It shows the relationship between the changes in sales and the changes in fixed operating income. Thus, the operating leverage has impact mainly on fixed cost, variable cost and contribution.

It indicates the effect of a change in sales revenue on the operating profit (EBIT). Higher the operating leverage indicates higher the amount of fixed cost and reduces the operating profit and increases the business risks.

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$$\text{Operating Leverage} = \frac{\text{Contribution}}{\text{EBIT/Operating Profit}}$$

Example: A firm has the following sales and cost data. Sales 50,000 units @ ₹ 6 per unit. Variable expenses ₹ 2 per unit. Fixed expenses ₹ 1,00,000. The earnings will be:

		₹
Sales (50,000 × ₹ 6)	=	3,00,000
Less: Variable Cost (50,000 × ₹ 2)	=	1,00,000
Contribution	=	2,00,000
Less: Fixed expenses	=	1,00,000
EBIT/Operating profit	=	1,00,000

From the above calculation, it is observed that, variation in production influences the operating profit. When the production was 50,000 units, the EBIT was 1,00,000 and EBIT was nil, when the production was dropped to 25,000 units.

Let us compare the same situation by using operating leverage.

Situation I—where sales = ₹ 3,00,000 V.C. = ₹ 1,00,000 and Fixed cost = ₹ 1,00,000

Operating Leverage	=	<u>Contribution</u>	
		EBIT/Operating Profit	
Sales	=	₹ 3,00,000	
Less: Variable Cost	=	₹ 1,00,000	
Contribution	=	<u>₹ 2,00,000</u>	
Less: Fixed expenses	=	<u>₹ 1,00,000</u>	
EBIT/Operating Profit	=	<u>₹ 1,00,000</u>	
Operating Leverage	=	$\frac{2,00,000}{1,00,000} = 2 \text{ times}$	

Situation II = If the sales has dropped to ₹ 1,50,000, V. Cost = ₹ 50,000 and Fixed cost = ₹ 1,00,000

Sales	=	₹ 1,50,000
Less: Variable Cost	=	₹ 50,000
Contribution	=	<u>₹ 1,00,000</u>
Less: Fixed expenses	=	<u>₹ 1,00,000</u>
EBIT/Operating Profit	=	<u>Nil</u>
Operating Leverage	=	$\frac{1,00,000}{0} = 0$

Hence, if the production is reduced to 25,000 units (50 per cent), it is not possible for the firm to have operating profit.

In the previous illustration, we have learnt that 25,000 units of production will not yield any operating profit or the company has reached the break-even. Any units which are produced beyond 25,000 units yields operating profits. Therefore, any increases in sales, fixed costs remaining same, increases operating profit. The increase in percentage operating income due to percentage, of increase in sales is called as "Degree of operating leverage".

This is calculated as follows:

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$$\text{Degree of Operating Leverage} = \frac{\text{Percentage change in Income}}{\text{Percentage change in Sales}}$$

Let us understand the degree of operating leverage with the following example:

Particulars	1995	1996
Sales : ₹ 4 per unit	50,000 units	55,000 units
Variable Cost ₹ 2 per unit	₹ 50,000	₹ 50,000

Particulars	1995 ₹	1996 ₹	Variations ₹	
Sales. 50,000 × 4	2,00,000	55,000 × 4	2,20,000	20,000
Variable Cost 50,000 × 2	1,00,000	55,000 × 2	1,10,000	10,000
Contribution	1,00,000	1,10,000	10,000	
Less: Fixed Cost	50,000	50,000	Nil	
EBIT/Operating profit	50,000	60,000	10,000	

$$\begin{aligned} \text{O.L.} &= \frac{C}{\text{EBIT}} = \frac{1,00,000}{50,000} = \frac{1,10,000}{60,000} \\ &= 2 \text{ times} = 1.83 \text{ times} \end{aligned}$$

When the sales revenue increases by 10 per cent (2,00,000 × 10/100), operating leverage will be 1.83 times or 1.83 times or 18.33 percent and increases EBIT by ₹ 10,000.

Combined Leverage:

This leverage shows the relationship between a change in sales and the corresponding variation in taxable income. If the management feels that a certain percentage change in sales would result in percentage change to taxable income they would like to know the level or degree of change and hence they adopt this leverage. Thus, degree of leverage is adopted to forecast the future study of sales levels and resultant increase/decrease in taxable income. This degree establishes the relationship between contribution and taxable income.

$$\text{Combined Leverage} = \text{Operating Leverage} \times \text{Financial Leverage}$$

$$\text{Combined Leverage} = \frac{\text{Contribution}}{\text{EBIT/Operating Profit}} \times \frac{\text{EBIT}}{\text{EBT}}$$

$$\text{Combined Leverage} = \frac{\text{Contribution}}{\text{Earning before Tax}}$$

Example:

A company, has a sales of Rs.2 lakh. The variable costs are 40 per cent of the sales and fixed expenses are Rs.60, 000. The interest on borrowed capital is assumed to be Rs.20, 000. Compute the combined leverage and show the impact on taxable income when sales increases by 10 per cent.

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	₹	
Sales	=	2,00,000
Less: Variable Cost (40/100 × 2,00,000)	=	<u>80,000</u>
Contribution	=	1,20,000
Less: Fixed Cost	=	<u>60,000</u>
Operating Profit/EBIT	=	60,000
Less: Interest on Borrowings	=	<u>20,000</u>
Earnings before Tax	=	<u>40,000</u>
Combined Leverage	=	$\frac{\text{Contribution}}{\text{EBIT}} = \frac{1,20,000}{40,000} = 3 \text{ times}$

When sales increased by 10 per cent (i.e., ₹ 2,00,000 × 10/100 = 20,000),

	₹	
Sales	=	2,20,000
Less: Variable Cost ($\frac{40}{100} \times 2,20,000$)	=	88,000
Contribution	=	1,32,000
Less: Fixed Cost	=	<u>60,000</u>
Operating Profit/EBIT	=	72,000
Less: Interest on/Borrowings	=	<u>20,000</u>
Earnings before Tax	=	<u>52,000</u>
Combined Leverage	=	$\frac{\text{Contribution}}{\text{EBIT}} = \frac{1,32,000}{52,000} = 2.5 \text{ times}$

This shows that there is an increase of ₹ 12,000 EBIT (₹ 52,000 – ₹ 40,000), for an increase of 10 per cent of sales. The taxable income increases by 30 per cent.

$$\begin{aligned} \text{Increase in Taxable Income} &= \frac{\text{Incremental profit}}{\text{Original profit}} \times 100 \\ &= \frac{12,000}{40,000} \times 100 = 30 \text{ per cent} \end{aligned}$$

It should be observed that the leverage is ascertained from a particular sales point. When different levels of sales are adopted, different degrees of composite leverages are obtained. When the volume of sales increases, fixed expenses remains same, the degree of leverage falls. This happens because of existence of fixed charges in the cost structure.

EBIT-EPS Analysis in Leverage

EBIT-EPS analysis gives a scientific basis for comparison among various financial plans and shows ways to maximize EPS. Hence EBIT-EPS analysis may be defined as 'a tool of financial planning that evaluates various alternatives of financing a project under varying levels of EBIT and suggests the best alternative having highest EPS and determines the most profitable level of EBIT'.

Concept of EBIT-EPS Analysis:

The EBIT-EBT analysis is the method that studies the leverage, i.e. comparing

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alternative methods of financing at different levels of EBIT. Simply put, EBIT-EPS analysis examines the effect of financial leverage on the EPS with varying levels of EBIT or under alternative financial plans.

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It examines the effect of financial leverage on the behavior of EPS under different financing alternatives and with varying levels of EBIT. EBIT-EPS analysis is used for making the choice of the combination and of the various sources. It helps select the alternative that yields the highest EPS.

We know that a firm can finance its investment from various sources such as borrowed capital or equity capital. The proportion of various sources may also be different under various financial plans. In every financing plan the firm's objectives lie in maximizing EPS.

Advantages of EBIT-EPS Analysis:

We have seen that EBIT-EPS analysis examines the effect of financial leverage on the behavior of EPS under various financing plans with varying levels of EBIT. It helps a firm in determining optimum financial planning having highest EPS.

Various advantages derived from EBIT-EPS analysis may be enumerated below:

Financial Planning:
Use of EBIT-EPS analysis is indispensable for determining sources of funds. In case of financial planning the objective of the firm lies in maximizing EPS. EBIT-EPS analysis evaluates the alternatives and finds the level of EBIT that maximizes EPS.

Comparative Analysis:

EBIT-EPS analysis is useful in evaluating the relative efficiency of departments, product lines and markets. It identifies the EBIT earned by these different departments, product lines and from various markets, which helps financial planners rank them according to profitability and also assess the risk associated with each.

Performance Evaluation:

This analysis is useful in comparative evaluation of performances of various sources of funds. It evaluates whether a fund obtained from a source is used in a project that produces a rate of return higher than its cost.

Determining Optimum Mix:

EBIT-EPS analysis is advantageous in selecting the optimum mix of debt and equity. By emphasizing on the relative value of EPS, this analysis determines the optimum mix of debt and equity in the capital structure. It helps determine the alternative that gives the highest value of EPS as the most profitable financing plan or the most profitable level of EBIT as the case may be.

Limitations of EBIT-EPS Analysis:

Finance managers are very much interested in knowing the sensitivity of the earnings per share with the changes in EBIT; this is clearly available with the help of EBIT-EPS analysis but this technique also suffers from certain limitations, as described below

No Consideration for Risk:

Leverage increases the level of risk, but this technique ignores the risk factor. When a corporation, on its borrowed capital, earns more than the interest it has to pay on debt, any financial planning can be accepted irrespective of risk. But in times of poor business the reverse of this situation arises—which attracts high degree of risk. This aspect is not dealt in EBIT-EPS analysis.

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Contradictory Results:

It gives a contradictory result where under different alternative financing plans new equity shares are not taken into consideration. Even the comparison becomes difficult if the number of alternatives increase and sometimes it also gives erroneous result under such situation.

Over-capitalization:

This analysis cannot determine the state of over-capitalization of a firm. Beyond a certain point, additional capital cannot be employed to produce a return in excess of the payments that must be made for its use. But this aspect is ignored in EBIT-EPS analysis.

Example 5.1:

Ankim Ltd., has an EBIT of Rs 3, 20,000. Its capital structure is given as under:

	Rs
Equity Share Capital of Rs 10 each	4,00,000
13% Preference Share Capital	1,00,000
9% Debentures	2,00,000

The company is in the tax bracket of 50%.

You are required to calculate the Earning Per Share.

Solution: Computation for EPS

	Rs
EBIT	3,20,000
Less: Interest $(2,00,000 \times \frac{9}{100})$	18,000
EBT	3,02,000
Less: Tax @ 50%	1,51,000
EAT	1,51,000
Less: Preference Dividend $(1,00,000 \times \frac{13}{100})$	13,000
Earnings available to equity shareholders	1,38,000

Number of equity shares = 40,000

$$\begin{aligned} \therefore \text{Earnings per share} &= \frac{\text{Earnings available to equity shareholders}}{\text{Number of equity shares}} \\ &= \frac{\text{Rs } 1,38,000}{40,000} = \text{Rs } 3.45 \end{aligned}$$

Indifference Points:

The indifference point, often called as a breakeven point, is highly important in financial planning because, at EBIT amounts in excess of the EBIT indifference level, the more heavily levered financing plan will generate a higher EPS. On the other hand, at EBIT amounts below the EBIT indifference points the financing plan involving less leverage will generate a higher EPS.

i. Concept:

Indifference points refer to the EBIT level at which the EPS is same for two alternative financial plans. According to J. C. Van Home, 'Indifference point refers to that EBIT level at which EPS remains the same irrespective of debt equity mix'. The management is indifferent in choosing any of the alternative financial plans at this level because all the financial plans are equally desirable. The indifference point is the cut-off level of EBIT below which financial

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leverage is disadvantageous. Beyond the indifference point level of EBIT the benefit of financial leverage with respect to EPS starts operating.

The indifference level of EBIT is significant because the financial planner may decide to take the debt advantage if the expected EBIT crosses this level. Beyond this level of EBIT the firm will be able to magnify the effect of increase in EBIT on the EPS.

In other words, financial leverage will be favorable beyond the indifference level of EBIT and will lead to an increase in the EPS. If the expected EBIT is less than the indifference point then the financial planners will opt for equity for financing projects, because below this level, EPS will be more for less levered firm.

ii. Computation:

We have seen that indifference point refers to the level of EBIT at which EPS is the same for two different financial plans. So the level of that EBIT can easily be computed. There are two approaches to calculate indifference point: Mathematical approach and graphical approach.

Mathematical Approach:

Under the mathematical approach, the indifference point may be obtained by solving equations. Let us present the income statement given in Table 5.1 with the following symbols in Table 5.4. We are starting from EBIT only.

TABLE 5.4 Income Statement Presented with Symbols

EBIT	X
Less: Interest (I)	I
EBT	(X - I)
Less: Tax(at t% on EBT)	(X - I)t
EAT	(X - I)(1 - t)
Less Preference Dividend	P _d
Earnings available to Equity Shareholder	(X - I)(1 - t) - P_d

$$EPS = \frac{(X - I)(1 - t) - P_d}{N}$$

Where, N represents number of equity shares.

In case of financing, three types of sources may be opted: Equity, debt and preference shares. So we may have four possible combinations Equity, Equity-Debt, Equity-Preference Shares and Equity- Debt-Preference Shares.

So, EPS under various alternatives will be as follows:

Equity-Debt: $EPS = \frac{(X - I)(1 - t)}{N}$

Equity-Preference Shares: $EPS = \frac{X(1 - t) - P_d}{N}$

Equity-Debt-Preference Shares: $EPS = \frac{(X - I)(1 - t) - P_d}{N}$

Note:

The symbols have their usual meaning.

The indifference point between any two financial plans may be obtained by equalizing the respective equations of EPS and solving them to find the value of X.

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Example :

Debarathi Co. Ltd., is planning an expansion programme. It requires Rs 20 lakhs of external financing for which it is considering two alternatives. The first alternative calls for issuing 15,000 equity shares of Rs 100 each and 5,000 10% Preference Shares of Rs 100 each; the second alternative requires 10,000 equity shares of Rs 100 each, 2,000 10% Preference Shares of Rs 100 each and Rs 8,00,000 Debentures carrying 9% interest. The company is in the tax bracket of 50%. You are required to calculate the indifference point for the plans and verify your answer by calculating the EPS.

Solution: Capital Structure

	Plan I (Rs)	Plan II (Rs)
Equity share capital	15,00,000	10,00,000
10% Preference share capital	5,00,000	2,00,000
9% Debentures	-	8,00,000
Total	20,00,000	20,00,000
Number of equity shares	15,000	10,000

Let, at X level of EBIT, the EPS under both the plan will be same.

$$\text{EPS under 1st alternative: } \frac{X(1-t) - P_d}{N_1} = \frac{X(1-0.5) - 50,000}{15,000}$$

$$\text{Again, EPS under 2nd alternative: } \frac{(X-1)(1-t) - P_d}{N_2} = \frac{(X-72,000)(1-0.5) - 20,000}{10,000}$$

Now, equalizing both the EPS we get:

$$\Rightarrow \frac{X(1-0.5) - 50,000}{15,000} = \frac{(X-72,000)(1-0.5) - 20,000}{10,000}$$

$$\Rightarrow \frac{0.5X - 50,000}{15,000} = \frac{0.5X - 36,000 - 20,000}{10,000}$$

$$\Rightarrow \frac{0.5X - 50,000}{3} = \frac{0.5X - 56,000}{2}$$

$$\Rightarrow 1.5X - 1,68,000 = X - 1,00,000$$

$$\therefore X = \frac{68,000}{0.5} = \text{Rs } 1,36,000$$

We may verify the result by calculating EPS under both the plans.

Computation of EPS under Different Plans

	Plan I	Plan II
EBIT	1,36,000	1,36,000
Less: Interest		72,000
EBT	1,36,000	64,000
Less: Tax	68,000	32,000
EAT	68,000	32,000
Less: Preference Dividend	50,000	20,000
Earnings available to equity shareholders	18,000	12,000
No. of equity shares	15,000	10,000
$\therefore \text{EPS} = \frac{\text{Earning available to equity shareholders}}{\text{Number of equity shares}}$	18,000 15,000	12,000 10,000
	= Rs 1.20	= Rs 1.20

Graphical Approach:

The indifference point may also be obtained using a graphical approach. In Figure 5.1 we have measured EBIT along the horizontal axis and EPS along the vertical axis. Suppose we have two financial plans before us: Financing by equity only and financing by equity and debt. Dif-

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ferent combinations of EBIT and EPS may be plotted against each plan. Under Plan-I the EPS will be zero when EBIT is nil so it will start from the origin.

The curve depicting Plan I in Figure 5.1 starts from the origin. For Plan-II EBIT will have some positive figure equal to the amount of interest to make EPS zero. So the curve depicting Plan-II in Figure 5.1 will start from the positive intercept of X axis. The two lines intersect at point E where the level of EBIT and EPS both are same under both the financial plans. Point E is the indifference point. The value corresponding to X axis is EBIT and the value corresponding to Y axis is EPS.

These can be found drawing two perpendiculars from the indifference point—one on X axis and the other on Y axis. Similarly we can obtain the indifference point between any two financial plans having various financing options. The area above the indifference point is the debt advantage zone and the area below the indifference point is equity advantage zone.

Above the indifference point the Plan-II is profitable, i.e. financial leverage is advantageous. Below the indifference point Plan I is advantageous, i.e. financial leverage is not profitable. This can be found by observing Figure 5.1. Above the indifference point EPS will be higher for same level of EBIT for Plan II. Below the indifference point EPS will be higher for same level of EBIT for Plan I. The graphical approach of indifference point gives a better understanding of EBIT-EPS analysis.

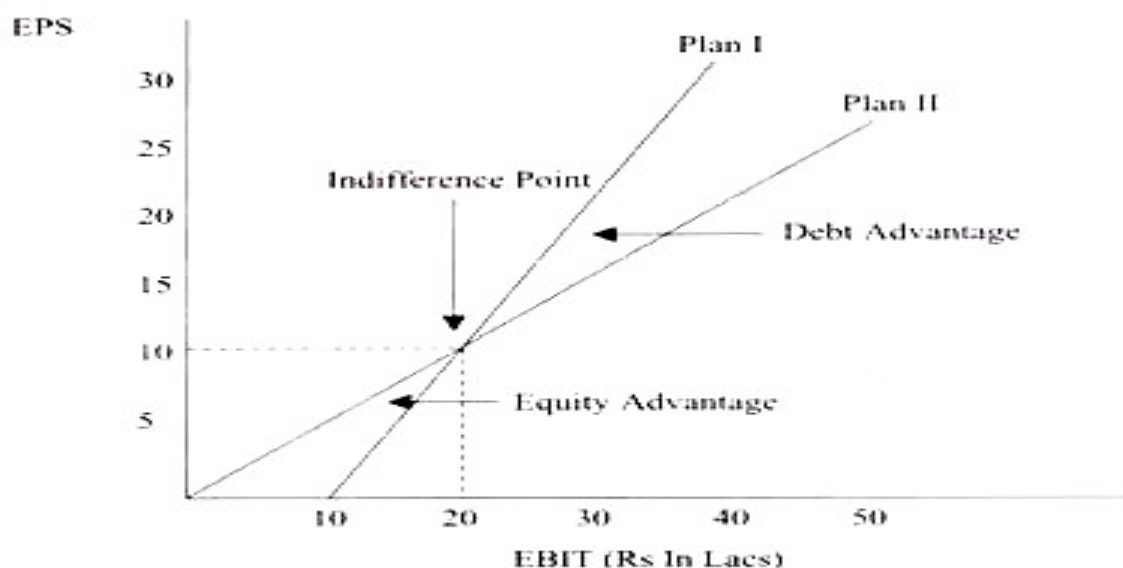


FIGURE 5.1 Graphical Presentation of Indifference Point

Financial Breakeven Point:

In general, the term Breakeven Point (BEP) refers to the point where the total cost line and sales line intersect. It indicates the level of production and sales where there is no profit and no loss because here the contribution just equals to the fixed costs. Similarly financial breakeven point is the level of EBIT at which after paying interest, tax and preference dividend, nothing remains for the equity shareholders.

In other words, financial breakeven point refers to that level of EBIT at which the firm can satisfy all fixed financial charges. EBIT less than this level will result in negative EPS. Therefore EPS is zero at this level of EBIT. Thus financial breakeven point refers to the level of EBIT at which financial profit is nil.

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Financial Break Even Point (FBEP) is expressed as ratio with the following equation:

$$\text{FBEP} = \frac{(\text{EBIT} - I)(1 - t) - P_d}{N} = 0$$

Or $(\text{EBIT} - I)(1 - t) - P_d = 0$

Or $(\text{EBIT} - I) = \frac{P_d}{(1 - t)}$

Or $\text{EBIT} = I + \frac{P_d}{(1 - t)}$

where, EBIT = Earnings before Interest and Tax,

I = Interest,

t = Rate of Tax,

P_d = Preference Dividend, and

N = Number of Equity Shares.

It is to be noted here that beyond the financial breakeven point increase in EBIT will result in proportional increase in EPS.

Example:

A company has formulated the following financing plans to finance Rs 15, 00,000 which is required for financing a new project.

	Plan I (Rs)	Plan II (Rs)	Plan III (Rs)
Equity Share Capital (Rs 10 each)	15,00,000	10,00,000	7,50,000
8% Debentures	-	5,00,000	2,50,000
10% Preference Share Capital	-	-	5,00,000
	15,00,000	15,00,000	15,00,000

Compute the financial breakeven point for each alternative plan assuming tax rate at 50%.

Solution: We know that the financial breakeven point is the EBIT where EPS is 0.

∴ $\text{FBEP} = \frac{(\text{EBIT} - I)(1 - t) - P_d}{N} = 0$

Financial breakeven point for Plan I:

$$\frac{(\text{EBIT} - 0)(1 - 0.5) - 0}{1,50,000} = 0$$

⇒ $0.5 \text{ EBIT} - 0 = 0$

∴ $\text{EBIT} - 0 = 0$

Financial breakeven point is 0

Financial breakeven point for Plan II:

$$\frac{(\text{EBIT} - 40,000)(1 - 0.5) - 0}{1,00,000} = 0$$

⇒ $0.5 \text{ EBIT} - 20,000 = 0$

∴ $\text{EBIT} = 40,000$

Financial breakeven point is 40,000

Financial breakeven point for Plan III:

$$= \frac{(\text{EBIT} - 20,000)(1 - 0.5) - 50,000}{75,000} = 0$$

⇒ $0.5 \text{ EBIT} - 10,000 - 50,000 = 0$

$0.5 \text{ EBIT} = 60,000$

∴ $\text{EBIT} = 1,20,000$

Financial breakeven point is 1,20,000

Dividend

The dividend is one of the important ways in which the companies communicate the financial health and the shareholder value. Through a distribution from their earnings, companies indicate a positive future and a strong performance. The ability and the willingness of a company to pay stable dividends over a good period of time and even increase them steadily gives a good picture about the fundamentals of the company.

Forms of Dividend

There are various forms of dividends that are paid out to the shareholders:

Cash Dividend

A Cash dividend is the most common form of the dividend. The shareholders are paid in cash per share. The board of directors announces the dividend payment on the date of declaration. The dividends are assigned to the shareholders on the date of record. The dividends are issued on the date of payment. But for distributing cash dividend, the company needs to have positive retained earnings and enough cash for the payment of dividends.

Bonus Share

Bonus share is also called as the stock dividend. Bonus shares are issued by the company when they have low operating cash, but still want to keep the investors happy. Each equity shareholder receives a certain number of additional shares depending on the number of shares originally owned by the shareholder. For example, if a person possesses 10 shares of Company A, and the company declares bonus share issue of 1 for every 2 shares, the person will get 5 additional shares in his account. From company's angle, the number of shares and issued capital in the company will increase by 50% (1/2 shares). The market price, EPS, DPS etc will be adjusted accordingly. In this case company shall retain earning also at the same time share holder gets dividend. An investor who desires cash return, can sell investment in secondary market. It is also called capitalization of earning.

Share Repurchase

Share repurchase occurs when a company buys back its own shares from the market and reduces the number of shares outstanding. This is considered as an alternative to the dividend payment as cash is returned to the investors through another way.

Property Dividend

The company makes the payment in the form of assets in the property dividend. The asset could be any of this equipment, inventory, vehicle or any other asset. The value of the asset has to be restated at the fair value while issuing a property dividend.

Scrip Dividend

Scrip dividend is a promissory note to pay the shareholders later. This type of dividend is used when the company does not have sufficient funds for the issuance of dividends.

Liquidating Dividend

When the company returns the original capital contributed by the equity shareholders as a dividend, it is termed as liquidating dividend. It is often seen as a sign of closing down the company.

Factors Determining

Dividend Internal Factor

1. Nature of Firm's Business:

Nature of business activity of the firm influences largely the level of income. If a firm is engaged in rendering public utility services or in manufacturing staple products, its income level will be slightly affected by cyclical economic conditions. The firm usually has stable income and therefore, pays a stable dividend. Principle of conservatism need not be followed in such a firm while formulating dividend policy.

However, a firm with fluctuating earnings must retain larger share of income during boom periods so as to smoothen dividends over the cycle. One way to handle uncertain productivity outcomes is to institute a regular dividend policy and couple it with a policy of paying extra dividends whenever earning power warrants it.

2. Access to Capital Markets:

A firm with record of high and stable earnings will have easy access to capital market sources. The easier access to capital markets which is more particularly true of large and well established ventures may encourage the management to formulate liberal dividend policy to pay out sizeable portion of the income.

However, if a firm has difficult access to external source of finance which is particularly true in case of small, new or otherwise risky business, the management should restrict dividend payments to retain larger earnings for financing profitable projects.

3. Age of the Firm:

Age of the firm goes far to influence the pattern of income distribution. A young and growing concern will require large amount of funds to finance its growth requirements. But it experiences considerable problem in procuring funds from the market because of reluctance of investors to tread on unbeaten path. Management must, therefore, follow conservative dividend policy to plough back larger earnings.

But an old established company having reached saturation point may follow a high pay- out policy for two main reasons. In the first instance, reserves and surplus which the firm has built up in its chest in course of its prolonged and successful operations is likely to be adequate to cover its long-term financial needs.

Easier access to capital markets may be another factor contributing to lenient dividend policy by well established firms.

4. Growth Rate of the Firm:

Closely related to age of the firm is rate at which a firm is expanding its business. A rapidly growing concern will have constant need of long-term funds to seize favourable opportunities and for that purpose it may find it expedient to finance greater part of its expansion out of its earnings.

Such a decision will mean that dividend must be kept at a minimum.

Before doing so, the management must make it sure that reinvestment of earnings would yield a return higher than what stockholders could expect to obtain by individually investing their cash dividends in other opportunities available to them.

But a firm, which does not need additional funds for expansion or for replacement of assets in a period of rising prices, may distribute a high portion of its earnings.

5. Liquidity Position of the Firm and Its Funds Requirements:

A finance manager must assess cash position of the firm and estimate its future cash needs while deciding about portion of the profits to retain in the firm and the portion to pay as dividends.

A firm with high profitability and large reserves may not necessarily have sufficient cash balances to pay cash dividends particularly when most of the sales have been affected through credit and/or firm's cash balances have been seriously depleted through the expansion of current or fixed assets or through the reduction of its liabilities.

In such a situation it would be unwise to drain off additional cash by paying dividends. Even if firm's cash position is comfortable, but it needs cash to repay bank loan and to purchase raw materials for production purposes, prudent manager would not impair liquidity position of the firm for sake of maintaining regularity in dividend payment though, of course, the latter is also important.

Adequate working capital is always essential to successful operation of the firm and it is not wise to reduce working capital below a safe minimum in order to maintain a given dividend state. Management's desire to preserve high liquidity in the firm is more pronounced particularly when there is uncertainty about future income.

Adequate cash is needed to meet future contingencies. As a matter of fact, one of the prolific sources of survival of a firm is constant retention of earnings and building up cash reserves.

6. Repayment of Debt:

A firm may extinguish its past debts either by means of creating new obligations to replace the old ones or by retained earnings. If the management adopts the second alternative, larger portion of earning will have to be retained.

7. Ownership of Firm:

In a closely held firm with a few but affluent stockholders the management will always retain larger share of the profits so as to reduce tax liability of the stock-holders. But if a closely held firm comprises of a few wealthy stockholders and others in the middle income group, the management may not sail smoothly because of conflicting interests of the owners. The former may prefer a low dividend pay-out and the latter relatively high dividend pay-out rate. The dividend policy in such a firm may be a compromise between a low and a high pay-out— an intermediate payout ratio.

In widely held firms with a larger number of stockholders it is very difficult to ascertain wishes of individual stockholders and to take dividend decision in light of investing and financing decisions that will serve the interest of all owns.

8. Restrictions in Debt Covenants:

In case a firm is indebted with long-term debt' finance manager must examine carefully provisions of debt agreements and decide about dividend payments, accordingly. There may be an agreement with lenders which may either prevent the payment of dividends entirely or limit the amount of dividends to be paid or disallow payment of dividend until certain conditions are fulfilled.

Such provisions are generally made to prevent stockholders from draining cash away from the business to such an extent that the liquidity position of the firm would be impaired. If the firm in question is under such sort of restrictions, the management's freedom to decide about dividends is limited.

In such case the finance manager appraises the Board of Directors of all contractual provisions that affect dividends in any way.

9. Timing of investment Opportunities:

Dividend decisions should be made in the light of timing of investment opportunities. A firm needs funds for its investment opportunities that would arise after a long period. If funds built up through retention of earnings lie unutilized during the intervening period or remain invested in short-term liquid securities yielding less than the required rate of return on retained earnings, shareholders' interest will not be maximized. In such case, it would be desirable to pay out high dividends to stock-holders and raise capital when needed.

10. Control:

Control is also an important factor that influences pattern of income distribution. Issue of additional common stocks for procuring funds dilutes control to the detriment of existing stockholders who have dominating voice in the firm.

At the same time, recourse to long-term loans may entail financial risk in the firm and may at times spell death knell on the enterprise which is again deleterious to the interest of residual stockholders. In view of this, present owners' desire to maintain control dictates the policy of withholding dividend payments to build up funds for growth and other purposes.

Theories of Dividend

Some of the major different theories of dividend in financial management are as follows: 1. Walter's model 2. Gordon's model 3. Modigliani and Miller's hypothesis. On the relationship between dividend and the value of the firm different theories have been advanced.

They are as follows:

1. Walter's model:

Professor James E. Walter argues that the choice of dividend policies almost always affects the value of the enterprise. His model shows clearly the importance of the relationship between the firm's internal rate of return (r) and its cost of capital (k) in determining the dividend policy that will maximize the wealth of shareholders.

Walter's model is based on the following assumptions:

1. The firm finances all investment through retained earnings; that is debt or new equity is not issued;
2. The firm's internal rate of return (r), and its cost of capital (k) are constant;
3. All earnings are either distributed as dividend or reinvested internally immediately.
4. Beginning earnings and dividends never change. The values of the earnings per share (E), and the dividend per share (D) may be changed in the model to determine results, but any given values of E and D are assumed to remain constant forever in determining a given value.
5. The firm has a very long or infinite life.

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Walter's formula to determine the market price per share (P) is as follows:

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$$P = D/K + r(E-D)/K/K$$

The above equation clearly reveals that the market price per share is the sum of the present value of two sources of income:

- i) The present value of an infinite stream of constant dividends, (D/K) and
- ii) The present value of the infinite stream of stream

gains. $[r (E-D)/K/K]$

Criticism:

Walter's model is quite useful to show the effects of dividend policy on an all equity firm under different assumptions about the rate of return. However, the simplified nature of the model can lead to conclusions which are not true in general, though true for Walter's model.

The criticisms on the model are as follows:

1. Walter's model of share valuation mixes dividend policy with investment policy of the firm. The model assumes that the investment opportunities of the firm are financed by retained earnings only and no external financing debt or equity is used for the purpose when such a situation exists either the firm's investment or its dividend policy or both will be sub-optimum. The wealth of the owners will maximize only when this optimum investment is made.
2. Walter's model is based on the assumption that r is constant. In fact r decreases as more investment occurs. This reflects the assumption that the most profitable investments are made first and then the poorer investments are made. The firm should stop at a point where $r = k$. This is clearly an erroneous policy and fails to optimize the wealth of the owners.
3. A firm's cost of capital or discount rate, K , does not remain constant; it changes directly with the firm's risk. Thus, the present value of the firm's income moves inversely with the cost of capital. By assuming that the discount rate, K is constant, Walter's model abstracts from the effect of risk on the value of the firm.

2. Gordon's Model:

One very popular model explicitly relating the market value of the firm to dividend policy is developed by Myron Gordon.

Assumptions:

Gordon's model is based on the following assumptions.

1. The firm is an all Equity firm
2. No external financing is available
3. The internal rate of return (r) of the firm is constant.
4. The appropriate discount rate (K) of the firm remains constant.
5. The firm and its stream of earnings are perpetual
6. The corporate taxes do not exist.
7. The retention ratio (b), once decided upon, is constant. Thus, the growth rate (g) = br is constant forever.
8. $K > br = g$ if this condition is not fulfilled, we cannot get a meaningful value for the share.

According to Gordon's dividend capitalization model, the market value of a share (P_0) is equal to the present value of an infinite stream of dividends to be received by the share. Thus:

$$P_0 = \frac{E_1(1-b)}{K-br}$$

The above equation explicitly shows the relationship of current earnings (E_1), dividend policy, (b), internal profitability (r) and the all-equity firm's cost of capital (k), in the determination of the value of the share (P_0).

3. Modigliani and Miller's hypothesis:

According to Modigliani and Miller (M-M), dividend policy of a firm is irrelevant as it does not affect the wealth of the shareholders. They argue that the value of the firm depends on the firm's earnings which result from its investment policy.

Thus, when investment decision of the firm is given, dividend decision the split of earnings between dividends and retained earnings is of no significance in determining the value of the firm. M – M's hypothesis of irrelevance is based on the following assumptions.

1. The firm operates in perfect capital market
2. Taxes do not exist
3. The firm has a fixed investment policy
4. Risk of uncertainty does not exist.

That is, investors are able to forecast future prices and dividends with certainty and one discount rate is appropriate for all securities and all time periods. Thus, $r = K = K_t$ for all t . Under M – M assumptions, r will be equal to the discount rate and identical for all shares. As a result, the price of each share must adjust so that the rate of return, which is composed of the rate of dividends and capital gains, on every share will be equal to the discount rate and be identical for all shares.

Thus, the rate of return for a share held for one year may be calculated as follows:

Where P^0 is the market or purchase price per share at time 0, P_1 is the market price per share at time 1 and D_1 is dividend per share at time 1. As hypothesized by M – M, r should be equal for all shares. If it is not so, the low-return yielding shares will be sold by investors who will purchase the high-return yielding shares.

This process will tend to reduce the price of the low-return shares and to increase the prices of the high-return shares. This switching will continue until the differentials in rates of return are eliminated. This discount rate will also be equal for all firms under the M-M assumption since there are no risk differences.

From the above M-M fundamental principle we can derive their valuation model as follows:

$$P_0 = \frac{D_1 + P_1}{(1+r)} \quad P_0 = \frac{D_1 + P_1}{(1+k)} \quad r = k$$

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Multiplying both sides of equation by the number of shares outstanding (n), we obtain the value of the firm if no new financing exists.

$$V = nP_0 = \frac{N(D_1 + P_1)}{(1+k)}$$

If the firm sells m number of new shares at time 1 at a price of P^1 , the value of the firm at time 0 will be

The above equation of M – M valuation allows for the issuance of new shares, unlike Walter's and Gordon's models. Consequently, a firm can pay dividends and raise funds to undertake the optimum investment policy. Thus, dividend and investment policies are not confounded in M – M model, like waiter's and Gordon's models.

Criticism:

Because of the unrealistic nature of the assumption, M-M's hypothesis lacks practical relevance in the real world situation. Thus, it is being criticized on the following grounds.

- i. The assumption that taxes do not exist is far from reality.
- ii. M-M argue that the internal and external financing are equivalent. This cannot be true if the costs of floating new issues exist.
- iii. According to M-M's hypothesis the wealth of a shareholder will be same whether the firm pays dividends or not. But, because of the transactions costs and inconvenience associated with the sale of shares to realize capital gains, shareholders prefer dividends to capital gains.
- iv. Even under the condition of certainty it is not correct to assume that the discount rate (k) should be same whether firm uses the external or internal financing.
- v. If investors have desire to diversify their port folios, the discount rate for external and internal financing will be different.
- vi. M-M argues that, even if the assumption of perfect certainty is dropped and uncertainty is considered, dividend policy continues to be irrelevant. But according to number of writers, dividends are relevant under conditions of uncertainty.

UNIT - IV
CAPITAL STRUCTURE PLANNING

Capital Structure Planning

The company has to initially analyze its financial requirement on the short, medium and long-term basis. Taking the various factors into consideration, the management must plan an appropriate composition of debt and equity.

Meaning

The term 'structure' means the arrangement of the various parts. So capital structure means the arrangement of capital from different sources so that the long-term funds needed for the business are raised.

Thus, capital structure refers to the proportions or combinations of equity share capital, preference share capital, debentures, long-term loans, retained earnings and other long-term sources of funds in the total amount of capital which a firm should raise to run its business.

Approaches

NET INCOME (NI) APPROACH

This approach has been developed by Durand), It is a relevant theory. According to this approach, capital structure decision is relevant to the valuation of the firm. In other words, a change in debt proportion in capital structure will lead to a corresponding change in cost of capital (K_0) as well as total value of the firm.

Assumptions

Net income approach is based on the following assumptions:

1. There are no taxes;
2. Cost of debt is less than the cost of equity;
3. Use of debt in capital structure does not change the risk perception of investors.
4. Cost of debt and cost of equity remains constant;

NI approach argument is based on the above three assumptions. Increase of debt (cheapest source of long-term finance) in capital structure reduces cost of capital (K_0), due to, which there is no change in the cost of equity [Risk perception of investors] leading to an increase in the total value of the firm.

When cost of debt (K_i) and cost of equity (K_e) are constant, with the increased use of debt in the capital structure it will magnify the equity shareholder's earnings and thereby market value of the firm and equity shares (see Fig), Value of the firm based on NI approach is as follows:

$$E = NI \div K_e$$

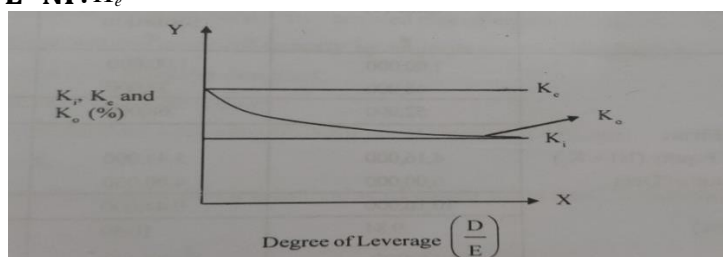


Illustration: VenketIntel Company Ltd expects operating profit (EBIT) of ? 100,000. The company has raised 12 per cent debentures of 3,00,000. The company's equity capital cost

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is 13 per cent. Determine the value of the firm and cost of capital.

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Solution:

Calculation of Net Income = EBIT-Debentures Interest

EBIT	Rs. 1,00,000
Less: Debentures Interest (3,00,000×12/100)	36,000
Net Income	64,000

Value of the Firm= E+ D

Market Value of Equity (NI÷K ₀)(64,000 ÷ 0.13	4,92,307.69
Add: Market Value of Debt	3,00,000.00
	7,92,307.69

Calculation of Cost of Capital (K₀) $K_0 = (EBIT \div V)100$

$$= (1,00,000 \div 7,92,307.69) = 12.62\%$$

Illustration 2: ABC Company, is expecting an EBIT of{ 1,00,000 whose equity capitalization rate

(K) is 12.5 per cent, Currently the company has a debt capital ofRs. 4,00,000 at 8 per cent,Calculate the value of the firm (V) and cost of capital (K).

Case (1) When the company increases debt by 2, 00,000, uses proceeds to repurchase equityshares.

Case (2) When company reduces debt to 2, 00,000 by issue of equity shares, of the same amount.

Solution

Calculation of Net Income

Particulars	Case (1)	Present Situation	Case (2)
EBIT	100000	100000	100000
Less: Interest	48000	32000	16000
Net Income	52000	68000	84000
Value of the NI FIRM:			
Market value of Equity (NI/K)	416000	544000	672000
Add: Market value of Debt	600000	400000	200000
	1016000	944000	872000
Cost of Capital (%)	9.84	10.59	11.47
EBIT / V	$\frac{416000}{34400}$	$\frac{544000}{54400}$	$\frac{672000}{74400}$
S / No. of Equity shares	12.09	10	9.03

Calculations of No. of Equity shares: Assuming Rs. 10 per share as face value.Present situation: 5, 44,000÷ 10 = 54,400 shares

Case (1): Existing shares - Redeemed

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shares $54,400 - (2,00,000 \div 10) = 34,400$

shares

Case (2): Existing shares + Fresh Issue of

shares $54,400 + (2,00,000 \div 10) = 74,400$ share

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From the above it can be observed that the value of the firm increases from Rs. 9,44,000 to 10,16,000 when there is an increase in the debt by Rs. 4,00,000 and reduces from 9,44,000 to 8,72,000 when debt is reduced to Rs. 2,00,000,

It can also be observed that market price of equity share increases when debt increases in capital structure and vice versa.

NET OPERATING INCOME (NOI) APPROACH

This is another approach, which has been suggested by Durand, It is just-opposite to the net income approach. According to this approach, the capital structure decisions of a firm are irrelevant. It says that any change in debt proportion in capital structure (leverage) will not lead to any change in the value of the capital (K_0). They (V , K_0 and share price) are independent of financial leverage.

Assumptions

NOI approach is based on the following assumptions:

1. Overall Cost of Capital (K_0) remains unchanged for all degrees of leverage. (see Fig.)
2. The market capitalizes the total value of the firm as a whole and no importance is given for split of value of firm between debt and equity;
3. The market value of equity is residue (i.e., Total value of the firm minus market value of debt);
4. The use of debt funds increases the received risk of equity investors, thereby K_e increases;
5. The debt advantage is set off exactly by an increase in cost of equity;
6. Cost of debt (K_i) remains constant;
7. There are no corporate taxes.

The total value of the firm according to NOI is calculated as follows: $V = EBIT \div K_0$

One of the assumptions says that market value of equity is residual.

Symbolically: $E = V - D$

Optimum Capital Structure

According to NOI approach, there is no optimum capital structure because the total value of the firm (V), market price of equity share and cost of capital (K_0) remains unaffected with the change in financial leverage (change in debt proportion).

Illustration: Venkat Intel Company Ltd., expects an operating income of Rs. 1,00,000. The Company has 12 per cent debt of Rs. 3,00,000. The company's overall cost of capital is 13 per cent. Calculate the total value of the firm and the equity capitalisation rate (K_e)

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Solution:

$$\begin{aligned} \text{Value of the Firm} &= \text{EBIT} \div K_e \\ &= 1,00,000 \div 0.13 = 7,69,230.77 \\ \text{Market value of equity} &= V - D \\ &= 7,69,230.77 - 3,00,000 \\ &= \text{Rs. } 4,69,230.77 \end{aligned}$$

Cost of equity/Equity capitalisation Rate (K_e)

$$K_e = \frac{E}{E + V - D} \text{ or } \frac{\text{EBIT} - I}{1,00,000 - 36,000} \times 100 = 13.64\%$$

Illustration: ABC Company's cost of capital is 12.5% is expecting an operating profit at Rs. 1,00,000 whose cost of capital is 12.5 per cent. The company has a debt capital of 4,00,000 at 8 per cent. You are required to calculate the total value of the firm and equity capital cost (K_e).

Case (1) The company increases debt from 4,00,000 to Rs. 6,00,000 and uses the proceeds for Repurchase of equity shares.

Case (2) the company reduces debt to Rs. 2,00,000 by fresh issue of equity shares of the same Amount.

Solution:

Computation of V, K_0 , and K_e

Particulars	Case(1)	Present Position	Case (2)
V=EBIT % K_0	$1,00,000 \div 0.0125$	$1,00,000 \div 0.0125$	$1,00,000 \div 0.0125$
	Rs. 8,00,000	Rs. 8,00,000	Rs. 8,00,000
	Rs. 8,00,000	Rs. 8,00,000	Rs. 8,00,000
Less: Debt	6,00,000	4,00,000	2,00,000
Value of Equity	2,00,000	4,00,000	6,00,000
Cost of Equity (E)			
$\frac{\text{EBIT} - I}{E} \times 100$	$\frac{1,00,000 - 48,000}{2,00,000}$	$\frac{1,00,000 - 32,000}{4,00,000}$	$\frac{1,00,000 - 16,000}{6,00,000}$
	=26%	=17%	=14%

Market price of share:

$$\frac{E}{\text{NO. of equity shares outstanding}}$$

Calculation of No. of equity shares: For calculation of market price per share, there is a need to calculate the number of outstanding equity shares [assume Rs. 10 face value of share].

Present positions = $4,00,000 \div 10 = 40,000$ shares

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Case (1) = Present shares - Repurchased shares

$$= 40,000 - [2,00,000 \div 10] = 20,000 \text{ shares}$$

Case (2) = Present shares + New shares

$$= 40,000 + [2,00,000 \div 10] = 60,000 \text{ shares}$$

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Market price per share

Present position	=	$4,00,000 \div 40,000^1$	=	Rs.10
Case (1)	=	$2,00,000 \div 20,000^2$	=	Rs.10
Case (2)	=	$6,00,000 \div 60,000^3$	=	Rs.10

From the above analysis it is clear that both the total value of the firm, and market price per share are unaffected by the change in debt proportion in capital structure. But K_e changes when increase in leverage increases and vice versa.

MODIGLIANI-MILLER APPROACH (MM HYPOTHESIS)

This approach was developed by Professors, Franco Modigliani and Merton Miller. [MM, hereafter] in their classic contribution on capital structure, which has been called the most influential finance article ever written, who later became Nobel Laureates in economics:

MM Approach is identical to the NOI approach. In other words, the total value of the firm is independent of its capital structure. However, there is a basic difference between NOI and MM approach. The NOI approach is purely definitional, which does not provide operational justification for irrelevance of the capital structure in the valuation of the firm. On the other hand, MM approach supports the NOI approach in behavioral justification for the independence of the cost of capital and value of the firm at any level of degree of leverage. MM argues that, in the absence of taxes, firm's total market value and overall cost of capital remains constant to the change of debt capital proportioning capital structure. This has been proved by operational justification.

Assumptions

MM approach is based on the following assumptions:

- a. Information is available free of cost
- b. The same information is available for all investors
- c. Securities are infinitely divisible
- d. Investors are free to buy or sell securities
- e. There is no transaction cost
- f. There are no bankruptcy costs
- g. Investors can borrow without restriction on the same terms on which a firm can borrow
- h. Dividend payout ratio is 100 per cent
- i. EBIT is not affected by the use of debt

Basic propositions: The propositions of MM approach are as follows:

I. Based on the above listed assumptions, MM's first proposition is: The overall cost of capital (k_0) and the value of the firm (V) are independent of capital structure. In other words, k_0 and V are constant for any proportion of debt-equity mix. The total value is given by capitalising the expected net operating income by the discount rate appropriate to its risk class Symbolically:

$$V = S + D = \text{NOI} \div k_0$$

II. The second proposition is: Cost of equity capital (K_e) to capitalisation rate of the pure equity plus a premium for the financial risk. Cost of equity (K_e) capital increases with use of more debt in capital structure. The increase in k offsets exactly the use of a less expensive source of funds represented by debt.

III. And the Third is: The cut-off rate for investment purposes is completely independent of the way in which an investment is financed, we discuss here proposition I only, because we need to see the relationship between leverage and valuation.

Proposition I: According to this proposition the total value of the firm must be constant for all degrees of leverage [deb-equity mix], As a result, the k_0 and market price of share is same, irrespective of what debt-equity may be. MM proved the proposition I based on "arbitrage process", The following discussion explains the arbitrage process.

Arbitrage Process

The term 'arbitrage' refers to an act of buying an asset or security in one market at a lower price and selling it in another market at a higher price. As a result of such action [buying and selling] equilibrium is restored in the market price of an asset that is unequal in the markets. The arbitrage process involves purchase of assets or securities whose prices are lower [undervalued securities] and sale of assets or securities whose prices are high in market where prices are out of equilibrium, Arbitrage process is a balancing operation.

MM explains the arbitrage mechanism, by taking two firms which are exactly similar in all respects except (leverage) in their capital structures, one firm uses debt in its capital structure [Levered firm 'L'], while the other does not [unlevered firm UL] or completely financed by equity capital. Such homogenous firms are perfect substitutes. The value of the firm differs just because of leverage, but cannot be different (always) because of arbitrage process.

Investors of a firm whose share value is high will sell their shares and buy shares of the firm whose share value is low (undervalued share). Investors will be able to earn some income at less investment and with the same risk [perceived risk], this is because the investors would borrow in the proportion of degree of leverage in the present firm. The use of debt in the arbitrage process by investors is called as "personal or home-made leverage". Use of personal leverage is based on the assumption that investors can borrow funds without any restriction on the same terms on which a firm can borrow. Investors will be able to substitute, by borrowing (debt) funds himself/herself.

The arbitrage process comes to an end when two identical firm's share price is equal. But practically the share prices of two identical firms never become equal, hence there is no end for arbitrage process.

Steps in working out Arbitrage Process

Students need to keep in mind the following three steps in working out of arbitrage process:

Step 1: Investors Current Position: In this step there is a need to find out the current investment and income (return).

Step 2: Calculation of Savings in Investment: by moving from levered firm to unlevered firm. Savings in investment is equal to total funds [Funds raised by sale of shares plus funds raised by personal borrowing] minus some percentage of investment. Here the income will be the same as that was in previous firm.

Step 3: Calculation of Increased Income: by investing total funds available.

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Note: Students need to keep in mind that there is no need to use all the three steps given above for all problems, but it depends on a given situation. Assume that the question is to show the arbitrage processes. Here students need to use all the three steps. On the other hand, if the question is to "show the savings in investment or increase income (return)" there is a need to use only two steps, step 1 (compulsory) and step 2, for calculation of savings in investments, or step 3 for calculation of increase income (return).

Illustration: Two firms, Venkat Ltd. and Sai Ltd. are identical in all respects except leverage in capital structure. Venkat Ltd has 10 per cent 3, 00,000 debentures. Both the firms have the same EBIT of 50,000. The equity capitalization rate of Venkat 16 per cent and Sai 12.5 per cent. You are required to calculate the total value of each firm, and show arbitrage process assuming an investor holds 10 per cent of the outstanding shares of the Venkat Ltd. (levered firm).

Solution:

Calculation of Value of the Firms

Particulars	Venkat Ltd	Sai Ltd
EBIT	50,000	50,000
Less: Interest on Debenture (3,00,000x 10/100)	30,000	-
Net Income	20,000	50,000
Value of the Firm:		
• Market value equity (s)= NI÷Ke	1,25,000	4,00,000
• Market value of Debt (D)	3,00,000	-
Value of the Firm (V)	4,25,000	4,00,000

The above table indicates that Venkat Ltd.'s value is higher than Sai Ltd.'s value due to use of leverage in capital structure.

Arbitrage Process: In the problem, there is a need to show the arbitrage process, so there is a need to use three steps.

Step 1: Investors current position in Venkat Ltd. with 10% Investment

Investment on equity shares (1, 25,000 x 10/100)	12,500
Dividend Income (20,000 x 10/100)	2,000

Step 2: Investor position in Firm Sai Ltd. with 10% investment [savings in investment]

Total funds available:

Own funds [By sale in Venkat Ltd.]	12,500
Add: Borrowed Funds or personal leverage (3, 00,000×10/100)	30,000
	42,500

Investment with 10%

Sai Ltd. Value	4, 00,000
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Investment outlay is (4, 00,000 x 10/100) = 40,000

40,000 investment includes 30,000 (borrowed funds full) plus 10,000 own funds

Savings in Investment= Total Funds Available - Investment in Firm Sai Ltd.

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$$= 42,500 - 40,000 = 2,500$$

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Step 3: Investor position in Firm Sai Ltd if total funds available invested (Increase in dividend income calculation)

Investment of total funds = 42,500
50,000

Total Income $\frac{4,00,000}{50,000} \times 42,500 = 5,312.5$

Dividend Income: Total Income - Interest on Personal Borrowings
= 5,312.5 - (30,000 x 10/100) = 2,312.5

Increase in dividend income is 312.5

Investor is better off or benefited by selling shares in Firm Vanket Ltd and buying shares at Sai Ltd by use of personal leverage or homemade leverage.

TRADITIONAL APPROACH

This traditional approach was given by Soloman. In the preceding approaches of capital structure we have discussed that the Net Income (NI) approach and Net Operating Income (NOI) approach represents two extreme views with regard to the relation between leverage (use of debt) and value of the firm (cost of capital). According to the NI approach, use of debt in capital structure affects both cost of capital (K_0) and total value of the firm, the other hand, NOI approach suggests that the use of debt in capital structure is irrelevant to the value of the firm and cost of capital. Another approach given by MM supports the NOI approach, but validity of MM approach is doubtful due to the imperfect assumptions.

Traditional approach is the mid-way between the NI and NOI approaches. It is a compromise between the two approaches. It is also known as "Intermediate Approach". Traditional approach partly takes some features of NI approach and NOI approach.

Traditional approach is similar to NI approach in a way that cost of capital and value of the firm which are dependent of capital structure (that is leverage) affects the cost of capital and value of the firm. But it does not accept that the value of the firm will necessarily increase for all degrees of leverage.

Traditional approach supports the view of NOI approach that beyond a certain degree of leverages the overall cost of capital increases, leading to decrease in the total value of the firm. But it differs from NOI approaches in the sense that the overall cost of capital will not remain stable for all degrees of leverages.

Traditional approach views that judicious use of debt-equity mix helps to increase the firm's total value and reduce the overall cost of capital. The rationale behind this view is that debt is relatively cheaper [due to tax benefit] source of long-term fund when compared to raising funds by issue of equity shares. In other words, the overall cost of capital (K_0) will decrease with the use of debt.

Main propositions

The following three are the main propositions of traditional approach

1. The pre-tax cost of debt (K_i) remains more or less constant upto a certain degree of leverage and/but rises thereafter at an increasing rate,
2. The cost of equity capital (K_e) remains more or less constant rises slightly upto a certain degree of leverage and rises sharper thereafter, due to increased perceived risk,
3. The overall cost of capital (K_0), as a result of the behavior of pre-tax cost of debt (K_i) and cost of equity (K_e) behaves in the following manner: It

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- (a) Decreases up to a certain point level of degree of leverage [stage I increasing firm value];
- (b) Remains more or less unchanged for moderate increase in leverage thereafter (stage II optimum value of firm), and
- (c) Rises sharply beyond certain degree of leverage [stage III decline in firm value].

The above three propositions suggest that the cost of capital (K_0) is dependent on capital structure. It declines with leverage [in stage I] up to a certain point, increases moderately with moderate increase in leverage [stage II] and increases sharply beyond a safe point [stage III]. The relationship between leverage and cost of capital (K_0) is shown in Figure .

The above figure (Traditional Approach) suggests that there is a range of capital structure in which the cost of capital (K) is the minimum and the value of the firm is maximum. There are many variations of the traditional approach, but all the supporters of the traditional approach agree that the cost of capital declines and value of firm increases with use of debt in capital structure.

Illustration 8: Tirumala Steel Company Ltd., is expecting a net operating income (EBIT) of 1,00,000. The equity capitalisation rate is 12.5 per cent. The company has used 8 per cent debt of 33,00,000. You are required to determine the value of the firm (V) and cost of capital (K_0).

Case 1: The company is planning to increase debt (leverage) by 2,00,000, and uses these funds to retire equity capital to that extent. Cost of debt is 10 per cent and cost of equity is 15 percent.

Case 2: The company plans to increase debt by 2,00,000 by issue of debentures of the same amount. The cost of debt is 12 per cent and cost of capital is 17 per cent.

Solution:

Calculation of NI, Firm Value (V) and Cost of Capital(K_0)

Particulars	Case(2) Debt 7,00,000	Debt 3,00,000	Case(1) Debt 5,00,000
Opening Income	1,00,000	1,00,000	1,00,000
Less: Interest an Debt	84,000	24,000	50,000
Net Income	16,000	76,000	50,000

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Value of the Firm:			
• Market value of equity (E) $NI \div Ke$	94,117.65	6,08,000	3,33,333.33
• Market value of debt (D)	7,00,000.00	3,00,000	5,00,000.00
	7,94,117.65	9,08,000	8,33,333.33
Cost of Capital (Ke) EBIT $\div v$	12.59%	11%	12%

From the above it can be observed that value of the firm at 3,00,000 debt, is 9.08.000. The value of the firm has reduced to 8,33,333 when increase in debt is by 2,00,000, and further the firm value came down to 7,94,114.65 when the debt further increased to 7,00,000. The same is the case with cost of capital also, i.e., K_0 increased with increase in use of debt in capital structure due to increase in cost of equity capital.

INDIFFERENCE POINT

The EBIT level at which the EPS is same for two alternative capital structures is known as the indifference point. It may be defined as the level of EBIT beyond which the benefits of financial leverage begin to operate with respect to earnings per share (EPS). In other words, if the expected level of EBIT is less than the indifference point, it is advantageous with the use of equity capital to a maximise EPS.

Indifference point between two capital structures can be obtained by using the following formula.

$$= \frac{(X - I_1)(1 - t) - PD(1 + Dt)}{ES_1} = \frac{(X - I_2)(1 - t) - PD(1 + Dt)}{ES_2}$$

Where X=EBIT

I_1, I_2 = Interest under alternatives 1 and 2

t= Tax rate

PD= Preference dividend

Dt= Preference dividend tax

ES_1, ES_2 = No. of equity share outstanding under alternative 1 and 2

Illustration: WDC Ltd., has a total capitalisation of 10 lakhs consisting entirely of equity capital (Rs. 10 each share). It is planning to raise additional funds of 5 lakhs for implementing capital budgeting project. There are two alternatives available to the company.

(a) Entire equity share capital by issue of shares,

(b) Entire amount by debt at 10 per cent interest.

The company is in the tax bracket of 50 per cent, Calculate indifference point.

Solution:

$$\text{Indifference point formula } \frac{(X - I_1)(1 - 0.5)}{ES_1} = \frac{(X - I_2)(1 - 0.5)}{ES_2}$$

$$= \frac{(X)(1 - 0.5)}{1,00,000 + 50,000} = \frac{(X - 50,000)(1 - 0.5)}{1,00,000}$$

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$$\begin{array}{r} 50,000X = 75,000X - 3,75,00,00,000 \\ 3,75,00,00,000 = 75,000X - 50,000X \end{array} \qquad \begin{array}{r} 1,50,000 = (0.5X)(25,000) \\ \hline 1,00,000 \end{array}$$

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= 25,000X- 3,
75,00,00,000/25,000X=Rs.
1,50,000

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UNIT - V
CAPITAL BUDGETING

Introduction:

Capital Budgeting is the process of making investment decision in capital expenditure. It involves the planning and control of capital expenditure. It is the process of deciding whether or not to commit resources to particular long-term projects whose benefits are to be realized over a period of time.

According To Charles T Horn green: –Capital Budgeting is the long term planning for making and financing proposed capital outlays

According To Lynch: –Capital Budgeting consists in planning development of available capital for the purpose of maximizing the long term profitability of the concern From the above definition, it may be concluded that it is the process by which the companies allocate funds to various investment projects designs to ensure profitability and growth.

Concept of Capital Budgeting:

Capital budgeting is a planning process that is used to determine the worth of long-term investments of an organization. The long- term investments of the organization can be made in purchasing a new machinery, plant, and technology.

In other words, capital budgeting is a method of identifying, evaluating, and selecting long-term investments. The concept of capital budgeting has a great importance in project selection as it helps in planning capital required for completing long-term projects. Selection of a project is a major investment decision for an organization.

Therefore, capital budgeting decisions are included in the selection of a project. In addition, capital budgeting helps in estimating costs and benefits involved in a particular project. A project is not worth investing, if it does not yield adequate return on invested capital.

Some of the management experts have defined capital budgeting in the following ways:

According to Charles T. Holmgren, “Capital Budgeting is long-term planning for making and financing proposed capital outlays.”

As per Richards and Green law, “The capital budgeting generally refers to acquiring inputs and long-run returns.”

In the words of G. C. Philipattos, “Capital budgeting is concerned with the allocation of the firm’s scarce financial resources among the available market opportunities. The consideration of investment opportunities involves the comparison of the expected future streams of earnings from a project; with the immediate and subsequent stream of expenditures for it.”

According to Joel Dean, “Capital Budgeting is a kind of thinking that is necessary to design and carry through the systematic programme for investing stockholders’ money.” From the aforementioned definitions, it can be concluded that capital budgeting is an important process for any organization.

Importance of Capital Budgeting:

Large Investment:

Capital budgeting decision involves large investment of funds. But the funds available with the firm are always limited and the demand for funds far exceeds the resources. Hence it is very important for a firm to plan and control its capital expenditure.

Long Term Commitment of Funds:

Capital expenditures involve not only large amount of funds but also funds for long term or permanent basis. The long term commitments of funds increase, the financial risk involved in the investment decision. Greater the risk involved, greater is the need for careful planning of capital expenditure i.e. Capital Budgeting.

Irreversible Nature:

The Capital expenditure decision is of irreversible nature. Once the decision for acquiring a permanent asset is taken, it becomes very difficult to dispose of these assets without incurring heavy losses.

Long term Effect on profitability:

Capital budgeting decisions have a long term and significant effect on the profitability of a concern. Not only the present earnings of the firm are affected by the investments in capital assets but also the future growth and profitability of the firm depends upon the investment decision taken today. An unwise decision may prove disastrous and fatal to the very existence of the concern.

Difficulties of investment Decisions:

The long term investment decision is difficult to be taken because the decision extends to a series of years beyond the current accounting period, uncertainties of future, higher degree of risk.

National Importance:

Investment decision though taken by individual concern is of national importance because it determines employment, economic activities and growth.

PAYBACK METHOD

The payback period is the time required to earn back the amount invested in an asset from its net cash flows. It is a simple way to evaluate the risk associated with a proposed project. An investment with a shorter payback period is considered to be better, since the investor's initial outlay is at risk for a shorter period of time. The calculation used to derive the payback period is called the payback method. The payback period is expressed in years and fractions of years. For example, if a company invests \$300,000 in a new production line, and the production line then produces positive cash flow of \$100,000 per year, then the payback period is 3.0 years ($\$300,000 \text{ initial investment} \div \$100,000 \text{ annual payback}$).

The formula for the payback method is simplistic: Divide the cash outlay (which is assumed to occur entirely at the beginning of the project) by the amount of net cash inflow generated by the project per year (which is assumed to be the same in every year).

Payback Period Example

Alaskan Lumber is considering the purchase of a band saw that costs \$50,000 and which will generate \$10,000 per year of net cash flow. The payback period for this capital investment is 5.0 years. Alaskan is also considering the purchase of a conveyor system for \$36,000, which will reduce sawmill transport costs by \$12,000 per year. The payback period for this capital investment is 3.0 years. If Alaskan only has sufficient funds to invest in one of these projects, and if it were only using the payback method as the basis for its investment decision, it would buy the conveyor system, since it has a shorter payback period.

Payback Method Advantages and Disadvantages

The payback period is useful from a risk analysis perspective, since it gives a quick picture of the amount of time that the initial investment will be at risk. If you were to analyze a prospective investment using the payback method, you would tend to accept those investments having rapid payback periods and reject those having longer ones. It tends to be more useful in industries where investments become obsolete very quickly, and where a full return of the initial investment is therefore a serious concern. Though the payback method is widely used due to its simplicity, it suffers from the following problems:

1. *Asset life span.* If an asset's useful life expires immediately after it pays back the initial investment, then there is no opportunity to generate additional cash flows. The payback method does not incorporate any assumption regarding asset life span.
2. *Additional cash flows.* The concept does not consider the presence of any additional cash flows that may arise from an investment in the periods after full payback has been achieved.
3. *Cash flow complexity.* The formula is too simplistic to account for the multitude of cash flows that actually arise with a capital investment. For example, cash investments may be required at several stages, such as cash outlays for periodic upgrades. Also, cash outflows may change significantly over time, varying with customer demand and the amount of competition.
4. *Profitability.* The payback method focuses solely upon the time required to pay back the initial investment; it does not track the ultimate profitability of a project at all. Thus, the method may indicate that a project having a short payback but with no overall profitability is a better investment than a project requiring a long-term payback but having substantial long-term profitability.
5. *Time value of money.* The method does not take into account the time value of money, where cash generated in later periods is worth less than cash earned in the current period. A variation on the payback period formula, known as the discounted payback formula, eliminates this concern by incorporating the time value of money into the calculation. Other capital budgeting analysis methods that include the time value of money are the net present value method and the internal rate of return.
6. *Individual asset orientation.* Many fixed asset purchases are designed to improve the efficiency of a single operation, which is completely useless if there is a process bottleneck located downstream from that operation that restricts the ability of the business to generate more output. The payback period formula does not account for the output of the entire system, only a specific operation. Thus, its use is more at the tactical level than at the strategic level.
7. *Incorrect averaging.* The denominator of the calculation is based on the average cash flows from the project over several years - but if the forecasted cash flows are mostly in the part

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of the forecast furthest in the future, the calculation will incorrectly yield a payback period that is too soon. The following example illustrates the problem.

Payback Method Example #2

ABC International has received a proposal from a manager, asking to spend \$1,500,000 on equipment that will result in cash inflows in accordance with the following table:

Year	Cash Flow
1	+\$150,000
2	+150,000
3	+200,000
4	+600,000
5	+900,000

The total cash flows over the five-year period are projected to be \$2,000,000, which is an average of \$400,000 per year. When divided into the \$1,500,000 original investment, this results in a payback period of 3.75 years. However, the briefest perusal of the projected cash flows reveals that the flows are heavily weighted toward the far end of the time period, so the results of this calculation cannot be correct.

Instead, the company's financial analyst runs the calculation year by year, deducting the cash flows in each successive year from the remaining investment. The results of this calculation are:

Year	<u>Cash Flow</u>	<u>Net Invested Cash</u>
0		-\$1,500,000
1	+\$150,000	-1,350,000
2	+150,000	-1,200,000
3	+200,000	-1,000,000
4	+600,000	-400,000
5	+900,000	0

The table indicates that the real payback period is located somewhere between Year 4 and Year 5. There is \$400,000 of investment yet to be paid back at the end of Year 4, and there is \$900,000 of cash flow projected for Year 5. The analyst assumes the same monthly amount of cash flow in Year 5, which means that he can estimate final payback as being just short of 4.5 years.

Discounted Cash Flow (DCF) Techniques
Meaning

Investments are essentially current capital expenditures incurred at present in anticipation of future returns. Hence, the timing of expected future cash flows is important in the investment decision. In any economy, capital or funds invested have value and therefore, time value of money is an important concept.

For example, investors place a higher value on recent returns than on future ones. Hence, the technique that discounts [or reduces] the future values into their present values at a specified time value [discount rate] is called as DCF technique.

It is considered that DCF techniques provide a more objective basis for evaluating and selecting investment projects. Also they enable one to isolate differences in the timing of cash flows for various projects by discounting the cash flows to their present values.

Because these techniques take account of both the magnitude and the timing of expected cash flows in each period of a project's life. Generally, these techniques consider the net cash flows as representing the recovery of original investment plus a return on capital invested.

Discounting

Discounting is reducing the values of future cash flows or returns to make it directly comparable to the values at present. It is the basic operation of any DCF method.

The problem is that a rupee today is worth more than the same rupee in a year's time regardless of inflation, because the rupee one has invested can grow to a larger sum in the future. The rate at which the future cash flows are reduced to their present value is termed as discount rate.

Discount rate, otherwise called as the time value of money, is some interest rate that expresses the time preference for a particular future cash flow. Realistic capital investment appraisal depends on two factors, viz., discounting period and a suitable discount rate.

Normally, the economic life of a project is used as the discounting period. However, the length of discounting period depends on factors such as the life of equipment with the largest life span, technological change, availability of raw materials, market stability, etc.

The market rate of interest is normally considered for discounting. But the cost of capital computed based on the overall capital structure of the company or on the basis of financial pattern would be an appropriate discount rate.

Types of DCF Techniques:

There are mainly two types of DCF techniques viz... Net Present Value [NPV] and Internal Rate of Return [IRR].

(A) Net Present Value Techniques [NPV]:

Net Present Value may be defined as the excess of present value of project cash inflows [stream of benefits] over that of outflows [cash outlays]. The cash flows of a project are discounted at some desired rate of return, which is mostly equivalent to the cost of capital.

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For a conventional investment where all cash outflows take place in the base year, NPV may be represented as follows:

$$NPV = \frac{B_1}{[1+k]^1} + \frac{B_2}{[1+k]^2} + \frac{B_3}{[1+k]^3} + \dots + \frac{B_n}{[1+k]^n} - C_0$$

$$NPV = \sum_{t=1}^n \frac{B_t}{(1+k)^t} - C_0$$

Where $B_t = B_1, B_2, B_3 \dots B_n$ represent s the cash inflows in periods 1, 2, 3,

... n. C_0 represents the cash outlays in time period 0.

K represents the discount rate, which is equal to firm's cost of capital.

For a non-conventional investment where the cash outflows take place over more than one year.

$$NPV = \frac{B_0}{(1+r)^0} + \frac{B_1}{(1+r)^1} + \frac{B_2}{(1+r)^2} + \dots + \frac{B_n}{(1+r)^n} - C_0 +$$

$$\frac{C_1}{(1+r)^1} + \frac{C_2}{(1+r)^2} + \dots + \frac{C_n}{(1+r)^n}$$

$$NPV = \sum_{t=0}^n \frac{B_t}{(1+r)^t} - \sum_{t=0}^n \frac{C_t}{(1+r)^t}$$

Where ' B_t ' represents the cash inflows in periods, 0, 1, 2, n.

' C_t ', represents the cash outlays in periods 0, 1, 2, 3 ...n; ' r ' represents the desired discount rate:

Where ' r ' is equal to firm's cost of capital, it may be replaced by ' K '.

Selection Criteria:

In the case of mutually exclusive projects or alternative projects [where only one project is to be selected] accept a project that has the highest NPV. In the case of independent investment projects, accept a project if its NPV is greater than or equal to zero; reject if its NPV is negative.

In the case budget constraints or capital rationing, project selection could be done by ranking projects having positive NPV in the descending order of their NPVs and then choosing the first 'x' number of projects that the budget provision permits.

Example [Independent Investment]:

The Bata Co. Ltd., is considering the purchase of a new machine costing Rs. 80,000. Earnings after taxation are expected to be as follows:

Years	Cash flows*
-------	-------------

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1	8,000
2	24,000
3	32,000
4	48,000
5	32,000

The company has a target of return on capital of 10 per cent. On this basis, find the profitability of the machine and state if it is financially preferable.

Solution:

Profitability Statement
(at 10 percent discount factors)

Year	PV of Re. 1 at 10%	Cash Flows	PV of cash flows
		Rs.	Rs.
1	0.909	8,000	7,272
2	0.826	24,000	19,824
3	0.751	32,000	24,032
4	0.683	48,000	32,784
5	0.621	32,000	19,872
	Total:	1,44,000	1,03,784
	Cost:	80,000	80,000
	NPV:		23,784

From the above statement it is evident that the new machine would be profitable since the PV of cash inflows is greater than the PV of cash outflows.

Example [Mutually exclusive or alternative investments]:

Vignesh Ltd is considering the purchase of a new machine. Two alternative machines (A and B) have been suggested, each having an initial cost of Rs. 4,00,000 and requiring Rs. 20,000 as additional working capital at the end of 1st year.

Earnings after taxation are expected to be as follows:

Year	Cash Inflows	
	Machine A	Machine B
1	40,000	1,20,000
2	1,20,000	1,60,000
3	1,60,000	2,00,000
4	2,40,000	1,20,000
5	1,60,000	80,000

The company has a target of return on capital of 10% and on this basis you are required to compare the profitability of the machines and state which alternative you consider financially preferable.

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Note:

The following table gives the present value of Re. 1 due in 'n' number of years:

Year	Present Value at 10%
1	0.91
2	0.83
3	0.75
4	0.68
5	0.62

Solution:

Statement showing the profitability of the two machines

Year	Discount Factor	Machine A		Machine B	
		Cash inflow	Present Value	Cash inflow	Present Value
1	0.91	40,000	36,400	1,20,000	1,09,200
2	0.83	1,20,000	99,600	1,60,000	1,32,800
3	0.75	1,60,000	1,20,000	2,00,000	1,50,000
4	0.68	2,40,000	1,63,200	1,20,000	81,600
5	0.62	1,60,000	99,200	80,000	49,600
		7,20,000		6,80,000	
		Total present value of cash inflows	5,18,400		5,23,200
		Total present value of cash outflows	4,18,200		4,18,200
		Rs. 400000 + 20000 × 0.91			
		Net present value	1,00,200		1,05,000

Recommendations:

Machine B is preferable to machine A. Though total cash inflow of machine A is more than that of machine B by Rs. 40,000, the net present value of the cash inflows of machine B is more than that of Machine A.

Moreover, in case of Machine B cash inflow in the earlier years is comparatively higher than that in case of Machine A.

Merits and Demerits of NPV Method:

Merits:

1. The salient feature of NPV technique is that it indicates the value added to the total assets of the firm by taking up the proposed investment at a particular rate of discount.
2. The NPV criterion automatically allows for the recovery of the initial investment and the cost of funds invested in such investments. For example, if the gross PV of a project costing Rs.50000 is Rs.58645 at 10% discount rate, it means that the value added to the total assets in present value terms is Rs.8645 [i.e., NPV = Rs.58645 – 50000], This is after providing for the initial investment of Rs.50000 and for interest cost at 10% p.a.
3. the most significant advantage of NPV method is that it recognizes the time value of money and considers all cash flows over the entire economic life of the project.
4. It is in consistent with the objective of maximizing the welfare of the owners of the firm.

Demerits:

1. It is difficult to understand and use. Since it requires accurate cash flows, accurate life of the project and discount rate.
2. It may not give satisfactory answer when the projects being compared involve different amounts of investments. For example, a project with high NPV may not be desirable if it also requires a large investment.
3. Selection of an appropriate discount rate is very difficult.
4. This technique is based on compound interest principle. Under this method, it is assumed that the cash flows could be reinvested at the same rate of interest [discount rate], which is not practically feasible.
5. Under the NPV criterion, profitability is not related to the capital outlay required for it. A project may have a high NPV but it can still be unattractive, for it requires a very high capital outlay. For example, two projects X and Y costing Rs.50000 and Rs.80000 respectively generate NPVs of Rs.11500 and Rs.12500. Of these two, Project Y would be recommended by NPV criterion since its NPV is higher by Rs.1000.

However, the profitability is not attractive compared to the additional investment required for Project Y.

(B) Internal Rate of Return [IRR]:

The Internal Rate of Return may be defined as that rate of interest when used to discount the cash flows of an investment, reduce its NPV to zero. Or it is the rate of discount, which equates the aggregate discounted benefits with aggregate discounted costs.

IRR is also called as 'Discounted Cash Flow Method' or 'Yield Method' or 'Time Adjusted Rate of Return Method'. This method is used when the cost of investment and the annual cash inflows are known but the discount rate [rate of return] is not known and is to be calculated.

Symbolically, the IRR may be expressed as follows:

For a conventional investment, n

$$[\text{Aggregate discounted cash inflows}] = [\text{Aggregate initial investment}]$$

Where the discount rate 'r' is the IRR. B_t represents cash inflows during the time period 1, 2, 3, n, and C_0 is the initial cash outflows.

IRR indicates the maximum rate of return that a project can contribute and is mainly based on the internal cash inflows generated by it. In other words it is the 'break-even interest showing the highest interest rate consistent with the project not making any loss.

However, in order to judge the profitability of the project, IRR should be compared with a cut off rate of return, which might be the company's cost of capital.

Decision Criteria:

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In the case of an independent project, accept the project if its IRR is greater than the cut off rate; if lower, reject it. In the case of mutually exclusive projects, accept the project with the largest IRR, provided it is greater than the cut off rate; reject others.

In case there are budget constraints, rank the projects in the descending order of their IRRs and choose the first 'x' number of projects, which the budget provision permits.

Method of Calculating IRR:

Trial and Error Yield Method: As the name suggests, the object is to find the expected yield from the investment. The procedure involved may be summarized as follows:

- (a) List the annual sales and cost other than depreciation and reducing the latter from the former obtain the net cash flow.
- (b) Obtain the capital investment cost. Often this will be at present value because the amount spent is invested in the base year.
- (c) Calculate the present value of the net cash inflows by using an appropriate discount rate. This rate is found by trial and error method from the present value tables. The object is to make the present value of cash inflows equal to the capital investment cost.
- (d) Carry out this procedure for each project being considered and then rank them in the order of preference.

Merits of IRR Method:

1. Like NPV method, IRR method also recognizes the time value of money and considers cashflows over the entire life of the project.
2. It has a psychological appeal to the user as it is expressed in percentage figure.
3. Unlike NPV method, it does not require any discount rate. IRR is itself a break-even rate [discount rate], which makes the present values of all cash inflows equal to those of cash outflows.
4. It is also in consistent with the firm's objective of maximizing owners' welfare.

Limitations of IRR Method:

5. It is very difficult to use in practice as it involves complicated computational problems.
6. It assumes that the reinvestment rate of cash flows is at IRR, but it may be different for different projects considered by a firm. Under NPV method, the reinvestment rate [discount rate] is assumed to be the same for all projects, which seems a more appropriate assumption.
7. The IRR method may yield multiple rates for a project when cash flows take place at different time periods. This will make the decision-making more complicated.
8. It may give inconsistent results with NPV if the projects differ in their expected lives, or cash flows, or timing of cash flows.

Example 4:

Govindan Ltd., is planning to increase its present capacity, and is considering purchase of a new machine. Machine X is available at a price of Rs. 40,000.

Earnings before tax have been estimated as follows:

Year	Cash flows
1	11,000
2	15,000

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3	20,000
4	16,000
5	8,000
	70,000

Compute the IRR and ascertain the profitability of the project.

Solution:

Trial and Error Method:

Profitability statement for Machine X

Year	Cash flows Rs.	Trial Discount factor (20 %)	No.1 PV of cash flows Rs.	Trial Discount factor (24 %)	No.2 PV of cash flows Rs.	Trial Discount factor (22 %)	No.3 PV of cash flows Rs.
0	(40000)	1.000	(40000)	1.000	(40000)	1.000	(40000)
1	11000	.833	9163	.806	8866	.820	9020
2	15000	.694	10410	.650	9750	.672	10080
3	20000	.579	11580	.524	10840	.551	11020
4	16000	.482	7712	.423	6768	.451	7216
5	8000	.402	3216	.341	2728	.370	2960
NPV	30000		2081		(1048)		296

From the above statement it is ascertained that in the first trial at 20% the present value of cash inflows exceeds the present value of cash outflows by Rs. 2,081. On the second trial at 24% the present value of cash inflows is less than the cash outflows.

On the third trial at 22%, cash inflows are marginally greater than cash outflows. Thus, approximately 22% is the rate of return which equates the present value of inflows withoutflows.

If greater accuracy is required interpolation may be used to find the required discount rate, rather than making calculation of unlimited trials. To apply interpolation techniques, a simple method is given here based on the above example.

$$\text{IRR} = 22\% + (296/1704) \times 2\% = 22.34\%$$

The profitability statement shows that by using the IRR method, Machine X yields a rate of return of 22.34%.

Formula for Interpolation:

$$\text{IRR} = A + (C/[C - D] \times (B - A))$$

Where A = Discount factor of the low trial
 B = Discount factor of the high trial
 C = NPV of cash inflows of the low trial
 D = NPV of cash inflows of the high trial

Establishing the Trial Rates:

In the Trial and Error method, difficulty is often experienced in the selection of the first trial rate. Once the first rate is established, the second trial rate is determined by considering the value of NPV.

If the NPV is negative, the second trial rate will be higher than the first rate. If the NPV is positive, the second rate should be lower than the first rate. However, the problem is to select the first trial rate.

As an aid to this selection, a rough guide is as follows:

Accounting rate of return

Accounting rate of return (also known as simple rate of return) is the ratio of estimated accounting profit of a project to the average investment made in the project. ARR is used in investment appraisal.

Formula

Accounting Rate of Return is calculated using the following formula:

$$\text{ARR} = \frac{\text{Average Accounting Profit}}{\text{Average Investment}}$$

Average accounting profit is the arithmetic mean of accounting income expected to be earned during each year of the project's life time. Average investment may be calculated as the sum of the beginning and ending book value of the project divided by 2. Another variation of ARR formula uses initial investment instead of average investment.

Decision Rule

Accept the project only if its ARR is equal to or greater than the required accounting rate of return. In case of mutually exclusive projects, accept the one with highest ARR.

Examples

Example: An initial investment of \$130,000 is expected to generate annual cash inflow of \$32,000 for 6 years. Depreciation is allowed on the straight line basis. It is estimated that the project will generate scrap value of \$10,500 at end of the 6th year. Calculate its accounting rate of return assuming that there are no other expenses on the project.

Solution

$$\begin{aligned} \text{Annual Depreciation} &= (\text{Initial Investment} - \text{Scrap Value}) \div \text{Useful Life in Years} \\ \text{Annual Depreciation} &= (\$130,000 - \$10,500) \div 6 \approx \$19,917 \\ \text{Average Accounting Income} &= \$32,000 - \$19,917 = \$12,083 \\ \text{Accounting Rate of Return} &= \$12,083 \div \$130,000 \approx 9.3\% \end{aligned}$$

Example 2: Compare the following two mutually exclusive projects on the basis of ARR. Cash flows and salvage values are in thousands of dollars. Use the straight line depreciation method.

Project A:

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Year	0	1	2	3
Cash Outflow		-220		
Cash Inflow		91	130	105
Salvage Value				10

Project B:

Year	0	1	2	3
Cash Outflow		-198		
Cash Inflow		87	110	84
Salvage Value				18

Solution

Project

A:

Step 1: Annual Depreciation = $(220 - 10) / 3 = 70$

Step 2: Year	1	2	3
Cash Inflow	91	130	105
Salvage Value			10
Depreciation*	-70	-70	-70
Accounting Income	21	60	45

Step 3: Average Accounting Income = $(21 + 60 + 45) / 3 = 42$

Step 4: Accounting Rate of Return = $42 / 220 = 19.1\%$

Project B:

Step 1: Annual Depreciation = $(198 - 18) / 3 = 60$

Step 2: Year	1	2	3
Cash Inflow	87	110	84
Salvage Value			18
Depreciation*	-60	-60	-60
Accounting Income	27	50	42

Step 3: Average Accounting Income = $(27 + 50 + 42) / 3 = 39.666$

Step 4: Accounting Rate of Return = $39.666 / 198 \approx 20.0\%$

Since the ARR of the project B is higher, it is more favorable than the project A.

Advantages and

Disadvantages

1. Like payback period, this method of investment appraisal is easy to calculate.
2. It recognizes the profitability factor of investment.

Disadvantages

1. It ignores time value of money. Suppose, if we use ARR to compare two projects having equal initial investments. The project which has higher annual income in the latter years of its useful life may rank higher than the one having higher annual income in the beginning years, even if the present value of the income generated by the latter project is higher.

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2. It can be calculated in different ways. Thus there is problem of consistency.

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3. It uses accounting income rather than cash flow information. Thus it is not suitable for projects which having high maintenance costs because their viability also depends upon timely cash inflows.

ROI (Return on Investment)

ROI (Return on Investment) measures the gain or loss generated on an investment relative to the amount of money invested. ROI is usually expressed as a percentage and is typically used for personal financial decisions, to compare a company's profitability or to compare the efficiency of different investments.

ROI Calculation and Formula

Want to know how to calculate ROI? The return on investment formula is:

ROI = (Net Profit / Cost of Investment) X 100

The ROI calculation is flexible and can be manipulated for different uses. A company may use the calculation to compare the ROI on different potential investments, while an investor could use it to calculate a return on a stock.

For example, an investor buys \$1,000 worth of stocks and sells the shares two years later for \$1,200. The net profit from the investment would be \$200 and the ROI would be calculated as follows:

$$\text{ROI} = (200 / 1,000) \times 100 = 20\%$$

The ROI in the example above would be 20%. The calculation can be altered by deducting taxes and fees to get a more accurate picture of the total ROI.
[Easily calculate your return on investment with the CAGR Calculator]

The same calculation can be used to calculate an investment made by a company. However, the calculation is more complex because there are more inputs. For example, to figure out the net profit of an investment, a company might need to track exactly how much cash went into the project and the time spent by employees working on it.

How to Calculate ROI (More Examples)

Because ROI can be made as complex or as simple as the measurer wants it to be, it can be used by a variety of different professionals or companies.

A marketing professional could calculate the ROI of a marketing campaign by dividing the campaign's revenue by the marketing expenses directly involved in that campaign.

So if the marketing department spent a total of \$1,000 on material costs and labor hours on the campaign, and it generated \$5,000 in revenue for the year, then the campaign had an ROI of 500% -- or $(\$5,000 \text{ in revenue} / \$1,000 \text{ in cost}) \times 100 = 500\% \text{ ROI}$.

A homeowner could calculate the ROI of a given home renovation, too. Let's say the homeowner spent \$30,000 to update their kitchen. If the homeowner had the home appraised just before and after the renovation, and found the house gained \$45,000 in value, that would mean the renovation yielded a 50% ROI -- or $(\$15,000 \text{ in profit} / \$30,000 \text{ in cost}) \times 100 = 50\% \text{ ROI}$. [Want maximum ROI on home renovations?]

What is a Good ROI?

ROI is one of the most used profitability ratios because of its flexibility. That being said, one of the downsides of the ROI calculation is that it can be manipulated, so results may vary between users. When using ROI to compare investments, it's important to use the same inputs to get an accurate comparison.

Also, it's important to note that the basic ROI calculation does not take time into consideration. Obviously, it's more desirable to get a +15% return over one year than it is over two years.

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