

RECEIVABLE MANAGEMENT

We have a credit policy – WHICH COMPRISES OF

Number of days credit is allowed to customers, discount offered Bad debts incurred
and Sales achieved with each policy Investment in debtors

After considering all these factors we have to decide which credit policy gives highest profits.

If variable costs and fixed costs are given ---then value debtors at total cost

If variable cost is given but fixed cost is not given –value debtors at variable cost

If variable costs and fixed costs both are not give then value debtors at selling price

CREDIT POLICIES

Question 1

RST Limited is considering relaxing its present credit policy and is in the process of evaluating two proposed policies. Currently, the firm has annual credit sales of Rs. 225 lakhs and accounts receivable turnover ratio of 5 times a year. The current level of loss due to bad debts is Rs. 7,50,000. The firm is required to give a return of 20% on the investment in new accounts receivables. The company's variable costs are 60% of the selling price. Given the following information, which is a better option?

	Present Policy	Policy Option I	Policy Option II
Annual credit sales(Rs.)	225	275	350
Accounts receivable turnover ratio	5	4	3
Bad debt losses (Rs.)	7.5	22.5	47.5

(8 Marks, November, 2010)

Statement evaluating different credit policies (Rs in lakhs)

	Present	Policy option 1	Policy option II
Sales	225	275	350
Less variable cost 60%	135	165	210
Contribution 40%	90	110	140
Debtors turnover	5 times	4	3 times
Average collection period in months 12/DTR	2.4 months	3 months	4 months
Investment in debtors at VC $VC \times 2.5/12$	27	41.25	70
Loss due to bad debts	7.5	22.5	47.5
Net profit (cont – bad debts)	82.5	87.5	92.5
Interest on inv in debtors @ 20%	5.4	8.25	14.00
Net profit	77.10	79.25	78.5

It can be seen from the above table that policy I gives highest profit. We recommend policy 1

Total variable cost	12 months ===== 135lakhs
	2.4 months----- 135x 2.4/12 = 27 lakhs
Debtors at selling price	225 /5 or 225x 2.4/12 45 lakhs
Variable cost	45 lakhs x 60% Rs 27 lakhs

Question 2

The Marketing Manager of XY Ltd. is giving a proposal to the Board of Directors of the company that an increase in credit period allowed to customers from the present one month to two months will bring a 25% increase in sales volume in the next year.

The following operational data of the company for the current year are taken from the records of the company:

	Rs.
Selling price	21 p.u.
Variable cost	14 p.u.
Total cost	18 p.u.
Sales value	18,90,000

The Board, by forwarding the above proposal and data requests you to give your expert opinion on the adoption of the new credit policy in next year subject to a condition that the company's required rate of return on investments is 40%. **(8 Marks, May, 2011)**

	Present policy	New policy 2 months	Incremental
Sales quantity 1890000/21	90000 units	112500	22500
Sales Rs	18,90,000	23,62,500	
Variable cost @ Rs 14 per unit	12,60,000	15,75,000	
Fixed costs @ Rs 4 per unit	3,60,000	3,60,000	
Total cost 90000 x 18	16,20,000	19,35,000	
Profit	2,70,000	4,27,500	157500
Credit period	1 month	2 months	
INVESTMENT in debtors at cost	1,35,000	3,22,500	1,87,500
Interest on investment in debtors at cost @ 40%	54000	1,29,000	75000
Net profit	216000	2,98,500	82500

Increase in profit is Rs 82,500

If we consider rate of return on additional investment in debtors

Additional investment in debtors

Rs 1,87,500

Additional income

Rs 1,57,500

Return on investment

157500/187500 x100 =84%

LEVERAGE

Leverage means disproportionate change. When there are two variables such that change in one variable affects change in other variable but the change is not in the same proportion, leverage is experienced. Leverage arises due to a fixed factor. In a business, two types of leverages are experience:-

Operating Leverage & Finance Leverage.

Operating Leverage:

Operating leverage measures operating risk of the business. It refers to risk involved in day-to-day business operations of producing & selling goods. Operating leverage arises due to the fixed cost portion in the total cost of the product. It shows relation between sales & EBIT (Earning before Interest & Tax) It Shows the percentage change in EBIT due to change in sales.

$$\text{Operating leverage} = \frac{\% \text{ Change in EBIT}}{\% \text{ Change in Sales}}$$

Change in EBIT / original EBIT X 100

Change in Sales/ original sales X 100

Eg.: A company sells its products at 15 Rs. p.u. and its variable cost is Rs.9 p.u. The fixed cost is Rs.10,000 p.a. currently company sells 12,000 units.

Calculate operating leverage.

Sol.:

If sales increases by 25% from the present level.

Particulars	12,000 units	15,000 units
Sales @ 15 p.u.	1,80,000	2,25,000
(-) Variable cost @ 9 p.u.	(1,08,000)	(1,35,000)
Contribution	72,000	90,000
(-) Fixed cost	(10,000)	(10,000)
EBIT	62,000	80,000

$$\begin{aligned} \text{Operating Leverage} &= \frac{\text{Change in EBIT}}{\text{Original EBIT}} \times \frac{\text{Change in Sales}}{\text{Original Sales}} \\ &= \frac{18,000}{62,000} \times \frac{45,000}{1,80,000} \\ &= \frac{0.2903}{0.25} \\ &= 1.16 \text{ times.} \end{aligned}$$

Operating Leverage of 1.16 means that from the current level if the sales change by 1% EBIT will change by 1.16%. It should be noted that operating risk of 1.16% is at level of operations of 12,000 units. At other levels operating leverage will change.

Operating leverage can be calculated as follows:

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

Thus at 12,000 units level, operating leverage.

$$= \frac{72,000}{62,000} = 1.16$$

At 15,000 units level, operating leverage = $\frac{90,000}{80,000} = 1.125$

80,000

Finance Leverage:

This leverage shows the financial risk of the business. It arises due to capital structure of the business. Some of the funds employed in the business have fixed commitments in the form of interest preference dividend. It is due to this fixed commitment that the company experiences financial leverage. Financial leverage shows the effect of change in EBIT on EPS. Finance leverage Share the % change in EPS for every 1% Change in EBIT.

$$\begin{aligned} \text{Financial Leverage} &= \frac{\% \text{ change in EPS}}{\% \text{ Change in EBIT}} \\ &= \frac{\text{Change in EPS} / \text{Original EPS} \times 100}{\text{Change in EBIT} / \text{Original EBIT} \times 100} \end{aligned}$$

Continuing with the above example, if the company has Rs.2,00,000 @ 13% Debentures and 15,000 equity shares of Rs.10 each. Find finance leverage if tax rate is 40%.

Particulars	12,000 units	15,000 units
EBIT	62,000	80,000
(-) Int. on Debentures	(26,000)	(26,000)
EBT	36,000	54,000
(-) Tax @ 40%	(14,900)	(21,600)
Profits for Shares holders	21,600	32,400
(-) Pref Dividend	-	-
Profit Eq Share holders	21,600	32,400
No. of Equity shares	15,000	15,000
Earning per share	1.44	2.16

$$\begin{aligned} \text{Finance Leverage} &= \frac{\text{Change in EPS} \times 100}{\text{Original EPS}} = \frac{0.72}{1.44} \\ &= \frac{\text{Change in EBIT} \times 100}{\text{Original EBIT}} = \frac{18,000}{62,000} \\ &= \frac{0.5}{1.72} \\ &= 0.29 \end{aligned}$$

In case of absence of pref divided finance leverage can also be calculated as:

$$\text{Finance leverage} = \frac{\text{EBIT}}{\text{EBT}}$$

At 12,000 units level

$$\text{Finance leverage} = \frac{62,000}{36,000} = 1.72$$

Finance leverage changes with the change in operating levels. Hence at 15,000 units level

$$\text{Finance leverage} = \frac{80,000}{54,000} = 1.48$$

Combined leverage: It measures the overall risk of the business.

Combined leverage: operating Leverage X Financial Leverage
 In absence of pref. dividend,

$$\text{Combined Leverage} = \frac{\text{EBIT}}{\text{EBIT}} \times \frac{\text{contribution}}{\text{EBT}} \times \frac{\text{Contribution}}{\text{EBT}}$$

Sr. No.	Leverage operating	Leverage finance	Conclusion
1.	Low	Low	Management conservative, very Low Risk, Growth of earnings Slow.
2.	High	Low	High risk in day-to-day business operations, low gearing benefit. Not advisable to invest situation.
3.	Low	High	Low day to day operational risk, high gearing advantage, Ideal situation.
4.	High	High	High operational & financial risk, management optimistic. Business Risky not advisable.

Question 1

Calculate the degree of operating leverage, degree of financial leverage and the degree of combined leverage for the following firms and interpret the results:

	P	Q	R
Output (units)	2,50,000	1,25,000	7,50,000
Fixed Cost (Rs.)	5,00,000	2,50,000	10,00,000
Unit Variable Cost (Rs.)	5	2	7.50
Unit Selling Price (Rs.)	7.50	7	10.0
Interest Expense (Rs.)	75,000	25,000	-

(4 Marks, November, 2010)

	P -250000 units	Q-125000 units	R- 750000 units
Selling price per unit	7.5	7	10
Sales	18,75,000	8,75,000	75,00,000
Variable cost @ Rs 5, Rs 2 and Rs 7.5 per unit	12,50,000	2,50,000	56,25,000
Contribution Sales –var cost	6,25,000	6,25,000	18,75,000
Less fixed costs	5,00,000	2,50,000	10,00,000

EBIT	1,25,000	3,75,000	8,75,000
Less interest exp	75,000	25,000	Nil
EBT	50,000	3,50,000	8,75,000
Leverages			
Financial leverage Cont/ EBIT	6,25,000/1,25,000 =5 times	6,25,000/3,75,000 =1.67	18,75,000/8,75,000 2.14
Financial leverage EBIT/EBI	1,25,000/50,000 =2.5	3,75,000/3,50,000 =1.07	8,75,000/8,75,000 = 1
Combined leverage OL x FL	5x2.5 = 12.5	1.67x 1.07 = 1.79	2.14 x 1 2.14

CAPITAL STRUCTURE

Meaning of capital structure

Capital structure represents a combination or mix of different sources of Long term funds in the total capital employed by the company. It refers contribution of various sources of long term finance in the total long term capital employed by the company.

For example if long term capital employed by the company is Rs 50,00,000 the various combinations which may be employed by the company are given below

	I	II	III	IV
Equity capital	20,00,000	30,00,000	10,00,000	40,00,000
Preference capital	10,00,000	5,00,000	15,00,000	5,00,000
Retained earnings	15,00,000	7,00,000	7,00,000	2,00,000
Debentures and Loans	5,00,000	8,00,000	18,00,000	3,00,000

Each of the above mix is a pattern of capital structure.

A capital structure involves mix of equity, Preference and Borrowings.

Difference between capital structure and Financial Structure

Financial structure refers to how the assets of the firms are financed. It covers short term as well as long terms sources of finance where as capital structure considers only long term sources of finance.

Principles to be kept in mind while framing a capital structure.

While choosing a capital structure, certain fundamental principles should be kept in mind, which are discussed below.

1. Cost principles.

A pattern of Capital structure consists of finance from different sources such as equity, preference and long term borrowings. Each of the above sources involves cost to the company. While selecting a capital structure, the company should consider the cost of financing. For example debt finance may be cheaper than preference capital finance as interest paid for debt is deductible from taxable profits.

2. Risk Principles.

Designing of capital structure should take into account, the risk associated with the structure. For example a high content of debt in overall capital may reduce the cost of capital but leads to higher risk from the point of view of shareholders. Capital structure should be such as to ensure solvency of the firm

3. Control principles.

While designing a capital structure, the finance manager cannot ignore the extent of control lost by the management. Issue of more and more equity shares to public will dilute the existing control pattern. Similarly issue of convertible debentures is likely to disturb or change the control pattern in future.

4. Flexible principle.

Capital structure selected or opted for should be such that it allows the finance manager to change or modify the structure according to the needs of the situation. A capital structure may be good in a particular situation, but may require a change due to changes in the situations

has earned 11%, which is 1% higher than the return payable to preference shareholders and debenture holders.

Due to this the equity shareholders will get a return of 11% plus 3 times of excess earnings i.e., $11\% - 3\% = 14\%$. This is indicated by capital gearing ratio of 3.

Conversely if the company earns 9% return on the entire capital the equity shareholders will get $9\% - 1\% \times 3 = 6\%$ return on their capital. This is shown below.

Profits before pref. dividend and Interest on debentures	72,000
Less preference dividend and debenture interest	60,000
Profit available for Equity shareholders	12,000

On Equity Shareholder's fund of Rs 2,00,000.

Rate of return on equity shareholders fund is 6%.

So the company is highly geared there will high fluctuations in the rate of return available to equity shareholder's.

The above concept is also called as financial leverage or gearing. Due to trading on equity or higher financial leverage or gearing the slight increase in return on capital employed may lead to disproportionate increase in rate of return to equity shareholders.

However, excessive gearing or trading on equity is more risky.

Trading on equity is a double edged weapon.

Q1. The management of RT Ltd. wants to raise its funds from market to meet out the financial demands of its long-term projects. The company has various combinations of proposals to raise its funds. You are given the following proposals of the company:

Proposal	Equity shares (%)	Debts (%)	Preference shares (%)
P	100	-	-
Q	50	50	-
R	50	-	50

- (i) Cost of debt and preference shares is 12% each.
- (ii) Tax rate –40%
- (iii) Equity shares of the face value of Rs. 10 each will be issued at a premium of Rs. 10 per share.
- (iv) Total investment to be raised Rs. 8,00,00,000.
- (v) Expected earnings before interest and tax Rs. 3,60,00,000.

From the above proposals the management wants to take advice from you for appropriate plan after computing the following:

- Earnings per share
- Financial break-even-point

COMPUTE the EBIT range among the plans for indifference. (RTP NOV 19)

1. (i) **Computation of Earnings per Share (EPS)**

Plans	P (°)	Q (°)	R (°)
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Earnings before interest & tax (EBIT)	3,60,00,000	3,60,00,000	3,60,00,000
Less: Interest charges	--	(48,00,000)	--
Earnings before tax (EBT)	3,60,00,000	3,12,00,000	3,60,00,000
Less : Tax @ 40%	(1,44,00,000)	(1,24,80,000)	(1,44,00,000)
Earnings after tax (EAT)	2,16,00,000	1,87,20,000	2,16,00,000
Less : Preference share dividend	--	--	(48,00,000)
Earnings available for equity shareholders	2,16,00,000	1,87,20,000	1,68,00,000
No. of equity shares	40,00,000	20,00,000	20,00,000
E.P.S	5.40	9.36	8.40

(ii) Computation of Financial Break-even Points

Proposal 'P' = 0

Proposal 'Q' = ₹ 48,00,000 (Interest charges)

Proposal 'R' = Earnings required for payment of preference share dividend

i.e. ₹ 48,00,000 ÷ 0.6 = ₹ 80,00,000

(iii) Computation of Indifference Point between the Proposals

Combination of Proposals

(a) Indifference point where EBIT of proposal "P" and proposal 'Q' is equal

$$\frac{\text{EBIT}(1-0.4)}{40,00,000 \text{ shares}} = \frac{(\text{EBIT} - ₹ 48,00,000)(1-0.4)}{20,00,000 \text{ shares}}$$

$$0.6 \text{ EBIT} = 1.2 \text{ EBIT} - ₹ 57,60,000$$

$$\text{EBIT} = ₹ 96,00,000$$

(b) Indifference point where EBIT of proposal 'P' and proposal 'R' is equal:

$$\frac{\text{EBIT}(1-0.40)}{40,00,000 \text{ shares}} = \frac{\text{EBIT}(1-0.40) - ₹ 48,00,000}{20,00,000 \text{ shares}}$$

$$\frac{0.6 \text{ EBIT}}{40,00,000 \text{ shares}} = \frac{0.6 \text{ EBIT} - ₹ 48,00,000}{20,00,000 \text{ shares}}$$

$$0.30 \text{ EBIT} = 0.6 \text{ EBIT} -$$

48,00,000

$$\text{EBIT} = \frac{48,00,000}{0.30} = 1,60,00,000$$

(c) Indifference point where EBIT of proposal 'Q' and proposal 'R' are equal

$$\frac{(\text{EBIT} - 48,00,000)(1-0.4)}{20,00,000 \text{ shares}}$$

=

48,00,000

$$\text{EBIT}(1-0.4) -$$

20,00,000 shares

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There is no indifference point between proposal 'Q' and proposal 'R'

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UNIT – I : COST OF CAPITAL

Capital in this chapter means long term funds. The various sources of long term funds are disclosed below:

- (a) Borrowing (Redeemable or perpetual)
- (b) Preference Capital.
- (c) Equity Capital.
- (d) Retained Earnings.

Each source of finance has its own cost.

1. Cost Of Debt (Kd) I = Irredeemable Debt

$$Kd = \frac{I(1 - T)}{Npd} \times 100$$

Where : Kd = Cost of Debt.

I = Interest.

T = Tax Rate.

Npd = Net Proceeds of Debt.

Eg: A company issue 12% irredeemable debenture of Rs. 10,00,000. Cost of issue was Rs. 50,000. Tax rate is 40%.

Case 2 : Redeemable Debt :

$$Kd = \frac{I(1 - T) + \left(\frac{Rd - Npd}{N} \right)}{\left(\frac{Rd + Npd}{2} \right)} \times 100.$$

Where, Kd = Cost of Debt.

I = Interest.

T = Tax rate.

Rd = Redeemable Value of Debt.

Npd = Net Proceeds of Debt Issue.

N = No. of years after which debt is to be redeemed.

Eg: 12% Debentures worth Rs. 10,00,000 are issued at a discount of 5%. The debentures are redeemable at a premium of 10% after 8 years. Tax rate is 40%. Find cost of debt.

$$\begin{aligned} &= \frac{1,20,000(1 - 0.4) + \frac{(11,00,000 - 9,50,000)}{8}}{\frac{9,50,000 + 11,00,000}{2}} \times 100 \\ &= \frac{72,000 + 18,750}{10,25,000} \times 100 = 8.85\% \end{aligned}$$

Loss on redemption is Rs. 1,50,000 which is amortised over a period of 8 years. In the denominator 10,25,000 represents average amount of funds utilized over a period of 8 years.

In the above formula, we have assumed that tax benefit is not available in case of loss on redemption. If tax benefit is available on loss on redemption, then cost of debt

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$$= \frac{\left(1,20,000 + \frac{1,50,000}{8}\right)^{(1-0.4)}}{10,25,000} \times 100$$

$$= 8.12 \%$$

Cost of preference share as a source of finance.

Cost of Preference Capital (Kp) : Cost of Preference capital is calculated in the same manner as in case of debentures. The points of differences are :

- (a) Preference Capital holders are entitled to dividend, and
 - (b) Preference Dividend is paid from post tax profits.
- So, there is no tax shield on preference dividend.

Case 1: Perpetual Preference Shares:

$$K_p = \frac{\text{Dividend}}{\text{Npd}} \times 100$$

Where : Kp = Cost of Preference Capital.

Npd = Net Proceeds of Preference Issue.

Case 2 : Redeemable Preference Shares :

$$K_p = \frac{\text{Dividend} + \left(\frac{Rv - Npd}{N}\right)}{\left(\frac{Rv + Npd}{2}\right)} \times 100$$

Where : Rv = Redeemable Value of Preference Issue.

Cost of equity shares

Approaches for computing cost of equity

- 1) Dividend price approach (stable Dividend or with growth)
- 2) Earning price approach
 - a. Realised approach.
- 3) CAPM model

Divident price approach

Case 1: Dividend Approach:

$$= \frac{\text{Dividend per share}}{\text{Ex-Dividend market price of share}} \times 100.$$

Eg : A company has being paying a dividend of Rs. 3 per share for last many years. The market price of shares has been stable at Rs. 21.

$$\text{Cost Of Equity Capital} = \frac{3}{21} \times 100$$

$$= 14.29\%$$

Case 2: Dividend plus growth model :

$$= \frac{\text{Dividend per share}}{\text{Market Price}} \times 100 + \text{Growth rate}$$

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Ex dividend market price per share

The shareholders not only expect dividend for current year but also expect growth in the rate of dividend.

Eg: Dividend pr share is 3.5, and market price of shares is Rs. 28. The shareholders expect a growth rate of 6%.

$$\left(\frac{3.5}{28} \times 100\right) + 6\%$$

$$= 12.5\% + 6\%$$

$$= 18.5\%$$

If market price of shares are usually based upon future expected dividend. If dividend of current year and future years both are available, in such a case, cost of capital (Equity) will be computed with reference to expected future dividend. While calculating cost of equity capital we take market price of shares, if company is proposing to issue new shares then we may take net proceeds of shares in place of market price.

Problem 1 : Calculate the WACC using the following data by using:

- (a) Book value weights
- (b) Market value weights

The capital structure of the company is as under:

	Rs.
Debentures (Rs. 100 per debenture)	5,00,000
Preference shares (Rs. 100 per share)	5,00,000
Equity shares (Rs. 10 per share)	10,00,000
	20,00,000

The market prices of these securities are:

Debenture Rs. 105 per debenture
 Preference Rs. 110 per preference share
 Equity Rs. 24 each.

Additional information:

- (1) Rs. 100 per debenture redeemable at par, 10% coupon rate, 4% floatation costs, 10 year maturity.
- (2) Rs. 100 per preference share redeemable at par, 5% coupon rate, 2% floatation cost and 10 year maturity.
- (3) Equity shares has Rs. 4 floatation cost and market price Rs. 24 per share.

The next year expected dividend is Rs. 1 with annual growth of 5%. The firm has practice of paying all earnings

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in the form of dividend.

Corporate tax rate is 50%.

Solutions

$$\text{Cost of Equity}(K_e) = \frac{D_1}{P_0 - F} + g = \frac{\text{Rs. } 1}{\text{Rs. } 24 - \text{Rs. } 4} + 0.05 = 0.1 \text{ or } 10\%$$

$$\text{Cost of Debt}(K_d) = \frac{I(1-t) + \left(\frac{RV - NP}{n}\right)}{\left(\frac{RV + NP}{2}\right)} = \frac{10(1-0.5) + \left(\frac{100 - 96}{2}\right)}{\left(\frac{100 + 96}{2}\right)}$$

$$\text{Cost of debt}(K_d) = \frac{10(1-0.5) + \frac{(100-96)}{2}}{\frac{(100+96)}{2}} = \left(\frac{5+0.4}{98}\right) = 0.055 \text{ (approx.)}$$

$$\text{Cost of preference shares}(K_p) = \frac{10}{\frac{198}{2}} = \left(\frac{5+2}{99}\right) = 0.053 \text{ (approx.)}$$

(a) Calculation of WACC using book value weights

Source of capital	Book Value	Weights	After tax cost of capital	WACC (K ₀)
		(a)	(b)	(c) = (a) × (b)
10% Debentures	5,00,000	0.25	0.055	0.0137
5% Preference shares	5,00,000	0.25	0.053	0.0132
Equity shares	10,00,000	0.50	0.10	0.0500
	20,00,000	1.00		0.0769

WACC (K₀) = 0.0769 or 7.69%

Source of capital	Market Value	Weights	After tax cost of capital	WACC (K ₀)
		(a)	(b)	(c) = (a) × (b)
10% Debentures (Rs. 105 × 5,000)	5,25,000	0.151	0.055	0.008
5% Preference shares (Rs. 110 × 5,000)	5,50,000	0.158	0.053	0.008
Equity shares (Rs. 24 × 1,00,000)	24,00,000	0.691	0.10	0.069
	34,75,000	1.000		0.085

WACC (K₀) = 0.085 or 8.5%

CAPITAL BUDGETING(INVESTMENT DECISIONS)

Investments decisions involve the following questions.

- 1) Whether to invest or not = compare Return on invest and cost of Capital
- 2) If to invest, then in which project -- for this purpose we have to-evaluate project

METHODS OF EVALUATION (Financial evaluation)

- a) Pay back period
- b) Net present value
- c) Discounted pay back period
- d) Accounting rate of return or Average rate of return
- e) Internal rate of return
- f) Profitability Index.

An organisation arranges funds from various sources such as equity, retained earnings, debentures and preference capital. Each source of finance has its cost. The combined cost of finance or capital is known as weighted average cost of capital.

The next step is to invest the funds. In this process two questions are to be answered

- 1) Whether to invest or not
- 2) If to invest, then in which project.

Investments will be made if rate of return on investment is more than weighted average cost of capital the decision regarding where to invest is taken after financial evaluation of projects.

Before discussing evaluation of projects let us understand the concepts of cash flows and discounted cash flows.

CASH FLOWS:

Cash flows means inflows and outflows of cash associated with the project.

Cash flows are different from profits while calculating the profit we take into the account.

Cash flows implies actual cash received from the project.

While computing profits we make a distinction between capital receipts and revenue receipts. We consider only revenue receipts for the purpose of profits.

While computing cash flows we take into account all cash flows whether on account of capital or revenue.

E.g. Investment of Rs.10,00,000 is made in the first year profits after depreciation are 1,75,000 depreciation is Rs.100000 per year, Tax rate is 40%.

Profit before depreciation (cash in Profits)	2,75,000
(-) Depreciation	<u>1,00,000</u> ↑

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Taxable Profit	1,75,000
Tax 40%	<u>70,000</u>
Profit after Tax	1,05,000
(+) Depreciation	<u>1,00,000</u>

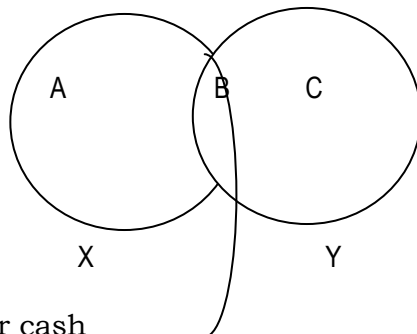
Cash inflows **2,05,000**

Suppose, the project continues for 8 years. In the 8th year profit before depreciation is 3,30,000. Depreciation is 1,00,000. Tax rate is 40% and the machine purchased for Rs.10,00,000 (Depreciation Rs.1,00,000 per year) is sold at the end of the 8th year for Rs.2,30,000.

Profit before Depreciation	3,30,000
(-) Depreciation	<u>1,00,000</u>
	2,30,000
(+) Profit on sale of machine	<u>30,000</u>
	2,60,000
(-) Tax 40%	<u>1,04,000</u>
Profit After Tax	1,56,000
(+) Depreciation	1,00,000
(-) Profit on sale of machine	(30,000)
(+) Sale price of machine	<u>2,30,000</u>

4,56,000

Cash flow



X = Items for cash

Y = Items for Tax

Inflows/Outflows

Adjust fo

Amount subject to tax

(-) Tax

Post tax

Reserve

(+) (-)Adjust

Cash flow

B
<u>C</u>
XXX
XXX
XXX
C
<u>A</u>
XXX

2) DISCOUNTED CASH FLOWS:

Understand future value and present value for e.g. if Rs.10,000 is invested @ 11% p.a. how much will be the amount after 3 years.

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$$FV = P \left(1 + \frac{\mu}{100} \right)^n$$

Where, P = present value / present investment

μ = Rate of interest

n = Number of years

$$\therefore A = 10,000 \left(1 + \frac{11}{100} \right)^3$$

$$A = 10,000 (1.11)^3$$

$$A = 13676.31$$

Eg. Find future value after 8 years if Rs.13,000 is invested @ 8% p.a.

$$F.V. = P \left(1 + \frac{\mu}{100} \right)^n$$

$$F.V. = 13,000 \left(1 + \frac{8}{100} \right)^8$$

$$F.V. = 13,000 (1.08)^8$$

$$F.V. = 24062.09$$

Present Value:

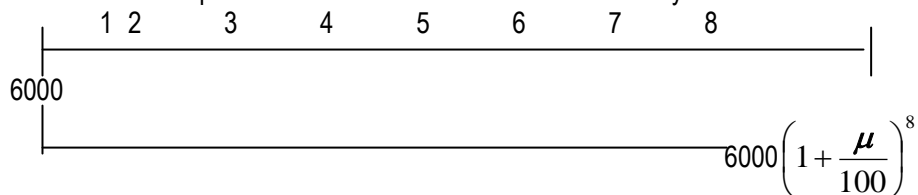
$$F.V. = P \left(1 + \frac{\mu}{100} \right)^n$$

F.V.

$$P = \frac{\text{-----}}{\left(1 + \frac{\mu}{100} \right)^n}$$

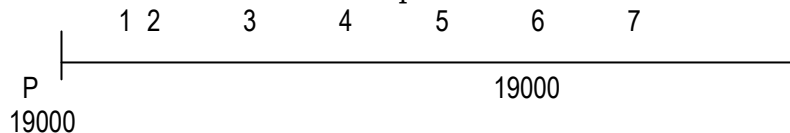
$$\left(1 + \frac{\mu}{100} \right)^n$$

If Rs.6000 is deposited in Bank what will be its value after 8 years



If a person want Rs.19,000 after 7 years.

How much be should deposit now



$$\left(1 + \frac{\mu}{100} \right)^8$$

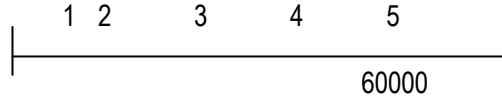
Present value = $\frac{FV}{\left(1 + \frac{\mu}{100} \right)^8}$

$$\left(1 + \frac{\mu}{100} \right)^8$$

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$$\frac{\mu}{100} = 1$$

Eg.1) Find present value Rs.60000 to be received after 5 years discounting rate 11%



$$60000/(1.11)^5 = 35607.08$$

$$\text{Discounting factors} = 1/(1.11)^5 = 0.59345$$

2) Rs.20000 to be received after three years discounting rate 15%

$$20000/(1.15)^3 = 13150.32$$

Discounting factor

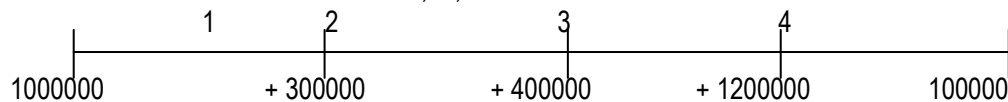
$$\left(\frac{1}{(1.15)^3} \right) = 0.657516232$$

When cash inflows and outflows are discounted and present value is obtained we get discounted cash flows.

Let us understand various methods of evaluation y an e.g.

Initial invest = Rs.10,00,000

Cash inflows:	Yr 1	=	3,00,000
	Yr 2	=	4,00,000
	Yr 3	=	12,00,000
	Yr 4	=	1,00,000



1) Pay back Method:

It means period required to recover initial investment

	Cumulative
	Recovery
1 st	300000
2 nd	700000
3 rd	1900000

In two years recovery is Rs.700000.

In third, 300000 are to be recovered in third year.

$$1200000 = 12 \text{ months}$$

$$300000 = ? \quad 3 \text{ months}$$

Payback period is 2 years and 3 months.

2) Discounted pay back period: In this method the inflows are discounted (calculating present value) and period required to recover investments by considering the discounted cash flows is discounted pay back period.

* **Question is similar as before**
Rate of discounting is 15%

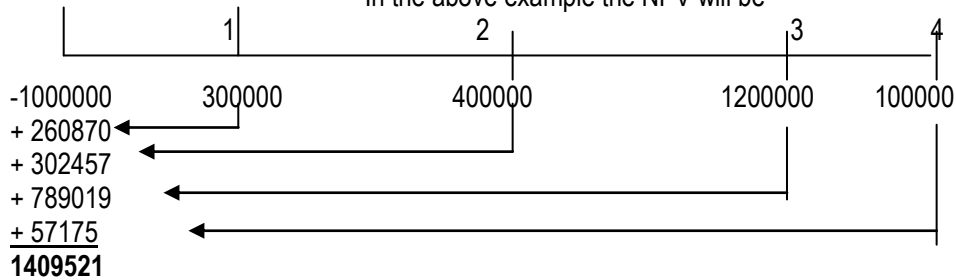
Year	Inflows	discounted cash inflows	Cum Dis. Cash flows
1	300000	$300000/(1.15)^1 = 260870$	260870
2	400000	$400000/(1.15)^2 = 302457$	563327

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- 3 1200000/(1.15)³ = 789019 1352346
 4 100000/(1.15)⁴ = 57175 1409521
 Recovery is 2 years = 563327
 Balance i.e. 1000000 – 563327 = 436673 is to be recovered in 3rd year
 789019 = 1 year
 436673 = ? (0.55) yr.
 Dis. Payback period = 2.55 year

3) **Net present value:** NPV is Present Value of inflows – present values of outflows

In the above example the NPV will be



Present Value of inflows	=	1409521
Present value of outflows	=	<u>1000000</u>
Net present value		409521

In above example the net present value is positive even after discounting inflows at 15%. It means the rate of return is more than 15%.

4) Profitability index = Present value of inflows/present value of outflows.

In above eg:

$$\text{Profitability index} = \frac{1409521}{1000000} = 1.409521$$

5) Internal rate of return: In the above example the inflows have been discounted at 15%. If inflows are discounted at higher rate say 20%, the present value of inflows will be lower and NPV will reduce. Suppose discounting rate is 20%.

Year	Discount Value @20%	
0	-1000000	
1	300000	250000
	<u>300000</u>	
	(1.20) ¹	
2	400000	277778
	<u>400000</u>	
	(1.20) ²	
3	1200000	694444
	<u>1200000</u>	
	(1.20) ³	
4	100000	48225.30
	<u>100000</u>	
	(1.20) ⁴	
		<u>1270447</u>

The present value of inflows have reduced from 1409521 to 1270447. If rate is further increased the NPV will decline.

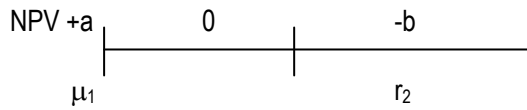
* Internal rate of return is that rate of discounting where NPV = 0 i.e.

Present value of inflows = present value of outflows.

How do find IRR

1. Discount inflows at the rate which gives NPV as positive but at a very small amount [+a]
2. Discount inflows at the rate which gives -ve NPV [-b]
3. Let rate of discounting in the first case be r_1 & in second case r_2

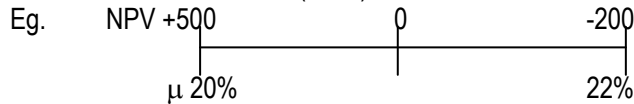
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IRR is between μ_1 , & r_2

$$\mu_1 < IRR < \mu_2$$

$$IRR = \mu_1 + \frac{a \times (\mu_2 - \mu_1)}{(a + b)}$$



Rate	NPV
+2%	-700
?(1.42)%	-500
IRR = 20 + 1.42 = 21.42%	

Question similar as before Calculating IRR

Year	Inflow	Discounted	
		30%	33%
1	300000	230769	225564
2	400000	236686	226129
3	1200000	546199	510066
4	100000	<u>35013</u>	<u>31959</u>
		1048667	993718
	(X PV)	48667	-6282
Yr	32%		
1	227273		
2	229568		
3	521746		
4	<u>32939</u>		
	<u>1011526</u>		
	+ 11526		
	+11526	0	-6282
	32%	32.647	33%

$$IRR = 32 \% + x \%$$

$$1\% = -17808$$

$$x \% = -11526$$

$$11526 \times \frac{1}{17808} = 0.647$$

$$IRR = 32 + 0.647 = 32.647$$

RATIO ANALYSIS

Ratio	Formulae	Interpretation
Liquidity Ratio		
Current Ratio	$\frac{\text{Current Assets}}{\text{Current Liabilities}}$	A simple measure that estimates whether the business can pay short term debts.
Quick Ratio	$\frac{\text{Quick Assets}}{\text{Current Liabilities}}$	It measures the ability to meet current debt immediately. Ideal ratio is 1
Cash Ratio	$\frac{\left(\begin{array}{l} \text{Cash and Bank balances} + \\ \text{Marketable Securities} \end{array} \right)}{\text{Current Liabilities}}$	It measures absolute liquidity of the business.
Basic Defense Interval Ratio	$\frac{\left(\begin{array}{l} \text{Cash and Bank balances} + \\ \text{Marketable Securities} \end{array} \right)}{\text{Operating Expenses} \div \text{No. of days}}$	It measures the ability of the business to meet regular cash expenditures.
Net Working Capital Ratio	$\text{Current Assets} - \text{Current Liabilities}$	It is a measure of cash flow to determine the ability of business to survive financial crisis.
Capital Structure Ratio		
Equity Ratio	$\frac{\text{Shareholders' Equity}}{\text{Capital Employed}}$	It indicates owner's fund in companies to total fund invested.

Debt Ratio	$\frac{\text{Total outside liabilities}}{\text{Total Debt} + \text{Net worth}}$	It is an indicator of use of outside funds.
Debt to equity Ratio	$\frac{\text{Total Outside Liabilities}}{\text{Shareholders' Equity}}$	It indicates the composition of capital structure in terms of debt and equity.
Debt to Total Assets Ratio	$\frac{\text{Total Outside Liabilities}}{\text{Total Assets}}$	It measures how much of total assets is financed by the debt.

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Capital Gearing Ratio	$\frac{\text{(Preference Share Capital+Debentures)+Other Borrowed funds}}{\text{(Equity Share Capital+Reserves \& Surplus-Losses)}}$	It shows the proportion of fixed interest bearing capital to equity shareholders' fund. It also signifies the advantage of financial leverage to the equity shareholder.
Proprietary Ratio	Proprietary Fund Total Assets	It measures the proportion of total assets financed by shareholders.
Coverage Ratios		
Debt Service Coverage Ratio (DSCR)	$\frac{\text{Earnings available for debt services}}{\text{Interest+Instalments}}$	It measures the ability to meet the commitment of various debt services like interest, instalment etc. Ideal ratio is 2.
Interest Coverage Ratio	$\frac{\text{EBIT}}{\text{Interest}}$	It measures the ability of the business to meet interest obligations. Ideal ratio is > 1.
Preference Dividend Coverage Ratio	$\frac{\text{Net Profit / Earning after taxes (EAT)}}{\text{Preferred dividend liability}}$	It measures the ability to pay the preference shareholders' dividend. Ideal ratio is > 1.
Fixed Charges Coverage Ratio	$\frac{\text{EBIT+Depreciation}}{\text{Interest+} \frac{\text{Re-payment of loan}}{1-\text{tax rate}}}$	This ratio shows how many times the cash flow before interest and taxes covers all fixed financing charges. The ideal ratio is > 1.
Activity Ratio/ Efficiency Ratio/ Performance Ratio/ Turnover Ratio		
Total Asset Turnover Ratio	$\frac{\text{Sales / Cost of Goods Sold}}{\text{Average Total Assets}}$	A measure of total asset utilisation. It helps to answer the question - What sales are being generated by each rupee's worth of assets invested in the business?

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Fixed Assets Turnover Ratio	$\frac{\text{Sales / Cost of Goods Sold}}{\text{Fixed Assets}}$	This ratio is about fixed asset capacity. A reducing sales or profit being generated from each rupee invested in fixed assets may indicate overcapacity or poorer-performing equipment.
Capital Turnover Ratio	$\frac{\text{Sales / Cost of Goods Sold}}{\text{Net Assets}}$	This indicates the firm's ability to generate sales per rupee of long term investment.
Working Capital Turnover Ratio	$\frac{\text{Sales / COGS}}{\text{Working Capital}}$	It measures the efficiency of the firm to use working capital.
Inventory Turnover Ratio	$\frac{\text{COGS / Sales}}{\text{Average Inventory}}$	It measures the efficiency of the firm to manage its inventory.
Debtors Turnover Ratio	$\frac{\text{Credit Sales}}{\text{Average Accounts Receivable}}$	It measures the efficiency at which firm is managing its receivables.
Receivables (Debtors') Velocity	$\frac{\text{Average Accounts Receivables}}{\text{Average Daily Credit Sales}}$	It measures the velocity of collection of receivables.

Payables Turnover Ratio	$\frac{\text{Annual Net Credit Purchases}}{\text{Average Accounts Payables}}$	It measures the velocity of payables payment.
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Profitability Ratios based on Sales

Gross Profit Ratio	$\frac{\text{Gross Profit}}{\text{Sales}} \times 100$	This ratio tells us something about the business's ability consistently to control its production costs or to manage the margins it makes on products it buys and sells.
Net Profit Ratio	$\frac{\text{Net Profit}}{\text{Sales}} \times 100$	It measures the relationship between net profit and sales of the business.
Operating Profit Ratio	$\frac{\text{Operating Profit}}{\text{Sales}} \times 100$	It measures operating performance of business.

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Expenses Ratio		
Cost of Goods Sold Ratio (COGS)	$\frac{\text{COGS}}{\text{Sales}} \times 100$	It measures portion of a particular expenses in comparison to sales.
Operating Expenses Ratio	$\left(\frac{\text{Administrative exp. + Selling \& Distribution Overhead}}{\text{Sales}} \right) \times 100$	
Operating Ratio	$\frac{\text{COGS} + \text{Operating expenses}}{\text{Sales}} \times 100$	
Financial Expenses Ratio	$\frac{\text{Financial expenses}}{\text{Sales}} \times 100$	
Profitability Ratios		
Return on Investment (ROI)	$\frac{\text{Return / Profit / Earnings}}{\text{Investments}} \times 100$	It measures overall return of the business on investment/ equity funds/capital employed/ assets.
Return on Assets (ROA)	$\frac{\text{Net Profit after taxes}}{\text{Average total assets}}$	It measures net profit per rupee of average total assets/ average tangible assets/ average fixed assets.
Return on Capital Employed (Pre-tax) ROCE	$\frac{\text{EBIT}}{\text{Capital Employed}} \times 100$	It measures overall earnings (either pre-tax or post tax) on total capital employed.
Return on Capital Employed (Post-tax) ROCE	$\frac{\text{EBIT}(1-t)}{\text{Capital Employed}} \times 100$	It indicates earnings available to equity shareholders in comparison to equity shareholders' net worth.
Return on Equity (ROE)	$\left(\frac{\text{Net Profit after taxes - Preferred dividend (if any)}}{\text{Net worth / equity shareholders' fund}} \right) \times 100$	
Profitability Ratios Required for Analysis from Owner's Point of View		
Earnings per Share (EPS)	$\frac{\text{Net profit available to equity shareholders}}{\text{Number of equity shares outstanding}}$	EPS measures the overall profit generated for each share in existence over a particular period.

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Dividend per Share (DPS)	$\frac{\text{Dividend paid to equity shareholders}}{\text{Number of equity shares outstanding}}$	Proportion of profit distributed per equity share.
Dividend payout Ratio (DP)	$\frac{\text{Dividend per equity share}}{\text{Earning per Share (EPS)}}$	It shows % of EPS paid as dividend and retained earnings.
Profitability Ratios related to market/ valuation/ Investors		
Price-Earnings per Share (P/E Ratio)	$\frac{\text{Market Price per Share (MPS)}}{\text{Earning per Share (EPS)}}$	At any time, the P/E ratio is an indication of how highly the market "rates" or "values" a business. A P/E ratio is best viewed in the context of a sector or market average to get a feel for relative value and stock market pricing.

Dividend Yield	$\frac{\text{Dividend} \pm \text{Change in share price}}{\text{Initial share price}} \times 100$ OR $\frac{\text{Dividend per Share (DPS)}}{\text{Market Price per Share (MPS)}} \times 100$	It measures dividend paid based on market price of shares.
Earnings Yield	$\frac{\text{Earnings per Share (EPS)}}{\text{Market Price per Share (MPS)}} \times 100$	It is the relationship of earning per share and market value of shares.
Market Value /Book Value per Share	$\frac{\text{Market value per share}}{\text{Book value per share}}$	It indicates market response of the shareholders' investment.
Q Ratio	$\frac{\text{Market Value of equity and liabilities}}{\text{Estimated replacement cost of assets}}$	It measures market value of equity as well as debt in comparison to all assets at their replacement cost.

Q1. The financial statements of a company contain the following information for the year ending 31st March, 2011:

Particulars	Rs.
Cash	1,60,000
Sundry Debtors	4,00,000

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Short-term Investment	3,20,000
Stock	21,60,000
Prepaid Expenses	<u>10,000</u>
Total Current Assets	<u>30,50,000</u>
Current Liabilities	<u>10,00,000</u>
10% Debentures	<u>16,00,000</u>
Equity Share Capital	<u>20,00,000</u>
Retained Earnings	<u>8,00,000</u>
Statement of Profit for the year ended 31st March, 2011	
Sales (20% cash sales)	40,00,000
Less: Cost of goods sold	<u>28,00,000</u>
Profit before Interest & Tax	12,00,000
Less: Interest	<u>1,60,000</u>
Profit before tax	10,40,000
Less: Tax @ 30%	<u>3,12,000</u>
Profit After Tax	7,28,000

You are required to calculate:

- (i) Quick Ratio
- (ii) Debt-equity Ratio
- (iii) Return on Capital Employed, and
- (iv) Average collection period (Assuming 360 days in a year). **(8 Marks, November, 2011)**

Quick ratio = quick assets /current liabilities

Quick assets =current assets – stock – prepaid expenses

Rs 30,50,000 -21,60,000 – 10,000 = Rs 8,80,000

Current liabilities = 10,00,000

Quick ratio = Rs 8,80,000/10,00,000 =0.88

Debt equityratio = long term debts /shareholders funds

Long term debt Rs 16,00,000

ShareholderRs.s funds = 20,00,000 +8,00,000 = Rs 28,00,000

Deb

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t equity ratio = $16,00,000/28,00,000 = 0.5714$

Return on capital employed

$$\frac{\text{EBIT/ capital employed}}{\text{Capital employed}} \times 100$$

EBIT 16,00,000

Capital employed =Rs 16,00,000 + (Rs 20,00,000 +Rs 8,00,000)

Rs 44,00,000

Return of capital employed $12,00,000/44,00,000 \times 100 = 27.27\%$

Debtors turnover = credit sales/Average receivables

Credit sales =Rs 32,00000

Average debtors =Rs 4,00,000

Debtors turnover ratio $32,00,000/4,00000$

8 times

Average collection period in days

$360/8 = 45 \text{ days}$

$32,00,000 \quad \text{--}360\text{day}$

$4,00000 \quad ?$

$4,00000 \times 360/32,00000 =45 \text{ days}$

CASH BUDGET

Q1. The following details are forecasted by a company for the purpose of effective utilization and management of cash:

(i) Estimated sales and manufacturing costs:

Year and month 2010	Sales Rs.	Materials Rs.	Wages Rs.	Overheads Rs.
April	4,20,000	2,00,000	1,60,000	45,000
May	4,50,000	2,10,000	1,60,000	40,000

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June	5,00,000	2,60,000	1,65,000	38,000
July	4,90,000	2,82,000	1,65,000	37,500
August	5,40,000	2,80,000	1,65,000	60,800
September	6,10,000	3,10,000	1,70,000	52,000

- (ii) Credit terms:
- Sales – 20 percent sales are on cash, 50 percent of the credit sales are collected next month and the balance in the following month.
 - Credit allowed by suppliers is 2 months.
 - Delay in payment of wages is $\frac{1}{2}$ (one-half) month and of overheads is 1 (one) month.
- (iii) Interest on 12 percent debentures of Rs. 5,00,000 is to be paid half-yearly in June and December.
- (iv) Dividends on investments amounting to Rs. 25,000 are expected to be received in June, 2010.
- (v) A new machinery will be installed in June, 2010 at a cost of Rs. 4,00,000 which is payable in 20 monthly installments from July, 2010 onwards.
- (vi) Advance income-tax, to be paid in August, 2010, is Rs. 15,000.
- (vii) Cash balance on 1st June, 2010 is expected to be Rs. 45,000 and the company wants to keep it at the end of every month around this figure. The excess cash Rs. (in multiple of thousand rupees) is being put in fixed deposit.

You are required to prepare monthly Cash budget on the basis of above information for four months beginning from June, 2010. **(7 Marks, May, 2010)**

Cash budget for June 2010 to Sept 2020

Particulars	June	July	Aug	Sept
Opening balance	45,000	45,500	45,500	45,000
Receipts				
Cash sales	1,00,000	98,000	1,08,000	1,22,000
Coll for debtors	3,48,000	3,80,000	3,96,000	4,12,000
Divident	25,000			
Total receipts and op balance (A)	5,18,000	5,23,500	5,49,500	5,79,000
Payments				
Payment for material purchased	2,00,000	2,10,000	2,60,000	2,82,000
Wages	1,62,500	1,65,000	1,65,000	1,67,500
Overheads	40,000	38,000	37,500	60,800
Interest on deb 5,00,000x 12% x 6/12	30,000			
Installment for new machine		20000	20,00	20,000

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			0	
Advance income tax			15,000	
Investment in FDS	40,000	45,000	7000	3000
Total payments (B)	4,72,500	4,78,000	5,04,500	533300
Closing balance (A-B)	45,500	45,500	45,000	45,700

Collection on account of sales and debtors

	Sales	April	May	June	July	Aug	Sept
April	4,20,000	84,000	1,68,000	1,68,000			
May	4,50,000	-	90,000	1,80,000	1,80,000		
June	5,00,000	-	-	1,00,000	2,00,000	2,00,000	
July	4,90,000	-	-	-	98,000	1,96,000	1,96,000
Aug	5,40,000	-	-	-	-	1,08,000	2,16,000
Sept	6,10,000	-	--	-	-		1,22,000
Total							
Cash sales				1,00,000	98,000	1,08,000	1,22,000
				3,48,000	3,80,000	3,96,000	4,12,000
Purchases							
April	2,00,000			2,00,000			
May	2,10,000				2,10,000		
June	2,60,000					2,60,000	
July	2,82,000						2,82,000
Aug	2,80,000						
Sept	3,10,000						
Wages		April	May	June	Juyy	Aug	Sept
April	1,60,000	80,000	80,000				
May	1,60,000		80,000	80,000			
June	1,65,000			82,500	82,500		
July	1,65,000				82,500	82,500	
Aug	1,65,000					82,500	82,500
Sept	1,70,000						85,000
Total payments				1,62500	1,65,000	1,65000	1,67,500

Q15. Explain the various theories of Capital Structure.

Ans. Theory of capital structure

In order to achieve the goal of identifying an optimum debt-equity mix, it is

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necessary for the finance manager to be conversant with the basic theories underlying the capital structure of corporate enterprises..

The theories of capital structure tries to establish relationship between capital structure

(Debt Equity mix) and cost of capital and valuation of firm.

These theories are

1. Net Incomes (NI) Approach
2. Net Operating Income (NOI) Approach
3. Modigliani – Miller (MM) Approach,
4. Traditional Approach.

1. Net Income (NI) Approach

This approach has been suggested by Durand.

According to this approach, capital structure decision is relevant to the valuation of the firm.

In other words a change in the capital structure causes a corresponding change in the overall cost of capital as well as the total value of the firm.

According to this approach a higher debt content in the capital structure (i.e. high financial leverage) will result in decline in the overall or weighted average cost of the capital.

This will cause increase in the value of the firm and consequently increase in the value of equity shares of the company.

Reverse will happen in a converse situation.

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Net Income approach is based on the following three assumptions:

- (i) There are no corporate taxes
 - (ii) The cost of debt is less than cost of equity or equity capitalisation rate.
 - (iii) The debt content does not change the risk perception of the investors.
- The value of the firm on the basis of NI Approach can be ascertained as follows:- $V = S + B$

Where :

V = Value of Firm;

S = Market value of Equity,

B = Market value of Debt

Market value of Equity can be ascertained as follows:

$S = NI/k_e$

Where :

S = Market value of equity;

NI = Earnings available for equity shareholders;

K_e = Equity Capitalisation Rate.

Q16. X Ltd., is expecting an annual EBIT of Rs. 1 lacs. The cost of equity capital or capitalisation rate is 12.5%. You are required to calculate the total value of the firm. Also state the overall cost of capital.

Under the following options

- 1) Debt of the company is Rs 1,00,000
 - 2) Debt of the company is Rs 2,00,000
 - 3) Debt of the company is Rs 3,00,000
- Interest is payable at the rate of 10 % on Debt

	Case I Debt Rs 1,00,000			Debt Rs 2,00,000			Debt Rs 3,00,000		
	Income	Rate	Capital						
Net profit before interest and tax	1,00,000			1,00,000			1,00,000		
Less: Interest	10,000	10%	1,00,000 = B	20,000	10%	2,00,000	30,000	10%	3,00,000
Net profit for equity shareholders	90,000	12.5%	7,20,000 = S	80,000	12.5%	6,40,000	70,000	12.5%	5,60,000
Total value			8,20,000 V = S+B			8,40,000 V = S+B			8,60,000 V = S+B
Weighted average cost of capital	1,00,000/8,20,000 x100 =			1,00,000/8,40,000 x100			1,00,000/8,60,000 x100		

In case I the firm has employed Debt of Rs 1,00,000

It pays interest of Rs 10,000

Net income available for equity shareholders is Rs 90,000

The expected rate of return by equity shareholders is 12.5% (K_e is constant)

The value of equity based on returns available will be $Rs\ 90,000/12.5\% = Rs.\ 7,20,000$

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The total stake in the firm or value of the firm is Rs 1,00,000 + 7,20,000 = Rs. 8,20,000

The firm moves from case I to case II where it employs a Debt of Rs. 2,00,000
Suppose the firm issues Debentures of Rs 1,00,000 and uses this money to pay to equity shareholders

The total funds employed by the firm remains same

Debt employed of Rs.2,00,000

It pays interest of Rs.20,000

Net income available for equity shareholders is Rs 80,000

The expected rate of return by equity shareholders is 12.5% (K_e is constant)

The value of equity based on returns available will be Rs 80,000/12.5%=

Rs 6,40,000

The total value of the firm is Rs 2,00,000 + 6,40,000 = Rs 8,40,000

It might appear to the readers that though the value of firm has increased, the stake of Equity shareholders has reduced from Rs.7,20,000 to Rs 6,40,000. This view is incorrect.

In case the stake of equity was Rs 7,20,000 While shifting from case I to case II the equity shareholders received Rs 1,00,000 Therefore even after receiving Rs 1,00,000 their stake has reduced only by Rs 80,000 therefore moving from case I to case II the shareholders wealth has increased by Rs 20,000. At case II the wealth of shareholders is Rs 1,00,000 + Rs. 6,40,000= Rs. 7,40,000

The firm moves from case II to case III where it employs a Debt of Rs.3,00,000
Suppose the firm issues Debentures of Rs 1,00,000 and uses this money to pay to equity shareholders The total funds employed by the firm remains same

Debt employed = Rs 3,00,000

It pays interest of Rs 30,000

Net income available for equity shareholders is Rs 70,000

The expected rate of return by equity shareholders is 12.5% (K_e is constant)_

The value of equity based on returns available will be Rs 70,000/12.5%=

Rs 5,60,000

The total value of the firm is Rs 3,00,000 + 5,60,000 = Rs 8,60,000

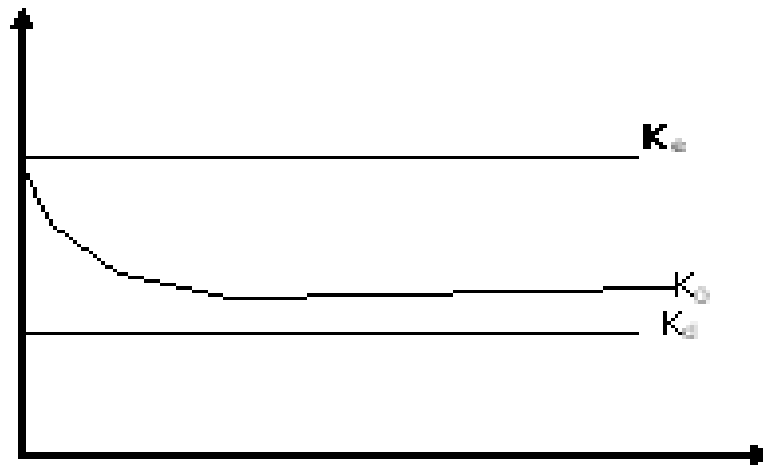
It might appear to the readers that though the value of firm has increased, the stake of Equity shareholders has reduced from Rs. 6,40,000 to Rs.5,60,000. This view is incorrect.

In case I the stake of equity was Rs 6,40,000

Therefore even after receiving Rs 1,00,000 their stake has reduced only by Rs. 80,000 therefore moving from case I to case II the shareholders wealth has increased by Rs 20,000.

Diagram showing K_e and K_d constant and k_o falling.

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2. Net Operating Income (NOI) Approach

This approach has also been suggested by Durand.

This is just opposite of Net Income approach. According to this approach the market value of the firm is not at all affected by the capital structure changes.

The market value of the firm is ascertained by capitalising the net operating income at the overall cost of capital (k), which is considered to be constant.

The market value of equity is ascertained by deducting the market value of the debt from the market value of the firm.

Assumptions. The Net Operating Income (NOI) approach is based on the following

Assumptions:

- (i) The overall cost of capital (k) remains constant for all degrees of debt equity mix or leverage.
- (ii) The market capitalises the value of the firm as a whole and therefore, the split between debt and equity is not relevant.
- (iii) The use of debt having low cost increases the risk of equity shareholders this, results in increase in equity capitalisation rate. Thus, the advantage of debt is set off exactly by increase in the equity capitalisation rate.
- (iv) There are no corporate taxes.

Value of the firm. According to the NOI Approach, the value of a firm can be determined by the following equation:

$$V = \frac{\text{EBIT}}{K}$$

Where:

V = Value of firm;

K = Overall cost of capital;

EBIT = Earnings before interest and tax.

Value of Equity. The value of equity (S) is a residual value, which is determined by deducting the total value of debt (B) from the total value of the firm (V). Thus, the value of equity (S) can be determined by the following equation:

$$S = V - B$$

Where;

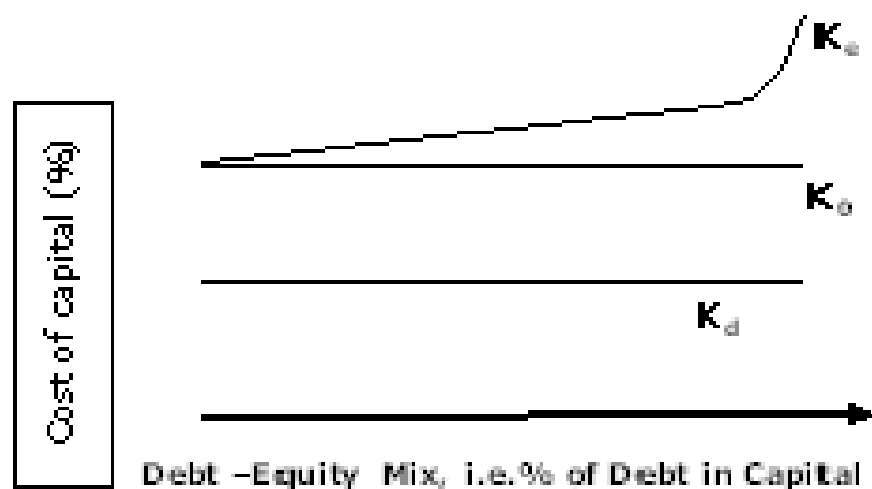
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S = Value of equity
V = Value of Firm;
B = Value of debt.

Suppose capital of a firm contains Debt of Rs 1,00,000.
The Net Operating income before interest is Rs 1,00,000. And Expected rate is 12.5%

	Case I Debt Rs 1,00,000			Debt Rs 2,00,000			Debt Rs 3,00,000		
	Income	Rate	Capital						
Net profit before interest and tax	1,00,000	12.5% K	8,00,000	1,00,000	12.5%	8,00,000	1,00,000	12.5%	8,00,000
Less: Interest	10,000	10% K _d	1,00,000 = B	20,000	10%	2,00,000	30,000	10%	3,00,000 (B)
Net profit for equity shareholders	90,000	12.86% K _e $\frac{90,000}{700,000} \times 100$	7,00,000 = S	80,000	13.33% $\frac{80,000}{600,000} \times 100$	6,00,000	70,000	14%	5,00,000 (S)
Total value			8,00,000 V = S+B			8,00,000 V = S+B			8,00,000 V = S+B
Weighted average cost of capital	$1,00,000/8,00,000 \times 100 =$			$1,00,000/8,00,000 \times 100$			$1,00,000/8,00,000 \times 100$		

Optimum Capital Structure. According to Net Operating Income (NOI) Approach, the total value of the firm remains constant irrespective of the debt-equity mix or the degree of leverage. The market price of equity shares will, therefore, also not change on account of change in debt-equity mix. Hence, there is nothing like optimum capital structure. Any capital structure will be optimum according to this approach.



3. Modigliani-Miller Approach

The Modigliani-Miller (MM) approach is similar to the Net Operating Income (NOI) approach.

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In other words, according to this approach, the value of a firm is independent of its capital structure.

However, there is a basic difference between the two. The NOI approach is purely definitional or conceptual.

It does not provide operational justification for irrelevance of the capital structure in the valuation of the firm.

While MM approach supports the NOI approach providing behavioural justification for the independence of the total valuation and the cost of capital of the firm from its capital structure.

In other words, MM approach maintains that the weighted average cost of capital does not change with change in the debt equity mix or capital structure of the firm.

It also gives operational justification for this and not merely states only a proposition.

Basic Propositions. The following are the three basic propositions of the MM approach:

1. The overall cost of capital (k) and the value of the firm (V) are independent of the capital structure. In other words k and V are constant for all levels of debt-equity mix. The total market value of the firm is given by capitalising the expected net operating income (NOI) by the rate appropriate for that risk class.
2. The cost of equity (k_e) is equal to capitalisation rate of a pure equity stream plus a premium for the financial risk. As the firm employs more and more debt the financial risk increases with more debt content in the capital structure. As a result, k_e increases in a manner to off set exactly the use of a less expensive source of funds represented by debt.
3. The cut-off rate for investment purposes is completely independent of the way in which an investment is financed.

Assumptions

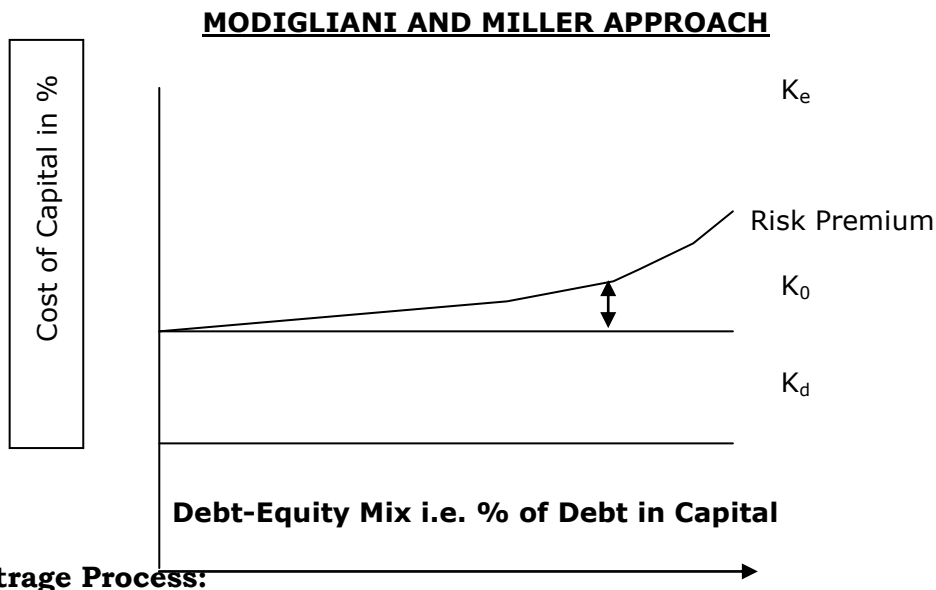
The MM approach is subject to the following assumptions:-

1. **Capital markets are perfect. This means --**
 - (a) Investors are free to buy and sell securities;
 - (b) The investors can borrow without restriction on the same terms on which the firm can borrow;
 - (c) The investors are well informed;
 - (d) The investors behave rationally; and
 - (e) There are no transaction costs.
2. The firms can be classified into homogeneous risk classes All firms within the same class will have the same degree of business risk.
3. All investors have the same expectation of a firm's net operating income (EBIT) with which to evaluate the value of any firm
4. The dividend pay-out ratio is 100%. In other words, there are no retained earnings.
5. There are no corporate taxes. However, this assumption has been removed later.

In brief, the MM hypothesis can be put in the following words: "MM hypothesis based on the idea that no matter how you divide up the capital structure of a firm among debt, equity and other claims, there is a conservation of investment value.

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That is, because the total investment value of a corporation depends upon its underlying profitability and risk. It is invariant with respect to relative changes in the firm's financial capitalisation. Thus, the total pie does not change as it is divided into debt, equity, and other securities. The sum of the parts must equal the whole; so regardless of financing mix, the total value of the firm stays the same:1



The “arbitrage process” is the operational justification MM hypothesis. The term ‘Arbitrage’ refers to an act of buying an asset or security in one market having lower price and selling it in another market at a higher price. The consequence of such action is that the market price of the securities of the two firms exactly similar in all respects except in their capital structures can not for long remain different in different markets. Thus, arbitrage process restores equilibrium in value of securities. This is because in case the market value of the two firms which are equal in all respects except their capital structures, are not equal, investors of the overvalued firm would sell their shares, borrow additional funds on personal account and invest in the under-valued firm in order to obtain the same return on smaller investment outlay. The use of debt by the investor for arbitrage is termed as ‘home made’ or ‘personal leverage’. This will be clear with the following illustration.

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Q17. Two firms A and B are identical in all respects except that the firm A has 10% Rs.50,000 debentures. Both the firms have the same earnings before interest and tax amounting to Rs.10,000. The equity capitalisation rate of firm A is 16% while that of firm B is 12.5%.

You are required to calculate the total market value of each of the firms and explain with an example the working of the 'Rs.arbitrage process'.

SOLUTION:

STATEMENT SHOWING THE TOTAL VALUE OF THE FIRMS

Particulars	Firm A	Firm B
	Rs.	Rs.
Earning before Interest & Tax (EBIT)	10,000	10,000
Less: Interest	5,000	---
	-----	-----
Earning available for equity share-holders	5,000	10,000
	-----	-----
Equity capitalisation rate (Ke)	16%	12.5%
Total market value of equity (S):		
5,000		
Firm A: ----- X 100	31,250	---
16		
10,000		
Firm B: ----- X 100	----	80,000
12.5		
Total market value of Debt (B)	50,000	---
	-----	-----
Total value of firm (V)	81,250	80,000
	-----	-----
Overall cost of capital (k): EBIT/V:		
10,000		
Firm A : ----- X 100:	12.3%	---
81,250		
Firm B : 10,000		
----- x 100	----	12.5%
80,000		
Debt Equity Ratio: (B/S):		
50,000		
Firm A : -----	0.6	
81,250		

Working of the Arbitrage Process: The above table shows that market value of the firm A having debt content in its capital structure is higher than the market value of the firm B which does not have any debt content in its capital structure.

According to MM Hypothesis this situation can not continue for long on account of working of the arbitrage process.

The investors in company A can earn a higher return on their investment with a

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lower financial risk. Hence, the investors in company A will start selling their shares and start buying shares in company B.

These arbitrage transactions will continue till company A's shares decline in price and B's shares increase in price enough to make the total value of the two firms identical. This can be understood with the following example.

Suppose there is an investor X. He holds 10% of the outstanding shares of firm A. This means his holding amounts to Rs.3,125 (i.e. 10% of Rs.31,250) and his share in the earnings which belong to equity share-holders would amount to Rs.500 (i.e. 10% of Rs.5,000)

Mr. X will sell his holdings in firm A and invest money in firm B. Firm B has no debt in its capital structure and hence, the financial risk to Mr X would be less in firm B as compared to firm A.

In order to have the same degree of financial risk in firm B, Mr. X will borrow additional funds equivalent to his proportionate share in firm A's debt on his personal account i.e. Rs.5,000 (10% of Rs.50,000) at 10% interest. The investible funds available with Mr X will be Rs 3125 + 5000 = Rs 8125.

The income by investing Rs 8125 in Firm B will be Rs

$$\frac{8,125 \times 10,000}{80,000} = 1,015.62$$

Income from firm B	1015.62
Less interest on borrowings 10% x 5000	500.00
Net income	515.62
Income formerly earned in A	500.00
Increase in income by shifting from B to A	15.62

The degree of risk is same in both the firms

In case of company A the company is levered

However in case of Proposal B the company B is not levered but the investor has substituted personal leverage for leverage of the company

(A) Mr X's position in firm A with 10% equity holding:

- a) Investment outlay Rs.3,125; and
- b) Dividend income 10% of Rs.5,000 Rs. 500

(B) Mr X's position in firm B with 10% equity holding:

(i) Investment outlay (own funds Rs.3,000+ borrowed funds Rs.5,000)	8,000
(ii) Dividend income:	
Total income 10% of Rs.10,000	1,000
Less: Interest payable on borrowed funds 10% on Rs.5,000	500
	500

(C) Mr X's position in firm B, if he invests the total available funds:

- (i) Total investment outlay:

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(own funds Rs.3,125 + borrowed funds Rs.5,000)		8,125
(ii) Total income 10,000/80,000 X 8,125) =	1,016	
Less: Interest payable on borrowed funds	500	516

The above analysis shows that Mr X can have a higher income in case he shifts his investments from firm A to firm B. Other investors will also follow the same process. As a result there will be an increasing demand for the securities of firm B which will lead to increase in the market price of its shares. Simultaneously, the price of the shares of firm A will decline. This process will continue till it is possible to reduce the investment outlays and get the same return. Beyond this point, shifting from firm A to firm B will not be beneficial. This is called as the point of equilibrium. At this level the total value of the two firms as well as the overall cost of the capital would be the same.

Thus, according to MM hypothesis, the total value of a levered firm (i.e. a firm having debt content in its capital structure) can not be more than that of an unlevered firm. The reverse is also true i.e. the value of an unlevered firm cannot be greater than the value of a levered firm. **This is** again because of the setting in of the arbitrage process, which will decrease the market value of the unlevered firm and increase that of the levered firm.

Modigliani & Miller proposition II

Discuss the relationship between the cost of equity and financial leverage in accordance with MM Proposition II (M-04)

In 1963 Modigliani and miller modified their theory. Part II of MM proposition states that if debt is employed and there is a tax rate, tax will be reduced due to payment of interest as tax is paid on post interest income. Due to this relief in tax, the weighted average cost of capital will come reduce

The relationship between the cost of equity and financial leverage in accordance with MM proposition II is given by the following relation.

$$r_E = r_O + D/E ((r_O - r_D)(1 - T_c))$$

Where

- r_E = Required rate of return to equity shareholders
- r_O = Required rate of return for an all equity firm
- D = Debt amount in the capital structure
- E = Equity amount in capital structure
- T_c = Corporate tax rate
- r_D = Required rate of return to lenders.
- TWACC = Total weighted average cost of capital

This can be understood with the following example.

Suppose the net operating income of a concern is Rs 2,00,000.

Equity capital is Rs 4,00,000

Tax rate is 40%

There are no debts

In such a case the rate of return on equity shareholders is calculated as under

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Net Income	2,00,000
Less Tax	80,000
Amount for equity shareholders	1,20,000
Return on equity shareholders funds	30%
Value of equity 1,20,000/0.30	4,00,000
$r_O = 30\%$	

Rs 4,00,000 is the value of unlevered firm.

The firm employs a 10% debt of Rs 1,00,000 and repays Rs 1,00,000 to equity shareholders.

The value of the firm will be = value of unlevered firm + Debt x tax rate
 $4,00,000 + 1,00,000 \times 0.40 = 4,40,000$

In such a case the Return of shareholders will be as under

Net Income	2,00,000
Less interest 10%	10,000
Profits for before tax	1,90,000
Less Tax 40%	76,000
Profits after tax	114000
Value of firm as computed above	4,40,000
Less value of debt	1,00,000
Equity shareholders funds	3,40,000
$K_e = 114000/340000 \times 100 = 33.53\%$	
$r_E = r_O + D/E ((r_O) - r_D)(1 - T_c)$	
$K_e = 30\% + (30\% - 10\%) \times (1 - 0.40) \times 1,00,000 / 340000 = 33.53\%$	

Q18. There are two firms P and Q which are identical except P does not use any debt in its capital structure while Q has Rs. 8,00,000, 9% debentures in its capital structure. Both the firms have earning before interest and tax of Rs. 2,60,000 p.a. and the capitalization rate is 10%. Assuming the corporate tax of 30%, calculate the value of these firms according to MM Hypothesis. **(Nov - 09)**

Ans: Calculation of Value of Firms P and Q according to MM Hypothesis

Market Value of Firm P (Unlevered)

$$\begin{aligned}
 V_u &= \frac{EBIT(1-t)}{K_e} \\
 &= \frac{2,60,000(1-0.30)}{10\%} \\
 &= \frac{Rs.1,82,000}{10\%} = Rs.18,20,000
 \end{aligned}$$

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Market Value of Firm Q (Levered)

$$V_E = V_u + DT$$

$$= \text{Rs.}18,20,000 + (8,00,000 \times 0.30)$$

$$= \text{Rs.}18,20,000 + 2,40,000 = \text{Rs.}20,60,000.$$

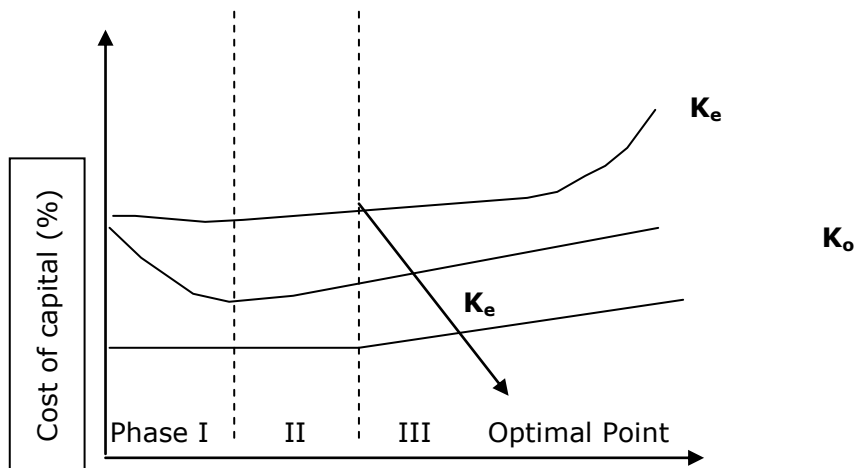
	UNLEVERED FIRM	LEVERED FIRM
NET OPERTING INCOME	2,60,000	2,60,000
LESS INTEREST	NIL	72,000
INCOME BEFORE TAX	2,60,000	1,88,000
TAX @ 30%	78000	56,400
PROFIT AFTER TAX	1,82,000	1,31,600
RATE OF EQUITY CAPITALISATION	10%	1,31,600/12,60,000 X 100 = 10.44% OR 10% + (10%-9%)(1-.3) X 8,00,000 /12,60,000 = 10.44%
VALUE OF FIRM	18,20,000	20,60,000
LESS VALUE OF DEBT	NIL	8,00,000
VALUE OF SHAREHOLDERS	18,20,000	12,60,000
IF DEBT IS EMPLOYED		
VALUE OF FIRM 18,20,000 + 8,00,000X.3		20,60,000
LESS VALUE OF DEBT		8,00,000
VALUE OF SHAREHOLDERS		12,60,000

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4. TRADITIONAL APPROACH FOR DETERMINING CAPITAL STRUCTURE.

1	Traditional approach was proposed by ezra soloman
2	Traditional approach is the midway between net income approach and net operating income approach
3	This theory states that there is an optimal capital structure and the firm can increase its value through a appropriate capital structure
4	This theory divides the capital structure in to three stages

Stage	Debt	Equity	Effect on weighted average cost of capital
1	Cost of debt remains constant	Cost of equity remains constant	Since cost of debt is less than cost of equity, weighted average cost of capital falls
2	Cost of debt remains constant	Cost of equity remains rises as shareholders perceive more risk	Since cost of debt is less than cost of equity, increase in debt reduces weighted average cost of capital. However the equity shareholders perceive the company as more risky and hence cost of equity rises. There for weighted average cost of remains constant
3	Cost of debt also rises	Cost of equity also rises	Weighted average cost of capital rises.



Debt -Equity Mix, i.e.% of Debt in Capital

Assumption of this theory.

1. Business risk is constant regardless of capital structure and the way company invests its funds
2. Taxation is ignored
3. The earning of the company are expected to remain constant in perpetuity and all investors share the same expectation about these future earnings
4. The company can change gearing by issuing debt and repurchasing equity or by issuing equity and redeeming debt.
The company will select a capital structure where the company Rs.s weighted average cost of capital is minimum.

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Example.

Degree of debt	Cost of equity	Cost of debt	Weighted average cost of capital
0%	16%	12%	16%
20%	16%	12%	15.2 stage I
50%	18.4%	12	15.2 stage II
80%	21%	15%	16.2 Stage III