

# Financial Management

## Management

Art of getting things done by others is called management.

## Financial Management

It is the managerial activity which is concerned with planning and controlling of firm's financial resources.

- Improve financial efficiency

## Objectives

- Create wealth      - Profit maximization
- Generate cash      - Wealth maximization
- Provide ROI

- 1) Financial planning
- 2) Financial control
- 3) Financial decision-making

## Functions of FM

### (a) Investment decisions

These decisions relate to the selection of assets in which funds will be invested by a firm

### (b) Financial decisions

Related to acquiring optimum finance to meet financial objectives and seeing that financial resources are managed effectively.

(c) Dividend decisions - related to financial planning process.

Related to determination as to how much and how frequently cash can be paid.

Financial planning process

### Establishing objectives

- Policy formulation
- Capital requirements
- Policies to control debt & equity capital
- Forecasting
- formulation of procedures

### Financial environment

It is part of an economy with the major players being firms, investors, and markets. Essentially, this sector can represent a large part of a well-developed economy. Individuals who own private property have the ability to grow their capital.

SEBI - Security Exchange Board of India

### Financial Institutions

An intermediary that channels the savings of individuals, businesses and governments into loans or investments. Investment banks, commercial banks etc.

financial banks, credit unions,

## Financial marketing

Financial markets are forums where suppliers of funds and demanders of funds can transact business directly.

- Physical assets vs financial market
- Spot vs future market
- Money vs capital market
- Primary vs secondary market

↳ Purchasing through stock market

\* Nominal or market interest rate

- real rate of interest or return  
(+)

expected rate of inflation

risk premium to compensate for  
uncertainty

\* Time value of money

- compounding
- Discounting

- future value → Present value

- single flow vs single flow

- multiple flows - uneven multiple flows

- Annuity

$FV_n = PV \times (1+i)^n$  → Future value of  
initial cash outflow after  
 $(1+i)^n$  → Future value in  $n$  years  
of Interest factor ( $FVIF$ )  
 $PV \rightarrow$  Initial cash outflow

↗ Rate of interest  $r\%$   
 ↗ life of the investment  
 ↗ multiple compound periods  
 $A = P(1 + r/m)^{m \times n}$

$m \rightarrow$  no. of times per year compounding  
 $A \rightarrow$  Amount at the end of period 'n'  
 $i \rightarrow$  Interest rate       $n \rightarrow$  no. of years

# If you invest 5000/- today at a compound interest of 9%, what will be the future value after 25 years.

$$\begin{aligned}
 A &= P(1 + i)^n \\
 &= 5000 (1 + 0.09)^{25} \\
 &= 5000 (1.09)^{30} (1.09)^{30} (1.09)^{15} \\
 &\approx 5000 \times 13.268 \times 13.268 \times 3.642 \\
 &\approx 32,05,685.2
 \end{aligned}$$

# A finance company advertises the pay in lump sum amt of 44,650/- at the end of 5 years to the investors who deposit annually 6000/- for 5 years. What is the interest rate implicit in this offer?

$$FVIFA = \frac{44,650}{6000} = 7.44\%$$

\* Look at FVIFA table and read the value corresponding to 5 years until 7.44  
Therefore FVIFA at 20% is 7.44

Interest rate = 20%.

## Unit - II

### Leverage

Leverage refers to an increased means of accomplishing some purpose.

In Financial Management, the term leverage is used to describe the ability of fixed cost assets/funds to increase the returns to its owner i.e. shareholders. According to James Huston, leverage is as the employment of an asset or source of funds for which the firm has to take a fixed cost or fixed return. The fixed cost also called fixed operating cost and fixed returns also called financial cost remains constant irrespective of change in volume of output of sales. Basically, there are 2 types of leverages:

- 1) Financial leverage
- 2) Operative leverage

The leverage associated with the employment of fixed cost assets is referred to as operative leverage while the leverage resulting from the use of ~~fixed~~ or return source of fund is known as financial leverage.

In addition to these two leverages, one more leverage is derived by combining both of them i.e. composite/combined leverage.

- Q) A firm is considering two financial plans with a view to examine their impact on earning per share. The total funds required for investment in assets are 5 lakhs.
- Financial plan

Particulars	Plan I	Plan II
Debt (Interest at 10% p.a)	4 Lakhs 0.02,00,000	1 Lakh 10,000
Equity shares (Rs 10 each)	1 Lakh 10,000	4 Lakhs 40,00,000
Total finances requires	5 Lakhs 50,00,000	5 Lakhs 50,00,000
No. of equity shares	10,000	40,000

The earnings before interest and tax are assumed as ₹ 50,000/ ₹ 25,000 & ₹ 1,25,000. The rate of tax is taken as 50%. Comment your answers.

	Plan - I	Plan - II
EBIT	50,000	50,000
less - Interest	40,000	10,000
EBT	10,000	40,000
less - Tax @ 50%	5,000	20,000
Earnings after tax & interest	5,000	20,000
Earnings per share (EPS)	$\frac{5,000}{10,000} = 0.5p$	$\frac{20,000}{40,000} = 0.5p$

	Plan-I	Plan-II
EBIT	26,000	25,000
less - Interest	6,000	10,000
EBT	20,000	15,000
Tax @ 50%	10,000	7,500
EPS	$\frac{12,500}{10,000} = 1.25\text{p}$	$\frac{32,500}{40,000} = 0.81\text{p}$

	Plan-I	Plan-II
EBIT	1,25,000	1,25,000
less - Interest	40,000	10,000
EBT	85,000	1,15,000
Tax @ 50%	42,500	57,500
EPS	$\frac{42,500}{10,000} = 4.25\text{p}$	$\frac{57,500}{40,000} = 1.43\text{p}$

### Conclusions

Plan-I leverages financial plan because it has 80% debt financing and has only 20% equity financing.

Plan-II is a conservative financial plan where fixed cost funds are only 20% of total funds and the rest is financed through equity capital.

The EPS is increasing in Plan-I increase of profits

It is clear from the above analysis that EPS is increasing with increase in profits in Plan-I as compared to plan-II. This is possible with the use of more FC funds in plan-I.

The increase in EPS in Plan-I is due to financial leverage because EBIT are same in all situations.

$$\text{EBIT} = \frac{1}{2} \times 100000 = 50000$$

$$50000 - 6000 = 44000$$

$$\frac{44000}{100000} \times A = 0.44 \times A$$

$$\frac{44000}{100000} \times A = 0.44A$$

$$\frac{44000}{100000} \times A = 0.44A$$

$$\frac{44000}{100000} \times A = \frac{44000}{100000} \times B$$

$$44000 \times A = \frac{44000}{100000} \times B$$

$$44000 \times A = \frac{44000}{100000} \times B$$

$$44000 \times A = \frac{44000}{100000} \times B$$

~~EPS = 6~~

Stabbed values from table

Total	Interest	Profit	EBIT	EPS	Avg
PFIFCF	1.50	0.00	1.50	0.00	
2.00PFA	2.00	0.00	2.00	0.00	
3.20PA	2.20	0.00	2.20	0.00	
3.20PAP	2.20	0.00	2.20	0.00	
4.00PA	4.00	0.00	4.00	0.00	
20.80PAW	20.80	0.00	20.80	0.00	
20.80GPA	20.80	0.00	20.80	0.00	
20.80GPA	20.80	0.00	20.80	0.00	

(\*) Shyam purchased Rs. 80,000 for a musical system at a monthly interest of 1.25%. The loan is to be repaid in 12 equal monthly instalments. Payable at the end of each month. Prepare the loan amortization schedule.

The monthly instalment

$$80,000 = A \times PV \{ FA_{n=12} \}; r = 1.25\% \\ 80,000 = A \times \frac{1 - (1+r)^{-n}}{r}, \quad r = 0.0125 \\ 80,000 = A \times \frac{1 - (1 - 0.0125)^{-12}}{0.0125} \\ = A \times \frac{1 - 1.16}{0.0125} = A \times \frac{1 - 0.86}{0.0125} \\ = A \times \frac{0.14}{0.0125} = A \times 11.02$$

$$\boxed{A = 722.1}$$

Loan amortization schedule

Month	Beg. amt	Instalment	Interest @ 1.25%	Principal	Rembal
1	80,000	722.1	1000	622.1	73779
2	73779	722.1	922.23	6298.7	67480.3
3	67480.3	722.1	843.5	6378.5	61102.8
4	61102.8	722.1	763.78	6457.2	54645.6
5	54645.6	722.1	683.02	6537.9	48107.7
6	48107.7	722.1	601.34	6619.65	41488.05
7	41488.05	722.1	518.6	6702.4	34785.6
8	34785.65	722.1	434.8	6786.12	27999.5

9	2221	349.99	6872	21127.5
10	2221	264.09	6956.9	14170.6
11	2221	177.1	7043.8	7126.2
12	2221	89	7131.9	-5.7

Q) Interest @ 12%, if frequency of compounding is 4 times, what is the amount you get on maturity. Principal \$6000, by case

$$FV = PV \left\{ 1 + \frac{r}{m} \right\}^{mn}$$

$$= 6000 \left\{ 1 + \frac{0.12}{4} \right\}^{4 \times 6}$$

$$= 6000 [1.03]^{24}$$

$$= 10164$$

Interest is also paid on interest which is called compound interest. It is calculated with the help of formulae.

$$\begin{aligned} & \text{Pmt} \\ & 0.25(1+0.07) \\ & \hline 0.2500 & 0.2675 \end{aligned}$$

$$\begin{aligned} & 0.2500 \\ & 0.2675 \\ & \hline 0.0175 \end{aligned}$$

Mr. X purchased a stock on Jan 1<sup>st</sup> 2024 for Rs. 100 and Rs. 10 received as dividend at the end of year. The stock price on 31<sup>st</sup> Dec 2024 is Rs. 110. What is holding period return.

$$\text{holding period return} \\ (x) = \frac{\text{I/R} + \text{value@end}}{\text{value@beg}}$$

$$1+x = \frac{10 + 110}{100}$$

$$100 + 100x = 120$$

$$100x = 20 \Rightarrow x = 0.2$$

$$\boxed{x = 20\%}$$

From the following info, determine the total returns. Beg value is Rs. 10,000, cash flow dividend received Rs. 250, and capital appreciation Rs. 1250. Determine holding period return.

$$1+x = \frac{\text{Income + end}}{\text{beg}}$$

$$1+x = \frac{250 + 1250}{10000}$$

$$= \frac{12000}{10000}$$

$$x = 0.2 \Rightarrow \boxed{x = 20\%}$$

The purchase price of a security is Rs. 250 as on 1<sup>st</sup> Jan 2024 & the dividend received is Rs. 10. If the expected rate of return is 15%, what will be the selling price as on 31<sup>st</sup> Dec 2024.

$$P_0 = \frac{D_1}{1+\delta} + \frac{P_1}{1+\delta}$$

$$250 = \frac{10}{1.15} + \frac{P_1}{1.15}$$

$$P_1 + 10 = 287.5$$

$$P_1 = 277.5$$

@ 20%

$$250 = \frac{10 + P_1}{1.2}$$

$$P_1 + 10 = 300$$

$$P_1 = 290$$

Mr. X purchased one stock at a price of Rs. 25 & he holds the same for 1 year. Rs. 1 in dividend is collected at end of year & share is sold for Rs. 26.50. Find  
 i) Rate of return  
 ii) If 18% & 15%, what is value of stock at the beginning.

$$1 + \delta = \frac{1 + 26.5}{25} \Rightarrow 25 + 25\delta = 27.5$$

$$25\delta = 2.5$$

$$\delta = 10\%$$

$$1 + 0.15 = \frac{1 + 26.5}{\text{beg}}$$

$$\text{beg} = \frac{22.5}{1.15} \Rightarrow \text{beg} = 23.91$$

date	value
1	23.91
2	23.91
3	23.91
4	23.91
5	23.91
6	23.91
7	23.91
8	23.91
9	23.91
10	23.91
11	23.91
12	23.91
13	23.91
14	23.91
15	23.91
16	23.91
17	23.91
18	23.91
19	23.91
20	23.91
21	23.91
22	23.91
23	23.91
24	23.91
25	23.91
26	23.91
27	23.91
28	23.91
29	23.91
30	23.91
31	23.91

NO. = 8

NO. = 8

## yield to maturity

An investor buys a bond in 1978 matures in 1980 at Rs. 900. It has maturity value of 10 years and par value of Rs. 1000. It fetches Rs. 90 every year. Calculate yield to maturity.

$$YTM = \frac{C + \frac{M-P}{n}}{\frac{M+P}{2}}$$

$$= \frac{90 + \frac{1000 - 900}{10}}{\frac{1000 + 900}{2}}$$

$$= \frac{90 + 10}{950} = \frac{10}{95}$$

$$YTM = 0.105 \times 100 = 10.5\%$$

C → Coupon  
Interest  
(per year)

M → Maturity value  
P → Purchase value

## Risk & Return of security

Systematic risk ( $\beta$ )

Unsystematic risk ( $\alpha$ )

From the following info, you are required to prepare which stock is preferable on the basis of risk & return.

Return of stock A | Return on stock B

	$\Delta x = n - \bar{x}$			
12%	0	$\frac{0}{16}$	11%	-1
16%	4	16	12%	0
4%	-8	64	13%	1
20%	8	64	10%	-2
8%	-4	16	14%	2
		160		
$\bar{x} = 60\%$			$\bar{x} = 60\%$	

$$A \therefore \frac{2A}{N} = \frac{60}{8} = 12\% \quad B = \frac{\sum B}{N} = \frac{60}{5} = 12\%$$

$$\sum d_n^2 = 160$$

$$S_d(S) = \sqrt{\frac{\sum d_n^2}{n}}$$

$$S_A = \sqrt{\frac{160}{5}} = \sqrt{32} = 5.66$$

$\therefore B$  is chosen since  $S_B$  is less

$$S_B = \sqrt{\frac{10}{3}} = \sqrt{2} = 1.414$$

$\therefore$  On the basis of exp return, both stocks are having equal return i.e. 12% but stock B is less risky when compared with A on account of least standard deviation.

### operating leverage

It results from the presence of fixed costs that helps in magnifying net operating income fluctuations owing to small variations in revenue. The operating leverage occurs when a firm has fixed cost which must be recovered irrespective of sales volume. The FC remaining same, the percentage change in operating revenue will be more than the % change in sales. The occurrence is known as operating leverage.

The degree of operating leverage depends upon the amount of fixed elements in the cost structure. It can be determined by means

of break-even of cost-volume-profit analysis. The degree of leverage calculated as  $DL = \frac{\text{Contribution}}{OP}$

Contribution = sales - VC

Operating profit = sales - VC - FC  
= Contribution - FC

Degree of  $DL = \frac{\% \text{ change in profit}}{\% \text{ change in sales}}$

Q) A firm  $FC = 60,000$   $VC = 70\%$  of sales  
sales = 2,00,000 in last year  
2,50,000 in current year.

Find change in sales & OP when  
(i) FC is not there (i.e. no leverage)  
(ii) FC is there

if fixed cost is not there	Previous year	current year	% change
Sales	2,00,000	2,50,000	25%
Less VC (70% of sales)	1,40,000	1,75,000	25%
	60,000	75,000	25%

  

if FC is there	Previous year	current year	% change
Sales	2,00,000	2,50,000	25%
( $\rightarrow$ ) VC	1,40,000	1,75,000	25%
	60,000	75,000	25%
( $\rightarrow$ ) FC	50,000	60,000	20%
Profit from operations	10,000	25,000	150%

## Comments

In situation-I, where there are no FC, the percentage change in sales & % change in OP is same.

In situation-II where there are FC, the leverage is being occurring the % change in profit 150% is much more than % change in sales i.e. 25%.

The FC element has helped in magnifying % increase in OP.

## Combined Leverage / Composite Leverage:

Both financial & operating leverage magnifies revenue of the firm. OL affects the income which is result of production on the other hand, FL is the result of financial decisions. The composite leverage focuses attention on entire income of the firm. The risk factor should be properly assessed by the management before using CL

$$DCL = \frac{\% \text{ change in EPS}}{\% \text{ change in sales}} \xrightarrow[\text{earning per share}]{}$$

$$= OL \times FL$$

- A company has sales of Rs 5,00,000  
 VC = 3,00,000, FC = 1 Lakh & long  
 term loans 4 Lakhs @ 10% rate of interest. Calculation

$$OL = \frac{\text{Contribution}}{EBIT}$$

$$= \frac{5,00,000 - 3,00,000}{5L - 3L - 1L}$$

$$= \frac{2}{1} \Rightarrow OL = 2$$

$$\begin{aligned} EBIT &= \text{Sales} \\ &\quad - VC - FC \end{aligned}$$

$$FL = (\text{Sales} - VC - FC) / (\text{Sales} - V - F - I)$$

$$= \frac{EBIT}{EBT} \Rightarrow \frac{1,00,000}{60,000} = \frac{5}{3}$$

$$CL = OL \times FL \Rightarrow 2 \times \frac{5}{3}$$

$$2 \times \frac{5}{3} = 3.33$$

$$\boxed{CL = 3.33}$$

A simplified income statement: Calculate & interpret its DOL, DFL & DCL

### Income statement

Particulars	Amt.
Sales	10,60,000
- (VC)	2,62,000
- (FC)	26,000
	<u>1,08,000</u>
EBIT	2,08,000
- Interest	1,10,000
- Taxes (30%)	<u>34,400</u>
Net income	68,600

$$DOL = \frac{S - V}{S - V - F} \cdot 2 \frac{10,50,000 - 8,67,000}{2,83,000 - 25,000}$$

$$= \frac{283000}{208000}$$

$$DOL = 1.36$$

$$DFL = \frac{208000}{18000} = 2.12$$

$$DCL = 1.36 \times 2.12$$

$$= 2.88$$

Interpretation  
DOL of 1.36 indicates that 1% change in sales is likely to result in 1.36% change in EBIT.

DFL of 2.12 indicates that 1% change in EBIT is likely to cost a change of 2.12% in net income of company.

DCL of 2.88 indicates that 1% change in sales is likely to result in 2.88% change in net income of company.

Two companies:

Particulars	P Limited	Q Ltd
Sales	500	1000
-VC	200	300
Contribution	300	200
-FC	160	400
EBIT	140	300
-Interest	60	100
EBT	100	200

You are required to determine

- calculate operating, financial & combined leverages for two companies
- comment on the relative risk position of them.

$$OL_p = \frac{300}{150} = 2$$

$$FL_p = \frac{150}{100} = \frac{3}{2}$$

$$CL_p = 3$$

$$OL_Q = \frac{700}{200} = \frac{7}{2}$$

$$FL_Q = \frac{300}{200} = \frac{3}{2}$$

$$CL_Q = \frac{9}{3} = \cancel{3}$$

$$3.5$$

### Comments

Q Ltd is higher than the P Ltd. As OL of Q Ltd is higher than the P Ltd, Q has higher DOP. The DOP of Q Ltd is higher than P Ltd as the tendency of OP to vary disproportionately with sales is higher for Q Ltd as compared to P Ltd.

Since FL for the two companies is same, both the companies have same DFR.

As CL for Q Ltd is higher than P Ltd so Q Ltd has ~~more~~ overall higher risk compared to P Ltd.

## Risk & Return

From the following data, analyse the performance of two securities

Sec - A		Sec - B	
Return	Prob	Return	Prob
8%	0.15	9%	0.3
9%	0.20	10%	0.49
10%	0.30	11%	0.3
11%	0.20		
12%	0.15		

Determination of exp return & risk of Sec A

Return	Prob	Prob return	$d = E(R) - r$	$d^2$	$P \times d^2$
0.08	0.15	0.012	0.02	0.0004	0.00006
0.09	0.2	0.018	0.01	0.0001	0.00002
0.1	0.3	0.030	0	0	0
0.11	0.2	0.018	-0.01	0.0001	0.00002
0.12	0.15	0.018	-0.02	0.0004	0.00006

$$E(R) = \frac{\sum \text{Return} \times \text{Prob}}{N} = \frac{0.08 \times 0.15 + 0.09 \times 0.2 + 0.1 \times 0.3 + 0.11 \times 0.2 + 0.12 \times 0.15}{5} = 0.107$$

$$\sigma = \sqrt{Pd^2} = \sqrt{16 \times 10^{-5}} \\ = 4 \times 10^{-2} \sqrt{10} = 0.04 \times 0.316 \\ = 0.0126$$

$$\sigma = 1.26\%$$

Security - B

Return	Prob	Prob return	d	$d^2$	$P \times d^2$
0.09	0.3	0.027	0.01	0.0001	0.00003
0.1	0.4	0.04	0	0	0
0.11	0.3	0.033	-0.01	0.0001	0.00003

$$E(R) = \frac{0.09 + 0.1 + 0.11}{3} = 0.1$$

$$\sum Pd^2 = 6 \times 10^{-5}$$

$$\sigma = \sqrt{6 \times 10^{-5}} \approx 0.22\%$$

$$= 0.0022$$

$$\sigma = 0.22\%$$

$\therefore$  Select  $B$  due to low std. deviation and same expected return.

### Risk to Portfolio Risk

#### Determination of portfolio return & risk

Portfolio means investment in two or more securities. The return & risk of the portfolio can be determined follows

$$E(R_p) = x_1 R_1 + x_2 R_2$$

where  $E(R_p) \rightarrow$  Exp. return on portfolio

$x_1, x_2 \rightarrow$  Proportion of investment

$R_1, R_2 \rightarrow$  Return on each securities

#### Portfolio risk

$$\sigma_p = \sqrt{x_1^2 \sigma_1^2 + x_2^2 \sigma_2^2 + 2x_1 x_2 \rho_{12} \sigma_1 \sigma_2}$$

$\rho_{12} \rightarrow$  correlation

$$\rho_{12} = 0.75$$

$\sigma = 0.22\%$

1	2	3	4	5	6
1000.0	1000.0	10.0	100.0	1.0	100.0
0	0	0	0.0	0.0	1.0
0.0008	1000.0	10.0	100.0	0.0	100.0

$$200 \times 0.22 =$$

Stock L & M have yielded the following returns for the last two years

Year	Return on Stock (%)	
	L	M
2003	12	14
2004	18	12

- Determine (i) Expected return on portfolio made up of 60% of L & 40% of M  
(ii) find out the st.dev for each stock  
(iii) what is the covariance & corr. of  
(iv) correlation b/w L & M  
(v) What is portfolio risk of a portfolio made up of 60% of L & 40% of M

$$\text{(i)} E(R_p) = X_1 R_1 + X_2 R_2 \\ = 0.6(15) + 0.4(13) \\ = 0.09 + 0.052 \\ = 9 + 5.2 \\ = 14.2\%$$

$$\text{(ii)} E(R_p) = 14.2\% \\ \sigma_p^2 = \frac{(12-15)^2 + (18-15)^2}{2} = \frac{12}{2} = 9 \\ \sigma_p = \sqrt{9} = 3$$

$$\sigma_L^2 = \frac{(14-13)^2 + (12-13)^2}{2} = \frac{2}{2} = 1$$

$$\sigma_M^2 = 1 \\ \text{standard deviation} \\ \sigma = 3$$

standard deviation

$$(iii) r = \frac{cv}{s_x s_y} \quad \text{covariance}$$

$$cv = \frac{(12-15)(14-13)+(18-15)(12-13)}{2}$$

$$= \frac{-3-3}{2} = -3$$

$$\boxed{cv = -3}$$

$$r = \frac{-3}{3 \times 1} = -1 \Rightarrow \boxed{r = -1}$$

(iv)

$$s_p^2 = x_1^2 s_1^2 + x_2^2 s_2^2 + 2x_1 x_2 s_1 s_2 r_{12}$$

$$= 0.68 \times 9 + 0.04 \times 1 + (0.0024) \cancel{2}(3)(2)(-1)$$
~~$$= 0.54 + 0.04 \leftarrow 0.0144$$~~
~~$$= 0.58 - 0.0144$$~~

$$= 0.565$$

~~$$= 0.6 \times 9 + 0.4 \times 1 + (0.24)(2)(3)(1)(-1)$$~~
~~$$= 5.4 + 0.4 - 1.44$$~~
~~$$= 5.8 - 1.44 = 4.36$$~~

$$s_p^2 = 0.36 \times 9 + 0.16 \times 1 + (0.24)(2)(3)(1)(-1)$$

$$= 1.96$$

$$\boxed{s_p = 1.4}$$

~~Consider~~

$\therefore$  Consider  $\beta = 1$  & if  $s_p > \beta$

↓  
negative influence  
if  $s_p < \beta$   
↓  
positive influence

stocks Y & Z have the following parameters:

Particulars	Stock Y	Stock Z
Exp return	20	30
Exp variance	16	25

Corr:

Covariance b/w Y & Z = 20  
Is there any advantage of holding a combination of Y & Z

$$r = \frac{C V}{S_1 S_2} \quad C V = 20$$

$$= \frac{20}{4 \times 5} = 1$$

∴ Positive correlation. There is no advantage of holding a combination of Y & Z as risk cannot be reduced on account of perfectly positive correlation exists b/w these two stocks.

The expected rates of return & probs of their occurrence for security A & B are given below.

Probability	Return on A	Return on B
0.05	-2	-3
0.20	9	6
0.50	12	11
0.20	15	14
0.05	26	19

(i) Find exp return of each security.

(ii) If an investor interested to invest equal proportion on both securities, what would be the return?

- (iii) If the proportion is changed  
25% & 25% and 25% & 25%,  
would be exp reduction

c)  $E(R_p) = -0.1 + 1.8 \times 6 + 3 + \cancel{0.2} \times 1.3$   
 $\approx 12$

$$E(R_p) = -0.15 + 1.2 + 5.5 + 2.8 + \cancel{0.2} \times 0.9$$
 $\approx 10.3$

(ii)  $E(R_p) = 0.5 \times 12 + 0.5 \times 10.3$   
 $= 6 + 5.15$   
 $= 11.15\%$

(iii)  $E(R_p) = 0.25 \times 12 + 0.25 \times 10.3$

$$E(R_p) = 0.25 \times 12 + 0.25 \times 10.3$$
 $\approx 11.525\%$

- A financial analyst analyzing two investment alternatives of Y & Z. The estimated rates of return & their chances of occurrence for the next year are given below

Probability	Return on stocks	
	Y	Z
0.20	22%	5%
0.60	14%	15%
0.20	-4%	25%

Determine each alternatives expected rate of returns, variance & std.

ii) Is  $y$  comparatively riskless?

iii) If financial analyst wishes to invest half in  $z$ ,  $y$  &  $w$ , would it reduce risk?

$$E(R_y) = 4 \cdot 4 + 8 \cdot 4 - 0 \cdot 8$$

= 12.0

and probability is 0.5

$$E(R_z) = 1 + 9 + 5 = 15$$

standard deviation is 0.2

$$S_x^2 = (22-12)^2 \cdot 0.2 + (14-12)^2 \cdot 0.6 + (-4-12)^2 \cdot 0.2$$

$$S_x^2 = 20 + 2 \cdot 4 + 16 = 51.2$$

$$\Rightarrow S_x = \sqrt{51.2} = 7.14$$

$$E(R_w) = (-10)^2 \cdot 0.2 + 0 + 40^2 \cdot 0.2$$

$$S_w^2 = 90 \Rightarrow S_w = 9.49$$

$y$  is not riskless

$z$  is riskless, short holds

$$S_p^2 = 0.25 \cdot 7.14^2 + 0.25 \cdot 15^2 + (14-12)(15-15)(0.25)$$

$$+ 0.25 \cdot (22-12)(15-15)(0.25) + 0.25 \cdot (-4-12)(25-15)(0.25)$$

$$= -20 - 32 = -52$$

$$\sqrt{-52} = \frac{-52}{\sqrt{8.58 \times 6.32}} = -0.96$$

$$S_p^2 = 0.25(7.14^2 + 15^2) + 2(0.25)(54.2256)(-0.96)$$

$$= 28.4 + 26 = 54.2256$$

$$\Rightarrow S_p = \boxed{1.54}$$

## Cost of Capital

Cost of capital of a firm is the minimum rate of return expected by investors. It is the weighted avg cost of various sources of capital used by the firm. The capital used by a firm may be in the form of debt, preference capital, retained earnings & equity shares.

### Definition

It is the rate that must be earned on the net proceeds to provide for cost elements of the burden at the time they fall due. According to James, it is a cutoff rate for the allocation of capital to investment of projects. It is the rate of return on a project that will leave unchanged the market price of the stock.

### Computation of cost of capital.

#### 1) Cost of debt

##### (a) Cost of perpetual / irredeemable debt

The cost of debt is the rate of interest payable on debt.

$$\frac{P_0 - P_1}{P_0} = \frac{I}{P_0}$$

$$K_{db} = \frac{I}{P}$$

$K_{db}$  → before tax cost of debt  
 $I$  → Interest

$P$  → Principal amt

In the case of debt raised at premium or discount, we should consider 'P' as amt of net proceeds received from the issue and not face value of security

$$K_{db} = \frac{I}{NP} \quad NP \rightarrow \text{Net proceeds}$$

$$K_{da} = K_{db} (1-t) = \frac{I}{NP} (1-t)$$

$K_{da}$  → After tax cost of debt

$t$  → tax rate

X Ltd issues Rs 50,000 8% debentures @ par. The tax rate applicable to the company is 50%. Compute cost of debt capital.

$$\underline{K_{da}} = \frac{I}{NP} (1-t)$$

$$\sim \frac{4000}{50000} (1-0.5)$$

$$= \frac{2}{25} \times \frac{1}{2}$$

$$\boxed{K_{da} = 4\%}$$

(Y Ltd issues Rs. 50,000, 8% debenture at a premium of 10%, the tax applicable to the company is 60%. Compute cost of debt capital.)

$$K_{da} = \frac{4000}{55000} (1 - 0.6)$$

$$= \frac{4}{55000} \times \frac{4}{10} \times 100\%$$

$$= \frac{32}{55000} \times 100\%$$

$$K_{da} = 2.91\%$$

A Ltd issues Rs. 50,000 of 8% debenture at a discount of 5%. Tax = 50%.

~~$$K_{da} = \frac{4000}{45000} \times (1 - 0.5)$$~~

~~$$\frac{4}{45} \times \frac{1}{2} \times 100\%$$~~

$$K_{da} = \frac{4000}{42500} (1 - 0.5)$$

$$= \frac{40}{425} \times \frac{1}{2} \times 100\%$$

$$K_{da} = 4.21\%$$

B Ltd issues Rs. 1,00,000, 9% debentures at premium of 10%. The cost of flotation on 2%. The tax rate applicable is 60%. Compute cost of debt.

$$\begin{aligned} NP &= 1L + 10\% \text{ of } 1L \\ &= 1L + 10K \\ &= 1,10,000 \end{aligned}$$

$$\text{flotation cost} = 110000 \times \frac{2}{100} \\ = 2200$$

$$NP = 1,10,000 - 2200 \\ = 1,07,800$$

$$K_{da} = \frac{9000}{107800} \times \frac{4}{10}$$

$$K_{da} = 3.34\%$$

(b) Cost of redeemable debt

i) Before tax

$$K_{db} = \frac{i + \frac{1}{n}(RV - NP)}{\frac{1}{2}(RV + NP)}$$

$i \rightarrow$  Annual interest

$n \rightarrow$  No. of years in which debt is to be redeemed

$RV \rightarrow$  Redeemable value of debt

$NP \rightarrow$  Net proceeds of debentures

$$3.34\% \text{ ad. b.d.}$$

(iii) After tax

$$I(1-t) + \frac{1}{n} (RV - NP)$$

$$K_{da} = \frac{\frac{1}{2} (RV + NP)}{1}$$

$t \rightarrow \text{tax}$

A company issues Rs. 10,00,000, 10% redeemable debentures at a discount of 5%. The cost of floatation amounts to Rs. 30,000. The debentures are redeemable after 5 years. Calculate before tax & after tax cost of debt assuming a tax rate of 50%.

$$K_{db} = \frac{100000 + \frac{1}{5} (1000000 - 920000)}{\frac{1}{2} (1000000 + 920000)}$$

$$= \frac{100000 + 16000}{960000} = \frac{116000}{960000} = 12.08\%$$

$$K_{db} = 12.08\%$$

$$K_{da} = \frac{100000 \times \frac{1}{2} + 16000}{960000} = \frac{66000}{960000} = 6.88\%$$

$$K_{da} = 6.88\%$$

A 5 year Rs. 100 debenture of a firm can be sold for net price of Rs. 96.50. The coupon rate of interest is 14% pa and the debenture will be redeemed at 5% premium on maturity. The firm's tax rate is 40%. Compute after tax cost of debentures.

$$\text{cost of debentures} = \frac{14(0.6) + \frac{1}{3}(105 - 96.5)}{\frac{1}{2}(105 + 96.5)}$$

$$K_{da} = \frac{\frac{14}{3} + \frac{1}{5}(8.5)}{\frac{1}{2}(201.5)} = \frac{\frac{50.5}{6}}{201.5}$$

Assuming that a firm pays tax at 50%, compute the after tax cost of debt capital in the following cases

- i) The perpetual bond sold at par, coupon rate of interest being 7%.
- ii) A 10 year 8% Rs. 1000 per bond sold at Rs. 950 less 4% underwriting commission.

$$i) K_{da} = \frac{i}{NP} (1-t)$$

$$= \frac{7}{100} (1-0.4) = 3.5\%$$

$$\text{iii) } K_{da} = \frac{I(1-t) + \frac{1}{n}(RV - NP)}{RV + NP}$$

$$= \frac{80(1-0.5) + \frac{1}{10}(1000 - 912)}{1000 + 912}$$

$$= \frac{40 + 8.8}{916} = \boxed{5.1\%}$$

## 2) Cost of preference capital

A fixed rate of dividend is payable on preference shares. The cost of preference capital, which is perpetual, can be calculated as follows

$$K_p = \frac{D}{P}$$

$K_p$  → cost of preference capital

$D$  → Annual preference dividend

$P$  → Proceeds of preference share capital

## Premium (%) Discount

$$K_p = \frac{D}{NP}$$

$NP$  → Net proceeds

Sometimes redeemable preference shares are issued. It is calculated as follows.

$$D + \frac{MV - NP}{n}$$

$$K_{Pr} = \frac{\frac{MV - NP}{n}}{\frac{MV + NP}{2}}$$

$D \rightarrow$  Dividend

$MV \rightarrow$  Maturity value

A company issues ~~Rs. 10,000~~ 10%.

A company issues of Rs. 100 each. Cost of issue is 2%. per share. Calculate cost of preference capital if these shares are issued ~~at par~~.

i) @ Par

ii) @ Premium 10%.

iii) @ Discount 5%

$$K_P = \frac{100000}{1000000 - 20000}$$

$$= \frac{100000}{800000} = 0.125$$

$$K_P = 10.2\%$$

$$\text{(iii)} \quad K_p = \frac{100000}{1100000 - 20000}$$

$$= \frac{100000}{1080000}$$

$$= 9.25\%$$

$$\text{(iii)} \quad K_p = \frac{100000}{950000 - 20000}$$

$$= \frac{100000}{930000}$$

$$= 10.25\%$$

A company issues 10,000 10% preference shares of Rs. 100 each redeemable after 10 years @ premium of 5%, the issue is Rs. 2 per share. Calculate cost of preference capital.

$$K_p = \frac{D + \frac{MV-NP}{n}}{\frac{MV+NP}{2}}$$

$$= \frac{100000 + \frac{1050000 - 930000}{2}}{1060000 + 930000}$$

$$= \frac{100000 + \frac{20000}{2}}{1020000 + 203000}$$

$$= \frac{1015000}{1015000}$$

$$\frac{102000}{1015000}$$

~~K<sub>p</sub> = 10.64%~~

$$K_p = 10.64\%$$

### 3) Cost of equity share capital

The cost of equity is the maximum rate of return that the company must earn on equity financed portion of its investment in order to leave unchanged the market price of its stock.

#### (a) Dividend by price ratio method / dividend yield method

Under this method, discount rate that equates the present value of expected future dividends per share with NP of a share

$$k_e = \frac{D}{NP} \text{ or } \frac{D}{MP}$$

(or)  $\frac{\text{Dividends}}{\text{Market Price}}$

$k_e \rightarrow$  cost of equity capital

$D \rightarrow$  expected dividend per share

$NP \rightarrow$  Net proceeds per share

$MP \rightarrow$  Market price of share

A company issues 1000 equity shares of Rs. 100 each at premium of 10%.

The company has been paying 20% dividend to equity share holders for past 5 years & expects to maintain the same in future also. Compute cost of equity.

capital. Will it make any difference?  
MP of equity share is ~~Rs. 100~~ 160

$$k_c = \frac{20}{160} = 12.5\%$$

$$k_c = \frac{20}{160} = 12.5\%$$

(b) Dividend yield + growth in dividends method

$$k_c = \frac{D_1}{NP} + G = \frac{D_0(1+G)}{NP} + G$$
$$= \frac{D_1}{NP} + G$$

$D_1 \rightarrow$  Expected dividend per share  
at end of year

$NP \rightarrow$  Net proceeds per share

$G \rightarrow$  growth rate in dividends

$D_0 \rightarrow$  Previous year dividend

A company plans to issue 1000 new shares of Rs. 100 each @ par. The flotation costs are expected to be 5% of share price. The company pays a dividend of Rs. 10 per share initially and the growth in dividends is expected to be 5%. Compute cost of new equity share.

$$K_C = \frac{D_1}{N P} + G$$

$$= \frac{10}{95} + 5$$

$$= 5.1$$

$$\boxed{\text{New cost} = 15.1}$$

## Capital Budgeting

- Standard techniques - Present value of cash flows, equivalent cash flow at different rates, present value of cash flows, net present value, internal rate of return, payback period, etc.
- Capital budgeting must consider risk factors and risk-free rates.
- Capital budgeting must consider tax shields and tax loss carryforwards.
- Discounted cash flow techniques
  - discounting future cash flows at a rate that reflects the risk of the cash flows.
  - discounting cash flows at a rate equal to the required return by investors.

## Capital Budgeting

It is a process of making investment decisions in capital expenditure, Capital expenditure is defined as benefits of which are expected to be received over a period of time exceeding one year.

Acc to Charles T., capital budgeting is long term planning for making and financing capital outlays.

### Need & importance

- Helps to ~~adjust~~ attract large investment project
- Long term commitment of funds
- Irreversible in nature
- Long term effect on profitability
- Difficulties on investment decisions
- National importance

### Capital budgeting process

Step 1: Identify investment proposals

Step 2: Screen the proposals

Step 3: Evaluate various project proposals

Step 4: Fix priorities

Step 5: Final approval

Step 6: Implementation of proposals

Step 7: Review of performance

Methods of capital budgeting/Evaluation of investment proposals

1) Traditional methods

(a) Payback period method

(b) Accounting rate of return (ARR)

2) Discounted methods (Time adjusted)

(a) Net present value (NPV)

(b) Internal rate of return method (IRR)

(c) Profitability index method (PI)

Payback Period Method:

It is also called payout or payoff method. It represents the period in which the total investment in permanent assets pays back itself.

$$PB = \frac{CFO (or) OC}{ACI}$$

CFO → Cash outlay of project

OC → Original cost of asset

ACI → Annual cash inflow

A project costs £1,00,000 and an annual cash inflow of £20,000 for 8 years. Calculate payback period.

$$\text{Payback period} = \frac{\text{Initial outlay}}{\text{A. Cash inflow}}$$

$$= \frac{1,00,000}{20,000} = 5 \text{ years}$$

Determine the payback period for project which requires a cash outlay of £10,000 and generates cash inflow of £2000, £4000, £2000 & £2000 in 2<sup>nd</sup>, 3<sup>rd</sup> & 4<sup>th</sup> year respectively.

Determination of PBP (Initial Investment)

$X_i$	ACI	cumulative ACI
1	2000	2000
2	4000	6000
3	3000	9000
4	2000	11,000

$$3 + \frac{1000}{2000}$$

$$3 + 0.5 = 3.5 \text{ years}$$

$3.5 \text{ years} \Rightarrow 3 \text{ yrs } 6 \text{ m}$

A project costs £L and yields annually a profit of 80,000 after depreciation at 12% per annum & Before tax of 50%.

Calculate PBP?

$$\text{Profit before tax} = 80,000$$

$$\text{Tax @ } 50\% = 40,000$$

$$\text{PBT} = \underline{40,000}$$

$$\begin{array}{l} \text{(a) Depreciation} \\ @ 12\% \\ \text{on } \underline{\text{SL}} \end{array} = \underline{60,000}$$

$$1,00,000$$

PBDATA I

$$\underline{6,00,000}$$

$$\text{PBP} = \underline{1,00,000}$$

These are 2 projects X & Y each project requires an investment of 20,000. You are required to rank these projects once to payback period from the following info

Year	Project X	Project Y
1	1000	2000
2	2000	4000
3	4000	6000
4	5000	8000
5	8000	-

Cumulative profit  
of X after 5 yrs = 20,000  
Initial investment = 20,000

$$PBP(X) = 5 \text{ yrs}$$

Cumulative profit  
of Y after 4 yrs = 20,000

$$PBP(Y) = 4 \text{ yrs}$$

∴ Choose project Y

Average

Accounting rate of return method (ARR)

This method takes into account the earnings expected from the investment over their whole life. It is known an accounting rate of return for the reason that, under this method, the concept of profit (net profit after depreciation & tax) is used rather than cash inflows. Under this method, a project with higher rate of return is selected as compared to the one with lower rate of return.

$$ARR = \frac{\text{Total profits (after dep & tax)}}{\text{Net investment of project} \times \text{No. of years of profit}}$$

$$(08) \quad \text{ARR} = \frac{\text{Avg annual profits}}{\text{Net inv of project}} \times 100$$

A project requires an investment of Rs. 5L and has a scrap value of Rs. 20,000 after 5 years. It is expected to yield profit after dep & taxes during the 5 years amounting to Rs. 40,000, 60,000, 70,000, 60,000 & 20,000 resp. Calculate avg rate of return.

$$\text{Total profit} = 40 + 60 + 70 + 60 + 20 \\ = 2,140,000$$

$$\text{Avg profit} = \frac{2140000}{5} = 428,000$$

$$\text{Net inv} = 5,00,000 - 20,000 \text{ (scrap value)} \\ = 4,80,000$$

$$\text{ARR} = \frac{428000}{480000} \times 100 = 88\%$$

Calculate ARR for the projects A & B from the following:

Particulars	Project A	Project B
Investments	20,000	30,000
Expected life (no salvage value)	5y	8y
Profits	Rs. 20,000 x 50% = Rs. 10,000	Rs. 30,000 x 50% = Rs. 15,000

Projected net incomes after interest  
depreciation & tax

Year	Project A	Project B
1	2000	3000
2	1500	3000
3	1500	2000
4	1000	1000
5	-	1000
	6000	10,000

If the required rate of return is 12%, which project should be undertaken?

### Determination of ARR

Particulars	Project A	Project B
Total profits (after Dep., tax, int)	6000	10,000
Avg profit	1500	2000
Net investment	20,000	20,000
ARR	$\frac{1500}{20000} \times 100 = 7.5\%$	$\frac{2000}{30000} \times 100 = 6.67\%$

If we calculate ARR on avg investment which initial inv divided by 2.

Avg Inv	$\frac{20000}{2} = 10,000$	$\frac{30000}{2} = 15,000$
ARR	$\frac{1500}{10000} \times 100 = 15\%$	$\frac{2000}{15000} \times 100 = 13.33\%$

The average return on avg investment  
is highest in case of project A & it  
is also greater than the required rate  
of return of 12%. Hence, project A  
is suggested to be undertaken.

Kuthile Ltd is considering the purchase  
of a machine. Two machines are  
available namely E & F. The cost of  
each machine is 60,000. Their expected  
life is 5 years. Net profits before  
tax & after dep during expected life  
of the machines are given below

Year	Machine E	Machine F
1	15,000	8,000
2	20,000	15,000
3	25,000	20,000
4	15,000	30,000
5	10,000	20,000
	<u>85,000</u>	<u>90,000</u>

following the method of avg return on  
avg investment, ascertain which of the  
alternatives will be more profitable.  
The avg rate of tax is 50%.

Profits after tax

$$\text{Machine E} \rightarrow \begin{array}{r} 85000 \\ (-) 42600 \\ \hline 42600 \end{array}$$

$$\text{Machine F} \rightarrow \begin{array}{r} 90000 \\ (-) 46000 \\ \hline 46000 \end{array}$$

E F

Avg profit 8600 9000

Investment 60000 60000

ARR 14.16% 15%

For avg ARR

Net inv 30000 30000

Avg ARR 28.33% 30%

∴ Since the ARR of Machine F is greater, it is profitable to buy F

## Net Present Value (NPV):

It is the modern method of evaluating investment proposals. This method takes into consideration the time value of money and attempts to calculate the return on investment by introducing the factor of time as element. It recognizes the fact that a rupee earned today is worth more than the same rupee earned tomorrow. The present value of one rupee in any no. of years can be found with the use of following formula:

$$PV = \frac{1}{(1+r)^n}$$

PV → present value  
 $r \rightarrow$  rate of interest  
 $\therefore$  discount rate

The present value of cash inflows for a no. of years is found as follows:

$$PV = \frac{A_1}{(1+r)} + \frac{A_2}{(1+r)^2} + \frac{A_3}{(1+r)^3} + \dots + \frac{A_n}{(1+r)^n}$$

$A_1, A_2, \dots, A_n \rightarrow$  future net cash flows  
 $\therefore$  profit after tax before dep)

$r \rightarrow$  rate of interest

$n \rightarrow$  no. of years

NPV =  $V_{NPV}$

From the following info, calculate net present value of the two projects & suggest which should be accepted assuming a discount rate of 10%.

Particulars	Project X	Project Y
Initial invest	20,000	30,000
Estimated life	5y	8y
Scrap value	1000	2000

The profits before dep & after tax are as follows

Project	Year 1	Year 2	Year 3	Year 4	Year 5
X	5000	10,000	10,000	5000	2000
Y	20,000	10,000	5000	3000	2000

### Net present value - Project X

Year	Cash inflow	PV @ 10%	PV of cash inflow
1	5000	0.909	4545
2	10,000	0.826	8260
3	10,000	0.751	7510
4	5000	0.683	2049
5	2000	0.621	1242
Scrap value (Year 5)	1000	0.621	621
		PV of FCF	24227

$$\text{Less Initial inv} (-20,000) \\ \text{NPV} = 4227$$

# NPV - Project Y

Year	Cash inflow	PV @ 10%	PV of CI
1	20,000	0.909	18180
2	10,000	0.826	8260
3	5000	0.751	3756
4	3000	0.683	2049
5	2000	0.621	1242
6	2000	0.562	1242
Sum P			15028
		PV of FCI	34728
		Initial inv (-) 30000	
		NPV - 4728	

We find the NPV of project Y is higher than NPV of project X & hence it is suggested that Project Y should be selected unless the project is unacceptable unless the yield is 10%.

Outflows given below with cash inflows in VRS

Years	Outflows	Inflows
0	beginning 60,000	0
1	outflow 30,000	20,000
2	outflow 30,000	30,000
3	outflow 30,000	60,000
4	outflow 30,000	80,000
5	outflow 30,000	30,000

Salvage value - 40,000, calculate NPV.

Year	CF	PV @ 10%	PV of CF
1	20,000	0.909	18180
2	30,000	0.826	24780
3	60,000	0.751	45060
4	80,000	0.683	54640
5	30,000	0.621	18630
Scrap	40,000	PV of FCF	12484
			18618
		Initial inv	(-) 150000
			(-) 27270
		NPV	<u>- 8860</u>

### Internal rate of return (IRR)

It is a modern technique that takes into account the time value of money. It is also known as time adjusted rate of return or discount rate of return or yield method or trial & error yield method. In NPV method, the NPV is determined by discounting the future cash flows of a project at a predetermined or a specified rate called cutoff rate but in IRR, the cashflows of a project are discounted at a suitable rate by hit & trial method, which equates the NPV so calculated to the amount

of industry. Under this method, discount rate is determined internally.

initial investment of project is 60,000. Life of asset is 4 years. Estimated net annual cash flows:

Year 1 - 15000

Calculate IRR.

Year 2 - 20,000

Year 3 - 30,000

Year 4 - 20,000

Costing

Determination of IRR

Year	@ 10%	@ 12%	@ 14%
1	0.909	0.893	0.877
2	0.826	0.797	0.769
3	0.751	0.712	0.675
4	0.683	0.636	0.592
	13635	13295	13155
	16520	15940	15380
	22530	21360	20220
	13660	12720	11840
	66345	63415	60825

	@ 15%
.870	13050
.756	15120
.653	19240
.582	11440
	59350

The present value of cash flows @ 14% is 60,625 and @ 15% is 59350. So, initial cost of investment is 60,000 falls between these two discount rates.

@ 14% — NPV + 625

@ 15% — NPV - 650

So, IRR = 14.55%

Profitability Index (PI):

It is also called as benefit cost ratio (or) desirability factor. It explains the relationship b/w PV, CI & PV of CO. It is calculated as follows:

$$PI = \frac{PV \text{ of CI}}{PV \text{ of CO}} \quad (\text{or}) \quad \frac{PV \text{ of CI}}{\text{Initial cash outlay}}$$

It is also calculated through NPV.

$$\text{PI of net} = \frac{NPV}{\text{Initial cash outlay}}$$

The net profitability index can also be found as  $PI - 1$

$$PI_N = PI - 1$$

The initial cash outlays of project is ₹ 50,000 & it generates CI of ₹ 20,000, ₹ 15,000, ₹ 25,000 & ₹ 10,000 in 4 years.

Using present value index, appraise profitability of proposed investment.

assuming 10% rate of discount  
therefore PV of cash inflows

$$= 20,000 \times 0.909 = ₹ 18,180$$

$$= 15,000 \times 0.826 = ₹ 12,390$$

$$= 25,000 \times 0.751 = ₹ 18,775$$

	C I	P V @ 10%	P V
1	20,000	0.909	<del>46180</del> 18180
2	16,000	0.826	12390
3	26,000	0.751	18775
4	10,000	0.683	683
			56175
			$\frac{56175}{50000} \leftarrow 1.1235$
			NPV 6175

$$PI(\text{Gross}) = \frac{PV \text{ CI}}{\text{Outlay}} = \frac{56175}{50000}$$

$$\boxed{PI_G = 1.1235}$$

As  $PI > 1$ , the proposal can be accepted.

$$PI_{\text{net}} = \frac{NPV}{\text{outlay}} = \frac{6175}{50000}$$

$$\boxed{PI_N = 0.1235}$$

As net PI is positive, the proposal can be accepted.

for every 1 rupee of investment, there is a chance to get 12% profit.

From the following information, a company has investment opportunity costing 40,000 with following cash flow after tax & before dep as follows.

Year	net cash flow
1	2000
2	2000
3	2000
4	2000
5	2000
6	2000
7	10,000
8	15,000
9	10,000
10	4000

- Using 10% as cost of capital, determine the following:
  - Pay back period
  - NPV @ 10%
  - P.I @ 10%
  - IRR

Year	NC I	Cumulative
0	0000	0000
1	2000	2000
2	2000	14000
3	2000	21000
4	2000	28000
5	2000	35000
6	10000	43000
7	15000	58000
8	10000	78000
9	4000	82000
10		

initial inv = 40,000

It is b/w year 5 & 6

$$5 + \frac{5000}{8000}$$

5.625 years → Payback period

for ARR, Avg profit = 8200

$$\text{ARR} = \frac{8200}{40000} = 20.5\%$$

~~NPV~~

Year	NC I	Cumulative
0	00000	0000
1	2000	2000
2	2000	14000
3	2000	21000
4	2000	28000
5	2000	35000
6	8000	43000
7	10000	53000
8	15000	68000
9	10000	78000
10	4000	82000

Year	NCI	PV@ 10%	PV of CI
1	2000	0.909	1818
2	2000	0.826	1652
3	2000	0.751	1502
4	2000	0.683	1366
5	2000	0.621	1242
6	2000	0.564	1132
7	8000	0.513	4096
8	10000	0.466	4660
9	15000	0.424	6360
10	10000	0.386	3860
			18942

$$\text{Ini inv } \leftarrow \underline{40000} \quad \text{NPV} = 8942$$

July 2009 checklist June 2010

## UNIT - I

### Working capital management

Rotation of cash is management of working capital. Balance b/w receipts & honours.

According to Ginsenberg, circulating capital means current assets of a company that are changed in the ordinary course of business from one form to another. For example cash to inventories, inventories to receivables, receivables to cash etc.

These are 2 types:

- 1) Gross WC
- 2) Net WC

In a broad sense, the term WC refers to gross WC. It represents the amt of funds invested in current assets. Hence gross WC is the capital investment in total current assets of the enterprise.

Ex: Cash in hand, cash at bank, BR, sundry debtors, accrued income etc

## Net Working capital

Excess of current assets over current liabilities

$$\text{Net WC} = \text{CA} - \text{CL}$$

### Current liabilities

- Bills payable, sundry creditors, expense, dividends payable, bank overdraft etc

### Balance sheet of Parrot Ltd

Liabilities	Amt	Assets	Amt
Equity shares	2L	Goodwill	20,000
8% debentures	1L	L&B	1,50,000
Reserves & surplus	50,000	PLM	10,00,000
Sundry creditors	1,50,000	F Goods	60,000
Bills payable	30,000	Work in progress	40,000
Office expenses	20,000	Prepaid expenses	20,000
Fixation provision	20,000	Market expenses	60,000
Proposed dividends	30,000	Sundry debtors	90,000
Bank overdraft	50,000	BBR fund	20,000
Trade receivable		Cash at bank	90,000
	30L 16,50,000		6,50,000

Determine gross working capital & net working capital less than hand in desk  
 → the amount less less cash available

$$\text{Total current assets} \\ \text{CA} = 3,80,000$$

$$\text{WC} = \text{CA} - \text{CL} \\ = 3,80,000 - 3,00,000 \\ = 80,000$$

### factors affecting WC

/ nature / characteristics of business

/ size / scale of business

Policies

/ length of production cycle (or)  
/ manufacturing process

/ seasonal variations

- WC cycle

- Rate of stock turnover

- Credit policy (linked with cash)

- Business cycle

- Credit growth of business

- Earning capacity & dividend policies

- Price level changes

- Other factors

- collection period

- credit period

- sales level

- depreciation & cost

## Proforma

### Statement of WC requirement

Particulars	Amt	Amt
<u>Current Assets</u>		
(a) Cash	x	
(b) Stock	x	
(c) B/F		x
Total CA	xxx	xxx
<u>Current Liabilities</u>		
(a) Creditors	x	
(b) B/P	xx/39	
(c) Bank Overdraft	x	
Total CL	xxx	xxx
Net WC	xxx	xxx

- Prepare an estimate of WC requirement  
from the following information of a  
trading company

Projected Annual Sales 1,00,000  
Selling price (SP) 8 per unit  
Net profit sales 25%  
Avg credit period allowed  
(Debtors) to customers 8 weeks

Avg credit period allowed  
to suppliers (Creditors) 4 weeks

Avg stock holding 12 weeks

Allow 10% contingencies

Statement of WC Reg

Current Assets		Sales = 8L x 8 = 8L Profit - 25% i.e. 2L Cost of sales = 6L
Debtors (8 weeks) $(6,00,000 \times 8) / 52$	92,308	
Stock (12 weeks) $(6L \times 12) / 52$	1,38,462	
CA		
		2,30,770
Current Liabilities		
Creditors (4 weeks) $(6L \times 4) / 52$	46154	
CL		46154
Net WC		184616
10% contingency		(+) 18462
		203078
NWC reqd	= 2,03,078	

KR traders Ltd are engaged in large scale retail business from following info. You are required to forecast their WC requirements

Projected Annual Sales 1.5L  
25%

y. Net profit

Avg credit period (debtors) 8 weeks

Avg creditors 4 weeks

Avg stock 8 weeks

10% contingency

# Statement of WC seq

<u>CA</u>		
Debtors (8 weeks)		
$112000 \times 8$	17308	
$\frac{52}{52}$		
Stock (8 weeks)	17308	
		34616
<u>CL</u>		
Creditors (4 weeks)		
$112000 \times 4$	8564	8546
$\frac{52}{52}$		
10% contingency	P 2182	26052
		2605
		28657

Working  
 Sales = 1.  
 Profit = 20  
 = 37  
 Cost of  
 = 1.12

A proforma of cost sheet of a company provides the following particulars

Element of cost	Percentage
Materials	40%
Direct Labor	20%
Overheads	20%

The following further particulars are available

- (i) It is proposed to maintain a level of activity of 2L units
- (ii) SP - 12 per unit
- (iii) Raw materials are expected to remain in the store for avg 1 month.
- (iv) Materials will be in process on an avg of 1/2 month

- i) finished goods are req to be in stock  
 ii) an avg period of 1 month.  
 iii) credit allowed for debtors - 2 months  
 u for suppliers - 1 month  
 iv) assume that sales & production  
 follow a consistent pattern, you are req  
 to prepare a stmt of WC requests.

stmt of WC requests	
CA	Sales = $2L \times 12$ = $24L$
Raw materials (1month)	$80,000$
$24L \times \frac{1}{12} \times \frac{40}{100}$	
Work in progress	$80,000$
$1.96L \times \frac{1}{12}$	
finished goods (1m)	$80,000$
Debtors credit + (2m)	$1,60,000$
	Elements of cost - $80\%$ .
	Profit = $20\%$ = $4.8L$
	Cost of sales = $19.2L$

$$\begin{aligned} \text{Sales} &= 2L \times 12 \\ &= 24L \end{aligned}$$

$$\text{Materials} - 40\% \Rightarrow 9,60,000$$

$$\text{Labor} - 20\% \Rightarrow 4,80,000$$

$$\text{Overhead} - 20\% \Rightarrow 4,80,000$$

$$\text{Profit} - 20\% \Rightarrow 4,80,000$$

$$\text{Cost of production} = 19,20,000$$

Stmt of WC Reg

<u>CA</u>		
Raw materials ( $\frac{9,60,000}{12}$ )		80,000
Work in progress (Materials-100%, & Labor, overhead-50%) $\frac{960000}{12} + \left(\frac{960000}{12}\right) \frac{1}{2} + \left(\frac{480000}{12}\right) \frac{1}{2}$		1,20,000
Stock of finished goods ( $\frac{1920000}{12} \times 2$ )		1,60,000
Debtors ( $\frac{1920000}{12} \times 2$ )		3,20,000
<u>CA</u>		6,80,000
<u>CL</u>		
Creditors ( $\frac{160000}{12}$ )		80,000
<u>CL</u>		80,000
Net Working capital (WC)		6,00,000

$$NWC = 6,00,000$$

You are given following estimates.  
 Your company desires to purchase a business & has consulted you on one point on which you are asked to advise them if the avg amt of WC will be required in the 1<sup>st</sup> year's working & are instructed to add 10% to your computed figures to allow for contingencies.

Particulars	Amt
<u>Joint blocked up Soo stocks</u>	
(a) Stock of finished product	5000
(b) Stock of stores materials	9000
<u>Avg credit given</u>	
(a) Inland sales - 6 weeks credit	3,12,000
(b) Export sales - 1.5 weeks "	78,000
<u>Lag in payment of wages &amp; other outgoings</u>	
(a) Wages - 1.5 weeks	2,60,000
(b) Stock of materials - 1.5 month	48,000
(c) Rent & royalties - 6 months	10,000
(d) Clerical staff - 1/2 month	62,400
(e) Managers - 4/2 month	48,000
(f) Miscellaneous expenses - 1.5 month	48,000
<u>Payment in advance</u>	
(a) Sundry expenses (paid quarterly in advance)	8000
<u>Unbilled profit on an avg throughout the year</u>	11,000

## Statement of WC requirements

Particulars	Amt	Ampt.
<u>Current assets</u>		
i) Stock of finished product	5000	
ii) Stock of stores & materials	8000	80,00
iii) <u>Sundry debtors</u> $312000 \times \frac{6}{52}$	36,000	80,00
(a) Inland sales $\rightarrow$		
(b) Exported ('/2) $78000 \times \frac{1.5}{52}$	2250	
iv) Payments in advance ('/4)	2000	40,250
		53,250
<u>Current liabilities</u>		
Wages (1.5 w) $260000 \times \frac{1.5}{52}$	7500	
Stock of materials (1.5 m)	6000	
Rent $(100000 \times \frac{6}{12})$	5000	
Clerical staff $(\frac{62400}{12} \times 0.5)$	2600	
Manager salary $(\frac{4800}{12} \times \frac{1}{2})$	200	
Miscellaneous expenses	6000	27,300
Net WC (CA - CL)		25,950
( $\times 10\%$ , contingency)		2595
		28,545

Note: Undrawn profits have been ignored, for the following reasons:

- (i) Profits may or maynot be used as "w"
- iii) Even if it is to be used for WC, it should be reduced by the amt of income tax drawings, dividends paid etc.

A manufacturing company sells goods in the same market and earns a gross profit of 20% on sales. Its annual figures are as follows:

Sales - 3,00,000

Material used - 1,08,000

Wages - 76,000

Manufacturing exp - 1,20,000

Administrative & other exp - 30,000

Selling & distribution exp - 18,000

Depreciation - 12,000

\* Income tax payable in 4 instalments of which one falls in the next financial year - 60,000

Additional info

Credit given by suppliers on materials - 2 months

Credit allowed to customers - 1 month

Wages are paid 1/2 a month in arrear

Manufacturing & administrative exp are paid 1 month in arrear

Selling & dist exp are paid quarterly in advance

The company wishes to keep 1 month stock of raw materials & also finished goods.

The company believes in keeping cash of Rs 50,000 including the overdraft limit of 20,000 not yet utilized by the company.

You are required to prepare a stat showing working requirements of company adding 10% contingency.

# Statement of WC requirements

Particulars	Amt	Amt
<u>Current Assets</u>		
Cash		
Overdraft	30,000	
Stock of raw materials	20,000	
Stock of finished goods	9,000	
Selling & dist exp ( $\frac{1}{4} \times 18000$ )	20,000	
Customer credit (1 month)	4500	
	26,000	
		88,500
<u>Current Liabilities</u>		
Supplier credit (2 month)	18,000	
Wages ( $\frac{1}{2}$ month)	4000	
Manufacturing exp (1 m)	12500	
	34500	
Net WC	54000	
(+) 10% contingency	5400	
	59400	