Indian Cost Accountants Service - Notes

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Capital Budgeting

Introduction:

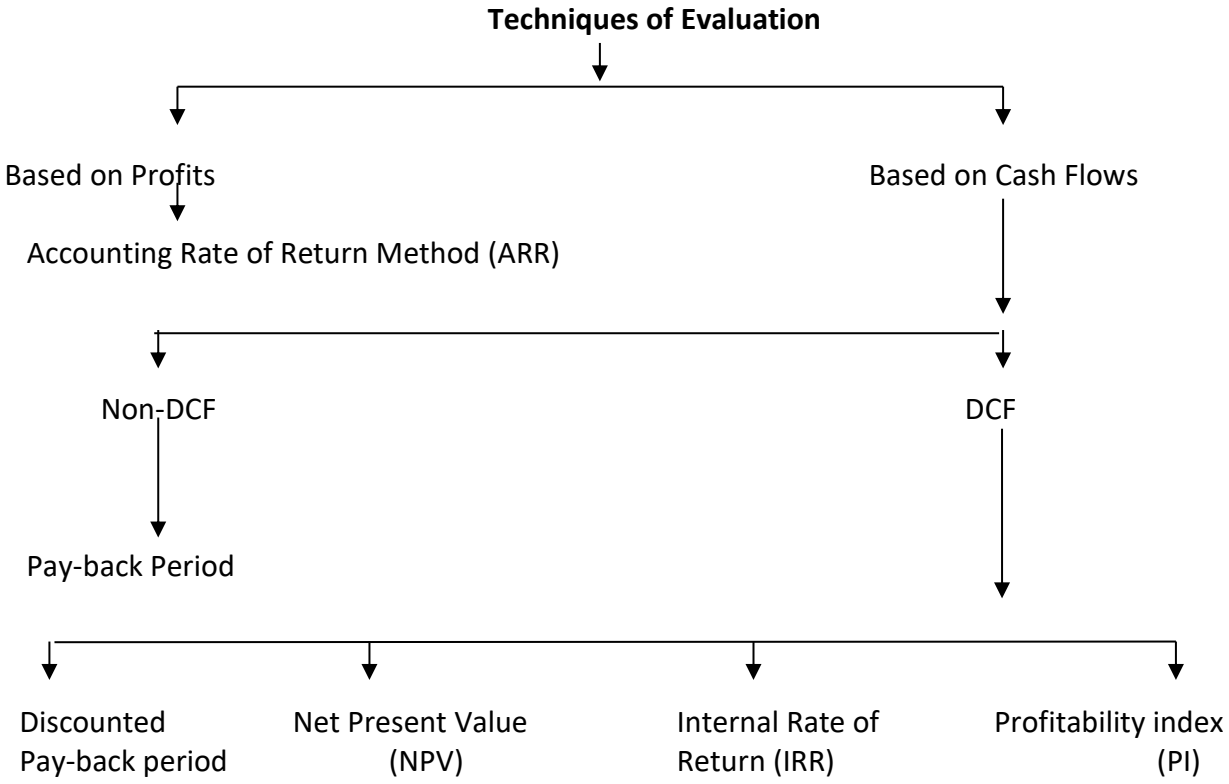
Budgeting means making plans for or setting goals for future. In a revenue budget we include only revenue items and that too for a period of one year. While in a capital budget we include both revenue as well as capital items and make budget for a long period of time. Capital budgeting decisions means a decision whether or not money should be invested in a long term project.

These decisions are very important for the following interrelated reasons:

1. **Substantial expenditure:** It involves huge investments. It is therefore necessary for a firm to make such decisions after a thoughtful consideration. Otherwise the incorrect decision would not only result into huge losses but may also account for the failure of the firm.
2. **Long term period:** These decisions have long term consequences. It not only influences the future benefits and costs of the firm but also influences the rate and direction of growth of the firm.
3. **Irreversibility:** It is very difficult to reverse these decisions because of the following reasons:
   i. Market for used capital investments is ill-organized and
   ii. Most of the capital assets bought by a firm are tailored to meet its specific requirements.

Techniques of evaluation:

Though there are many techniques of evaluation of investment proposals, important ones could be broadly classified as under:



Capital Budgeting

Classification of Proposals:

A firm may have several projects/proposals for its consideration. It may adopt one of them, some of them or all of them depending upon the type of proposal. We can classify various proposals into following three categories:

1. **Independent Proposals:** These are the proposals, which do not compete with each other. The firm can straightway accept or reject these proposals on the basis of cut off rate or minimum required rate of return.
2. **Mutually Exclusive Proposals:** These are the proposals, which compete with each other in a way that the acceptance of one proposal precludes the acceptance of all other proposals.

(Calculation of Cash Flows)

Cash flows may be classified as follows:

1) Annual cash flow
2) Initial cash flow
3) Terminal cash flow

Calculation of Annual Cash Flow:

Particulars	**Amount**
Sales	50000
Purchase	-30000
Other expenses	-6000
CFBT	**14000**
Depreciation	-6000
PBT	**8000**
Tax@30%	-2400
PAT	**5600**
Depreciation	+6000
CFAT	**11600**

Shortcut for calculation of Annual CFAT:

$$CFAT = (Sales-CE-D)*(1-t)+D$$

$$CFAT = (CFBT-D)*(1-t)+D$$

$$CFAT = CFBT*(1-t) – D*(1-t) + D$$

$$CFAT = CFBT*(1-t) – \cancel{D} + D*t + \cancel{D}$$

$$CFAT = CFBT*(1-t)+D*t$$

$$CFAT = 15000*0.7 + 12500*0.3 = 10500+3750 = 14250$$

Capital Budgeting

Question A project requires initial investment of Rs.50,000. Life of the project is 4 years, scrape value is negligible. Cash flows before tax for four years are Rs.15000, 15000, 20000 and 25000 respectively. Find out cash flows after tax. Tax rate is 30%.

Answer

SLM depreciation = (50000-0)/4 = 12500

Year	CFBT	Dep	PBT	Tax	PAT	CFAT
			CFBT-Dep	PBT*.30	PBT-Tax	PAT+Dep
1	15000	12500	2500	750	1750	14250
2	15000	12500	2500	750	1750	14250
3	20000	12500	7500	2250	5250	17750
4	25000	12500	12500	3750	8750	21250

PAT = PBT - Tax
PAT = PBT - PBT x t
PAT = PBT (1 - t) = 2500 x 0.7 = 1750

Question From the following particulars, calculate post tax cash flows assuming a tax rate of 40%:

Initial cash outlay	Rs.100000
Salvage value	Nil
Depreciation Method	Straight Line

Profit before Depreciation and tax: Year1 Rs.10000, Year2 Rs.10000, Year3 Rs.20000, Year4 Rs.80000.
~~Assume that the company has other profitable business activities. What if it is the first project of the company?~~

Answer

Carry Forward the loss

Year	CFBT	PBT	Tax	PAT	CFAT
1	10000	-15000	0	-15000	10000
2	10000	-15000	0	-15000	10000
3	20000	-5000	0	-5000	20000
4	80000	55000	-8000	47000	72000

Tax for 4th years
55000-35000 = 20000
20000 x 40% = 8000

Set off loss in the same year

Year	CFBT	PBT	Tax	PAT	CFAT
1	10000	-15000	6000	-9000	16000
2	10000	-15000	6000	-9000	16000
3	20000	-5000	2000	-3000	22000
4	80000	55000	-22000	33000	58000

	Profit	Tax
Existing business	50000	-20000

Capital Budgeting

Proposal	-15000	+6000
Net	35000	-14000

Treatment of working capital in capital budgeting:

1) Amount of working capital should be treated as outflow of cash at year zero and the same amount should be treated as an inflow of cash at the end of last year.
2) Any increase in working capital is treated as an outflow of cash while decrease is treated as an inflow of cash.

Year	0	1	2	3	4
WC required (Rs.)	25,000	45,000	45,000	5,000	0
Cash Flow	**-25,000**	**-20,000**	**0**	**40,000**	**5,000**

PAY-BACK PERIOD METHOD

The Pay-back period is the length of time required to recover the initial Investment in the project.

In case of equal annual cash flows:

$$Payback\ period = \frac{Initial\ Investment}{Annual\ Cash\ Flow} = \frac{100}{20} = 5\ years$$

Shorter the better.

Decision criteria :

1) In this method normally the maximum acceptable pay-back period is defined. In case of an independent project if the pay back period is less than or equal to this defined period then the project is accepted otherwise rejected.
2) In case of two or more mutually exclusive projects, project having lowest pay back period is accepted.

Advantages:

(1) Easy to understand & simple to calculate.
(2) It gives a rough & ready idea of the risk involved in the project.

Disadvantages:

(1) doesn't consider Time value of money.
(2) Ignores cash flows beyond the pay-back period.

Notes:

This method is suitable in case of industries where risk of obsolescence is very high or liquidity position is tight.

Capital Budgeting

Question From the following information calculate the Payback period:
Capital Outlay Rs.200000; Scrap Value Nil; Useful Life 5 years.

Profit before depreciation:

Year	Amount (Rs.)
1	100000
2	100000
3	80000
4	80000
5	40000

Tax rate is 35%.

Answer

Year	CFBT	PBT	PAT	CFAT	Cum. CF
1	100000	60000	39000	79000	79000
2	100000	60000	39000	79000	158000
3	80000	40000	26000	66000	224000
4	80000	40000	26000	66000	290000
5	40000	0	0	40000	330000

$$Payback\ period = 2 + \frac{42000}{66000} = 2.636\ years$$

Or 2 years and 8 monhts

DISCOUNTED PAY-BACK PERIOD METHOD

It is the length of time required to recover initial expenses along with desired return. In case of two mutually exclusive proposals we will accept the project with lower discounted pay back period. In case of an independent proposal if discounted pay back period is less than or equal to life of the project then will accept the proposal.

Question Solve previous question by Discounted payback period method if discounting rate is 10%p.a.

Year	CFAT	PV@10%	Cum PV	
1	79000	71,818	71,818	79000 ÷ 1.10 = M+
2	79000	65,289	1,37,107	79000 = = M+ MRC
3	66000	49,587	1,86,694	66000 = = = M+ MRC
4	66000	45,079	2,31,773	66000 = = = = M+ MRC
5	40000	24,837	2,56,610	40000 = = = = = M+ MRC

$$Discounted\ Payback\ period = 3 + \frac{(200000 - 186694)}{45079} = 3.3\ years$$

It will take 2.64 years to recover Initial Investment only
It will take 3.3 years to recover initial investment along with return @10% p.a.

NET PRESENT VALUE METHOD (NPV)

This is the best method of project evaluation. NPV method is a discounted cash flow technique, means this method takes into account time value of money. Following are the various steps for calculation of NPV:

1) Determine Initial cash flows
2) Estimate annual cash flows
3) Estimate terminal cash flows
4) Estimate other cash flows
5) Calculate present value of all the above cash flows
6) Calculate NPV : NPV = Present value of inflows - Present value of outflows

Decision criteria :

1) In case of an independent project if the NPV is positive or zero, then the project is accepted otherwise rejected.
2) In case of two or more mutually exclusive projects, project having highest NPV is accepted.

Question In the previous question calculate NPV

Year	CFAT	PV@10%	200000
1	79000	71,818	200000 + 10% - 79000 = 141000
2	79000	65,289	141000 + 10% - 79000 = 76100
3	66000	49,587	76100 + 10% - 66000 = 17710
4	66000	45,079	17710 + 10% - 66000 = 46519 surplus
5	40000	24,837	40000 surplus
		2,56,610	

Net Present Value = 256610 - 200000 = +56610

Capital Budgeting

Interpretation of NPV:

if NPV is Rs. 56610 it means that inflows from this project are sufficient:
1) to recover initial investment and
2) to give a return @10% p.a. and
3) to give surplus which has sum of pv of Rs.56610.

Question From the following information calculate NPV of a business proposal:

Initial Investment in Fixed Assets	₹5,00,000
Initial Investment in Working Capital	₹1,00,000
Salvage Value of Fixed Assets in 3 years	₹2,00,000
Annual Cash inflows before tax	₹3,00,000
Income tax rate	30%
Cost of capital	18%

Depreciation is to charged on WDV method @40%.

Answer

Step 1: Initial Cash Flow:

Particulars	**Amount**
Fixed Assets	-500000
Working Capital	-100000
Total	**-600000**

Step 2: Annual Cash Flows:

Year	**CFBT**	**Dep**	**CFAT**	**PV@18%**
1	300000	200000	*270000	228814
2	300000	120000	246000	176673
3	300000	72000	231600	140959
		108000		546446

*300000 x 0.7 + 200000 x 0.3 = 210000+60000 = 270000

500000 x 40% - = 300000
x 40% - = 180000
x 40% - = 108000

300000 – 200000 = 100000 x 0.7 = 70000 + 200000 = 270000

Step 3: Terminal Cash Flows:

Salvage Value	200000
Tax on capital gain	
(200000-108000) x 30%	-27600
Working Capital	100000
Total	**272400**
PVF (18%,3rd)	0.609
Present Value	**165892**

Step 4: Net Present Value = -600000+546446+165892 = 112337

Step 5: Decision: NPV is positive hence accept the proposal.

General Notes:

1) If the rate of depreciation is given in the question then it is applied on cost of asset. (you should not do cost-salvage value in this case)
2) If salvage value is considered while calculating depreciation then there will not be any capital gain/loss.
   Cost of asset 100000, Salvage Value 10000, life 3 years. Dep = (100000-10000)/3 = 30000
   Book Value (WDV) year 1: 70000 Year 2: 40000 Year 3: 10000

Alternative method to calculate Cash Flows:

Alternative -1

CFAT = {(Sales – Cash Expenses) – Dep} x (1-t) + Dep
CFAT = (CFBT – Dep) x (1-t) + Dep
CFAT = CFBT x (1-t) – Dep (1-t) + Dep
CFAT = CFBT x (1-t) – ~~Dep~~ + Dep x t + ~~Dep~~
CFAT = CFBT x (1-t) + Dep x t
Don't use this shortcut if the loss is to carried forward

Alternative -2

CFAT = CFBT x (1-t) + Dep x t
CFAT = (Sales – Cash Expenses) x (1-t) + Dep x t
CFAT = Sales x (1-t) – Cash Expenses x (1-t) + Dep x t
CFAT = Sales x (1-t) – Material x (1-t) – Wages x (1-t) + Dep x t
CFAT = 50000 x 0.7 – 30000 x 0.7 – 6000 x 0.7 + 6000 x 0.3
CFAT = 35000 – 21000 – 4200 + 1800 = 11600

(Replacement Decision)

Question Maheshwari Brother purchased a machine 5 years ago at a cost of Rs.75,000. The machine had an expected life of 15 years at the time of purchase and a zero estimated salvage value at the end of 15 years. It has been depreciated on a straight line basis and has a book value of Rs.50,000 at present. The purchase manager reports that he can buy a new machine for Rs.1,00,000. It will have a useful life of 10 years.

Existing sales are Rs.1,00,000 and are expected to go up to Rs.1,10,000 on account of purchase of the new machine. Further it will reduce operating cost from Rs.70,000 to 50,000. The old machine's current market value is Rs.10,000. Taxes are at present levied at the rate of 50% and the firm's cost of capital is 10%. Calculate net cash outlay of the project and net cash inflows. Also calculate NPV and give your decisions.

Answer
Replace
1) Initial CF = -100000+10000+20000* = -70000
* (book value 50000 - salvage 10000) loss x 50% = 20000

2) Annual CF = (110000-50000) x 0.5 + 10000 x 0.5 = 35000
35000 x 6.146 = 215060 (1÷1.10 = = = = = = = = = GT)
3) Terminal CF = Nil
4) NPV = -70000+215060 = +145060

Continue

1) Initial CF = Nil
2) Annual CF = (100000-70000) x 0.5 + 5000 x 0.5 = 17500
   17500x 6.146 = 107530
3) Terminal CF = Nil
4) NPV = +107530

Decision: Replace, because it has higher NPV. Replace – Continue = 145060 – 107530 = 37530

Alternative Solution (Incremental Basis)

1) Incremental Initial CF = Replace – Continue
= (-70000) – (0) = -70000

Replace = -100000+10000+20000* = -70000
* (book value 50000 - salvage 10000) loss x 50% = 20000

2) Incremental Annual CF
= (10000+20000) x (1-0.5) + (10000-5000) x 0.5 = 17500
   17500 x 6.146 = 107530
3) Terminal CF = Nil
4) NPV = -70000+107530= +37530
5) Decision: NPV is positive hence REPLACE in better than Continue

INTERNAL RATE OF RETURN METHOD (IRR)

Internal rate of return is the rate at which the discounted cash inflows are equal to the discounted cash outflows. It means that at IRR, NPV is zero. It represents the rate of returned earned on the capital invested in a project.

Decision criteria :

1) In case of an Independent project if the IRR is more than cost of capital then the project is accepted otherwise rejected.
2) In case of two or more mutually exclusive projects, project having highest IRR is accepted.

Question An investment of Rs.1,05,000 yields the following cash inflows after tax. Determine internal rate of return.

Year	**1**	**2**	**3**
Rs.	30,000	40,000	60,000

Answer

Year	**CFAT**	10%	11%	
0	-105000	-1,05,000	-1,05,000	105000
1	30,000	27,273	27,027	105000+**10.2%**= 115710-30000 = 85710
2	40,000	33,058	32,465	85710+**10.2%**=94452 -40000 = 54452
3	60,000	45,079	43,871	54452+**10.2%** = 60000-60000 = 0
	NPV	**410**	**-1,636**	

$$Rate = LR + \frac{NPVl}{NPVl + NPVh} \times (HR - LR)$$

$$= 10\% + \frac{410}{410 + 1636} \times (11 - 10) = 10.20\%$$

(Modified Internal Rate of Return)

IRR tells us rate of return (earning) on amount which remains invested. But it does not consider the rate of return on amount which will be released from project and reinvested elsewhere. For example if initial investment is Rs.31,699 and annual cash flows for 4 years are Rs.10,000 hence IRR is 10%p.a.

In this project outstanding balance for 1st, 2nd, 3rd and 4th year are 31699, 24869, 17355, 9091 respectively. IRR indicates that we will be earning 10% return on the outstanding balance of each year. But it does not consider reinvestment of Rs.10,000 released from the project each year.

We can't take good decision ignoring reinvestment risk. A project may be accepted due to higher IRR but if gives higher cash inflows in initial years and that inflow is reinvested at a lower rate then finally we will be getting lower amount. Therefore we need a method in which rate of return on reinvestment is also considered.

In Modified IRR first we calculate future value of all cash inflows at the reinvestment rate at the end of life of the project. Then we use $FV=PV(1+r)^n$ formula. Here PV is amount of initial investment. In this formula value of r is MIRR.

Question Calculate IRR if initial investment in the project is Rs.50,000 and annual cash flows for three years are Rs.21,000 p.a. Also calculate Modified IRR if the reinvestment rate is 12%.

Answer

Year	CF	FV@12%
0	-50000	
1	21000	26,342
2	21000	23,520
3	21000	21,000
	Total	70862

IRR = 12.51% 21000÷1.1251 = M+ =M+ =M+ MRC -> 50000
FV = PV x $(1+r)^n$
70862 = 50000 x $(1+MIRR)^3$
$1.417^{1/3}$ = 1+MIRR
1.1232 = 1+MIRR
MIRR = 12.32%

Keystrokes:
1.417 square root 12 times ->1.000085096
Deduct 1
x 1/3 -> 0.00002836
Add 1
Square (x=) 12 times -> 1.1232

Profitability Index or Desirability Factor or Present Value Index

Popular formula for PI is as follows:

$$PI = \frac{Present\ Value\ of\ Inflows\ (annual\ +terminal)}{Present\ Value\ of\ Outflows\ (initial)}$$

Decision criteria :

1) In case of an Independent project, it is accepted if PI is equal to or more than one.
2) In case of two or more mutually exclusive projects, project having highest PI is accepted.
3) But PI method is used mainly for capital rationing. If the capital available for investment is limited and we have several independent proposals in hand then we can select project(s) as per PI method. Here we calculate PI for all the projects and rank them accordingly. Then we allot fund as per PI till the fund is exhausted.

Question Alpha Limited is considering five capital projects for the years 2000, 2001, 2002 and 2003. The company is financed by equity entirely and its cost of capital is 12%. The expected cash flows of the projects are as follows:

	Year and Cash flows (Rs.'000)			
Project	**2000**	**2001**	**2002**	**2003**
A	(70)	35	35	20
B	(40)	(30)	45	55
C	(50)	(60)	70	80
D	_	(90)	55	65
E	(60)	20	40	50

Note: figures in brackets represents cash outflows.

30 ÷ 1.12 = M- 45 = = 35.87 55 = = = 39.15 MRC -> 48.24

All the projects are divisible. None of the projects can be delayed or undertaken more than once. You are required to calculate which project Alpha Limited should undertake if the capital available for investment is limited to Rs.1,10,000 in year 2000 and with no limitation in subsequent years.

Answer

Project	**PV_i**	**Initial CF**	**PI**	**Rank**	**Fund**
A	73.39	70	1.05	4	reject
B	48.24	40	1.21	2	40
C	59.17	50	1.18	3	10
D	9.75	-	-	-	accept
E	85.33	60	1.42	1	60

Decision:

Alpha limited should accept project D first of all, because it does not require any fund at year 2000 and its NPV is positive. Then it should accept project E and B fully and project C for Rs.10000 only.

what if projects are indivisible:

D, E, C will be accepted. 60+50 = 110

ACCOUNTING/AVERAGE RATE OF RETURN METHOD (ARR)

Capital Budgeting

This method of evaluation of proposals is based on Profit of the project rather than Cash Flow. ARR means the average annual yield on the project.

$$ARR = \frac{Average\ Annual\ Profit\ after\ tax}{Average\ Investment}$$

$$\text{Average Investments} = \frac{\text{Initial Investments} + \text{Scrape Value}}{2}$$

Question Calculate the Average Rate of Return of project MNC from the following particulars:

Initial Cash Outlay for assets	Rs.225000
Working capital required	Rs.25000
Scrap value of assets after 5 years	Rs.25000

Cash flow before tax :-

Year	1	Rs.80000
	2	Rs.100000
	3	Rs.160000
	4	Rs.160000
	5	Rs.50000

Tax rate is 50%. Depreciation is charged on SLM.

Answer

Step 1:

$$\text{Average Investment} = \frac{Opening + Closing}{2} = \frac{250000 + 50000}{2} = 150000$$

Opening = 225000 fixed assets + 25000 working capital = 250000

Closing = 25000 fixed assets + 25000 working capital = 50000

Step 2:

Year	CFBT	PBT	PAT
1	80000	40000	20000
2	100000	60000	30000
3	160000	120000	60000
4	160000	120000	60000
5	50000	10000	5000
			175000

Average annual PAT = 175000/5 = 35000

Step 3:

$$ARR = \frac{average\ annual\ PAT}{average\ Investment} = \frac{35000}{150000} = 23.33\%$$

Leverages

Leverage: means disproportionate change

The term leverage represents influence or power. In financial analysis leverage represents the influence of one financial variable over some other related financial variable. Generally if we want to calculate impact of change in variable X on variable Y, it is termed as Leverage of Y with X. and represented as follows:

$$\frac{LY}{LX} = \frac{\text{Change in Y / Y}}{\text{Change in X / X}}$$

In financial analysis leverages are of three types:

1) Operating Leverage
2) Financial Leverage
3) Total or Combined leverage.

leverages show the relationship among certain Income Statement items as follows:

Operating Leverage	Total Revenue (Q x S) 1000 x 200	200000	400000
	Less: Variable Cost (Q x V) 1000 x 120	-120000	-240000
	Contribution	80000	160000
	Less: **Operating Fixed Cost** (F) (excluding finance charges)	-40000	-40000
Financial Leverage	Profit before interest and tax (EBIT)	40000	120000
	Less: **Interest on Debt**	-10000	-10000
	Profit before Tax (PBT)	30000	110000
	Less: Tax 25%	-7500	-27500
	Profit after Tax (PAT)	22500	82500
	Less: **Preference Dividend**	-7500	-7500
	Earning available to Equity Shareholders (EAES)	15000	75000
	Divided by: No. Of Equity Shares	10000	10000
	Earning Per Share (EPS)	1.5	7.5

Total Leverage

Here: -

Q = Quantity Sold
S = Selling Price
V = Variable Cost Per Unit

(1) Operating Leverage:

Kohler defines the Operating Leverage as - "The tendency of net income (EBIT) to vary disproportionately with sales."

$$Degree\ of\ Operating\ Leverage = \frac{\%\ Change\ in\ EBIT}{\%\ Change\ in\ Sales} = \frac{200}{100} = 2\ times$$

$$DOL = \frac{Contribution}{Contribution - Fixed\ Cost} = \frac{80000}{80000 - 40000} = 2times$$

Break Even Point, Margin of Safety & Operating Leverage :

$$Margin\ of\ Safety = \frac{Sales - Sales\ at\ BEP}{Sales}$$

$$Margin\ of\ Safety = \frac{Sales - Sales\ at\ BEP}{Sales} \times \frac{PV\ Ratio}{PV\ Ratio} = \frac{Contribution - Fixed\ Cost}{Contribution}$$

$$Hence\ MOS = \frac{1}{DOL}$$

If DOL increases MOS will decrease & business risk will increase. If DOL decreases MOS will increase & business risk will decrease.

$$PV = \frac{Cont}{Sales} \qquad \boldsymbol{Sales \times PV = Cont}$$

$$BEP = \frac{Fixed\ Cost}{PV} \qquad \boldsymbol{BEP \times PV = Fixed\ Cost}$$

Question Shoppers Stop Ltd. has a P/V ratio of 40%. During the year 99-00, its total sales amounted to Rs.10,00,000 & B.E.P. is Rs.7,60,000. Compute the DOL of the company for the year 99-00. What should be the amount of sales if it is proposed to reduce DOL by 3 ?

Answer
Contribution = 10 lakh x 40% = 4 lakh
Fixed Cost = 7.6 lakh x 40% = 3.04 lakh

$$\mathrm{DOL} = \frac{4}{4 - 3.04} = 4.167 - 3 = 1.167$$

$$1.167 = \frac{\mathrm{C}}{\mathrm{C} - 3.04} \gg \mathrm{C} = 21.24359$$

$$PV = \frac{C}{S} \gg 0.40 = \frac{21.24359}{S}$$
$$\gg S = 53.11\ lakhs$$

(2) Financial Leverage :
Financial leverage shows relationship between Earning Per Share (EPS) and Earning Before Interest & Tax (EBIT). It has been defined by Kohler as "the tendency of net residual income to vary disproportionately with net income .....".

In other words it could be defined as proportionate change in EPS with respect to proportionate change in EBIT. Thus,

$$Degree\ of\ Financial\ Leverage = \frac{\%\ Change\ in\ EPS}{\%\ Change\ in\ EBIT} = \frac{400\%}{200\%} = 2$$

Shortcut :

$$DFL = \frac{EBIT}{EBIT - Int. - \frac{D_P}{1-t}} = \frac{40000}{40000 - 10000 - \frac{7500}{0.75}} = \frac{40000}{40000 - 10000 - 10000} = 2$$

Total Revenue (Q x S) 1000 x 200	200000	400000
Less: Variable Cost (Q x V) 1000 x 120	-120000	-240000
Contribution	80000	160000
Less: **Operating Fixed Cost** (F) (excluding finance charges)	-40000	-40000
Profit before interest and tax (EBIT)	40000	120000
Less: **Interest on Debt**	-10000	-10000
Profit before Tax (PBT)	30000	110000
Less: Tax 25%	-7500	-27500
Profit after Tax (PAT)	22500	82500
Less: **Preference Dividend**	-7500	-7500
Earning available to Equity Shareholders (EAES)	15000	75000
Divided by: No. Of Equity Shares	10000	10000
Earning Per Share (EPS)	1.5	7.5

(3) Total or Combined Leverage :

Combined Leverage shows relationship between Earning Per Share (EPS) and Level of Activity / Volume / Sales. It Could be defined as proportionate change in EPS with respect to proportionate change in Volume or Level of Activity. Thus,

$$DCL = \frac{Percentage\ change\ in\ EPS}{Percentage\ chage\ in\ Sales} = \frac{400\%}{100\%} = 4$$

$$DTL = \frac{Contribution}{Contribution - Fixed\ Cost - Interest - \frac{D_P}{1-t}} = \frac{80000}{80000 - 40000 - 10000 - \frac{7500}{0.75}} = 4$$

Combined Leverage could also be calculated as follows :

DTL = DOL x DFL = 2 x 2 = 4

Cost of Capital & Capital Structure Decisions

Cost of Capital

Major consideration in capital structure planning
Selection of an appropriate capital structure is dependent on number of factors. These are:
(1) Risk : Financial Risk
(2) Control : Right to vote
(3) Cost : jiski cost kam ho waha se fund le aao.

COST:
What is return for investor is the cost for company. Means cost of any source of finance is nothing but expectation of investors (IRR). Besides expectation of investors cost is also affected by issue expenses (named as floatation cost) and tax effect.

Cost of Debt:

Question A Bond having face value of Rs.100 and coupon of 12% p.a. will mature in 3 years. If Current market price of bond is Rs.98. If issue expenses are Re.1 per bond and tax rate is 30% what is cost of debt for the company?

Answer:

Year	Cash Flow
0	+97
1	-8.4
2	-8.4
3	-108.4
IRR	9.60%

-12 + 12*30% = -12 + 3.6 = -8.4

Shortcuts

1) Redeemable debt:

$$K_d = \frac{I(1-t) + \frac{R-P}{n}}{\frac{R+P}{2}} = \frac{12 \times 0.7 + \frac{100-97}{3}}{\frac{100+97}{2}} = \frac{8.4+1}{98.5} = 9.54\%$$

2) Irredeemable or perpetual debt:

$$K_d = \frac{I(1-t)}{P}$$

here K_d = Cost of Debt
I = Amount of Interest (not the rate of interest)
P = Net proceeds from debt (issue price – issue expenses)
R = Redemption Price
t = Tax Rate bookmark

Cost of Preference Shares:

Calculation of cost of preference shares is mostly same as that of cost of debt .The only difference is that dividend of preference shares is not an allowable expenditure for the purpose of income tax while interest is deductible. Also dividend tax is payable on preference dividend but not on interest.

Cost of Capital

Shortcuts

1) Redeemable Preference Shares:

$$K_P = \frac{D + \frac{R-P}{n}}{\frac{R+P}{2}}$$

2) Irredeemable or perpetual* Preference shares:

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

* Issue of irredeemable preference shares is not permissible as per Companies Act, 2013.

here: K_p = Cost of Preference Shares
D = Dividend (including dividend tax, if any – removed from 1st April, 2020)
R = Redemption price
P = Proceeds from issue (Issue price – issue expenses)
t = tax Rate

Question Calculate the cost of capital for Outdated Co. Ltd. in the following situations :

5000 10% Preference shares of Rs.100 each, issued at par. Issue expenses amount to 4% in total. The shares are redeemable @ Rs.105 per share after 9 years.

Answer
R=105, P = 96, D=10, n=9

$$Kp = \frac{10 + \frac{105-96}{9}}{\frac{105+96}{2}} = 10.94\%$$

105-96 ÷ 9 +10 = M+
105+96 ÷ 2 = ÷ =
x MRC =

Cost of Equity Share Capital:

Measurement of cost of equity shares is somewhat different from cost of debt & preference shares because unlike debt & preference shares there is no fixed payment to equity shareholders.

There may be different dividend patterns hence there are many approaches regarding calculation of cost of equity shares as follows:

$$Value = \frac{performance}{expectation} = \frac{Rs.6}{Ke} = Rs.60$$

(1) Dividend Capitalization Approach	Dividend Constant
(2) Earning Capitalization Approach	EPS Constant
(3) Growth Approach	growth rate constant
(4) Capital Asset Pricing Model (CAPM)	The Best Approach

(1) Dividend Capitalization Approach :-

$$P_0 = \frac{D}{K_e} \; original\ formula$$

$$K_e = \frac{D}{P} \quad Jugad\ formula$$

Cost of Capital

K_e = Cost of Equity
D = Dividend (including dividend tax if any)
P = Net proceeds realized (issue price - issue expenses)

Question A company's shares are presently quoted in the market at Rs.50 per share. Dividend declared by the company is Rs.4 and it is expected to maintain the same . What is the cost of Equity Share Capital?

Answer

$$K_e = \frac{D}{P} = \frac{4}{50} = 8\%$$

(2) Earning Capitalization Approach : -

$$K_e = \frac{E}{P}$$

Question Find out the cost of equity in the following case:
Earning per share Rs.6, Market price per share Rs.50.

Answer

$$K_e = \frac{E}{P} = \frac{6}{50} = 12\%$$

(3) Growth Approach :-

$$P_0 = \frac{D_1}{K_e - g} \; Original\ formula$$

$$K_e = \frac{D_1}{P_0} + g \;\; Jugad\ Formula$$

D_1 = Dividend for the first year (including dividend tax if any) = $D_0(1+g)$
D0 = Rs.5 g = 6% D1 = 5 x (1.06) = 5.30
g = growth rate.

Question Calculate cost of equity for Evergrowing Financial Ltd. if the dividend paid last year was Rs.2 per share, growth rate is 6% p.a. and current market price is Rs.40 per share.

Answer

$$K_e = \frac{D_1}{P_0} + g = \frac{2.12}{40} + 0.06 = 11.3\%$$

Examples of D_0:

- Company has paid dividend
- Company is paying dividend
- Company is about to pay dividend
- Dividend for the last year

Examples of D_1:

- Company will pay dividend
- Dividend at the end of current year
- Dividend at end of 1st year
- Next expected dividend

How to calculate growth rate:
Growth rate = Return on equity x Retention ratio
= 15% x 40% = 6%

$$ROE = \frac{Earning\ available\ to\ equity\ shareholders}{Equity\ shareholders'fund} = \frac{30cr}{200cr} = 15\%$$

$$Dividend\ payout\ ratio = \frac{DPS}{EPS} = \frac{3}{5} = 60\%$$

Retention ratio = 100 – dividend payout ratio = 100 – 60 = 40%

(4) Capital Asset Pricing Model :-
In all the above approaches we calculated cost of equity (expectation of equity shareholders) as a balancing figure. But CAPM calculates expectation of investors based on risk.

$$E(R_P) = K_e = R_f + (R_m - R_f)\beta$$

$E(R_P) = 6 + (14 - 6) \times 2$
= 6 + 8 x 2
= 6 + 16
= 22

Here:
E(Rp) = Ideal expectation of investors, i.e., cost of capital
R_f = Risk free rate of return (say return on Govt. bonds)
R_m= **Return** on market portfolio (say return on BSE Sensex)
$R_m - R_f$= **Risk premium** on market portfolio
β = Risk Index (Regression coefficient)

Overall Cost of Capital: -

A firm's overall cost of capital is the weighted average of the cost of various sources of finance used by it. The weights assigned to various sources of funds may be Book Value Weights, Market Value Weights or Marginal Weights. Symbolically,

$$K_O = \frac{K_d \times D + K_P \times P + K_e \times E + K_r \times R}{D + P + E + R}$$

Here, Ko, Ke, Kp, Kd & Kr are Overall cost of capital, cost of equity, cost of preference shares, cost of debt and cost of Reserves respectively and D,P,E &R are weight of Debt, Preference, equity and reserves respectively.

Question Compute the overall cost of capital for Doughtful Ltd. in the following cases using book value weights:

(i)	Cost of Debt :-		Balance outstanding	Market Value
	Debentures	7 %	10,00,000	10,50,000
	Bank Loans	7.5 %	3,50,000	3,50,000
	Cost of Preference Share	11 %	2,50,000	2,25,000
	Cost of Equity (no.50000)	16 %	5,00,000	6,25,000
	Cost of Retained earnings	15 %	15,00,000	18,75,000

Cost of Capital

$$K_O = \frac{K_d \times D + K_P \times P + K_e \times E + K_r \times R}{D + P + E + R}$$

$$K_O = \frac{7\% \times 10 + 7.5\% \times 3.5 + 11\% \times 2.5 + 16\% \times 5 + 15\% \times 15}{10 + 3.5 + 2.5 + 5 + 15}$$

$$= \frac{428.75}{36} = \mathbf{11.91}\%$$

$$K_O = \frac{7\% \times 10.5 + 7.5\% \times 3.5 + 11\% \times 2.25 + 16\% \times 6.25 + 15\% \times 18.75}{10.5 + 3.5 + 2.25 + 6.25 + 18.75}$$

$$= \frac{505.75}{41.25}$$

$$= \mathbf{12.26}\%$$

Capital Structure Decisions

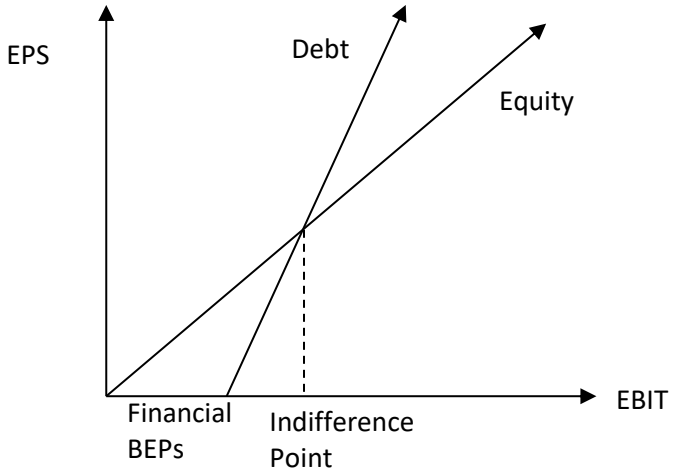
EBIT-EPS analysis

Till the point we have been simply calculating cost of various sources of finance. But to arrive at a decision regarding capital structure we need to consider income also. For this we start with EBIT and calculate EPS of all the given capital structures and chose the one with highest EPS.

EPS depicts performance. To calculate value we should go a step further. We will divided EPS by cost of equity to calculate fair price of the share. Alternatively we can multiply EPS by P/E (because P/E = $1/K_e$).

If the cost of equity or P/E is not given in the question, we can assume is to be same for all the options hence ignore it and take decision on the basis of EPS only.

y



Indifference Point: EBIT keeps on changing hence EPS and MPS will also change. Therefore it is not fair to chose capital structure on the basis of a single EBIT only. We need to know the behavior of EPS with change in EBIT. Indifference point may help us on this issue.

Indifference point is the level of EBIT at which EPS is same for two capital structures. To calculate indifference point, we should assume EBIT to be "X" and put EPS of two option equal.

$$EPS = \frac{(EBIT - Interest)(1-t) - D_P}{Number\ of\ equity\ shares}$$

Financial Break Even Point: It is the level of EBIT at which EPS is zero. Higher the Financial BEP higher the financial risk and vice versa.

Financial Break Even Point:

$$0 = \frac{(EBIT - Interest)(1-t) - D_P}{Number\ of\ equity\ shares}$$

Cost of Capital

Question A company which is presently growing and packing tea now planning to enter into jute industry. To establish the new project it requires Rs.2 crore. It has three options as under :

1)	12% Debentures	Rs.1 crore
	Equity Shares	Rs.1 crore
2)	Equity Shares	Rs.2 crore

Calculate the indifference point and the financial breakeven points. Tax rate may be assumed as 50%.

Answer

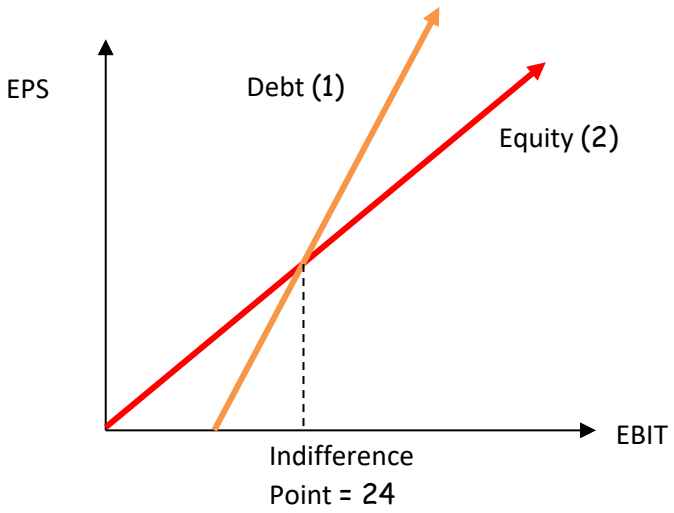
Indifference point between option 1 & 2 : Rs.24 lakhs

$$\frac{(EBIT - 1200000) \times 0.5}{1000000} = \frac{(EBIT) \times 0.5}{2000000}$$

E – 1200000 = 0.5 E

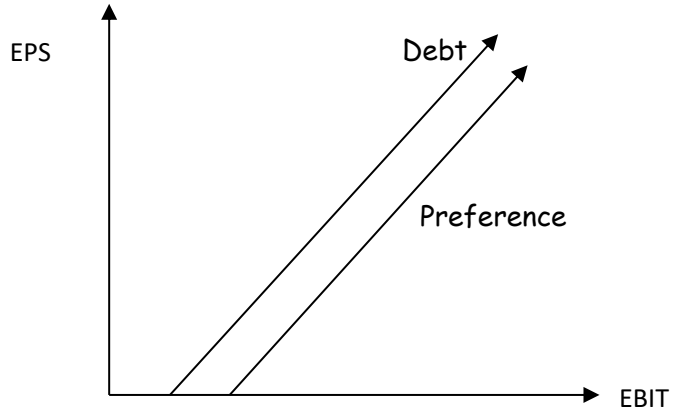
EBIT = 1200000/0.5 = 24,00,000

Can't calculate indifference point because debt plan is better than preference plan at all levels of EBIT.

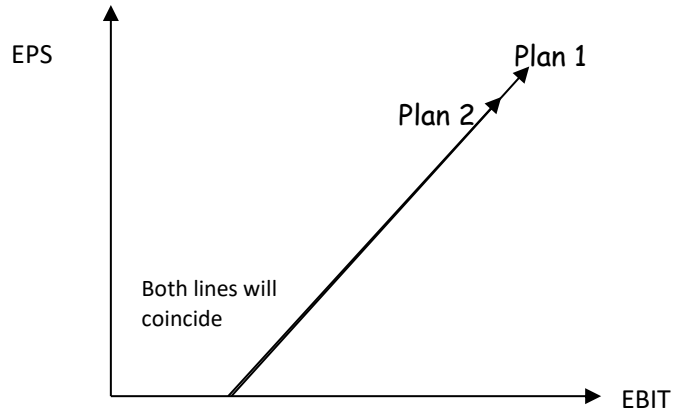


Just keep in mind that if amount of equity share capital is same under two financial plans then one of the following two situations will arise:

1) **<u>No indifference point</u>**: if after tax cost of the source other than equity shares **is not same** under both plans then there will be no indifference point between the two. Because one plan will be better than other at all levels of EBIT. For example if two plans have equity shares of `1,00,000 each. Plan 1 has 10% debentures of `50,000 while plan 2 has 8% Term loan of `50,000. Then plan 2 will be better than plan 1 at any level of EBIT and there will be no indifference point



2) **<u>Many indifference points</u>**: if after tax cost of the source other than equity shares **is same** under both plans then each EBIT will be an indifference point.



Question X Ltd., a widely held company is considering a major expansion of its production facilities and the following alternatives are available:

Alternatives	(Rs. in Lakhs)		
	A	**B**	**C**
Share Capital (Rs.10)	50	20	10
14% Debentures	-	20	15
Loan from a Financial Institution @ 18% p.a. Rate of Interest	-	10	25

Expected rate of return before tax is 25%. The rate of dividend of the company is not less than 20%. The company at present has low debt. Corporate taxation 50%. Which of the alternatives you would choose?

Cost of Capital

Answer

$$ROI = \frac{EBIT}{Capital\ Employed} \rightarrow \quad Capital\ employed * ROI = EBIT = 50 * 25\% = \mathbf{12.5}$$

Particulars	A	B	C
EBIT	1250000	1250000	1250000
Interest	0	-460000	-660000
PBT	1250000	790000	590000
Tax@50%	-625000	-395000	-295000
PAT	625000	395000	295000
No.	500000	200000	100000
EPS	1.25	1.98	2.95
÷ Ke	20.00%	20.00%	20.00%
MPS	6.25	9.88	14.75

EBIT = 50 x 25% = 12.5 lakh

Decision:

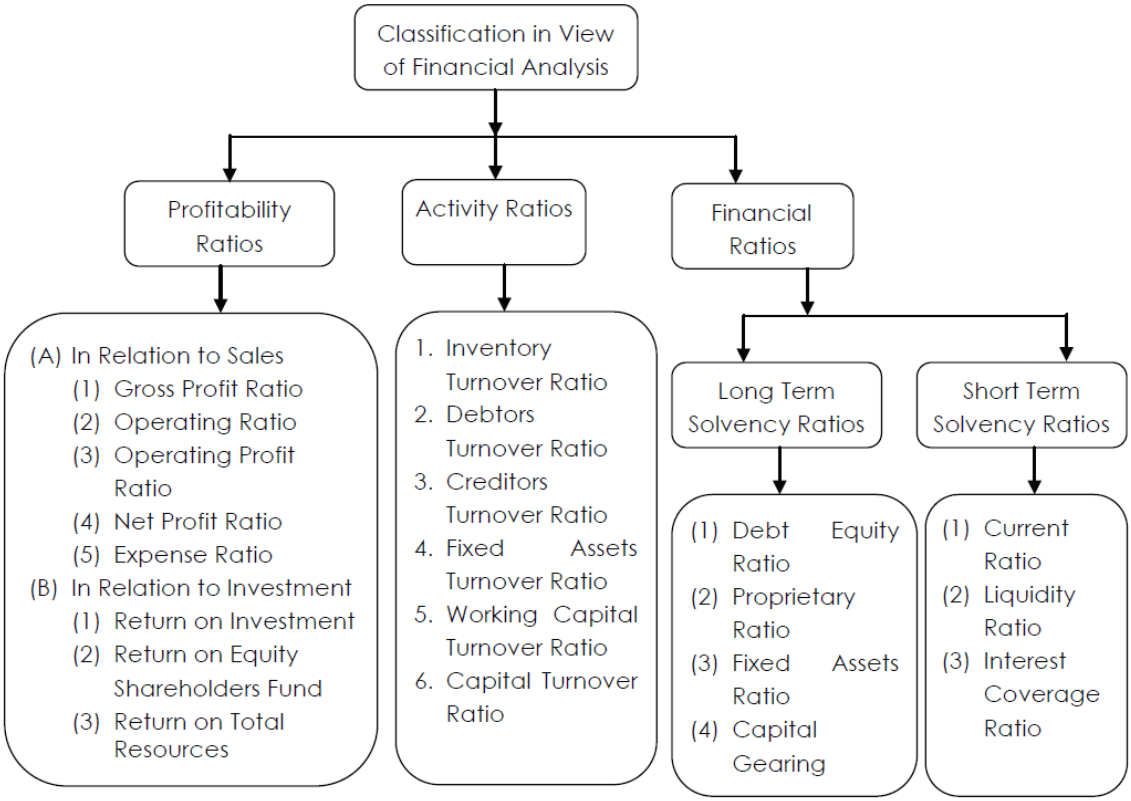
1) Plan C is the best to raise Rs.50 lakhs
2) Accept this business proposal because value of share is rising from Rs.10 to Rs.14.75 per share

Tools of Financial Analysis

"Ratio means a meaningful comparison of two data"

Introduction

There are various techniques of analysis of financial statements, ration analysis is one of them. Ratio measures the relationship between two data.



Cash position ratios

$$Super\ Quick\ Ratio = \frac{Cash\ \&\ Bank\ Balance + Marketable\ Securities}{Current\ Liabilities}$$

Term defined:

- *Trade investments*: means investments held for the purpose of promotion of trade. These are long term investments. For example Shares held in a subsidiary company, Security deposit given to obtain dealership etc.
- *Non trade investments*: means investments held for the purpose of short term cash management.
- *Marketable investment*: means investments which can be easily converted into cash. Usually investments that are quoted on a recognized exchange and regularly traded are assumed marketable.
- *Current liabilities*: means all the liabilities which are payable within a period of one year. It also includes short term bank borrowings.

$$Basic\ Defence\ Interval\ = \frac{Cash\ \&\ Bank\ Balance + Marketable\ Securities}{Average\ Daily\ Cash\ Expenses}$$

Terms defined:

$$\text{AV. Daily cash exp.} = \frac{\text{Cash Cost of goods sold + Administrative + Selling \& Distribution exp.}}{360}$$

Ideal cash ratios: There are no ideal cash position ratios. This ratios differ from industry to industry and from company to company. For example labor intensive industries do not have to make higher initial capital expenditure but they have to incur higher labor cost. These industries are supposed to make frequent cash payment to workers, hence they have to maintain higher cash balance. Therefore these industries will have higher ideal cash position ratios. On the other hand a company operating fully automatic machine will have to make higher initial capital expenditure but need not to maintain higher amount of cash subsequently.

Liquidity Ratios

$$Current\ Ratio = \frac{Current\ Assets}{Current\ Liabilities}$$

Practically ideal current ratio depends upon the following:

1) Nature of business
2) Extent of automation
3) Competition in the market
4) Inventory policy
5) Credibility
6) Other factors

Terms defined:

- *Current Assets* means the assets, which are realizable within a period of one year either in cash or in kind. It includes inventories, sundry debtors, bills receivables, cash & bank balance, marketable non-trade investments (at current market value), loans and advances, accruals, prepaid expenses etc.
- *Current liabilities* means liabilities, which are payable within a period of one year. It includes sundry creditors, bills payable, outstanding expenses, accrued expenses, provision for taxation, proposed dividend, unclaimed dividend, short term bank borrowings etc., overdue long term borrowings, long term borrowings (or its installments) approaching maturity within one year,

Dividend Decision

$$Quick\ Ratio\ or\ Acid\ Test\ Ratio = \frac{Quick\ Assets}{Current\ Liabilities} \quad or \quad \frac{Quick\ Assets}{Quick\ Liabilities}$$

Above two formulas may give different results but these are equally acceptable.

Ideal ratio: Ideal quick ratio is 1:1.

Terms defined:

- *Quick assets* means assets realizable within a period of two or three month. Quick assets are same as current assets except stock (because you cannot sale stock immediately in cash) and prepaid expenses (it can't be realized in cash). But if stock is easily salable in cash it should be included in quick assets. On the other hand if debtors are expected to realize after a considerable period of time it should be excluded from quick assets.

- Quick liabilities are those liabilities which are payable within a period of two or three months. These are same as current liabilities except financing current liabilities (for example bank overdraft, cash credit limit etc.).

Profitability Ratios

$$Gross\ Profit\ Ratio = \frac{Gross\ Profit}{Sales}$$

Term defined: Gross Profit = Sales – Cost of goods sold. Sales means net sales that is after deducting sales return.

Ideal Ratio: There is no ideal Gross Profit Ratio. But it should be enough to cover operating expenses & return to investors.

$$Operating\ Profit\ Ratio = \frac{Operating\ Profit}{Sales}$$

Terms defined: Operating profit means the profit generated from the principal business activities of the company. It excludes the effect of non operating incomes and expenses.

Dividend Decision

Calculation of Operating and Net Profit

Particulars	Amount
Gross Profit	**50,000**
Add: Other Operating Incomes	
Interest/Dividend on Trade Investment	2,000
Less: Indirect Operating expenses	
Administrative expenses	10,000
Selling & Distribution expenses	8,000
Interest on short term borrowings	2,000
Interest on long term borrowings	4,000
Provision for income tax	5,000
Operating Profit	**23,000**
Add: Non Operating Incomes	
Interest/Dividend on non trade Investments	1,000
Profit on sale of fixed assets	5,000
Profit on sale of Trade/Non Trade Investments	4,000
Less: Non Operating Expenses	
Loss on sale of fixed assets	2,000
Loss on sale of Trade/Non Trade Investments	3,000
Extraordinary losses	4,000
Net Profit	**24,000**

$$\text{OPERATING RATIO} = \frac{\text{Cost of goods sold + Other operating expenses}}{\text{Sales}} \times 100$$

OR

OPERATING RATIO = 100 – Operating Profit ratio

Terms defined: other operating expenses means administrative, selling & distribution expenses.

$$Net\ Profit\ Ratio = \frac{Net\ Profit}{Sales}$$

Ideal Ratio: There is no ideal net profit ratio. In fact it depends upon operating profit and non operating incomes and expenses.

Dividend Decision

$$Return\ on\ Investment = \frac{Return = EBIT}{Average\ Capital\ Employed}$$

ROI yah batata hai ki business mein jo long term fund laga hua hai. Uspar ek saal mein kitna percent return kama lete hai.

$$Return\ on\ Invesment\ after\ tax = Return\ on\ Investent\ \times (1 - t)$$

Terms defined: Return = Operating Profit (Don't take Net profit here)
+ Interest on long term borrowings
+ Provision for taxation

Calculation of Capital Employed (From Liability side of Balance Sheet)

Particulars	Amount
Paid up equity share capital	1,00,000
Reserves & surplus	50,00,000
Less: miscellaneous losses & expenditures	Nil
Equity Shareholders' fund	51,00,000
Paid up preference share capital	1,00,000
Net Worth/Proprietor's Fund/ Equity/**Shareholders' fund**	52,00,000
Debt (Long term borrowings)	10,00,000
Less: Non trade investment	2,00,000
Capital Employed	60,00,000

Shortcut: Capital Employed = Debt + Equity

Calculation of Capital Employed (From Asset side of Balance Sheet)

Particulars	Amount
Fixed assets	40,00,000
Capital Work in progress	10,00,000
Trade Investment	2,00,000
Current Assets	16,00,000
Less: Current Liabilities	8,00,000
Capital Employed	60,00,000

Shortcut: Capital Employed = Fixed Assets + Working Capital

Average capital employed = (Opening capital + Closing capital) / 2

Ideal Ratio: there is no ideal ratio. But usually it is preferable on higher side.

Dupont analysis of ROI

$$ROI = \frac{EBIT}{Capital\ Employed} * \frac{Sales}{Sales} = \frac{EBIT}{Sales} * \frac{Sales}{Capital\ empolyed}$$

ROI = Profit Ratio * Capital turnover ratio
ROI = 10% * 2 = 20%

Dividend Decision

If turnover ration is increased.
ROI = 12% * 3 = 36%

Do it up to optimum utilization of assets.

Dividend Decision

$$Return\ on\ Assets = \frac{Return}{Assets}$$

Terms defined: Return = Same as defined in ROI formula
Total Assets = Total of assets side of balance sheet

Sometimes Tangible assets or Fixed assets are also used in place of Total assets.

$$Return\ on\ Equity = \frac{Earnings\ Available\ to\ Equity\ Shareholdres}{Equity\ Shareholdres'\ Fund}$$

Terms defined: Earning available to equity shareholders = Profit after tax minus Dividend to preference shareholders.

Dupont analysis of ROE

$$ROE = \frac{EAES}{ESF} * \frac{Sales}{Sales} * \frac{Asset}{Asset} = \frac{EAES}{Sales} * \frac{Sales}{Asset} * \frac{Asset}{ESF}$$

ROE = Profit ratio * asset turnover ratio * asset leverage
Increased asset leverage will increase financial risk
Increased turnover ration will increase business risk

Example:
Paid up equity share capital = 100000
CRR = 200000
Free reserves = 100000
10% Debt = 800000
10% Preference shares = 200000
EBIT = 196000
Tax = 30%

Calculate 1) ROI; 2) after tax ROI; 3) ROE
ROI = 196000/1400000 = 14%
after tax ROI = 14%*0.7 = 9.8%
ROE = 61200/400000 = 15.3%

Reconciliation of ROI and ROE:

$$ROE = ROI * (1-t) + (ROI - r_i) * (1-t) * \frac{Debt}{ESF}$$
$$+(ROI * (1-t) - r_d) * \frac{Preference}{ESF}$$

= 14*0.7 + 4%*0.7* (8/4) -0.2%*(2/4)
= 9.8% + 5.6% - 0.1%
= 15.3%

Capital Structure Ratios

$$Debt\ to\ Equity\ Ratio = \frac{Debt}{Equity}$$

Terms Defined: Debt = All the long term borrowings whether secured or unsecured.
Equity = As defined in ROI formula

Note that, Equity = Shareholders' fund = Net Worth = Proprietary fund
But Equity ≠ Equity shareholders' fund

Ideal Ratio: Ideal debt equity ratio is 2:1. It means a company can borrow double the amount of its shareholders' fund.

$$Proprietory\ Ratio = \frac{Proprietors\ Fund}{Total\ Assets}$$

Terms defined: Proprietary fund = Equity = Shareholder owners fund = Net worth
= Equity capital = Paid up equity capital + Paid up preference capital + Reserve & surplus - losses & Miscellaneous Expenses.

Total assets = Total of assets of side – Fictitious assets (Losses & Miscellaneous expenditure)

$$\text{FIXED ASSETS RATIO} = \frac{\text{Fixed Assets}}{\text{Capital employed}}$$

Terms Defined: Fixed assets means net fixed assets (net of depreciation). Trade investments may also be included in fixed assets for the purpose of this ratio.

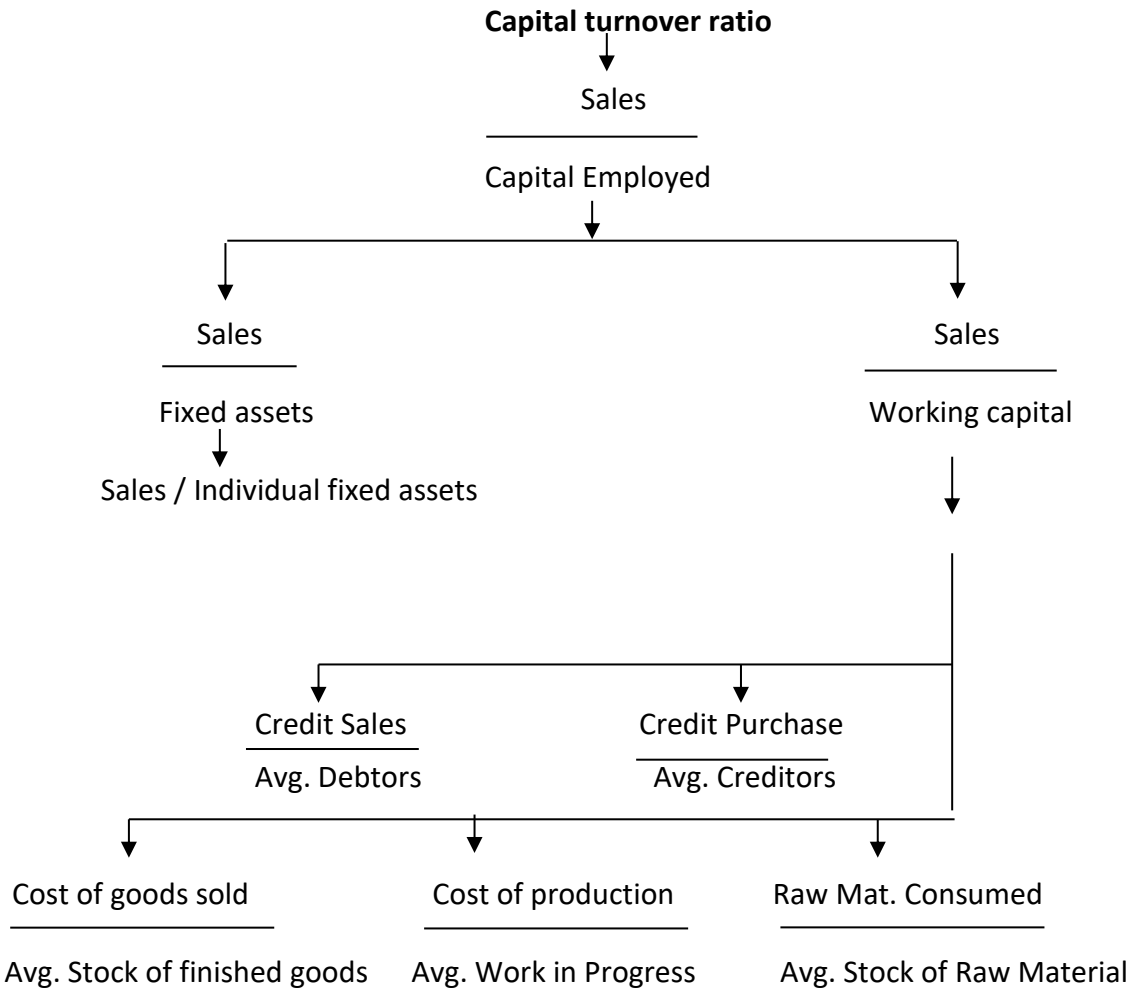
Comments: Under this ratio the amount invested under net fixed is compared with capital employed. This ratio indicates The percentage of capital employed, invested in fixed assets. It should not be more than one. Because a ratio higher than 1 indicates that some of the fixed assets are financed out of short term sources of finance. It is dangerous and may any time cause financial disaster. but at the same time it should also not be substantially less than one. A ratio substantially less than one indicates that a major portion of long term funds are used for financing current assets, which in turn indicates that ample liquidity but poor profitability.

Turnover ratios

$$\text{CAPITAL (EMPLOYED) TURNOVER RATIO} = \frac{\text{Turnover (Net sales)}}{\text{Average Capital employed}}$$

Dividend Decision

Terms defined: Capital employed is same as defined in ROI



$$\text{FIXED ASSETS TURNOVER RATIO} = \frac{\text{Turnover}}{\text{Net fixed assets}}$$

Terms defined: *Net fixed asset* means fixed assets after charging depreciation. Fictitious assets are excluded from net fixed assets.

$$\text{WORKING CAPITAL TURNOVER RATIO} = \frac{\text{Turnover}}{\text{Working Capital}}$$

Terms defined: *Working capital* means total of all the currents assets minus total of all the current liabilities.

$$\text{FINISHED GOODS TURNOVER RATIO} = \frac{\text{Cost of goods sold}}{\text{Average stock of finished goods}}$$

Terms defined:
Average stock finished goods = (Opening stock + Closing stock) / 2

Link with Working capital management: finished goods turnover ratio may be used to calculate finished goods holding period as follows:

$$\text{Finished goods holding period} = \frac{\text{360 days or 12 months}}{\text{Finished goods turnover ratio}}$$

$$FGTR = \frac{Cost\ of\ goods\ sold}{stock\ of\ FG} \qquad FG\ period = \frac{1}{FGTR} \times 360$$

$$\text{WORK IN PROGRESS TURNOVER RATIO} = \frac{\text{Cost of production}}{\text{Average stock of W.I.P.}}$$

Link with working capital management: With the help of WIP turnover ratio one can calculate WIP period as follows:

$$\text{WIP period} = \frac{\text{360 or 12}}{\text{WIP turnover ratio}}$$

Usually WIP period depends upon nature of product, production process and extent of automation. For fully automatic production process it will remain lower, on the other hand for labor intensive process it will remain higher.

$$\text{RAW MATERIAL TURNOVER RATIO} = \frac{\text{Consumption of Raw Material}}{\text{Average stock Raw Material}}$$

Link with working capital management: With the help of raw material turnover ratio one can calculate raw material storage period as follows:

Dividend Decision

$$\text{Raw Material storage period} = \frac{360 \text{ or } 12}{\text{Raw Material turnover ratio}}$$

$$\text{DEBTORS TURNOVER RATIO} = \frac{\text{Credit sales}}{\text{Average receivable (before provision)}}$$

Terms defined: Average receivable means (opening debtors + closing debtors)/2. Debtors includes bills receivables also.

Link with working capital management: We can calculate collection period with the help of this ratio:

$$\text{Collection Period} = \frac{360 \text{ or } 12}{\text{Debtors turnover ratio}}$$

$$\text{CREDITORS TURNOVER RATIO} = \frac{\text{Credit purchase}}{\text{Average creditors}}$$

Link with working capital management: we can calculate payment period with the help of this ratio:

$$\text{Payment Period} = \frac{360 \text{ or } 12}{\text{Creditors turnover ratios}}$$

Coverage ratios

$$\text{INTEREST COVERAGE RATIO} = \frac{\text{EBIT}}{\text{Interest}}$$

Terms defined: EBIT = Earning before interest and tax. here interest means interest on long term borrowings.

Comments: There is no ideal interest coverage ratio. But from the point of view of money lenders it is preferable on higher side. A higher interest coverage ratio means higher safety to money lenders, e.g., if the ratio is 2, it means company is required to pay interest of Re.1 while the amount available for payment of interest is Rs.2.

But a very high ratio is not favourable from the point of view of company. Higher interest coverage ratio means lower financial leverage and lower financial risk. A company with very low financial risk can not take advantage of trading on equity and that means lower profitability for equity shareholders.

$$\text{Profit available for debt servicing}$$

Dividend Decision

$$\text{DEBT SERVICES COVER RATIO} = \frac{\text{Profit available for debt servicing}}{\text{Principal + Interest}}$$

Ideal ratio: Ideal DSCR should be 2:1.

Terms defined: Profit available for debt servicing = Profit after tax
+ Non cash expenses
+ Interest on long term borrowings

Other Ratios

$$\text{Book Value Per Share} = \frac{\text{Equity shareholders' Fund}}{\text{No. Of equity shares}}$$

Comments: Usually for a company its BVPS remains higher than its face value. It indicates that how much claim shareholders have on company for each share they hold.

$$\text{PAY-OUT RATIO} = \frac{\text{Dividend per share}}{\text{Earning per share}}$$

Comments: It indicates percentage of company's profit distributed to its equity shareholders. Higher payout ratio leads to lower retained earnings, which in turn leads to lower growth.

$$\text{RETENSION RATIO} = \frac{\text{Earning per share - Dividend per share}}{\text{Earning per share}}$$

Comments: it can also be calculated as (100-Payout ratio). It indicates the percentage of earning retained by the company. It is useful for the calculation of growth rate, which in turn is used for calculation of cost of equity share capital. Normally high growth potential companies have higher retention ratio.

$$\text{PRICE EARNING (P/E) RATIO} = \frac{\text{Market price per share}}{\text{Earning per share}}$$

PE ration = 100/20 = 5 times

Comments: P/E ratio shows that how many times is market price of company's equity share as compared to its earning per share. P/E ratio is inverse of K_e (= EPS/MPS). Higher the P/E ratio lower the K_e and vice versa. if the P/E ratio for a company's share is higher it means the company is able to maintain higher market price even with a lower earning. It happens usually in case of companies with higher growth opportunities. Higher P/E ratio is preferable from the point of view of company because it maximizes wealth.

Dividend Decision

$$\text{DIVIDEND YIELD} = \frac{\text{Dividend per share}}{\text{Market price per equity shares}}$$

Comments: This ratio indicates percentage return on market price. Whenever a company declares dividend it is expressed as a percentage of face value, and investors create a wrong impression about that return. For example if a company says that it if going to pay a dividend of 80% and face value per share is Rs.10, one may think that it is a very big return for a year. But if the market price per share is Rs.800 dividend yield boils down to 1%. The intending investor can now decided whether it will be beneficial for him to purchase the shares at the prevailing market price or not.

$$\text{EARNING YIELD} = \frac{\text{Earning per share}}{\text{Market price per shares}}$$

Comments: Earning yield is basically nothing but cost of equity share capital and what is cost to the company is the return to the equity shareholders. Earning yield shows the percentage return to a shareholder on market price of shares. It is calculated by long term investors.

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