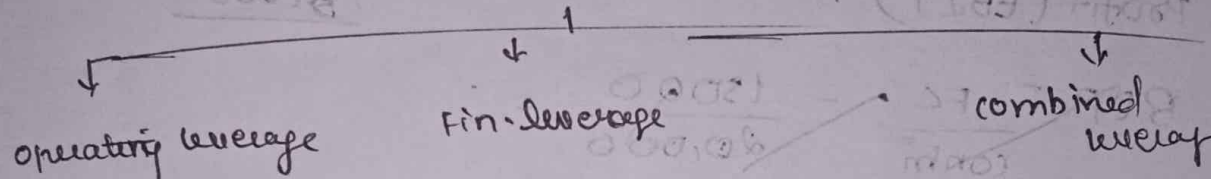
LIA-2

Leverage :-

* Represents influence / power.
* Influence of one fin. variable over some other related fin. variable.
* These fin. variables may be costs, output, sales & revenue, earnings (EBIT), (EPS).

Measurement of leverage = $\frac{\text{change in } Y \div Y}{\text{change in } X \div X}$



OL :-

$BEP = \frac{FC}{\text{contribution per unit}}$ $\quad BEP = \frac{FC}{\text{sales}} \times 100$

Particulars	Product X ₹	Product Y ₹
SP	40	20
VC	20	12
Contribution ✓	20	8
Total 1000 contb	20,000	8000.
Fixed cost	15000	5000
Profit (EBIT)	5000	3000

$BEP = \frac{FC}{\text{contb}} = \frac{15000}{20} = 750$ $\quad = \frac{5000}{8} = 625$ units

$OL = \frac{\text{Contribution}}{EBIT} = \frac{20,000}{5000} = x \Rightarrow 4$

" " $\frac{8000}{3000} \Rightarrow y = 2.67$

② Particulars

	Product Y (₹)
Sales (50 × 1000)	50,000
VC (30 × 1000)	30,000
Contribution	20,000
FC	15,000
Profit (EBIT)	5,000

$BEP = \frac{FC}{Contri} = \frac{15000}{20,000} =$

$PV\ ratio = \frac{\text{Contribution}}{\text{Sales}}$

$BEP = \frac{FC}{PV}$

$BEP = FC/PV \qquad \frac{15000}{0.4} = 37500$

$MOS = \frac{\text{Sales} - BEP\ sales}{\text{Sales}} = \frac{50000 - 37500}{50,000} = 0.25$

$OL = \frac{Contri}{EBIT} \qquad \frac{20000}{5000} = 4$

Degree $OL = \frac{1}{MOS} = \frac{1}{0.25} = 4$

$OL = \frac{Cont}{EBIT}$ $FL = \frac{EBIT}{EBT}$ $CC = \frac{Cont}{EBT}$

① PORTFOLIO RISK

Total Risk = syetematic + unsystemic risk

α & β :- [Measures of external Risk].

Determine the expected return & SD of the foll. portfolio two stocks have a correlation coef .75

PORTFOLIO	Weight	Expected Return	SD
ABC	.50	.14	.20
XYZ	.50	.14	.20

calculation of return & risk :

Expected risk = .5

$$SD = \sqrt{\frac{\Sigma (x_i - \bar{x})^2}{N}}$$

Year	Return (x_i)	$(x_i - \bar{x})$	$(x_i - \bar{x})^2$
1	50	-28	784
2	70	-8	64
3	80	2	4
4	100	22	~~###~~ 484
5	90	12	144
	Mean = 78		1480

$$SD = \sqrt{\frac{1480}{5}} = 17.20.1.$$

Variance in expected return is 17.20.1.

② The return on individual security (R_i) and market (R_m).

R_i	14	18	6	12	13	14	11	6	9	8
R_m	16	20	9	8	10	9	11	18	17	15

compute α & β.

R_i	R_m	$R_i * R_m$	R_i^2
14	16	224	196
18	20	360	324
6	9	54	36
12	8	96	144
13	10	130	169
14	9	126	196
11	11	121	121
6	18	108	36
9	17	153	81
8	15	120	64
111	133	1492	1367

$\downarrow$ $\downarrow$

11.1 13.3

$$\alpha = \bar{y} - \beta \bar{x}$$

$$\beta = \frac{n\Sigma xy - (\Sigma x)(\Sigma y)}{n\Sigma x^2 - \Sigma (x)^2}$$

$$\beta = \frac{n\Sigma R_i * R_m - \Sigma(R_i)\Sigma(R_m)}{n\Sigma R_i^2 - \Sigma(R_i)^2}$$

$$\beta = \frac{10 * 1492 - 111 \times 113}{10 \times 1367 - (111)^2}$$

$\boxed{\beta = 0.1163}$ → < 1 so, less aggressive

$$\alpha = 11.1 - (0.1163 * 13.3)$$

$\boxed{\alpha = 9.55}$

② Risk of two assets portfolio :-

② Leverage [OL, FL, CL]

Break even point = $\frac{FC}{\text{contribution}}$.

② Risk of 2 assets :-

$$\sigma_p = \sqrt{\sigma_x^2 w_x^2 + \sigma_y^2 \sigma_y^2 + 2 \sigma_x \sigma_y w_x w_y \times Cor_{xy}}$$

	M	N
Expected return (%)	16.00	24.00
Weight	0.5	0.5
std dev (%)	20.00	20.00

What is the portfolio risk (std dev) if

a) $cor_{mn} = +1.0$,

b) $cor_{mn} = -1.0$,

c) $cor_{mn} = 0.0$

d) $cor_{mn} = +0.10$

e) $cor_{mn} = -0.10$

4) correlation is (+)ve, corrn = +1.0

$$\sigma_p = \sqrt{\sigma x^2 w_x^2 + \sigma y^2 w_y^2 + 2\sigma x \sigma x w_x w_y}$$

$$= \sigma x w_x + \sigma y w_y$$

$$\sigma_p = 20 \times 0.5 + 20 \times 0.5 = 20\%$$

(3) Leverage:

OL, FL, CL

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

$$FL = \frac{EBIT}{EBT}$$

$$CL = \frac{\text{contribution}}{EBT}$$

	X	Y
Sales	4,00,000	8,00,000
VC	1,60,000	2,40,000
EOAtn	240000	560000
FC	128000	280000
Profit (EBIT)	112000	280000
Interest	48000	120000
EBT	64000	160000

X	Y
OL = 2.14	OL = 2 times
FL = 1.75	FL = 1.75 "
CL = 3.75	CL = 3.5 "

④ A firms sells its only product at ₹-12 / unit. Its variable cost is ₹-8 / unit. Present sales are 1000 units. Calculate OL in each

a) FC is 1000 b) FC is 1500 c) FC is 1200

Sales = 12 × 1000 = 12000

VC = 8 × 1000 = 8000

Sales	12000	Sales	12000	Sales	12000
VC	8000	VC	8000	VC	8000
Contri	4000	Contrib	4000	Contri	4000
1st FC	1000	2nd FC	1500	3rd FC	1200
EBIT (Profit)	3000	EBIT (Profit)	2500	EBIT (Profit)	2800

$OL = \frac{4000}{3000} = 1.34$

$OL = \frac{4000}{2500} = 1.6$

$OL = \frac{4000}{2800} = 1.43$

⑤ x ltd has choice of toll.

Particulars	Plan 1	Plan 2	Plan 3	Find FL
Equity Share	6,00,000	5,00,000	2,00,000	
10% debt	4,00,000	5,00,000	8,00,000	
EBIT	2,50,000	2,50,000	2,50,000	

$FL = \frac{EBIT}{EBT}$

	Plan 1	Plan 2	Plan 3
EBIT	2,50,000	2,50,000	2,50,000
Int on debt	(40,0000)	(5,00,000) × 10% ↓	(8,00,000) × 10% ↓
@ 10%	40000	50000	80000
	40000	50000	80000
EBT	2100000	200000	170000
EL = EBIT / EBT	2,50,000 / 2,100,000 = 1.19	2,50,000 / 2,00,000 = 1.25	2,50,000 / 170000 = 1.097

(6) Calculate OL, FL, CL

OIP = 3,00,000, FC = 3,50,000 VC = ₹ 1

Unit SP = ₹ 3 ₹ 25000

Sales 3,00,000 × 3 = 9,00,000

VC 3,00,000

Contr 6,00,000

FC 3,50,000

EBIT 2 50 000

(-) Int 25000

EBT 225000

$OL = \frac{6,00,000}{2,50,000} = 2.4$

$FL = \frac{2,50,000}{2,25,000} = 1.12$

$CL = \frac{6,00,000}{2,25,000} = 2.67$

(7) A firm has sales = 15,00,000 VC = 9,00,000 FC = 3,00,000, Debt = 8,00,000 @ 8-1. calculate OL, FL, CL. If the firm decides to double the EBIT how much of a raising sales would be made on -1- basis?

Sales	15,00,000
VC	9,00,000
Contri	6,00,000
FC	3,00,000
EBIT (profit)	3,00,000
-Int (8,00,000 x 8+)	64,000
EBT	2,36,000

$OL = \frac{6,00,000}{3,00,000} = 2$

$FL = \frac{3,00,000}{2,36,000} = 1.27$

$CL = \frac{6,00,000}{2,36,000} = 2.54$

Req. sales to double profit (EBIT) = $\frac{FC + \text{Desired EBIT}}{PV \text{ ratio}}$

PV ratio = $\frac{\text{contribution}}{\text{sales}} \times 100$

$\Rightarrow \frac{3,00,000 + (2 \times 3,00,000)}{PV \text{ ratio}}$ -> 0.40

$\Rightarrow \frac{6,00,000}{15,00,000} \times 100 = 0.40$

EBIT = 22,50,000

Req sales = 2250000 - 15,00,000 = 7,50,000

-1. to in sales = $\frac{7,50,000}{1,50,0000} \times 100 = 50.1.$

(8) Cost of capital / cut-off rate / hurdle rate:

- Return expected by the providers (ie; shareholders, lenders) to the business as a compensation for thier contribution to the total capital.
- the expense a company incurs in order to finance its operations and investments.
- useful in evaluation of investment options

Significance of the cost of capital:

- Evaluating investment decisions
- Designing a firm's debt policy &
- Appraising the fin. performance of top mgmt

(9) Perpetual debentures:

value of debenture,

$$V_d = \frac{A}{i}$$

A → Annual int-amt
i → Expected rate of int.

A deb holder is to recieve an annual int. of ₹-100 for perpetual on his debt of ₹-1000 calculate the value of debenture if req rate of return.

i) 15-1;

ii) 8-1.

iii) 10-1.

$V_d = \frac{A}{i}$ → Ann

i → Expect rate int.

A = 100

a) 15%. $V_d = \frac{100}{15} \times 100 = 666.66$

b) 8%. $V_d = \frac{100}{0.8} = 1250$

c) 10%. $V_d = \frac{100}{0.1} = 1000.$

Irredemble debenture :

Yield of debenture $Y_d = \frac{A_i}{M_{Pd}} \times 100\%$

A_i → Annual int

M_{pd} → Market price of debt

a) Y_d = ?

A = 1000 int @ 10% per annum.

MPd = 800

$A_i = 1000 \times \frac{10}{100} = 100$

MPd = 800

$Y_d = \frac{A_i}{M_{Pd}} = \frac{100}{800} \times \frac{100}{100} = 0.125 \times 100$

$= 12.5\%.$

Redemble Debenture

Yield to maturity $Y_{TM} = \dfrac{Ai + (F-P)/n}{(F+P)/2}$

F -> face value

P -> Mrkt price.

Ai -> Annual int. amt.

a) $Ai = 1000 \times \frac{9}{100}$.

yrs = 8 ie; n = 8

P = 800

$Y_{TM} = \dfrac{Ai + (F-P)/n}{(F+P)/2}$

$= \dfrac{90 + (1000 - 800)/8}{(1000 + 800)/2}$

$= \dfrac{90 + (200)/8}{1800/2} = \dfrac{90+25}{900} = \dfrac{115}{900}$

$\Rightarrow 0.127 \times 100$

$\Rightarrow 12.70\%$

b) P = 800,

$Ai = 1200 \times \frac{12}{100} \Rightarrow 144.$

$n = 5$

$Y_{TM} \Rightarrow \dfrac{Ai + (F-P)/n}{(F+P)/2}$ $\quad Y_{TM} = \dfrac{144 + (1200 - 800)/5}{(1200 + 800)/2}$

$= \frac{224}{1000} = 0.224$

$= 22.4\%$

c) $P = 800$.

$Ai = 1000 \times \frac{12}{1000} = 120$

$n = 5$.

$$Y_{TM} = \frac{Ai + (F-P)/n}{(F+P)/2}$$

$$= \frac{120 + (1000-800)/5}{(1000+800)/2}$$

$= \frac{160}{900} = 17.1\%$

~~FOI~~ Risk of two assets Portfolio:

Expected return [%]	16.00	24.00
weight	0.50	0.50
standard deviation	20.00	20.00

what is the portfolio risk [variance] if

a) $cor_{mn} = +1.0$

b) $cor_{mn} = -1.0$

c) $cor_{mn} = 0.0$

d) $cor_{mn} = +0.10$

e) $cor_{mn} = -0.10$

$$\sigma_p = \sqrt{\sigma_x^2 w_x^2 + \sigma_y^2 w_y^2 + 2 w_x w_y \sigma_x \sigma_y} = \sigma_x w_x + \sigma_y w_y$$

$$\sigma_p = \sqrt{\cdot}$$

FORMULAS :

(1.) Leverage

Sales - VC = Contr

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

$$\Leftarrow \frac{\text{Sales}}{VC}$$

$$\Leftarrow \frac{\text{Contri}}{EBIT}$$

$$\Leftarrow \frac{FC}{EBIT}$$

$$FL = \frac{EBIT}{EBT}$$

$$\Leftarrow \frac{\text{Int} \times \text{Lev}}{EBT}$$

$$CL = \frac{\text{contribution}}{EBT}$$

For doubling the EBIT $= \frac{FC + (2 \text{ Deduct } EBIT)}{PV \text{ Ratio}}$

$$PV \text{ ratio} = \frac{\text{contribution}}{\text{sales}} \times 100.$$

New EBIT — Incd sales = New EBIT - actual sales

$$\% = \frac{\text{Incd sales}}{\text{actual sale}} = \%$$

(2) Perceptual debenture :

$$V_d = \frac{A}{i}$$

A → Annual int amt

i → Expected rate of int.

(7) Expected cash flow :-

Prob	cashflow	Prob	Cash
0.1	10	0.3	30
0.2	20	0.4	40

→ $\bar{R}$ = 0.1 × 10 + prob

(Prob × cash) + - - - - = total

→ $\bar{R}$ = " " " " "

SD; σ = prob × [(cash − total)^2] +

↳ answer $\sqrt{(\quad)^{1/2}}$

↳ E(R)

(8) Req. rates of returns :-

$E(R_i) = R_f + [R_m - R_f] \times \beta$

$E(R_i)$ → rate of return

R_f → rate of return

R_m → market

β → given

(9)