PORTFOLIO MANAGEMENT
CLASS - 7 _ PART-I

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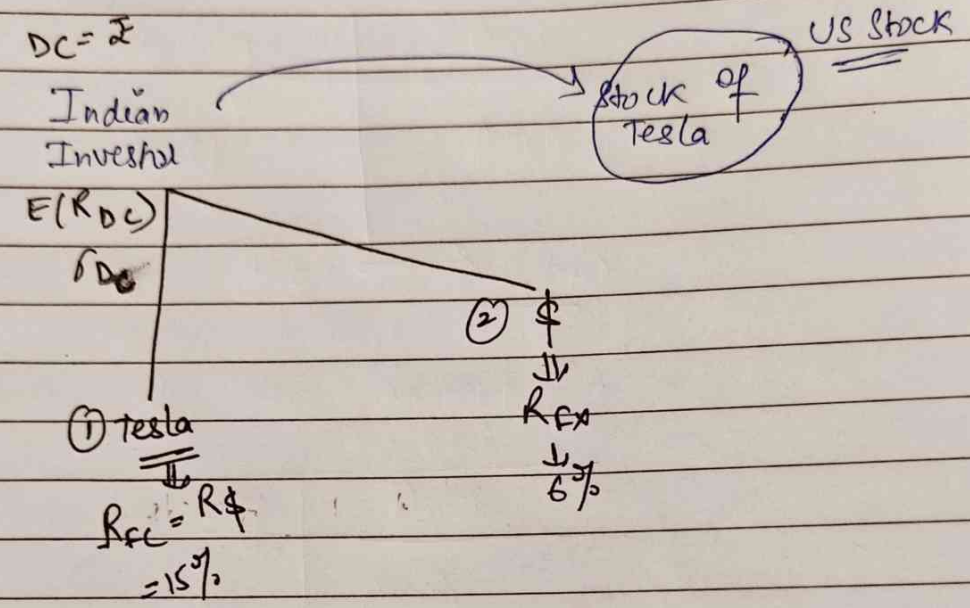
Investment in a foreign stock (already done in Forex)



$$\therefore E(R_{DC}) = (1.15 \times 1.06) - 1$$
$$= 21.9\%$$

$$\sigma_{DC} = \sqrt{\sigma_{stock}^2 + \sigma_{FC}^2 + 2\rho_{st}\sigma_{FC}}$$

Q.28.

$$R_{FC} = R_f + (R_m - R_f)\beta$$
$$= 15 + (85-8) \times 1.2$$
$$= 16.4\%$$

$$R_{FX} = -4\%$$

$$E(R_{DC}) = (1.164 \times 0.96) - 1$$
$$= 11.74\%$$

Q.29.

R_{FC} [CAPM]
$= R_f + (R_m - R_f)\beta$
$= 6 + (9-6)\,1.4$
$= 10.2\%$ (stock ka return)

$R_{FX} = -4\%$

$\therefore E(R_{DC}) = (1.102 \times 0.96) - 1$
$= 5.792\%$ (ER for US co.)

$\sigma_{DC} = \sqrt{\sigma^2_{stock} + \sigma^2_{FX} + 2\, r\, \sigma_{st}\, \sigma_{FX}}$

$= \sqrt{10^2 + 8^2 + 2 \times .15 \times 10 \times 8}$

$= 13.71\%$

v.v. Imp

Levered & Unlevered Beta (can come in Cap Bud, Eq. Valuation, Mergers & Acq as well as Portfolio Ch).

Project risk
- bus. kya ~~chez~~ ka hai → IT ka, steel ka etc } unlevered Beta. ↓ debt k bina kya risk hai
- ~~kitna FC use kr rha hai~~ — op. leverage
- ~~FL → kitna debt use kar rha hai~~
  ~~↓ fin. leverage~~

Unlevered Beta ⇒ β_U → It is also called Asset Beta (β_A)
Risk is amplified → This is levered Beta (β_L) (Also known as Equity Beta) (β_E) ⇓
It shows "Business risk" → dhande ka risk + Operating leverage (OL)
If we are using debt i.e. FL

If there is no debt :

Liability	Asset
Equity	Assets
β_E	β_A

But if there is debt :

Liability	Asset
Equity β_E	Assets
Debt β_D	
β_L	β_A

(I) $$W_D \beta_D + W_E \beta_E = \beta_A$$

In most ICAI problems (except recent past), β_D is assumed to be "0".

In that case ——

$$W_E \beta_E = \beta_A$$

$$\left(\frac{E}{D+E}\right) \beta_E = \beta_A$$

$$\beta_E = \beta_A \left[\frac{D+E}{E}\right]$$

(II) $$\beta_E = \beta_A \left[1 + \frac{D}{E}\right]$$

If tax rate "t" is given —

(III) $$\beta_E = \beta_A \left[1 + \frac{D(1-t)}{E}\right]$$

β_L β_U

$$k_e = w_d k_d + w_e k_e \quad \text{(or)}$$
$$= R_f + (R_m - R_f)\beta_A$$

Different types of sums —

- Type I - Chomu sum

Q.No. 33

$E = 80$ lakh
$D = 20$ lakh
$\therefore$ Asset = 100 lakh

$\beta_E = 1.5$
$R_m - R_f = 8\%$
$R_f = 6\%$

(i) $$\beta_E = \beta_A \left[1 + \frac{D}{E}\right]$$

(ii) $$1.5 = \beta_A \left[1 + \frac{20}{80}\right]$$

Rearranging

$$\beta_A = \frac{1.5}{1 + \frac{20}{80}}$$

$$\beta_A = \frac{1.5}{1.25} = 1.2 \text{ (Ans)}$$

∴ $K_e = R_f + (R_m - R_f)\beta_A$
$= 6 + 8 \times 1.2$
$= 15.6\%$ (Ans)

Alternatively

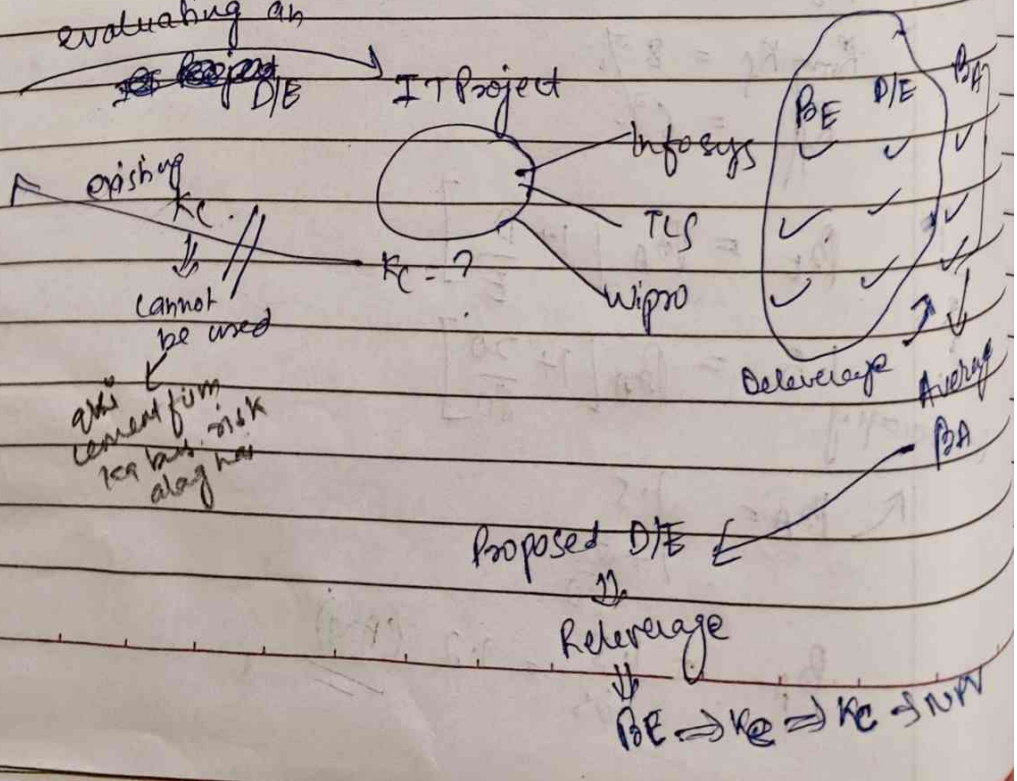
$K_c = W_d K_d + W_e K_e$
$K_e = R_f + (R_m - R_f)\beta_e$
$= 6 + 8 \times 1.5$
$= 18\%$

$K_d = R_f = 6\%$

∴ $K_c = W_d K_d + W_e K_e$
$= 0.2 \times 6 + 0.8 \times 18$
$= 15.6\%$

CA1 used wrong solution.

- Type II - Cap Budgeting Type sum



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Q No. 34

Relevarage D/E ratio = 0.27
R_f = 12%.
K_d = 14%.
K_m = 18%.
Tax rate = 35%.

Step 1: Deleveraging

Proxy Firms

$$\beta_U = \frac{\beta_L}{1 + \frac{D}{E}(1-t)}$$

ABC $\beta_U = \frac{1.1}{1+0.3(0.65)} = 0.9205$

DEF $\beta_U = \frac{0.9}{1+0.25(0.65)} = 0.7742$

GHI $\beta_U = \frac{0.95}{1+0.35(0.65)} = 0.7739$

JKL = $\beta_U = \frac{1}{1+0.3(0.65)} = 0.8368$

Avg β_U = 0.8262

Step 2: Releveraging

$$\beta_E = \beta_A \left[1 + \frac{D}{E}(1-t)\right]$$

$$= 0.8264 \left[1 + 0.27 \times 0.65\right]$$

$$= 0.9714$$

Step 3: $k_e = R_f + (R_m - R_f)\beta_E$

$$= 12 + (18-12)\,0.9714$$

$$= 17.83\%$$

Step 4: k_d (post tax) $= 14 \times 0.65$

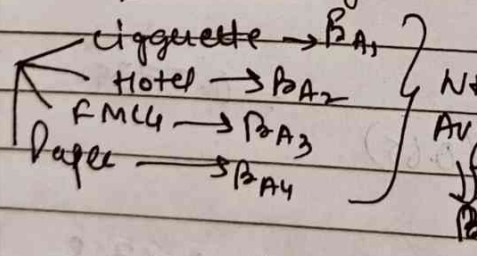
$$= 9.1\%$$

Step 5: $k_c = W_d k_d + W_e k_e$

$$= \frac{0.27}{1.27} \times 9.1 + \frac{1}{1.27} \times 17.83$$

$$= 15.97\%$$

- **Type III : Mixed Play → Conglomerate**



Tough ques

Q. NO. 32

E = 500 cr
D = 290 cr
A = 790 cr
Printer div. 64%.
$\beta_A = 1.55$.

118.84

1.5 : 1
3 : 2

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Spare & Consumable div → $\beta_A = 1.40$

i) β_A of ABC = Wtd Avg of two divisions

$= 0.64 \times 1.55 + 0.36 \times 1.40$

$= 1.496$

$A \times \beta_A = D \times \beta_D + E \times \beta_E$

$790 \times 1.496 = 290 \times 0.28 + 500 \times \beta_E$

$\therefore \beta_E = 2.20$ (Ans)

ii) $A = 790$ crore $\Rightarrow \beta_A = 1.496$

$\Downarrow$

$D/E = 1.5$

Debt

$= \frac{1.5}{2.5} \times 790$

$= 474$

Equity

$\frac{1}{2.5} \times 790$

$= 316$

Existing Debt

$\Downarrow$

290

$\Downarrow$

$\beta_{D_1} = 0.45$

New Debt

$\Downarrow$

184 (bf)

(474 - 290)

$\Downarrow$

$\beta_{D_2} = 0.5$

$790 \times 1.496 = 290 \times .45 + 184 \times 0.5 + 316 \times \beta_E$

$\therefore \beta_E = 3.04$ (Ans)

Ambiguous

iii) Yes, because ~~eqto~~ β_E has gone up.

RTP SUM came in Exam

~~Imp~~ Q. ~~EXTRA Q.~~ Q No. 35

$\beta = r \frac{\sigma y}{\sigma x}$

Car AC (B) $= 0.6 \times \frac{30}{20}$

$= 0.9$

Window AC (B) $= 0.7 \times \frac{35}{20}$

$= 1.225$

Split AC (B) = ?

Proxy Firm → Window 50% → $\beta = 1.225$; Split 50%

⇓

$\beta = r \frac{\sigma y}{\sigma x}$

$= 0.85 \times \frac{50}{20}$

$= 2.125$

$\therefore 2.125 = \frac{\beta_{Window} + \beta_{Split}}{2}$

$2.125 \times 2 = 1.225 + \beta_S$

$\beta_{Split} = 3.025$

ABC
- car (60%) → β 0.9
- window (25%) → 1.225
- split (15%) → 3.025

$\therefore \beta_{ABC} = 0.6 \times 0.9 + 0.25 \times 1.225 + 0.15 \times 3.025$

$= 1.3$ (Ans)

ii)
$R_f = 4\%$
$R_m = 10\%$

$K_e = R_f + (R_m - R_f)\beta$ (∵ no debt ∴ β_e is taken) $\beta_d = 0$
$= 4 + (10-4)1.3$
$= 11.8\%$ (Ans)

iii)
$E(R) = R_f + (R_m - R_f)\beta_e$

For debt

$5 = 4 + (10-4)\beta_d$

$1 = 6\beta_d$

$\beta_d = \frac{1}{6}$

$\beta_A = W_d \beta_D + W_e \beta_E$

$1.3 = 0.5 \times \frac{1}{6} + 0.5 \beta_E$

$\beta_E = 2.433$ (Ans)