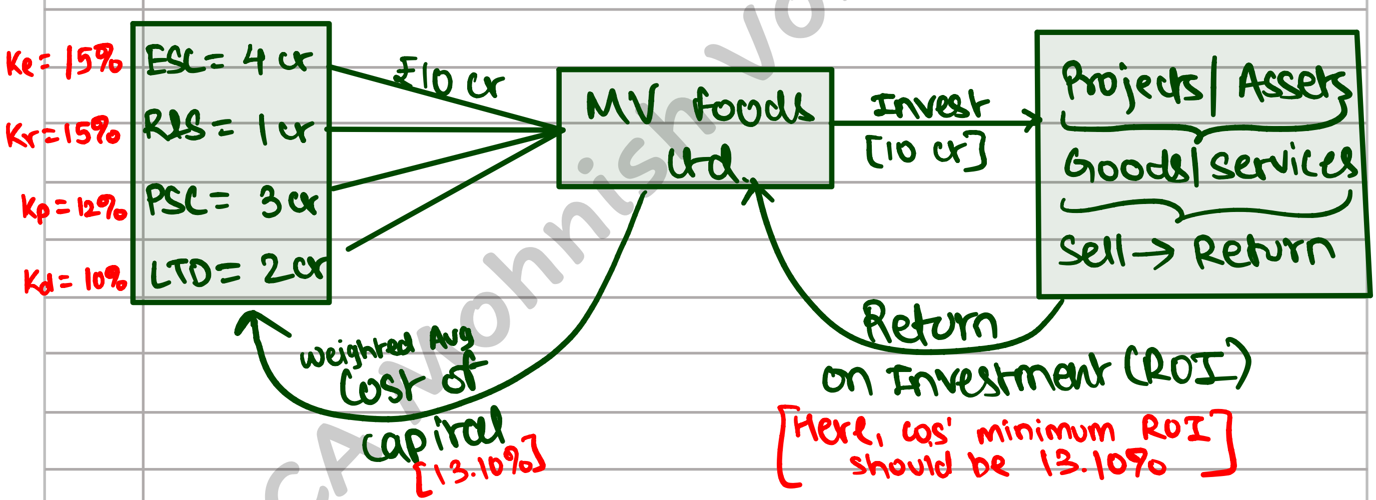
FM Chp 4 - COST OF CAPITAL

- Cost of Debt (Kd)
- Cost of Preference Sh. Capital (Kp)
- Cost of Equity Sh. Capital (Ke)
- Cost of Retained Earnings (Kr)

In this chapter we will learn to -

i) calculate Kd, Kp, Ke & Kr

ii) calculate Weighted Average cost of capital [WACC or Ko]



Calculation of Weighted Average cost of capital

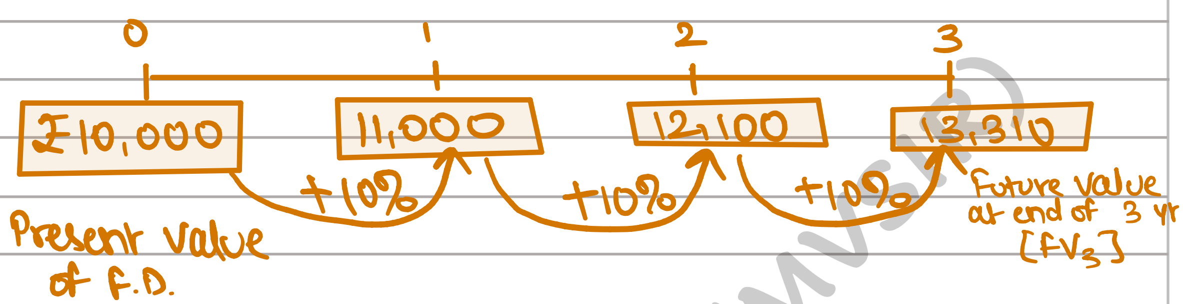
Sources	Amt (₹)	Weights (wi)	Cost (ci)	wi x ci
ESC	4 cr	$w_e = 4/10 = 0.40$	$K_e = 15\%$	6%
R&S	1 cr	$w_r = 1/10 = 0.10$	$K_r = 15\%$	1.50%
PSC	3 cr	$w_p = 3/10 = 0.30$	$K_p = 12\%$	3.60%
LTD	2 cr	$w_d = 2/10 = 0.20$	$K_d = 10\%$	2%
	10 cr	1	—	13.10%

[WACC or Ko]

TIME VALUE OF MONEY

I) FV of a Single Amount

Suppose you invest ₹10,000 in a bank's fixed deposit. Interest Rate is 10% p.a. What will be the F.V. at the end of 3 years?



The value of FD today [PV = ₹10,000] becomes ₹13,310 [FV_3] at the end of 3rd yr if interest rate is 10% p.a.

$$10{,}000 + (10\% \times 10{,}000) = 11{,}000$$

$$11{,}000 + (10\% \times 11{,}000) = 12{,}100$$

$$12{,}100 + (10\% \times 12{,}100) = 13{,}310$$

$$\underbrace{10{,}000 + 10\% + 10\% + 10\%}$$

$$10{,}000 \times (1 + 10\%) \times (1 + 10\%) \times (1 + 10\%)$$

$$\Rightarrow \underbrace{10{,}000}_{PV} \times \underbrace{(1 + 0.10)^3}_{(1+r)^n} = \underbrace{13{,}310}_{FV_n}$$

$$PV \times (1+r)^n = FV_n$$

Example 2

0 — Int Rate = 12% — 10

₹50,000 $\quad$ $FV_{10} = ?$

$$FV_{10} = PV \times (1+r)^{10}$$

$$\Rightarrow FV_{10} = 50{,}000 \times (1 + 0.12)^{10}$$

$$= 50{,}000 \times 3.106$$

$$\Rightarrow FV_{10} = ₹1{,}55{,}300$$

II) PV of a Single Amount

Eg: Suppose you are going to receive ₹1,00,000 after 5 yrs from now. Then what will be the P.V., if interest rate is 15% p.a.?

0 — Int Rate = 15% — 5

PV = ? $\quad$ $\boxed{1{,}00{,}000}$ FV_5

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

$$\Rightarrow PV = \frac{1{,}00{,}000}{(1+0.15)^5} = \frac{1{,}00{,}000}{2.011} = 49{,}726.50$$

$\Rightarrow PV = 1{,}00{,}000 \times \frac{1}{(1+0.15)^5}$

$= 1{,}00{,}000 \times \left[\frac{1}{1+0.15}\right]^5$

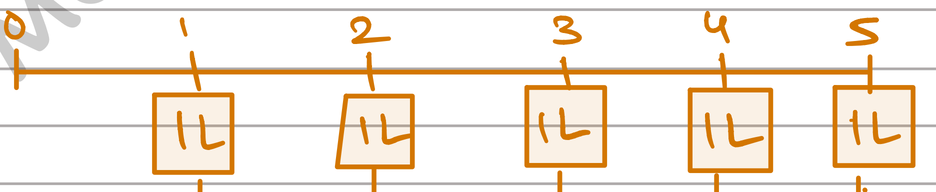
$= 1{,}00{,}000 \times 0.497 = ₹49{,}700$

* Discounting factors @ 15%
[Present Value Interest Factors → PVIF(15%, n)]

1st yr ke end ke ₹1 ki value → aaj 15% → 0.870
2nd yr ke end ke ₹1 ki value → aaj 15% → 0.756
3rd yr ke end ke ₹1 ki value → aaj 15% → 0.658
4th yr ke end ke ₹1 ki value → aaj 15% → 0.572
5th yr ke end ke ₹1 ki value → aaj 15% → 0.497

III) PV of Annuity [Uniform Cashflows for finite period]

Eg: Suppose as per a contract, you are going to receive ₹1,00,000 at the end of every year upto 5 yrs. Then what is the P.V., if rate is 15%.



$PV = \frac{1L}{(1.15)^1}$

$PV = \frac{1L}{(1.15)^2}$

$PV = \frac{1L}{(1.15)^3}$

$PV = \frac{1}{(1.15)^4}$

$PV = \frac{1}{(1.15)^5}$

$$PV = \frac{1L}{(1.15)^1} + \frac{1L}{(1.15)^2} + \frac{1L}{(1.15)^3} + \frac{1L}{(1.15)^4} + \frac{1L}{(1.15)^5}$$

$$= 1L\left(\frac{1}{1.15}\right)^1 + 1L\left(\frac{1}{1.15}\right)^2 + 1L\left(\frac{1}{1.15}\right)^3 + 1L\left(\frac{1}{1.15}\right)^4 + 1L\left(\frac{1}{1.15}\right)^5$$

$$= 1L(0.870) + 1L(0.756) + 1L(0.658) + 1L(0.572) + 1L(0.497)$$

$$= ₹3,35,300.$$

OR

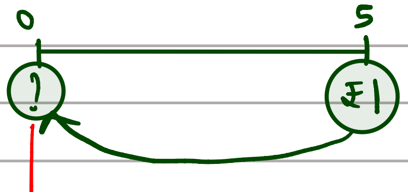
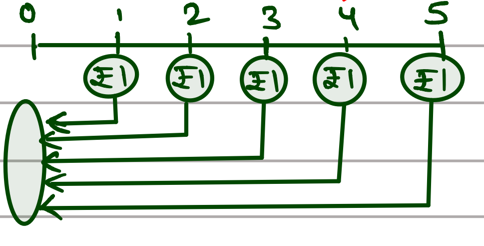
$$1L\,(0.870 + 0.756 + 0.658 + 0.572 + 0.497)$$

$$\Rightarrow 1L \times 3.353$$

$$\Rightarrow \underline{₹3,35,300}$$

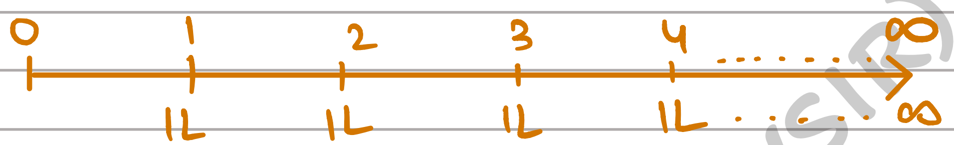
$$\boxed{\text{PV of Annuity} = A \times PVAF(r, n)}$$

OR $\underbrace{A \times \left[\dfrac{1-\left(\frac{1}{1+r}\right)^n}{r}\right]}_{\text{Not to be used ever}}$

Present Value Interest Factor [PVIF]	Present Value Interest Factor Annuity [PVIFA or PVAF]
Eg: PVIF(15%, 5)	Eg: PVAF(15%, 5)
	
$\frac{1}{(1.15)^5} = 0.497$	$PVAF(15\%, 5) = \frac{1}{(1.15)^1} + \frac{1}{(1.15)^2} + \frac{1}{(1.15)^3} + \frac{1}{(1.15)^4} + \frac{1}{(1.15)^5} = 3.353$

IV) PV of Perpetuity [Uniform Cashflows for Infinite period]

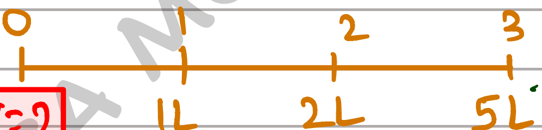
Eg: Suppose as per a contract, you are going to receive ₹ 1L at the end of each year for infinite period. Find PV, if interest rate is 12%.



PV of Perpetuity = $\boxed{\frac{1L}{(1+0.12)^1} + \frac{1L}{(1+0.12)^2} + \frac{1L}{(1+0.12)^3} \ldots\ldots \infty}$

$\Rightarrow \frac{A}{r} \Rightarrow \frac{1L}{0.12} = \underline{\underline{8.33L}}$

V) P.V. of uneven cashflow



6,31,600

$\boxed{PV=?}$

Discounting Rate = 10%

$\frac{1L}{(1+0.10)^1}$

$\frac{2L}{(1+0.10)^2}$

$\frac{5L}{(1+0.10)^3}$

$PV = \frac{1L}{(1.10)^1} + \frac{2L}{(1.10)^2} + \frac{5L}{(1.10)^3}$

$= 1L \times \left(\frac{1}{1.10}\right)^1 + 2L\left(\frac{1}{1.10}\right)^2 \ldots$

$= 1L \times (0.909) + 2L(0.826) + 5L \times (0.751)$

$= ₹6,31,600$

Basic task of finance manager is EFFICIENT-
i) Procurement &
ii) Utilisation of funds.

* Main objective of FM
↓
wealth (value) max

$$\left[\text{Value of firm} = \frac{\text{EBIT}}{\text{WACC}}\right]$$

Thus, a finance manager has to select such a capital structure where
↓
Expected Return of Fund Providers [WACC] is MINIMUM
↓
When WACC is Minimum, Value of firm will be MAXIMISED
↓
Hence, for this purpose, we need to calculate the cost of various sources of finance & WACC.

---

* COST OF CAPITAL

- is NOT just what amount company pays on its capital (funds)
- But it is ALSO the return expected by the providers of capital (funds)

Investor or Fund Provider ← WACC = 15% ← Company

Investor or Fund Provider: Return expected on funds provided to co.

Company: co. mei funds ko use karne ka kharcha.

* Cost of capital is expressed in terms of "rate" → % form.

* Cost of capital is aka.
  → cut off rate, or
  → Hurdle rate, or
  → minimum rate of return.

---

* SIGNIFICANCE OF COST OF CAPITAL

i) It helps in evaluating investment decisions cost of capital is used as discounting rate while making investment decision.

ii) Helps in taking financing decision. Finance manager will select that source of finance whose cost is lower, while also considering risk & control.

iii) Designing optimum credit policy. [Average collection period]

---

* COST OF LONG TERM DEBT [Kd]

- External Borrowings or debt instruments -
  i) do NOT have ownership of company.
  ii) do NOT participate in the affairs of the company [no voting right]
  iii) But, they enjoy a charge against profits BEFORE taxes.

PBIT → +ve / −ve

− Interest → must be paid → charge against profit.

PBT

− Tax

PAT

Pref Div | Eq Div

{ Paid only when +ve PAT } Appropriation of Profit

* "LONG TERM DEBT" includes

- Long Term Loans from F.I.
  ↓
  Similar to Kd on Redeemable Debentures.
- Debentures / Bonds
  ↓
  In this chapter we will calculate Kd on Debentures / Bonds only.

* IMPORTANT NOTE

→ Interest on Bonds / Deb. is always calculated on FACE VALUE.

→ Company gets a benefit of Tax Shield (Saving) on Interest expenditure.

Example:

Co. M

Total Capital = ₹ 10L

- ESC = ₹ 10 L (1 sh = ₹ 10)
- LTD = 0

Co. N

Total Capital = ₹ 10L

- ESC = ₹ 6 L (1 sh = ₹ 10)
- 10% LTD = 4L

Particulars	Co. M (₹)	Co. N (₹)
PBIT (Assume)	3,00,000	3,00,000
(–) Interest	—	(40,000)
PBT	3,00,000	2,60,000
(–) Tax (30%)	(90,000) → ₹12K Tax saving	(78,000)
PAT → EFES	2,10,000	1,82,000
(÷) No. of Eq Sh.	1,00,000 sh.	60,000 sh.
EPS	₹ 2.10/sh	₹ 3.03/sh.

In above example, co. N paid interest of ₹40,000, due to which it had to pay lower tax by $\underbrace{\text{₹}12{,}000}_{\text{Tax saving (Shield) on Interest}}$ [40,000 × 30%]

10% LTD $\xrightarrow{\text{₹}4L}$ Co. N

$\frac{28{,}000}{4L - 10K}$ ☹

40,000 – 12,000 = 28,000 } Effective Interest Exp.

Thus, cost of using debt for co. N is

$$Kd = \frac{28{,}000}{4{,}00{,}000} = 7\%$$

This proves that Interest rate on Debt is NOT equal to Kd always.

Also, for calculating Kd → Interest Net of Tax [Interest (1 – t)] is used.