Time Value of Money

F.V

Future value of Single amount ⇒

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

Future value of Uneven Cashflows ⇒

$$FV_n = PV(1+r)^{n-1} + PV(1+r)^{n-2} + \dots + PV(1+r)^{n-n}$$

F.V of Annuity ⇒ $FVA_n = A\left[\frac{(1+r)^n - 1}{r}\right]$

P.V

Present value of Single amount ⇒

$$PV = FV_n \left[\frac{1}{(1+r)^n}\right]$$

Present Value of Uneven Cashflows ⇒

$$PV_n = \frac{C_1}{1+r} + \frac{C_2}{(1+r)^2} + \dots + \frac{C_n}{(1+r)^n}$$

P.V of Annuity ⇒ $PVA_n = A\left[\frac{1 - \frac{1}{(1+r)^n}}{r}\right]$

Comp. Freq.	m
Annually	1
Semi-annu	2
Quaterly	4
Monthly	12
Weekly	52
Daily	365
Cont.	formula

- Perpetuity ⇒ $P = \frac{A}{r}$

- Intra-year compounding & discounting ⇒ $FV_n = PV\left(1 + \frac{r}{m}\right)^{m \times n}$

- Effective Interest rate $= \left(1 + \frac{\text{stated anual I.R}}{m}\right)^m - 1$

comp. freq.

→ Risk & Return

1) Rate of return = $\dfrac{\text{Annual income} + \text{Ending Price} - \text{Begining Price}}{\text{Begining Price}}$

$= \dfrac{\text{Annual income}}{\text{Beginning Price}} + \dfrac{\text{Ending Price} - \text{Beginning Price}}{\text{Beginning Price}}$

= Current yield + Capital gain yield

2) Variance of Returns (Risk) :

$$\sigma^2 = \frac{\sum (R_i - \bar{R})^2}{n-1}$$

OR

$$\sigma^2 = \sum P_i (R_i - R)^2$$

Step Deviation = $\sigma = \sqrt{\text{variance}}$

3) Expected return : $E(R_P) = \sum W_i \, E(R_i)$ ← probability; → return of individual

4) Beta ⇒ $B_j = \dfrac{COV.(R_j R_m)}{\sigma_m^2} = \dfrac{\sum (R_{jt} - R_j)(R_{Mt} - R_M)}{\sigma_m^2 (n-1)}$

Alpha ⇒ $\alpha_j = R_j - B_j R_M$

characteristic line, $R_{jt} = \alpha_j + B_j R_{Mt} + \varepsilon_j$

5) CAPM :-

$E(R_i) = R_F + [E(R_M) - R_F] B_i$

→ Capital Budgeting

① Payback Period (PBP) :- $\dfrac{\text{Amnt left to recover after some Yr}}{\text{Amt to recover from that Yr.}} \times 12 \text{ months}$ (Investment - that year amnt)

② NPV = Total discounted cashflow - Investment.

③ Benefit Cost ratio / Profitability Index (BCR) = $\dfrac{\text{Total discounted cash flow}}{\text{Investment}}$

④ Discounted Payback Period = Calc. PBP at Discount Factor.

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5) IRR = Lowest discounting rate + $\frac{\text{NPV @ Lowest rate}}{\text{NPV @ Lowest rate} - \text{NPV @ highest rate}}$ × (Diff. in the rates)

Internal rate of return

C.S

(1) Revenues / Selling Price = Units × Price
(−) Variable costs
Contribution = S.P − V.C
(−) Fixed cost

EBIT : Earnings before Interest & Tax = Contribution − F.C
EBT : Earnings before Tax = EBIT − Interest
EAT : Earnings after Tax = EBT − Tax
Earnings available for Equity shareholders : EAT − Pref. Dividend

$$\text{Earnings Per share} = \frac{EAES}{\text{Units}}$$

(2) $$\text{Degree of Operating Leverage} = \frac{\text{Contribution}}{EBIT}$$

$$\text{" " Financial "} = \frac{EBIT}{EBT}$$

$$\text{Total Leverage} = D.O.L \times D.F.L = \frac{\text{Contribution}}{EBT}$$

(3) $$\text{Break Even Point (units)} = \frac{\text{Fixed costs}}{\text{Contribution/unit}}$$

$$P/V \text{ ratio} = \frac{\text{Contribution/unit}}{S.P \text{ per unit}} \times 100$$

$$BEP \text{ (in Rs)} = \frac{F.C}{P/V \text{ ratio}}$$

4) $$EPS = \frac{(EBIT - I)(1 - t)}{n}$$

If Pref. Dividend given: D_p

$$EPS = \frac{(EBIT - I)(1-t) - D_p}{n}$$

5) Interest Coverage ratio = EBIT / interest on Debt

$$\text{Cash flow Coverage ratio} = \frac{(EBIT + Dep. + \text{other non cash charges})}{\text{Interest on Debt} + \left(\frac{\text{Loan repayment installm.}}{1-t}\right)}$$

$$\text{Debt service Coverage ratio} = \frac{\Sigma(PAT + Dep + Interest + L)}{\Sigma(Interest + LRI + L)}$$

Dividend Decision

→ **Walter Model :-**

$$P = \left(\frac{D + (E - D)\, r/k}{k} \right)$$

P = Price per equity share

D = Dividend/share

E = Earnings/share

k = cost of capital

r = rate of return

$r > k \rightarrow P \uparrow$ as Dividend payout ratio $\downarrow$

$r = k \rightarrow P$ = constant " " changes

$r < k \rightarrow P \uparrow$ as " " ratio $\uparrow$

Gordon Model :-

$$P_0 = \left(\frac{E_1 (1-b)}{k - br} \right)$$

b = retention

k = rate return req. by Shareholders

$g = b \cdot r$

growth rate = retention rate . rate of return

Scanned with CamScanner

Working Capital Management / Policy

Operating Cycle = inventory period + accounts receivable period

Cash Cycle = Operating Cycle − accounts payable period

where: Inventory period = $\frac{\text{Avg. inventory}}{\text{Avg. COGS}} \times 365$ → Cost of Goods sold

Acc. receivable Period = $\frac{\text{Avg. Acc. receivable}}{\text{Annual sales}} \times 365$

Acc. Payable Period = $\frac{\text{Avg. Acc. Payable}}{\text{Avg. COGS}/365}$

→ Cash And liquidity Management

1) Baumol Model:
$$C = \sqrt{\frac{2bT}{I}}$$

C = amount of marketable securities conv. into cash/order

I = interest per planning period on investment in marketable securities

T = Projected Cash requirements during planning period

2) Miller and Orr Model:-
$$RP = \sqrt[3]{\frac{3b\sigma^2}{4I}} + L.L$$

$$UL = 3R.P - 2LL$$

where, RP = return point ; LL = lower control limit

I = daily interest ; UL = upper " "

b = F.C/order for conv. securities into cash.

σ^2 = Variance

→ Credit Management

1) Impact on residual income :-

COG

$$\Delta RI = [\Delta S(1-V) - \Delta S b_n](1-t) - K\,\Delta I$$

ΔRI = change in residual income

ΔS = increase in sales ; t = corporate tax rate

V = ratio of V.C to Sales ΔI = increase in recievable investment.

b_n = bad debt loss ratio on new sales.

i)

$$\Delta I \rightarrow \frac{\Delta S}{360} \times ACP \times V$$

ACP → Avg collection period

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ii) Effect of lengthing the credit period on residual income

$$\Delta I = (ACP_N - ACP_0)\left(\frac{S_0}{360}\right) + V(ACP_N)\left(\frac{\Delta S}{360}\right)$$

↓ new avg collection period after lengthning.

iii) Effect of relaxing discount policy on residual income

$$\Delta DIS = P_n(S_0 + \Delta S)d_n - P_0 S_0 d_0$$

&

$$\Delta I = \frac{S_0}{360}(ACP_0 - ACP_N) - V\frac{\Delta S}{360} ACP_N$$

$$\Delta RI = [\Delta S(1-V) - \Delta DIS](1-t) + K\Delta I$$

iv) Effect of relaxing the collection effort on the residual income

$$\Delta BD = b_n(S_0 + \Delta S) - b_0 S_0$$

~~ΔRI = E~~

&

$$\Delta I = \frac{S_0}{360}\left(ACP_N - ACP_0\right) + \frac{\Delta S}{360} ACP_N(V)$$

$$\Delta RI = [\Delta S(1-V) - \Delta BD] b - K\Delta I$$

2) Value of receivables $= \frac{Sales}{360} \times ACP$