

CAPITAL BUDGETING

CB-1

• CB involves investment decision of the finance manager in long term asset.

• Features of LTA:-

- (i) investment - initial year.
 - (ii) amount - huge.
 - (iii) returns flow - future.
 - (iv) future is uncertain \therefore returns - uncertain.
 - (v) irreversible - huge losses.
- \therefore detailed analysis of LTA.

- 1) Consider dep separately, profit dep - both net of tax.
- 2) always use annuity factor wherever poss.
- 3) always check profit or loss on sale of scrap.
- 4) Terminal value CF = end yr CF
- 5) FC = dep + allocated OH + cash FC (conli take cash FC)

• Rules of CB

- 1) Only Cash Flows are imp - accounting profit & losses are not important as profits can be manipulated (paisa aaya ki gaya)
- 2) Only future cash flows are imp:- do not consider sunk cost / past CF. (kuch bhi ho jaaye change nahi hona chahye)
- 3) Incidental or related CF only:- include all incidental or related CF, profits. (new aayi to old gayi, main hu to mere wajah se hai cost.)
 - a) main & by product \rightarrow by prod sold - incidental CF to main prod.
- 4) Include or Working Capital Req:- hidden adjustment.
 - * aaj/abhi - int invst \rightarrow cash outflow - w.c introduced
 - * end of proj - business wind \rightarrow cash inflow - recovery of wc
- 5) Ignore all allocated overheads:- whether OH allocated or \uparrow or \downarrow simply ignore. allocated OHC not incidental - thumb rule.
- 6) Ignore all financing CF:- as CB is invst decision. even if it is incidental.
- 7) Non cash item - CF - only if Tax:-
 - CIF - non cash exp - TR X expense - tax benefit
 - COF - non cash income - TR X income - tax payment
- 8) All exp all income net of tax:-

$$\text{NET of tax} = \text{amt} (1 - TR)$$

Techniques of Capital Budgeting.

Non discounting tech
doesn't consider time value
of money

Discounting tech.
considers time value of
money

Pay Back
Period

Accounting Rate of Return
Avg ROR
Book ROR

Net Present
Value
(NPV)

Internal ROR
Time Adj ROR
Margin ROR

Modified
IRR

Profitability Index
(PI)

Desirability factor
Present Value Index

Discounted
Pay Back Period

Time Adj
PBP

Traditional
NPV

Annualised
NPV

Benefit cost ratio

1) PAY BACK PERIOD (PBP)

- period in which initial inv is recovered.
- shorter the period better the project.

To reco :- _____

Yr	CF	cumulative CF
1	x	x
2	x	2x
3	x	3x

PBP = yes + ? months

To reco = x

(-) 2nd yr. (x)

addition x in 3rd yr.

12m — (x)

?m — x

2) DISCOUNTED PBP

Time Adj PBP

- considers present value of CF rather only CF.

Yr	CF	PV @	PV(CF)	Cum D. CF
1	x
2	x
3	x	..	(x)	..

To reco y

(-) 2nd yr (x)

addn x — 3rd yr.

12m — x

?m — addn.

always take discounted CF.

3) Acc ROR

Avg ROR

Book ROR

return on inv based on avg profits for whole life.

$$ARR = \frac{\text{Avg PAT for life of proj}}{\text{net inv}} \times 100$$

net inv = ii - scrap.

ARR > COC - accept

ARR < COC - reject

4] NET PRESENT VALUE

$$NPV = PV(CIF) - PV(COF)$$

(lead)

NPV

+ve → accept project

-ve → reject

zero → accept only if non financial benefits.

• all CF @ end of year unless specified.

• give impact of TAX.

Yr Pal CF PV@ DCF

5] PI

DESIRABILITY FAC

Present Value Index

PI indicates PCIF generated for every Ru 1 of PCOF incurred.

PI → 1.75 i.e

Rs 1.75 for every Ru 1.

incurred.

$$PI = \frac{PV \text{ of } CIF}{\text{initial inv}}$$

OR

$$= \frac{NPV + PCOF}{PCOF}$$

$$= \frac{NPV + \text{ini. inv}}{\text{in. inv}}$$

PI interpretation **CB-2**

PI > 1 NPV +ve accept

PI < 1 NPV -ve reject

PI = 1 NPV = 0 only if non financial benefits.

6] ANNUALISED NPV

$$A.NPV = \frac{NPV \text{ (lead)}}{AF \text{ for } n \text{ yrs}}$$

n = life of project

DISPARITY IN LIFE

Assump 1

Assump 2

Proj. will get repeated till infinity

one time proj.

annualised NPV

NPV (traditional)

• nothing mentioned → take assump ①

• question will not mention.

- check disparity in life

if yes - assump 1

no - assump 2

Annualised NPV

-ve → equivalent annual cost = EAC

+ve → equivalent annual benefit = EAB

* if there is an option → of repair in old machine → as we can't go on doing that 4 life time.

INCREMENTAL NPV

$$\uparrow NPV = \text{new NPV} - \text{old NPV}$$

+ve - accept

-ve - no

0 - non financial benefit.

calculate - a) new over old project

Yr	Pal	old	new	(A-B)	PV@	DCF
		m	m	CF	+	%

Optimum replacement cycle ORC

• period after which same asset should be replaced again & again so that - least cost max benefit.

• decide - $ANPV = \frac{NPV}{AF(n \text{ yrs})}$

• life is 3 yrs then - replace after

- 1 yr - ANPV
- 2 yr - ANPV
- 3 yr - ANPV

• highest ANPV is ORC.

7] INTERNAL ROR

• indicates the ROR generated by proj based on cash flows.

• if disc is done on IRR

$$NPV = 0$$

$$PI = 1$$

• $IRR > COC$ accept

$IRR < COC$ reject.

• Steps

1) Pay Back = $\frac{II}{\text{Avg life CF}}$

2) Approximate \rightarrow AF table
find NPV @ this rate
 $\alpha @ 10\%$

3) NPV +ve \rightarrow \uparrow IR (higher)
find NPV

NPV -ve \rightarrow \downarrow IR (lower)
find NPV

4)

$$IRR = \text{lower rate} + \left[\frac{NPV(LR)}{NPV(LR) - NPV(HR)} \times \text{diff in rate} \right]$$

assump:- CF are reinvested @ ~~coc~~ and not IRR in the project.

8] Modified IRR

assump:- all CF are reinvested @ COC for projects life.

If life is 3 yrs. @ 10% amt + int.

\therefore 1st year \rightarrow rein for 2 yrs @ 10% $\rightarrow x$

2nd \rightarrow 1 yr. @ 10% $\rightarrow x$

3rd \rightarrow 0 yr $\rightarrow x$

Total CF @ 3rd year $\rightarrow x$

0 - II
3 - CF \rightarrow find IRR = MIRR.

Block of Asset

single asset \rightarrow block (ITA)

① dep on a. 100% of block

$$a. 100\% = op 100\% + \text{Puech-salep. cold}$$

② P/L on sale of asset is not calculated as long as block continues.

only @ end we find P/L.

③ When block ceases to exist i.e. no other assets in block. calculate P/L.

dep for $(n-1)$ yrs.

Block

other assets \rightarrow P/L - end yr.

$$\text{dep} = n-1 \text{ yrs.}$$

no other assets \rightarrow P/L - X

dep - full life.

CAPITAL RATIONING

- Funds to be invested - limited.
- due to external & internal factors.
- decide on NPV or PI

divisible proj

↓
PI

→ feasibility
indivisible proj

↓
NPV

• 3 methods

1) Feasibility set / Agg of profit / Total NPV:-

- make combi of proj ≤ available funds.
- calculate NPV of set
- max NPV set - selected.
- only make sets having +ve NPV

2) PI method

- rank proj as per PI.
- accept proj till ini. invst is within the available funds.

3) IRR

- rank as per IRR
- accept till ini invst is within available funds

$$PI = \frac{NPV + ini \cdot invst}{i \cdot i}$$

$$\therefore NPV = PI \cdot i \cdot i - ini \cdot invst$$

$$= ini \cdot invst (PI - 1)$$

LEASE FINANCING

CB-3

Point of view of

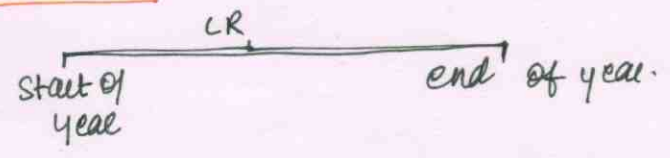
- | | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|
| <p>lessor</p> <ul style="list-style-type: none"> • lease Rent to be charged • is the lease financially viable +ve NPV • IRR of lease $NPO > 0$ | <p>lessee</p> <ul style="list-style-type: none"> • whether asset bought or leased: \uparrow NPV |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|

• calculation of LR to be charged

- Equated Plan stepped plan Ballon plan Deferred plan

$$PV \text{ of MLP} = PV \text{ of net cost incurred}$$

I] Equated Plan:



$$= \frac{PV(\text{net cost of asset})}{1 + AF@x\% \cdot \text{for } n-1 \text{ yrs}} = \frac{PV}{AF@x\% \cdot \text{for } n}$$

II] Stepped up

lease R \uparrow a fixed rate per year.

Year	Pay	CF	PV	PCF
1	LR	x	...	
2		$2 + \uparrow$		
3		$x + \uparrow + \uparrow$		

III] Ballon plan:

less - begⁿ more later

IV] Deferred Plan:

no - begⁿ later LR.

PV of net cost incurred = same like NPV.

Tax	LR - beg ⁿ	Tax - end	AF	xx
0-4	LR	x	AF	xx
1-5	Tax on LR	(x x TR)	AF	(xx)
	Both end		LR	≡
0-5	LR(1-TR)		AF	xx

* Take all CF (Int, principal loan etc)