

Capital Budgeting

Capital Expenditure:

Making a large outlay of money today in anticipation of benefits (Cash Inflows) which would flow across the life of the investment

- ✓ Large Outlay
- ✓ Irreversible
- ✓ Future Impact

Principles:

1. Cash flow principle:

- Capital budgeting is concerned with Cash Flows and not with Profits.
- Profits are susceptible to accounting tricks such as depreciation, amortization, stock valuation etc.,
- Cash flows are simply the difference between Cash Received and Cash Paid.

Principles

2. After – tax Principle:

The Cash flows must be expressed after tax – as tax is an outflow.

3. The Incremental Principle:

Incremental cash flow refers to the difference between the firm's future cash flows with a project and those without the project.

Principles

Riders: While computing incremental cash flows, the following riders should be kept in mind

- ✓ Include after-tax Opportunity Costs – Cost of foregoing the next best alternative.
- ✓ Forget Sunk Costs – Costs incurred in the past and which are not recoverable.
- ✓ Average could be wrong
- ✓ Remember Working Capital
- ✓ Consider side-effects

Capital Budgeting/Investment Decisions

Classification:

A. On the basis of Firm's Existence

- I. Cost Reduction Decisions
 - 1. Replacement Decisions
 - 2. Modernization Decisions
- II. Revenue Expansion Decisions
 - 3. Expansion Decisions
 - 4. Diversification Decisions
 - 5. Set up of New Business Decision

B. On the basis of Decision Situation

- 1. Mutually Exclusive Decisions (for Complementary Projects)
- 2. Accept – Reject Decisions (for Independent Projects)
- 3. Contingent Decisions (for Mutually Exclusive Project)

Capital Budgeting Process

Stage 1: Project Planning

Identification of potential investment opportunities after carrying out SWOT Analysis

Stage 2: Project Evaluation

- a. Determination of Cash Inflows & Cash Outflows of each proposal
- b. Selection of Capital Budgeting technique
- c. Appraisal of the projects

Stage 3: Project Selection

Making choice of the project so as to maximize the shareholders' wealth

Capital Budgeting Process

Stage 4: Project Implementation

Raising of funds, Purchase of required assets and deployment of assets to carryout the project

Stage 5: Project Control

Monitoring the project with the help of feedback reports – CE Progress Reports, Performance Reports.

Stage 6: Project Review

Reviewing the entire project to explain its success or failure.

Techniques of Capital Budgeting

Traditional Techniques – Non Time Adjusted:

1. Accounting Rate of Return (ARR)
2. Payback Period (PBP)

Time Adjusted Techniques:

1. Discounted Payback Period (D/PBP)
2. Net Present Value (NPV)
3. Internal Rate of Return (IRR)
4. Profitability Index (PI)

Accounting or Average Rate of Return

Average annual yield on the project

Formula: $ARR = \frac{\text{Average Earnings After Tax pa}}{\text{Net Investments}} \times 100$

Decision: Single – Accept if $ARR > \text{Required Rate of Return}$
Multiple – Project with Highest ARR be selected

Payback Period (PBP)

➤ Time period required for complete recovery of the Project Cost by way of cash inflows (CFAT)

Formula: a. Annual CFATs - Constant
$$PBP = \frac{\text{Initial Cash Outflows}}{\text{Annual CFAT}}$$

b. CFATs – Uneven

$PBP = \text{Base Year} + \frac{\text{Total C/O} - \text{Cum CFAT in Base year}}{\text{CFATs next to Base Year}} \times 365$

Base Year = Year upto which the Cum CFAT < Total C/O

Payback Period & (D/PBP)

Decision: Single – Accept if $PBP < \text{Pre-determined PBP}$

Multiple – Project with **Least** PBP be selected

Discounted Payback Period:

➤ When PBP is computed after discounting the Cash Flows by a Pre-determined rate.

Decision: Single – Accept if $DPBP < \text{Pre-determined PBP}$

Multiple – Project with **Least** DPBP be selected

Net Present Value (NPV)

➤ Sum of the PV of all Future Cash Inflows Less the sum of the PV of all Cash Outflows

Formula: $NPV = PVI - PVO$

Decision: Single – Accept if NPV is Positive

Multiple – Project with **Highest** NPV selected

Projects with unequal lives:

Equated Annual Benefit (EAB) $= NPV / PVAF$

Equated Annual Cost (EAC) $= PVO / PVAF$

Decision: EAB - Highest should be selected.

EAC - Lowest should be selected

Equity NPV vs. Project NPV

Basis of Distinction

Discount rate

Interest on LT debt

Repayment of LT debt

Cash Outflows

Project NPV

Overall Cost of Capital

Not deducted

Not deducted

Total Project Cost

Equity NPV

Cost of Equity

Deducted

Deducted

Cost financed by Equity

Internal Rate of Return

Internal Rate of Return (IRR):

- ✓ Rate at which PV of cash inflows is equal to the PV of cash outflows.
- ✓ Rate at which “NPV = Zero”
- ✓ Called internal rate because it depends solely upon the cash flows associated with the project and not on any rate determined outside the project.

IRR

Internal Rate of Return:

- Step 1: Compute NPV at an initial guess rate (L1)
Step 2: Compute NPV at an second guess rate (L2)
Step 3: Computer IRR through Linear intrapolation

Formula:

$$IRR = L1 + \{ (NPV \text{ of } L1) / (NPV \text{ of } L1 - NPV \text{ of } L2) \} \times (L2 - L1)$$

Decision:

Accept Rule: Accept if IRR is greater than target rate of return.

Choice Rules: Between two acceptable projects, select the one which has highest IRR

- Note:** 1. If at step 1, the NPV is positive, then the next guess rate should be greater number.
2. If at step 1, the NPV is negative, then the next guess rate should be a smaller number.

Profitability Index (PI)

Profitability Index (Desirability Factor) PI : It refers to the ratio of the PV of all cash inflows to the PV of all cash outflows associated with the project.

Formula:

Profitability Index = PV of all Cash Inflows / PV of all Cash Outflows

- Decision:** Accept the project if $PI > 1$,
Reject the project if $PI < 1$.

Capital Budgeting Decisions

Accept or Reject Decisions: A project will be accepted if the benefit is more than the cost after considering the time value of money.

Computation Procedure

Step 1: Computation of PV of Outflows in the Year 0

	Rs.
Investment in Fixed Assets	xxx
Add: Additional Working Capital	<u>xxx</u>
Total PV of Outflow in the Year 0	<u>XXX</u>

Step 2: Computation of PV of Operational Inflows

	Rs.
Cash Sales Revenue	xxx
Less: Cash Operating Cost	<u>xxx</u>
∴ Cash Flows Before Tax (CFBT)	xxx
Less: Depreciation	<u>xxx</u>
EBIT	xxx
Less: Interest	<u>xxx</u>
EBT	xxx
Less: Income-tax	<u>xxx</u>
EAT	xxx
Add: Depreciation	<u>xxx</u>
∴ CFAT	xxx
PV Factor	xxx
∴ PV of Operational Inflows	<u>XXX</u>

Step 3: Computation of PV of Terminal inflows

	Rs.
a. Sale value of Fixed Assets	xxx
b. Book value of Fixed Assets	<u>xxx</u>
c. Profit or Loss on Sale	xxx
d. Capital Gain / Loss (Tax)	<u>xxx</u>
e. Cash Inflows from the Sale of Asset(a-d or a+d)	xxx
f. Recoupment of Working Capital	<u>xxx</u>
g. Total Terminal Cash Inflows	xxx
h. PV Factor	xxx
i. PV of Terminal Inflows	<u>XXX</u>

Note: If there is a loss on sale of asset, then there will be Tax Savings on such loss. Such savings is treated as Inflows and there by added to sale value of asset.

Step 4: Computation of NPV	Rs.
a. PV of Operational Inflows	xxx
b. PV of Terminal Inflows	<u>xxx</u>
c. Total PV of Inflows	xxx
d. PV of Outflows	<u>xxx</u>
e.: NPV of the Project	xxx

Decision: If the NPV of the Project is Positive,
Accept and invest in the project.
If the NPV is Negative, Reject the project.

Replacement Analysis

- If a company bought an asset a few years back and at a point in time, the asset is no longer valuable, then it should be discarded.
- Hence each year, without fail, the company should look at the asset afresh and decide whether it would be worthwhile to continue with the asset.

A. Abandonment Decision:

- The value of any asset is the present value of future cash flows generated from the asset known as Fair Value.
- ✓ Rule 1: If Sale Price < Fair Value – Retain
- ✓ Rule 2: If Sale Price > Fair Value – Abandon

Purchase Decision

B. The Purchase Decision:

A new asset with a positive NPV is a good asset and it can prima facie be bought.

Note: Usual Capital Budgeting exercise (four step analysis) on the new machine to be carried out for finding NPV.

C. The Replacement Decision:

- ✓ Abandonment was about giving up an existing asset.
- ✓ Purchase was about buying a new asset.
- ✓ Replacement is about abandoning an existing asset and replacing it with a new one.

Replacement Analysis

- Note:**
1. If lives are unequal, EAB should be the basis of deciding.
 2. EAB or EAC can be applied only if the projects are repeatable means once the project duration is over, the project can be done second time around.
 3. If the projects are not repeatable, the decision will have to be based on NPV or PVO as the case may be and not on the basis of EAB /EAC.

Steps: 1. Compute NPV of the Existing Machine

2. Compute NPV of the New Machine
3. Select the Machine with the higher NPV
4. If the life of the two machines is unequal,
Compute EAB of EM and EAB of NM and select the one with the higher EAB.

Incremental Cash Flow Method

	Rs.	Rs.
Step 1: Compute incremental initial outflow		
Purchase price of the new asset	xxx	
Less: Net sale value of old asset	<u>xxx</u>	xxx
Step 2: Compute incremental operational flows		
Operational flows from the new asset	xxx	
Less: Operational flows from old asset	<u>xxx</u>	xxx
Step 3: Compute Incremental Terminal Flows		
Net sale value of new asset	xxx	
Less: Net sale value of old asset	<u>xxx</u>	xxx
Step 4: Consolidate the cash flows in steps 1 to 3.		
Discount them at the after tax cost of capital to arrive at NPV.		

Rule: If NPV is positive, the asset should be replaced.

Block of Assets

Coverage:

- A. Depreciation Allowance u/Sec 32 of IT Act, 1961
- B. Short –term Capital Gain / Loss – on Depreciable assets u/Sec 50 of IT Act, 1961
- C. Tax Implication on STCG/L.
 - A. **Depreciation Allowance u/Sec 32:**
 - Depreciation allowance is provided on the “Block of Assets” but not on individual assets separately.
 - Block of Assets mean Tangible & Intangible Assets which will satisfy the following two criteria
 - i. Assets of Same Class
 - ii. Assets with the same rate of depreciation.

Depreciation allowance is done for each Block of assets separately as below:

1st Block – Buildings (Rate of Depreciation 5%)

Particulars	Rs.	Rs.
1. Opening WDV		
- Building A	xxx	
- Building B	<u>xxx</u>	XXX
2. Add: Cost of Assets Purchased		
- Building C	xxx	
- Building D	<u>xxx</u>	XXX
3. Less: Sale of Assets		
- Building B	xxx	
- Building D	<u>xxx</u>	<u>XXX</u>
4. Balance before Depreciation		XXX
5. Less: Depreciation on above @ 10%		<u>xxx</u>
6. ∴ Closing WDV		XXX

B. Short term Capital Gain /Loss on Depreciable Assets:

- is calculated Block-wise only for those Blocks in which an Asset or Assets are sold during the Previous Year.

STCG / L for 1st Block – Buildings (Rate of Depreciation 5%)

Particulars	Rs.	Rs.
i. Sale Consideration		
- Sale of Building B	xxx	
- Sale of Building D	<u>xxx</u>	XXX
ii. Less: Cost:		
- Opening WDV of 1 st Block	xxx	
- Purchases in 1 st Block	xxx	
- Expenses on Transfer	<u>xxx</u>	<u>XXX</u>
iii. ∴ STCG/ L (i – ii)		XXX

Situation A: If all the Assets of the Block are Sold during the Previous Year (i.e. the Block of Asset is Empty at the end of the Previous Year)

- ✓ If Sale Value > Cost, then STC Gain exists
- ✓ If Sale Value < Cost, then STC Loss exists

Situation B: If all the Assets of the Block are Not Sold during the Previous Year (i.e. Some Assets of the Block are still existing at the end of the Previous Year)

- ✓ If Sale Value > Cost, then STC Gain exists
- ✓ If Sale Value < Cost, then **NO STC Loss**

Capital Rationing

- ✓ Rationing means short supply.
- ✓ Capital rationing means Money is in short supply.
- ✓ Money is said to be short supply, if the availability of money is less than the demand for money.
- ✓ Capital Rationing is a situation where in, there is a “Constraint on Available Funds” for investment in different projects.
- ✓ All projects are divided into Two types namely
 1. Divisible Projects
 2. Indivisible Projects

Note: In the absence of information, the projects are assumed to be Indivisible

Inflation & Capital Budgeting

- Inflation eats into the purchasing power of the rupee.
- While taking capital budgeting decision, one should take cognizance of inflation.

Cash Flows:

The future cash flows can be expressed either inclusive or exclusive of inflation.

- ✓ Money Cash Flows - inclusive of future inflation
- ✓ Real Cash Flows – exclusive of future inflation

Note: Money cash flow is the actual physical currency payable.

Unless stated otherwise, all cash flows are expressed in money terms

Discount Rates: Discount rates can be expressed either as inclusive or exclusive of inflation.

- ✓ Money Discount Rate - inclusive of future inflation
- ✓ Real Discount Rate - exclusive of future inflation

The link between MDR and RDR

$$\begin{aligned} \text{MDR} &= \text{RDR} + \text{IR} \\ \text{or} \\ (1 + \text{MDR}) &= (1 + \text{RDR}) \times (1 + \text{IR}) \end{aligned}$$

Inflation & Capital Budgeting

Present Values:

- Money cash flows should be discounted at the MDR to arrive at the Present Value.
- Real cash flows should be discounted at the RDR to arrive at the Present Value.

Note: Real cash flow is not the same as PV.

Real cash flow merely excludes future inflation,
while PV factors both inflation and risk premium.

NPV: In computing NPV all cash flows (Inflows & Outflows) should be expressed consistently either in money terms or in real terms.

Rule 1: Money cash flows can be converted into real cash flows by **discounting** at the Inflation rate

Rule 2: Real cash flows can be converted into money cash flows by **compounding** at the Inflation rate

To arrive at NPV: All cash flows should be converted into money terms or real terms.

- ✓ Discount money cash flows at the MDR to arrive at PV
- ✓ Discount real cash flows at the RDR to arrive at PV.
- ✓ In either case, the result should be the same

Note: Cash flow - Money or Real
Discount rate - Money or Real
Inflation rate - Symmetrical or Asymmetrical

Inflation Rates

Symmetrical Inflation: All items of revenue and cost have undergone the same level of inflation (one rate)

Asymmetrical Inflation: Some items have suffered inflation at rates that are different from those of others

Rule 1: If Symmetrical Inflation exists, then

- a. Convert cash flows into the terms in which the discount rates are. OR
- b. Convert the discount rate into the terms in which the cash flows are

Rule 2: If Asymmetrical Inflation exists, then convert the cash flows into the terms in which the discount rates are.

Depreciation: Depreciation is on original cost and hence,
to be considered as an item with Zero Inflation

Adjusted NPV (ANPV)

Meaning: The project's NPV after considering the effect of financing.

- Two adjustments are relevant here:
 - a. Issue Costs
 - b. Tax shield on interest on debt.

Note: This is a useful method because it tells the CFO to know where his NPV is coming from.

Method - Adjusted NPV

Step 1: Compute NPV of the project on the assumption that it is fully financed by Equity.

Note: Discounting the cash flows at cost of equity. This is called as Base case NPV

Step 2: Compute the issue costs.

Step 3: Compute the tax saved on interest payable.

Step 4: Compute PV of the tax shield.

Step 5: $ANPV = \text{Base case NPV} - \text{Issue costs} + \text{PV of interest tax shield.}$