



Department of Civil Engineering

Study Material

UNIT-III

PROJECT FINANCE

1. Introduction to Project Finance

Definition

Project Finance refers to the process of arranging funds required for planning, implementation, operation, and management of a project.

It involves estimating project costs, identifying sources of finance, evaluating investment proposals, and analyzing project profitability.

Objectives of Project Finance

- Arrange adequate funds for project execution.
- Minimize financing cost.
- Maximize returns on investment.
- Ensure financial sustainability.
- Evaluate project viability.

Importance of Project Finance

- Facilitates project implementation.
- Supports economic development.
- Assists investment decisions.
- Enhances profitability.
- Ensures efficient resource allocation.

2. Project Cost Estimation

Definition

Project Cost Estimation is the process of forecasting the total cost required to complete a project.

Objectives

- Determine financial requirements.
- Prepare project budget.
- Facilitate financing decisions.
- Control project expenditures.

Components of Project Cost



A. Land and Site Development Cost

Includes:

- Land acquisition
- Site clearance
- Boundary walls
- Landscaping

B. Building and Civil Works Cost

Includes:

- Factory buildings
- Offices
- Warehouses
- Roads

C. Plant and Machinery Cost

Includes:

- Purchase cost
- Transportation
- Installation

D. Preliminary and Pre-operative Expenses

Includes:

- Legal charges
- Consultancy fees
- Registration expenses

E. Working Capital Requirement

Funds needed for:

- Raw materials
- Labor
- Utilities

F. Contingency Provision

Extra amount reserved for unforeseen expenses.

Usually 5% to 10% of project cost.

Methods of Cost Estimation

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1. Analogous Estimation

Based on previous similar projects.

2. Parametric Estimation

Uses statistical relationships.

3. Bottom-Up Estimation

Estimates individual activities and aggregates them.

4. Expert Judgment Method

Uses experience of experts.

3. Project Financing

Definition

Project Financing refers to obtaining funds from various sources to meet project costs.

Objectives

- Ensure availability of funds.
- Optimize capital structure.
- Reduce financing risk.

Sources of Project Finance

A. Internal Sources

1. Equity Capital

Funds invested by owners/shareholders.

2. Retained Earnings

Profits reinvested in the business.

B. External Sources

1. Bank Loans

Term loans from commercial banks.

2. Financial Institutions

Loans from development banks.



3. Debentures and Bonds

Long-term debt instruments.

4. Venture Capital

Investment in high-risk projects.

5. Government Grants

Financial assistance from government agencies.

6. Foreign Investment

Investment from international investors.

Factors Affecting Financing Decisions

- Project size
- Risk level
- Cost of capital
- Repayment capacity
- Market conditions

4. Investment Criteria

Definition

Investment Criteria are standards used to evaluate the profitability and desirability of investment projects.

Objectives

- Select profitable projects.
- Maximize shareholder wealth.
- Improve resource allocation.

Types of Investment Criteria

Traditional Methods

- Payback Period
- Accounting Rate of Return

Discounted Cash Flow Methods

- Net Present Value
- Internal Rate of Return
- Profitability Index



5. Payback Period Method

Definition

Payback Period is the time required to recover the initial investment from project cash inflows.

Formula

$$\text{Payback Period} = \frac{\text{Initial Investment}}{\text{Annual Cash Inflow}}$$

Example

Initial Investment = ₹10,00,000

Annual Cash Inflow = ₹2,50,000

$$\text{Payback Period} = \frac{10,00,000}{2,50,000} = 4 \text{ years}$$

Decision Rule

- Shorter payback period is preferred.
- Longer payback period is rejected.

Advantages

- Simple and easy.
- Emphasizes liquidity.
- Useful for risky projects.

Limitations

- Ignores time value of money.
- Ignores cash flows after payback.

6. Accounting Rate of Return (ARR)

Definition

ARR measures average annual profit as a percentage of average investment.

Formula

$$\text{ARR} = \frac{\text{Average Annual Profit}}{\text{Average Investment}} \times 100$$

Example

Average Annual Profit = ₹2,00,000

Average Investment = ₹10,00,000

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$ARR = \frac{2,00,000}{10,00,000} \times 100 = 2\%$
 $ARR = 20\%$

Decision Rule

Higher ARR is preferred.

Advantages

- Easy calculation.
- Uses accounting information.

Limitations

- Ignores time value of money.
- Based on accounting profits rather than cash flows.

7. Net Present Value (NPV)

Definition

NPV is the difference between the present value of cash inflows and present value of cash outflows.

Formula

$$NPV = \sum \frac{CF_t}{(1+r)^t} - \text{Initial Investment}$$

Where:

CF = Cash Flow

r = Discount Rate

t = Time Period

Decision Rule

If $NPV > 0$

Accept Project

If $NPV = 0$

Indifferent

If $NPV < 0$

Reject Project



Advantages

- Considers time value of money.
- Considers all cash flows.
- Maximizes shareholder wealth.

Limitations

- Requires accurate discount rate.
- Calculation is complex.

8. Internal Rate of Return (IRR)

Definition

IRR is the discount rate at which NPV becomes zero.

Formula

$$NPV=0$$

or

$$\sum \frac{CF_t}{(1+IRR)^t} = \text{Initial Investment}$$

Decision Rule

$$IRR > \text{Cost of Capital}$$

Accept Project

$$IRR < \text{Cost of Capital}$$

Reject Project

Advantages

- Considers time value of money.
- Easy comparison with required return.

Limitations

- Multiple IRRs may occur.
- Complex calculations.

9. Profitability Index (PI)

Definition



Profitability Index measures present value of benefits per rupee invested.

Formula

$$PI = \frac{\text{PV of Cash Inflows}}{\text{PV of Cash Outflows}}$$
$$PI = \frac{\text{PV of Cash Inflows}}{\text{PV of Cash Outflows}}$$

Decision Rule

$$PI > 1$$

Accept Project

$$PI = 1$$

Indifferent

$$PI < 1$$

Reject Project

Example

PV of Benefits = ₹15,00,000

PV of Costs = ₹12,00,000

$$PI = \frac{15,00,000}{12,00,000} = 1.25$$
$$PI = \frac{15,00,000}{12,00,000} = 1.25$$

Project is accepted.

10. Cash Flow Estimation

Definition

Cash Flow Estimation involves forecasting future cash inflows and outflows of a project.

Importance

- Basis for investment appraisal.
- Helps profitability analysis.
- Supports financing decisions.

A. Cash Flow Estimation for New Projects

Cash Outflows

- Land cost



- Building cost
- Machinery cost
- Working capital

Cash Inflows

- Sales revenue
- Scrap value
- Tax benefits

Example

Initial Investment

₹50 Lakhs

Annual Cash Inflow

₹12 Lakhs

Salvage Value

₹5 Lakhs

Used for NPV and IRR calculations.

B. Cash Flow Estimation for Replacement Projects

Definition

Replacement projects involve replacing existing assets with new assets.

Factors Considered

Cost of New Asset

Purchase cost of replacement equipment.

Sale Value of Old Asset

Market value of existing equipment.

Operating Savings

Reduction in operating costs.

Tax Effects



Impact on taxable income.

Advantages

- Improved efficiency.
- Lower maintenance costs.
- Higher productivity.

11. Cost of Capital

Definition

Cost of Capital is the minimum required rate of return expected by investors.

It represents the cost of obtaining funds.

Importance

- Investment appraisal.
- Capital budgeting decisions.
- Financial planning.

Components of Cost of Capital

Cost of Equity

Return expected by shareholders.

Cost of Debt

Interest paid on loans.

Cost of Preference Shares

Dividend paid to preference shareholders.

Weighted Average Cost of Capital (WACC)

Formula

$$WACC = \frac{E}{V}K_e + \frac{D}{V}K_d$$

Where:

E = Equity

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D = Debt

V = Total Capital

K_e = Cost of Equity

K_d = Cost of Debt

Uses of Cost of Capital

- NPV calculation
- IRR comparison
- Financing decisions

12. Risk Analysis

Definition

Risk Analysis is the process of identifying and evaluating uncertainties affecting project outcomes.

Objectives

- Minimize losses.
- Improve decision making.
- Increase project success rate.

Types of Risks

1. Business Risk

Changes in:

- Demand
- Competition
- Technology

2. Financial Risk

- Interest rate changes
- Debt burden

3. Market Risk

- Price fluctuations
- Economic conditions

4. Operational Risk



- Equipment failure
- Human errors

5. Political Risk

- Government policy changes

6. Environmental Risk

- Natural disasters
- Climate impacts

Risk Analysis Techniques

Sensitivity Analysis

Studies impact of changes in variables.

Example:

- Sales decrease by 10%
- Cost increase by 15%

Measures effect on NPV.

Scenario Analysis

Evaluates:

- Best Case
- Normal Case
- Worst Case

Decision Tree Analysis

Graphical representation of decisions and outcomes.

Probability Analysis

Assigns probabilities to different outcomes.

Risk Mitigation Strategies

Avoidance



Eliminate risky activities.

Reduction

Reduce probability of occurrence.

Transfer

Insurance or outsourcing.

Acceptance

Accept risk and prepare contingency plans.

Summary of UNIT – III

After studying this unit, students should be able to:

1. Understand Project Finance concepts.
2. Estimate project costs accurately.
3. Identify various sources of project financing.
4. Apply investment criteria for project selection.
5. Evaluate projects using Payback Period, ARR, NPV, IRR, and PI.
6. Estimate cash flows for new and replacement projects.
7. Understand Cost of Capital and WACC.
8. Analyze and manage project risks.