

# Capital Budgeting

Introduction to Capital

# Introduction of Capital

## ▶ What is Capital?

- Money invested in business to generate income
- The money, property, and other valuables which collectively represent the wealth of an individual or business
- The net worth of a business, that is, the amount by which its assets exceed its liabilities
- **Capital = Total Assets – Total Liability**

## ▶ Types of Capital

- Fixed Capital
  - Working Capital
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# Fixed Capital

## ▶ Fixed Capital

- Capital invested in long term assets
- Not used for production
- Used for more than one year
- Fixed-capital investments are typically depreciated on the company's accounting statements over a long period of time
- $\text{Fixed Capital} = \text{Fixed Assets} - \text{Fixed Liability}$

# Factors determining Fixed Capital

## ▶ Factors determining fixed capital requirements

### ◦ Nature of business

- If the company is rendering services than it needs less fixed capital while company manufacturing heavy goods needs more fixed capital

### ◦ Size of business

- A large scale firm requires more fixed capital than a small enterprise

### ◦ Stage of development

- If the business is already developed than the amount invested in fixed assets are less

### ◦ Methods of handling production

- If a company is manufacturing all parts of a product, its fixed capital needs will be more, in comparison to an enterprise which is assembling parts produced by other concerns

### ◦ Mode of acquiring fixed assets

- Fixed assets can be either purchased or acquired on lease basis or taken on rent. In the first case, the requirement of fixed capital will be very high.

# Working Capital

## ▶ Working Capital

- Working capital is money available to a company for day-to-day operations
- A common measure of a company's liquidity, efficiency, and overall health
- It includes cash, inventory, accounts receivable, accounts payable, the portion of debt due within one year, and other short-term accounts
- Positive working capital generally indicates that a company is able to pay off its short-term liabilities almost immediately. Negative working capital generally indicates a company is unable to do so
- $\text{Working Capital} = \text{Current Assets} - \text{Current Liability}$

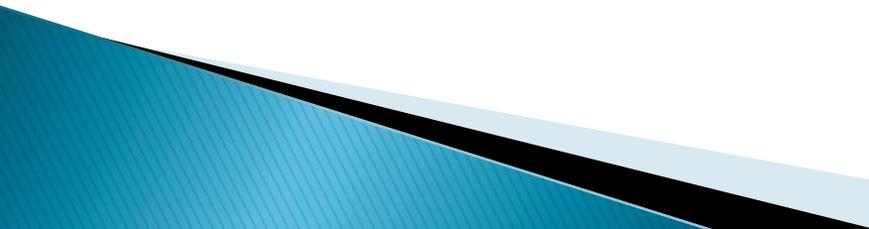
# Estimation of Working Capital

- ▶ **Factors determining working capital requirements**
  - **Nature of Business**
    - A manufacturing business needs more time to convert raw material to finished goods and to cash so it needs more working capital
  - **Size of business**
    - If the business unit is large the amount of working capital invested is more
  - **Business cycle**
    - when the demand of products increases, needs more capital
  - **Seasonal Demand**
    - Some goods are demanded throughout the year while others have seasonal demand
  - **Buying and selling terms**
    - If you are purchasing goods on credit than needs less capital investment but if you are selling goods on credit than it needs more working capital

# Estimation of Working Capital

- **Availability of Raw Material**
  - If the raw material is easily available less amount of working capital is blocked
- **Production cycle**
  - Production cycle means the time involved in converting raw material into finished product. The longer this period, the more will be the time for which the capital remains blocked in raw material and semi-manufactured products
- **Level of Competition**
  - High level of competition increases the need for more working capital

# Sources of raising capital

- ▶ Methods of Raising Long term Capital
    - Issue of shares
    - Issue of debentures
    - Loan from financial institutes
    - Loan from commercial bank
    - Public deposits
    - Reinvestment of Profit
  - ▶ Methods of raising short term capital
    - Trade credit
    - Bank overdraft
    - Cash credit
    - Selling of Assets
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# Introduction to Capital Budgeting



# Capital Budgeting

## ▶ Introduction:

- ❖ It involves the decision to invest the current funds in different projects
  - ❖ Capital budgeting is the process by which the financial manager decides whether to invest in specific capital projects or assets
  - ❖ Capital Budgeting & Investment Decisions these are decisions about when and how much to spend on capital assets
  - ❖ The goal of these decisions is to select capital projects that will increase the value of the firm
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# Capital Budgeting

- ▶ During the capital budgeting process answers to the following questions are required:
  - What projects are good investment opportunities to the firm?
  - From this group which assets are the most desirable to acquire?
  - How much should the firm invest in each of these assets?
- ▶ Capital budgeting is the process of making such decisions by
  - Identify alternatives
  - Evaluate and rank choices
  - Make the decision

# Capital Budgeting

- ▶ The investment decisions leads to a large expenditures include the purchase of fixed assets like land and building, new equipments, rebuilding or replacing existing equipments, research and development, etc. The large amounts spent for these types of projects are known as **capital expenditures**
- ▶ Any wrong selection of a project may incur heavy losses for the organization. In addition, the reputation and goodwill of the organization may also get affected.

# Capital Budgeting

- ▶ It involves
    - calculation of each project's future accounting profit by period
    - the cash flow by period
    - the present value of cash flows after considering time value of money
    - the number of years it takes for a project's cash flow to pay back the initial cash investment
    - an assessment of risk, and various other factors
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# Capital Budgeting Projects

- **Replacement Projects**
  - Existing assets are replaced with newer version
- **Expansion Projects**
  - Increase operations by adding new features
- **New product & services**

# Importance of Capital Budgeting

- ▶ **Why Capital Budgeting is important?**
  - Long term application
  - Involvement of large amount of funds
  - Irreversible decision
  - Risk and uncertainty
  - Difficult to make decisions
  - Long term effect on profitability

# Capital Budgeting Process

- **Project planning**
  - Identifying investment opportunities
- **Project Evaluation**
  - Determining proposal and its investments, inflows and outflows by applying investment appraisal technique
- **Project Selection**
  - Considering the return and risk associated with individual project selection of project is made.
- **Implementation**
  - When the final selection has been made, the firm must acquire the necessary funds, purchase the assets, and begin the implementation of the project.
- **Control**
  - Progress of the project is monitored
- **Performance review**
  - Review the entire project to explain success or failure

# Types of Capital Investment Decisions

## 1. On the basis of firm's existence

- **Cost Reduction Decision**

- Replacement and Modernization decision
- To Improve Operating efficiency and to reduce the cost

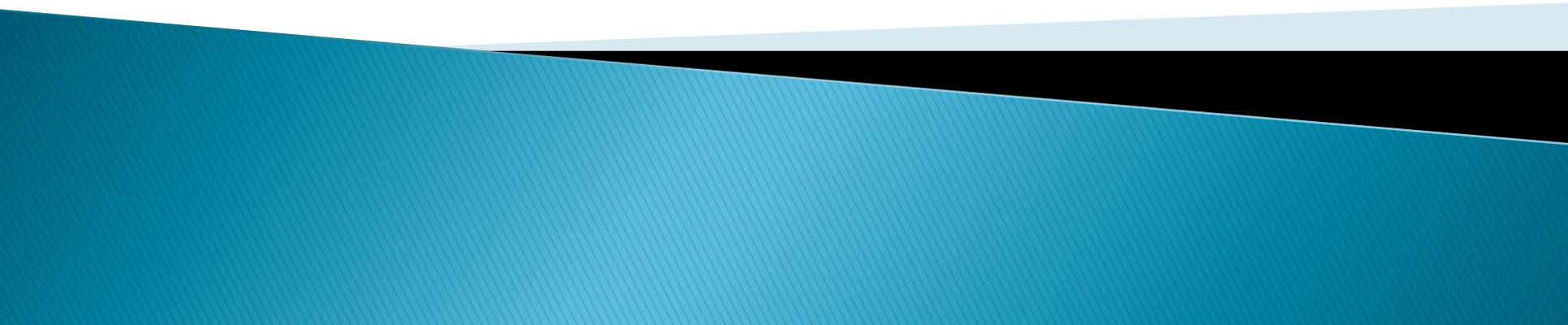
- **Revenue Expansion Decision**

- Expansion Decision
  - If firm feels to grow business or to meet inadequate production facilities
- Diversification Decision
  - New product or new market has been drive. It is evaluated very carefully to avoid the failure

# Types of Capital Investment Decisions

- ▶ 2. On the basis of situation
  - **Accept / Reject decision**
    - All those investment proposals which yield a rate of return greater than cost of capital are accepted and the others are rejected.
  - **Mutually exclusive project decision**
    - Mutually Exclusive Projects are those which compete with other projects in such a way that the acceptance of one will exclude the acceptance of the other projects.
  - **Contingent Decision**
    - Investment in one proposal depends on the investment in other proposal.

# Capital Budgeting Techniques



# Capital Budgeting Techniques

1. Payback Period
  2. Discounted Payback Period
  3. Net Present Value
  4. Accounting Rate of Return
  5. Internal Rate of Return
  6. Profitability Index
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# Payback Period

- ▶ Payback period is the time in which the initial cash outflow of an investment is expected to be recovered from the cash inflows generated by the investment
- ▶ **Decision Rule**  
Accept the project only if its payback period is LESS than the target payback period

# Payback Period

## ▶ Example of Even Cash flow

- Company is planning to undertake a project requiring initial investment of \$105 million. The project is expected to generate \$25 million per year for 7 years. Calculate the payback period of the project.

### **Solution**

$$\begin{aligned}\text{Payback Period} &= \text{Initial Investment} \div \text{Annual Cash Flow} \\ &= \$105\text{M} \div \$25\text{M} = 4.2 \text{ years}\end{aligned}$$

# Payback Period

## ▶ Uneven Cash Flow

- ▶ Company is planning to undertake another project requiring initial investment of \$50 million and is expected to generate \$10 million in Year 1, \$13 million in Year 2, \$16 million in year 3, \$19 million in Year 4 and \$22 million in Year 5. Calculate the payback value of the project

## ▶ Solution

Year	Cash Flow	Cumulative Cash Flow
1	10	10
2	13	23
3	16	39
4	19	58
5	22	80

Payback Period

$$= 3 + ((50-39) \div 19)$$

$$= 3 + (11 \div 19)$$

$$= 3 + 0.58$$

$$= 3.58 \text{ years}$$

# Payback Period

- ▶ Effect of Depreciation and Tax
- ▶ Calculate Payback period

Particular	Machine X	Machine Y
Cost	500000	750000
Salvage Value	Nil	Nil
Useful Life	5 yrs	5 yrs
Depreciation	SLM	SLM
Tax	50%	50%

Year	Machine X (CFBDBT)	Machine Y(CFBDBT)
1	150000	230000
2	200000	300000
3	230000	330000
4	280000	380000
5	300000	450000

# Payback Period

## ► Calculation of CFBDAT

Particular	1	2	3	4	5
CFBDBT	150000	200000	230000	280000	300000
-Dep = <u>Cost-SV</u> Useful Life	100000	100000	100000	100000	100000
CFADBT	50000	100000	130000	180000	200000
-Tax 50%	25000	50000	65000	90000	100000
CFADAT	25000	50000	65000	90000	100000
+Dep	100000	100000	100000	100000	100000
CFBDAT	125000	150000	165000	190000	200000

Year	CFBDAT	Cumulative CFs
1	125000	125000
2	150000	275000
3	165000	440000
4	190000	630000
5	200000	830000

$$\text{PBP} = 3 + \frac{(500000 - 440000)}{190000}$$

$$\text{PBP} = 3.32 \text{ years}$$

# Payback Period

## ▶ Advantages:

- Simple to calculate
- Provides the indication like how certain the cash flows are
- If the company is facing liquidity problem, it provides a good ranking of projects that would return money early

## ▶ Disadvantages:

- Ignores the cash flows beyond the payback period
- Ignores the time value of money
- Not concerned with whether an investment increases the firms value

# Time Value of Money

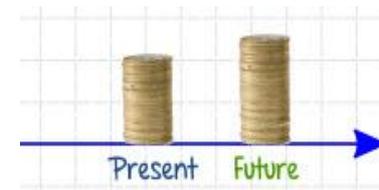
- ▶ The time value of money (TVM) is the idea that money available at the present time is worth more than the same amount in the future due to its potential earning capacity
  - ▶ The cost of capital is always decreases in future
  - ▶ “Money now is more valuable than money later on”  
Why? Because you can use money to make more money!
  - ▶ You could run a business, or buy something now and sell it later for more, or simply put the money in the bank to earn interest
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# TVM and PV & FV

- ▶ **Ex:**
- ▶ Let us say you can get 10% interest on your money.  
So, \$1,000 now can earn  $\$1,000 \times 10\% = \$100$  in a year.  
Your **\$1,000 now** becomes **\$1,100 next year**.

So \$1,000 now is the **same** as \$1,100 next year (at 10% interest):

We say that \$1,100 next year has a **Present value** of \$1,000.



# Present Value & Future Value

- ▶ **Formula to Calculate Present Value**

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

Where

PV = Present Value

FV = Future Value

R = interest rate (as a decimal, so 0.10, not 10%)

N = number of years

- ▶ **Formula to Calculate Future Value**

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

# Discounted Payback Period

- ▶ The discounted payback period is the amount of time that it takes to cover the cost of a project, by adding positive discounted cash flow coming from the profits of the project
- ▶ The advantage of using the discounted payback period over the payback period is that it takes into account time value of money
- ▶ In discounted payback period we have to calculate the present value of each cash inflow taking the start of the first period as zero point. For this purpose the management has to set a suitable discount rate. The discounted cash inflow for each period is to be calculated using the formula:  
$$\text{Discounted Cash Inflow} = \frac{\text{Actual Cash Inflow}}{(1 + i)^n}$$
- ▶ Decision Rule  
If the discounted payback period is less than the target period, accept the project. Otherwise reject.

# Discounted Payback Period

- ▶ A company wants to invest in a project costing \$10,000 and expects to generate cash flows of \$5,000 in year 1, \$4,000 in year 2, and \$3,000 in year 3. The weighted average cost of capital is 10%. Calculate discounted payback period.
- ▶ Answer

Year	Cash Flow	Present Value $CF/(1+r)^n$	Cumulative Cash Flow
1	5000	4545.45	4545.45
2	4000	3305.79	7851.24
3	3000	2253.94	10105.18

$$DPP = 2 + \frac{(10000 - 7851.24)}{2253.94} = 2.95 \text{ yrs}$$

- ▶ OR you can also calculate with the following method

# Discounted Payback Period

Year	Cash Flow	PV Factor $1/(1+r)^n$	Present Value of CF	Cumulative Cash Flow
1	5000	0.9090	4545	4545
2	4000	0.8264	3305.6	7850.6
3	3000	0.7513	2253.9	10104.5

The recovery of the investment falls between the 2<sup>nd</sup> and 3<sup>rd</sup> year. So, the payback period is 2 years plus a fraction of the 3<sup>rd</sup> year

$$\text{The fractional value} = \frac{(10000 - 7850.6)}{2253.9} = 0.95$$

Therefore, the **Discounted Payback Period = 2.95yrs**

# Discounted Payback Period

## ▶ Advantages

- Consider the time value of money
- Considers the riskiness of the project (through the cost of capital)

## ▶ Disadvantage

- Ignores the cash flows beyond the discounted payback period
- Not concerned with whether an investment increases the firm's value

# Net Present Value

- NPV is a method of determining the current value of all future cash flows generated by a project after accounting for the initial capital investment.
- NPV is defined as the Present Value of the cash flows from an investment minus the initial investment.
- NPV is used to determine How much value is created from undertaking an investment?
- It is one of the most reliable measures used in capital budgeting because it accounts for time value of money by using discounted cash flows in the calculation.
- **Formula:**

$$NPV = \sum_{t=1}^n \frac{CF_t}{(1+R)^t} - CF_0$$

▶ Where

N= Total Number of years

CF=Cash inflow of each year (Future Value of each year)

r= rate of interest / Opportunity cost

CF<sub>0</sub> =Initial Investment

# Net Present Value

## ▶ Decision Rule

- If  $NPV > 0$  accept the project otherwise reject the project

## ▶ Example:

A friend needs \$500 now, and will pay you back \$570 in a year. Is that a good investment when you can get 10% elsewhere?

Money Out: \$500 now

You invested \$500 now, so  $PV = -\$500.00$

Money In: \$570 next year

$$PV = \$570 / (1+0.10)^1 = \$570 / 1.10 = \mathbf{\$518.18}$$
 (to nearest cent)

The Net Amount is:

$$\text{Net Present Value} = \$518.18 - \$500.00 = \mathbf{\$18.18}$$

So, at 10% interest, that investment is worth **\$18.18**

*(In other words it is **\$18.18** better than a 10% investment, in today's money.)*

# Net Present Value

- ▶ A project requires an initial investment of \$225,000 and is expected to generate the following net cash inflows:

Year	Cash Flow
1	\$95,000
2	\$80,000
3	\$60,000
4	\$55,000

Compute net present value of the project if the minimum desired rate of return is 12%.

Year	Cash Flow	Present Value Factor $PV\$1 = 1 / (1 + i)^n$	PV of CF
1	\$95,000	0.8928	93366
2	\$80,000	0.7971	63768
3	\$60,000	0.7118	43128
4	\$55,000	0.6355	34952.5
<b>TOTAL</b>			<b>235214.5</b>
-Initial Investment			225000
<b>Net Present Value</b>			<b>10214.5</b>
<b>NPV &gt; 0 so accept the project</b>			

# Net Present Value

## ▶ Advantages

- Considers the time value of money
- Considers all cash flows
- Considers the risk of future cash flow (through the cost of capital)
- Tell whether the investment will increase the firms value

## ▶ Disadvantage

- Difficult to use
- Requires an estimation of cost of capital in order to calculate the NPV

# Accounting Rate of Return

- ▶ Accounting rate of return (also known as simple rate of return or Average Rate of Return) is the ratio of estimated accounting profit of a project to the average investment made in the project

$$\text{ARR} = \frac{\text{Average Accounting Profit}}{\text{Average Investment}}$$

- ▶ **Note:**
- ▶ Take Cash Flow after depreciation after tax while calculating average investment (Do not add salvage value)
- ▶ While calculating Average investment
- ▶  $\text{Average Investment} = \frac{1}{2}(\text{Book value at the beginning of year 1} + \text{Book value at the end of useful life})$
- ▶ **Decision Rule**  
Accept the project only if it's ARR is equal to or greater than the required accounting rate of return

# Accounting Rate of Return

- ▶ A project of \$650,000 is expected to generate the following cash flows over its useful life:

Year		Cash outflows	Cash inflows
0	Initial investment	\$(650,000)	0
1		–	\$150,000
2		–	\$220,000
3		–	\$300,000
4		–	\$250,000
5		–	\$180,000
6		–	\$112,000
6	Salvage value	–	\$20,000

- ▶ The project does not require any cash expenses. Depreciation is to be provided using straight line method. According to accounting policies of the company, the salvage value is treated as the reduction in depreciable basis.
- ▶ **Required:** Compute accounting rate of return from the above information.

# Accounting Rate of Return

- ▶ **Step 1: Computation of annual depreciation expenses:**
- ▶ (Cost – salvage value) / Life of the asset
- ▶ (\$650,000 – \$20,000) / 6
- ▶ \$10, 5000
- ▶ **Step 2: Computation of average incremental annual income:**

	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>	<u>Year 4</u>	<u>Year 5</u>	<u>Year 6</u>
Expected revenues (cash inflows)	\$150,000	\$220,000	\$300,000	\$250,000	\$180,000	\$112,000
Depreciation expenses	\$105,000	\$105,000	\$105,000	\$105,000	\$105,000	\$105,000
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Net operating income	45,000	115,000	195,000	145,000	75,000	7,000
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- ▶ Average income = (45,000 + 115,000 + 195,000 + 145,000 + 75,000 + 7,000) / 6  
= \$97,000

# Accounting Rate of Return

- ▶ **Step 3: Computation of accounting rate of return:**  
*If initial investment is used as denominator:*

$$\text{Accounting rate of return/Simple rate of return} = \frac{\text{Incremental accounting income}}{\text{Initial investment}}$$

$$\begin{aligned} &= \$97,000 / \$650,000 \\ &= 14.92\% \end{aligned}$$

*If average investment is used as denominator:*

$$\begin{aligned} &\$97,000 / \$335,000^* \\ &= 28.96\% \end{aligned}$$

$$\begin{aligned} &*(\$650,000 + \$20,000)/2 \\ &= \$335,000 \end{aligned}$$

# Accounting Rate of Return

- ▶ Advantages:
    - It is very simple to understand and use.
    - It can be readily calculated using the accounting data.
    - It uses the entire stream of incomes in calculating the accounting rate.
  - ▶ Disadvantages:
    - It ignores the time value of money
    - It uses accounting, profits, not cash flows in appraising the projects
- 