MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

UNIT-I
INTRODUCTION TO MANAGERIAL ECONOMICS

INTRODUCTION TO MANAGERIAL ECONOMICS

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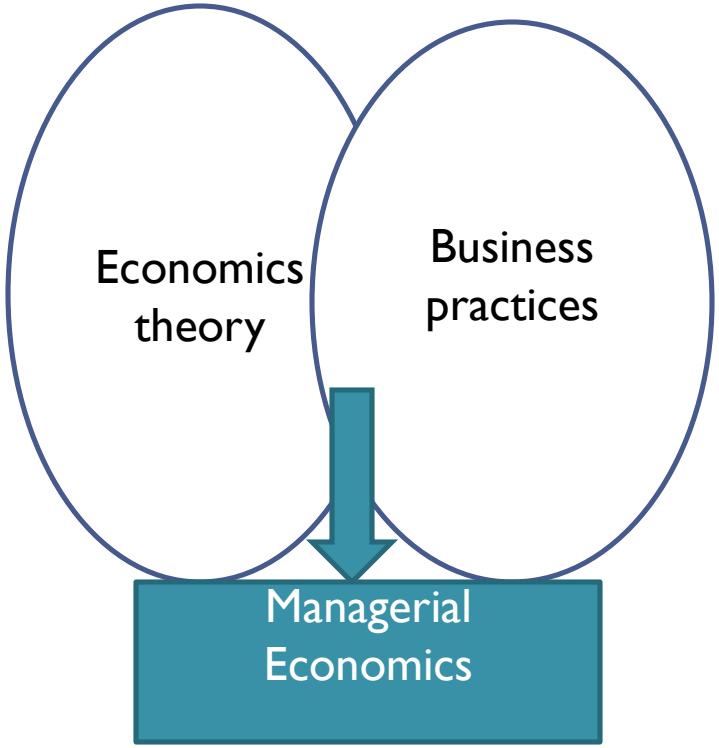
Introduction to Managerial Economics.

Managerial economics is a discipline which deals with the application of **economic** theory to business management. It deals with the use of **economic** concepts and principles of business decision making.



INTRODUCTION TO ECONOMICS

Economics is a study of human activity both at individual and national level. Any activity involved in efforts aimed at earning money and spending this money to satisfy our wants such as food, Clothing, shelter, and others are called "Economic activities". It was only during the eighteenth century that Adam Smith, the Father of Economics, defined economics as the study of nature and uses of national wealth'

Definition:

Dr. Alfred Marshall, one of the greatest economists of the nineteenth century, writes

“Economics is a study of man’s actions in the ordinary business of life: it enquires how he gets his income and how he uses it”.

Prof. Lionel Robbins defined Economics as

“The science, which studies human behavior as a relationship between ends and scarce means which have alternative uses”.

Economics-

- **Micro economics**

Microeconomics

➢ The study of an individual consumer or a firm is called microeconomics.

➢ Microeconomics deals with behavior and problems of single individual and of micro organization.

- **Macroeconomics**:

➢ The study of ‘aggregate’ or total level of economic activity in a country is called macroeconomics.

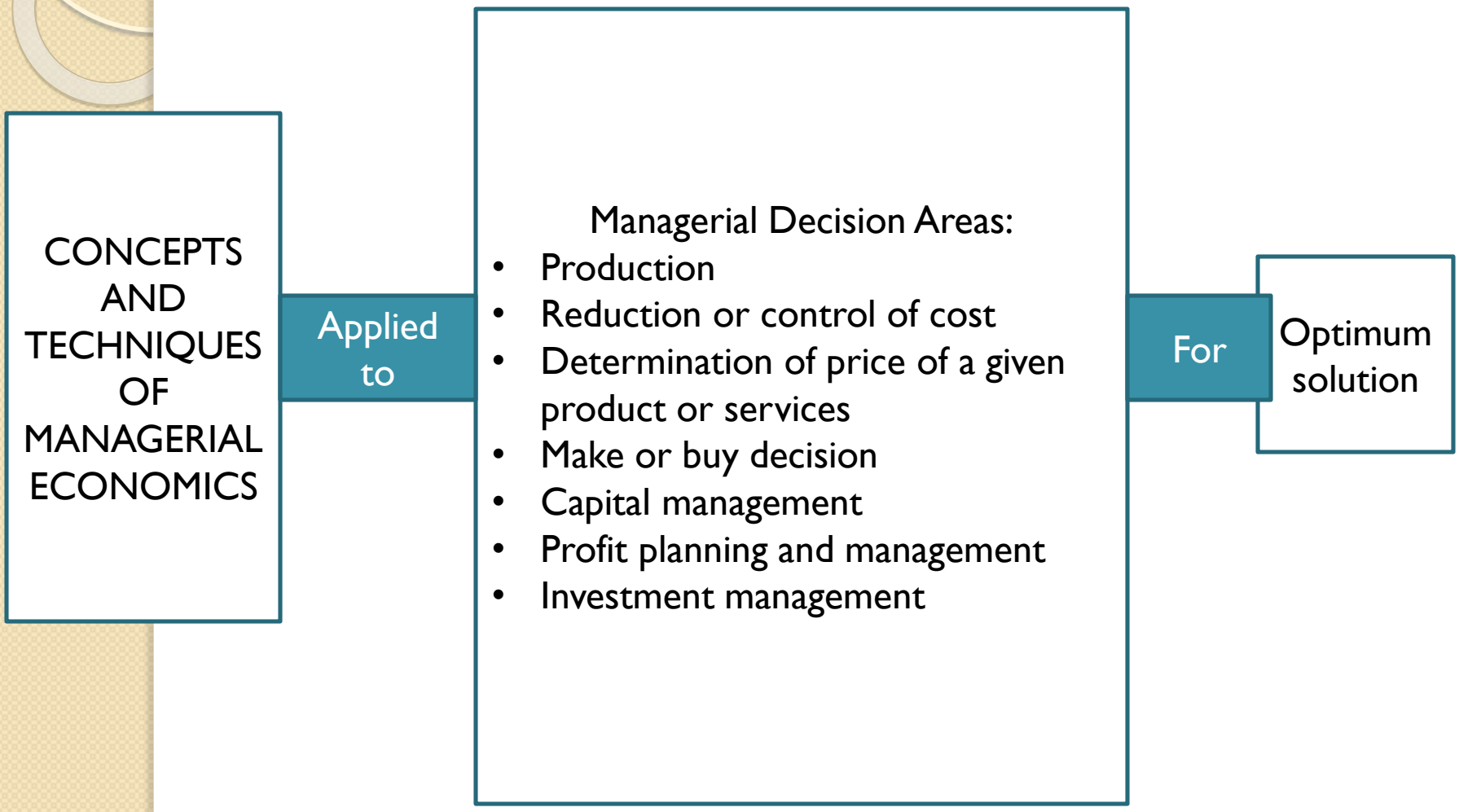
INTRODUCTION TO MANAGERIAL ECONOMICS

Managerial Economics means the application of economic theory to the problem of management. Managerial economics may be viewed as economics applied to problem solving at the level of the firm. It enables the business executive to assume and analyze things.

NATURE OF MANAGERIAL ECONOMICS

- Close to micro economics
- Operates against the backdrop of macro economics
- Normative Statements
- Prescriptive action
- Applied in nature
- Offers scope to evaluate each alternative
- Interdisciplinary
- Assumption and Limitations

SCOPE OF MANAGERIAL ECONOMICS



CONTEMPORARY IMPORTANCE OF MANAGERIAL ECONOMICS

- Helps in evaluating managerial policies
- Advantageous in business organization
- Recognizes the economic strength and weakness
- Computing the economic relationship
- Makes business planning much easier
- Helps in managing the cost
- Systemization of business activities
- Resolves problem related to business taxation
- Helps in computing firm’s efficiency

DEMAND ANALYSIS INTRODUCTION

What is demand?

Every want is supported by the willingness and ability to buy. Constitute demands for particular product or service

Ex: if I want a car and I cannot pay for it. There is a no demand for the car from my side.

- Desire on the part of the buyer to buy.
- Willingness to pay for it.
- Ability to buy for it.

If 3 conditions are satisfied then there is a demand for the product from my side.

TYPES OF DEMAND

- Consumer good vs. product good
- Autonomous demand vs. desired demand
- Durable goods vs. perishable goods
- Firm demand vs. industrial demand
- Short run demand vs. long run demand
- New demand vs. replacement demand
- Total demand vs. segment demand

DETERMINANTS OF DEMAND

Factors determining demand

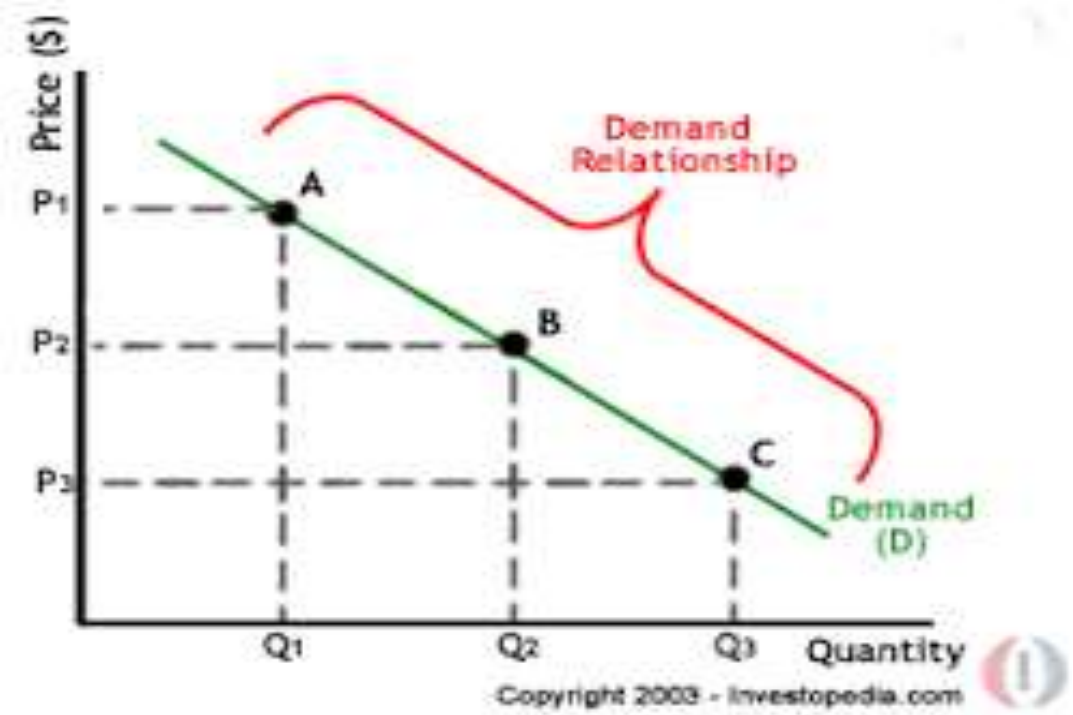
- Price of the product(P)
- Income level of the consumer(I)
- Taste & preference of the consumer(T)
- Price with related goods which may be Substitutes/ complementary(P_R)
- Expectation about the price In future(E_P)
- Expectation about the incoming in future(E_I)
- Size of population(S_P)
- Distribution of consumer over different region(D_C)
- Advertising efforts(A)
- Any other factors(O)

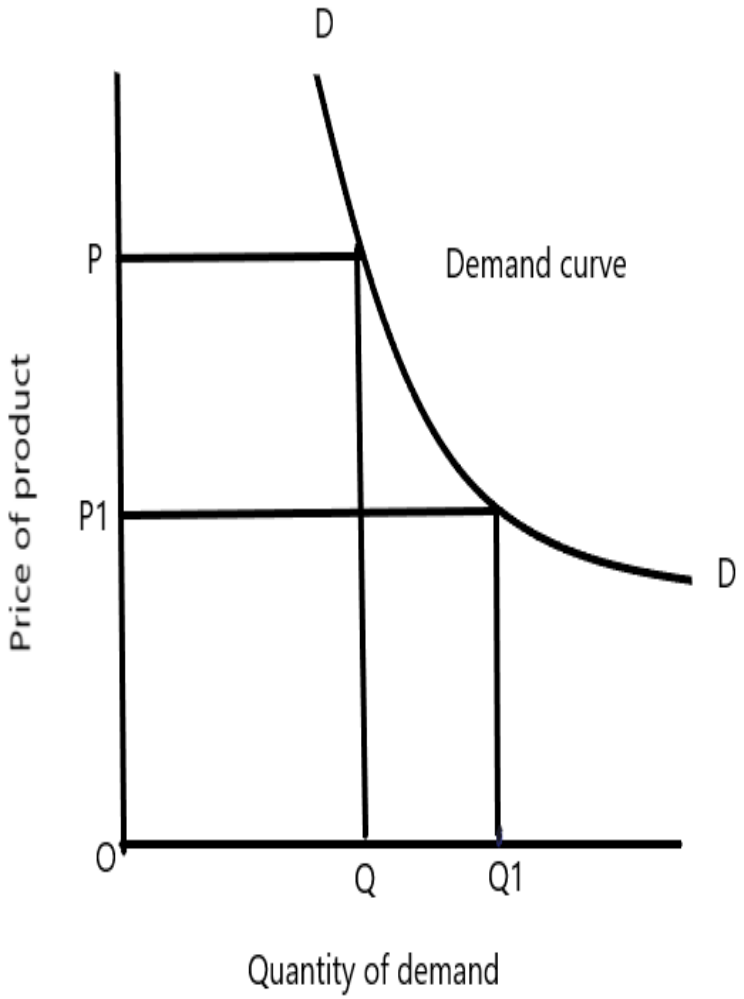
LAW OF DEMAND

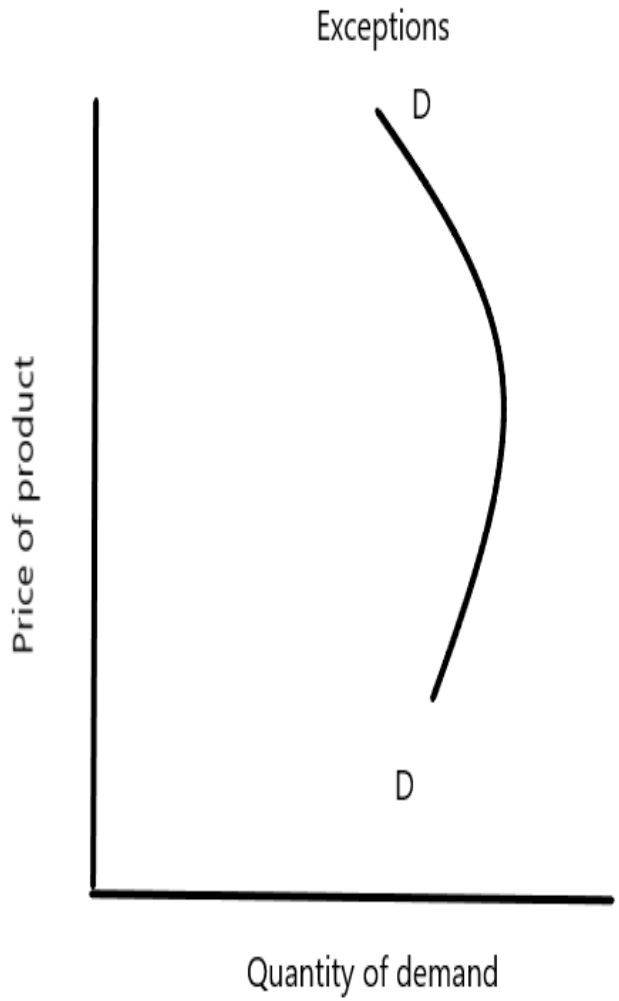
The law of demand states:

Other things remaining the same, the amount of quantity demanded rises with every fall in the price and vice versa

LAW OF DEMAND




D
P
Demand curve
P1
D
Price of product
O
Q
Q1
Quantity of demand


Exceptions
D
Price of product
D
Quantity of demand

EXCEPTIONS TO THE LAW OF DEMAND

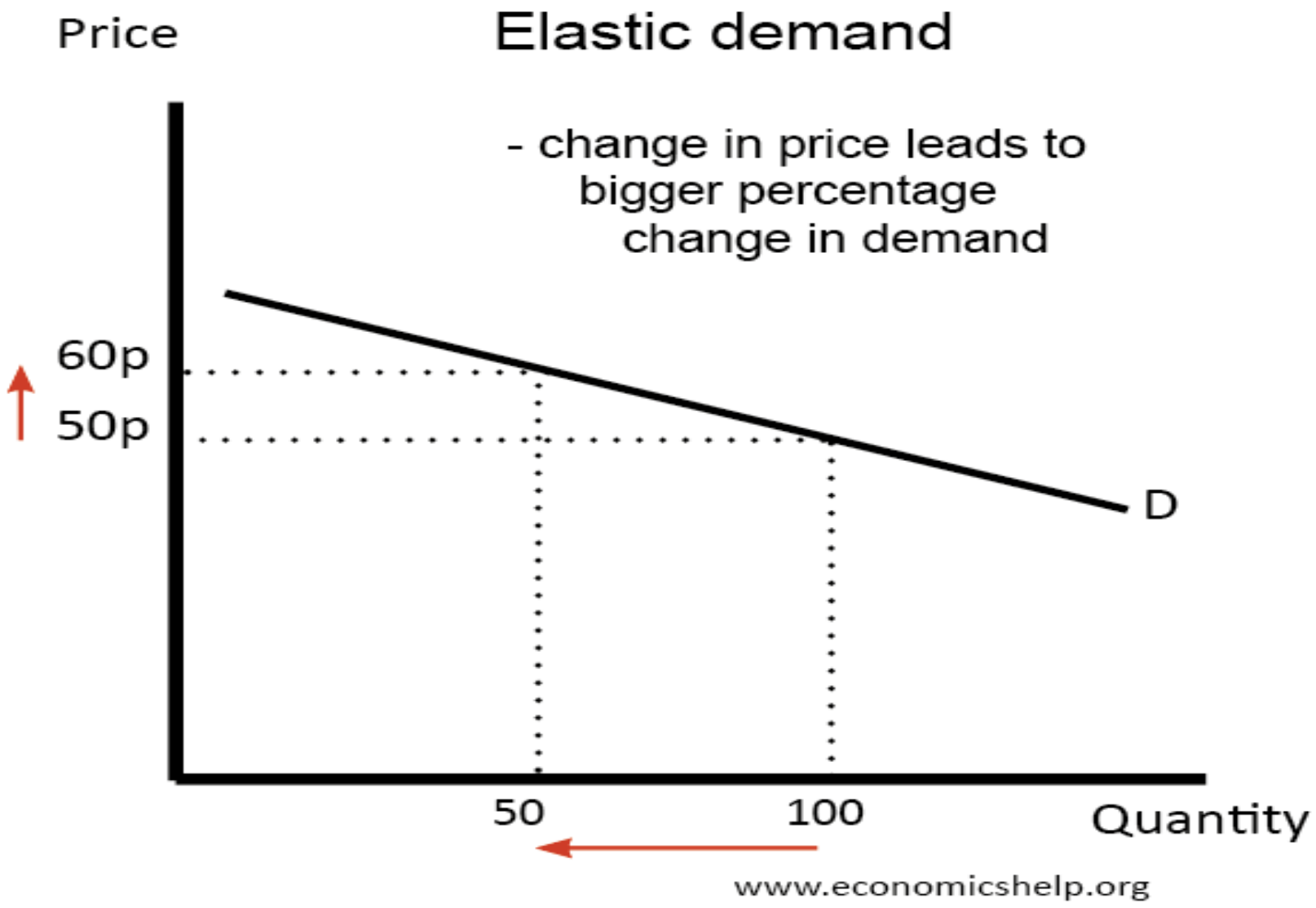
- **Exceptions**
- Where there is shortage of necessities fear.
- Where the product is such that is confers distinction
- Geffen's paradox
- In case of ignorance of price change

ELASTICITY OF DEMAND

- Elasticity of demand explains the relationship between a change in price and consequent change in amount demanded.

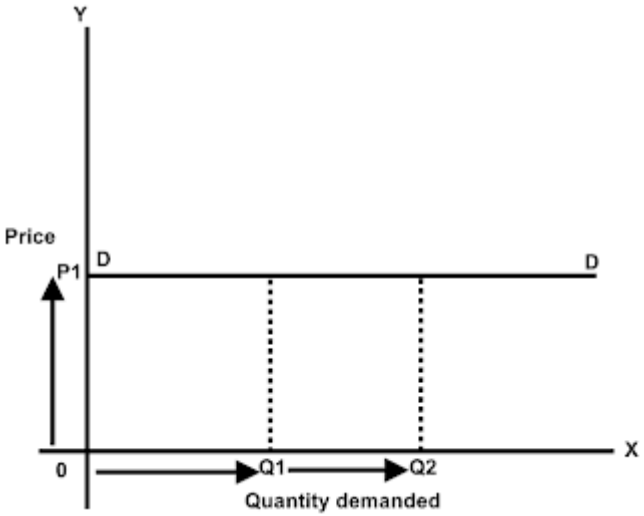
- **Elastic demand**: A small change in price may lead to a great change in quantity demanded. In this case, demand is elastic.
- **In-elastic demand**: If a big change in price is followed by a small change in the quantity demanded, then the demand in “inelastic”.

ELASTICITY OF DEMAND

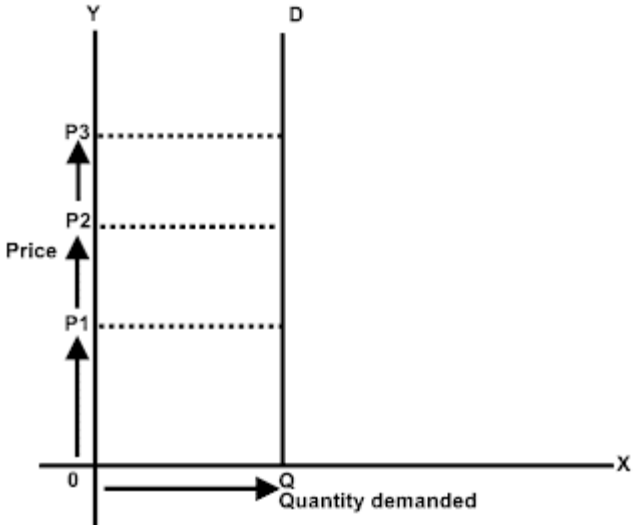


MEASUREMENTS OF ELASTICITY DEMAND

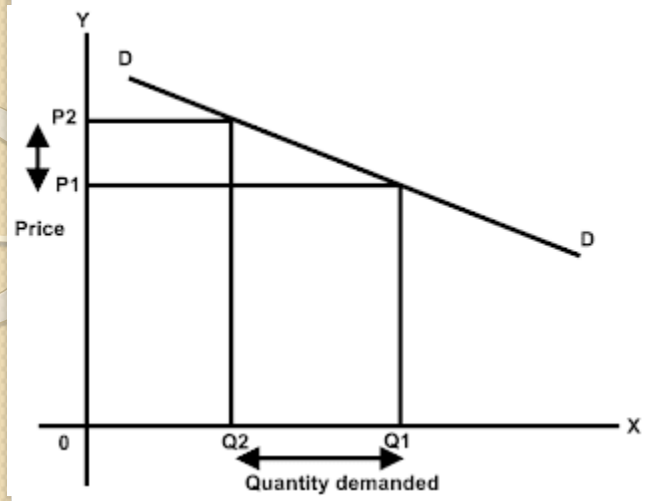
- Perfectly elasticity demand
- Perfectly in elasticity demand
- Relatively elasticity demand
- Relatively inelasticity demand
- Unity of elasticity demand



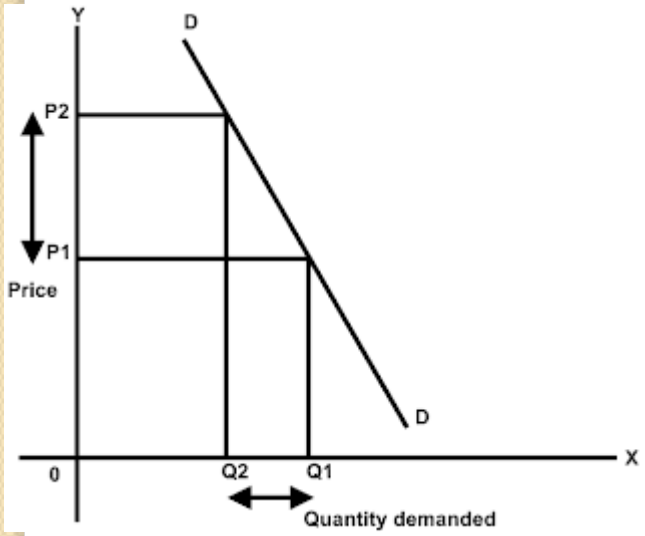
Perfectly elasticity demand



Perfectly in elasticity demand

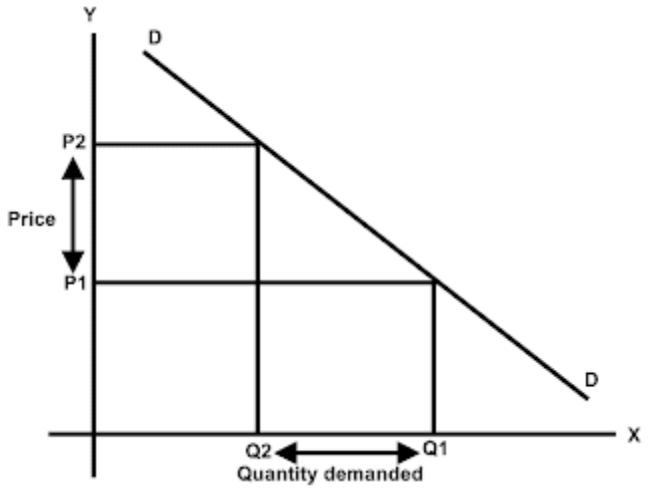


Relatively elasticity demand



Relatively inelasticity demand

- Unity of elasticity demand



TYPES OF ELASTICITY

- Price of elasticity demand
- Income elasticity demand
- Cross elasticity demand
- Advertisement elasticity demand

Types

$$\textbf{Price elasticity} = \frac{\textbf{proportionate change in the quantity demand of commodity}}{\textbf{proportionate change in the price of commodit}}$$

$$\text{income elasticity} = \frac{\text{proportionate change in the quantity demand of commodtiy}}{\text{proportionate change ein the income}}$$

$$\text{Advertisementelasticity} = \frac{\text{proportionate change in the quantity demanded of commodit}}{\text{proportionate change in the advertisement of commodity}}$$

$$\text{Cross elasticity} = \frac{\text{proportionate change in the quantity demand of commodity x}}{\text{proportionate change in the price of commodity y}}$$

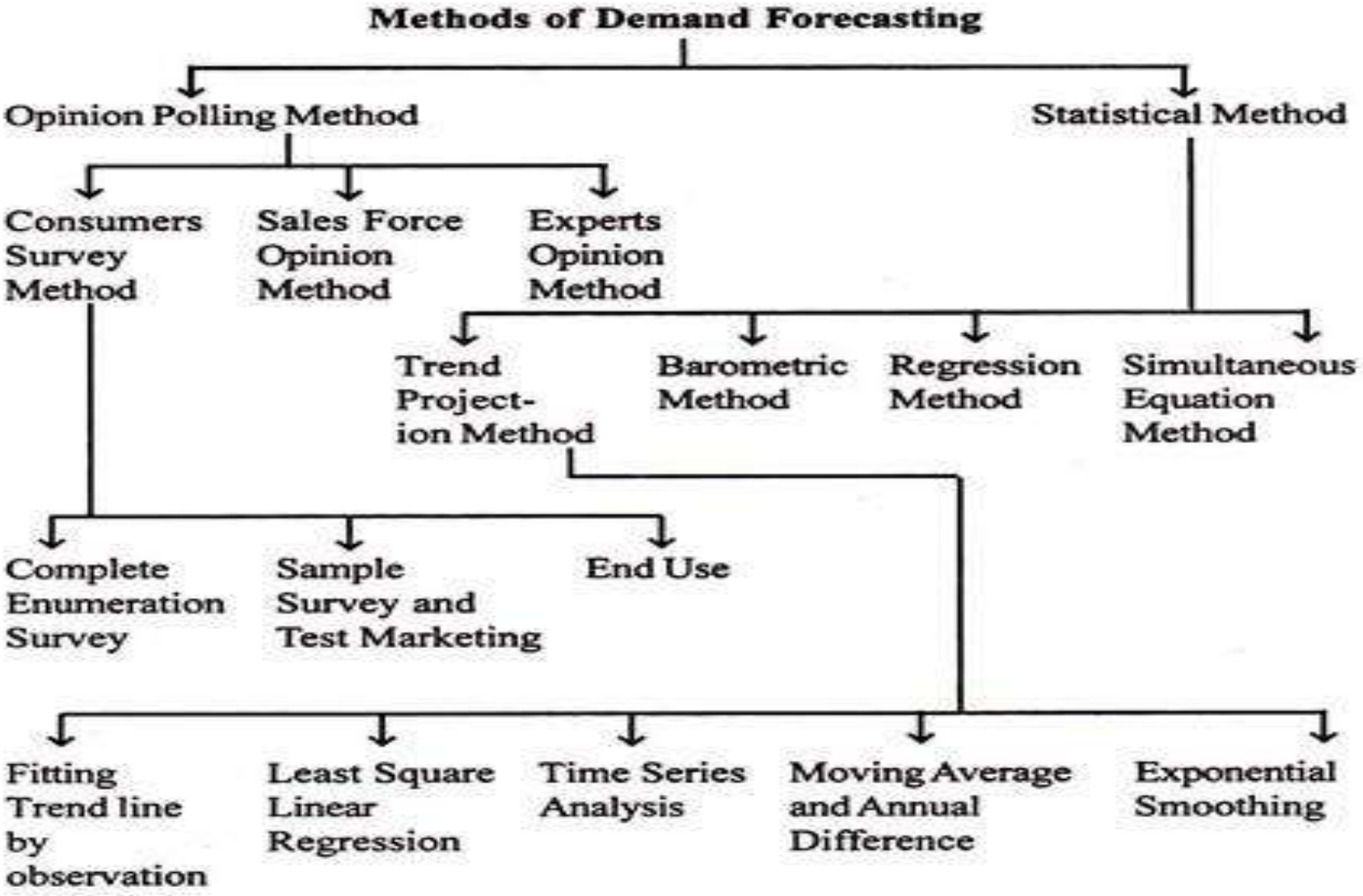
SIGNIFICANCE OF ELASTICITY

- Prices of factors of production
- Price of fixation
- Government policies
- Forecasting demand
- Planning the levels of output and price

DEMAND FORECASTING

- Demand Forecasting is the process in which historical sales data is used to develop an estimate of an expected forecast of customer demand. To businesses, Demand Forecasting provides an estimate of the amount of goods and services that its customers will purchase in the foreseeable future.

Table 1.


Methods of Demand Forecasting
Opinion Polling Method
Statistical Method
Consumers Survey Method
Sales Force Opinion Method
Experts Opinion Method
Trend Project-ion Method
Barometric Method
Regression Method
Simultaneous Equation Method
Complete Enumeration Survey
Sample Survey and Test Marketing
End Use
Fitting Trend line by observation
Least Square Linear Regression
Time Series Analysis
Moving Average and Annual Difference
Exponential Smoothing

MANAGERIAL ECONOMICS & FINANCIAL ANALYSIS (MEFA)

Unit-2

Syllabus

Production Function – Short-run and long- run production - Isoquants and Isocosts, MRTS, least cost combination of inputs - Cobb-Douglas production function - laws of returns - Internal and External economies of scale - **Cost Analysis**: Cost concepts - Break-Even Analysis (BEA) – Managerial significance and limitations of BEA - Determination of Break Even Point (Simple Problems)

Production Function – Short-run and long- run production

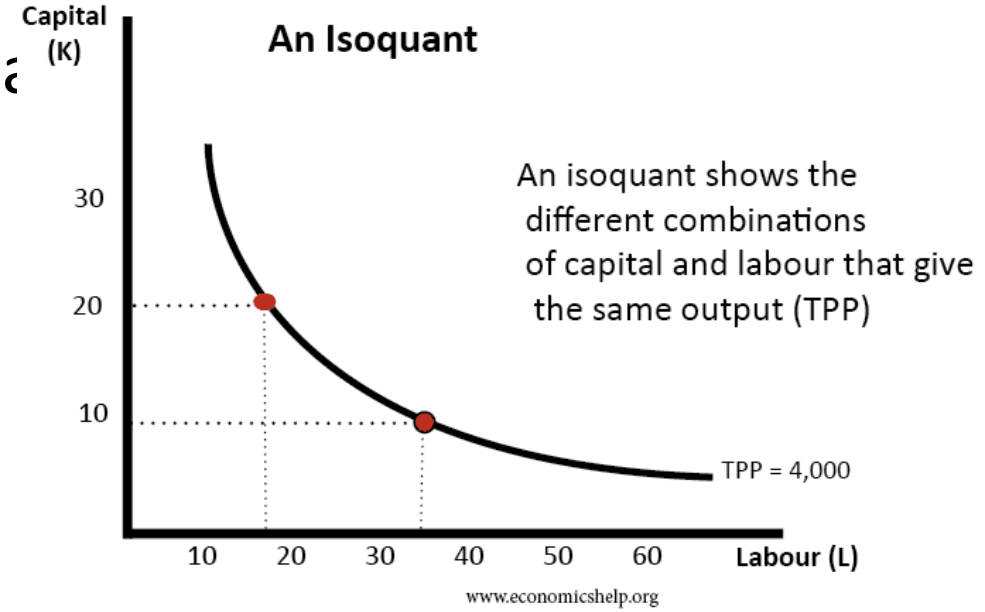
- The firm may change only the quantities of the variable inputs in the short run when the quantities of the fixed inputs remain unchanged.
- That is, in the short run, the output quantity can be increased (or decreased) by increasing (or decreasing) the quantities used of only the variable inputs. This functional relationship (of dependence) between the variable input quantities and the output quantity is called the short run production function.
- ADVERTISEMENTS:
- We have to remember here, of course, that in the short-run, the firm uses a particular combination of fixed inputs, and its short-run production function is obtained in respect of that combination.
- In the long run, however, all the inputs used by the firm, the variable inputs and the so called fixed inputs, all are variable quantities and the firm's production is a function of all these inputs. This functional relation of dependence between all the inputs used by the firm and the quantity of its output is called the long run production function of the firm.
- We may illustrate the difference between the short-run and the long run production functions in the following way. Let us suppose that the firm uses only two inputs X and Y to produce its output of one commodity, Q, and of these two inputs X is a variable input and Y is a fixed input.

Isoquants and Isocosts

- An isoquant shows all combination of factors that produce a certain output
- An isocost show all combinations of factors that cost the same amount.
- Isocosts and isoquants can show the optimal combination of factors of production to produce the maximum output at minimum cost.

Definition isoquant

- An isoquant shows a[illegible]s that produce a given output



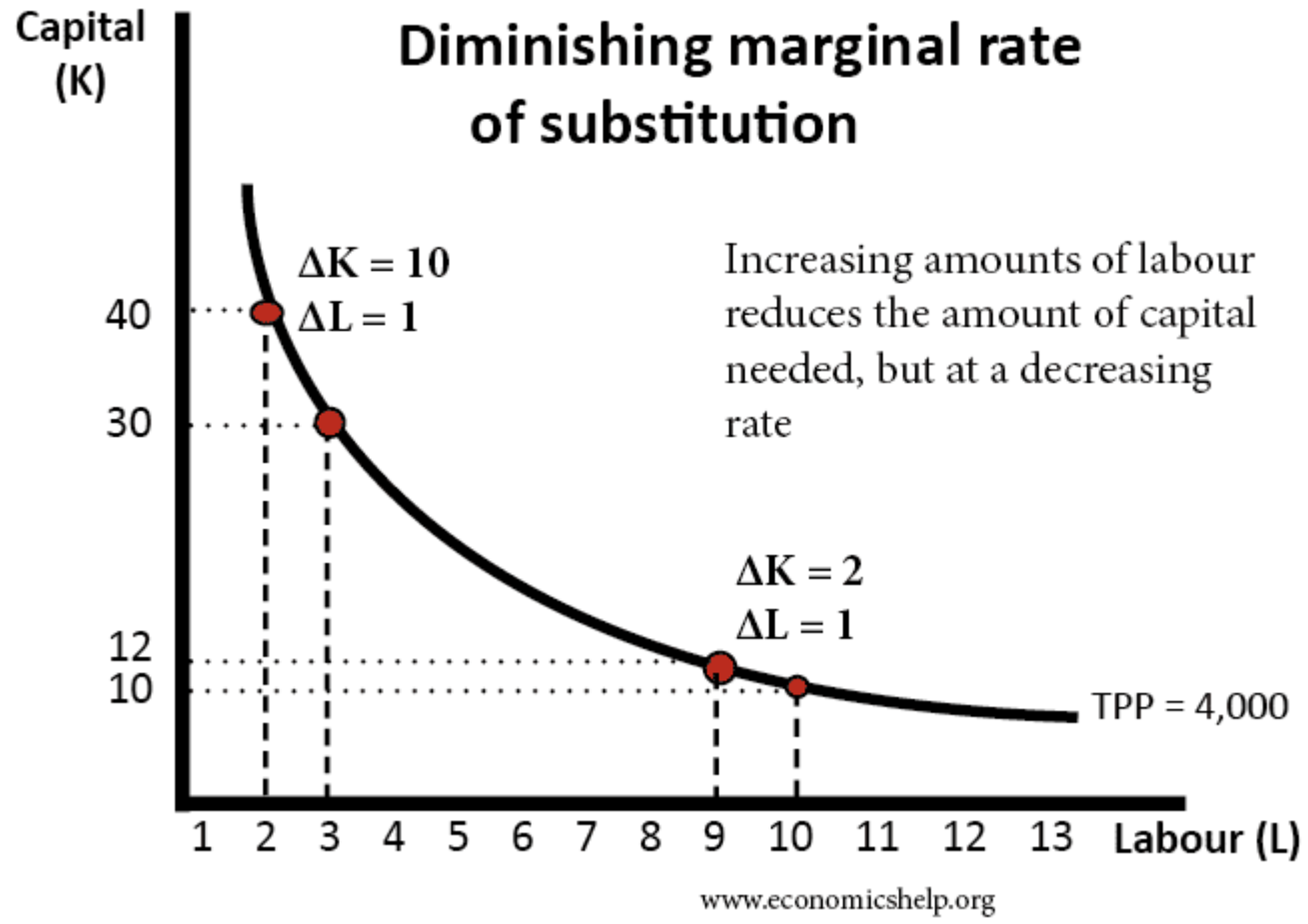
Isoquants and Isocosts

$$MRS = \frac{\Delta K}{\Delta L}$$

The marginal rate of substitution is the amount of one factor (e.g. K) that can be replaced by one factor (e.g. L). If 2 units of capital could be replaced with one-factor labour, the MRS would be 2

$$MRS = \frac{\Delta K}{\Delta L} = \frac{2}{1} = 2$$

Isoquants and Isocosts



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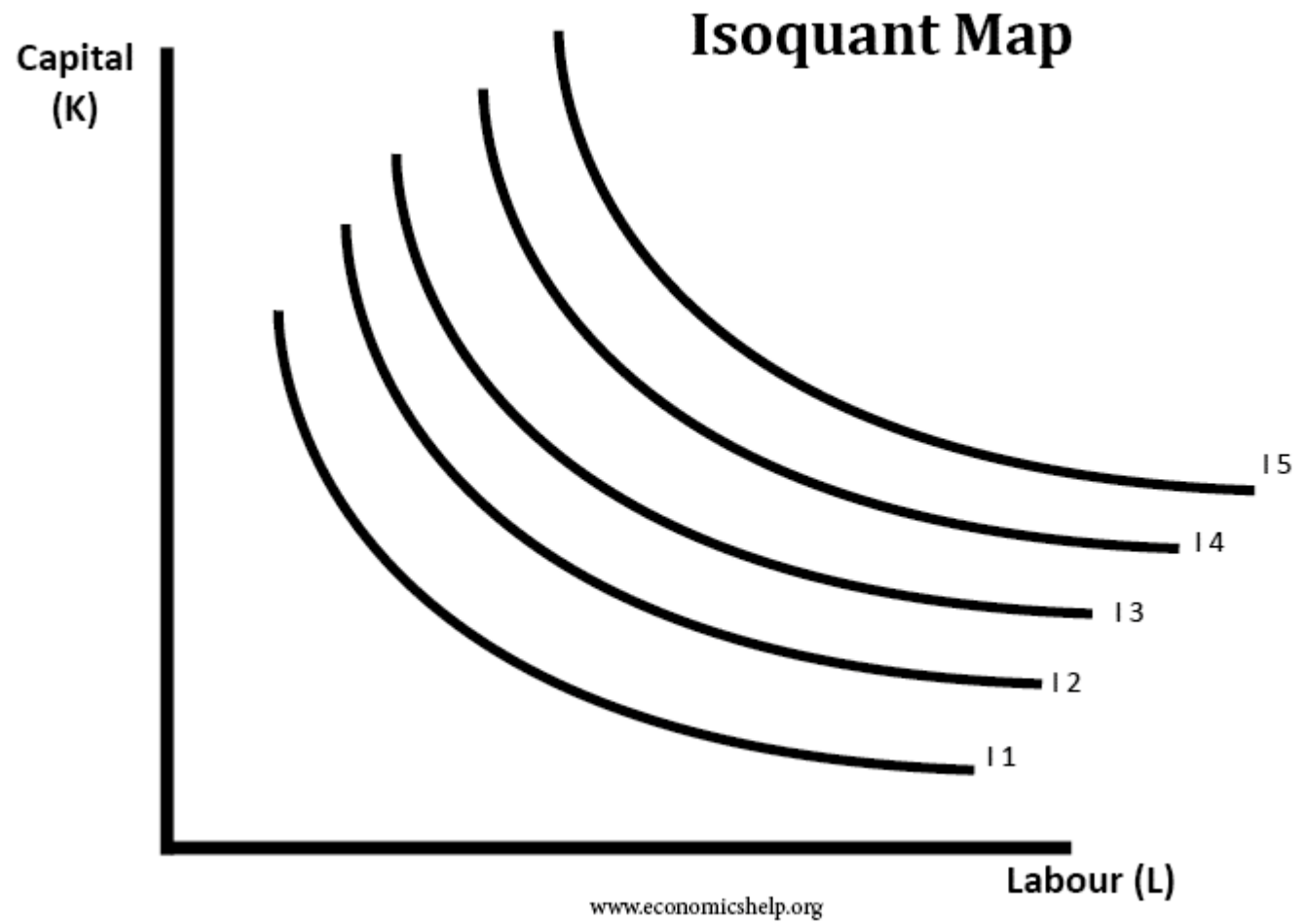
Isocosts

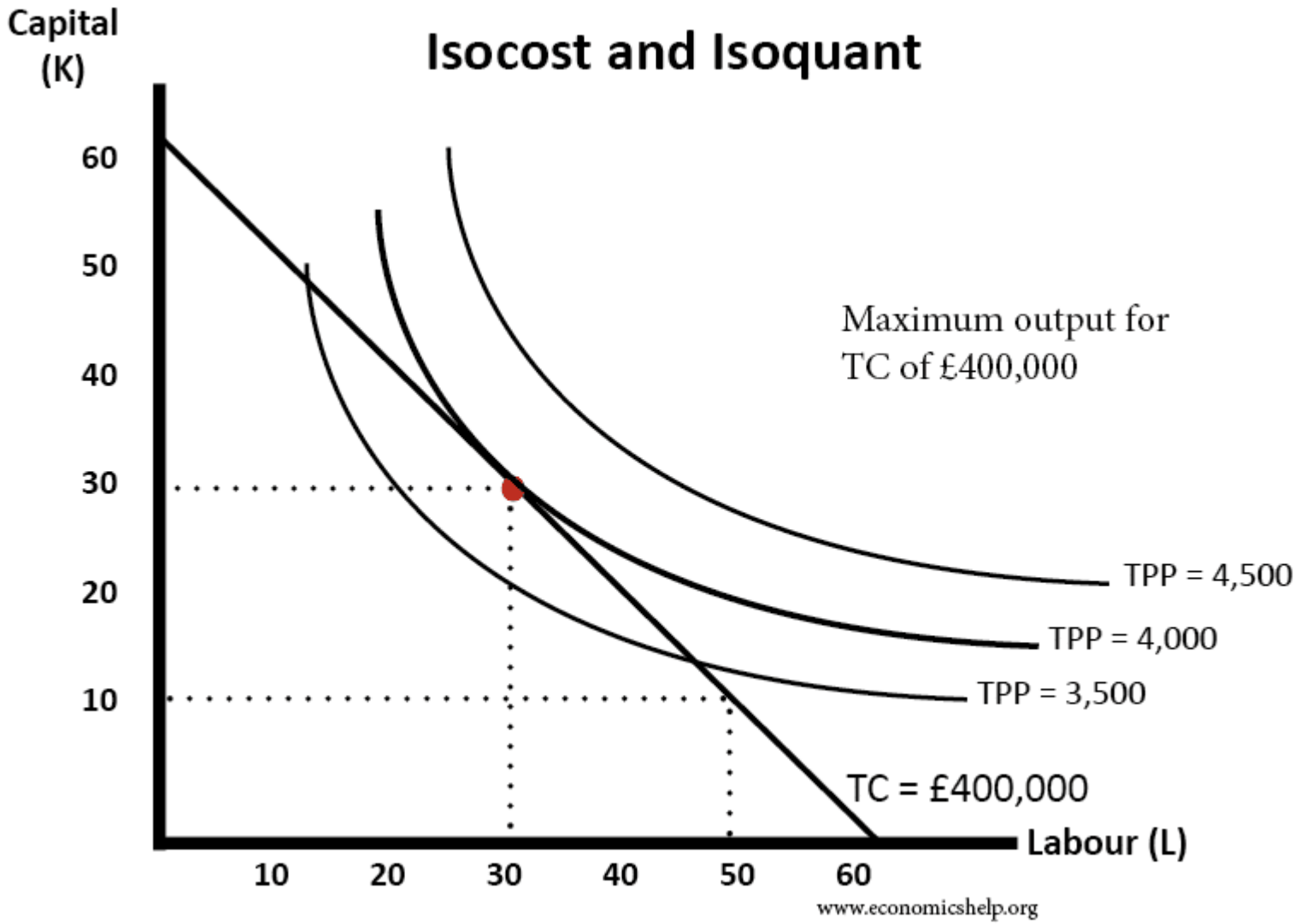

Isoquant Map
Capital
(K)
I 5
I 4
I 3
I 2
I 1
Labour (L)
www.economicshelp.org

Isoquants and Isocosts

- **Sample Problem**

- In this example, we have one isocost and three isoquants. With the isocost of £400,000 the maximum output a firm can manage would be a TPP of 4,000. If it produced at say 13 K and 48 Labour, it would only be able to produce a TPP of 3,500.
- A total TPP of 4,500 is currently not possible without increasing costs beyond £400,000

Isoquants and Isocosts



MRTS(Marginal Rate of Technical Substitution)

- The marginal rate of technical substitution (MRTS) is an economic theory that illustrates the rate at which one factor must decrease so that the same level of productivity can be maintained when another factor is increased.
- The MRTS reflects the give-and-take between factors, such as capital and labor, that allow a firm to maintain a constant output. MRTS differs from the marginal rate of [illegible] RTS is focused on producer equilibrium [illegible]mer equilibrium.

The Formula for the MRTS Is

$$\text{MRTS}(L, K) = -\frac{\Delta K}{\Delta L} = \frac{\text{MP}_L}{\text{MP}_K}$$

where:

$K = \text{Capital}$

$L = \text{Labor}$

$\text{MP} = \text{Marginal products of each input}$

$\frac{\Delta K}{\Delta L} = \text{Amount of capital that can be reduced when labor is increased (typically by one unit)}$

least cost combination of inputs

- **Least Cost Combination of Inputs:**
- The firm may produce a particular quantity of its product at each of the alternative input combinations that lies on the IQ for that quantity. Since the firm's goal is to maximise profit, the optimum input combination for producing a particular quantity of its product would be one that would produce the output at the minimum possible cost.
- The optimum input combination in this case is known as the least cost combination of inputs. In order to explain the firm's selection of the least cost combination of inputs, let us suppose that some of the firm's isoquants (IQs) and iso-cost lines (ICLs)

least cost combination of inputs

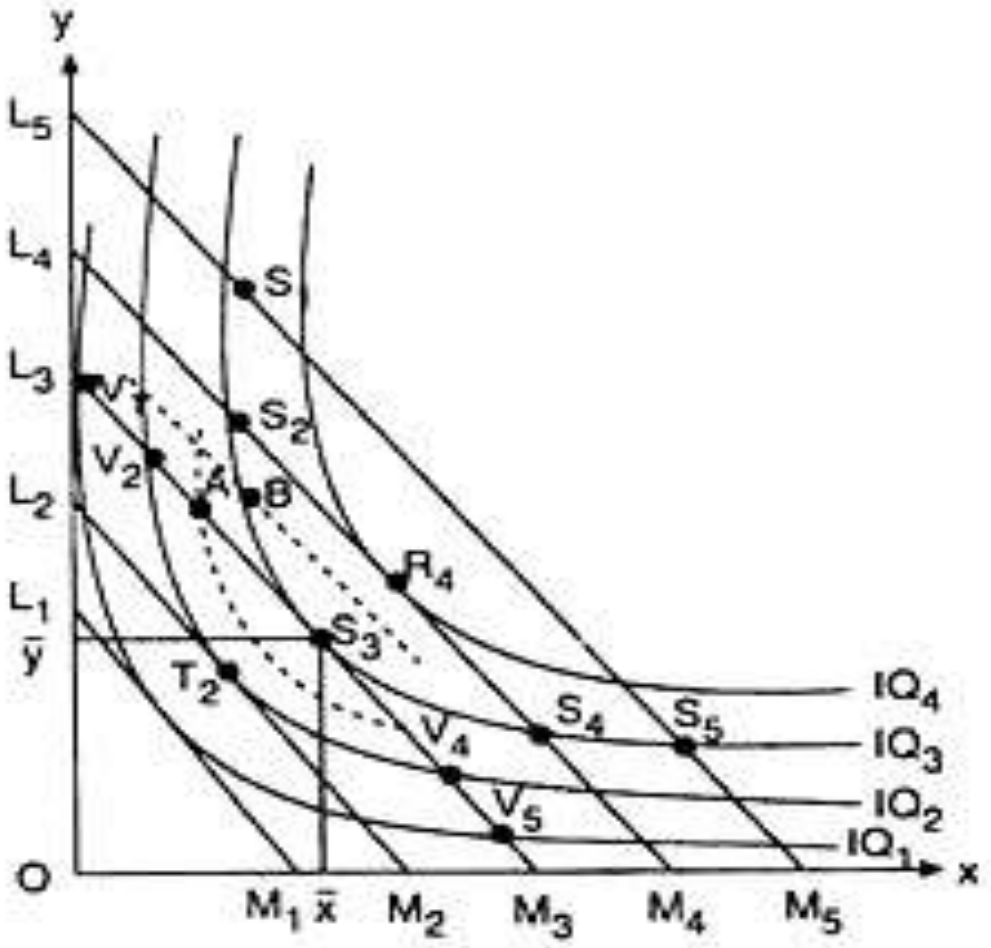


Fig. 8.12 Least cost and maximum output combinations of inputs

least cost combination of inputs

- Let us now suppose that the firm intends to produce a particular quantity $q = q_3$ of its product, and the isoquant for this particular quantity is IQ_3. In other words, if the firm uses any of the input combinations lying on IQ_3, it would be able to produce the output quantity $q = q_3$.
- But, since the different points on IQ_3, viz., S_1, S_2, S_3, S_4, S_5, etc. lie on different ICLs, they produce the same output, viz., q = but at different levels of cost, For we know that a higher (or a lower) ICL represents a higher (or a lower) level of cost.
- Therefore, in order to produce the output of q_3 at the least possible cost, the firm would have to select that point on IQ_3 that would lie on the lowest possible ICL. In Fig. 8.12, we see that the point S_3 on IQ_3 lies on the lowest possible ICL, viz., L_3M_3. Any other point on IQ_3 lies on a higher ICL or a higher level of cost than L_3M_3.
- Therefore, at an output of q_3, the least cost combination of inputs is $S_3(\bar{x}, \bar{y})$. In other words, if the firm is to produce an output of q_3, it would buy and use the quantity x of input X and the quantity y of input Y. Here it is very important for us to observe that the least cost combination of inputs is the point of tangency (here S_3) between the particular isoquant (here IQ_3) and an iso-cost line (here L_3M_3).

Cobb-Douglas production function

In economics and econometrics, the **Cobb–Douglas production function** is a particular functional form of the production function, widely used to represent the technological relationship between the amounts of two or more inputs (particularly physical capital and labor) and the amount of output that can be produced by those inputs. The Cobb–Douglas form was developed and tested against statistical evidence by Charles Cobb and Paul Douglas during 1927–1947

Formulation

In its most standard form for production of a single good with two factors, the function is

$$Y = AL^{\beta}K^{\alpha}$$

where:

Y = total production (the real value of all goods produced in a year or 365.25 days)
L = labor input (the total number of person-hours worked in a year or 365.25 days)
K = capital input (a measure of all machinery, equipment, and buildings; the value of capital input divided by the price of capital)[clarification needed]
A = total factor productivity
α and β are the output elasticities of capital and labor, respectively. These values are constants determined by available technology.

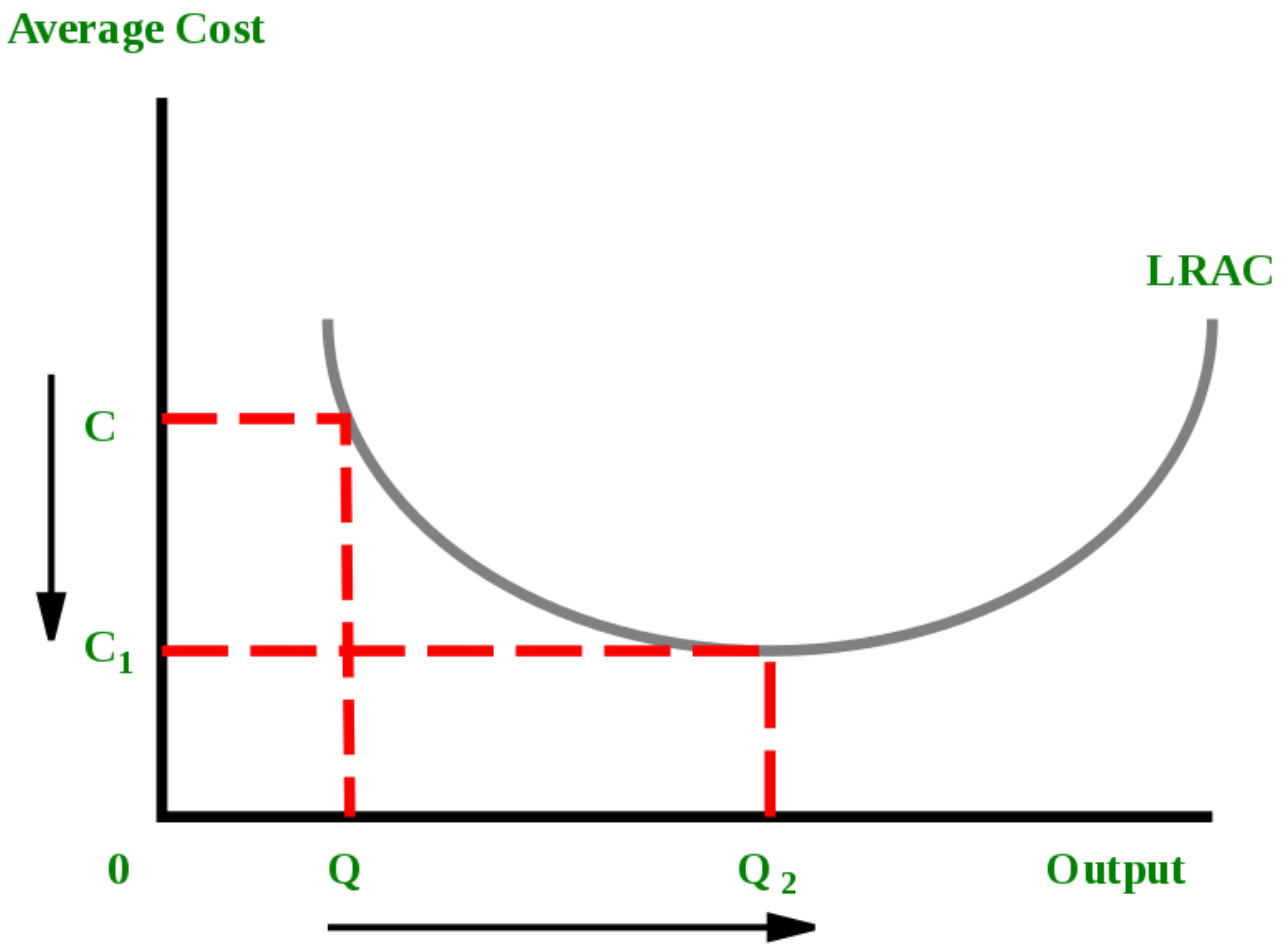
laws of returns Internal and External

- In the long run all factors of production are variable. No factor is fixed. Accordingly, the scale of production can be changed by changing the quantity of all factors of production.
- **Definition:**
- “The term returns to scale refers to the changes in output as all factors change by the same proportion.” Koutsoyiannis
- “Returns to scale relates to the behaviour of total output as all inputs are varied and is a long run concept”. Leibhafsky
- **Returns to scale are of the following three types:**
- 1. Increasing Returns to scale.
- 2. Constant Returns to Scale
- 3. Diminishing Returns to Scale

economies of scale

- In microeconomics, **economies of scale** are the cost advantages that enterprises obtain due to their scale of operation (typically measured by amount of output produced), with cost per unit of output decreasing with increasing scale. At the basis of economies of scale there may be technical, statistical, organizational or related factors to the degree of market control.
- Economies of scale apply to a variety of organizational and business situations and at various levels, such as a production, plant or an entire enterprise. When average costs start falling as output increases, then economies of scale are occurring. Some economies of scale, such as capital cost of manufacturing facilities and friction loss of transportation and industrial equipment, have a physical or engineering basis.
- Another source of scale economies is the possibility of purchasing inputs at a lower per-unit cost when they are purchased in large quantities.
- The economic concept dates back to Adam Smith and the idea of obtaining larger production returns through the use of division of labor.Diseconomies of scale are the opposite.
- Economies of scale often have limits, such as passing the optimum design point where costs per additional unit begin to increase. Common limits include exceeding the nearby raw material supply, such as wood in the lumber, pulp and paper industry. A common limit for low cost per unit weight commodities is saturating the regional market, thus having to ship product uneconomic distances. Other limits include using energy less efficiently or having a higher defect rate.
- Large producers are usually efficient at long runs of a product grade (a commodity) and find it costly to switch grades frequently. They will therefore avoid specialty grades even though they have higher margins. Often smaller (usually older) manufacturing facilities remain viable by changing from commodity grade production to specialty products.
- Economies of scale must be distinguished by economies stemming from an increase in the production of a given plant. When a plant is used below its optimal production capacity, increases of its degree of utilization bring about decreases in the total average cost of production. As noticed, among the others, by Nicholas Georgescu-Roegen (1966) and Nicholas Kaldor (1972) these economies cost are not economies of scale.

economies of scale



Cost Analysis

- **Definition:** In economics, the **Cost Analysis** refers to the measure of the cost – output relationship, i.e. the economists are concerned with determining the cost incurred in hiring the inputs and how well these can be re-arranged to increase the productivity (output) of the firm.
- In other words, the cost analysis is concerned with determining money value of inputs (labor, raw material), called as the overall cost of production which helps in deciding the optimum level of production.
- There are several cost concepts relevant to the business operations and decisions and for the convenience of understanding these can be grouped under two overlapping categories:
- **Cost Concepts Used for Accounting Purposes:** Generally, the accountants use these cost concepts to study the financial position of the firm. They are concerned with arranging the finances of the firm and therefore keep a track of the assets and liabilities of the firm. The accounting costs are used for taxation purposes and calculating the profit and loss of the firm. These are:
- **Opportunity Cost**
- **Business Cost**
- **Full Cost**
- **Explicit Cost**
- **Implicit Cost**
- **Out-of-Pocket Cost**
- **Book Cost**

Cost Analysis

- **Analytical Cost Concepts Used for Economic Analysis of Business Activities:** These cost concepts are used by the economists to analyze the likely cost of production in the future. They are concerned with how the cost of production can be managed or how the input and output can be re-arranged such that the overall profitability of the firm gets improved. These costs are:
- **Fixed Cost**
- **Variable Cost**
- **Total Cost**
- **Average Cost**
- **Marginal Cost**
- **Short-run Cost**
- **Long-Run Cost**
- **Incremental Cost**
- **Sunk Cost**
- **Historical Cost**
- **Replacement Cost**
- **Private Cost**
- **Social Cost**

Cost concepts

- **he cost concepts which are relevant to business operations and decisions can be studied on the basis of their purpose, under two overlapping categories:**

(i) Concepts used for accounting purposes, and

(ii) Concepts used in economic analysis of the business activities. Let us discuss here some important concepts of the two categories.

A. Some Accounting Cost Concepts:

1. Opportunity Cost and Actual Cost:

- Opportunity cost refers to the loss of earnings due to opportunities foregone due to scarcity of resources. If resources were unlimited, there would be no need to forego any income-yielding opportunity and, therefore, there would be no opportunity cost. Resources are scarce but have alternative uses with different returns. Incomes maximizing resource owners put their scarce resources to their most productive use and forego the income expected from the second best use of the resources.

Cost concepts

- **Business Costs and Full Costs:**
- Business costs include all the expenses which are incurred to carry our business. The concept of business costs is similar to the actual or real costs. Business costs “include all the payments and contractual obligations made by the firm together with the book cost of depreciation on plant and equipment”.
- **Explicit and Implicit or Imputed Costs:**
- Explicit costs refer to those which fall under actual or business costs entered in the books of accounts. The payments for wages and salaries, materials, license fee, insurance premium, depreciation charges are the examples of explicit costs. These costs involve cash payments and are recorded in normal accounting practices.

Break-Even Analysis (BEA)

- Break-even analysis seeks to investigate the interrelationships among a firm's sales revenue or total turnover, cost, and profits as they relate to alternate levels of output. A profit-maximizing firm's initial objective is to cover all costs, and thus to reach the break-even point, and make net profit thereafter.
- The break-even point refers to the level of output at which total revenue equals total cost. Management is no doubt interested in this level of output. However, it is much more interested in the broad question of what happens to profits (or losses) at various rates of output.

Break-Even Analysis (BEA)

- Therefore, the primary objective of using break-even charts as an analytical device is to study the effects of changes in output and sales on total revenue, total cost, and ultimately on total profit. Break-even analysis is a very generalized approach for dealing with a wide variety of questions associated with profit planning and forecasting.

commercial world.

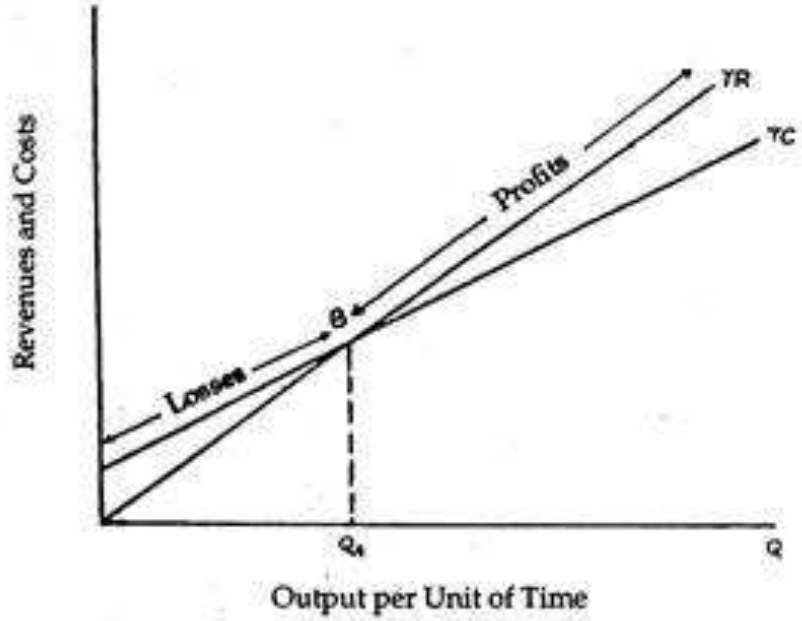


Fig 21.2 Linear Breakeven Chart

Managerial significance and limitations of BEA

1. What happens to overall profitability when a new product is introduced?

2. What level of sales is needed to cover all costs and earn, say, Rs. 1, 00,000 profit or a 12% rate of return?

3. What happens to revenues and costs if the price of one of a company's products is changed?

4. What happens to overall profitability if a company purchases new capital equipment or incurs higher or lower fixed or variable costs?

5. Between two alternative investments, which one offers the greater margin of profit (safety)?

6. What are the revenue and cost implications of changing the process of production?

Determination of Break Even Point (Simple Problems)

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	Product X	Product Y
Sales price	Rs. 8.00	Rs. 12.00
Full cost	7.00	10.50
Profit	1.00	1.50
Net profit on sales	$12\frac{1}{2}\%$	$12\frac{1}{2}\%$

Now we get a completely different picture. Each unit of X sold produces a higher cash contribution and a higher rate of contribution towards fixed costs and profit. It would surely merit the attention of the management in preference to product Y. The relationship is illustrated in Figure 21.4.

Determination of Break Even Point (Simple Problems)

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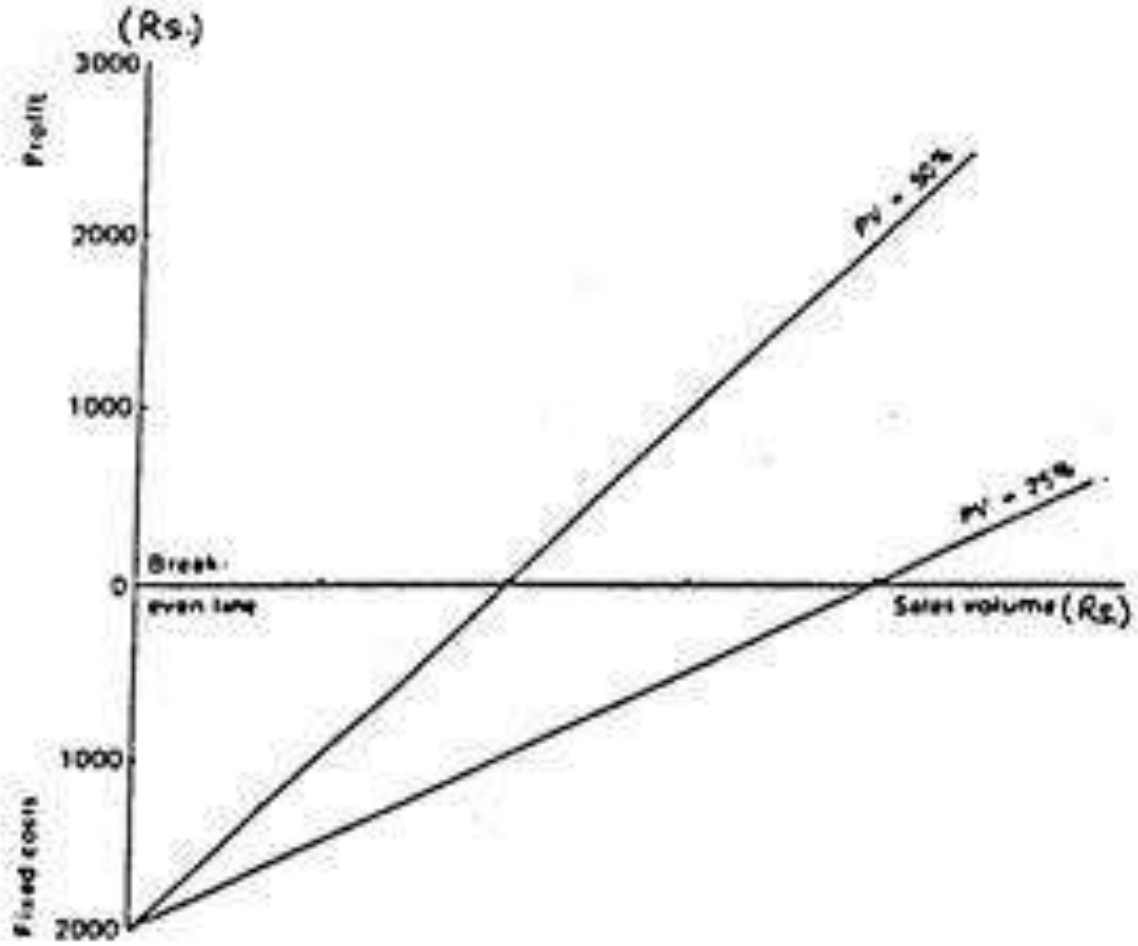


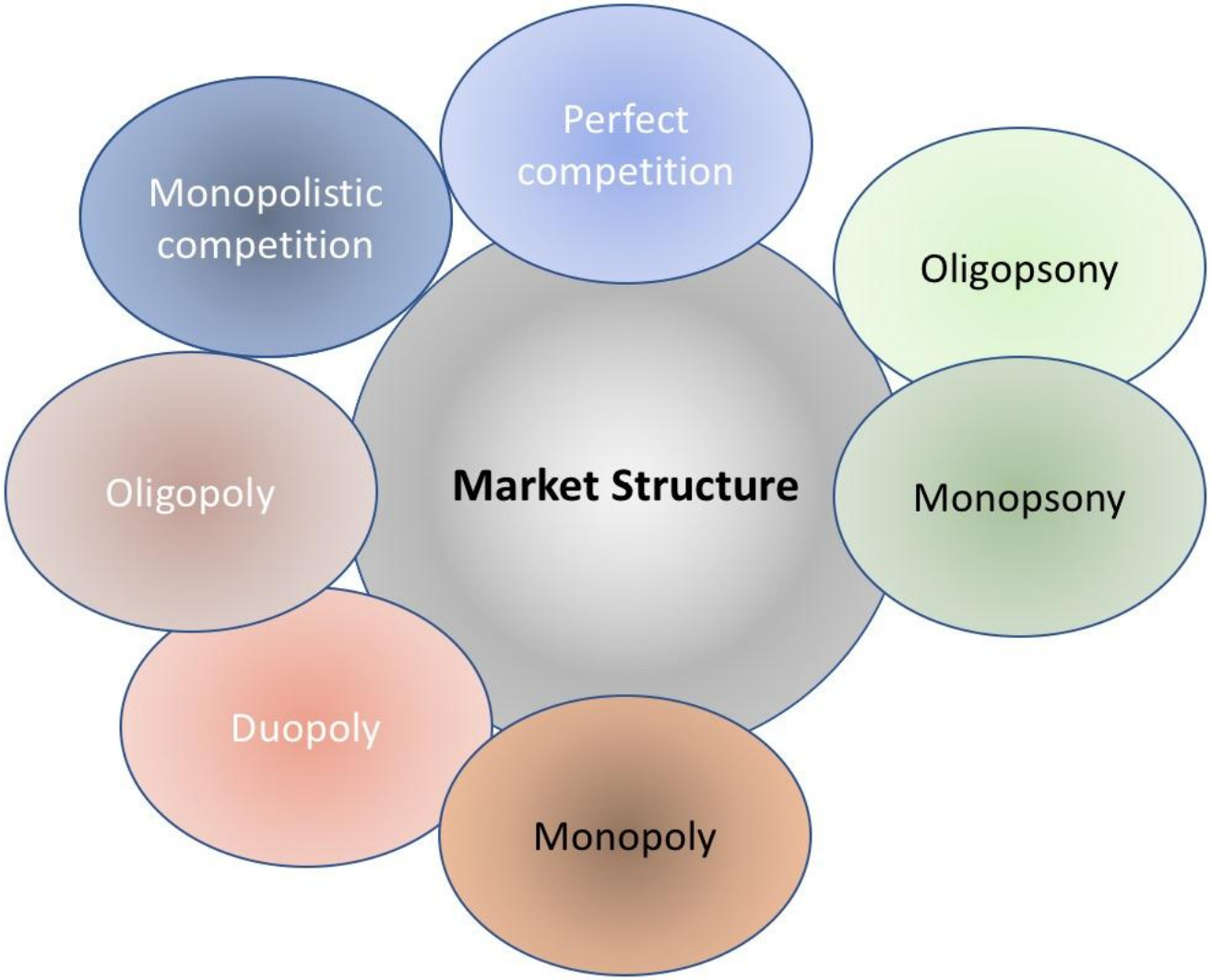
Fig 21.4 Profit-Volume Breakeven Chart

Unit-3
INTRODUCTION TO MARKET AND NEW ECONOMIC ENVIRONMENT

- **Market structure :**Types of Markets –Perfect and Imperfect Competition Feature Oligopoly –Monopolistic Competition Price output determination –Pricing Methods and Strategies New Economics Environment –Economic Systems –Economic Liberalization –Privatization and Globalization.

Market structure

- Market structure refer to the different market characteristics that determine relations between sellers to each another, of sellers to buyers and more. There are several basic defining characteristics of a market structure, such as the following, The distribution of market share for the largest firms.

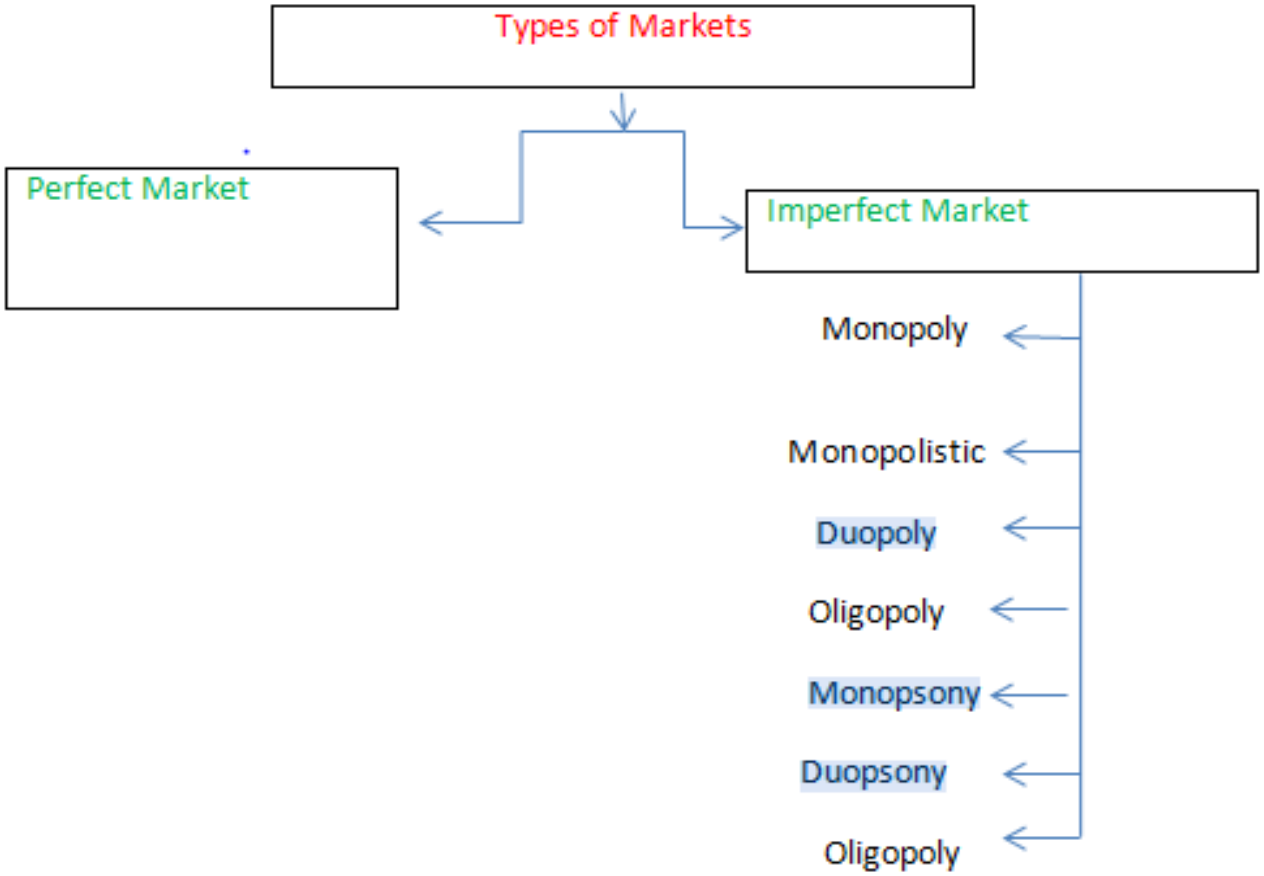

Perfect competition
Monopolistic competition
Oligopsony
Market Structure
Oligopoly
Monopsony
Duopoly
Monopoly

- Market meaning :A market is the area where buyers and sellers contact each other and exchange goods and services. Market structure is said to be the characteristics of the market. Market structures are basically the number of firms in the market that produce identical goods and services.

FEATURES OF MARKET STRUCTURE

1. The degree of seller concentration
2. The degree of buyer concentration
3. The degree of product differentation
4. The conditions of entry into the market

Types of Market



Perfect Competition /Market

- A market structure in which all firms in an industry are price takers and in which there is freedom of entry into and exit from the industry is called perfect competition.

Eg: Agriculture markets are examples of nearly perfect competition as well

FEATURES OF PERFECT MARKETS

- Large number of buyers and sellers
- Homogeneous product or services
- Freedom to entry and exit the market
- Perfect information available to the buyers and sellers
- Perfect mobility of factors of production
- Each firm is a price taker

Capital-Budgeting Techniques

UNIT-4

Capital Budgeting Concepts

- *Capital Budgeting involves evaluation of (and decision about) projects. Which projects should be accepted? Here, our goal is to accept a project which maximizes the shareholder wealth. Benefits are worth more than the cost.*
- *The Capital Budgeting is based on forecasting.*
- *Estimate future expected cash flows.*
- *Evaluate project based on the evaluation method.*
- *Classification of Projects*
  - Mutually Exclusive - accept ONE project only
  - Independent - accept ALL profitable projects.

Capital Budgeting Concepts

Cash Flows

- *Initial Cash Outlay - amount of capital spent to get project going.*

Capital Budgeting Concepts

Cash Flows

- *Initial Cash Outlay - amount of capital spent to get project going.*
- *If spend $10 million to build new plant then the Initial Outlay (IO) = $10 million*

CF_0 = Cash Flow time 0 = -10 million

Capital Budgeting Concepts

Cash Flows

- *Initial Cash Outlay - amount of capital spent to get project going.*
- *If spend $10 million to build new plant then the Initial Outlay (IO) = $10 million*

CF_0 = Cash Flow time 0 = -10 million

- *Annual Cash Inflows--after-tax CF*
  - Cash inflows from the project

CF_n = Sales - Costs

We will determine these in Chapter 10

Capital Budgeting Methods

Payback Period

- *Number of years needed to recover your initial outlay.*

Capital Budgeting Methods

Payback Period

- *Number of years needed to recover your initial outlay.*

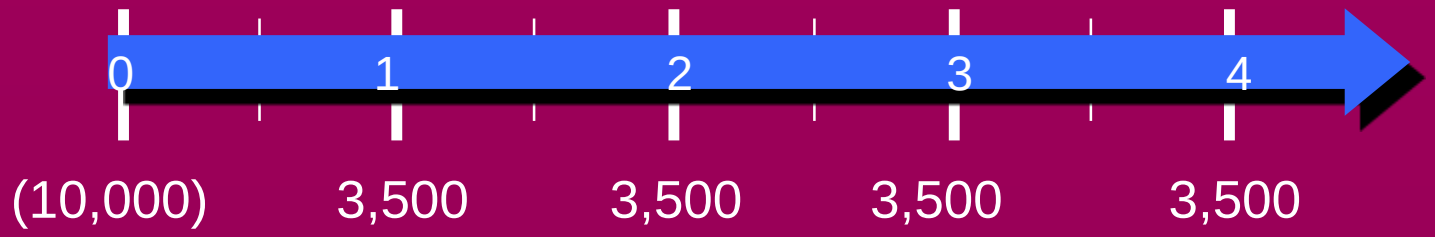
	PROJECT	
Time	A	B
0	(10,000.)	(10,000.)
1	3,500	500
2	3,500	500
3	3,500	4,600
4	3,500	10,000

Capital Budgeting Methods

Payback Period

- *Number of years needed to recover your initial outlay.*

	PROJECT	
Time	A	B
0	(10,000.)	(10,000.)
1	3,500	500
2	3,500	500
3	3,500	4,600
4	3,500	10,000



Capital Budgeting Methods

Payback Period

- *Number of years needed to recover your initial outlay.*

	PROJECT	
Time	A	B
0	(10,000.)	(10,000.)
1	3,500	500
2	3,500	500
3	3,500	4,600
4	3,500	10,000

(10,000)	3,500	3,500	3,500	3,500
Cumulative CF	-6,500			

Capital Budgeting Methods

Payback Period

- *Number of years needed to recover your initial outlay.*

	PROJECT	
Time	A	B
0	(10,000.)	(10,000.)
1	3,500	500
2	3,500	500
3	3,500	4,600
4	3,500	10,000

(10,000)	3,500	3,500	3,500	3,500
Cumulative CF	-6,500	-3,000		

Capital Budgeting Methods

Payback Period

- *Number of years needed to recover your initial outlay.*

	PROJECT	
Time	A	B
0	(10,000.)	(10,000.)
1	3,500	500
2	3,500	500
3	3,500	4,600
4	3,500	10,000

(10,000)	3,500	3,500	3,500	3,500
Cumulative CF	-6,500	-3,000	+500	

Capital Budgeting Methods

Payback Period

- *Number of years needed to recover your initial outlay.*

	PROJECT	
Time	A	B
0	(10,000.)	(10,000.)
1	3,500	500
2	3,500	500
3	3,500	4,600
4	3,500	10,000

(10,000)	3,500	3,500	3,500	3,500
Cumulative CF	-6,500	-3,000	+500	

Payback 2.86 years

Capital Budgeting Methods

Payback Period

- *Number of years needed to recover your initial outlay.*

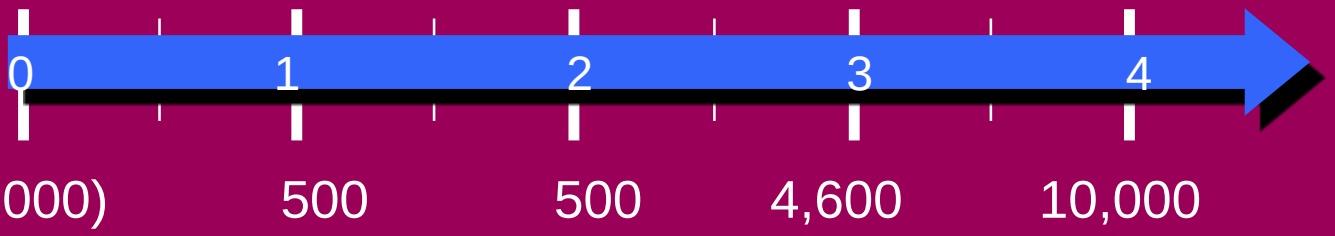
	P R O J E C T	
Time	A	B
0	(10,000.)	(10,000.)
1	3,500	500
2	3,500	500
3	3,500	4,600
4	3,500	10,000

Capital Budgeting Methods

Payback Period

- *Number of years needed to recover your initial outlay.*

Time	PROJECT A	PROJECT B
0	(10,000.)	(10,000.)
1	3,500	500
2	3,500	500
3	3,500	4,600
4	3,500	10,000



Capital Budgeting Methods

Payback Period

- *Number of years needed to recover your initial outlay.*

Time	PROJECT A	PROJECT B
0	(10,000.)	(10,000.)
1	3,500	500
2	3,500	500
3	3,500	4,600
4	3,500	10,000

(10,000)	500	500	4,600	10,000
Cumulative CF	-9,500			

Capital Budgeting Methods

Payback Period

- *Number of years needed to recover your initial outlay.*

Time	PROJECT A	PROJECT B
0	(10,000.)	(10,000.)
1	3,500	500
2	3,500	500
3	3,500	4,600
4	3,500	10,000

(10,000)	500	500	4,600	10,000
Cumulative CF	-9,500	-9,000		

Capital Budgeting Methods

Payback Period

- *Number of years needed to recover your initial outlay.*

Time	PROJECT A	PROJECT B
0	(10,000.)	(10,000.)
1	3,500	500
2	3,500	500
3	3,500	4,600
4	3,500	10,000

(10,000)	500	500	4,600	10,000
Cumulative CF	-9,500	-9,000	-4,400	

Capital Budgeting Methods

Payback Period

- *Number of years needed to recover your initial outlay.*

Time	PROJECT A	PROJECT B
0	(10,000.)	(10,000.)
1	3,500	500
2	3,500	500
3	3,500	4,600
4	3,500	10,000

(10,000)	500	500	4,600	10,000
Cumulative CF	-9,500	-9,000	-4,400	+5,600

Capital Budgeting Methods

Payback Period

- *Number of years needed to recover your initial outlay.*

Time	PROJECT A	PROJECT B
0	(10,000.)	(10,000.)
1	3,500	500
2	3,500	500
3	3,500	4,600
4	3,500	10,000

(10,000)	500	500	4,600	10,000
Cumulative CF	-9,500	-9,000	-4,400	+5,600

Payback = 3.44 years

Capital Budgeting Methods

Payback Period

- *Number of years needed to recover your initial outlay.*

Time	PROJECT A	PROJECT B
0	(10,000.)	(10,000.)
1	3,500	500
2	3,500	500
3	3,500	4,600
4	3,500	10,000

Evaluation:

Company sets maximum acceptable payback. If Max PB = 3 years, accept project A and reject project C

(10,000)	500	500	4,600	10,000
Cumulative CF	-9,500	-9,000	-4,400	+5,600

Payback 3.44 years

•Payback Method

The payback method is not a good method as it does not consider the time value of money.

Which project should you choose?

	CF0	CF1	CF2	CF3
A	-100,000	90,000	9,000	1,000
B	-100,000	1,000	9,000	90,000

•Payback Method

The Discounted payback method can correct this shortcoming of the payback method.

To find the discounted pay back

(1) Find the PV of each cash flow on the time line.

(2) Find the payback using the discounted CF and NOT the CF.

Example In Table 9-2

- Payback Method

Also, the payback method is not a good method as it does not consider the cash flows beyond the payback period.

Payback Method

Also, the payback method is not a good method as it does not consider the cash flows beyond the payback period.

Which project should you choose?

	CF0	CF1	CF2	Cf3	CF4
A	-100000	90000	10000	0	0
B	-100000	90000	9000	80000	1000000

Payback Method

Also, the payback method is not a good method as it does not consider the cash flows beyond the payback period.

Which project should you choose?

	CF0	CF1	CF2	Cf3	CF4
A	*-100,000*	*90,000*	*10,000*	*0*	*0*
B	*-100,000*	*90,000*	*9,000*	*80,000*	*100,0000*

These two shortcomings often result in an incorrect decisions.

Capital Budgeting Methods

Methods that consider time value of money and all cash flows

Net Present Value:
Present Value of all costs and benefits of a project.

Capital Budgeting Methods

Net Present Value

Present Value of all costs and benefits of a project.

Concept is similar to Intrinsic Value of a security but subtracts cost of the project.

NPV = PV of Inflows - Initial Outlay

Capital Budgeting Methods

Net Present Value

- *Present Value of all costs and benefits of a project.*
- *Concept is similar to Intrinsic Value of a security but subtracts of cost of project.*

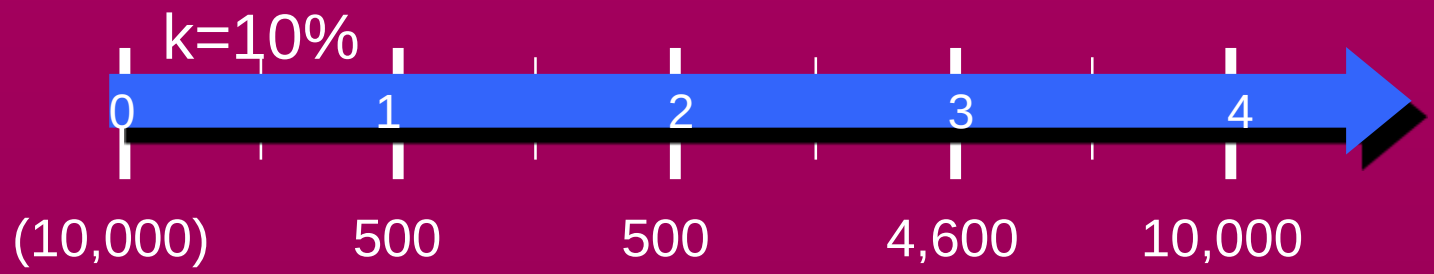
NPV = PV of Inflows - Initial Outlay

$$NPV = \frac{CF_1}{(1+k)} + \frac{CF_2}{(1+k)^2} + \frac{CF_3}{(1+k)^3} + \cdots + \frac{CF_n}{(1+k)^n} - IO$$

Capital Budgeting Methods

Net Present Value

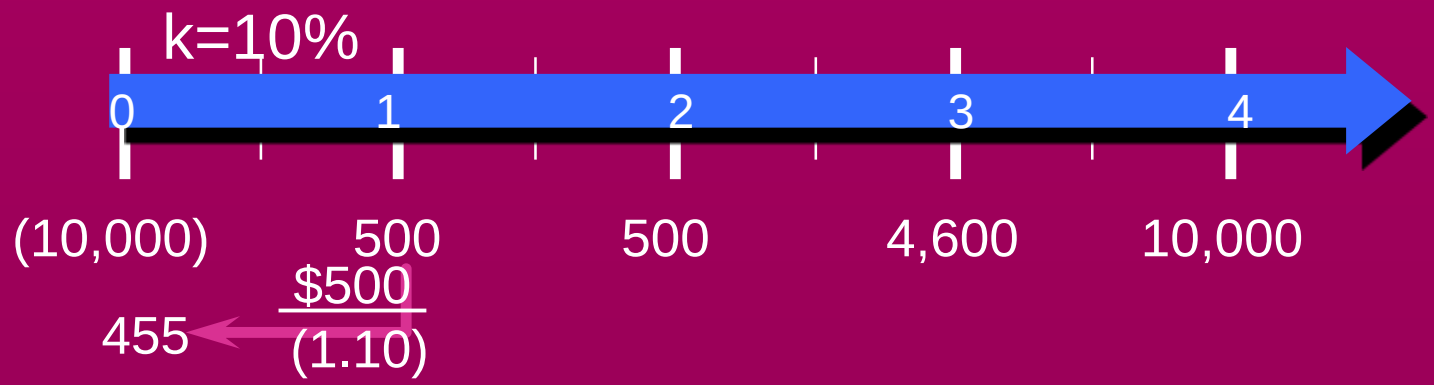
	PROJECT	
Time	A	B
0	(10,000.)	(10,000.)
1	3,500	500
2	3,500	500
3	3,500	4,600
4	3,500	10,000



Capital Budgeting Methods

Net Present Value

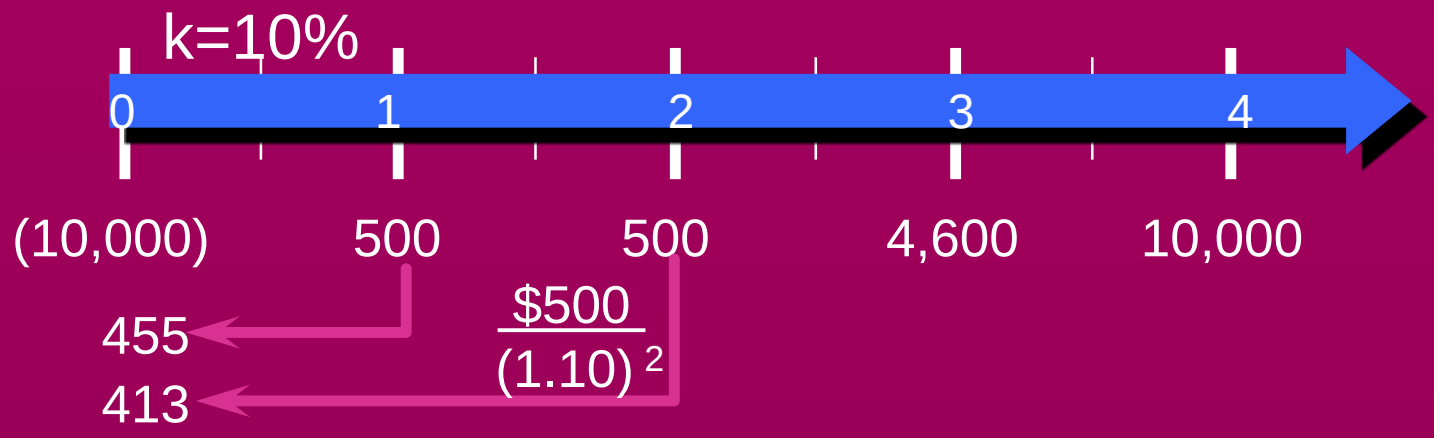
	PROJECT	
Time	A	B
0	(10,000.)	(10,000.)
1	3,500	500
2	3,500	500
3	3,500	4,600
4	3,500	10,000



Capital Budgeting Methods

Net Present Value

	PROJECT	
Time	A	B
0	(10,000.)	(10,000.)
1	3,500	500
2	3,500	500
3	3,500	4,600
4	3,500	10,000



Capital Budgeting Methods

Net Present Value

	PROJECT	
Time	A	B
0	(10,000.)	(10,000.)
1	3,500	500
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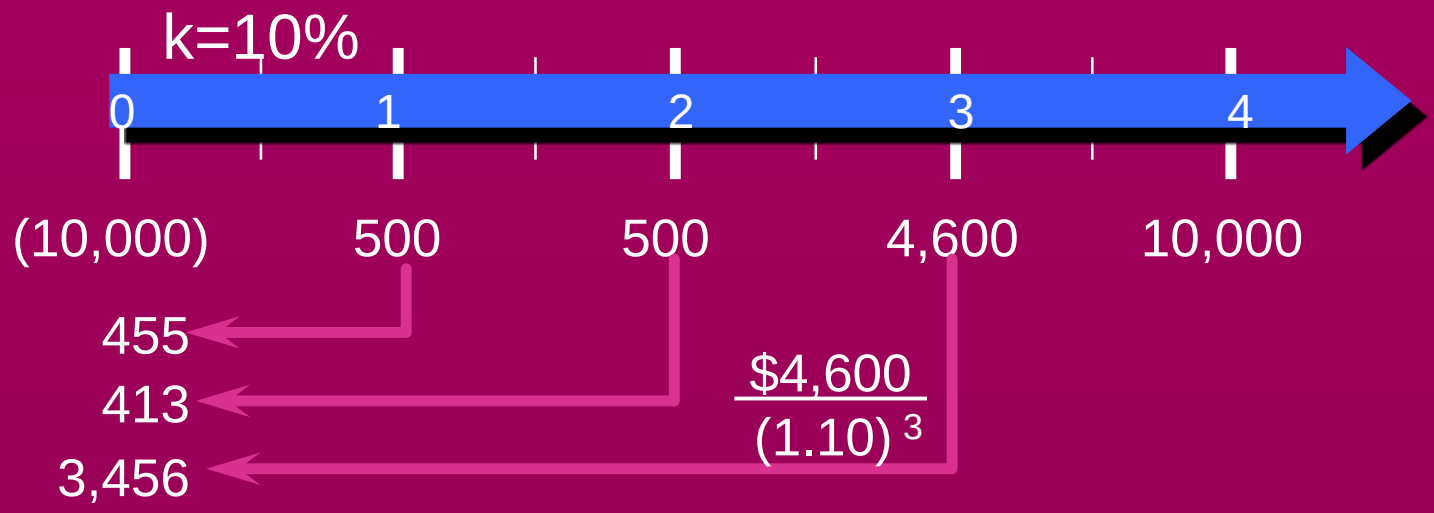
4	3,500	10,000



Capital Budgeting Methods

Net Present Value

	PROJECT	
Time	A	B
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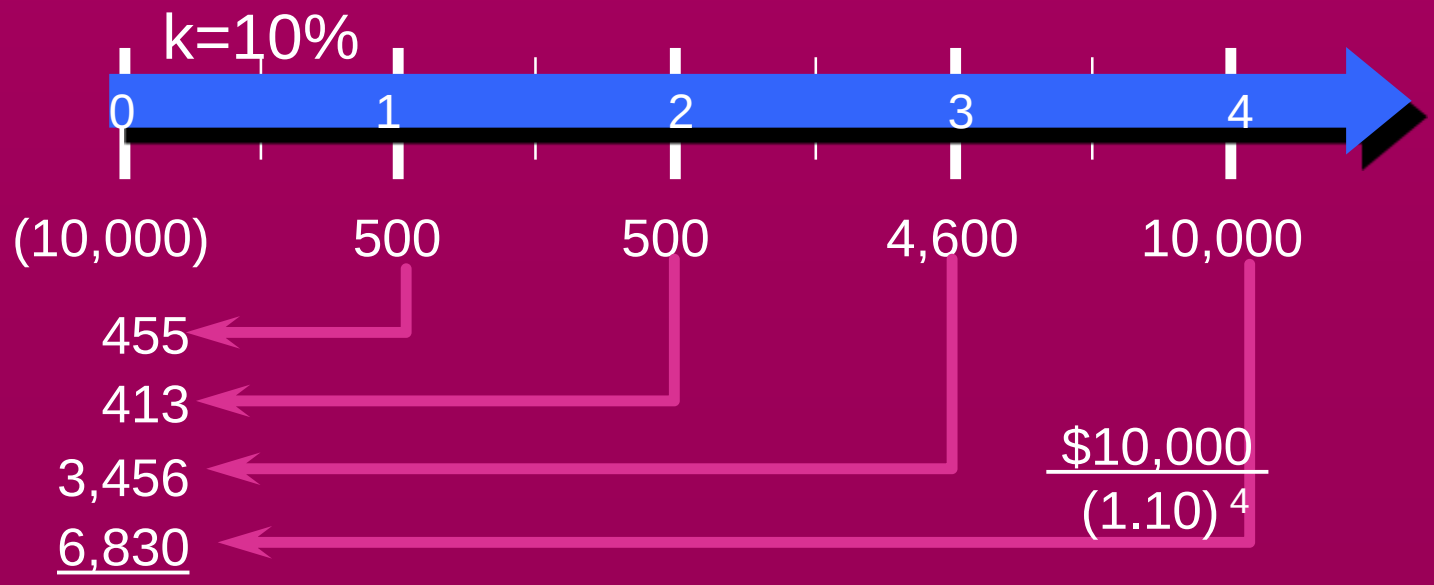
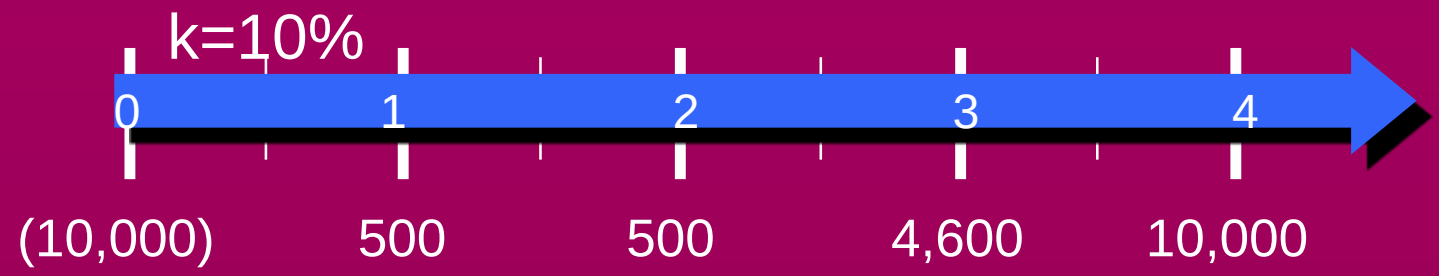
4	3,500	10,000



Capital Budgeting Methods

Net Present Value

	PROJECT	
Time	A	B
0	(10,000.)	(10,000.)
1	3,500	500
2	3,500	500
3	3,500	4,600
4	3,500	10,000



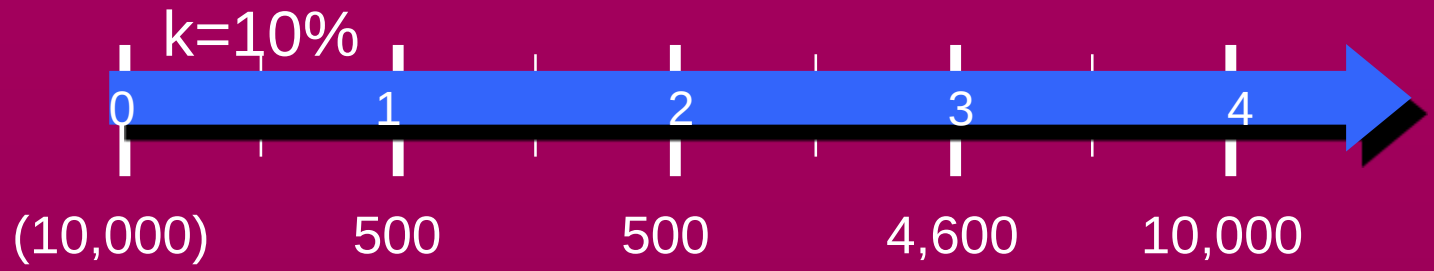
(10,000) 500 500 4,600 10,000

455
413
3,456
6,830
$11,154

Capital Budgeting Methods

Net Present Value

	PROJECT	
Time	A	B
0	(10,000.)	(10,000.)
1	3,500	500
2	3,500	500
3	3,500	4,600
4	3,500	10,000



(10,000) 500 500 4,600 10,000

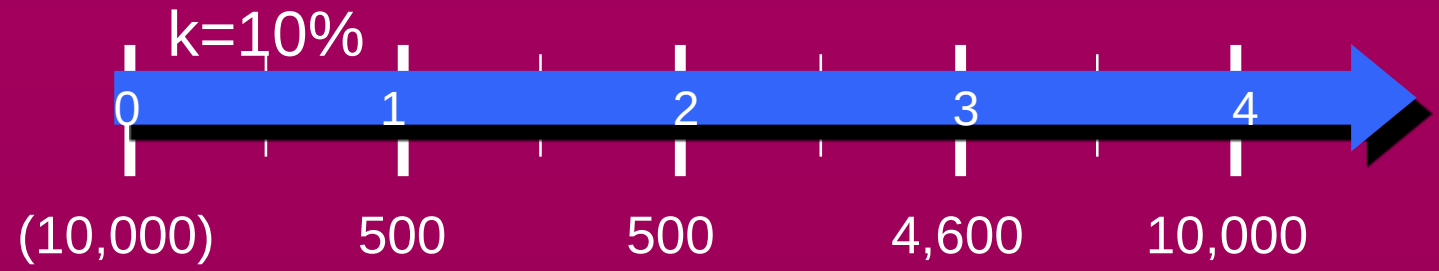
455
413
3,456
6,830
$11,154

PV Benefits > PV Costs
$11,154 > $ 10,000

Capital Budgeting Methods

Net Present Value

	PROJECT	
Time	A	B
0	(10,000.)	(10,000.)
1	3,500	500
2	3,500	500
3	3,500	4,600
4	3,500	10,000



455
413
3,456
6,830
$11,154

$1,154 = NPV

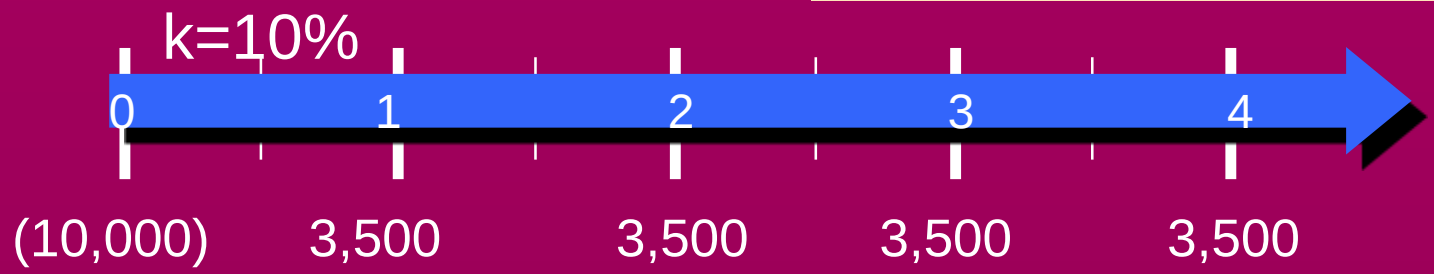
PV Benefits > PV Costs
$11,154 > $ 10,000

NPV > $0
$1,154 > $0

Capital Budgeting Methods

Net Present Value

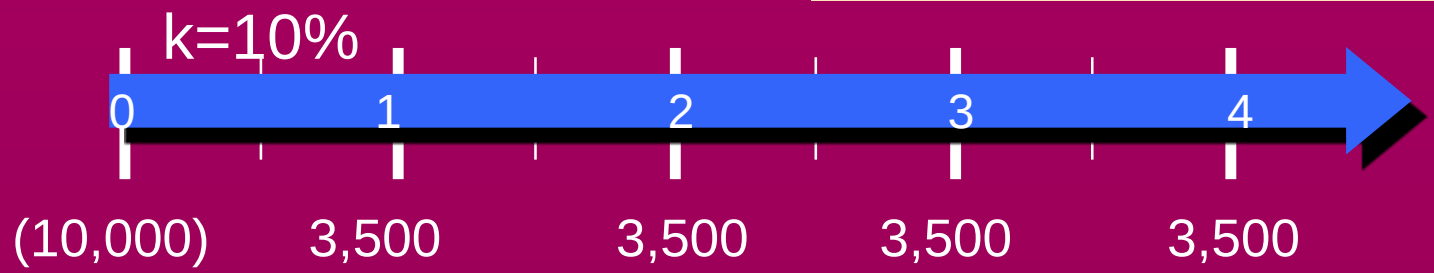
	PROJECT	
Time	A	B
0	(10,000.)	(10,000.)
1	3,500	500
2	3,500	500
3	3,500	4,600
4	3,500	10,000



Capital Budgeting Methods

Net Present Value

	PROJECT	
Time	A	B
0	(10,000.)	(10,000.)
1	3,500	500
2	3,500	500
3	3,500	4,600
4	3,500	10,000

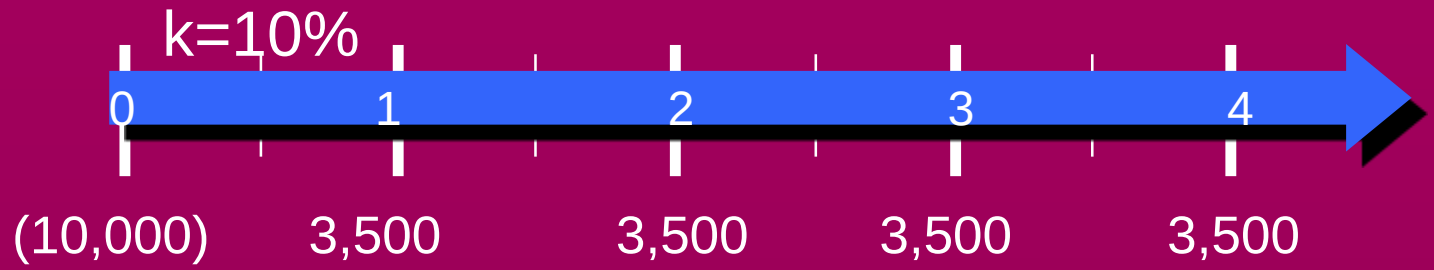


$$NPV = \frac{3,500}{(1+.1)} + \frac{3,500}{(1+.1)^2} + \frac{3,500}{(1+.1)^3} + \frac{3,500}{(1+.1)^4} - 10,000$$

Capital Budgeting Methods

Net Present Value

	PROJECT	
Time	A	B
0	(10,000.)	(10,000.)
1	3,500	500
2	3,500	500
3	3,500	4,600
4	3,500	10,000



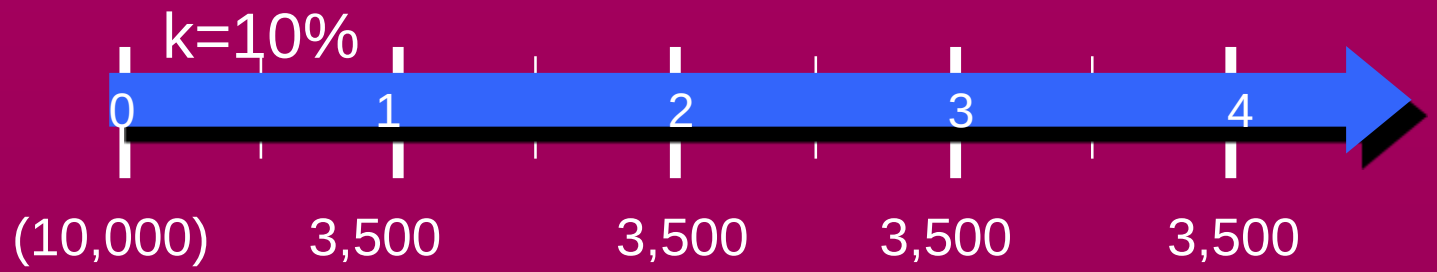
$$NPV = \frac{3,500}{(1+.1)} + \frac{3,500}{(1+.1)^2} + \frac{3,500}{(1+.1)^3} + \frac{3,500}{(1+.1)^4} - 10,000$$

PV of 3,500 Annuity for 4 years at 10%

Capital Budgeting Methods

Net Present Value

Time	PROJECT A	PROJECT B
0	(10,000.)	(10,000.)
1	3,500	500
2	3,500	500
3	3,500	4,600
4	3,500	10,000



$$NPV = \frac{3,500}{(1+.1)} + \frac{3,500}{(1+.1)^2} + \frac{3,500}{(1+.1)^3} + \frac{3,500}{(1+.1)^4} - 10,000$$

$$= 3,500 \times PVIFA_{4,.10} - 10,000$$

$$= 11,095 - 10,000 = \$1,095$$

Capital Budgeting Methods

NPV Decision Rules

- *If projects are independent then accept all projects with NPV $\geq$ 0.*

ACCEPT A & B

Capital Budgeting Methods

NPV Decision Rules

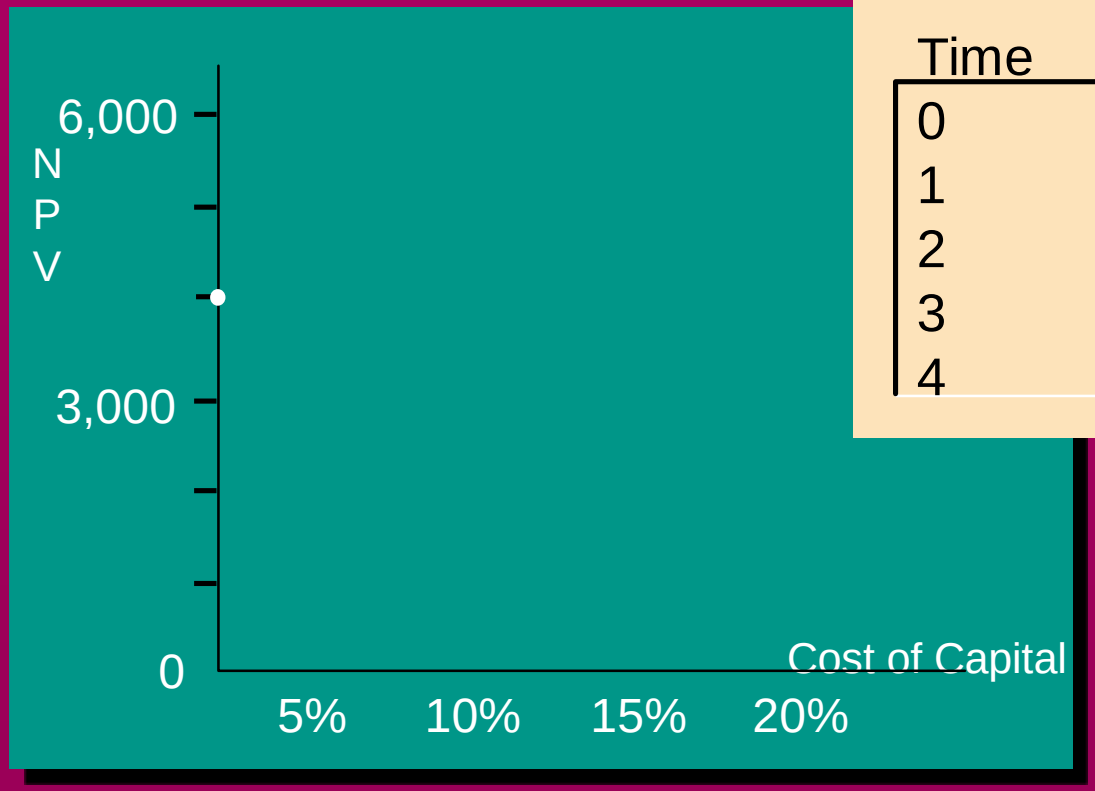
- *If projects are independent then accept all projects with NPV ≥ 0.*
- *If projects are mutually exclusive, accept projects with higher NPV.*

ACCEPT A & B

ACCEPT B only

Net Present Value Profile

- *Graphs the Net Present Value of the project with different required rates*



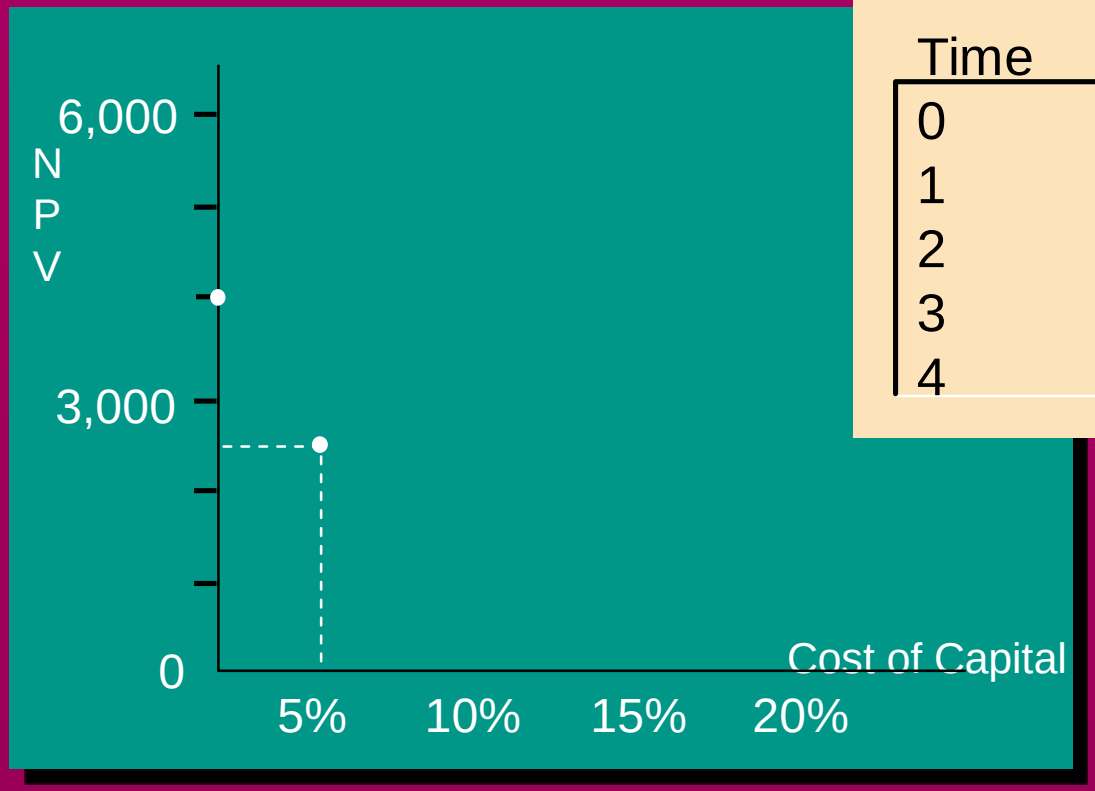
Time	PROJECT A	PROJECT B
0	(10,000.)	(10,000.)
1	3,500	500
2	3,500	500
3	3,500	4,600
4	3,500	10,000

$$NPV(0\%) = \frac{3,500}{(1+0)} + \frac{3,500}{(1+0)^2} + \frac{3,500}{(1+0)^3} + \frac{3,500}{(1+0)^4} - 10,000$$

$$= \$4,000$$

Net Present Value Profile

- *Graphs the Net Present Value of the project with different required rates*



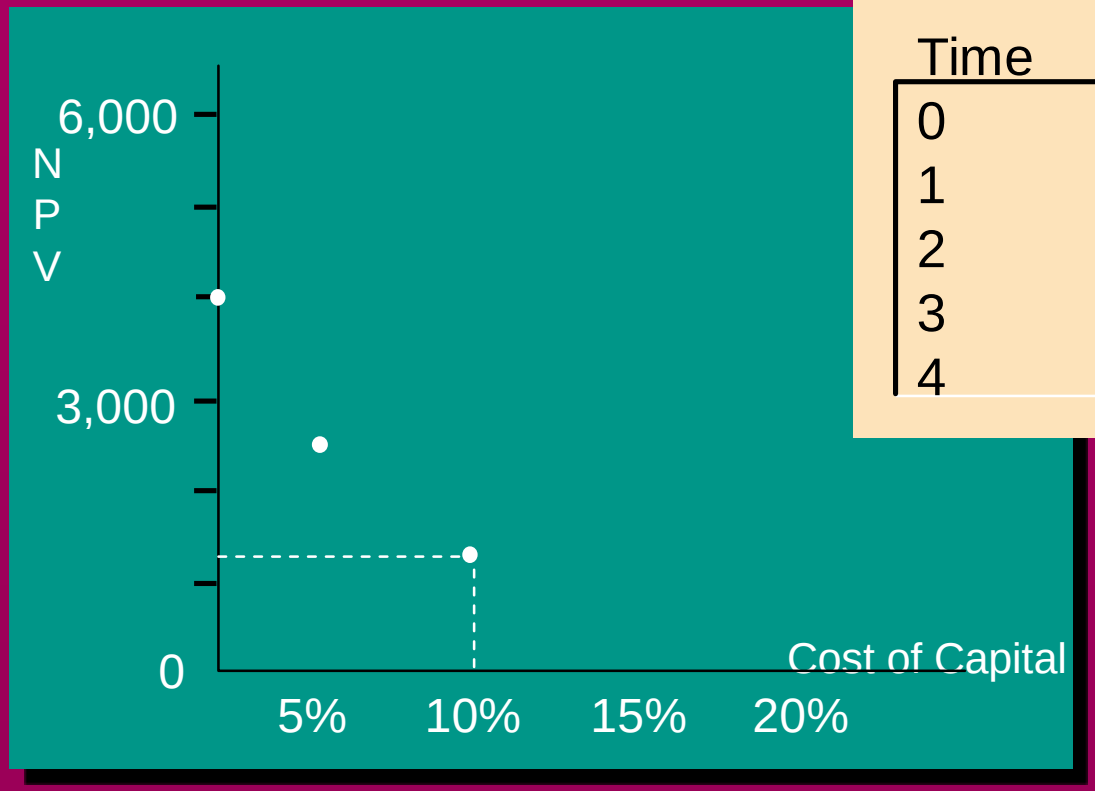
Time	PROJECT A	PROJECT B
0	(10,000.)	(10,000.)
1	3,500	500
2	3,500	500
3	3,500	4,600
4	3,500	10,000

$$NPV(5\%) = \frac{3,500}{(1+.05)} + \frac{3,500}{(1+.05)^2} + \frac{3,500}{(1+.05)^3} + \frac{3,500}{(1+.05)^4} - 10,000$$

$$= \$2,411$$

Net Present Value Profile

- *Graphs the Net Present Value of the project with different required rates*



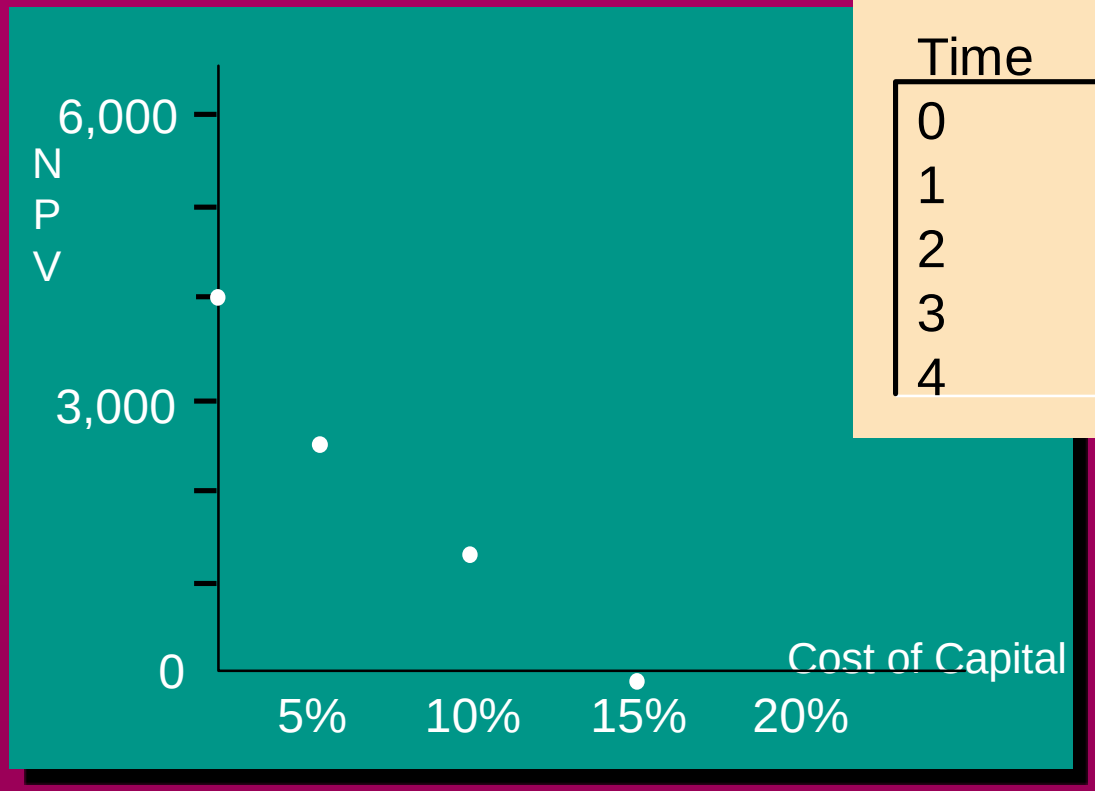
Time	PROJECT A	PROJECT B
0	(10,000.)	(10,000.)
1	3,500	500
2	3,500	500
3	3,500	4,600
4	3,500	10,000

$$NPV(10\%) = \frac{3,500}{(1+.10)} + \frac{3,500}{(1+.10)^2} + \frac{3,500}{(1+.10)^3} + \frac{3,500}{(1+.10)^4} - 10,000$$

$$= \$1,095$$

Net Present Value Profile

- *Graphs the Net Present Value of the project with different required rates*



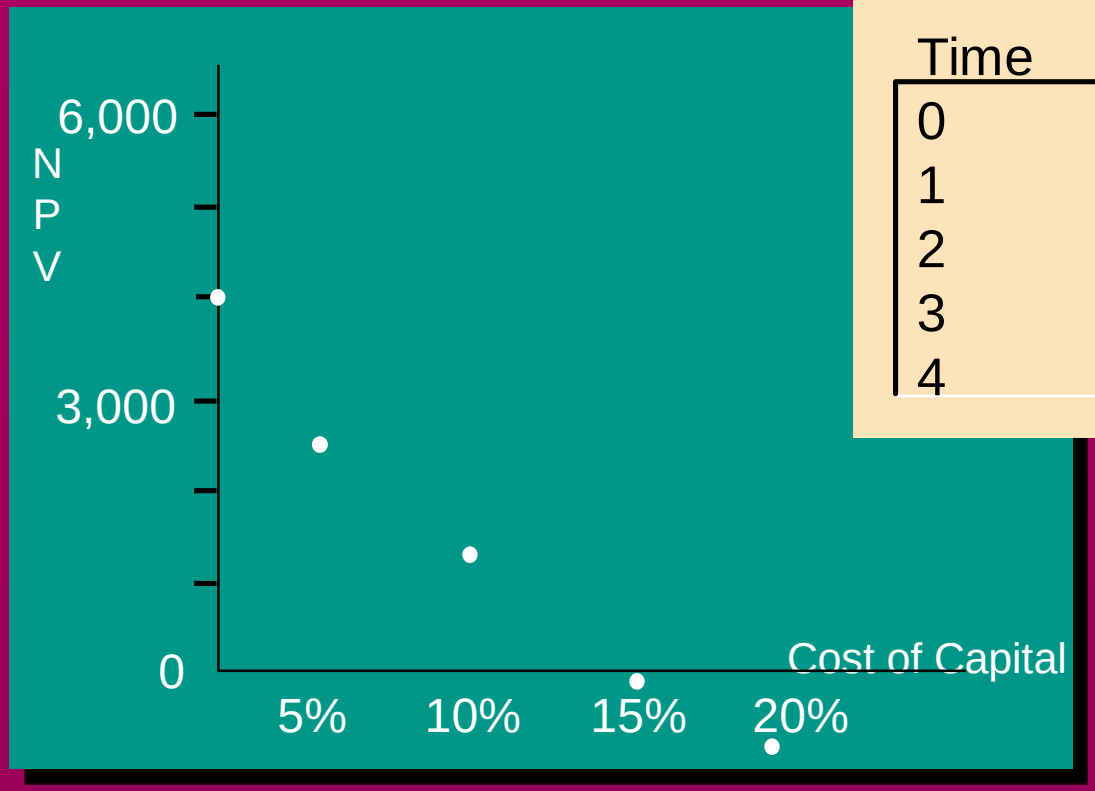
Time	PROJECT A	PROJECT B
0	(10,000.)	(10,000.)
1	3,500	500
2	3,500	500
3	3,500	4,600
4	3,500	10,000

$$NPV(15\%) = \frac{3{,}500}{(1+.15)} + \frac{3{,}500}{(1+.15)^2} + \frac{3{,}500}{(1+.15)^3} + \frac{3{,}500}{(1+.15)^4} - 10{,}000$$

$$= -\$7.58$$

Net Present Value Profile

- *Graphs the Net Present Value of the project with different required rates*



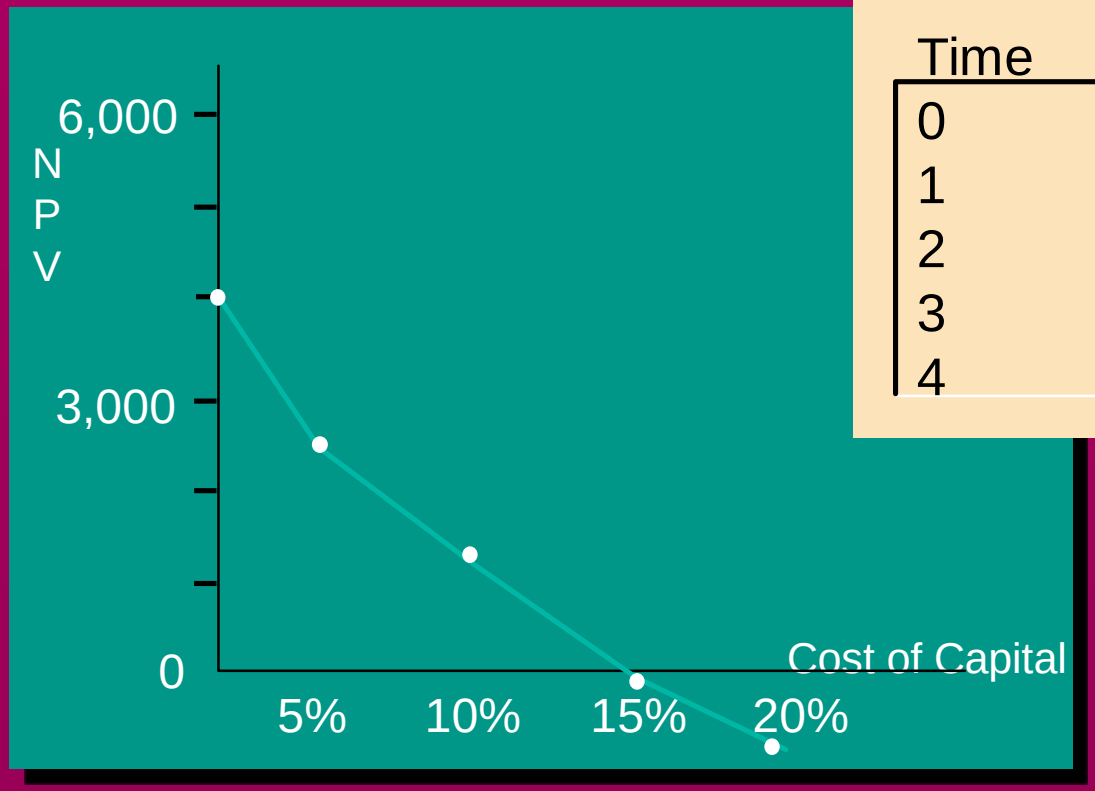
	PROJECT	
Time	A	B
0	(10,000.)	(10,000.)
1	3,500	500
2	3,500	500
3	3,500	4,600
4	3,500	10,000

$$NPV(20\%) = \frac{3,500}{(1+.20)} + \frac{3,500}{(1+.20)^2} + \frac{3,500}{(1+.20)^3} + \frac{3,500}{(1+.20)^4} - 10,000$$

$$= -\$939$$

Net Present Value Profile

- *Graphs the Net Present Value of the project with different required rates*

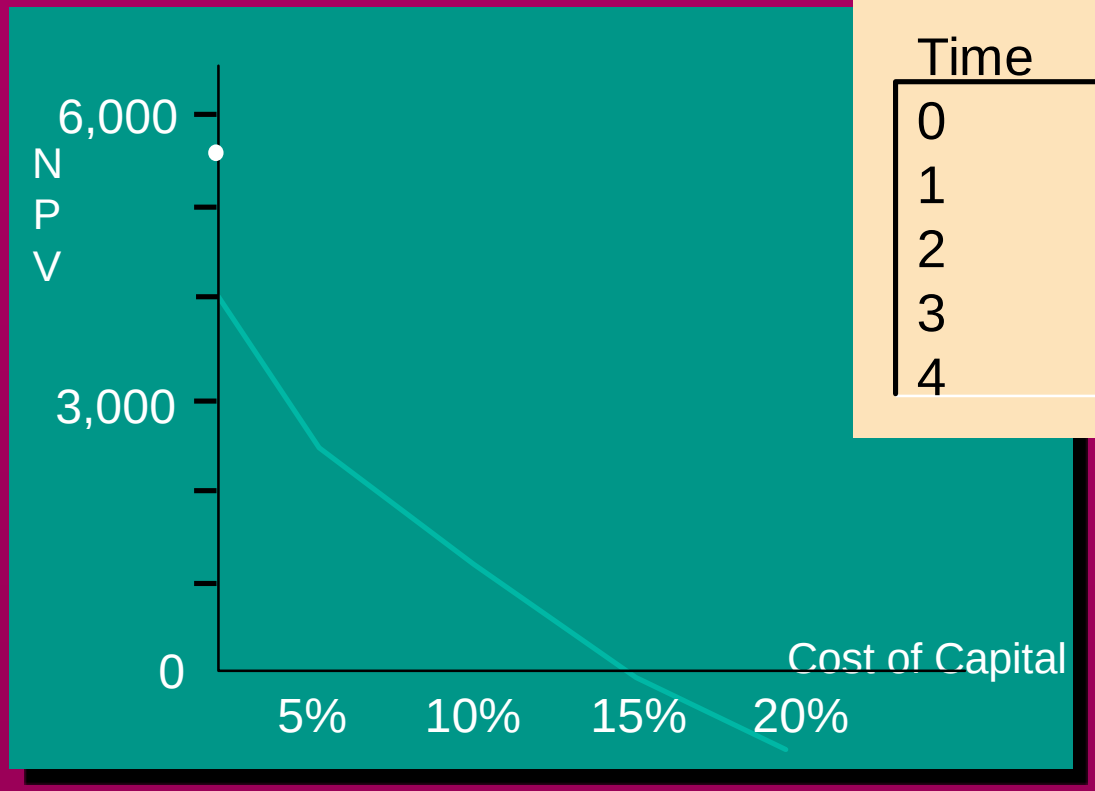


Time	PROJECT A	PROJECT B
0	(10,000.)	(10,000.)
1	3,500	500
2	3,500	500
3	3,500	4,600
4	3,500	10,000

Connect the Points

Net Present Value Profile

- *Graphs the Net Present Value of the project with different required rates*



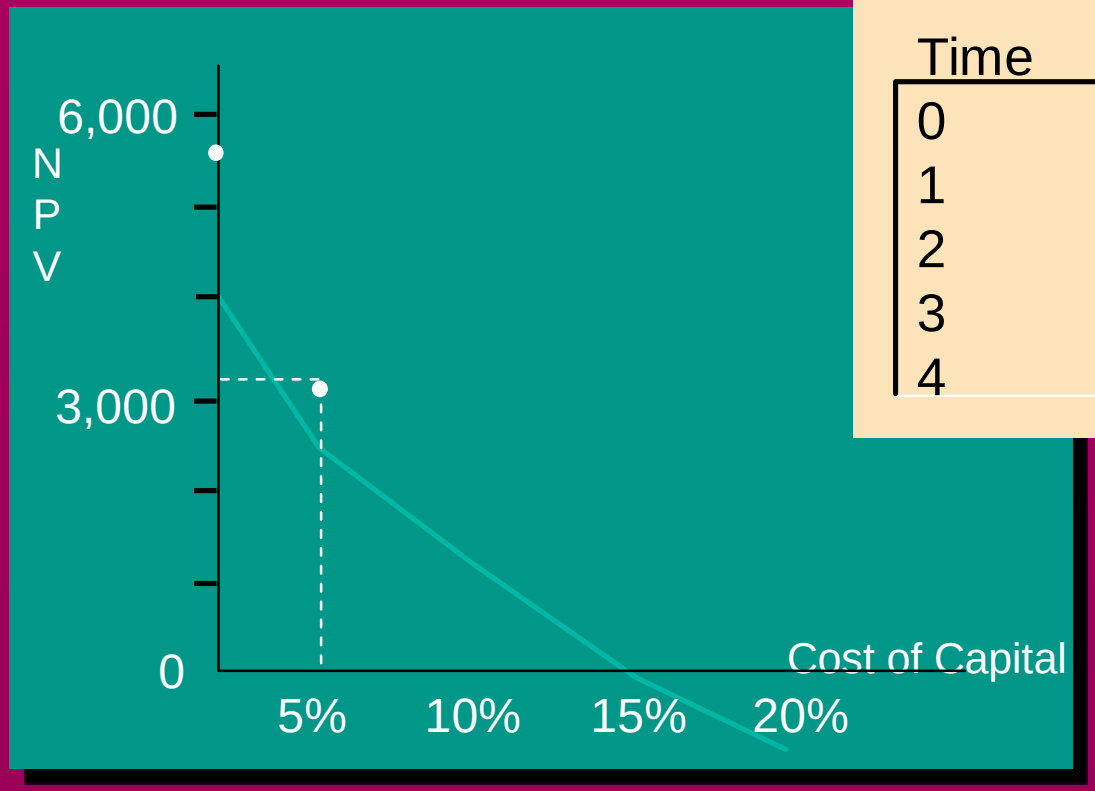
Time	PROJECT A	PROJECT B
0	(10,000.)	(10,000.)
1	3,500	500
2	3,500	500
3	3,500	4,600
4	3,500	10,000

$$NPV(0\%) = \frac{500}{(1+0)} + \frac{500}{(1+0)^2} + \frac{4,600}{(1+0)^3} + \frac{10,000}{(1+0)^4} - 10,000$$

$$= \$5,600$$

Net Present Value Profile

- *Graphs the Net Present Value of the project with different required rates*



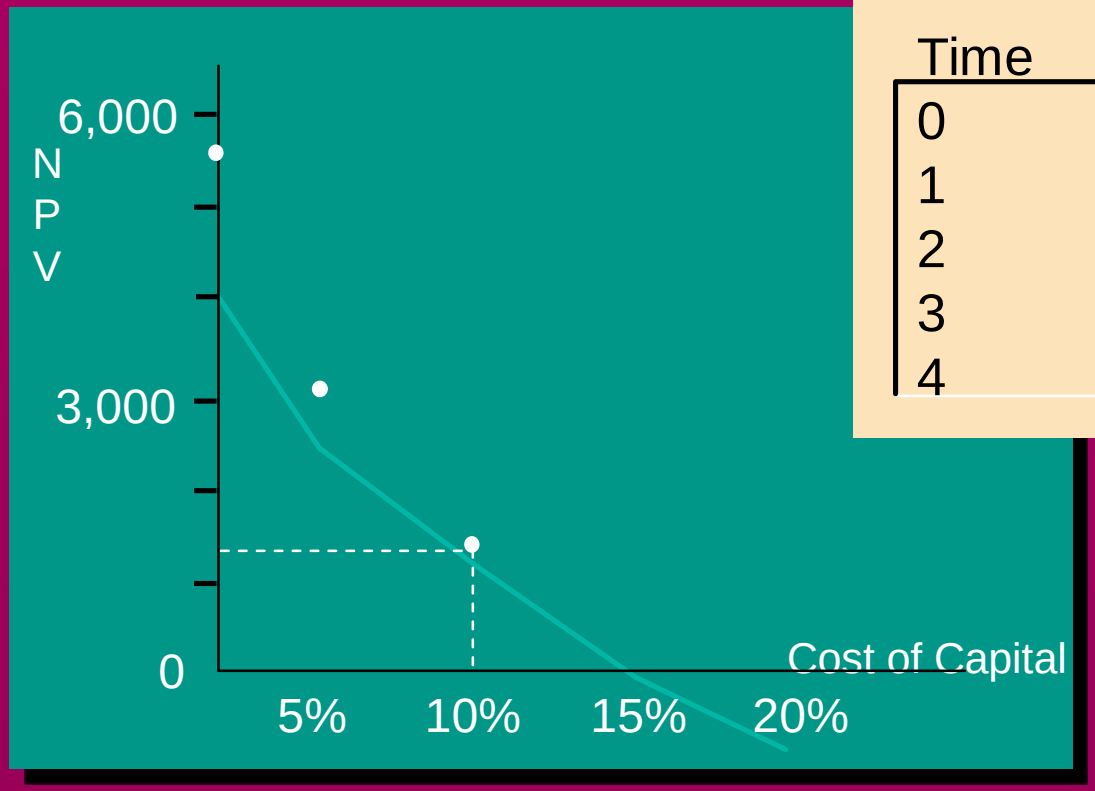
Time	PROJECT A	PROJECT B
0	(10,000.)	(10,000.)
1	3,500	500
2	3,500	500
3	3,500	4,600
4	3,500	10,000

$$NPV(5\%) = \frac{500}{(1+.05)} + \frac{500}{(1+.05)^2} + \frac{4,600}{(1+.05)^3} + \frac{10,000}{(1+.05)^4} - 10,000$$

$$= \$3,130$$

Net Present Value Profile

- *Graphs the Net Present Value of the project with different required rates*



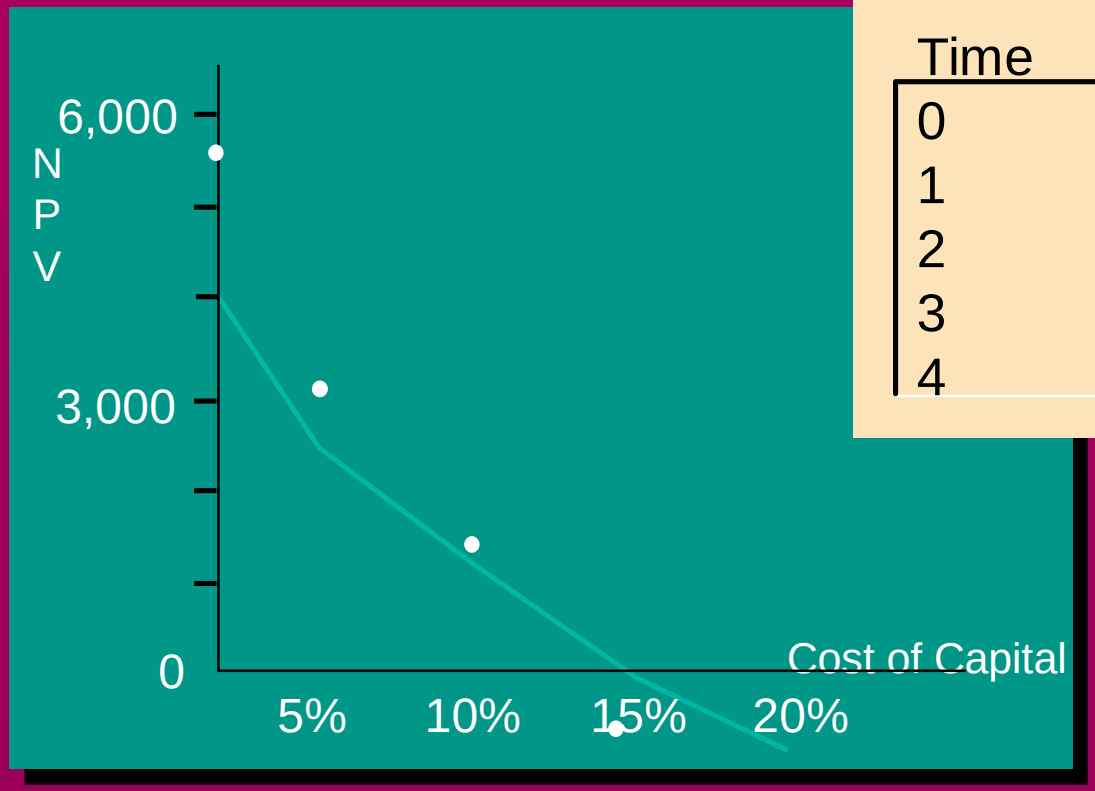
Time	PROJECT A	PROJECT B
0	(10,000.)	(10,000.)
1	3,500	500
2	3,500	500
3	3,500	4,600
4	3,500	10,000

$$NPV(10\%) = \frac{500}{(1+.10)} + \frac{500}{(1+.10)^2} + \frac{4,600}{(1+.10)^3} + \frac{10,000}{(1+.10)^4} - 10,000$$

$$= \$1.154$$

Net Present Value Profile

- *Graphs the Net Present Value of the project with different required rates*



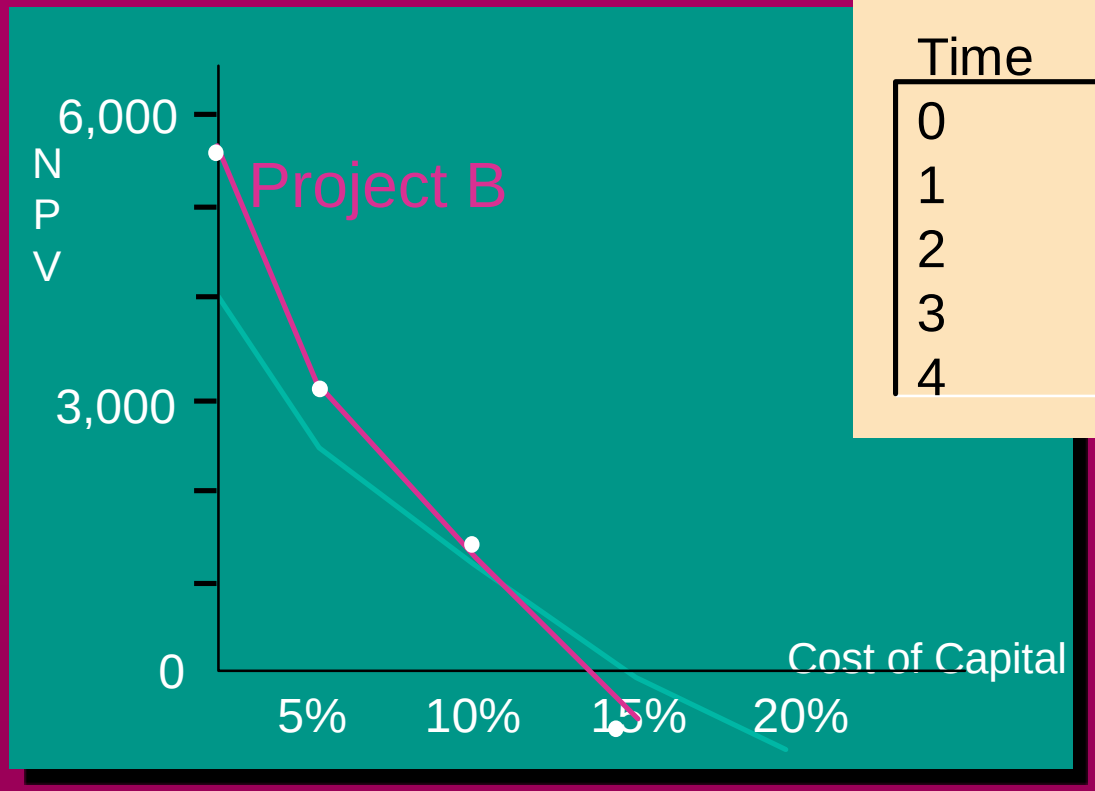
Time	PROJECT A	PROJECT B
0	(10,000.)	(10,000.)
1	3,500	500
2	3,500	500
3	3,500	4,600
4	3,500	10,000

$$NPV(15\%) = \frac{500}{(1+.15)} + \frac{500}{(1+.15)^2} + \frac{4,600}{(1+.15)^3} + \frac{10,000}{(1+.15)^4} - 10,000$$

$$= -\$445$$

Net Present Value Profile

- *Graphs the Net Present Value of the project with different required rates*

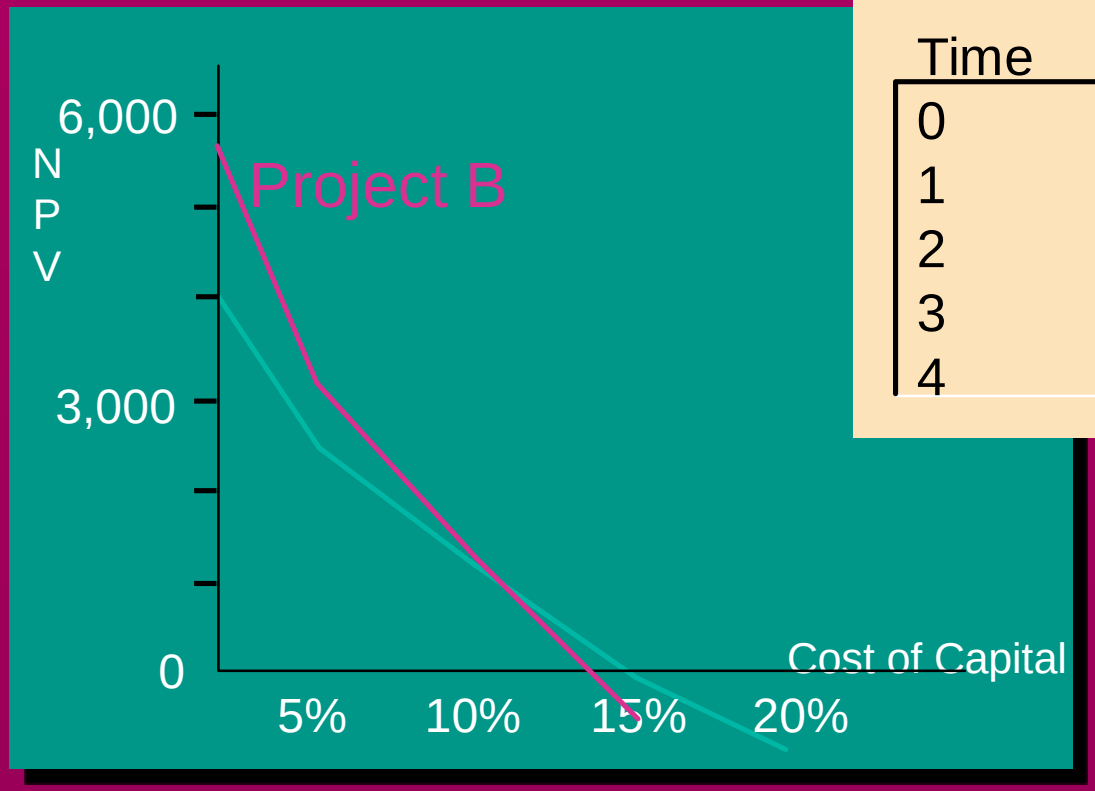


Time	PROJECT A	PROJECT B
0	(10,000.)	(10,000.)
1	3,500	500
2	3,500	500
3	3,500	4,600
4	3,500	10,000

Connect the Points

Net Present Value Profile

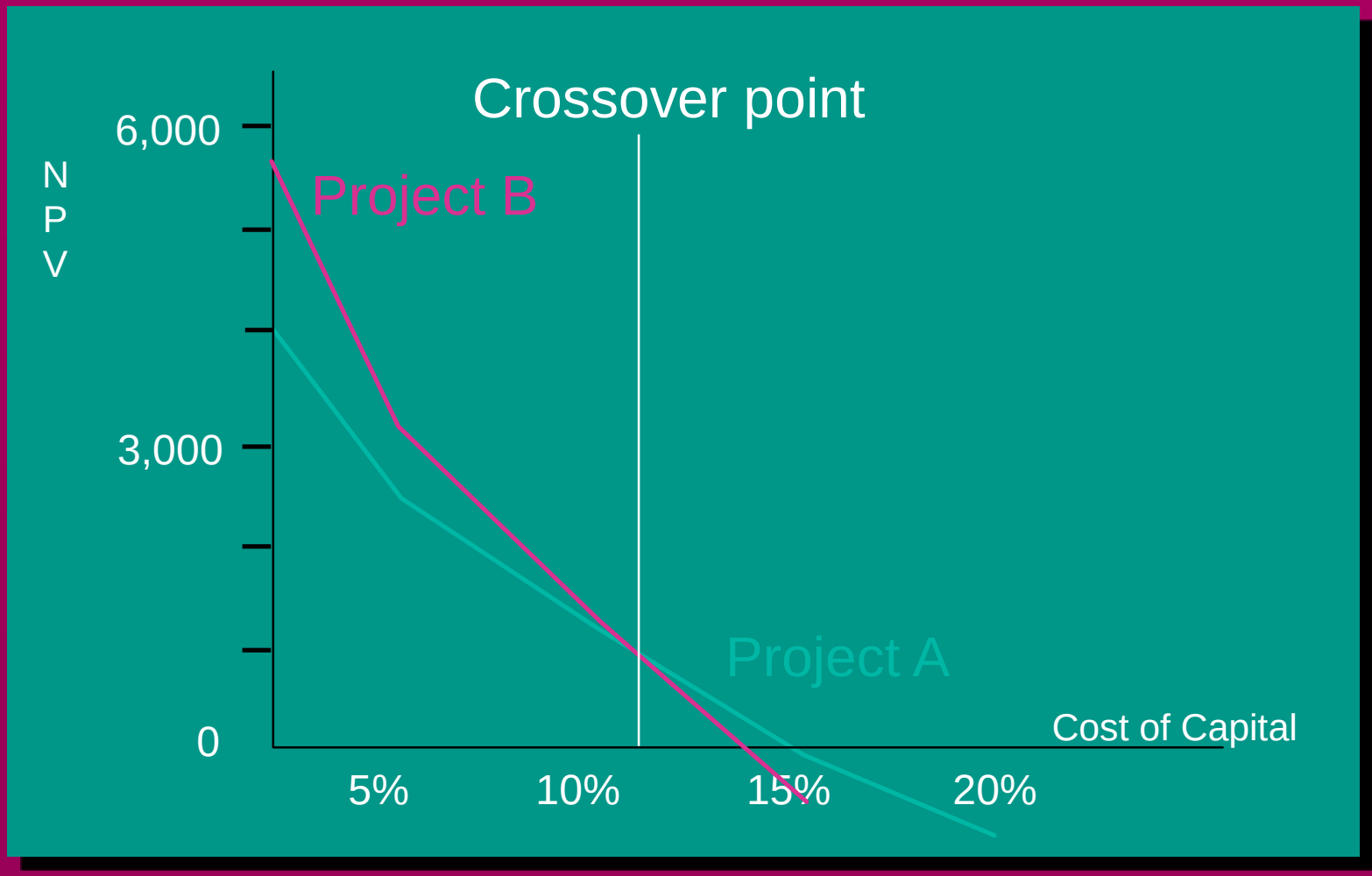
- *Graphs the Net Present Value of the project with different required rates*



Time	PROJECT A	PROJECT B
0	(10,000.)	(10,000.)
1	3,500	500
2	3,500	500
3	3,500	4,600
4	3,500	10,000

Net Present Value Profile

- *Compare NPV of the two projects for different required rates*



Net Present Value Profile

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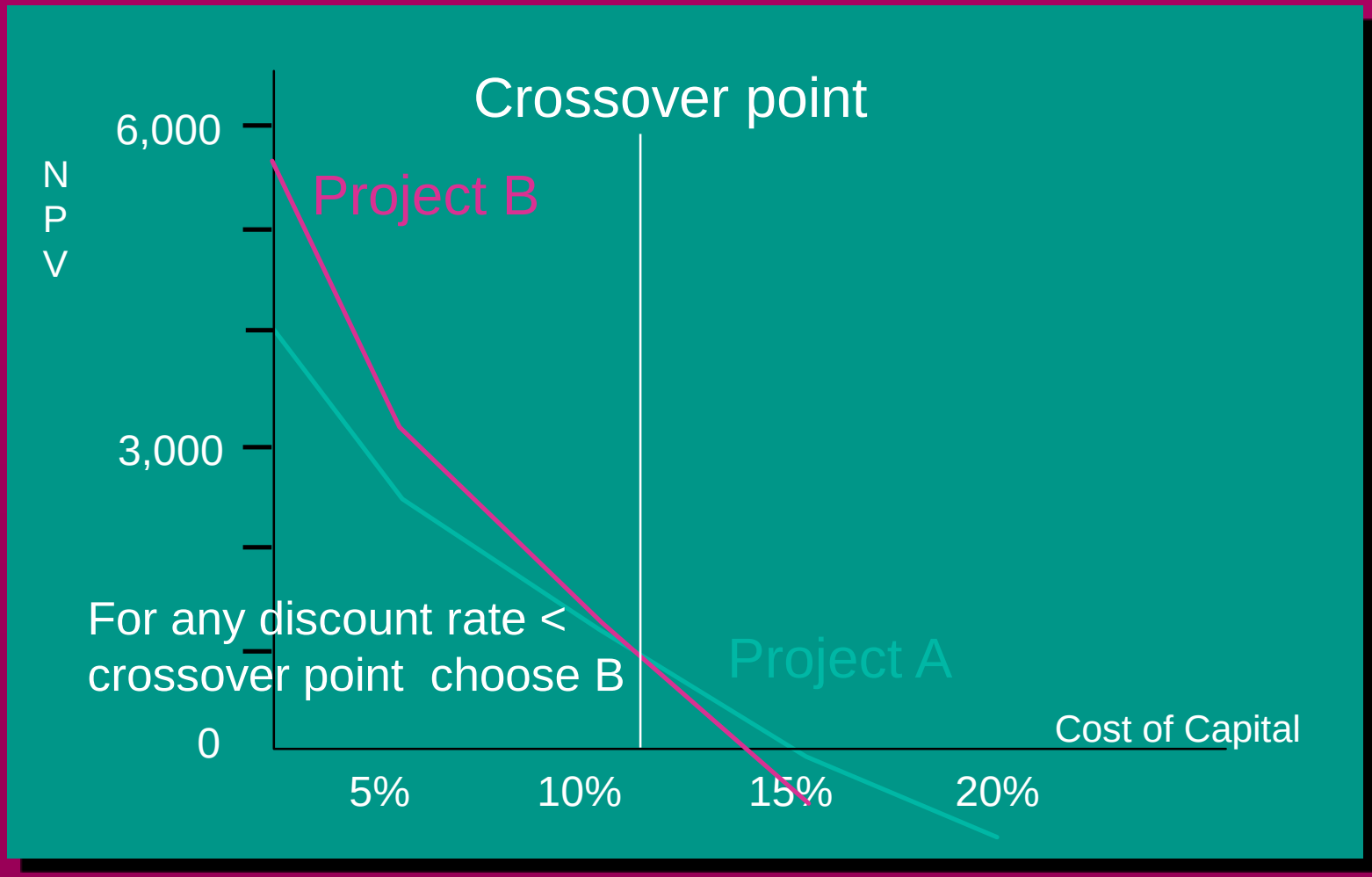
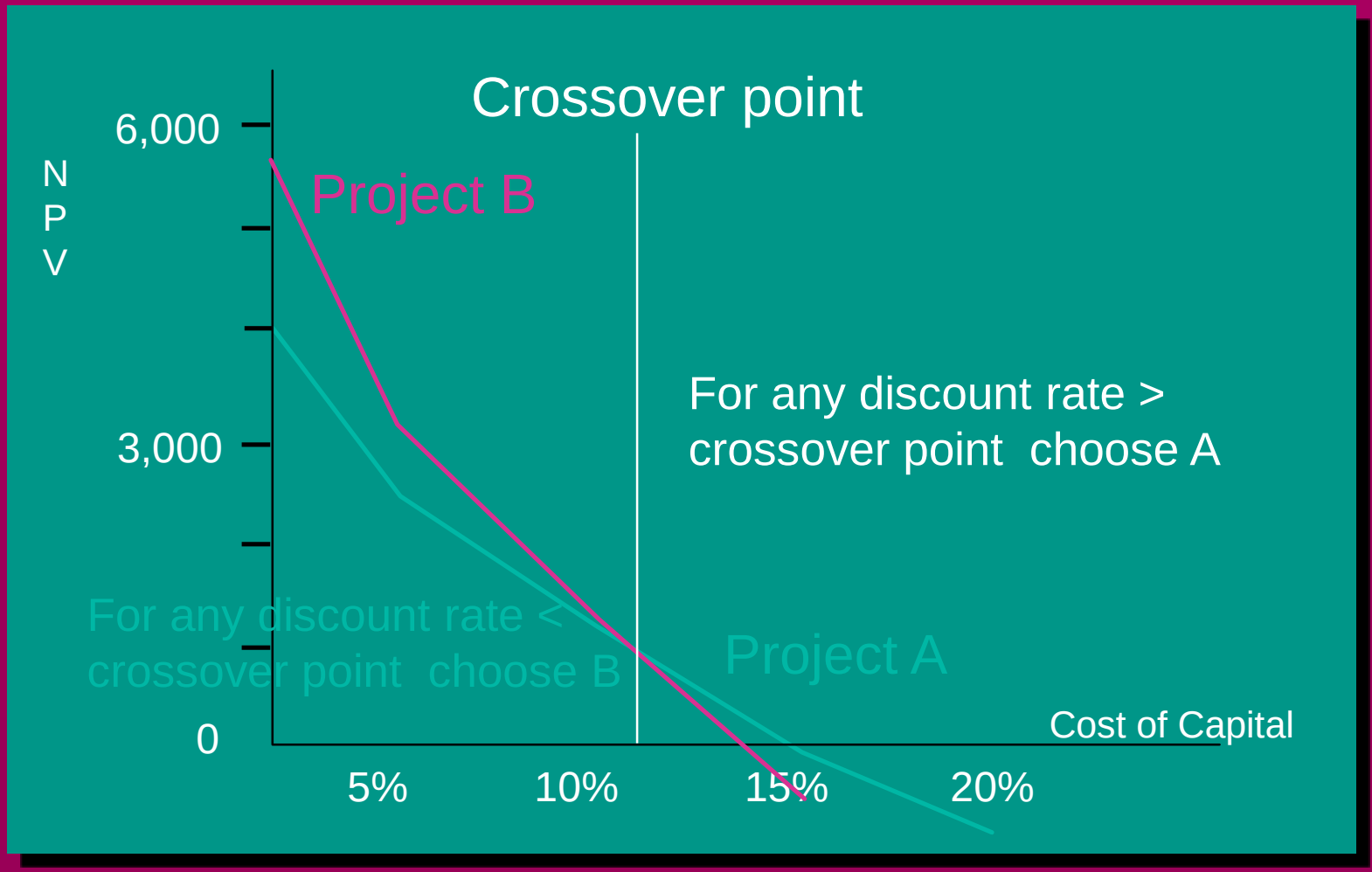


Net Present Value Profile

- *Compare NPV of the two projects for different required rates*



Capital Budgeting Methods

Internal Rate of Return

- *Measures the rate of return that will make the PV of future CF equal to the initial outlay.*

Definition:
The IRR is that discount rate at which
NPV = 0

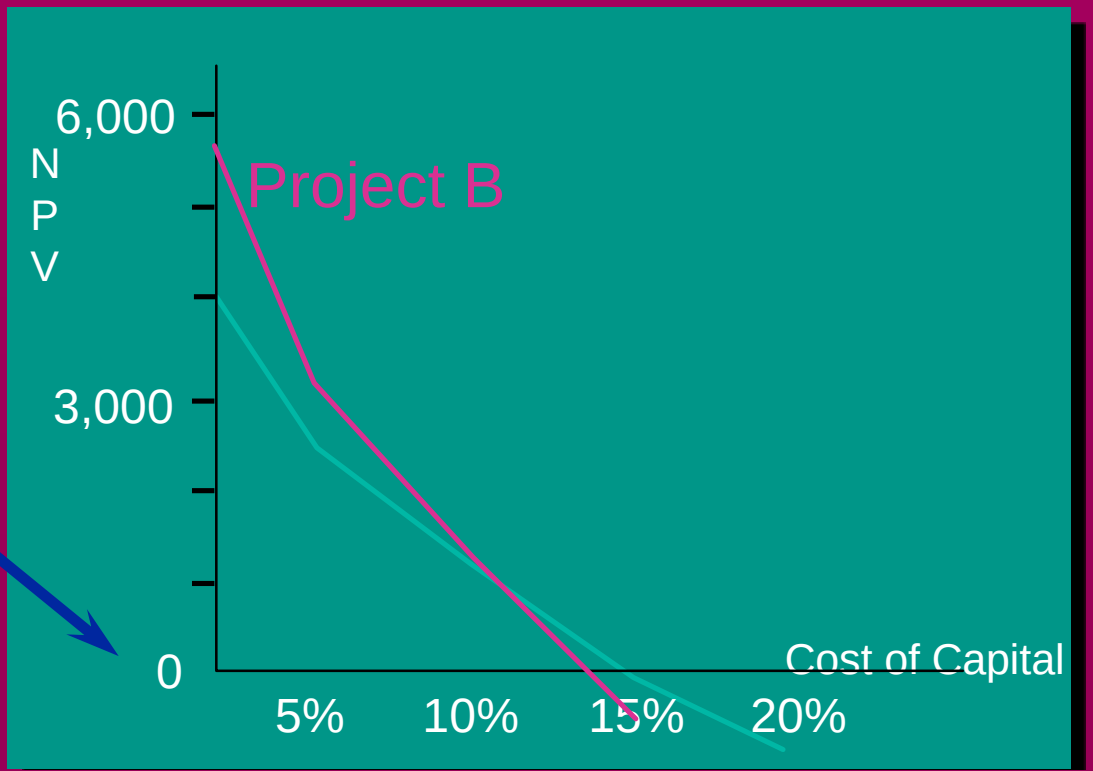
IRR is like the YTM. It is the same cocept but the term YTM is used only for bonds.

Capital Budgeting Methods

Internal Rate of Return

- *Measures the rate of return that will make the PV of future CF equal to the initial outlay.*

The IRR is the discount rate at which NPV = 0



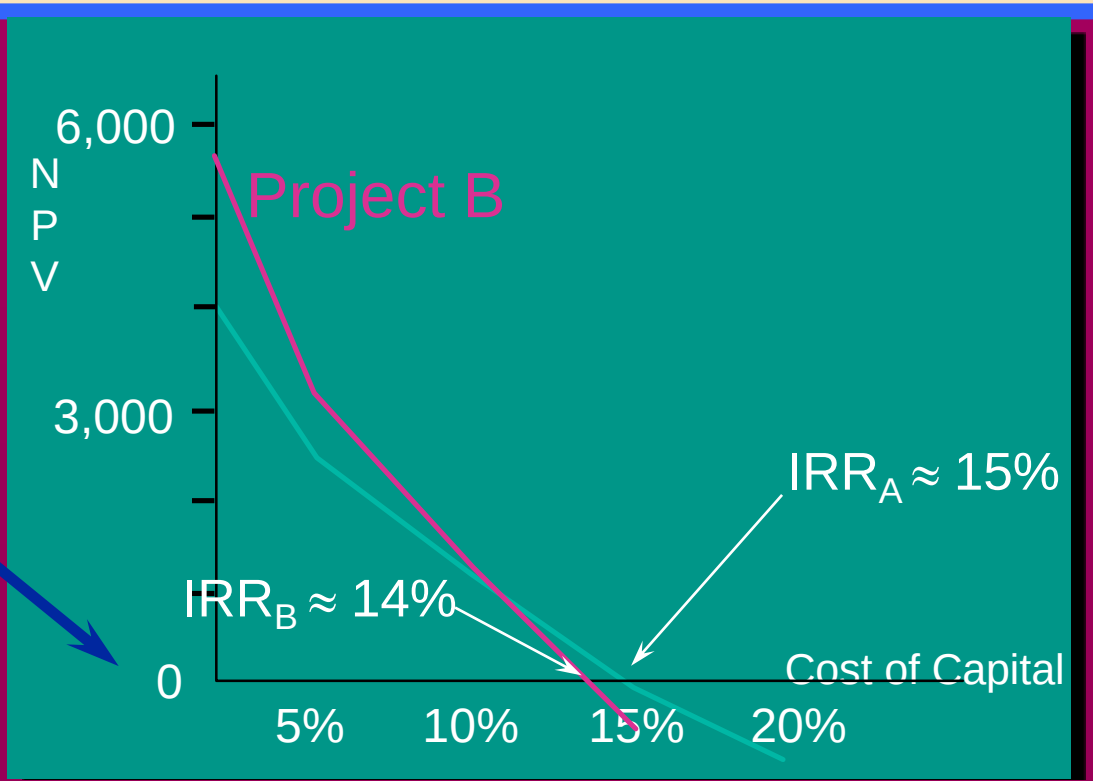
NPV = $0

Capital Budgeting Methods

Internal Rate of Return

- *Measures the rate of return that will make the PV of future CF equal to the initial outlay.*

Or, the IRR is the discount rate at which NPV = 0



NPV = $0

Capital Budgeting Methods

Internal Rate of Return

- *Determine the mathematical solution for IRR*

Capital Budgeting Methods

Internal Rate of Return

- *Determine the mathematical solution for IRR*

$$0 = NPV = \frac{CF_1}{(1+IRR)} + \frac{CF_2}{(1+IRR)^2} + \cdots + \frac{CF_n}{(1+IRR)^n} - IO$$

Capital Budgeting Methods

Internal Rate of Return

- *Determine the mathematical solution for IRR*

$$0 = NPV = \frac{CF_1}{(1+IRR)} + \frac{CF_2}{(1+IRR)^2} + \cdots + \frac{CF_n}{(1+IRR)^n} - IO$$

$$IO = \frac{CF_1}{(1+IRR)} + \frac{CF_2}{(1+IRR)^2} + \cdots + \frac{CF_n}{(1+IRR)^n}$$

Outflow = PV of Inflows

Capital Budgeting Methods

Internal Rate of Return

- *Determine the mathematical solution for IRR*

$$0 = NPV = \frac{CF_1}{(1+IRR)} + \frac{CF_2}{(1+IRR)^2} + \cdots + \frac{CF_n}{(1+IRR)^n} - IO$$

$$IO = \frac{CF_1}{(1+IRR)} + \frac{CF_2}{(1+IRR)^2} + \cdots + \frac{CF_n}{(1+IRR)^n}$$

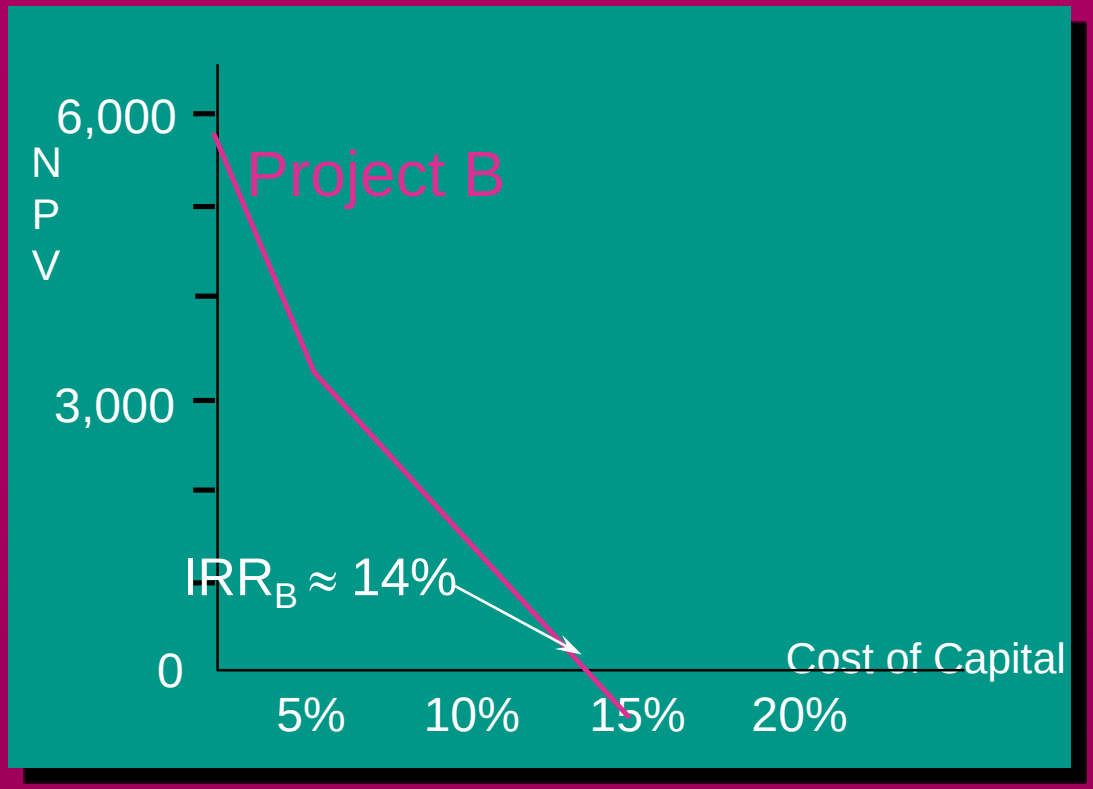
Outflow = PV of Inflows

Solve for Discount Rates

Capital Budgeting Methods

Internal Rate of Return For Project B

Cannot solve for IRR directly, must use Trial & Error

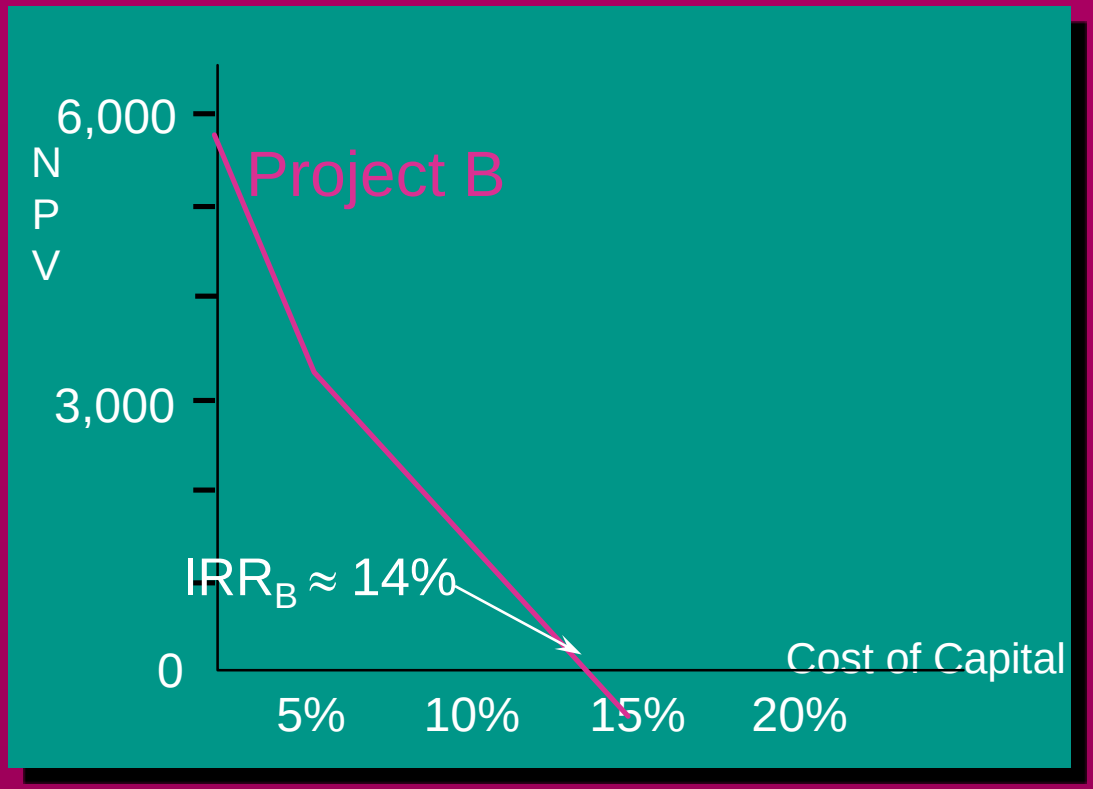


$$10{,}000 = \frac{500}{(1+\text{IRR})} + \frac{500}{(1+\text{IRR})^2} + \frac{4{,}600}{(1+\text{IRR})^3} + \frac{10{,}000}{(1+\text{IRR})^4}$$

Capital Budgeting Methods

Internal Rate of Return For Project B

Cannot solve for IRR directly, must use Trial & Error



$$10{,}000 = \frac{500}{(1+\text{IRR})} + \frac{500}{(1+\text{IRR})^2} + \frac{4{,}600}{(1+\text{IRR})^3} + \frac{10{,}000}{(1+\text{IRR})^4}$$

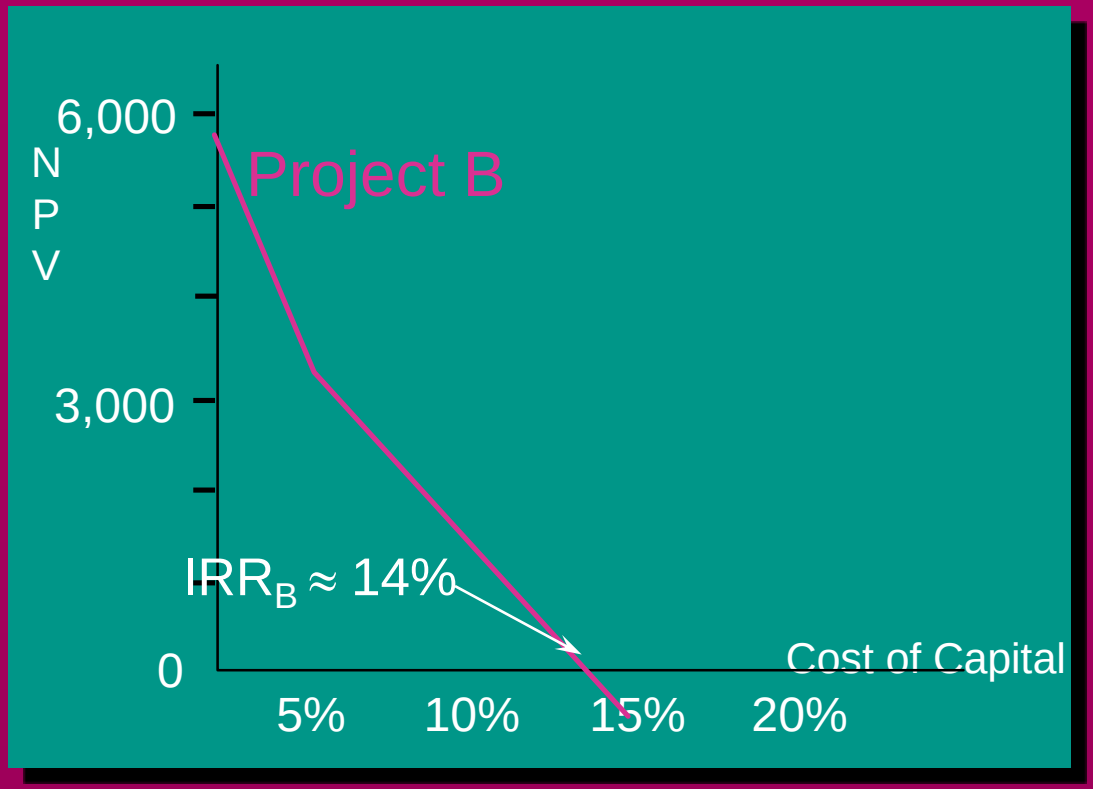
TRY 14%

$$10{,}000 \stackrel{?}{=} \frac{500}{(1+.14)} + \frac{500}{(1+.14)^2} + \frac{4{,}600}{(1+.14)^3} + \frac{10{,}000}{(1+.14)^4}$$

Capital Budgeting Methods

Internal Rate of Return For Project B

Cannot solve for IRR directly, must use Trial & Error



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$$10{,}000 \stackrel{?}{=} \frac{500}{(1+.14)} + \frac{500}{(1+.14)^2} + \frac{4{,}600}{(1+.14)^3} + \frac{10{,}000}{(1+.14)^4}$$

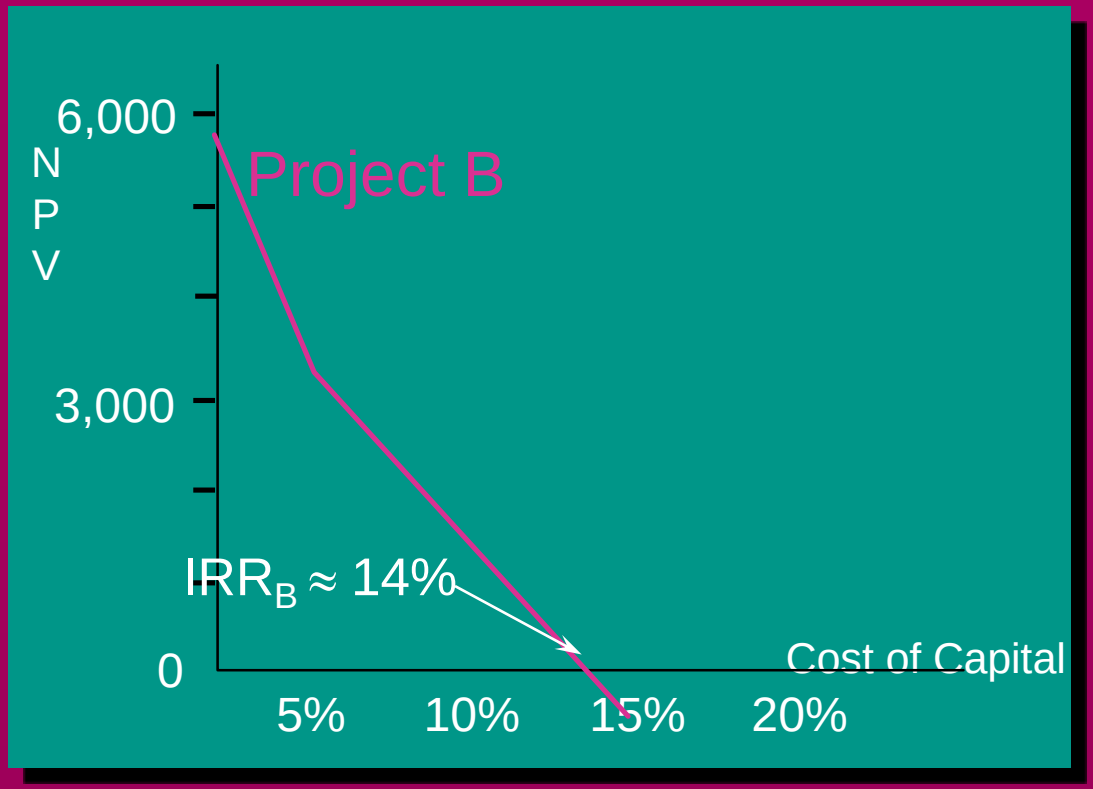
$$10{,}000 \stackrel{?}{=} 9{,}849$$

PV of Inflows too low, try lower rate

Capital Budgeting Methods

Internal Rate of Return For Project B

Cannot solve for IRR directly, must use Trial & Error



$$10{,}000 = \frac{500}{(1+\text{IRR})} + \frac{500}{(1+\text{IRR})^2} + \frac{4{,}600}{(1+\text{IRR})^3} + \frac{10{,}000}{(1+\text{IRR})^4}$$

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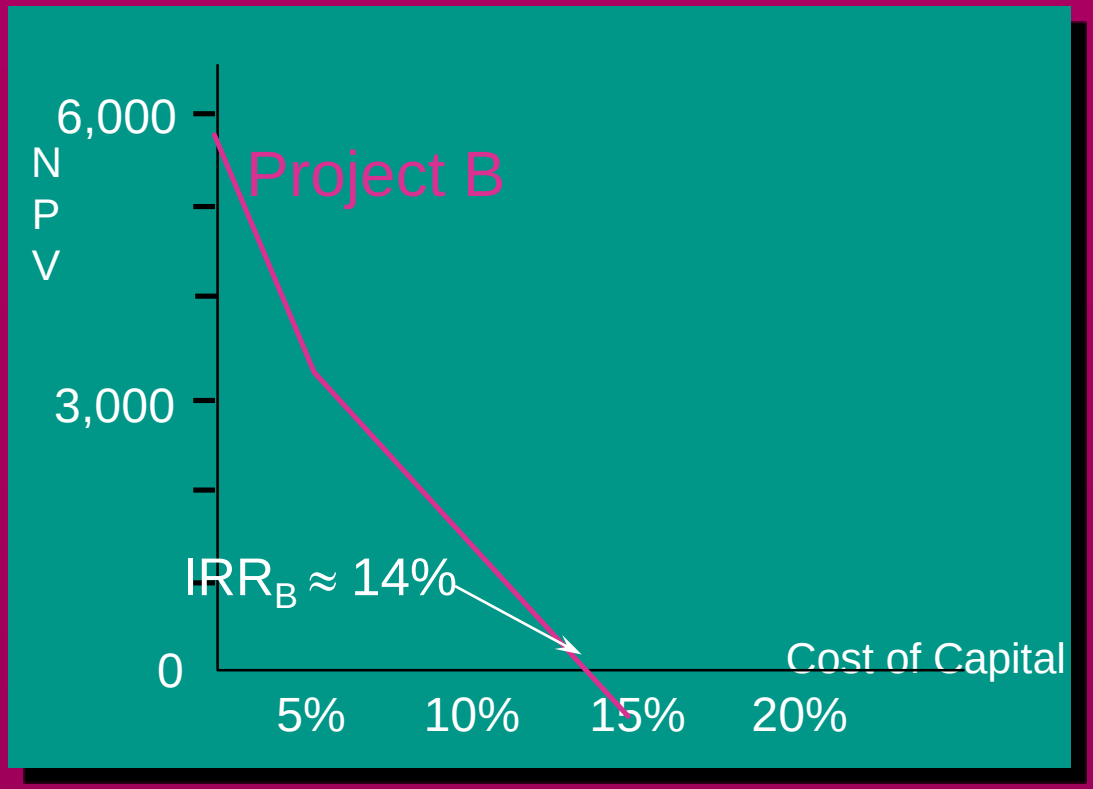
$$10{,}000 \stackrel{?}{=} \frac{500}{(1+.13)} + \frac{500}{(1+.13)^2} + \frac{4{,}600}{(1+.13)^3} + \frac{10{,}000}{(1+.13)^4}$$

Capital Budgeting Methods

Internal Rate of Return For Project B

Cannot solve for IRR directly, must use Trial & Error



$$10{,}000 = \frac{500}{(1+\text{IRR})} + \frac{500}{(1+\text{IRR})^2} + \frac{4{,}600}{(1+\text{IRR})^3} + \frac{10{,}000}{(1+\text{IRR})^4}$$

TRY 13%

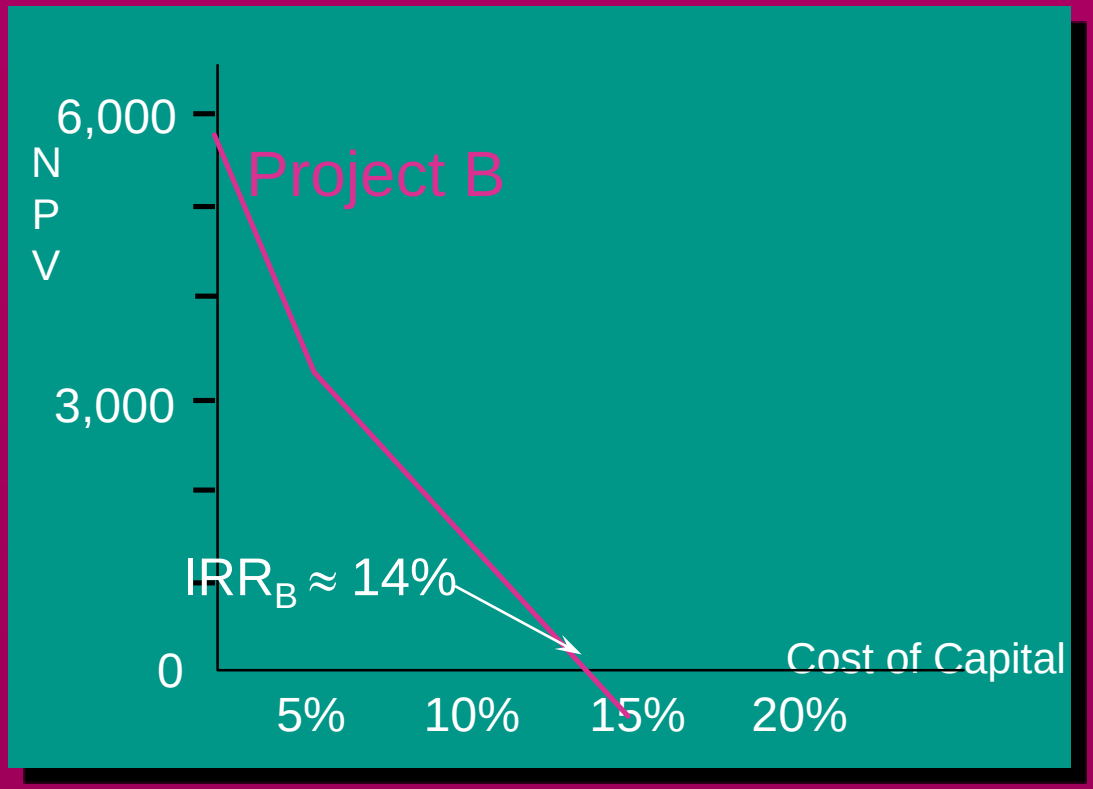
$$10{,}000 \stackrel{?}{=} \frac{500}{(1+.13)} + \frac{500}{(1+.13)^2} + \frac{4{,}600}{(1+.13)^3} + \frac{10{,}000}{(1+.13)^4}$$

$$10{,}000 \stackrel{?}{=} 10{,}155$$

Capital Budgeting Methods

Internal Rate of Return For Project B

Cannot solve for IRR directly, must use Trial & Error



$$10{,}000 = \frac{500}{(1+\text{IRR})} + \frac{500}{(1+\text{IRR})^2} + \frac{4{,}600}{(1+\text{IRR})^3} + \frac{10{,}000}{(1+\text{IRR})^4}$$

TRY 13%

$$10{,}000 \stackrel{?}{=} \frac{500}{(1+.13)} + \frac{500}{(1+.13)^2} + \frac{4{,}600}{(1+.13)^3} + \frac{10{,}000}{(1+.13)^4}$$

$10{,}000 \stackrel{?}{=} 10{,}155$ $\quad$ $13\% < \text{IRR} < 14\%$

Capital Budgeting Methods

Decision Rule for Internal Rate of Return

Independent Projects

Accept Projects with
IRR ≥ required rate

Mutually Exclusive Projects

Accept project with highest
IRR ≥ required rate

Capital Budgeting Methods

Profitability Index

Very Similar to Net Present Value

$$PI = \frac{\text{PV of Inflows}}{\text{Initial Outlay}}$$

Capital Budgeting Methods

Profitability Index

Very Similar to Net Present Value

$$PI = \frac{\text{PV of Inflows}}{\text{Initial Outlay}}$$

Instead of Subtracting the Initial Outlay from the PV of Inflows, the Profitability Index is the ratio of Initial Outlay to the PV of Inflows.

Capital Budgeting Methods

Profitability Index

Very Similar to Net Present Value

$$PI = \frac{\text{PV of Inflows}}{\text{Initial Outlay}}$$

Instead of Subtracting the Initial Outlay from the PV of Inflows, the Profitability Index is the ratio of Initial Outlay to the PV of Inflows.

$$PI = \frac{\frac{CF_1}{(1+k)} + \frac{CF_2}{(1+k)^2} + \frac{CF_3}{(1+k)^3} + \cdots + \frac{CF_n}{(1+k)^n}}{IO}$$

Capital Budgeting Methods

Profitability Index for Project B

$$PI = \frac{\frac{500}{(1+.1)} + \frac{500}{(1+.1)^2} + \frac{4{,}600}{(1+.1)^3} + \frac{10{,}000}{(1+.1)^4}}{10{,}000}$$

Time	PROJECT A	PROJECT B
0	(10,000.)	(10,000.)
1	3,500	500
2	3,500	500
3	3,500	4,600
4	3,500	10,000

Capital Budgeting Methods

Profitability Index for Project B

$$PI = \frac{\frac{500}{(1+.1)} + \frac{500}{(1+.1)^2} + \frac{4{,}600}{(1+.1)^3} + \frac{10{,}000}{(1+.1)^4}}{10{,}000}$$

$$PI = \frac{11{,}154}{10{,}000} = 1.1154$$

Time	PROJECT A	PROJECT B
0	(10,000.)	(10,000.)
1	3,500	500
2	3,500	500
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Capital Budgeting Methods

Profitability Index for Project B

$$PI = \frac{\frac{500}{(1+.1)} + \frac{500}{(1+.1)^2} + \frac{4{,}600}{(1+.1)^3} + \frac{10{,}000}{(1+.1)^4}}{10{,}000}$$

$$PI = \frac{11{,}154}{10{,}000} = 1.1154$$

Time	PROJECT A	PROJECT B
0	(10,000.)	(10,000.)
1	3,500	500
2	3,500	500
3	3,500	4,600
4	3,500	10,000

Profitability Index for Project A

$$PI = \frac{3{,}500 \times PVIFA_{4,\ .10}}{10{,}000}$$

Capital Budgeting Methods

Profitability Index for Project B

$$PI = \frac{\frac{500}{(1+.1)} + \frac{500}{(1+.1)^2} + \frac{4,600}{(1+.1)^3} + \frac{10,000}{(1+.1)^4}}{10,000}$$

$$PI = \frac{11,154}{10,000} = 1.1154$$

Time	PROJECT A	PROJECT B
0	(10,000.)	(10,000.)
1	3,500	500
2	3,500	500
3	3,500	4,600
4	3,500	10,000

Profitability Index for Project A

$$PI = \frac{3,500\left(\frac{1}{.10} - \frac{1}{.10(1+.10)^4}\right)}{10,000}$$

$$PI = \frac{11,095}{10,000} = 1.1095$$

Capital Budgeting Methods

Profitability Index Decision Rules

- *Independent Projects*
  - Accept Project if PI ≥ 1
- *Mutually Exclusive Projects*
  - Accept Highest PI ≥ 1 Project

Comparison of Methods

	Project A	Project B	Choose
Payback	< 3 years	< 4 years	A
NPV	$1,095	$1,154	B
IRR	14.96%	13.50%	A
PI	1.1095	1.1154	B

Comparison of Methods

- *Time Value of Money*
  - Payback - Does not adjust for timing differences (ignore Discounted Payback)
  - NPV, IRR and PI take into account the time value of money

Comparison of Methods

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- *Relevant Cash Flows?*
  - NPV, IRR and PI use all Cash Flows
  - Payback method ignores Cash Flows that occur after the Payback Period.

Comparison of Methods

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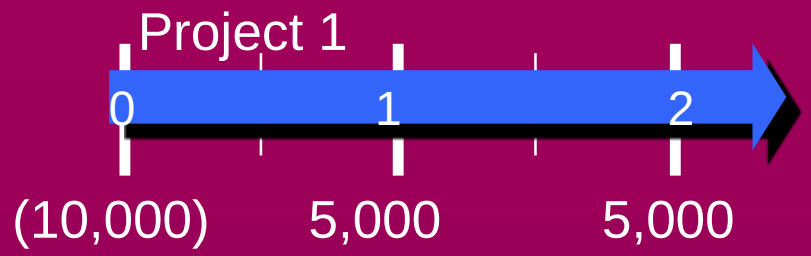

Comparison of Methods

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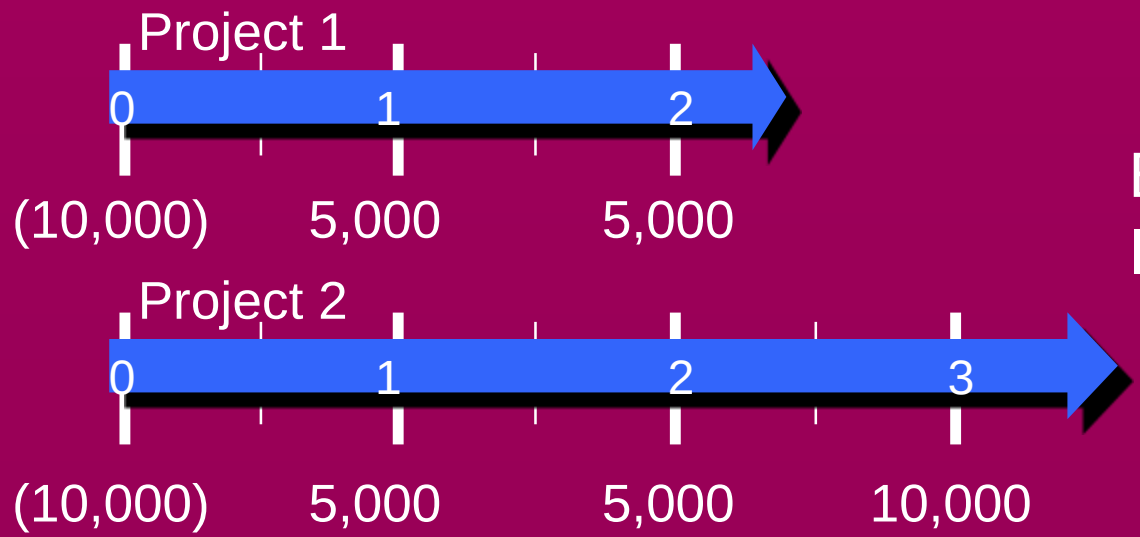


Both Projects have Identical Payback

Comparison of Methods

NPV & PI indicated accept Project B while IRR indicated that Project A should be accepted. Why?

Sometimes there is a conflict between the decisions based on NPV and IRR methods.

The conflict arises if there is difference in the timing of CFs or sizes of the projects (or both).

The cause of the conflict is the underlying reinvestment rate assumption.

Reinvestment Rate Assumptions

- NPV assumes cash flows are reinvested at the required rate, k.
- IRR assumes cash flows are reinvested at IRR.

Reinvestment Rate of k more realistic as most projects earn approximately k (due to competition)

***NPV** is the Better Method for project evaluation*

IRR

Because of its unreasonable reinvestment rate assumption, IRR method can result in bad decisions.

Another problem with IRR is that if the sign of the cash flow changes more than once, there is a possibility of multiple IRR. See p 340.

The problem of unreasonable assumption can be addressed by using Modified IRR

MIRR

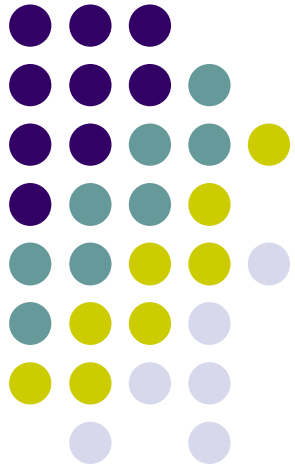
To find MIRR

1. *Find the FV of all intermediate CFs using the cost of capital (the hurdle rate) as the interest rate.*
2. *Add all FV.*
3. *Find that discount rate which makes the PV of the FV equal to the PV of outflows.*

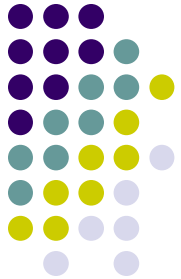
Drop MIRR computations.

INTRODUCTION TO FINANCIAL ACCOUNTING AND ANALYSIS

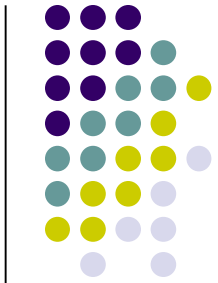
UNIT-5



Meaning of Financial Statements

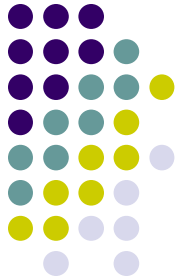


- Financial statements are summaries of the operating, financing, and investment activities of a firm.
- According to the *Financial Accounting Standards Board (FASB)*, the financial statements of a firm should provide sufficient information that is useful to
  - investors and
  - creditors
  - in making their investment and credit decisions in an informed way.

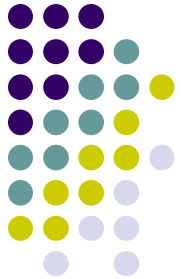


- The financial statements are expected to be prepared in accordance with a set of standards known as generally accepted accounting principles (GAAP).
- The financial statements of publicly traded firms must be audited at least annually by independent public accountants.
- The auditors are expected to attest to the fact that these financial statements of a firm have been prepared in accordance with GAAP.

Significance of Financial Statements

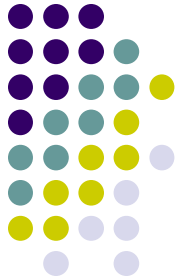


- Wall Street analysts and other sophisticated investors prefer such financial disclosure documents as 10-Ks, which contain more detailed information about the company
- Financial statements summarize and provide an overview of events relating to the functioning of a firm.
- Financial statement analysis helps identify
  - a firm's strengths and
  - weaknesses
  - so that management can take advantage of a firm's strengths and make plans to counter weaknesses of the firm.
- The strengths must be understood if they are to be used to proper advantage and weaknesses must be recognized if corrective action needs to be taken



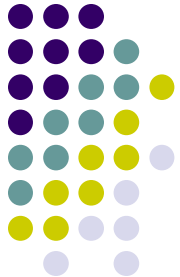
- For example, are inventories adequate to support the projected level of sales?
- Does the firm have too heavy an investment in account receivable?
- Does large account receivable reflect a lax collection policy?
- To ensure efficient operations of a firm’s manufacturing facility, does the firm have too much or too little invested in plant and equipment?
- Financial statement analysis provides answers to all of these questions.

Types of Financial Statements and Reports



- The Income Statement
- The Balance Sheet
- The Statement of Retained Earnings
- The Statement of Cash Flows

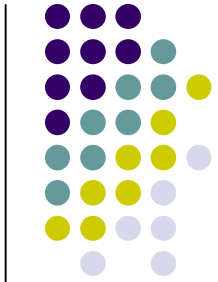
The Income Statement



- An income statement is a summary of the revenues and expenses of a business over a period of time, usually either one month, three months, or one year.
- Summarizes the results of the firm's operating and financing decisions during that time.
- Operating decisions of the company apply to production and marketing such as sales/revenues, cost of goods sold, administrative and general expenses (advertising, office salaries)
- Provides operating income/earnings before interest and taxes (EBIT)

- Results of financing decisions are reflected in the remainder of the income statement.
- When interest expenses and taxes are subtracted from EBIT, the result is net income available to shareholders.
- Net income does not necessarily equal actual cash flow from operations and financing.

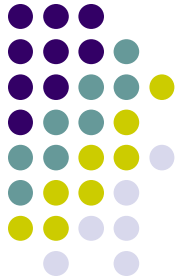
The Balance Sheet



- A summary of the assets, liabilities, and equity of a business at a particular point in time, usually at the end of the firm's fiscal year.

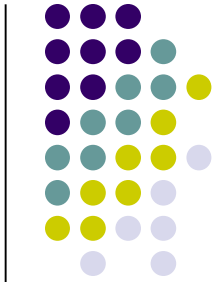
Assets (Resources of the business enterprise)	=	Liabilities (Obligations of the business)	+	Equity (ownership left over Residual)
Fixed Assets (Plant, Machinery, Equipment Buildings)		**Long-term** (Notes, bonds, & Capital Lease Obligation)		Common stock outstanding
				Additional paid-in capital
				Retained Earnings
Current Assets (Cash, Marketable Securities, Account Receivable, Inventories)		**Current Liabilities** (Accounts Payable, Wages and salaries, Short-term loans Any portion of long-term Indebtedness due in one-year)		

THE STATEMENT OF CASH FLOWS

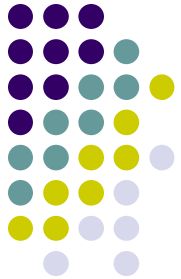


- The statement is designed to show how the firm's operations have affected its cash position and to help answer questions such as these:
  - Is the firm generating the cash needed to purchase additional fixed assets for growth?
  - Is the growth so rapid that external financing is required both to maintain operations and for investment in new fixed assets?
  - Does the firm have excess cash flows that can be used to repay debt or to invest in new products?

RATIO ANALYSIS

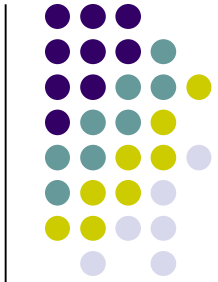


- Financial statements report both on a firm's position at a point in time and on its operations over some past period.
- From management's viewpoint, financial statement analysis is useful both as a way to
  - anticipate future conditions and
  - more important, as a starting point for planning actions
  - that will influence the future course of events or
  - to show whether a firm's position has been improving or deteriorating over time.



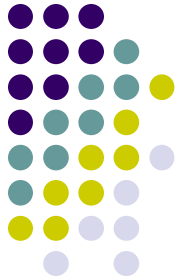
- Ratio analysis begins
  - with the calculation of a set of financial ratios
  - designed to show the relative strengths and
  - weaknesses of a company as compared to
    - Other firms in the industry
    - Leadings firms in the industry
    - The previous year of the same firm
- Ratio analysis helps to show whether the firm's position has been improving or deteriorating
- Ratio analysis can also help plan for the future

Types of Ratios



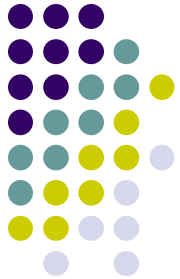
- Liquidity Ratios
  - Current Ratio
  - Quick Ratio/Acid Test Ratio
- Asset Management Ratios
  - Inventory Turnover Ratio
  - Days Sales Outstanding
  - Fixed Assets Turnover Ratio
  - Total Assets Turnover Ratio
- Debt Management Ratio
  - Total Debt to Total Assets Ratio
  - Times Interest Covered Ratio
- Profitability Ratios
  - Profit Margin on Sales
  - Return on Assets
  - Return on Equity
  - Basic Earning Power Ratio

Liquidity Ratio



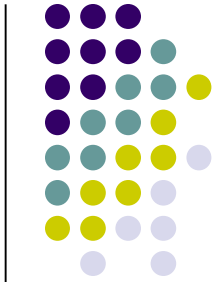
- A liquid asset is one that can be easily converted into cash at a fair market value
- Liquidity question deals with this question
  - Will the firm be able to meet its current obligations?
- Two measures of liquidity
  - Current Ratio
  - Quick/Acid Test Ratio

Asset Management Ratios



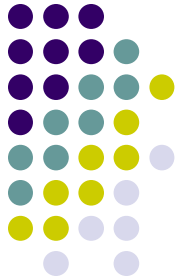
- Asset management ratio measures how effectively the firm is managing/using its assets
- Do we have too much investment in assets or too little investment in assets in view of current and projected sales levels?
- What happens if the firm has
  - Too much investment in assets
  - Too little investment in assets

Asset Management Ratios



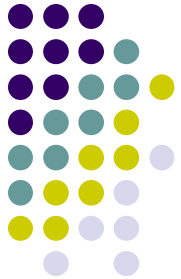
- Inventory Turnover Ratio
  - Measures the efficiency of Inventory Management
  - A high ratio indicates that inventory does not remain in warehouses or on shelves, but rather turns over rapidly into sales
- Two cautions
  - Market prices for sales and inventories at cost
  - Sales over the year and inventory at the end of the year

Asset Management Ratio



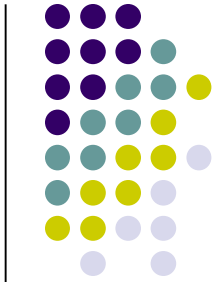
- Days Sales Outstanding (DSO)
  - To appraise the quality of accounts receivables
  - Average length of time that the firm must wait after making a sale before receiving cash from customers
  - Measures effectiveness of a firm credit policy
  - Indicates the level of investment needed in receivables to maintain firm's sales level
- What happens if this ratio is
  - Too high, or
  - Too low

Asset Management Ratios



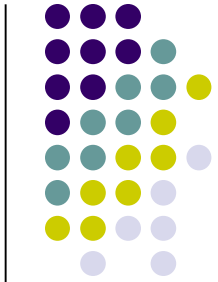
- Fixed Assets Turnover Ratio
  - Measures efficiency of long-term capital investment
  - How effectively a firm is using its plant and machinery to generate sales?
  - How much fixed assets are needed to achieve a particular level of sales?
- Cautions

Asset Management Ratio

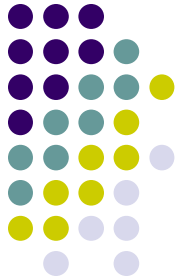


- Total Asset Turnover Ratio
  - Measure efficiency of total assets for the company as a whole or for a division of the firm
  - Core competency

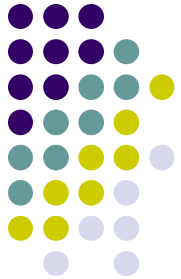
Debt Management Ratio



- Implications of use of borrowings
  - Creditors look to Stockholders' equity as a safety margin
  - Interest on borrowings is a legal liability of the firm
  - Interest is to be paid out of operating income
  - Debt magnifies return and risk to common stockholders

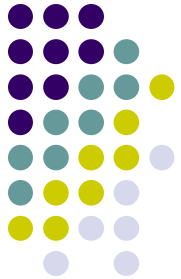


- Total Debt to Total Assets Ratio
  - Measures percentage of assets being financed through borrowings
  - Too high a number means increased risk of bankruptcy
- Leverage
  - What percentage of total assets are being financed through equity?

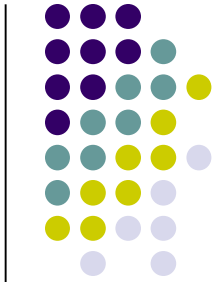


- Times Earned Interest (TIE)
  - Measure the extent to which operating income can decline before the firm is unable to meet its annual interest costs
  - Failure to pay interest can result in legal action by creditors with possible bankruptcy for the firm

Profitability Ratios

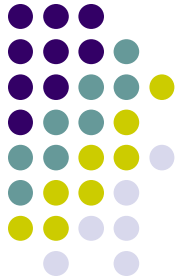


- Net result of a number of policies and decisions
- Show the combined effect of liquidity, asset management, and debt management on operating results



- Net Profit Margin on Sales
  - Relates net income available to common stockholders to sales
- Basic Earning Power
  - Relates EBIT to Total Assets
  - Useful for comparing firms with different tax situations and different degrees of financial leverage
- Return on Assets (ROA)
  - Relates net income available to common stockholders to total assets
- Return on Common Equity (ROE)
  - Relates net income available to common stockholders to common stockholders equity

PROBLEMS IN FINANCIAL STATEMENT ANALYSIS



- Developing and Using Comparative Data
- Distortion of Comparative Data
- Notes to Financial Statements
- Interpretation of Results
- Differences in Accounting Treatment
- Window Dressing
- Effects of Inflation