



**UNIVERSITY COLLEGE OF ENGINEERING  
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**NAGAPATTINAM- 610 204.**

**DEPARTMENT OF CIVIL ENGINEERING**

**GE1451 ENGINEERING ECONOMICS AND COST ANALYSIS  
IMPORTANT QUESTION WITH ANSWER**

**VOLUME-I**

UNIT-V

PART-A

1. What do you mean by break even analysis?

It is a tool for analyzing the financial aspect whereby the impact on profit of the changes in volume price costs and sales mix can be estimated with higher level accuracy.

2. Define margin of safety.

Margin safety may be defined as the excess of actual sales or production at the selected activity over break even sales or production. Simply margin of sales is excess sales over the break even sales .it is abbreviated as mos.

3. What is p/v ratio?

It is an important tool in decision making. It is used for the calculation of BEP and in problems regarding profit and sales relationship. A higher P/V ratio indicates the greater profitability and vice versa. So the organization makes necessary effort to obtain higher p/v ratio.

4. What is making or buy decision?

The outside price of the component is lower than the marginal cost of producing it is worth buying , if the outside price is higher than the marginal cost making the component in the factory may be preferred.

5. What is angle of incidence?

It indicates the profit earning capacity the angle is formed at the breakeven point where the sales line cuts the total cost line . The angle may be large or small. Large angle of incidence indicates higher profit rate and vice versa.

6. Write the merits and demerits on break even chart.

Assumption- all costs are segregated into fixed and variable cost. Total fixed costs are constant at all levels of output, production and sales figures are same variable costs vary proportionately with the level of volume of output.

Merits- preparation of flexible budget, formulation of price policy, it provides guidance for cost control, total profit could be calculated accurately.

Demerits- fixed cost does not always remain constant, it ignores economies of scale in production, and variable cost does not always vary proportionately.

7. What are the managerial uses of break even analysis?

It is very useful for forecasting and profits. Long term planning and growth the chart discloses profits at various levels of production. It can also be used to study the comparative plant efficiencies of the industry.

#### 8. Differentiate market price and normal price.

Market price prevails in the very short period

It is the result of temporary equilibrium between demand and supply

Market price is more influenced by demand

Market price fluctuates even daily

All commodities reproducible or non reproducible have a market price

**Normal price-** it prevails in the long period, it is the result of long period equilibrium, it is largely influenced by supply and cost of production, it is stable, it is equal to the cost of production, reproducible commodities alone have normal price.

#### 9. what is demand?

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Demand can be represented graphically, as a line with price on the y axis and quantity demanded on the x axis. It can also be represented in a table, known as a demand schedule.

Price and demand almost always have an inverse relationship. As the price of a good goes up, the demand goes down.

There are many factors other than price that influence demand. Some examples are tastes and preferences, disposable income, and the price

#### 10. What is the significance elasticity of demand?

The demand of a particular product change when there is a change in price or when there is a change in income of household's price of related goods, tastes and expectations advertising expenses etc.

#### 11. . What is the various elasticity's of demand?

Price elasticity of demand, income, cross, promotional, exportations elasticity of demand.

#### 12. What is supply?

The amount of that product which producers are able and willing to offer for sale at a given price.

#### 13. . What is supply schedule?

Supply schedule that as the price increases, each firm supplies greater quantity of output to the market and vice versa.

#### 14. What is supply curve? Or supply shift

It is the graphical representation of the supply schedule, the market supply curve summarizes the total quantity all producers are willing and able to produce at different alternative prices holding other factors such as competition, technology, government factors taxes etc that affect supply as constant.

15. Explain limitations of law of supply.

As it was in demand law of supply too has its limitation some of them are listed here

Future prices, agricultural outputs, factors other than price not remaining constant.

16. What are the factors in supply shift?

Variable that affects the position of the supply curve are called , these include

Price of inputs, level of technology, government regulation, competition of number of firms, taxes, producer expectation, substitutes in production.

17. What is elasticity of supply?

The degree of responsiveness of supply to a given change in price.

18. What are the types of supply elasticity?

Perfectly elastic supply, perfectly inelastic supply, unitary elastic supply , relatively elastic supply, relatively inelastic supply.

19. How is cost-volume-profit relationship determined?

The most important method of determining cost-volume-profit relationship is Break even Analysis.

20. Write down the limitations of break even Analysis?

BEP Analysis assumes costs and revenue to be linear in function. This practice is not true.

Break Even Chart is useful only for single product companies

## PART-B

. 1 Write the Short Notes on :

### Fixed Cost

Fixed costs (FC) are incurred independent of the quantity of goods or services produced. They include inputs (capital) that cannot be adjusted in the short term, such as buildings and machinery. Fixed costs (also referred to as overhead costs) tend to be time related costs, including salaries or monthly rental fees. An example of a fixed cost would be the cost of renting a warehouse for a specific lease period. However, fixed costs are not permanent. They are only fixed in relation to the quantity of production for a certain time period. In the long run, the cost of all inputs is variable

### Variable Cost

Variable cost (VC) changes according to the quantity of a good or service being produced. It includes inputs like labor and raw materials. Variable costs are also the sum of marginal costs over all of the units produced (referred to as normal costs). For example, in the case of a clothing manufacturer, the variable costs would be the cost of the direct material (cloth) and the direct labor. The amount of materials and labor that is needed for each shirt increases in direct proportion to the number of shirts produced. The cost "varies" according to production.

### Contribution:

Contribution is the difference between sales and the variable cost and referred to as "Gross Margin" It is Visualized as some sort of fund or pool out of which all fixed cost are to be met and to which each product has to contribute its share

The difference between contribution and fixed cost is either profit or loss as the case may be

### Margin Of Safety

Marginal Costing necessitates analysis of cost in to fixed variable. It has been designed to help the management to have a clear perspective on the effect of these two type of cost on the profitability margin and sales volume.

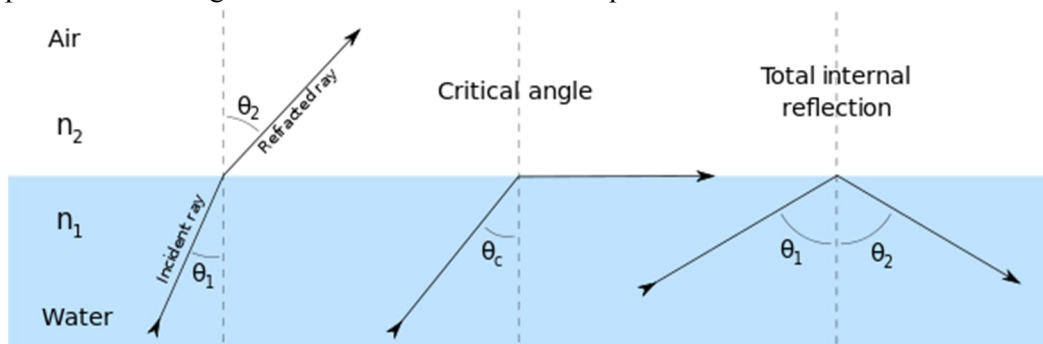
$$\text{Present sales} - \text{Break even sales} \text{ or } \frac{\text{Profit}}{\text{P/V Ratio}}$$

Margin Of safety can be improved by taking the following step.

1. Increasing production
2. Increasing selling price
3. Reducing the fixed or the variable cost of both
4. Substitution unprofitable product with profitable one

### Angle of Incidence

This is the angle between sales line and total cost line at the BEP. It indicates the profit earning capacity of the concern. Large angle of incidence indicates a high rate of profit: a small angle indicate a low rate of earning to improve this angle contribution should be increased either by raising the selling price and /or by reducing variables cost It also indicates as to what extent the output and sales price can be changed to attain a desired amount of profit

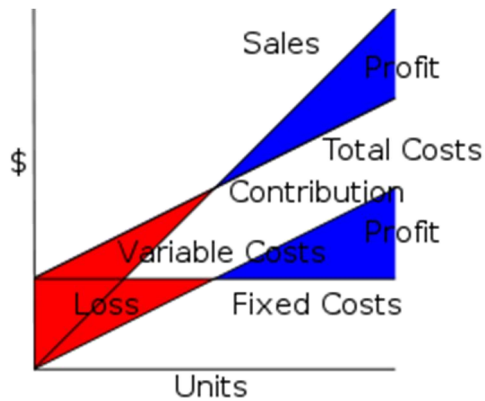


### Profit Volume Ratio

CVP analysis expands the use of information provided by breakeven analysis. A critical part of CVP analysis is the point where total revenues equal total costs (both fixed and variable costs). At this break-even point, a company will experience no income or loss. This break-even point can be an initial examination that precedes more detailed CVP analysis.

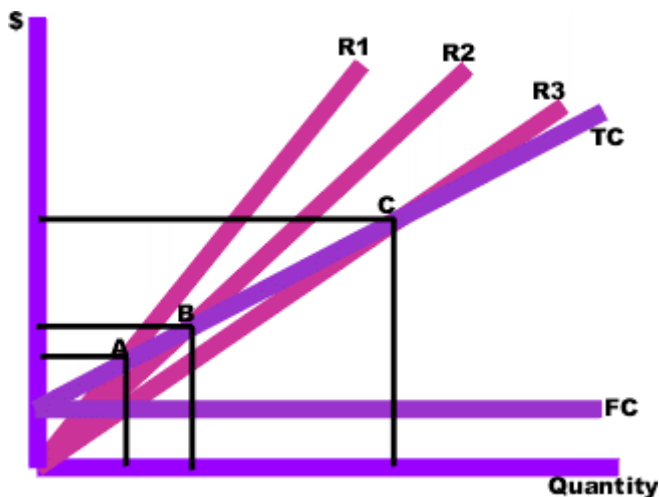
CVP analysis employs the same basic assumptions as in breakeven analysis. The assumptions underlying CVP analysis are:

- The behavior of both costs and revenues is linear throughout the relevant range of activity. (This assumption precludes the concept of volume discounts on either purchased materials or sales.)
- Costs can be classified accurately as either fixed or variable.
- Changes in activity are the only factors that affect costs.
- All units produced are sold (there is no ending finished goods inventory).
- When a company sells more than one type of product, the sales mix (the ratio of each product to total sales) will remain constant.



### Break Even Point

By inserting different prices into the formula, you will obtain a number of break-even points, one for each possible price charged. If the firm changes the selling price for its product, from \$2 to \$2.30, in the example above, then it would have to sell only  $1000 / (2.3 - 0.6) = 589$  units to break even, rather than 715.



To make the results clearer, they can be graphed. To do this, you draw the total cost curve (TC in the diagram) which shows the total cost associated with each possible level of output, the fixed cost curve (FC) which shows the costs that do not vary with output level, and finally the various total revenue lines (R1, R2, and R3) which show the total amount of revenue received at each output level, given the price you will be charging.

The break-even points (A,B,C) are the points of intersection between the total cost curve (TC) and a total revenue curve (R1, R2, or R3). The break-even quantity at each selling price can be read off the horizontal axis and the break-even price at each selling price can be read off the vertical axis. The total cost, total revenue, and fixed cost curves can each be constructed with simple formulae. For example, the total revenue curve is simply the product of selling price times quantity for each output quantity. The data used in these formulae come either from accounting records or from various estimation techniques such as regression analysis

### 2. S ltd furnishes you the following data for the year 1988 of the company

<b>Variable cost</b>	<b>6,00,000</b>
<b>Fixed cost</b>	<b>4,00,000</b>
<b>Net profit</b>	<b>2,00,000</b>
<b>Sales</b>	<b>12,00,000</b>

Find i) p/v ratio ii) BEP iii) profit when sales amounted to Rs14,00,000 iv) sales required to earn a profit of 6,00,000

Ans- p/v ratio=50%,BEP=Rs 8,00,000,profit=Rs 3,00,000, sales required to earn a profit of Rs 18,00,000

3. from the Following information relating to Standard manufacture Ltd., You are required to find out

1	P/V Ratio
2	Break Even Point
3	Profit
4	Margin Of Safety
5	Also Calculate the Volume of Sales to earn Profit of 6,000

If Total Sales Rs. 15000 Total Variable Cost Rs.7500, Total Fixed Cost Rs.4500.

Solution:

Marginal Cost Statement:

Particulars	(Rs)
Sales(S)	15,000
Less : Variable Cost (V)	7,500
Contribution(C)	7,500
Less: Fixed Cost (F)	4,500
Profit (P)	3,000

1	$P/V \text{ Ratio} = C/S * 100 (7500/15,000*100) = 50\%$
2	$BEP \text{ in Rs} = FS/C (4500* 15000/7500)=Rs.9,000$
3	Profit =Rs.3,000
4	Margin of Safety = Ts – BES 15,000-9,000= Rs.6,000
5	Sales Required to earn a Desired Profit of Rs.6,000= $F+D/PV \text{ Ratio}$ $4,500+6,000/50\% =Rs.21,000$

4. Assuring the Cost Structure and selling prices remain same in period I and II Find out:

1	P/V Ratio
2	Break Even Point
3	Contribution –for two periods
4	Margin of Safety – for two periods
5	Calculate the volume of sales to earns profit of Rs.20,000
6	Profit When Sales are Rs.1,00,000

period	Sales (RS)	Profit (Rs)
I	1,20,000	9,000
II	1,40,000	13,000

Solution:

Comparative Statement showing profitability of two periods

Period	Sales	Profit
II	1,40,000	13,000
I	1,20,000	9,000
Increase	20,000	4,000

1	P/V Ratio : increase in profit / increase in sales * 100 (4,000/20,000*100)=20%		
2	BEP:F/PV ratio (15,000/20%)=75,000		
3	Contribution –for two periods <b>C=S* PV Ratio then C-p = F</b>	I	C = 1,20,000*20% = 24,000
		II	C = 1,40,000 * 20% =28,000
4	Margin of safety – for two periods  <b>M/S= P/PV Ratio</b>	I	9,000*20%=45,000
		II	13,000*20%=65,000



5	Sales Required to earn a Desired Profit of Rs.6,000 = F+ D /P/v Ratio $15,000 + 20,000 / 20\% = \text{Rs.}1,75,000$	
6	Profit When Sales are Rs.1,00,000	$P = C - F \quad 20,000 - 15,000 = \text{Rs.}5,000$
		$C = S * PVR \quad 1,00,000 * 20\% = \text{Rs.}20,000$

**5.What do you understand by contribution ? How does it help the management to solving various problem?**

Marginal costing technique makes use of marginal contribution for marking various decisions. Marginal contribution is the difference between sales and marginal cost. It forms the basis for judging the profitability of different products or departments

**Advantages**

- ❖ The technique is less complicated and free from confusion.
- ❖ Under this technique net profit is not affected by the changes in production level or changes in stock volume; in fact profit is directly related to sales.
- ❖ Reports based on this technique provide information based on sales rather than production conveying real estate of efficiency.
- ❖ It helps in profit planning, particularly of short term nature.

**Disadvantages**

- ❖ It lays too much emphasis on selling function and as such production function has been considered to be less significant.
- ❖ Valuation of stock only at Marginal cost may amount to under-valuation from the financial manager’s view point and this may have working capital problem.
- ❖ Not suitable for external reporting, viz., for tax authorities where marginal income is not considered to be taxable profit.
- ❖ This technique does not attach due importance to time factor.

**6.From the following data you are required to calculate the break even point and net sale value at this point**

Selling price per unit RS.24

Direct material cost per unit Rs. 8

Direct labour cost per unit Rs.5

Fixed overhead Rs 24,000

Variable overheads @ 60% on direct labour

Trade discount 4%

If sales are 15% and 20% above the break even volume determine the net profits.

ANSWER BEP= 72000, if sales 20% above the break even determine profit (4800),if sales above the BEP find out profit( 3600)

### 7. Explain the marginal costing is a valuable aid for managerial decision.

Principles for marginal costing

1. For any given period of time, fixed costs will be the same, for any volume of sales and production (provided that the level of activity is within the 'relevant range'). Therefore, selling an extra item of product or service:
  - ➔ Revenue will increase by the sales value of the item sold
  - ➔ Costs will increase by the variable cost per unit
  - ➔ Profit will increase by the amount of contribution earned from the extra item
2. The volume of sales falls by one item ➔ the profit will fall by the amount of contribution earned from the item.
3. Profit measurement should be based on an analysis of total contribution. Since fixed costs relate to a period of time, and do not change with increases or decreases in sales volume, it is misleading to charge units of sale with a share of fixed costs
4. When a unit of product is made, the extra costs incurred in its manufacture are the variable production costs. Fixed costs are unaffected, and no extra fixed costs are incurred when output is increased
  1. Features- 1.Cost Classification
  2. The marginal costing technique makes a sharp distinction between
  3. variable costs and fixed costs. It is the variable cost on the basis of
  4. which production and sales policies are designed by a firm following the
  5. marginal costing technique
  6. Stock/Inventory Valuation
  7. Under marginal costing, inventory/stock for profit measurement is valued at marginal cost. It is in sharp contrast to the total unit cost under absorption costing method
  8. Marginal Contribution
  9. Marginal costing technique makes use of marginal contribution for marking various decisions. Marginal contribution is the difference between sales and marginal cost. It forms the basis for judging the profitability of different products or departments.

#### 5.Fixation of selling price

Fixation of selling price is one of the significant tasks of management. Prices are usually ascertained by market conditions and other economic aspects. Cost volume profit analysis supports the management in fixing the selling prices under diverse conditions.

#### **6. Accepting bulk order or foreign market order**

Some – bulk orders may be received from local dealer or foreign dealers asking for a price which is below the market price this calls for a decision to accept or reject the order the order from a local dealer should not be accepted at a price below the market price because it will affect the normal market and good will of the company on the order hand the order from the foreign dealer should be accepted because it will give additional contribution as the fixed costs have already been met

#### **7. Make or buy decision**

In a make or buy decision the price quote by the outside suppliers should be compared with the margin cost of producing the component parts if the outside price of the component is lower than the marginal cost producing it is worth buying on the other hand if the outside price is higher than the marginal cost making the component in the factory may be preferred

#### **8. Selection of suitable product mix**

When a factory manufactures more than one product a problem is faced by the management as to which product will give maximum profit the solution is the products which give the maximum contribution are to be retained and their production should be increased

#### **9. Key Factor**

It is also known as limiting factor or government factor or scarce a key factor is one which restricts productions and profit of a business it may arise due to the shortage of material Labour, capital, plant capacity or sale Normally when there is no limiting factor the selection of the product will be on the basis of the highest contribution per unit of the key factor

#### **10. Maintaining a desired level of profit**

Management may be interested in maintaining a desired level of profit the sales required to earn a desired level of profit can be ascertained by the marginal costing techniques

#### **11. Alternative methods of production**

Marginal costing is helpful in comparing the alternative methods of production machine work or hard work the method which gives maximum contribution is to be adopted keeping in mind the limiting factor

#### **12. Determination of optimum level of activity**

The technique of marginal costing help the management in determining the optimum level of activity to make such a decision contribution at different level of activity can be found the level of activity which gives the highest contribution will be the optimum level the level production can be rises till the marginal cost does not exceed the selling price

#### **13. Evaluation of performance**

Evolution of performance efficiency of various department or product lines can be made with the help of marginal costing the management has to discontinue the production of non-profitable products or department so as to maximize the profits in such cases decision to discontinue will be on the basis of the lowest contribution or P.V. Ratio

#### **14. Decision making**

Decision making is a process of selecting the best course of action from number of available alternatives. Problems like selection of method of manufacture using the production capacity for different products continuing or dropping of a product showing a loss expansion or change in market etc., call for a decision in such cases the decision should be made on the basis of contribution.

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### 8.Explain the supply determinants in detail or supply shifters.

1. Input prices- producer are willing to produce less at each given price
  2. Technological change-leads to produce more at a lesser cost, more efficient use of resources
  3. Government regulation-support the industry like small scale industries and village industries then regardless of the price the output increases.
  4. Number firms or competition-As additional firms enter an industry, more and more products become available in the market at a given price.
  5. taxes- a tax on each units of output sole, where the tax revenue is collected from the supplier
  6. Substitute in production- to increase the quantity supplied
  7. Producer expectation-producers can hold back outputs today and sell it later at a higher price.
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### 9.Explain Demand determinants in detail or Demand shifters

1. General factors-price of the product (when the price of the product is increased, the purchasing power of the consumer is decreased and thereby reducing the demand for the product.  
Income of the customer- the income increase the demand also increase in case of some commodities like fruits, vegetables petrol, diesel etc.  
The demand a tastes and preferences of the consumers in favor of a commodity will result in a greater demand for the commodity. The opposite also holds good.  
Price of related goods- (substitutes and complements)
  2. Factor related to luxuries and durables- consumer's expectation future prices(when a consumer expects a higher income in future, he spends more at present and demand for goods increases.  
Consumer's expectation of future income-the demands of the goods depend on the customer's ability and the desire to buy that product.
  3. Factors related to market demand- population, social economic geographic and demographic distribution of consumers.
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### 10. Explain Break Even Point With Diagram

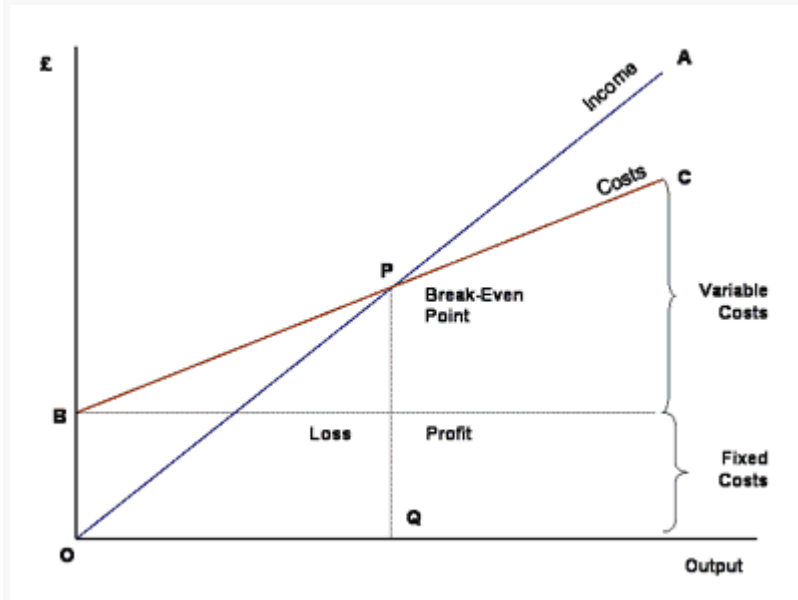
#### Introduction

Break-even analysis is a technique widely used by production management and management accountants. It is based on categorizing production costs between those which are "variable" (costs that change when the production output changes) and those that are "fixed" (costs not directly related to the volume of production).

Total variable and fixed costs are compared with sales revenue in order to determine the **level of sales volume, sales value or production at which the business makes neither a profit nor a loss (the "break-even point")**.

### The Break-Even Chart

In its simplest form, the break-even chart is a graphical representation of costs at various levels of activity shown on the same chart as the variation of income (or sales, revenue) with the same variation in activity. The point at which neither profit nor loss is made is known as the "break-even point" and is represented on the chart below by the intersection of the two lines:



In the diagram above, the line OA represents the variation of income at varying levels of production activity ("output"). OB represents the total fixed costs in the business. As output increases, variable costs are incurred, meaning that total costs (fixed + variable) also increase. At low levels of output, Costs are greater than Income. At the point of intersection, P, costs are exactly equal to income, and hence neither profit nor loss is made.

### Fixed Costs

Fixed costs are those business costs that are not directly related to the level of production or output. In other words, even if the business has a zero output or high output, the level of fixed costs will remain broadly the same. In the long term fixed costs can alter - perhaps as a result of investment in production capacity (e.g. adding a new factory unit) or through the growth in overheads required to support a larger, more complex business.

#### *Examples of fixed costs:*

- Rent and rates
- Depreciation
- Research and development
- Marketing costs (non- revenue related)
- Administration costs

### Variable Costs

Variable costs are those costs which vary directly with the level of output. They represent payment output-related inputs such as raw materials, direct labour, fuel and revenue-related costs such as commission.

A distinction is often made between "**Direct**" variable costs and "**Indirect**" variable costs.

**Direct** variable costs are those which can be directly attributable to the production of a particular product or service and allocated to a particular cost centre. Raw materials and the wages those working on the production line are good examples.

**Indirect** variable costs cannot be directly attributable to production but they do vary with output. These include depreciation (where it is calculated related to output - e.g. machine hours), maintenance and certain labour costs.

### **Semi-Variable Costs**

Whilst the distinction between fixed and variable costs is a convenient way of categorising business costs, in reality there are some costs which are fixed in nature but which increase when output reaches certain levels. These are largely related to the overall "scale" and/or complexity of the business. For example, when a business has relatively low levels of output or sales, it may not require costs associated with functions such as human resource management or a fully-resourced finance department. However, as the scale of the business grows (e.g. output, number people employed, number and complexity of transactions) then more resources are required. If production rises suddenly then some short-term increase in warehousing and/or transport may be required. In these circumstances, we say that part of the cost is variable and part fixed.

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