UNIT 2: THEORY OF COST

Concerned with Financial aspect of production.

Cost concepts - Types of costs:

1] Accounting cost & Economic cost:

a] Accounting cost: involves cash payment by Business.

Explicit cost ✔

Eg :- Payment made for various factors of production.

Wages Rent Interest

Implicit cost :-

Cost of using self owned factors

Jassi
- Job offer - ₹12 Lac p.a.
- JKL [Jassi ki Lassi]

Total Revenue -	₹30,00,000
(-) Accounting cost -	₹10,00,000
Accounting profit -	₹20,00,000
(-) Implicit cost	(12,00,000)
Economic Profit	8,00,000

Eco Cost: Exp - 1000000, Imp - 1200000, 2200000

	(25,00,000)
	(5,00,000)

Not the actual cash expenditure but represents the opportunity cost of using resources of entrepreneur in business.

Economic Cost = Explicit cost + Implicit cost

Total Revenue	XXX
(-) Economic Cost	(XXX)
Economic Profit	XXX

Economic cost includes:-

Implicit cost
a) Normal return on money invested by entrepreneur in business.
b) Wages/Salary not paid to Entrepreneur.
c) Monetary rewards for all factors owned by entrepreneur. Rent

Important Concepts:-

(i) Normal Profit:

Total Revenue - ₹30,00,000
(-) Accounting cost - ₹10,00,000
Accounting profit - ₹20,00,000 ✓

30,00,000
Economic-cost

(-) Implicit cost (20,00,000) ✓
Economic Profit Zero ✓

- Zero Economic Profit = Normal Profit
- Accounting Profit = Implicit cost
- Total Revenue = Total Economic Cost

(ii) Super Normal Profit:

Total Revenue - ₹30,00,000
(-) Accounting cost - ₹10,00,000
Accounting profit - ₹20,00,000

22,00,000

✓(-) Implicit cost (12,00,000)
Economic Profit 8,00,000

- Positive Economic Profit = Super Normal Profit
- Total Revenue > Economic Cost

Acc. profit > Implicit cost

2] Outlay cost & Opportunity cost:

a] Outlay cost: - Accounting cost
- Explicit cost

Actual Expenditure Eg :- Wages, Rent

b] Opportunity cost: Implicit cost is a type of opportunity cost.
- Cost of next best alternative
- Cost of missed opportunity

Eg :-
- Mutual funds [20%] - ₹20,000 ✓
- ₹1,00,000 → Fixed Deposit [8%] - ₹8,000
- Saving A/C [3%] - ₹3,000

3] Direct & Indirect cost:

a] Direct/Traceable cost: Readily identified & are traceable to a particular product, ~~operation & plant.~~

Eg :- Raw Material - Bread in Sandwich, Milk in Chai

b] Indirect/Overhead cost: Not easily indentifiable in relation to product.

Eg :- Rent, Electricity expenditure, etc.

→ However, they are charged to different products in Standard Accounting practice.

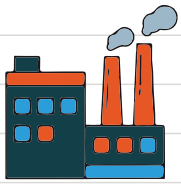
4] Incremental & Sunk cost:

a] Incremental cost: Additional cost incurred by the firm as a result of Business decision.

↓
Marginal Cost

↓
To change product line.

↓
To replace worn out Machine.



Factory

Capacity - 100,000 units

At present - 90,000 units

New order - 30,000 units

Accept → Additional cost

↓
Incremental cost

b] Sunk cost: Cost already incurred - which can't be recovered.

Eg :- Research, Advertisement expenditure, License, etc.

Important

→ Sunk Cost act as an ~~importatnt~~ barrier to entry of firms into the business.

5] Historical cost & Replacement cost:

a] Historical Cost: Refers to the cost incurred in the past on acquisition of assets such as Machines, Building.

b] Replacement Cost: Expenditure that has to be incurred for replacing an old Asset.

6] Private cost & Social cost:

a] Private Cost: Cost incurred by the firm.

- Implicit Cost
- Explicit Cost

b] Social Cost: Cost incurred by society on account of business activity.

- Society
- External Cost
  - Pollution → Health Issues
- Private Cost

Fixed Cost:

Eg :-1 Machine - ₹100,000
Capacity - 10,000 units

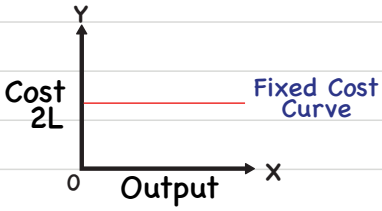
0 ——▼—— 10,000 units
FC - 100,000

Eg :-2 Offline Classes: Rent - ₹200,000 p.m.
Capacity - 500 Students

0 ——▼—— 500
FC - 200,000 p.m.

- FC do not vary with output upto a certain level of activity.
  - Independent of output
- FC is the Function of capacity. ✓
- Cannot be avoided - Temporary shut down
  - Can be avoided only when operations are completely shut down.

capacity



- Shut down cost:
  Cost which will continue even after operations are suspended.
  Eg :- Storing of old Machines which are not yet sold in the Market.

- Programmed Fixed cost or Discretionary expenditure:
  Depends on the decision of the Management.
  Eg :- Advertising.

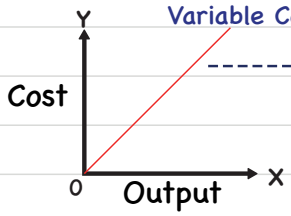
Variable Cost:

Cost which changes with change in output.

---▶ Function of Output.

Eg :- Raw material, Wages. ✔

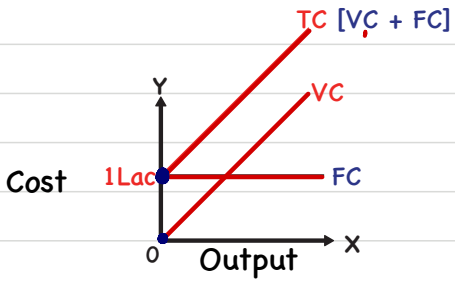
---▶ In case of Temporary Shut down - No variable cost



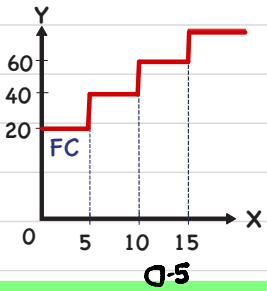
-------▶ Assumptions: VC changes Linearly with changes in output.
Same proportion

---▶ Semi-Variable Cost / Semi-Fixed Cost :

Eg :- Application Services: ₹100,000 - FC
+ 10% commision on every sale - VC



---▶ Stair-Step variable cost



Q-5

---▶ Fixed over certain range of output
+ new level when output goes beyond a given limit.

Cost Function:

Dependent Variable — Cost

Independent Variable — Determinants of cost
- Output
- Price of factors
- Technology

---▶ Mathematical relationship between cost of a product & various determinants of cost.

---▶ Cost function is obtained from Production function & Market supply of inputs.
Market Price

Cost Function

- Short Run Cost Function ◀--- Variable + Fixed factors
- Long Run Cost Function ---▶ All factors are variable

Short Run Cost Function:

Types of factors

- **Variable factors**
  Eg:- Raw Material, Wages.
- **Fixed factors**
  Eg:- Capital equipments, Rent, Top level Management Salary

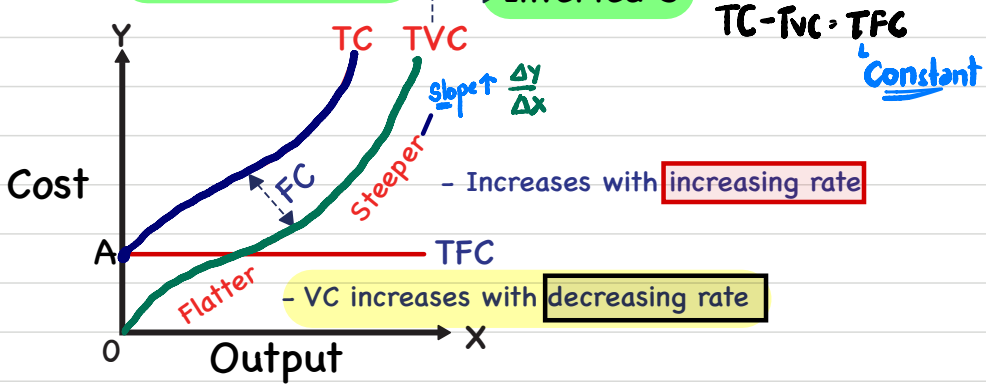
Short Run Total Cost :-

TVC ⟷ TFC

TC = TVC + TFC

Inverted S

TC - TVC = TFC (Constant)



Units of output	Total fixed cost	Total variable cost	Total cost
0	1000	0	1000
1	1000	50	1050
2	1000	90	1090
3	1000	140	1140
4	1000	196	1196
5	1000	255	1255
6	1000	325	1325
7	1000	400	1400
8	1000	480	1480
9	1000	570	1570
10	1000	670	1670
11	1000	780	1780
12	1000	1080	2080

(+40, 50, 56, 59, 100, 300; 50, 40, 59, 300)

---▶ 1] TFC remains fixed for the whole range of output, even if output is zero
  --▶ Parallel to X-axis

---▶ 2] TVC rises upwards indicating that as output ↑ TVC ↑.
  --▶ Inverted S shape
  --▶ It starts from origin, because VC = 0 when output = 0

---▶ 3] TC is addition of TFC + TVC (Add)
  --▶ Slope of TC & TVC are same at every level of ouput.

---▶ 4] Vertical distance between TC & TVC = TFC
  --▶ TFC, which remains fixed.

Explanation:

1] TVC initially increases at decreasing rate & then at an increasing rate with increase in output.

Because of Law of variable proportion

Stage I

Due to Increasing Return to factor

1 labour

Fewer quantity of variable inputs are required to produce the given output.

120 units

Stage II

Due to Diminishing Return to factor

2 lab.

Larger quantity of variable inputs are required to produce the same quantity of output.

120 units

VC curve is Steeper at higher level of output.

Short Run Average Cost :-

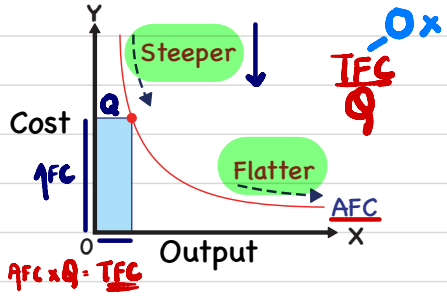
Units of output	Total fixed cost	Total variable cost	Total cost	Average fixed cost	Average variable cost	Average total cost	Marginal cost
0	1000	0	1000				
1	1000	50	1050	1000.00	50.00	1050.00	50
2	1000	90	1090	500.00	45.00	545.00	40
3	1000	140	1140	333.33	46.67	380.00	50
4	1000	196	1196	250.00	49.00	299.00	56
5	1000	255	1255	200.00	51.00	251.00	59
6	1000	325	1325	166.67	54.17	220..83	70
7	1000	400	1400	142.86	57.14	200.00	75
8	1000	480	1480	125.00	60.00	185.00	80
9	1000	570	1570	111.11	63.33	174.44	90
10	1000	670	1670	100.00	67.00	167.00	100
11	1000	780	1780	90.91	70.91	161.82	110
12	1000	1080	2080	83.33	90.00	173.33	300

1] Average Fixed cost:

$\frac{TFC}{Q}$ → Average Fixed cost per unit of output

- Since TFC is a constant amount, AFC will fall as output increases.
- AFC will keep on falling but never touch x-axis.
  - i.e. will never be zero

AFC = Rectangular Hyperbola
Area = AFC × Q
= TFC
→ Consatnt



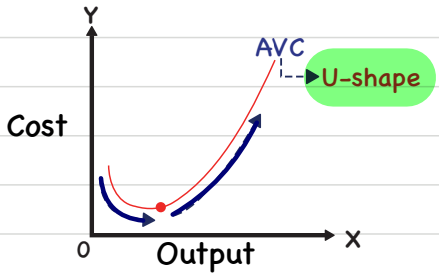
2] Average Variable cost:

Avg.

$\frac{TVC}{Q}$, Variable cost per unit of output

Shape of AVC

- Falls as output increases from zero to normal capacity. → Increasing return to a variable factor
- Increases, Steeply beyond normal capacity output. → Diminishing Returns



3] Marginal cost:

MC is addition to TC due to production of additional unit of output.

Eg :-

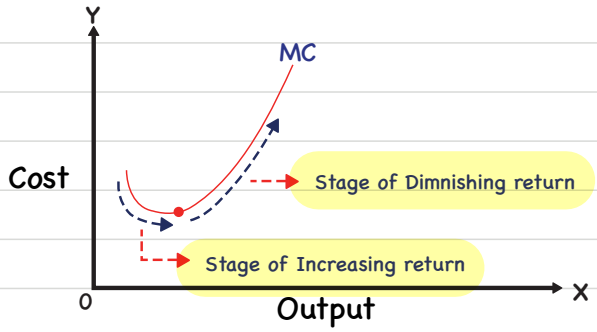
Output	TC
1	120
2	150
5	210

$MC = TC_2 - TC_1$

$MC = 150 - 120$

$MC = 30$

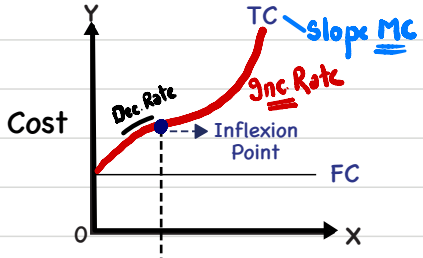
$MC = \frac{\Delta TC}{\Delta Q} = \frac{60}{3} = 20$

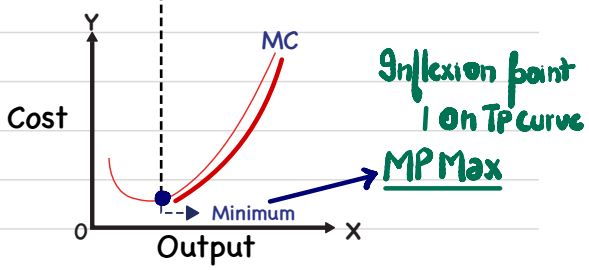


1. $MC = TC_N - TC_{N-1}$
2. $MC = \frac{\Delta TC}{\Delta Q}$ → Slope of TC

$\Rightarrow \frac{\Delta TVC + \Delta TFC}{\Delta Q} = \frac{\Delta TVC}{\Delta Q}$ (Change hi nhi hoti)

- MC is independent of FC.
- MC is the result of change in Variable cost.





a) MC curve is **Minimum** at Inflexion point on TC curve.
b) MC starts to **Rise** after inflexion point.

4] Average Total cost:

$$\frac{TC}{Q} = \frac{TVC + TFC}{Q}$$

$$= \frac{TVC}{Q} + \frac{TFC}{Q} \Rightarrow AVC + AFC$$

---▶ Behaviour of ATC depends upon behaviour of AVC + AFC

1] In the beginning, both AVC & AFC falls, therefore ATC curve also falls sharply.

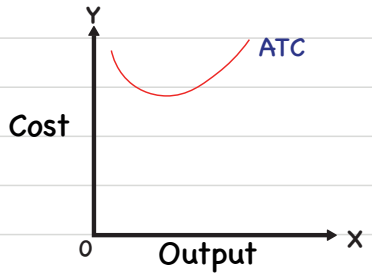
2] When AVC starts to rise but AFC keeps on decreasing.

Fall in AFC > Rise in AVC

→ ATC continues to Fall.

3] As output increases further, there is a sharp rise in AVC, which is more than fall in AFC.

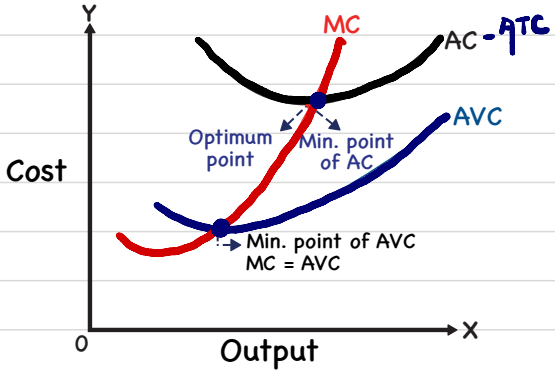
→ ATC starts to Rise.



→ Relationship between AC & MC :-

1. AC > MC ---▶ AC falls
2. AC < MC ---▶ AC rises
3. AC = MC ---▶ AC is at minimum point
   → Optimum point

Marg > Avg, Avg ↑
Avg > Marg, Avg ↓



→ Long Run Average Cost:

→ All factors are variable

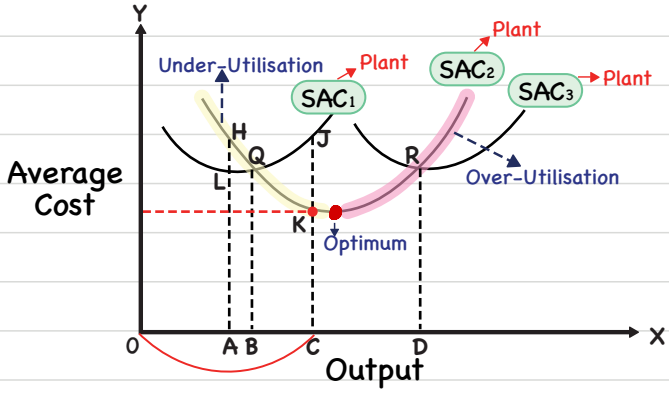
Long Run ---▶ Planning Horizon
Short Run ---▶ Production Horizon

---▶ In the Long Run

- firms can build any size or scale of plant
- can move from one plant to another
- acquire a big plant - if want to increase scale
- acquire a small plant - if want to decrease scale

---▶ Long Run cost of production

Least possible cost of producing any level of output when all factors are variable.



In the long run, the firm will examine which size of plant or on which SAC curve, it should operate to produce output at minimum cost.

---▶ To Produce the following outputs, which SAC curve to choose ?

1] OA - SAC_1

2] OB - SAC_1 or SAC_2

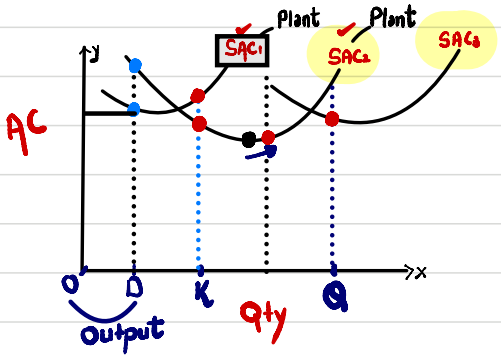
---▶ upto OB level of output - SAC_1

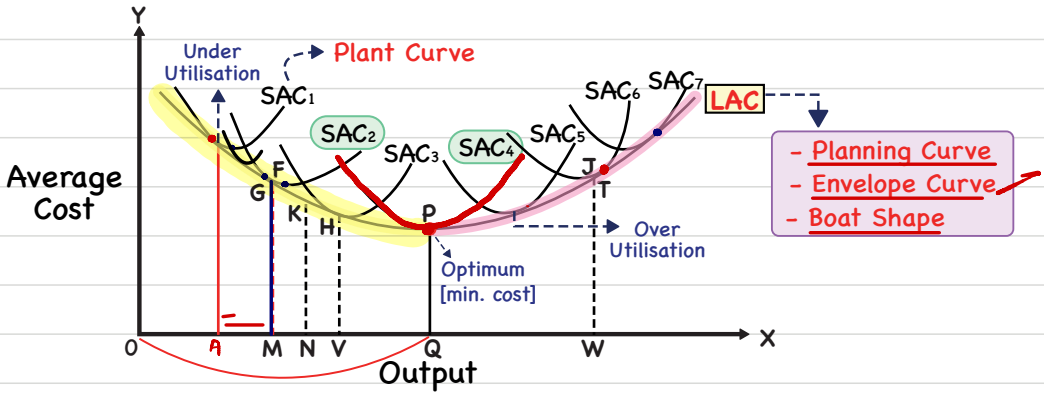
3] OC - SAC_2

OD - SAC_2 or SAC_3

---▶ from OB upto OD - SAC_2

4] Beyond OD - SAC_3





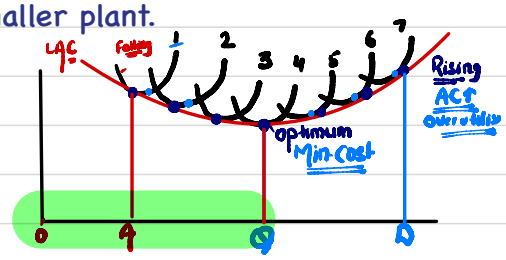
- Planning Curve
- Envelope Curve
- Boat Shape

Long Run cost curve - Depicts the relationship between output & Long Run cost of production.

---▶ LAC curve is a smooth curve enveloping all SAC curves.

---▶ LAC curve is tangent to SAC curve.

---▶ Larger output can be produced at Lowest cost with larger plant whereas Smaller output can be produced at the Lowest cost with Smaller plant.



Important Point :

LAC curve is not Tangent to the minimum point of the SAC curve

When LAC is declining
- It is tangent to the Falling portion to SAC
- For output less than OQ
  - Firm has to operate at less than full capacity [underutilisation]

When LAC is rising
- It is tangent to the Rising portion to SAC
- For output greater than OQ
  - Firm has to operate beyond optimum capacity.

OQ is the optimum output
- Min. point of LAC & corresponding SAC

---▶ Why 'U' shape of LAC ?
- Nothing to do with 'U' shape of SAC

U shape arises due to Law of Returns to Scale

Increasing Return to Scale
- Fall in LAC
- Economies of Scale

Decreasing Return to Scale
- Rise in LAC
- Diseconomies of Scale

---▶ The above analysis is based on Traditional economic analysis.

Empirical Evidence shows that Modern firms face "L" shape LAC curve
- Initially, when output is increased due to increase in size of plant
  - p.u. cost falls rapidly
    - Economies of Scale

---▶ LAC curve does not rise even after large scale of output

Economies & Diseconomies of Scale

Internal Economics

- Benefits which accrue to the firm when it expands due to own efforts.
- Due to Endogenous factors.
  - arising within firm
- Factors relating to:
  - Efficiency of the entrepreneur ✓
  - Managerial Talents ✓
  - Type of Machine used ✓
  - Marketing strategy adopted. ✓
- Benefits are available exclusively to the firm.

External Economics

- Benefits accruing to each member firm of the Industry as a result of expansion of industry.
- Not dependent on the output level of individual firm.

Diseconomies

1] Internal Economies & ~~Diseconmies~~ :-

	Economies	Diseconomies
1]Technical	With increase in operations, it becomes possible to use superior technology, specialised equipment & machinery → More efficiency → Average cost ↓ → Advantage of composite technology. → Greater degree of division of labour & specialisation.	Beyond a certain point, → Difficulties of management → Difficulties to exercise control & co-ordination.
2] Managerial Economies	Possible to divide its management into specialised department - Sales, Marketing, HR, tech, etc. → Management efficiency ↑ Increase in productivity ↑ → Decentralisation of decision making & Machanisation of Managerial functions.	Communication at diff level b/w Manager & Labourer become difficult → Delay in decision making → Difficult to exercise control & co-ordination → Red-tapism, bureaucracy Paper work
3] Commercial economies	→ Bulk order for Materials ✓ → Lower p.u of cost → Marketing : Additional output can be sold at little or no cost, when sales staff is not being worked to full capacity.	→ After optimum scale, Advertisement expense & other Marketing expense will increase more proportionately.

	--→ Large firm may also be able to sell its by - products. --→ Economies of transport & storage.	
4] Financial	--→ Large firms can easily procure finance. --→ Offer better Security to Bankers. --→ Investors have greater confidence in large firm --→ Raise capital at lower cost.	--→ Cost of raising finance will rise. Because of greater dependence on external finance.
5] Risk Bearing	Large business with diverse & multi production capability. better position to withstand economic ups & downs.	Diversification, instead of giving a cover to economic disturbance, increases it.

2] External economies & Diseconomies :-

--→1.Economies:-

a) **Raw Material & Capital Equipement:**
- Exploration of new & cheaper source of raw Material, machinery & Capital Equipment.
- Procurement of material & equipment at competitive prices.

b) **Technology:**
- Discovery of new technical knowledge.
- Use of improved & better Machinery
- Increase in productivity.

c) **Development of skilled Labour:**
- Pool of trained labour is developed.
- Labourer in the area are well experienced.

d) **Growth of ancillary industries:** Supporting
- Expansion of industry encourages the growth of ancillary industry.
- Which specialises in the supply of raw material, tools, repair services.
- Inputs prices go down in a competitive market.

e) Better Transportation & Marketing facilities: Expansion may make possible the developement of efficient transportation & marketing network.

f) Economics of Information: Necessary info regarding technology, Labour price & products may be easily & cheaply available.

2.Diseconomies:-

1. Rise in various factor prices.
   - because of increase in demand of Raw Material, Labour, etc.
2. Higher Trasportation & Marketing cost.
3. Government may prohibit or restrict expansion of industry at a particular place.
   - Regional disparity

Unit over :)