Economics

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6TH YEAR

HIGHER LEVEL

2020-21

COSTS OF PRODUCTION

Costs - Main topics to be covered

1 Factors of Production – page 2.

2 Short-Run and Long-Run – pages 2,28.

3 Fixed Costs and Variable Costs – pages 2,26,30.

4 The Law of Diminishing Returns – pages 2,12.

5 AFC, AVC, ATC and MC all in the Short-Run – pages 3,4,5,11,12,15,20,30,32,33.

6 Relationship between Marginal Cost and Average Total Cost – pages 5,11,15,23,25.

7 Long-Run costs and Economies and Diseconomies of Scale – pages 6,7,11,12,15,26.

8 Profit Maximisation – pages 8,9,10,23,28,30,32.

9 Explicit Costs versus Implicit Costs – page 25.

10 Normal Profit versus Supernormal Profit – page 25.

11 Social Costs versus Social Benefits – pages 12,14,20.

12 Marginal Cost of Labour – page 11.

13 Implications of skill shortages – page 33.

14 Factors affecting competitiveness – page 28.

15 Advantages of small-scale production – page 13,15,28.

16 Additions to old course as a result of the new syllabus – pages 36, 37.

Factors of Production

There are 4 factors of production, Land, Labour, Capital and Enterprise. The return to land is rent, the return to labour is wages, the return to capital is interest and the return to enterprise is profit.

The Short-Run – This is a period of time in which at **least one of the factors of production is fixed**. Assume **capital** is fixed in the short-run i.e. the size of the factory.
The length of the short-run varies according to the nature of the business e.g. the short-run for the ESB is up to 3 years i.e. the length of time it takes to build a new power station. With a corner shop it could be 3 months i.e. the length of time it takes to build an extension. With a milk delivery person it might be 1 week i.e. the length of time it takes to buy a bigger van.

The Long-Run –This is a period of time in which **all factors of production are variable**. In the case of the ESB it is anything beyond 3 years.

Fixed Costs and Variable Costs – A fixed cost is a cost that doesn't change as production changes e.g. Rent, factory manager's salary. A variable cost is a cost that increases as production increases e.g. raw materials, wages et cetera.

The Law of Diminishing Returns – As more and more of a **variable factor** of production (labour) is added to a **fixed factor** of production (capital) eventually a point will be reached whereby the increase in output will begin to decline.

| Labour Workers	Total Output Units	Marginal Output Units
1	10	10
2	25	15
3	45	20
4	70	25
5	80	10

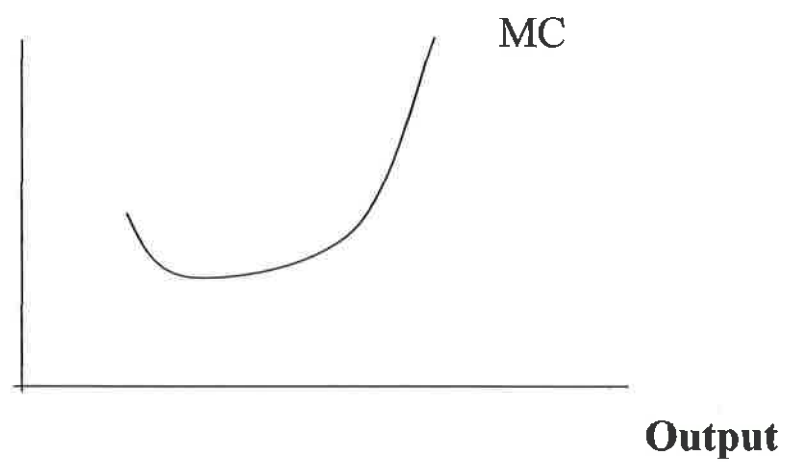The Law of Diminishing Returns sets in on the 5th worker and this causes the Average Variable Cost (AVC) to rise.

Output	Fixed Cost	Variable Cost	Total Cost	Marginal Cost	AFC	AVC	ATC
0	40	0	40	0	0	0	0
1	40	60	100	60	40	60	100
2	40	110	150	50	20	55	75
3	40	150	190	40	13⅓	50	63⅓
4	40	180	220	30	10	45	55
5	40	240	280	60	8	48	56
6	40	340	380	100	6⅔	56⅔	63⅓
7	40	500	540	160	5.7	71.4	77.1

Average Fixed Costs

Average Variable Cost

4

Average Total Cost

Costs

ATC
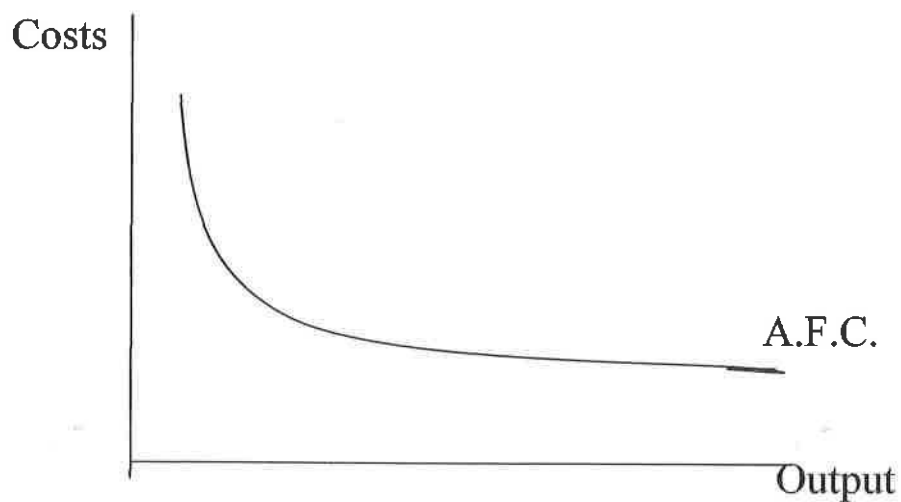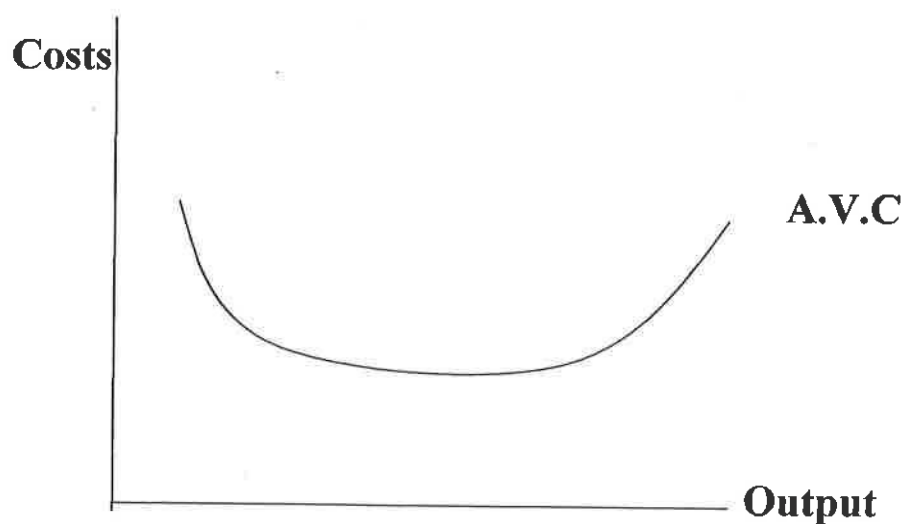
Output

Marginal Cost

Cost

MC
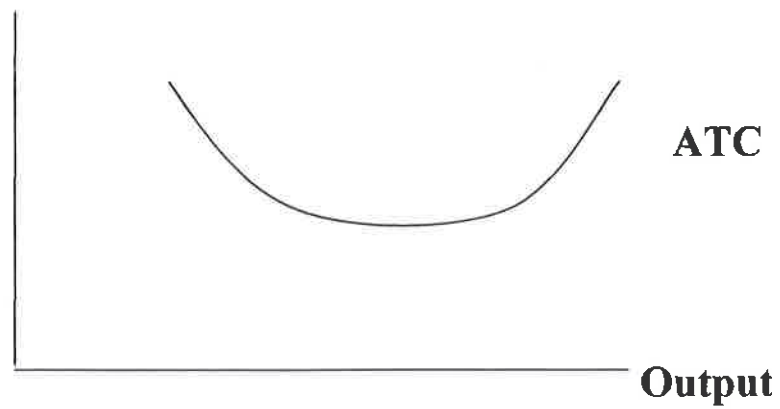
Output

Short Run Costs

Costs

MC   ATC

AVC

AFC

Output
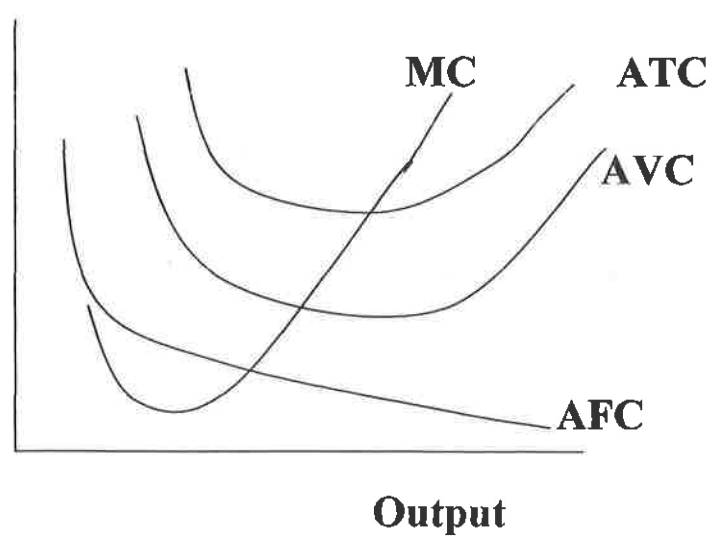
The average fixed cost curve shape is determined by **economies of scale**.

The average variable cost curve shape is determined by **specialisation** of the workforce and later the **law of diminishing returns.**

The average total cost curve falls initially due to economies of scale and the specialisation of the workforce. It rises, eventually, due to The Law of Diminishing Returns

The Marginal cost curve cuts the average total cost curve at its lowest point for the following reasons.

Relationship between MC and ATC

(i) When marginal cost is **less than** average total cost or AC then average total cost must **fall.**

If you are producing 2 units costing €6 each the total cost of the 2 units combined is €12 and the average total cost is €6 each. We decide to produce on extra unit costing €3 so the marginal cost (the extra cost incurred in producing one extra unit) is €3. The total cost of the 3 units combined is €6 + €6 + €3 = €15 and the average total cost is €15 ÷ 3 units which equals €5. When the marginal cost of €3 is less than the average total cost of €6 then the average total cost falls to €5.

(ii) When the marginal cost is **greater than** the average total cost then the average total cost must **rise**.............

(iii) When the marginal cost equals the average total cost then the average total cost remains the same.

Marginal Cost and Average Total Cost
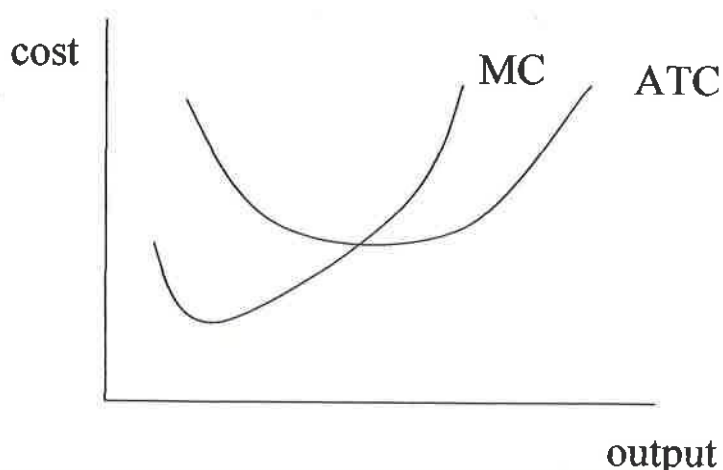
Long-Run Costs

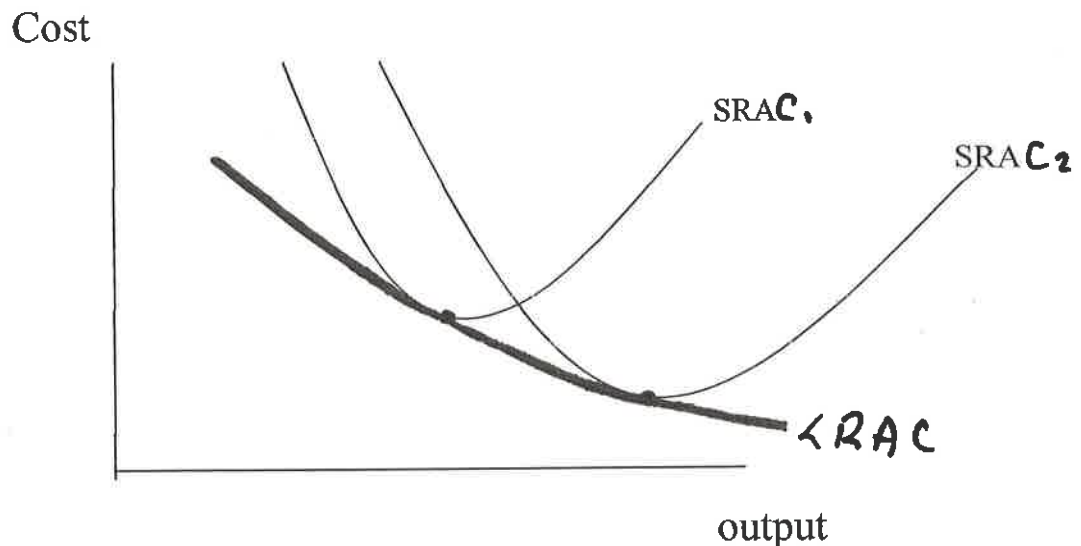In the long run all factors of production are variable (there are no fixed costs). The entrepreneur will choose whatever size factory (capital) gives him the lowest cost per unit.

Long Run Average Total Cost

Cost

SRAC$_1$

SRAC$_2$

LRAC

output

The long run average total cost can have many different shapes, and these shapes depend on economies of scale and diseconomies of scale (both internal and external). These will be shown in class.

Internal Economies of Scale

These are factors occurring within the firm that cause **cost per unit to fall** as the firm becomes larger and produces more goods.

Examples include –

1. Large firms can order their raw materials in bulk and gain large discounts.
2. Workers can specialise in big firms and become more productive reducing cost per unit for the business.
3. Large firms can negotiate cheaper finance from the banks …
4. Building economies and advertising economies…..

Internal Diseconomies of Scale

These are factors that cause **cost per unit to rise** as the firm becomes larger and produces more goods.

Examples include –

1. Worker morale in a large firm suffers leading to absenteeism, labour turnover and so on, all of which contribute to rising costs per unit.

2. The difficulties in managing a large complex enterprise leads to management making incorrect decisions that increase cost per unit.

3. Administration costs increase very quickly in a large firm….

External Economies of Scale

These are factors, as the **industry** in which the firm operates increases in size, that cause **cost per unit** of the individual firm **to fall.**

Examples include –

1. Specialised firms set up providing parts for the bigger firms e.g. as the car industry grew in size specialised firms producing gear boxes and tyres were established.

2. Training courses are set up and these make workers more skilled increasing their productivity.

3. Better infrastructure …

External Diseconomies of Scale

These are factors, as the **industry** in which the firm operates increases in size, that cause **cost per unit** of the individual firm **to rise.**

Examples include –

1. Shortages of skilled labour forcing up wages and cost per unit.

2. Bottlenecks in the infrastructure such as traffic jams and raw materials arriving late.

Profit Maximisation

In order to earn the highest level of profit a firm must produce the level of output where –

(i) Marginal Cost = Marginal revenue i.e. where the extra cost incurred in producing one extra unit equals the extra revenue earned from selling one extra unit.

(ii) Beyond the above level of output **MC must be higher than MR.**

(iii) In the short run the **revenue** earned by the firm must be greater than **variable cost.** In the long run the revenue earned by the firm must at least equal **total cost, which** includes normal profit.

Normal Profit is the minimum profit an entrepreneur must earn in order to continue operating as an entrepreneur. It is part of the cost of production of a firm. If the entrepreneur does not earn normal profit in the long run, production will cease.

Output	TC	MC	TR	MR	Profit
1	35	35	25	25	- 10
2	61	26	50	25	- 11
3	75	14	75	25	0
4	90	15	100	25	10
5	106	16	125	25	19
6	123	17	150	25	27
7	148	25	175	25	27
8	182	34	200	25	18

The firm maximises profit at 7 units where marginal cost = marginal revenue. Beyond that point at 8 units, marginal cost of €34 is greater than the marginal revenue of €25, so that if the firm was to produce 8 units profit would fall by €9.

Social Cost is the price that society has to pay for the existence of a particular good or service e.g. noise pollution, water pollution, traffic congestion, urban sprawl, and disfigurement of the landscape.

Leaving Certificate 1978

Output	Fixed Costs	Variable Costs	Selling Price
1	450	200	500
2	450	280	350
3	450	350	306
4	450	410	270
5	450	480	230
6	450	550	200

a) Show the equilibrium level of output using marginal criteria.

b) What is the total profit at equilibrium?

c) If a new firm enters the market and reduces the above company's sales to 2 units per week at €350 what would you advise the company to do?

Solution –

Output	FC	VC	TC	MC	SP	TR	MR	Profit
1	450	200	650	0	500	500	0	- 150
2	450	280	730	80	350	700	200	-30
3	450	350	800	70	306	918	218	118
4	450	410	860	60	270	1080	162	220
5	450	480	930	70	230	1150	70	220
6	450	550	1000	70	200	1200	50	200

a) The equilibrium level of output is at 5 units where **marginal cost = marginal revenue.**

b) The profit at 5 units is **€220.** This is found by subtracting total cost of €930 from total revenue of €1150.

c) At 2 units the total cost is €730 and this is greater than the total revenue of €700. The firm is making a **loss of €30**. Should the firm close?

The firm should remain **open in the short run** as long as its revenue exceeds its variable cost and make a contribution to its fixed cost. At 2 units the revenue of the firm is €700 and this is much greater than the variable cost of €280. The revenue then makes a €420 contribution to fixed costs of €450. In the short run if the firm closed it would still have to pay its fixed costs

and it would lose €450. If it remains open it will only lose €30. By remaining open for business it is **minimising its losses**.
In the long run the firm should remain open only if its revenue covers all costs including normal profit.

Leaving Certificate 1989

Max Flow Ltd incurred the following costs in producing their maximum output of 2 units per week. Rent €2500 per week; Normal Profit €400 (€200 per unit); Labour €500 per week; Materials €600 (€300 per unit). What is the minimum price at which each unit can be sold if production is to continue in a) the short run and b) the long run.
Solution –
a) 500 + 600 ÷ 2 = 550, so the minimum price is €551 per unit.
b) 1100 + 2500 + 400 = 4000 ÷ 2 = €2000 per unit.

Leaving Certificate 1982

The following are the costs incurred by an entrepreneur in producing his maximum output of one item per week –

Rent €50 per week; Wages €300 per week; Raw materials €250 per unit; Electricity charges €80 per week and Normal Profit is €100 per unit produced.
What is the minimum price at which the item can be sold if production is to continue in (1) the short run, and (2) the long run.
Solution –
1. In the **short run** a firm's revenue must **cover its variable cost** and make a **contribution to its fixed cost** if it is to stay in business. In this question there are 3 variable costs wages €300 + Materials €250 + Electricity €80 adding up to a total of €630. The minimum price must be above €630 say €631. If it sells for €631, the firm covers its variable cost of €630 and makes a €1 contribution to its fixed costs. If the firm was to close down it would lose €50 per week (the rent). By staying open at a price of €631, it is losing less, €49. The firm is minimising its losses.

2. In the long run a firm's **revenue must cover all costs including normal profit**, which in economics is regarded as being part of the cost of production. Variable Costs of €630 + Rent of €50 + Normal Profit of €100 = €780. So the minimum price is €780.

Leaving Certificate 2000

a) Draw the short run and the long run average cost curves. Explain the reasons for the shape of each curve.

b) With the aid of 2 clearly labelled diagrams, explain the relationship between: (i) the short run and the long run average cost curves, (ii) the short run average and marginal cost curves.

c) A firm wishes to increase its labour force from 5 to 6 employees. In order to do so the firm must raise the weekly wage from €200 to €230 per worker. (i) Explain what is meant by the term marginal cost of labour, (ii) Calculate, using the above data, the firm's marginal cost of labour.

Solution –

a) Refer to pages 4, 5, 6.

b) Refer to pages 4, 5, 6.

c) Marginal cost is the addition to total cost as a result of employing one additional unit of labour.

    5 workers x €200 = €1000

    6 workers x €230 = €1380

The marginal cost of one extra worker is €380.

Leaving Certificate 2002

a) Draw the short run average cost curve and the short run marginal cost curve and explain the relationship between the shapes of these curves.

b) It is generally agreed that the long run average cost curve initially slopes downwards due to <u>economies of scale</u> and then slopes upwards due to <u>diseconomies of scale</u>. These economies and diseconomies of scale can be internal and external.

Define the underlined terms and distinguish between internal and external economies of scale giving 2 examples of each.

c) Discuss the possible social costs and benefits of the construction of new roads in Ireland.

Solution –

a) Answered in Leaving Certificate 2000.

b) Refer to page 6 and 7.

c) Social costs include pollution, displacement of people, disfiguration of the landscape, and loss of business as construction work takes place.

Social benefits include increasing employment in the construction industry; Irish industry becomes more competitive as goods can get to the market place much faster; Life in the towns and cities of Ireland becomes more bearable as heavy traffic is removed from city centres.

Develop all points.

Leaving Certificate 2004

a) (i) State the Law of Diminishing Marginal Returns.

(ii) Using the table below, state at which level of employment diminishing marginal returns sets in.

Number of persons employed	1	2	3	4	5
Total Output in units	14	30	50	64	76
Marginal Output in units	14	?	?	?	?

b) The short run average cost curve of a firm slopes downwards initially, and afterwards slopes upwards. Explain.

c) It is generally agreed that the long run average cost curve initially slopes downwards due to economies of scale and then slopes upwards due to diseconomies of scale. These economies and diseconomies can be both internal and external.

(i) Define the underlined terms.

(ii) Distinguish between internal and external economies of scale, giving 2 examples in each case.

d) While there can be advantages from producing on a large scale, the majority of Irish firms are small. Explain 3 reasons why small firms survive in the Irish economy.

Solution –

a) (i) The Law of Diminishing Returns states that as more units of a variable factor of production are added to a fixed factor of production the returns to the variable factor of production will eventually decline.

(ii)
Persons	1	2	3	4	5
Total Output	14	30	50	64	76
Marginal Output	14	16	20	14	12

Diminishing returns sets in **after the 3rd person** because the marginal output has declined from 20 units to 14 units.

b) **The short run average cost curve** initially slopes **downwards** because existing workers become more efficient and fixed costs per unit falls due to economies of scale as the number of units produced increases.

The short run average cost curve increases due to the Law of Diminishing Returns, which results in an increase in the amount of variable factor of production used per unit produced, resulting in higher unit costs.

c) Answered as in Leaving Certificate 2002.

d) 1 **Personal services**. Consumers may desire personal attention in the provision of goods and services and a small firm may be the only type of business that can provide this e.g. a plumber repairing household leaks.

2 **Traditional or niche markets**. Wedding planners, craft goods and perishable goods are more suitable to smaller firms. A small firm may find it easier to locate closer to the market such as roadside sellers of local produce.

3 **Consumer loyalty**. A small firm may have built up a reputation over the years in the provision of goods and services and this may make it difficult for other firms to enter the market.

Other points include – Small scale of operation, the desire of citizens to maintain their own local community, membership of voluntary groups such as Centra.

Leaving Certificate 2006

c) There has been high expenditure in recent years on developing transport and communications infrastructure in Ireland. With the use of examples, outline 2 possible social costs and 2 possible social benefits of these developments.

(30m)

Solution
Social Benefits –
1 Enhanced **social capital** – Citizens can now avail of a better transport and communications infrastructure resulting in better quality services e.g. Luas.
2 Reduced **traffic congestion** – With the new motorways, improved rail services, traffic congestion in certain areas has eased e.g. by-passes for many towns.
3 Ability to attract foreign investment ……
4 Reduced travel time and less stress …..
5 Protection of the environment…….
Social Costs –
1 The **opportunity cost** of funds – Money used to develop these projects could have been used for alternative purposes, which may have benefited society in general e.g. improvements in the health services.
2 Increase in **land prices** – Land prices adjacent to these routes along which the new roads go may increase in price, causing difficulty to those who may wish to buy land.
3 Disruptions …….
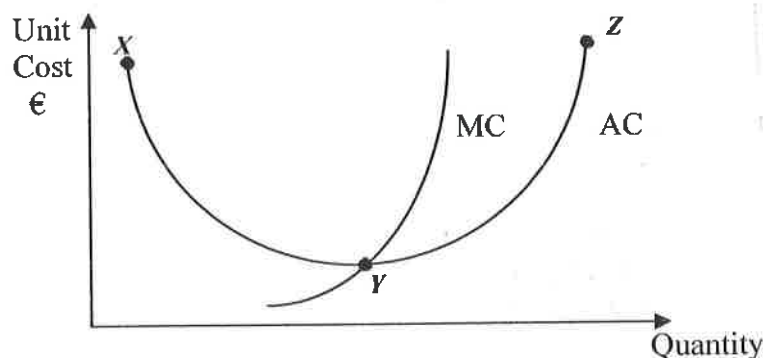4 Damage to the local environment ……..

Leaving Certificate 2009

3 a)
The Short Run Average Cost curve of a firm is usually shown as a u-shaped curve:
(i) State and explain the reasons for the shape of the AC curve;

1 from point X to Y;
2 from point Y to Z.

(ii) Explain the relationship between the Marginal Cost (MC) and Average Cost (AC) curves as shown above.

b) 'The shape of the Long Run Average Cost (LRAC) curve is determined by economies and diseconomies of scale'.
(i) Explain this statement, with the aid of a clearly labelled diagram.
(ii) Define Internal Economies of Scale and External Economies of Scale.
(iii) State and explain 2 examples of each economy of scale.

(C 'The Irish government should encourage initiatives that will prevent further cost increases and in turn sustain employment in small firms'.
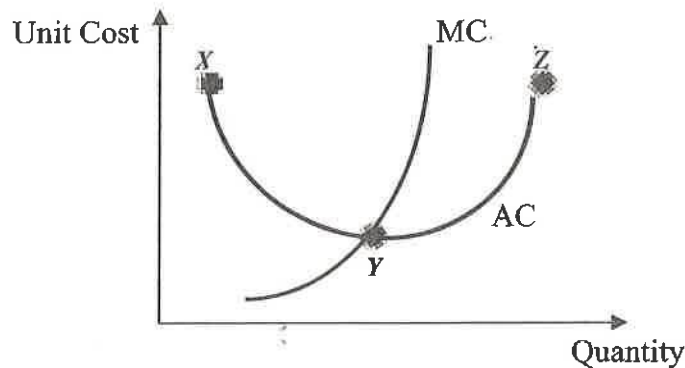Suggest, with reasons, actions the government could take to improve the competitiveness of small firms.

Solution LC 2009

(a) The Short Run Average Cost (AC) of a firm is usually shown as a U-shaped curve.

    (i) State and explain the reason(s) for the shape of the AC curve below:
- From point X to Y;
- From point Y to Z.

Downward sloping from X to Y	Upward Sloping from Y to Z
• **Specialisation:** Specialists may be employed or existing workers become more efficient resulting in lower unit costs. • **Fixed Costs spread over larger output:** As the number of units produced increases the unit cost falls.	• **The Law of Diminishing Marginal Returns.** This law will apply after a certain point resulting in an increase in the amount of variable factors used per unit produced, resulting in higher unit costs. *or* Example to illustrate why costs increase.
ONE point @ 7 marks graded	**ONE point @ 6 marks graded**

    (ii) Explain the relationship between the Marginal Cost (MC) and Average Cost (AC) curves as shown above

- When MC is greater than AC then AC is rising.

- When MC is less than AC then AC is falling.

- When MC is equal to AC the AC is at its minimum point/constant.

(b) 'The shape of a Long Run Average Cost (LRAC) curve is determined by economies and diseconomies of scale'.

(i) Explain this statement, with the aid of a clearly labelled diagram.
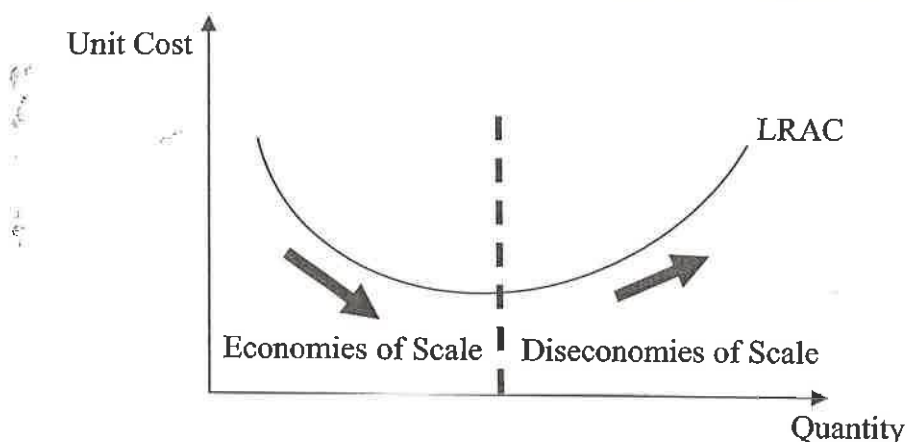
- LRAC slopes downwards due to increasing returns to scale;
- LRAC slopes downwards because economies of scale are dominant over this range of output.

- LRAC slopes upwards due to decreasing returns to scale;
- LRAC slopes upwards because diseconomies of scale are dominant over this range of output.

(ii) Define **Internal Economies of Scale** and **External Economies of Scale**.

Internal Economies of scale:

These are forces **within** a firm which cause
the average / unit costs of that firm to decline as the firm grows in size.

External Economies of scale:

These are forces **outside** a firm which cause the
average / unit costs of that firm to decline as the industry grows in size.

(iii) State and explain **two** examples of **each** economy.

INTERNAL	EXTERNAL
1. Increased use of specialised machinery A firm may be able to buy/use more specialised equipment/machinery resulting in a reduction in unit costs/machinery fully utilised	**1. Better infrastructure.** As roads / communications etc. improve they will benefit all firms.
2. Labour economies / **Greater specialisation of workers** If a particular job can be separated into separate and distinct components it may result in a reduction in costs.	**2. Bulk purchasing of raw materials by the industry.** As an industry expands firms require more materials / components. These may become cheaper as suppliers expand to meet increased demand.
3. Construction economies Large plants cost less per cubic foot than smaller ones.	**3. Development of specialist firms** Some of the jobs, which a firm once performed may be contracted out to specialist firms at reduced costs e.g. the supply of linen to hotels.
4. Buying economies Larger quantities bought may result in bigger discounts.	**4. Development of separate R & D units** As industry becomes very large, R&D agencies may set up to provide facilities for individual firms / the costs of research may be shared between firms *or* with a public body like Teagasc.
5. Economies in distribution Lower unit cost of delivery.	**5. Suppliers of Machinery** Manufacturers of machinery will be encouraged to design, develop and produce machines for expanding industry. These advanced machines will help reduce costs.
6. Financial economies Larger firms may avail of lower interest rates/larger firms better chance of acquiring a loan	**6. Development of Training Courses** Workers in expanding industries may be provided with training courses by VECs, FÁS thereby helping them become more efficient.
7. Managerial economies As a firm grows, management costs may not grow in proportion to the growth in the firm.	**7. Supports from Public Bodies.** Some public bodies help particular industries e.g. Failte Ireland / FAS may help firms in the tourism industry.
8. Production Process economies. A large firm may be able to run one process into the next without costly discontinuities	**8. Subsidiary Trades may develop** As an industry grows subsidiary trades may develop to service the expanding industry e.g Hotels, B&B's located close to airports etc.
9. Indivisibility problem reduced. If the volume of production increases, the unit cost may be lower e.g. glass-making furnaces may operate around the clock to save costs of cooling and re-heating/ full capacity used	**Internal** **2 @ 3 marks each.** **External** **2 @ 3 marks each.**
10. Marketing economies Savings in the cost of advertising e.g. NIKE advertising globally/ bigger firms bigger advertising campaigns.	

(c)

- **Reduce the minimum wage / wage restraint.**
  Employers would be able to get cheaper labour and therefore reduce costs.
  By negotiations for example through lowering direct taxes, the government could reach agreement with the social partners to limit pay rises

- **Reduce utility charges.**
  A reduction in costs for electricity, gas, postage, waste charges etc. or any state service provided for small businesses would help reduce costs of production.

- **Reduce taxation.**
  A decrease in indirect taxes e.g. VAT or excise duty on fuel or raw materials would reduce costs to small business.
  A decrease in direct taxes e.g. CPT would help firms reduce their costs.
  A reduction in income tax may encourage wage moderation thus helping firms to lower their costs.

- **Reduce bureaucracy.**
  Eliminate restrictions and excessive paperwork, thereby reducing administrative costs.

- **Subsidies to firms.**
  By reducing the rate of employer's PRSI it becomes cheaper to employ labour.
  By subsidising training costs / export credit insurance a firm's costs may decrease making them more competitive.

- **Develop infrastructure.**
  Traffic gridlock/lack of broadband and poor infrastructure generally increase costs for small business. By improving the infrastructure it should become more efficient and therefore less expensive to move goods and services around the country.

Leaving Certificate 2011
The table below shows the short run production costs for a small firm producing and selling kitchen furniture.

Units	Fixed Costs €	Variable Costs €	Total Costs €
1	400	600	1,000
2	400	1,200	1,600
3	400	1,850	2,250
4	400	2,900	3,300
5	400	4,100	4,500

a) (i) Using the information in the table above calculate the following:
  1 The marginal cost of producing the 4th unit.
  2 The average cost of producing 5 units.
  3 The profit earned by the firm selling 5 units at €1,200 per unit. (Show your workings)
(ii) Using the information in the table above, draw the firm's short run average cost curve (AC). Explain the reasons for its shape. (30)

b) 'The cost of doing business in Ireland is falling. However, some costs continue to increase or remain relatively high'
          (National Competitiveness Council Report, 2010)
(i) Discuss the economic advantages of falling costs of production for the Irish economy.
(ii) Outline possible restrictions on the growth of businesses in the Irish economy at present.   (30)

c) The British Petroleum (BP) oil spill in the Gulf of Mexico in 2010 is estimated to have cost a total of $40 bn. Identify 2 costs for BP and 2 costs to society associated with this oil spill.   (15)
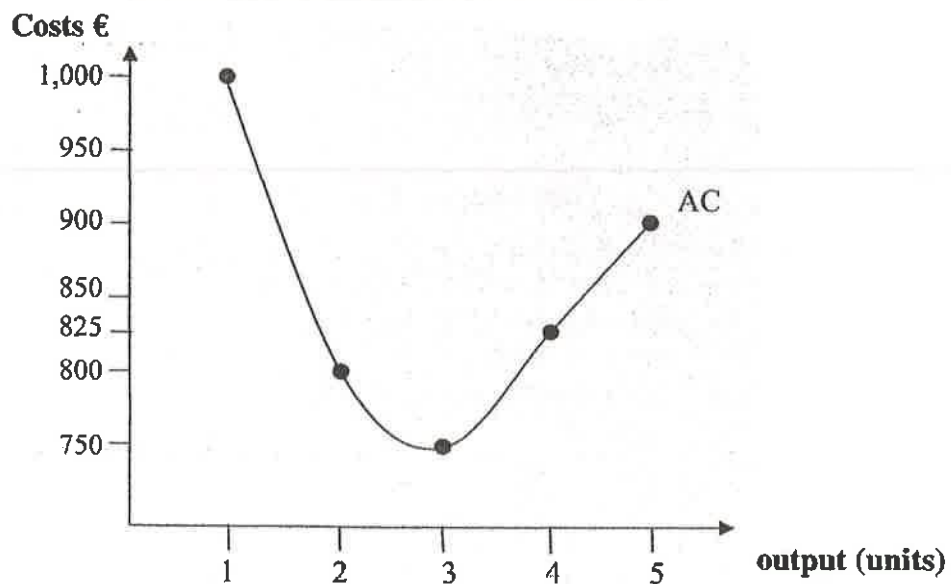
Solution –

a) (i) The marginal cost of producing the 4th unit is **€1050** (€3300-€2250).

The average cost of producing 5 units is **€900** (€4500÷ 5units).

The profit earned from selling 5 units of output at €1200 per unit is **€1500** (5 units x €1200 = €6,000 less €4500).

(ii)

The Short Run Average Cost Curve

Costs €

1,000

950

900   AC

850

825

800

750

output (units)

1   2   3   4   5

The declining portion of the average cost curve is due to the fixed costs being spread over a greater number of units, and specialisation of labour helping to reduce the variable cost per unit.

The increasing part of the average cost curve is due to the increasing variable cost per unit as a result of the Law of Diminishing Returns setting in.

b) (i) The economic advantages of falling costs of production for the Irish economy include –

1 Increased competitiveness – with lower costs firms will reduce their prices and this means Irish goods and services exported will become cheaper ......
2 Lower prices – with lower prices inflation will fall and this will encourage consumers to buy more goods and services. Sales will increase as will profits, employment and government revenue from taxation.
3 Increased employment – with rising demand businesses may increase their demand for labour or at least maintain their existing workforce.

Other points include Ireland becomes attractive for foreign investment etc.

(ii) Possible restrictions on the growth of businesses in Ireland at present include –

1 Limited availability of credit – the banking crisis has resulted in the banks having little money to loan out for potential new company start-ups and this is a major obstacle to the expansion of business.

2 Reduction in domestic demand – the continuing recession, rising unemployment, government tax increases and so on have resulted in a major fall in spending giving fewer opportunities for business expansion.

3 High cost of production – Business finds it difficult to expand in Ireland due to the very high operating costs. These include restrictive wage agreements, rates, utility costs, insurance and interest rates.

Other points include – legislation restricting mergers and takeovers, planning permission restrictions and so on.

c) **Two costs** of the BP oil spill **for BP** include –

1 **Clean-up costs** – BP are paying up to $20Bn to clean-up the affected waters, coastline and compensate fishermen and local tourist interests.

2 **Lost oil** – BP lost thousands of barrels of oil before they succeeded in capping the stricken oil rig. They have also suffered a huge fall in profits and a near halving of their share price.

Other points include - loss of new contracts to explore for oil, reputational damage and fines by the government.

Two social costs of the oil spill include –

1 **Environmental damage** – Society suffers due to damage to the waters, wildlife and natural beauty of the Gulf of Mexico.

2 **Disruption to local communities** – the spill has resulted in a downturn in economic activity in the local area leading to job losses and there is a huge fall-off in tourism. There is also damage to the food chain and a restricted supply of fish causing prices to rise.

Other points include – higher oil prices due to a fall in the supply of oil on world markets. And so on.

Leaving Certificate 2012

a) With the aid of 2 clearly labelled diagrams, explain the relationship between:

(i) The short run average cost curve and the long run average cost curve.

(ii) The short run average cost curve and the marginal cost curve.
(25marks)

b) Discuss the economic factors that should be considered by a firm when deciding where to locate its operations. (25marks)

c) Ocean Blue Ltd produces two boats weekly and incurs the following weekly costs:

Rent €1,200; Materials €2,000; Labour €1,600; Normal Profit €1,000.

What is the minimum price at which each boat can be sold if production is to continue in (i) the short run and (ii) the long run? Explain your answer in each case. (25marks)

Solution –

(a) (i) The short run and long run average cost curves –
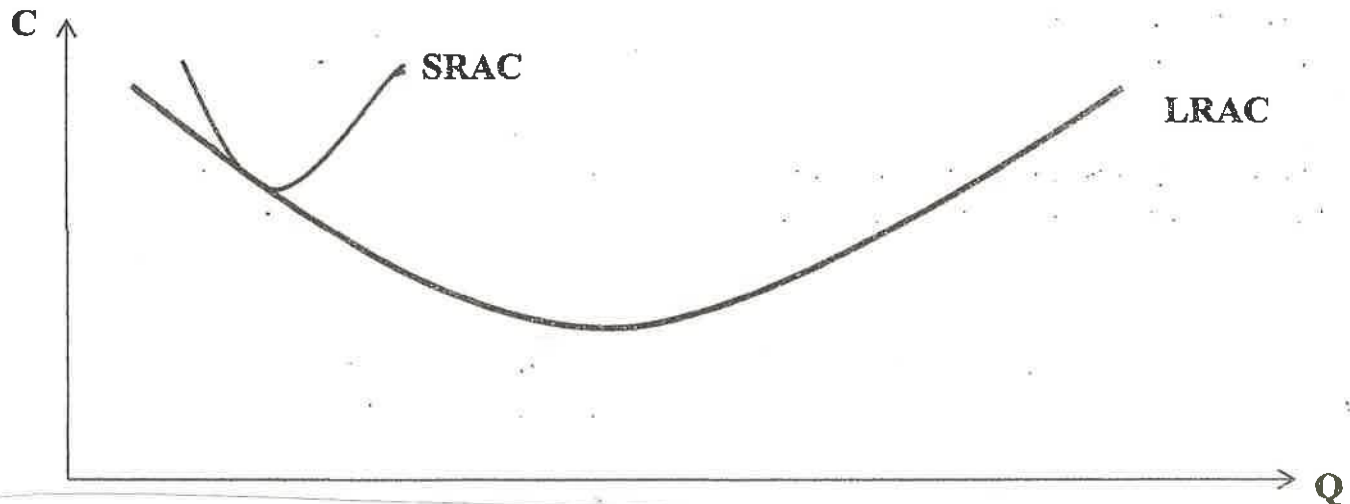

The **SRAC** curve represents a different scale of operation/size of firm. As a firm expands each SRAC represents its cost structure at a different stage of development.

The **LRAC** is made up of all the lowest points on the SRAC curves. The aim of any firm is to maximise its profits so the firm will produce where unit costs of production are cheapest along the LRAC

(ii) The short run average cost curve and marginal cost curve –
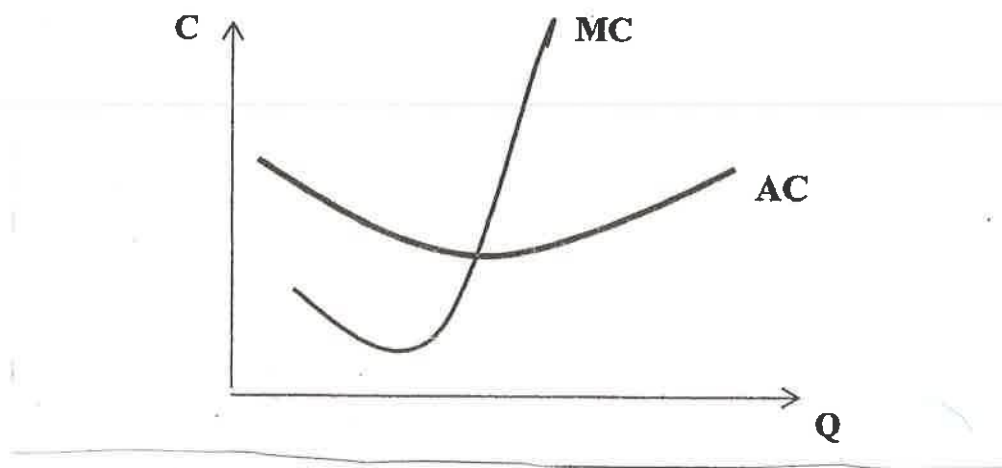
When marginal cost is less than average cost the average cost is falling. When marginal cost is greater than average cost then average cost is rising. When marginal cost equals average cost then average cost is at a minimum.

b) Economic factors to be considered by a firm when deciding where to locate its operations –

Within countries –

1 Transport infrastructure - the firm may require good efficient transport infrastructure to get their goods to the market or to source raw materials. This may include a good road network and possible closeness to a seaport or airport.

2 Access to water supplies/power – a manufacturing firm will require the uninterrupted supply of power and the supply of clean water.

3 Government incentives – there may be tax incentives/grants towards location available if the firm locates in certain areas of the country. The 12.5% corporation tax rate is one of the reasons why large foreign companies locate here.

4 Land for expansion/cost of land – If the firm plans to extend it will require land at a reasonable price for expansion.

Other points – 5 Workforce availability; 6 Planning permission; 7 Proximity to markets and raw materials.

Across countries –

1 Access to EU market/Member of the euro currency- Firms will locate where they have access to free movement of their goods within the EU. Membership of the euro makes payment for international transactions within the euro zone easier.

2 Stable economic climate/economic growth – Countries that are experiencing economic growth offer increased business confidence, larger domestic markets and this may encourage firms to locate there.
3 Low wage/production costs – Firms may locate to regions where wage rates are low and or production costs are low.
Other points – 4 Good industrial relations; 5 Attractiveness of return on investments.

c) (i) In the short run – a firm must cover its variable costs and make a contribution to its fixed costs.

Variable costs are materials and labour adding to €3,600. Divide this by 2 units and you get €1,800. So any price above €1,800 per unit.

(ii) In the long run – a firm must cover all of its costs including normal profit.
Add the variable costs of €3,600 to the rent of €1,200 and the normal profit of €1,000 to get a total cost of €5,800. Divide this by 2 units and you get €2,900 per unit.

Leaving Certificate 2015
a) In the case of any 2 of the following 3 pairs distinguish between the 2 concepts:
(i) Marginal Cost and Average Cost.
(ii) Explicit Cost and Implicit Cost.
(iii) Normal Profit and Supernormal Profit.   **(20m)**

b) The table below shows the output and production costs for a small bakery:

Units of Bread	Total Cost in €
0	100
100	200
200	280
300	330
400	360
500	450
600	600
700	770

(i) Use the data in the table above to answer the following questions:

What are the fixed costs of operating this bakery? Explain your answer.
What are the variable costs of producing 300 loaves of bread?
What is the average cost of producing 400 loaves of bread?

(ii) Using the data from the table above, draw one graph showing the following:
Total Costs.
Total Variable Costs.
Total Fixed Costs.

(iii) With reference to the graph you have drawn in part (ii) above does the graph represent the short run or the long run? Outline a reason for your answer.   (35m)

c) Discuss possible economies of scale and diseconomies of scale that the bakery may experience, should it expand its scale of production in the long run.   (20m)

Solution:

a) Marginal Cost and Average Cost;

Marginal cost is the addition to total cost from the production of an extra unit of output whereas average cost is the total cost divided by the total number of units produced (the cost per unit of the output produced)

Explicit Cost and Implicit cost:

Explicit costs are the costs a firm pays for its inputs which require cash to be spent by the firm. Implicit costs are often non-monetary costs such as a firm using the resources it owns where the inputs are not purchased in a market transaction e.g. the wages the owner does not take for her effort.

Normal Profit and Supernormal profit:

Normal profit is the minimum profit which the entrepreneur needs to earn to continue supplying the factor of production entrepreneurship. NP is part of the costs of production of a firm. Supernormal profit is the profit earned in excess of normal profit and occurs whenever the average revenue received from selling goods is greater than the average cost associated with production.

(b) (i) The variable cost column must be completed and I will do this in class but all one has to do is subtract €100 from the total cost column for all units of output.

The fixed costs are €100. **Total variable costs** for 300 units is €230. **The average cost** of 400 loaves is €360 ÷ 400 units = €0.90 per loaf.

Total Costs
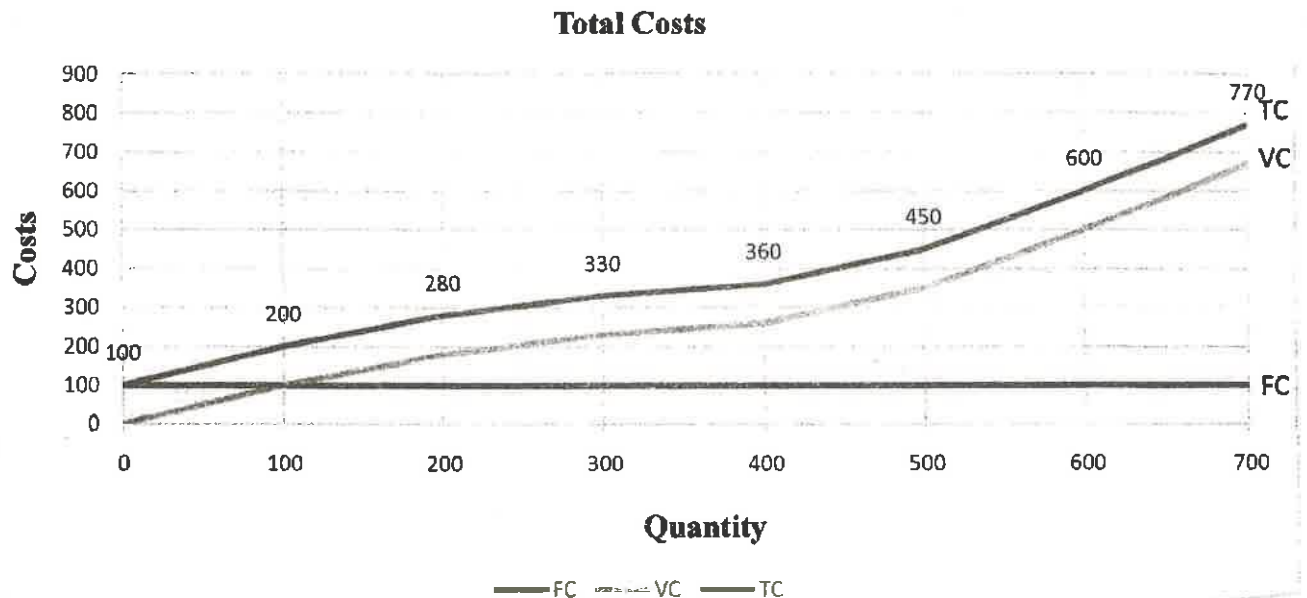
(iii) The graph represents the short-run because fixed costs only exist in the short-run. The short-run is a period of time in which at least one of the factors of production being used is fixed in quantity.

c) Economies of scale:

1 Purchasing: A large bakery may be able to avail of discounts in the purchase of raw materials because of bulk buying.

2 Marketing economies: The bakery may be able to reduce its advertising costs as these can be spread over a greater number of units of output so its advertising costs per unit will fall.

3 Labour economies: If the bakery expands, higher production levels allow specialisation, so that each worker can focus on a specific task and become very skilled at it. As a result output per worker increases driving down the unit cost of production.

Diseconomies of scale:

1 Staff morale: Specialisation and the division of labour may lead to workers becoming bored with repetitive tasks and the quality of the work may suffer as a result. It may also result in higher labour turnover and absenteeism causing costs per unit to rise.

2 Managerial diseconomies: The bigger the firm the more stretched the management team becomes. Communications may become more difficult and management may make incorrect decisions which will increase the cost per unit.

Leaving Certificate 2016 Q4

a) (i) Distinguish between the short-run and the long-run production periods.
(ii) In the short-run firms may stay in the industry even if they are making a loss. Explain this statement. **(15 marks)**

b) (i) Explain the terms *marginal revenue* and *marginal cost*.

The table below shows costs and revenue data of a firm.

Output	Price (€)	Total Revenue (€)	Total Cost (€)
1	20	20	42
2	20	40	60
3	20	60	77
4	20	80	97
5	20	100	130

Use the data in the table above to:

(i) Calculate the marginal revenue and the marginal cost at each output level. Show your workings.
(ii) Draw one graph showing the marginal revenue and the marginal cost and identify the profit maximising level of output for this firm, Explain your answer. **(30 marks)**

c) "*Overall Ireland's improving competitiveness performance over the period 2011 to 2014 has been central to the recovery in employment and economic growth.*"

(i) Outline the factors that influence the competitiveness of firms in Ireland.
(ii) Discuss 3 policies that the Irish government could consider to improve the competitiveness of firms in Ireland. **(30 marks)**

Solution:

a) (i) In the short-run production period at least one of the factors of production is fixed such as capital. In the long-run all of the factors of production are variable.

(ii) In the short-run if a firm's total revenue is greater than its total variable costs then it will continue to produce goods even though it is making a loss. Revenue earned

above the variable costs can be used to pay some of the fixed costs. So by remaining open the firm is minimising its losses i.e. the loss made by staying open and producing goods is less than the loss incurred as a result of closing down.
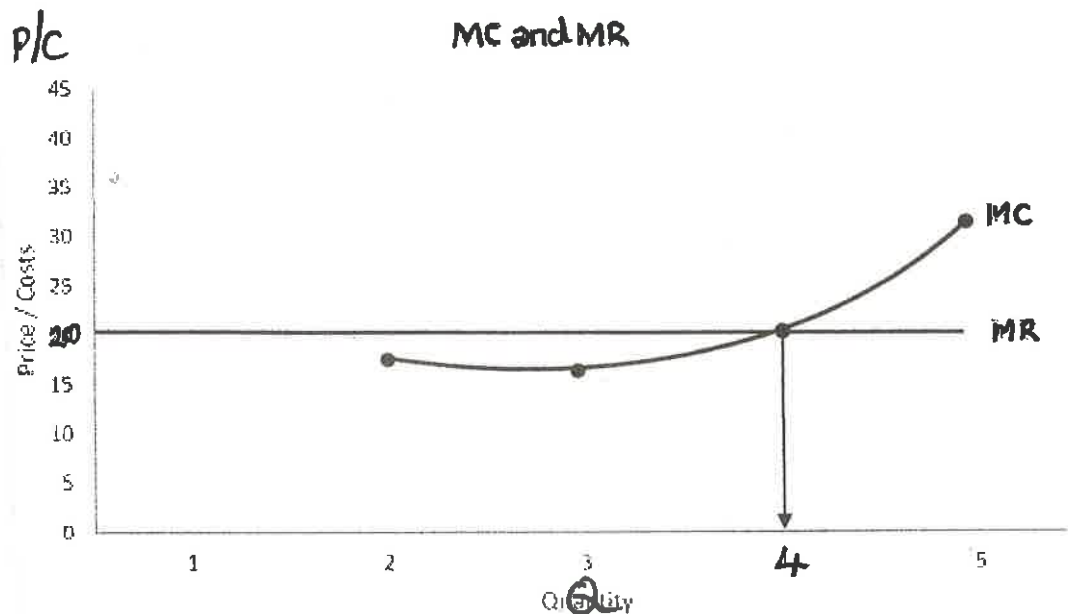
b) (i) **Marginal revenue** is the addition to total revenue as a result of producing one extra unit of output.
Marginal cost is the addition to total cost as a result of producing one extra unit.

(ii)

Output	Price	T. Revenue	T. Cost	M.R.	M.C.
1	20	20	42	-	-
2	20	40	60	20	18
3	20	60	77	20	17
4	20	80	97	20	20
5	20	100	130	20	33

(iii)

The profit maximising level of output is at 4 units where MC = MR.
If more than 4 units are produced then the extra cost of producing the 5th unit is 33 and the extra revenue earned from selling the 5th unit is 20. By producing the 5th unit the firm is reducing profit by 13.

c) (i) **Factors that influence the competitiveness of firms in Ireland:**

1 Wage costs – High labour costs increase the cost of producing goods and services and reduce competitiveness. Shortages of skilled labour force up wage costs. Also

rising housing and rental costs force workers to demand higher wages again reducing competitiveness.

2 Rising utility costs – Insurance premiums increasing and higher energy costs in Ireland compared to our major trading partners reduce competitiveness because they increase the cost of doing business.

3 Tax increases – Increases in indirect taxes such as VAT increase the cost of raw materials and reduce competitiveness.

Other points include – Inadequate broadband; Too much government regulation; Lack of R&D; Rising value of the €.

(ii) **3 policies of the Irish government to improve competitiveness:**

1 Wage restraint – The Irish government could do this by offering trade unions income tax cuts in return for wage moderation.

2 Reduce indirect taxation – The government could reduce VAT from 23%, reduce excise duty on fuel and reduce PRSI. This would increase the competitiveness of Irish firms and the government could collect the lost tax revenue by broadening the tax base or allow for revenue buoyancy.

3 Improve the infrastructure - Lack of broadband and poor transport infrastructure (gridlock on the M50) makes firms less competitive. By improving the infrastructure this will make firms more efficient and thus reduce costs. Workers' demands for wage rises would be reduced if the government reduced the cost of housing.

Other points include – Subsidies for firms; Reduce red tape; Deregulate the markets; Train workers in skill shortage areas.

Leaving Certificate 2017

(a) The table below shows the output and the total cost of a firm producing wireless earphones. The firm charges €13 per unit of output. Use this table to answer the questions which follow.

Output	0	1,000	2,000	3,000	4,000	5,000	6,000
Total Cost€	5,000	13,000	18,000	24,000	32,000	45,000	60,000

(i) Calculate the fixed cost and the variable cost when the output is 3,000 units.
(ii) Calculate the average variable cost when output is 5,000 units.
(iii) Calculate the total profit if 4,000 units are sold.
(iv) Using the data in the table above, draw one graph showing the average cost and the marginal cost of the firm, labelling them AC and MC.

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Solution –

(i) Fixed Cost is €5,000 because at output zero Total Cost is €5,000. When a company is producing nothing it has no Variable Cost.
At 3,000 units VC is €19,000.

(ii) At 5,000 units VC is €40,000(45,000 – 5,000). Therefore the AVC is €8 per unit (40,000/5,000)

(iii) If 4,000 units are sold the profit is €20,000 (52,000 – 32,000)

(iv)

Output (units)	0	1,000	2,000	3,000	4,000	5,000	6,000
Total Cost (€)	5,000	13,000	18,000	24,000	32,000	45,000	60,000
Average Cost	-	13	9	8	8	9	10
Marginal Cost	-	8	5	6	8	13	15

	0	1	2	3	4	5	6
Average Cost (=TC/Q)		13	9	8	8	9	10
Marginal Cost (=ΔTC/ΔQ)		8	5	6	8	13	15
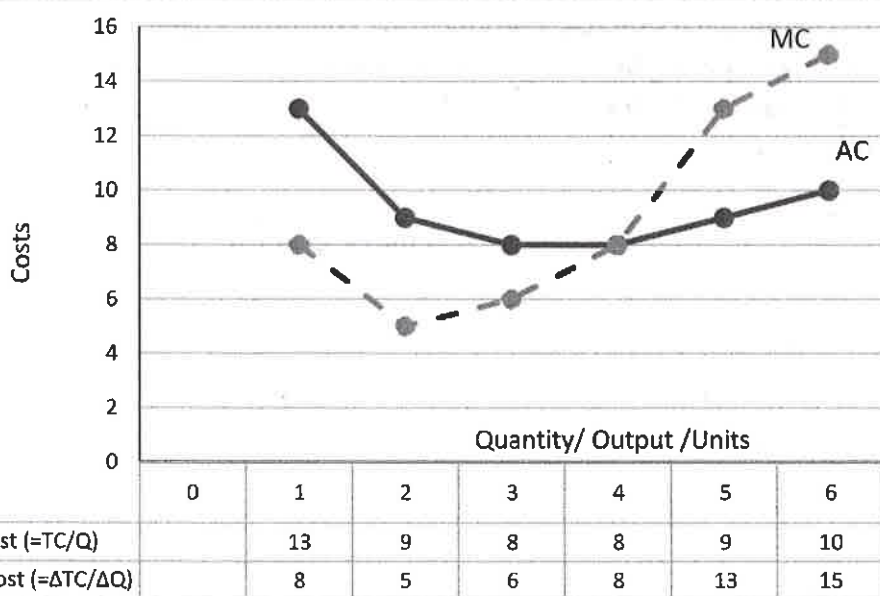
LC 2018 Section B

(a) The table below shows the output and total cost for a firm. The selling price for its product is fixed at €30 regardless of output.

Output units	0	1	2	3	4	5	6	7
Total Cost €	20	40	50	65	85	115	160	210

(i) Define the term marginal cost.
(ii) Draw and clearly label a graph to illustrate the marginal cost at each level of output.
(iii) Indicate on the graph that you have drawn the profit-maximising level of output and explain your answer.
(iv) Calculate the profit earned at this profit-maximising level of output. (25)

Solution-
(i) This is the addition to total cost as a result of producing one extra unit of output.

(ii)
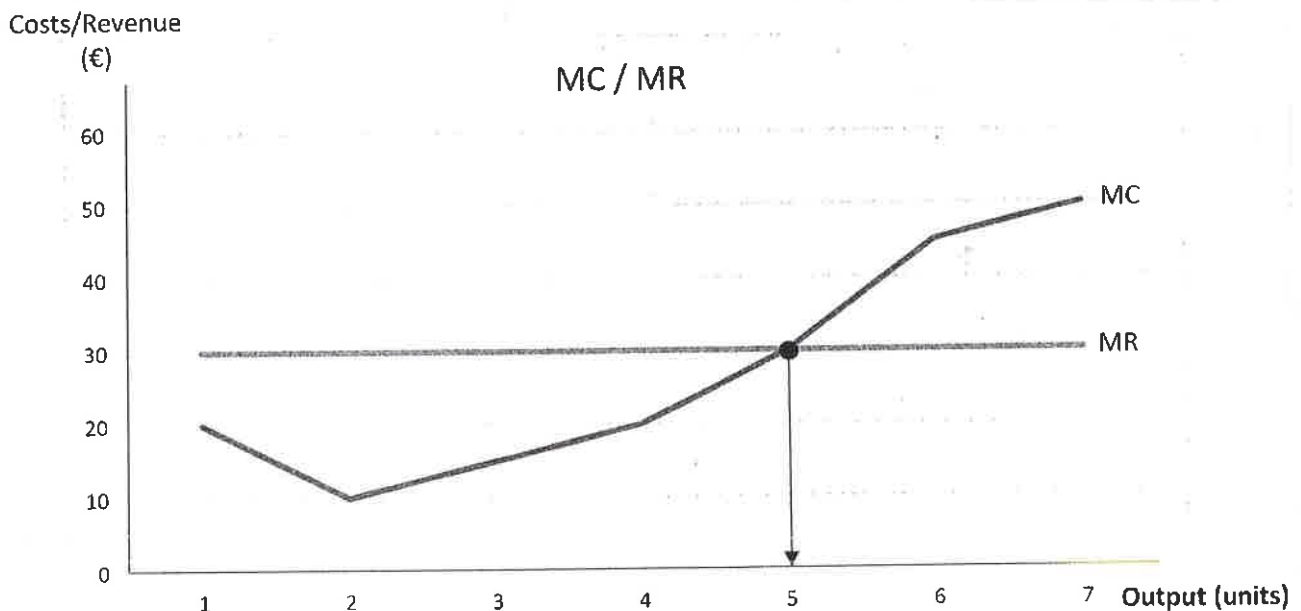
(iii) Profit maximisation occurs when MC=MR. The MR for this product is €30. Profit maximisation occurs at an output level of 5 units.
As long as MR exceeds MC, increasing the quantity adds to profit. At the level of output where MC = MR profit is neither increased or decreased.

(iv)   Profit = Total Revenue less Total Cost.

        €35 =   €150   -   €115

Leaving Certificate 2019 Q4

(a) (i) In the case of any 2 of the following 3 pairs, distinguish between the two terms:

Average Cost and Marginal Cost

Employment Rate and Participation Rate

Marginal Physical Product and Marginal Revenue Product.

(ii) Outline 2 factors which influence the Marginal Revenue Product of Labour.

                              (30)

(b) The table below shows the cost data for a firm in equilibrium.

Quantity of output	Average Variable Cost	Average Fixed Cost
0		
1	200	600
2	150	300
3	158.33	200
4	187.5	150
5	240	120
6	300	100

(i) Calculate the average total cost of producing the 6th unit of output.

(ii) Calculate the total cost of producing 2 units of output.

(iii) Calculate the marginal cost of increasing output from 4 units to 5 units.

(iv) If the firm maximises profit where marginal revenue is €100, how many units will it produce. Explain your answer.   (20)

(c) The jobs market is currently suffering from skills shortages in the areas of accounting, engineering, pharmaceuticals, I.T. and law amongst others.

(i) Explain 3 economic effects of skills shortages for the Irish economy.

(ii) Outline measures which the government and/or firms could take to address skills shortages in the Irish economy.   (25)

Solution –

(a) (i) <u>Average cost</u> is the cost per unit of output produced. It is calculated by dividing total cost by quantity.

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Marginal cost is the additional cost of producing an additional unit of output.

Employment rate refers to all the people in the labour force who are currently employed. It can be defined as the proportion of a country's working age population that is employed.

Participation rate refers to all those people in the labour force, aged between 15-66, who are willing and able to work at existing wage rates i.e. they are either employed or seeking work.

Marginal physical product refers to the additional output produced as a result of employing an additional unit of a factor of production.

Marginal revenue product refers to the additional revenue earned by a firm owing to the employment of an additional unit of a factor of production.
                    (2 at 6m and 2 at 4m)
(ii) Two factors that can influence the MRP of labour –

1 The productivity/commitment of the factor of production (and the entrepreneur) – the more productive each additional factor employed is then the more MRP that factor will earn.

2 The selling price of the output – if the selling price obtained on the market is rising or constant then the higher will be the factor's MRP.
                              (2 points at 5m each)

Other points include – The law of demand; Quality/specialised nature of the factors of production/unique talent; Training and education of the factors; Law of diminishing marginal returns.

(b)
(i)   AVC + AFC = ATC   300 + 100 = 400   (7m)

(ii)   AVC + AFC = ATC x Q = TC   150 + 300 = 450 x 2 = 900 (6m)

(iii)   MC = TC5 less TC4

        TC5 = (240 + 120) x 5   = 1,800
        TC4 = (187.5 + 150) x 4 = 1,350

        MC = 1,800 less 1,350 = 450   (3m)

(iv)   The firm produces the number of units where MC = MR

The firm will produce 2 units where MC of 100 = MR of 100.

(4m)

(c) Shortages of workers –

1 Upward pressure on wages – Where shortages are occurring employers may be forced to increase wage rates in order to keep the existing workforce and attract new workers. This may lead to cost push inflation as costs rise and firms are forced to increase price. Firms may also have to let some workers go and may find it difficult to meet production targets as a result.

2 Less attractive location for FDI – One of Ireland's key factors which make it attractive to foreign investment is readily available, well-educated, English-speaking workforce. If there are shortages of skilled labour in certain sectors it may well deter investment from abroad.

3 Deterioration in quality of services – If there is a shortage of specialised workers, then services may be provided by less qualified workers and lower paid jobs may not be completed at all.   **(3 points at 5 marks each)**

Other points include – Increased immigration; Negative impact on the productivity of Irish firms.

(ii)
1 Open up the Irish labour market/more efficient visa system/encourage emigrants to return home/encourage retired workers to return to the labour force.

2 Government initiatives such as increasing the minimum wage, reducing tax rates and increasing tax credits – By altering the tax structure this will create more incentives for skilled people to enter the work force.

(2 points at 5 marks each)

Other points include – Provide more attractive working conditions; Increase student grants for education and training in areas experiencing skill shortages; More apprenticeship schemes.

Costs of Production (New Course)

1 Explicit Costs versus Implicit Costs –

Explicit costs are costs incurred by a firm when it pays money for something such as when a company pays an insurance bill of €1,000. An Implicit cost doesn't involve paying out money such as if an entrepreneur invested €100,000 in a business and didn't charge the company interest. The implicit cost is the amount of deposit interest that €100,000 could have earned in a bank say 1%. There is an implicit cost of €1,000.

Short – Run Costs (another example) –

Q	FC	VC	TC	AFC (FC+VC)	AVC (FC÷Q)	ATC (VC÷Q)	MC (TC÷Q)
0	40	0	40	-	-	-	-
1	40	20	60	40	20	60	-
2	40	28	68	20	14	34	8
3	40	40	80	13.3	13.3	26.6	12
4	40	56	96	10	14	24	16
5	40	80	120	8	16	24	24
6	40	110	150	6.6	18.4	25	30
7	40	166	206	5.7	23.7	29.4	56
8	40	270	310	5	33.75	38.75	104

Social Costs and Social Benefits –

A social cost is the price that society has to pay as a result of the production and consumption of a commodity e.g. traffic congestion, air and water pollution, global warming. This is often called an externality or an external diseconomy of production/consumption.

A social benefit is the benefit that accrues to society as a whole as a result of an individual firm consuming or producing a product that is not measured by the price e.g. more skilled people, opportunities to meet people from other cultures, travel. This is often called an externality or an external economy of production/consumption.

Profit Maximisation (another example)

Q	Price	TR	MR	TC	MC	Profit
1	30	30	-	38	-	(8)
2	30	60	30	68	30	(8)
3	30	90	30	74	6	16
4	30	120	30	84	10	36
5	30	150	30	96	12	54
6	30	180	30	118	22	62
7	30	210	30	148	30	62
8	30	240	30	180	32	60

The firm will maximise profits at 7 units where marginal cost equals marginal revenue. If the firm produces 8 units profit falls from 62 to 60 because the marginal cost of the 8th unit being 32 is 2 greater than the marginal revenue from that 8th unit of 30.