

Costs of Production

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The costs of production affect the size of the output of a supplier. When studying the costs faced by a firm we must differentiate between the short term and the long run.

The **short run** is a period of time so short that at least one factor of production is fixed.

The **long run** is a period of time long enough for all factors of production to be varied.

The Law of Diminishing Marginal Returns

The Law of Diminishing Marginal Returns states that as extra quantities of a variable factor are applied to fixed quantities of a fixed factor, the extra output eventually begins to diminish. Diminishing returns represents an increase in costs.

Sample Exam Question: Using the table below, state after which level of employment diminishing marginal returns set in. Explain your answer.

No. of persons employed	1	2	3	4	5
Total Output (in units)	14	30	50	64	76
Marginal Output (in units)	14				

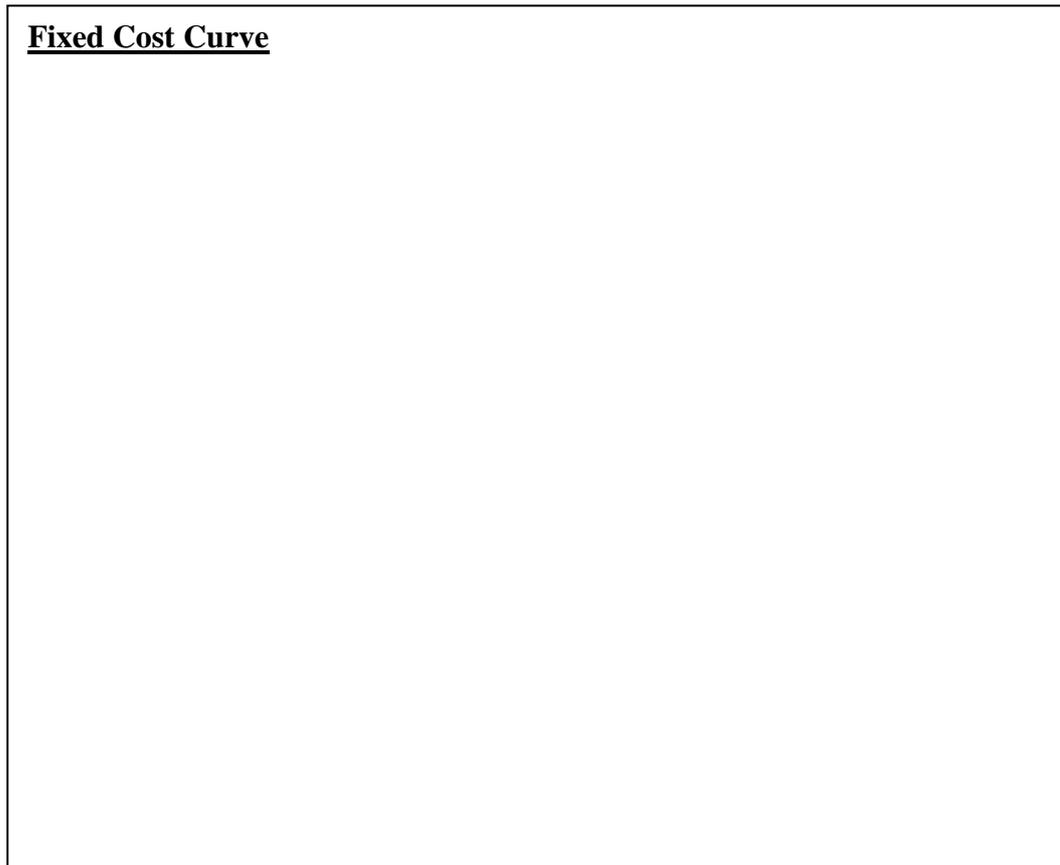
Sample Answer: The point after which Diminishing Returns set in: When the _____ person is employed / After the _____ person.

Average Fixed Costs, Average Variable Costs, Average Total Costs, Marginal Costs

Fixed Costs

Fixed costs are costs that do not vary with quantity of output.

Examples include rent, loan, loan repayments and rates on premises. The fixed cost curve is plotted below.

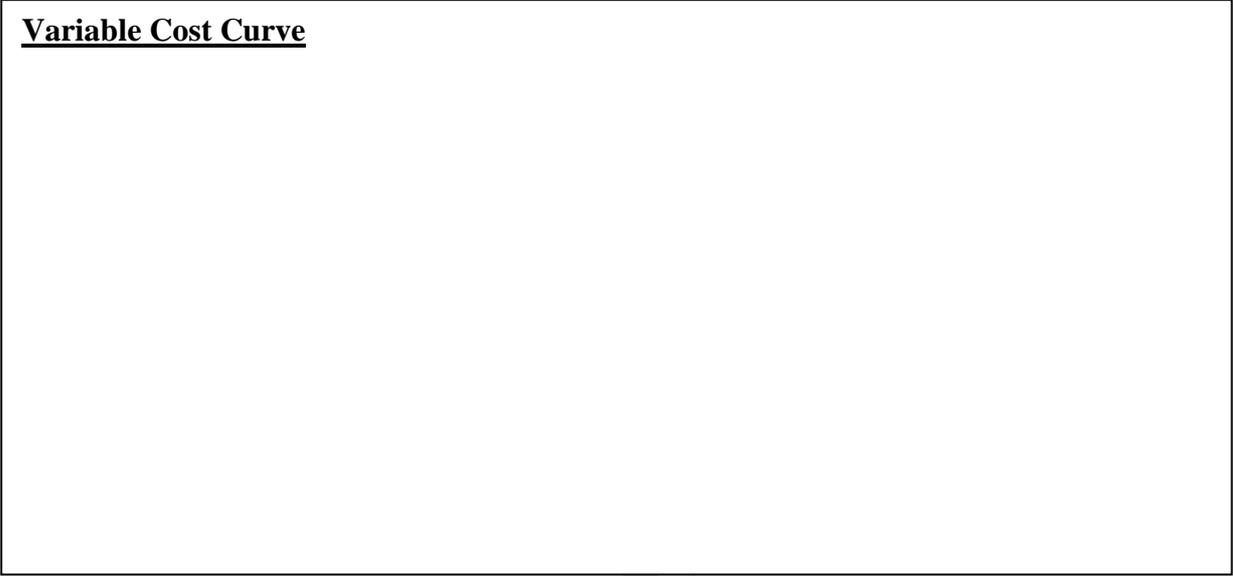


Variable Costs

Variable costs are costs that vary with output.

If the firm produces nothing, then its variable costs are zero. As output increases, so too do the electricity costs, raw material costs and labour costs of the firm. That is, these costs vary, depending on the size of the quantity produced. The variable cost curve is plotted below.

Variable Cost Curve



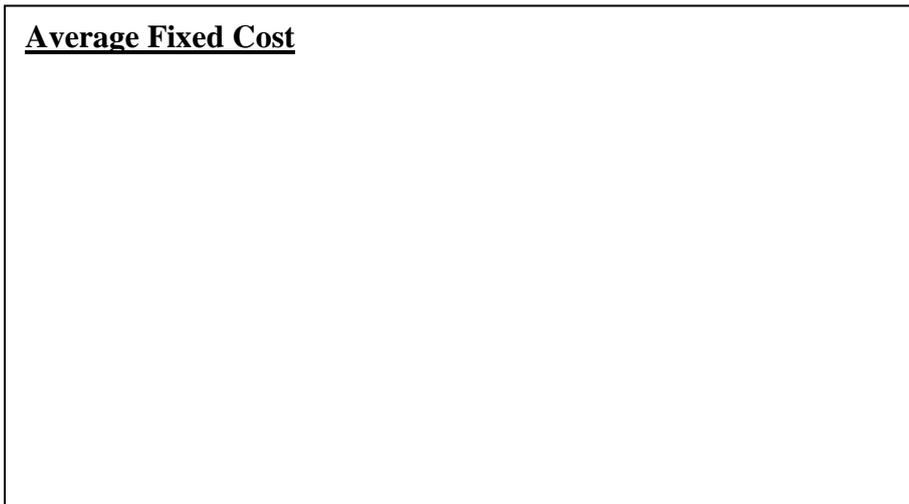
Total Costs

Total costs (TC) = Fixed Costs + Variable Costs

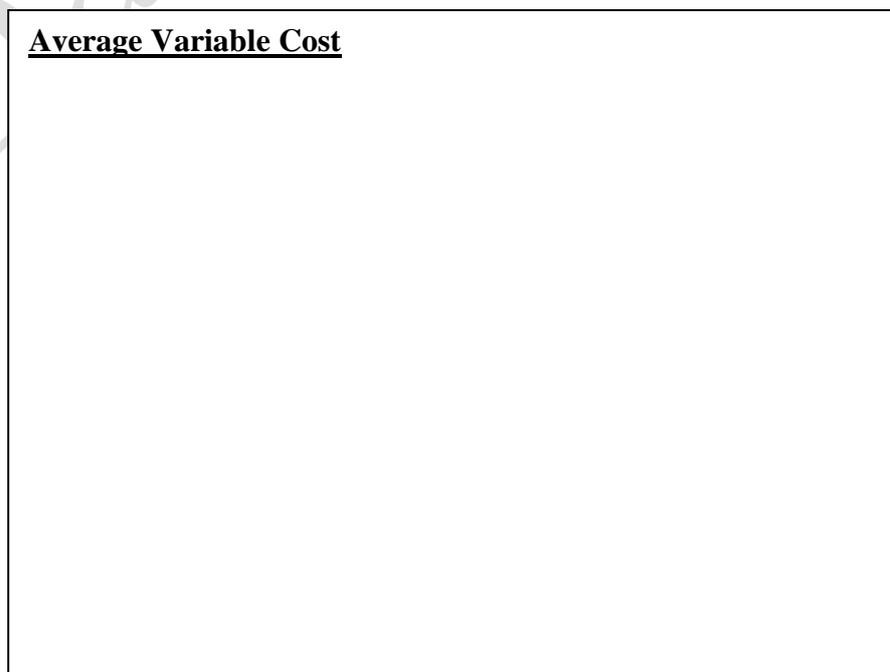
Total Cost Curve



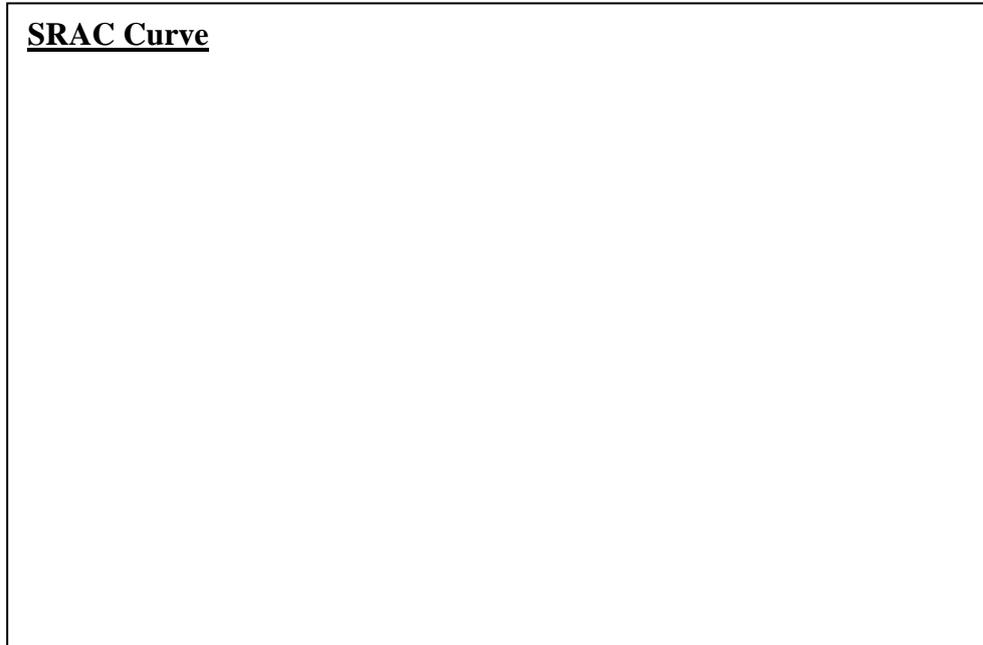
- **Average Fixed Costs**
 - Average Fixed Costs (AFC) are the fixed costs per unit of **output** or FC/Q .
- The diagram below shows that the AFC falls steeply and then flattens (yet continues to slope gently) as output increases. This is due to the fact that as more is produced, these **fixed costs are being spread over a greater quantity of output.**



- **Average Variable Costs**
 - Average variable costs (AVC) are the variable costs per unit or VC/Q . The diagram below shows that as AVC rises as a higher quantity is produce. This is due to the **Law of Diminishing Marginal Returns.** As output increases, more and staff are hired for example, and less extra output is produced due to the Law of Diminishing Marginal Returns. This represents an increase in costs.

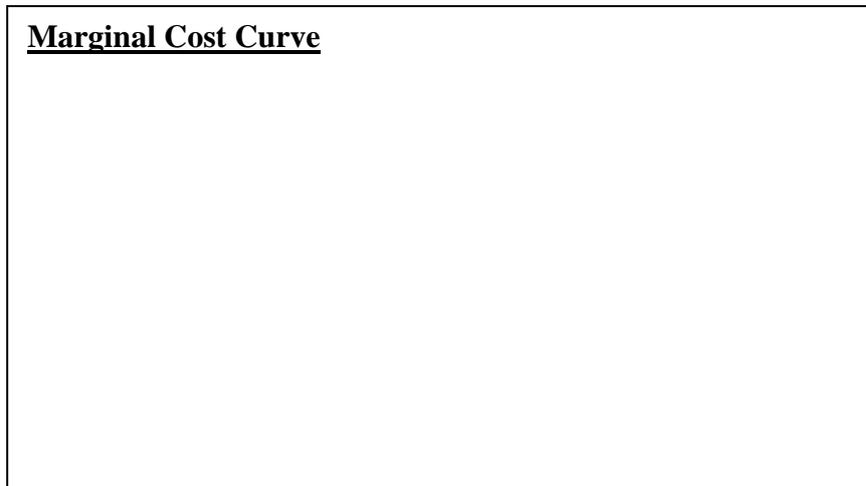


- **Average Total Cost (Average Cost)**
 - **Note:** average total cost is more commonly referred to as average cost (AC). It is also sometimes referred to the **short-run average cost curve (SRAC)** or short average cost. (SAC). The AC is U shaped. (Reasons for its shape on the next page)

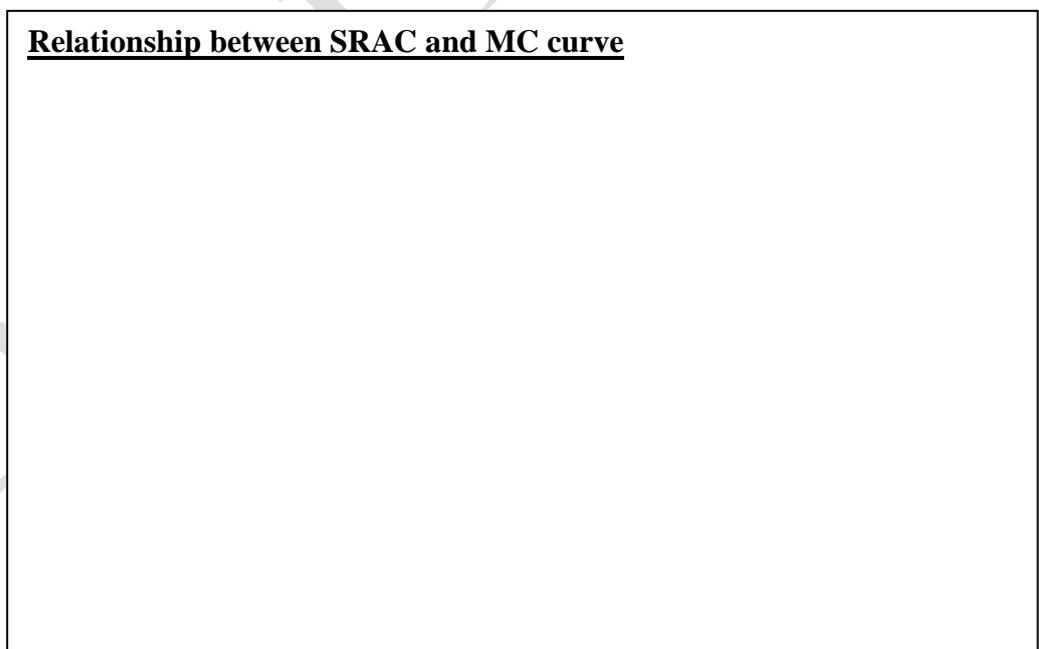


- **Shape of the Average Cost Curve in Short Run**
 - The Short-run average cost (SRAC) curve is more commonly referred to as the average cost (AC) curve.
 - The AC is made up of average fixed costs plus average variable costs. The average cost curve shown previously is U-shaped for the following reason
 - The AC curve initially slopes down.
 - This is due to the downward sloping AFC curve (explained above).
 - It also slopes down due to the specialisation of labour. As the firm increases output it will hire more staff. As more staff are hired they can specialise. This makes production more efficient and such efficiency represents a reduction in costs.
 - The AC curve then slopes up.
 - This is due to the effect of the upward sloping AVC curve and the Law of Diminishing Marginal Returns.

- **Marginal Cost**
 - is the extra **cost of producing an extra unit of output** or $\Delta TC/\Delta Q$.



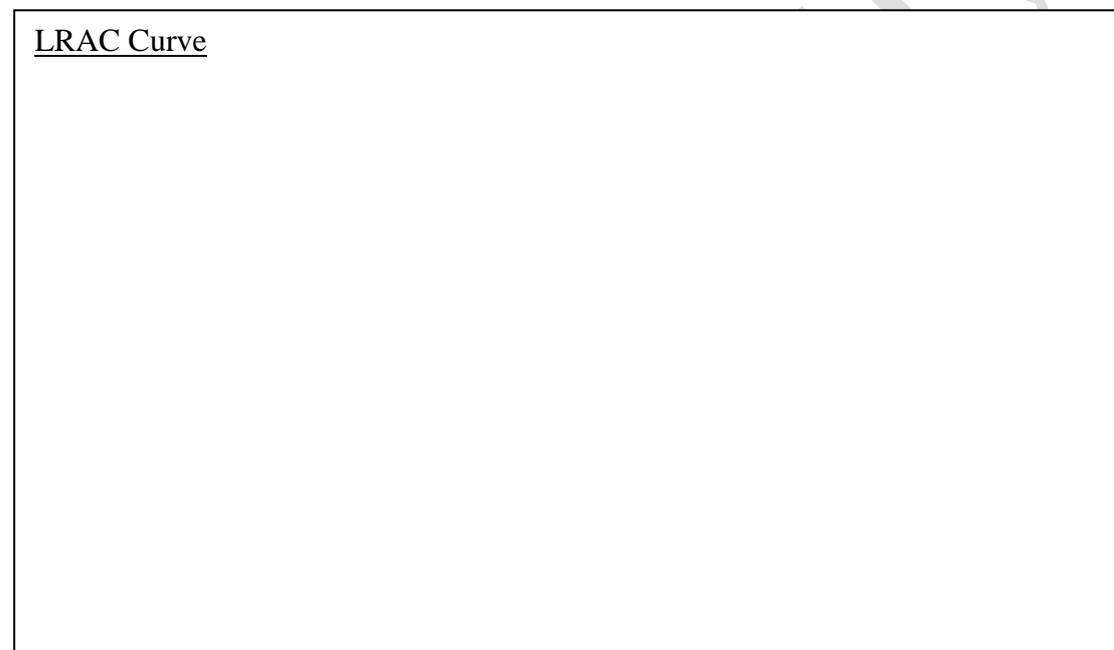
- **Relationship between the Marginal Cost and Average Cost Curve**
 - MC cuts the AC at the lowest point on the AC curve. In summary, the relationship between MC and AC is as follows:
 - When MC is below AC, AC is decreasing (dragged down).
 - When MC is above AC, AC is rising (dragged up).
 - When MC = AC, AC is at a minimum (lowest point).



Shapes of Long run Average Cost Curve.

The diagram below shows the Long Run Average Cost Curve (LRAC) curve. The different factory sizes have different cost structures. Each factory size has a SRAC associated with it. Therefore, firms that aim to maximise profits will want to produce at the minimum point of the SRAC curve associated with the relevant size of the factory. As the factory expands it will have different factory sizes and hence different SRAC curves associated with each one. No matter what the size of the operation is, it will always wish to produce at the lowest point on the SRAC curve.

If we join the lowest point of the various SRAC curves, then we end up with a hollow U-shaped LRAC curve. It slopes **downwards** initially as the firm expands due to **economies of scale outweighing diseconomies of scale**. The LRAC curve then **rises** as **diseconomies of scale outweigh economies of scale**



Revenue

Total Revenue (TR) = Price x Quantity

Average Revenue (AR) = Total revenue/Quantity

Marginal Revenue (MR) = $\Delta TR/\Delta Q$. Marginal revenue is the extra revenue earned from producing an extra unit of the good.

Profit = Total Revenue – Total Cost

- **How do firms decide the quantity to Produce/Supply?**
 - One common feature of firms in most markets is profit maximisation. This means firms supply a quantity that ensures the maximum possible level of profits. The profit-maximising level of output is the level of output associated with the point where MR is equal to MC.
 - If a firm increases production to a level where **marginal revenue (MR) of producing an extra unit of output is greater than the marginal cost (MC) of producing it, then the firm can make higher profits by increasing output.**
 - If a firm increases production to a level where the **marginal cost (MC) of producing the extra output is in excess of the marginal revenue (MR) earned from producing it,** then the production of these extra units **adds more to costs than revenue,** and so the firm should **reduce the output it produces.**
 - The **profit maximising level of output to produce is the output where MR = MC, and MC continues to rise**

Profits

After identifying the quantity to supply, we can identify the profits that can be earned by supplying that quantity by means of looking at the average revenue (AR) and average cost (AC) curves.

- **Normal profits** are earned if the firm produces where **AR = AC.** A firm must earn normal profit at the very minimum if it is continue in business. **As a result, normal profit is treated as a cost of production. It is included in average costs.**
- **Supernormal Profits** are earned if the firm produces where **AR > AC.** This is profit that is earned in excess of the minimum amount necessary to continue in business (normal profit). If supernormal profits are eliminated (e.g. due to new competitors) the firm is left with normal profit, it would still continue to produce.
- **A loss** is made if the firm produces where **AR < AC.**

Internal and External Economies and Diseconomies of Scale

ECONOMIES OF SCALE (INTERNAL)

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

- **Increased use of specialised machinery**
 - A firm may be able to buy/use more specialized equipment/machinery resulting in a reduction in unit costs/machinery fully utilized.
- **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.
- **Construction economies**
 - Large plants cost less per cubic foot than smaller ones.
- **Buying economies**
 - Larger quantities bought may result in bigger discounts.
- **Economies in distribution**
 - Lower unit cost of delivery.
- **Financial economies**
 - Larger firms may avail of lower interest rates/larger firms better chance of acquiring a loan.
- **Managerial economies**
 - As a firm grows, management costs may not grow in proportion to the growth in the firm.
- **Production Process economies**
 - A large firm may be able to run one process into the next without costly Discontinuities.
- **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.
- **Marketing economies**
 - Savings in the cost of advertising e.g. NIKE advertising globally/ bigger firms bigger advertising campaigns.

ECONOMIES OF SCALE (EXTERNAL)

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

- **Better infrastructure.**
 - As roads / communications etc. improve they will benefit all firms.
- **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.
- **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.
- **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.
- **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.
- **Development of Training Courses**
 - Workers in expanding industries may be provided with training courses by VECs, FÁS thereby helping them become more efficient.
- **Supports from Public Bodies.**
 - Some public bodies help particular industries e.g. Failte Ireland / FAS may help firms in the tourism industry.
- **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.

DISECONOMIES OF SCALE

- **Internal diseconomies of scale** refer to the increase in the AC of a firm as the firm grows in size.
 - **Communication costs**
 - As a firm grows in size, internal communication from management to staff becomes more difficult and inefficient.
 - **Unmotivated staff**
 - The benefits of specialization outlined above may be cancelled out as a result of staff becoming bored and unmotivated by carrying out repetitive tasks.
- **External diseconomies of scale** refers to the increase in the AC of a firm as the industry grows in size.
 - **Staff shortages**
 - As the IT industry expanded in Ireland in the late 1990s the demand for qualified IT personnel rose, leading to shortages of suitably qualified workers. Employers had to offer higher wages to attract staff – this represented an increase in costs to individual firms as a result of an increase in the size of the industry.
 - **Raw materials may increase in price/become scarce**
 - As an industry expands, firms may have to compete for raw materials which could raise the price (costs) of such raw materials or even cause shortages.
 - **Lack of Infrastructure expansion**

- The expansion of infrastructure may not keep pace with the expansion of the industry. This could result in an increase in the industry's delivery, communications and waste disposal.
- **Economic Advantages Of Falling Costs Of Production For The Irish Economy**
 - **Increased competitiveness**
 - With lower costs prices may fall for Irish goods and exports may become cheaper.
 - **Lower prices**
 - With lower prices inflation is lower and consumers may purchase more goods.
 - **Increased demand**
 - Businesses may have increased demand resulting in increased sales, profits and a more secure future.
 - **Increased employment**
 - With rising demand businesses may increase their demand for labour / maintain existing labour.
 - **Easier to attract investment**
 - Lower costs for businesses will encourage expansion and attract foreign firms to Ireland.
- **Actions The Government Could Take To Improve The Competitiveness Of Small Firms.**
 - **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.

- **Reasons why small firms survive in the Irish economy.**
 - **Small size of market / Scale of operation**
 - The restricted size of the market may not facilitate the operation of large scale business, e.g. in a rural area a small shop may be viable while a large supermarket may not.
 - **Personal services**
 - Consumers may desire personal attention in the provision of goods or services and a small firm may be the only type of business which can provide this e.g. a plumber providing repair services to households.
 - **Consumer loyalty**
 - A small firm may have built up a reputation over the years in the provision of goods and services to its customers and consumers may respond by their loyalty to that firm – making it difficult for other firms to gain a foothold.
 - **Desire of citizens to maintain their community as viable.**
 - Citizens in smaller communities may support local business so that the continuity of supply is ensured, thus helping to maintain a viable community e.g. in many areas throughout Ireland communities wish to maintain the existence of ‘community’ hospitals.
 - **Traditional / Niche markets**
 - The type of product / service being supplied might make it more suitable for a small firm. Examples include: wedding planners; handmade/ craft products; perishable products etc.
 - A small firm may find that it finds it easier to locate close to the market where it might be difficult for a larger firm to do so e.g. roadside sellers of local produce can be flexible in choosing their location.
 - **Exclusive nature of the commodity being provided**
 - Heavy goods which are costly to transport may be manufactured locally on a small scale to supply nearby markets e.g. the manufacture of concrete blocks in areas which service local markets.
 - **Availability of capital**
 - Small firms may find it very difficult to get the finance to expand their operations and hence the business remains small.
 - **Membership of voluntary groups**
 - Some firms producing on a small scale may offset the disadvantage they have in competition with large producers by a joint marketing strategy with other small suppliers – hotel

groups, individually owned grocery shops trading under a shared name (Spar, Centra etc).

Social Costs are the costs that society pays for the existence of a product, e.g., pollution and loss of a park in order to build a factory.

Social Benefits are the total increase in the welfare of society from an economic action.

The possible social costs & social benefits of the new roads being constructed in Ireland.

Possible Social Benefits

- 1) Traffic congestion:
With the new roads traffic congestion in an area may ease.
- 2) Less stress:
With fewer delays, stress for travellers may be reduced.
- 3) Shorter travelling times:
Better roads may make it possible for shorter commuting time to work/school.
- 4) Improvement of infrastructure:
With the infrastructure improving, attracting new industry may be easier.
- 5) Enhanced environment:
If the new roads by-pass towns it may allow the towns re-develop and enhance their physical environment to the benefit of all citizens.
- 6) Toll Roads / revenues :
If the roads are toll roads this will bring revenue to the government through VAT receipts and eventually ownership may pass to state.
- 7) Improved Safety:
Newer roads may improve safety and help reduce fatalities on roads.

Possible Social Costs

- 1) More pollution :
Greater noise and increased emissions for those who live in close proximity to the new roads.
- 2) Payment for the use of the road / Need for increased tax revenues:
If the roads are toll roads then all road users must pay for their use which until now had been at no cost.
- 3) Increase in land prices:
Land prices adjacent to those new roads may increase, causing difficulty to those who may wish to buy land.
- 4) Damage to the local environment:
The landscape through which the new roads are constructed may be disfigured.
- 5) Disruption to local communities
The new roads may affect the nature of the community life for existing communities.