AQA - A Level Economics

Individuals, Firms, Markets & Market Failure

4.1 Production, costs and revenue

Revision Notes

Contents

Hey there! 👋

We're **Tutor Packs**, and our mission is simple: making learning easy, stress-free, and actually enjoyable. ✨📚

We've got FREE revision notes and worked examples for loads of subjects, perfect for smashing those exams. 💪🤓

Want to see what we're all about and show support please visit our social media pages: https://www.tutorpacks.com/links

4.1.1 Production and productivity

What is Production?

Production is the process of turning inputs (like workers, machines, and materials) into outputs (like chocolate bars, furniture, or phone apps).

It's all about making stuff that people want and need, whether it's by one person, a company, or a whole country.

What is Productivity?

Productivity measures how efficiently you turn inputs into outputs. It tells you **how much is produced per worker or machine** in a given time.

Think of two YouTubers:

- Creator A edits 3 videos a week
- Creator B edits 5 videos a week

Creator B is more productive, because they create more output (videos) with the same input (their time).

So, **productivity = output per input over time**.

Measuring Productivity

Here's the basic formula:

$$Productivity = \frac{Total\ output}{Number\ of\ inputs}$$

Focusing on workers, we use:

$$Labour\ Productivity = \frac{Total\ output}{Number\ of\ workers}$$

Imagine a pizza restaurant with 4 chefs who make 600 pizzas per day.
Labour Productivity = 600 ÷ 4 = **150 pizzas per chef per day**

4.1.1 Production and productivity

Why Productivity Matters

- More productive workers = **more output** in the same time
- Helps businesses **lower costs** and **stay competitive**
- **Training**, **technology**, and **smart work** boost productivity

For example:

- Giving delivery drivers a GPS saves time and boosts deliveries
- Teaching a barista how to multitask helps serve more customers

4.1.2 Specialisation, division of labour and exchange

Specialisation is when a person, company, region, or even a whole country focuses on making just a few types of goods or services. By concentrating on what they do best, productivity goes up and so do living standards worldwide.

For example, the UK is known for producing things like medicines, aircraft, tourism services, and financial services. These specialised goods and services are then traded with other countries for things the UK doesn't produce as much.

Division of labour is a type of specialisation where each person focuses on doing just one specific job to help make a product or provide a service. Breaking a job into smaller tasks and letting each worker focus on just one. This boosts skill and speed.

- **So, division of labour is production broken down into different tasks and labour allocated to each task.**

Adam Smith, known as the "father of Economics," had some big ideas about productivity.

During a visit to a pin factory, he saw that making pins wasn't easy, one person alone could only make about 12 pins a day, since it involved many different steps like cutting, sharpening, and stamping. But if each worker focused on just one of these steps (a concept called division of labour), 10 workers together could make about 50,000 pins a day.

4.1.2 Specialisation, division of labour and exchange

The advantages and disadvantages of specialisation and the division of labour in organising production

Advantages	Disadvantages
Boosts Productivity: When workers focus on one specific task, they become faster and more skilled at it, improving efficiency. Plus, they're likely to have natural talents that make them even better at their job.	**Boredom and Burnout:** Doing the same task repeatedly can get boring, reducing worker motivation.
Better Quality Products: Specialised workers who master their tasks tend to produce higher-quality goods and services.	**Loss of Craftsmanship:** With more standardised tasks and mechanisation, products may lack the unique touch of a skilled craftsman.
Specialist Tools: It's cheaper to create specialised tools for a specific task, which can make production quicker and improve quality.	**Production Bottlenecks:** If one part of the process gets delayed, everything else must stop until that issue is fixed.
Saves Time: Workers aren't wasting time moving between tasks or getting out different tools, they stick to what they know best.	**Limited Skills:** Workers become highly specialised but lack a wide range of skills, which could lead to job difficulties if their role becomes obsolete.
Less Training Needed: Since workers only focus on one job, training is simpler and cheaper.	

4.1.2 Specialisation, division of labour and exchange

The advantages and disadvantages of specialising in the production of goods and services to trade

Advantages	Disadvantages
Comparative Advantage Boosts Economies: The theory of comparative advantage suggests that countries should focus on making goods they're best at producing (where they have a lower opportunity cost). This helps them grow their economies and increases global output overall.	**Risk of Over-Dependence:** If a country relies heavily on one type of export, it's risky. For example, if a country mainly relies on farming and crops fail due to bad weather, the economy could collapse.
Lower Production Costs: By specialising, countries can produce goods at a lower cost, which can lead to lower prices for consumers and increase competitiveness in global markets.	**Non-Renewable Resource Risks:** Some countries specialise in non-renewable resources, like oil. If these resources run out, they lose a huge source of income, and the resource itself is gone.
Economic Growth: By specialising and trading, countries can grow their economies faster, as they're able to focus on and improve their strongest industries, boosting overall productivity.	**High Interdependence:** Countries that depend on each other for trade may face serious issues if trade is disrupted, like during a war.
	Potential Pressure on Wages: Some argue that specialisation leads to more competition to cut costs, which could put pressure on wages to fall, though this isn't always the case.

4.1.2 Specialisation, division of labour and exchange

The functions of money

With specialisation, a person or firm do not produce everything they need themselves, so they need a way to trade. The earliest form of exchange was **barter** (trading goods directly), but it had some major issues. To solve these, **money** was developed, which serves four main functions:

1. **Medium of Exchange:** Money can be used to buy and sell anything, and everyone accepts it. Barter only worked if both parties wanted what the other had (called a "double co-incidence of wants"). With money, you can trade for what you need without this hassle.
2. **Measure of Value:** Money makes it easy to compare the value of different things, like a cupboard versus a t-shirt. It also puts a value on services and labour, making it clear what things are worth.
3. **Store of Value:** Money keeps its value over time, so you can save it and use it later. However, there is inflation, so this isn't always true.
4. **Method for Deferred Payment:** Money allows people to buy now and pay later (credit or loans). This only works because money holds its value over time.

tutorpacks.com

4.1.3 The law of diminishing returns and returns to scale

The difference between the short run and the long run

The Short Run

This is a time period where **at least one factor of production** (like machinery, land, or factory space) is **fixed**, meaning it can't be changed quickly. For example, if you own a small coffee shop, you can hire more baristas tomorrow, but you can't magically build a second café overnight. That's short run.

Usually, **labour** is the flexible factor because it's easier and quicker to hire or fire people than to expand buildings or buy equipment.

The Long Run

This is the opposite of the short run, **everything can be changed.** All factors of production become **variable**. So, in the long run, you can expand your shop, get new equipment, or even open more branches. It's the planning stage where big changes happen.

4.1.3 The law of diminishing returns and returns to scale

Marginal, average and total returns

Let's break down three key concepts that help businesses understand how productive their workers are: **marginal returns**, **total returns**, and **average returns**.

🔷 **Marginal Returns**

Marginal returns tell you how much extra output you get when you hire **one more worker**, while keeping everything else the same.

📍 For example:
Imagine a cupcake bakery has 5 bakers making 250 cupcakes. They hire a 6th baker, and suddenly the bakery is now making 290 cupcakes. That extra 40 cupcakes is the **marginal return** of that new worker.

It helps you answer the question: *"Is hiring another person worth it?"*

🔷 **Total Returns**

Total returns simply mean the **overall output** made by your team. It's the big-picture number; how much is being produced in total with your current number of workers.

📍 For example:
A T-shirt company has 12 workers making 600 shirts a day. That 600 is the **total return,** all the output from your current workforce.

tutorpacks.com

4.1.3 The law of diminishing returns and returns to scale

Marginal, average and total returns

🔷 **Average Returns**

Average returns show how **efficient** your team is, by calculating how much each person produces on average. You get it by dividing total output by the number of workers.

📍 For example:
A burger stand has 10 employees who together make 500 burgers a day. That means each worker makes 50 burgers, on average. So, the **average return** is 50 burgers per worker.

✅ **Why Does This Matter?**

These three types of returns help businesses figure out:

- If adding more workers increases output efficiently
- How productive the team is overall
- Whether they're getting the most out of each employee

Understanding this makes it easier to decide when to expand, when to invest in training, or when to rethink your setup.

4.1.3 The law of diminishing returns and returns to scale

The law of diminishing returns

The **Law of Diminishing Marginal Returns** says that if you keep adding more of one input (like workers 👷) to a fixed input (like machines 🏭 or kitchen space), your extra output (or productivity) will eventually **start to fall,** even though you're still adding workers.

🧠 **Example:**

Imagine a bakery with **one oven** 🍞. You start with one baker 👨‍🍳, and everything runs smoothly. You add a second baker and now you can bake even more bread, great. 🥐 Add a third, and you still get more bread… but the kitchen's starting to feel a bit crowded. 👨‍👨‍👨

Now add a fourth or fifth baker, suddenly, people are bumping into each other, waiting for oven time, and productivity **per baker** starts to **drop**. That's the law in action. ⚠️

🧠 **Why It Happens:**

- **Labour gets less productive** because there's limited equipment or space
- Each added worker brings **less output** than the one before
- But overall output still **increases**, just **more slowly**

⏳ **Why "Short Run"?**

This law only applies in the **short run**, which means **some inputs (like the size of the shop or number of machines) are fixed**. In the long run, you can buy more ovens or build a bigger kitchen, so this issue doesn't happen the same way.

tutorpacks.com

4.1.3 The law of diminishing returns and returns to scale

The law of diminishing returns

💼 **What It Assumes:**

This law is based on the idea that:

- Technology stays the same 🔧 (no new gadgets or upgrades)
- Some resources are **fixed** (you can't suddenly add more ovens)
- It's all happening **in the short run** ⏳

4.1.3 The law of diminishing returns and returns to scale

Returns to scale

Returns to scale is just a fancy way of asking:

"If a business grows, and increases all its inputs like workers, machines, and raw materials, how much more stuff does it produce?"

In the **long run**, businesses can change *all* their inputs, workers, machines, factories, you name it.

Let's look at three types of returns to scale 👇

📈 **1. Increasing Returns to Scale**

Definition: When a business increases all its inputs (like labour and machines) and gets *more than double* the output.
This means it's becoming **more efficient** as it grows, a sweet spot known as **economies of scale**.

Example:
A bakery doubles its staff and ovens and ends up producing 3 times as many cupcakes. 🧁

➡️ **2. Constant Returns to Scale**

Definition: When inputs are increased and output increases by the **same proportion**.
This means the business is scaling steadily, without becoming more or less efficient.

Example:
A T-shirt printing shop buys twice the machines and hires twice the staff and prints exactly twice the shirts 👕.

tutorpacks.com

4.1.3 The law of diminishing returns and returns to scale

Returns to scale

📉 **3. Decreasing Returns to Scale**

Definition: When inputs are increased, but output increases by **less** than expected.
This means the business is getting **less efficient,** a situation called **diseconomies of scale**.

Example:
A fast-food chain triples its locations and employees but only increases burger sales by 2x 🍔. Too many people, too much chaos, not efficient anymore.

🧠 **Why Does This Matter?**

Understanding returns to scale helps businesses:

- Know when to grow (and when not to 🚫)
- Avoid becoming too big for their own good
- Maximise productivity and profits in the long run

4.1.4 Costs of production

Types of costs

📃 **Fixed Costs (FC)**

These are your **non-negotiable bills**. They don't change no matter how many customers you serve.

Examples:

- Monthly rent on your shop
- Annual website hosting fees
- Salaries of office staff (not paid by the hour)

👉 Even if you don't book any clients this month, you still pay these.

💼 **Variable Costs (VC)**

These **depend on how much you produce or sell;** they go up when business is booming and down when it's quiet.

Examples:

- Printing materials for photo packages
- Coffee cups and beans for each drink sold at your café

👉 The more services/products, the more these costs add up.

➕ **Marginal Cost (MC)**

This is how much it costs to produce **one extra unit;** your cost for "just one more."

4.1.4 Costs of production

Types of costs

Simple cost formulas

1. **Total Cost (TC) = Total Fixed Costs (TFC) + Total Variable Costs (TVC)**

This is everything it costs to run your business at a given output.

2. **Total Variable Cost (TVC) = Variable Cost per unit × Quantity**

If each t-shirt costs £5 to make and you make 100, your TVC is £500.

3. **Average Total Cost (ATC) = Total Cost ÷ Quantity**

How much, on average, it costs to make each unit.

4. **Average Fixed Cost (AFC) = Total Fixed Cost ÷ Quantity**

Spread your fixed costs over all units made.

5. **Average Variable Cost (AVC) = Total Variable Cost ÷ Quantity**

The variable cost per item, averaged out.

6. **Marginal Cost (MC) = Change in Total Cost ÷ Change in Quantity**

If total cost goes from £200 to £240 when you make 10 more units, your marginal cost is £4 per unit.

4.1.4 Costs of production

Types of costs

Output (Q)	TFC	TVC	TC	AFC	AVC	ATC	MC $\left(\frac{\Delta TC}{\Delta Q}\right)$
0	£150						
1	£150	£50	£200	£150	£50	£200	
2	£150	£90	£240	£75	£45	£120	£40
3	£150	£115	£265	£50	£38.33	£88.33	£25
4	£150	£150	£300	£37.50	£37.50	£75	£35
5	£150	£210	£360	£30	£42	£72	£60
6	£150	£290	£440	£25	£48.33	£73.33	£80
7	£150	£410	£560	£21.43	£58.57	£80	£120

tutorpacks.com

4.1.4 Costs of production

Short-run and long-run costs

The big difference between **short run** and **long run** costs is all about **how much control firms have over their inputs** (like workers, machines, or buildings).

⏱ **In the Short Run:**

The short run is a time period where **some things are fixed**. That means you can't just change everything overnight.

- For example, you can **hire more workers** or **buy more materials**, but you **can't suddenly expand your factory or buy new expensive machines**.
- So, in the short run, you deal with **both fixed costs** (things you can't change, like rent or equipment) **and variable costs** (like wages or ingredients).

🕰 **In the Long Run:**

In the long run, **everything is flexible,** you can change all your inputs.

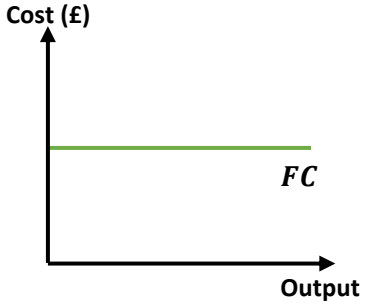
- Businesses can **move to a bigger factory**, **buy new machines**, **hire more staff**, or even **completely change their production method**.
- That means, in the long run, **all costs are variable**.

4.1.4 Costs of production

Cost curves

When businesses produce stuff (whether it's pizzas, T-shirts, or video games) they face different types of **costs**. These costs behave in different ways depending on how much is being produced.

1. Fixed Costs (FC)

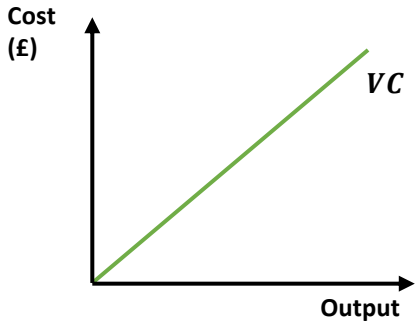


🔷 **Definition:** Costs that stay the same even if output changes.

🔷 **Example:** Renting a pizza oven. Whether you bake 1 pizza or 1,000 pizzas, rent is £3,000 a month. It doesn't care how productive you are.

2. Variable Costs (VC)

🔷 **Definition:** Costs that increase or decrease depending on the output.



🔷 **Example:** The ingredients for each pizza; more pizzas mean more dough, cheese, and toppings to buy. If you make 10 pizzas, you pay for ingredients for 10. If you make 100, well, you get the idea.

👉 Over time, businesses can lower these costs by buying in bulk (called **purchasing economies of scale**).

tutorpacks.com

4.1.4 Costs of production

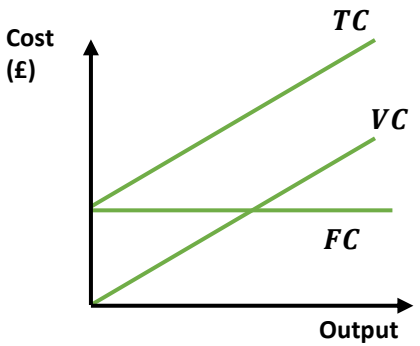
Cost curves

3. Total Cost (TC)

🔷 **Definition:** Fixed costs + Variable costs

🔷 **Example:** If rent is £3,000 and you spend £1,000 on ingredients, your total cost is £4,000.

🧠 **Note:** Total costs can't ever be zero, you always have at least fixed costs.

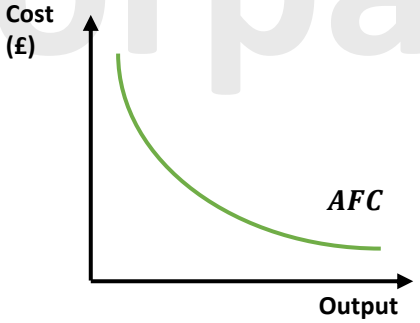


4. Average Fixed Cost (AFC)

🔷 **Definition:** Fixed cost divided by number of units produced

🔷 **Example:** If your oven rent is £1,000 and you bake 1 pizza, that one pizza cost £1,000 just in rent. But if you bake 1,000 pizzas, rent per pizza is only £1.

🎯 **Takeaway:** The more you produce, the more you spread out the fixed cost.



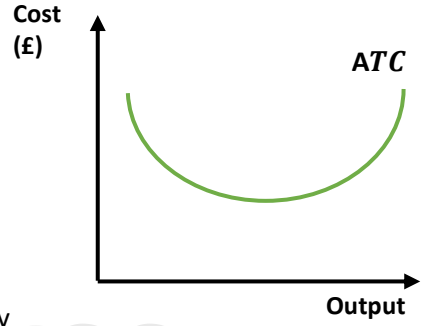
4.1.4 Costs of production

Cost curves

5. Average Total Cost (ATC)

🔷 **Definition:** Total cost divided by number of units produced

🔷 **Example:** If you spend £5,000 total to bake 1,000 pizzas, then your average total cost is £5 per pizza.

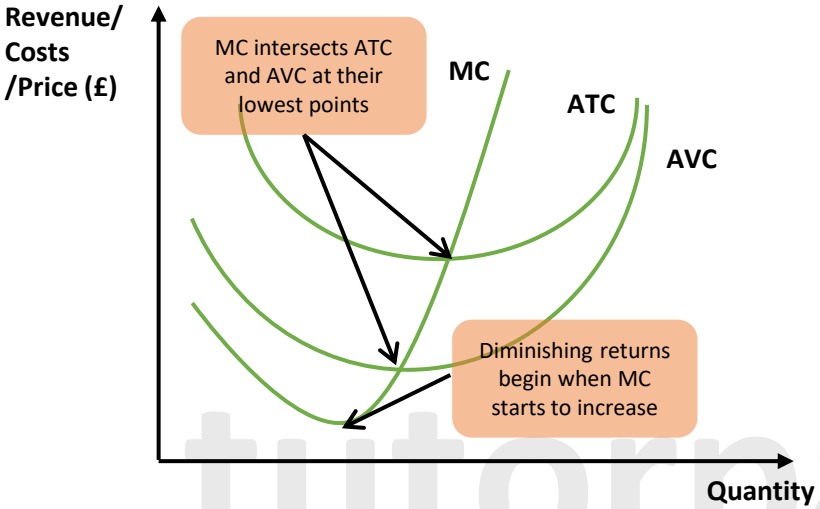


🔻 **As output increases:** Your average cost usually falls at first thanks to **economies of scale** (you're getting more efficient).

🔺 **Eventually though:** Costs can rise again due to **diseconomies of scale** (e.g. too many staff in the kitchen slowing each other down).

4.1.4 Costs of production

Short-run average cost curves



Analysis

Remember the **law of diminishing marginal productivity** (DMP) It's the idea that **as you add more of one input (like workers) to a fixed input (like a factory), the extra output you get from each new worker starts to fall**. At first, more workers = more output. But eventually, they get in each other's way, and productivity *drops*.

Average Fixed Cost (AFC)

- The distance between ATC and AVC equals AFC.
- AFC drops as output increases, because fixed costs are spread over more units.
- **Example:** Rent is £200. Make 1 unit? That's £200 per unit. Make 10? Now it's just £20 per unit.

4.1.4 Costs of production

Short-run average cost curves

Average Variable Cost (AVC)

- AVC is **U-shaped** due to the **law of diminishing marginal productivity**:
  - At first, extra workers = more output with lower cost.
  - But then DMP kicks in , eventually, too many cooks in the kitchen means crowding and overuse of equipment , and costs per unit rise.

Average Total Cost (ATC or AC)

- **Definition:** Total cost per unit = AFC + AVC.
- Also **U-shaped**, again because of **DMP**:
  - Initially, efficiency rises and ATC falls.
  - But as DMP sets in, rising variable costs push ATC back up.
- **Extra tip:** The **lowest point of the ATC curve** is where efficiency is at its peak *before* DMP ruins the party.

Marginal Cost (MC)

- **Definition:** The cost of making **just one more unit**.
- This curve is the most directly affected by **diminishing marginal productivity**.
  - At first, it's cheap to make one more unit.
  - But as DMP sets in, the cost of each extra unit **rises fast**.

Short-run average cost curves

Key Fact: MC Cuts AVC & AC at Their Lowest Point

- If **MC is lower than average**, it brings the average down.
- If **MC is higher**, it pulls the average up.
- So, the MC curve always crosses **AVC and AC at their lowest point,** where they stop falling and start rising.

A Real-World Example:

You're running a small t-shirt shop. At first, adding another person helps get shirts made faster and cheaper. But after a while, the room gets crowded, people get in each other's way, and every extra shirt costs more to make. That's diminishing returns (and rising MC) in action.

4.1.4 Costs of production

How factor prices and productivity affect firms'

When a company makes something (whether it's cars, cakes, or computer code) it has to decide *how* it's going to do it. This means choosing between things like labour (people) and capital (machines or tech). Two big factors that shape this decision are **cost** and **productivity**.

How Do Prices of These Inputs Affect Costs?

Higher Prices = Higher Costs

If the price of a factor input goes up (say wages increase because of a new minimum wage law), it becomes more expensive for a firm to produce the same product. For example:

If a bakery has to pay its staff more per hour, the cost of each loaf of bread also increases unless productivity improves.

Lower Prices = Lower Costs

If the cost of capital (e.g. loans for machines) goes down, maybe because of lower interest rates, firms can upgrade to better machines, reducing labour needs and bringing down costs.

Firms Want the Cheapest Mix That Still Works

Companies are constantly looking for the **most cost-effective combo** of labour and capital to get the job done. This helps them:

- Keep prices competitive
- Increase profits
- Stay in business

tutorpacks.com

4.1.4 Costs of production

How factor prices and productivity affect firms'

⚙️ How Does Productivity Fit Into This?

Productivity means getting more output from the same input. For example, if one worker makes 5 smoothies per hour, but another (with better training or a smoothie robot) makes 10, the second one is more productive.

💥 Higher Productivity = Lower Costs

If machines or people can do more in less time, fewer resources are needed to produce the same number of goods. E.g.:

A pizza shop installs a new oven that bakes 10 pizzas at once instead of 5. This means more pizzas per hour, without hiring more chefs.

😩 Lower Productivity = Higher Costs

If productivity drops (maybe due to outdated tech or unmotivated staff), the firm needs more inputs (like extra workers or longer hours) to produce the same amount, pushing costs up.

🔁 Capital-Intensive vs Labour-Intensive Production

- **Capital-intensive** = More machines than humans (e.g. car factories, bottling plants)
- **Labour-intensive** = More human work involved (e.g. restaurants, handmade crafts)

Firms switch between the two depending on:

- Prices of labour vs capital
- Productivity of each

4.1.4 Costs of production

How factor prices and productivity affect firms'

If wages in a country are high, but machines are cheap and efficient, a firm may go capital-intensive. If wages are low and workers are productive, it might go labour-intensive.

4.1.5 Economies and diseconomies of scale

As a business grows and produces more in the **long run**, its **average cost per unit** doesn't stay the same, it changes. Here's how:

📉 **Economies of Scale: When Bigger Is Cheaper**

Definition:
Economies of scale are the **cost advantages** a firm gains when it increases output. This means the more it produces, the lower the cost per unit, at least for a while.

Why?

Because bigger firms can spread their fixed costs, buy in bulk, use better equipment, and hire specialists.

Example:
A smoothie company buying bananas in huge crates instead of small boxes gets a discount; that's purchasing economy.

📈 **Diseconomies of Scale: When Bigger Gets Messy**

Definition:
Diseconomies of scale happen when a firm gets **too big**, and average costs **start rising**. Growth creates problems; more layers of management, poor communication, or even unhappy employees.

Example:
A tech firm that expands to 10 global offices may struggle to get teams to collaborate; that's a communication diseconomy.

4.1.5 Economies and diseconomies of scale

Types of economies and diseconomies of scale

Economies of scale	Diseconomies of scale
Technical – Advanced machinery, specialist workers, R&D reduces costs.	**Geographical** – more locations = more transport costs
Financial – Easier access to loans at better rates.	**Management** – too many layers slow decisions.
Risk-bearing – Diversifying products spreads risk.	**Communication** – messages get lost in the system/
Managerial – Hiring skilled managers boosts productivity.	**Cultural** – different office cultures can clash.
Purchasing – Bulk buying discounts.	
Marketing – Big firms spread ad costs over more units.	

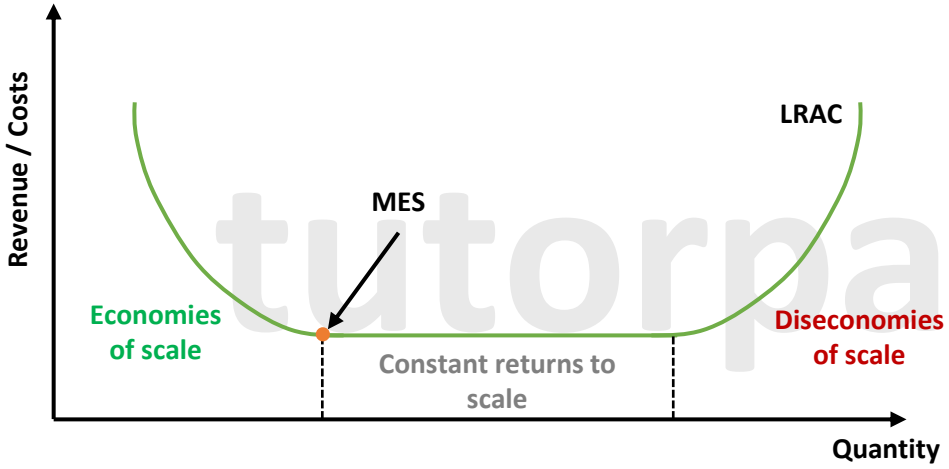
tutorpacks.com

4.1.5 Economies and diseconomies of scale

Minimum efficient scale (MES)

The **Minimum Efficient Scale (MES)** is the sweet spot on the **Long-Run Average Cost* (LRAC)** curve. It's the **lowest average cost per unit** a firm can reach when it's operating at maximum efficiency in the long run.

In other words, it's the point where producing more doesn't make things cheaper, but also not more expensive… yet.



* **Long-Run Average Cost (LRAC)**: This shows the average cost per unit when all factors of production (like land, labour, capital) can be changed. Nothing is fixed , the firm is free to expand or shrink

4.1.5 Economies and diseconomies of scale

Types of economies and diseconomies of scale

Analysis

1. **Early growth = Economies of Scale (Increasing Returns to Scale)**
   - The firm is becoming more efficient.
   - Costs per unit are falling.
   - Think: A bakery buying flour in bulk and using better ovens!
2. **MES = Minimum Efficient Scale**
   - The firm hits its lowest possible average cost per unit.
   - It's operating at peak efficiency; not too small, not too big.
3. **Beyond MES = Constant Returns to Scale**
   - Producing more doesn't really lower or raise the cost , it just stays steady.
   - The firm is cruising along at its most efficient size.
4. **Too much growth = Diseconomies of Scale (Decreasing Returns to Scale)**
   - Now, costs start to **rise**.
   - Maybe communication breaks down, or managing lots of staff gets chaotic.
   - Efficiency drops and average cost per unit increases.

tutorpacks.com

4.1.5 Economies and diseconomies of scale

Internal and external economies of scale

We've already talked about **internal economies of scale** (you can find the table below too), which are cost savings a business gets from growing on its own (like buying in bulk or using better machines).

Economies of scale	Diseconomies of scale
Technical – Advanced machinery, specialist workers, R&D reduces costs.	**Geographical** – more locations = more transport costs
Financial – Easier access to loans at better rates.	**Management** – too many layers slow decisions.
Risk-bearing – Diversifying products spreads risk.	**Communication** – messages get lost in the system/
Managerial – Hiring skilled managers boosts productivity.	**Cultural** – different office cultures can clash.
Purchasing – Bulk buying discounts.	
Marketing – Big firms spread ad costs over more units.	

But what about when **the whole industry** is growing, and your firm just benefits by being part of it?

That's where **external economies of scale** come in!
These are **cost savings a firm enjoys from things happening outside of the business**, but within the **industry or region** it operates in. Basically, you get a free ride on someone else's success!

These external benefits help reduce the **long-run average total cost** for all firms in the area.

4.1.5 Economies and diseconomies of scale

Internal and external economies of scale

Real-Life Sources of External Economies of Scale:

1. Access to Skilled Labour

When lots of similar businesses operate in one area, workers with the right skills are more likely to live and work nearby. This gives firms a **larger pool of trained talent**, so they save on recruitment and training costs.

Example:
In **Vancouver**, Canada's booming **video game industry** has attracted loads of talented designers and developers. Companies benefit by hiring skilled workers quickly and cheaply.

2. Geographic Clustering (aka Industry Hubs)

When businesses in the same industry **locate near each other**, it creates a mini-ecosystem. Suppliers, support services, and specialist workers all move in, making it cheaper and easier for everyone to operate.

Example:
Think about **Toulouse in France**, where aerospace giants like Airbus operate. Hundreds of smaller engineering firms have set up shop nearby, offering parts, services, and skilled labour. That means Airbus and its neighbours don't have to look far (or pay much) for what they need.

3. Improved Transport Links

As an industry grows, local or national governments often improve **infrastructure** (roads, rail, ports) to support it. This reduces delivery times and transport costs for all businesses in the area.

Example:
The **Port of Rotterdam** in the Netherlands has seen huge investment because of the thriving shipping and oil industries. Faster, more efficient transport means companies spend less on moving goods in and out.

tutorpacks.com

Internal and external economies of scale

🏛️ **4. Favourable Government Support**

Sometimes, the government steps in with **tax breaks, subsidies, or grants** to boost a particular industry or region. These policies reduce production costs for every firm that qualifies.

Example:
The **renewable energy industry in Denmark** has flourished thanks to generous government support. All firms involved in wind energy have benefited from lower costs thanks to R&D funding and tax incentives.

🎯 **Why It Matters**

External economies of scale **make it cheaper for everyone in a growing industry to operate**, not because they're individually more efficient, but because the **environment around them** is working in their favour.

So, whether it's clever neighbours, smarter roads, or helpful government policies, sometimes, being in the right place at the right time makes all the difference

4.1.5 Economies and diseconomies of scale

Continue the next page…

tutorpacks.com

4.1.5 Economies and diseconomies of scale

Short-run and Long run average cost curves

Let's start with the basics:

- In the **short run**, some resources (like the size of your café or number of machines) are **fixed**. You can't suddenly build a bigger kitchen overnight, right? But you can hire more baristas.
- This limited flexibility means the firm works with what it has, adding more **labour** (a **variable factor**) to existing equipment. This leads to **diminishing returns** after a point, where each new worker adds less and less extra output.

This is why **Short-Run Average Cost (SRAC) curves** are **U-shaped** – costs go down first (because of better use of fixed resources), then start to rise (because of overcrowding or inefficiency).

📈 **Enter the Long Run...**

In the **long run**, **all factors of production are variable** – you can expand the café, buy more machines, move into new locations, etc. This gives the firm room to improve efficiency and reduce costs over time.

This flexibility leads to **economies of scale** (falling long-run costs as output grows), then eventually **diseconomies of scale** (rising costs when the business gets too big and inefficient).

So, the **Long-Run Average Cost (LRAC) curve** is also U-shaped, but **for different reasons** than the SRAC.

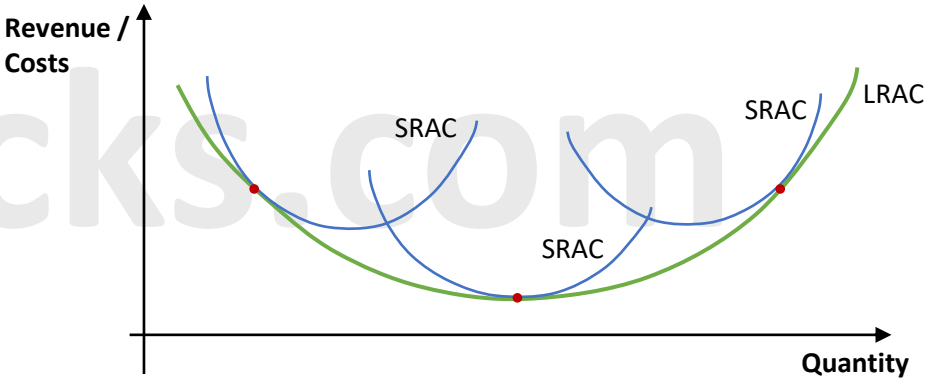
4.1.5 Economies and diseconomies of scale

Short-run and Long run average cost curves

The LRAC curve is like a smooth line that "hugs" the lowest points of many SRAC curves. Why?

- Each SRAC curve represents a different short-run setup (e.g. one machine, two machines, three machines, etc.).
- As the firm increases output, it jumps to a **more efficient setup** (a new SRAC curve) until it hits the best possible cost at a certain output.

That best point is called the **Minimum Efficient Scale (MES);** the lowest output level where long-run average costs stop falling.



🔄 **Movement vs Shift**

- **Moving along the LRAC** happens when a firm changes its level of output (e.g. selling more coffee using the same tech).
- **Shifting the LRAC curve** happens when there's a major change in external conditions, like:
  - 🚀 A new espresso machine that makes 50 cups a minute = **better technology**
  - 📉 Lower electricity bills = **reduced production costs**
  - 💰 A government tax = **higher costs**, shifting the curve **up**

4.1.6 Marginal, average and total revenue

Total, average and marginal revenue

- **Total Revenue (TR)**

This is the **total amount of money a business makes** from selling its goods or services.
Formula:
TR = Price (P) × Quantity sold (Q)

Example: If a bakery sells cupcakes for £2 each and sells 100 cupcakes, TR = £2 × 100 = **£200**

- **Average Revenue (AR)**

This is the **revenue made per unit sold**.
Formula:
AR = TR ÷ Q

Example: If our cupcake bakery made £200 from selling 100 cupcakes, AR = £200 ÷ 100 = **£2 per cupcake**

- **Marginal Revenue (MR)**

This is the **extra revenue** a business gets from selling **one more item**.
Formula:
MR = Change in TR ÷ Change in Q

Example: If selling 100 cupcakes earns £200 and selling 101 earns £202,
MR = £2 – that's the extra revenue from that 101st cupcake.

Fun Fact: Perfect vs Imperfect Competition

- In **perfect competition** (like farmers selling identical apples), **AR = MR = Price**, and all firms are price takers.
- In **imperfect competition** (think Apple or Nike), **MR < AR**, because firms have pricing power and need to lower prices to sell more units.

4.1.6 Marginal, average and total revenue

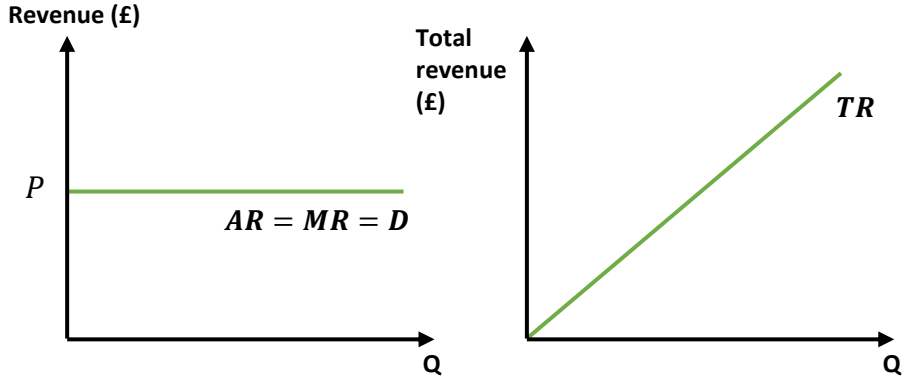
Total, average and marginal revenue

Perfect competition

The example below shows a **perfectly competitive market**, where price stays constant and **AR = MR = P**.

Output (Q)	Price (P)	TR $(P \times Q)$	AR $(TR \div Q)$	MR $\left(\frac{\Delta TR}{\Delta Q}\right)$
0	£10	**£0**	-	-
1	£10	**£10**	£10	£10
2	£10	**£20**	£10	£10
3	£10	**£30**	£10	£10
4	£10	**£40**	£10	£10
5	£10	**£50**	£10	£10

As a diagram it can be shown as below:



tutorpacks.com

4.1.6 Marginal, average and total revenue

Total, average and marginal revenue

🔍 **Analysis**

- The firm is a **price taker**, which means it has **no control over the market price**, it must sell its product at the going rate. In this case, the price is £10 per unit.

📦 Example: Think of a small wheat farmer selling in a huge national wheat market. They must accept the market price, if they try charging more, no one will buy from them.

- Since the price stays the same:
  - Every single unit is sold at **£10,** no discounts or price hikes.
  - If the farmer (or firm) tries to charge **more**, buyers would just switch to someone cheaper.
  - If they charged **less**, they'd just be undercutting themselves, and all similar sellers would have to follow, dropping prices for everyone.
  - This kind of market has **perfectly elastic demand**, customers will only buy at the market price and not a penny more.
- In this scenario:
  - **Total Revenue (TR)** increases at a **constant rate** , because you're just multiplying the number of units sold by the fixed price.
  - **Marginal Revenue (MR)** — the extra revenue from selling one more unit , is always £10.
  - **Average Revenue (AR)** is also £10.

📘 So basically, **MR = AR = Price**, and that's also the **demand curve** in perfect competition.

4.1.6 Marginal, average and total revenue

Total, average and marginal revenue

Imperfect competition

Output (Q)	Price (P)	TR $(P \times Q)$	AR $(TR \div Q)$	MR $\left(\frac{\Delta TR}{\Delta Q}\right)$
1	£5.00	**£5.00**	£5.00	£5.00
2	£4.80	**£9.60**	£4.80	£4.60
3	£4.50	**£13.50**	£4.50	£3.90
4	£4.00	**£16.00**	£4.00	£2.50
5	£3.20	**£16.00**	£3.20	£0.00
6	£2.50	**£15.00**	£2.50	-£1.00
7	£1.50	**£10.50**	£1.50	-£4.50

Diagram on the next page.

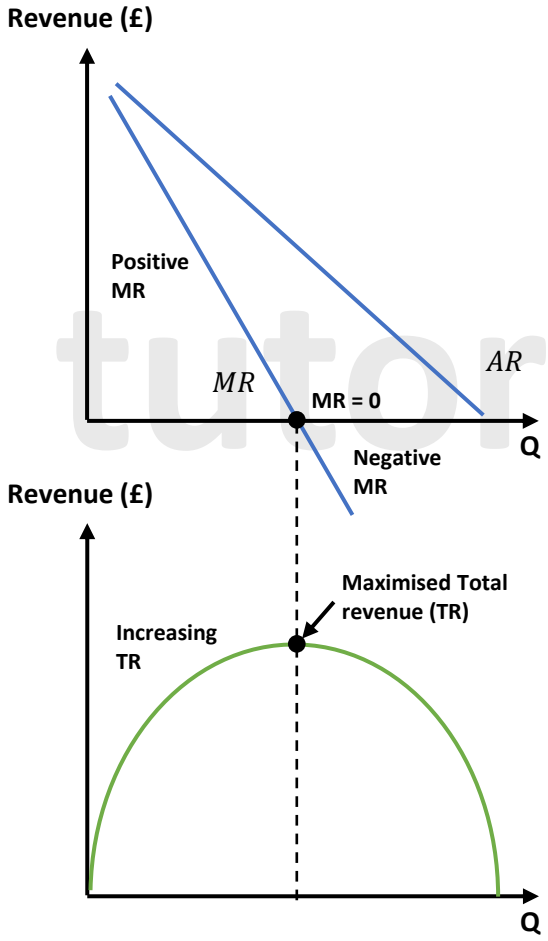
tutorpacks.com

4.1.6 Marginal, average and total revenue

Total, average and marginal revenue

Imperfect competition

As a diagram it can be shown as below:



4.1.6 Marginal, average and total revenue

Total, average and marginal revenue

Analysis

- A **price maker** is a firm that has control over the price it charges (unlike a price taker). Think of a local indie café that can set its prices, not like a corner shop selling milk at the same price as the supermarket.
- In imperfect competition, if a firm wants to sell more products, it has to **lower the price**. This is because the **AR** and **MR** both drop as more units are sold.
- **Total revenue (TR)** is maximised when **MR = 0**.
- When **MR = 0**, the **price elasticity of demand (PED)** is exactly **1**, meaning that the percentage change in quantity demanded is exactly the same as the percentage change in price. This is called **unitary elasticity** – a perfectly balanced point.

4.1.7 Profit

Profit is simply the **money a business makes after covering its costs**.
Profit = Total Revenue (TR) – Total Costs (TC)

Conditions for profit maximisation

There are **two key conditions** for profit maximisation:

1. TR and TC Are Furthest Apart

A firm makes the **highest profit** when the gap between **total revenue** and **total cost** is the **largest**, but only when **TR is above TC**.

Think of it like this: if you're selling cookies at a market, your profit is greatest at the point where your earnings from sales are miles ahead of what you spent on flour, sugar, and rent for the stall.

2. When Marginal Cost = Marginal Revenue (MC = MR)

This is the **golden rule** in economics.

- **Marginal cost (MC)** is the cost of producing **one more unit**.
- **Marginal revenue (MR)** is the extra money you earn from selling that **one more unit**.
  Profit is maximised when **the cost of making the next item equals the money it brings in**.

Let's say you're selling handmade candles:

- If making an extra candle costs £2 (MC) but brings in £5 (MR), you should definitely make it, it increases profit.
- Keep doing this until MC = MR — that's the sweet spot.

4.1.7 Profit

Profits and losses

✅ **Normal Profit**

Normal profit is the **minimum return** a business needs to stay in operation. It's just enough to **cover all costs**, including the **opportunity cost** (what the business owner gives up to run the business, like another job).

Think of it as breaking even, not making extra, but not losing anything either.
This happens when:
📍 **Total Revenue (TR) = Total Cost (TC)** or **Average Revenue (AR) = Average Cost (AC)**.

Example:
You run a coffee cart. You make £100 a day, and your total daily costs (coffee, milk, rent, your time) also come to £100. You're not rich, but you're covering everything; that's normal profit.

💸 **Supernormal Profit (also called abnormal or monopoly profit)**

This is when your business is making **more than enough** to just survive, you're thriving.

This happens when:
📍 **TR > TC** or **AR > AC**

Example:
Back to your coffee cart, now you're making £150 a day, but your costs are still only £100. That extra £50 is **supernormal profit,** you're not just surviving, you're smashing it.

tutorpacks.com

4.1.7 Profit

Profits and losses

Losses

A loss happens when your income **isn't enough** to cover your costs.

This happens when:
TR < TC or **AR < AC**

Example:
Imagine you're only making £70 a day, but your costs are £100. You're **losing £30** a day. You'll need to fix that fast or risk closing the business.

Quick Summary:

- **Normal profit** = business survives (TR = TC)
- **Supernormal profit** = business wins (TR > TC)
- **Loss** = business struggles (TR < TC)

4.1.7 Profit

The role of profit in a market economy

Profit is the reward businesses get for taking risks. It's more than just money, it drives decisions, growth, and innovation in a market economy.

Why Profit Matters:

1. **Encourages Innovation & Risk-Taking**
   Entrepreneurs start businesses and create new products (like eco-friendly packaging or quirky cafés) hoping to earn profit. This fuels creativity, jobs, and better living standards.

2. **Guides Resource Use**
   Profit tells firms where to focus. If something is making money, more businesses jump in like when reusable water bottles became trendy and profitable.

3. **Boosts Competition**
   Companies try to outdo each other to win profit meaning better quality and lower prices for us as customers.

4. **Drives Economic Growth**
   Profitable firms reinvest money into hiring staff, buying better equipment, or developing new tech, growing the economy and creating jobs.

5. **Creates Wealth**
   Profit helps businesses pay bonuses, reward investors, and expand. Everyone from employees to shareholders can benefit.

4.1.8 Technological change

Invention = Creating something completely new like the first-ever electric car.

Innovation = Taking something that already exists and improving it like upgrading that electric car to drive itself 🚗⚡.

🛠️ How Technological Change Impacts Production and Costs

Tech changes can shake up how businesses work for the better. Here's how:

- **Efficiency goes up, costs go down** 💰
  New tech can help businesses produce more with less, saving money and improving quality. Think about how 3D printers made it quicker and cheaper to create prototypes.

- **Products become better and cheaper**
  Think of **LED TVs**. They used to cost a fortune. Now you can grab a huge, high-quality one for a few hundred bucks, all thanks to tech improvements in manufacturing. 📺

- **New markets rise, old ones fall**
  Just like **Spotify** and music streaming took over CDs and iTunes downloads, new tech creates fresh industries and makes some older ones disappear. 🎵➡️📱

- **Creative destruction in action**
  Economist **Schumpeter** came up with this idea, new, innovative businesses shake up old ones. Stronger, more efficient companies grow. The weak ones fade out. In the end, the whole economy becomes more productive.

4.1.8 Technological change

🔁 How Tech Change Affects Market Structures

🚪 1. Technology Can Lower Barriers to Entry

- **Barriers to entry** are obstacles that make it hard for new businesses to enter a market (like needing lots of money or special knowledge). But tech can break these down.

- **Example**: A fitness trainer can now create an app or YouTube channel to reach thousands of people without needing a fancy gym. Tech levels the playing field.

⚔️ 2. Technology Boosts Competition

- More businesses can now sell online or market through social media. That means more choices and better prices for consumers.

- **Example**: A local bakery can now ship cakes nationwide using Instagram and delivery services like Uber Eats or Deliveroo, competing with big-name brands.

🔍 3. Technology Reduces Information Gaps

- **Information asymmetry** happens when one side (usually sellers) knows more than the other (buyers). Technology helps close that gap.

- **Example**: Instead of guessing which plumber to hire, you can check ratings and prices on apps like Checkatrade or Google Reviews.

🏰 4. But... It Can Also Increase Market Power

- Sometimes, the same tech gives **more power** to already-big firms. They grow so large that it's hard for anyone new to challenge them.

- **Example**: Apple and Microsoft dominate the tech world. Their brand loyalty, huge customer base, and ability to invest in research keep them ahead of small startups.

tutorpacks.com

Please see the ‘4.2 Production, costs and revenue Worked Examples’ pack for exam style questions.

For more FREE revision notes, tutorials, worked examples and help visit www.tutorpacks.com