

## What is the PPF model?

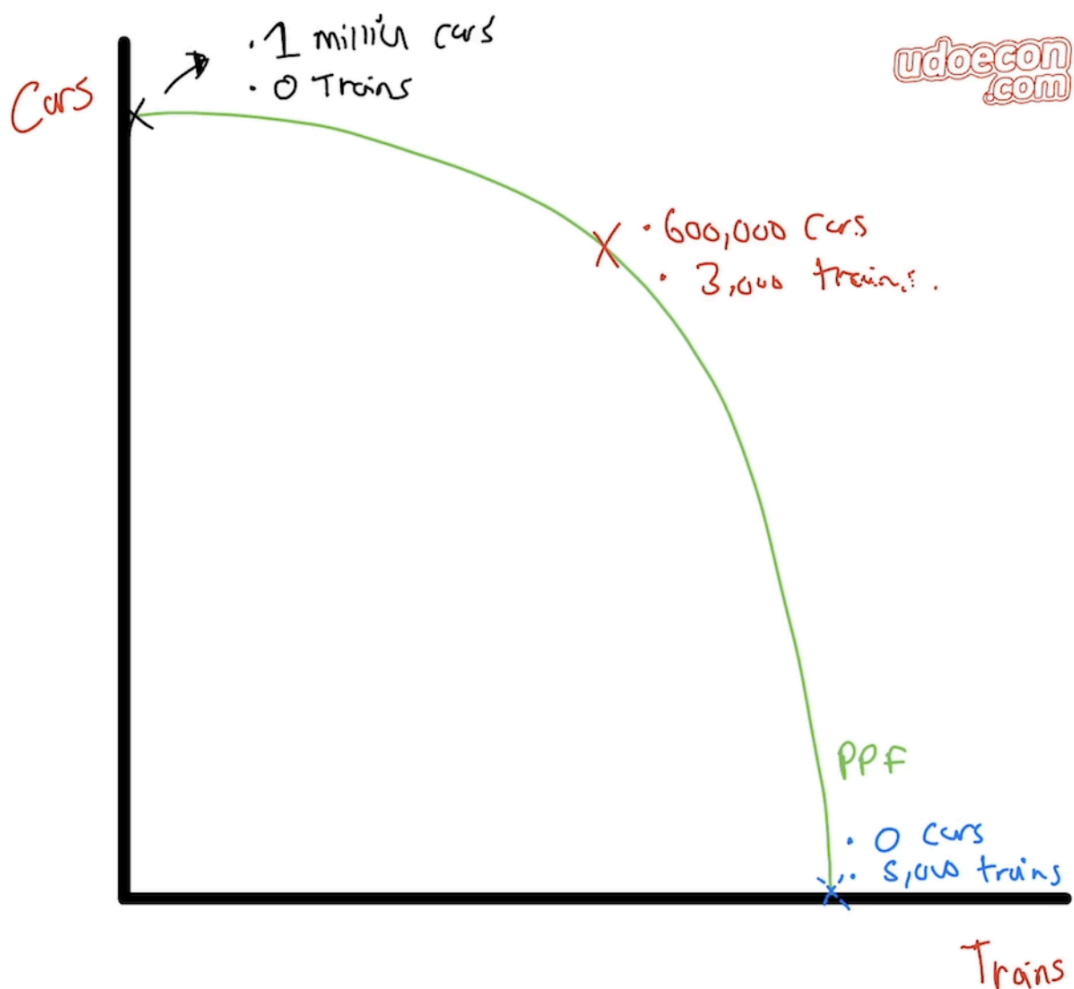
The **Production Possibility Frontier (PPF)** is a model that shows key ideas in economics such as **scarcity**, **choice**, **opportunity cost**, and **efficiency**.

It shows the **maximum possible output combinations** of two goods that an economy can produce using its available **resources** and **technology**.

Consider the UK economy, which can produce **cars** and **trains**.

- The economy could use all its resources to produce only **cars** (for example, **1 million cars a year, black point**).
- Or it could use all its resources to produce only **trains** (for example, **5,000 trains a year , blue point**).
- Alternatively, it could produce a **mix** of both — such as **600,000 cars** and **3,000 trains , red point** .

We can plot all the possible combinations of cars and trains that the UK can produce using all its resources. This gives the **PPF diagram** shown below.



## Possible and Unattainable Production

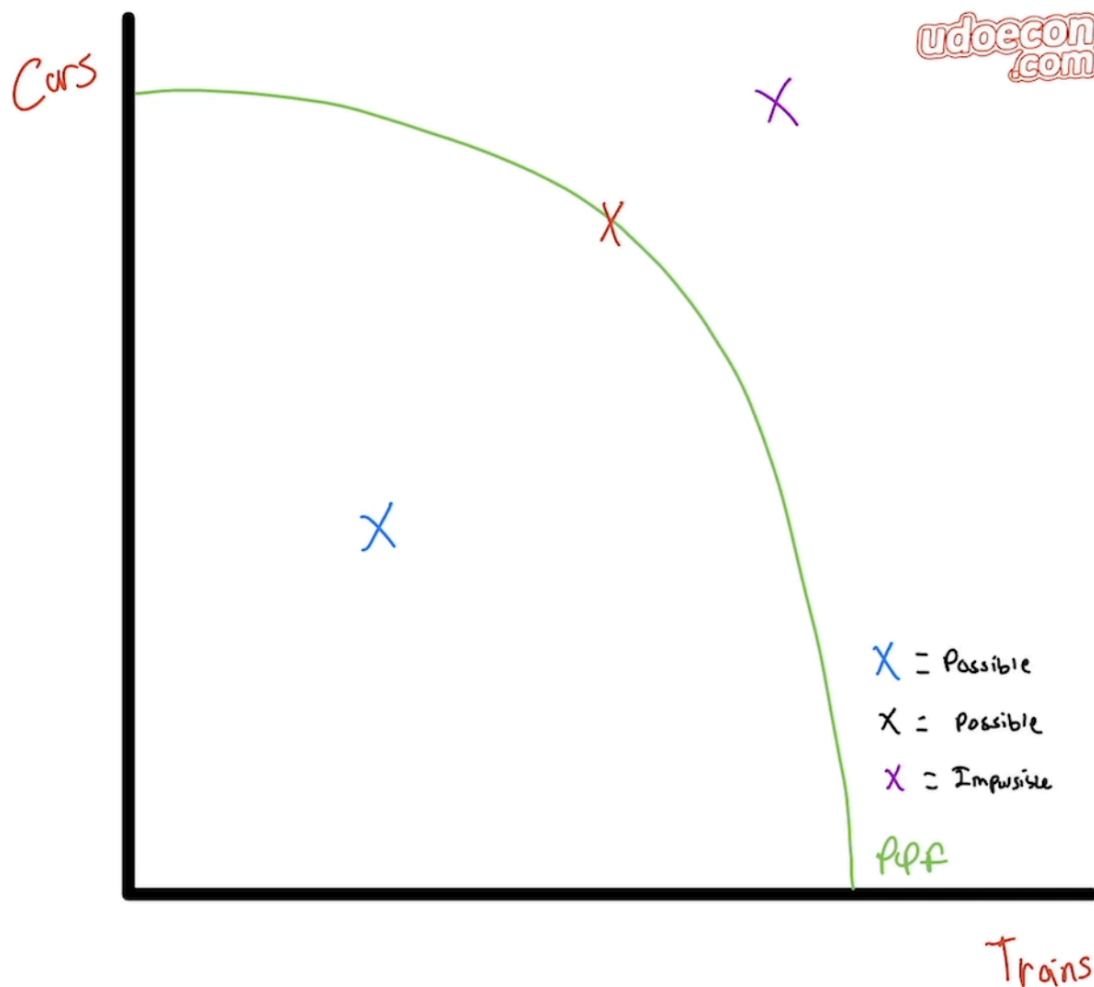
Points **on or inside** the PPF show what is **possible** for the UK economy to produce using its current resources.

For example, the **blue X** in the diagram represents a point **inside** the PPF — this is **possible**, but it means resources are **not being used efficiently**.

The **red X** on the curve shows a **possible and efficient** combination, where all resources are being fully used.

Points **beyond the PPF**, such as the **purple X**, are **unattainable** with the UK's current resources and technology.

In other words, the economy **cannot produce that many cars and trains at the same time** right now.



## Why is the PPF Curved?

The **PPF** shows **opportunity cost** — the **trade-off** between producing one good and giving up another.

The **slope of the PPF** represents the **opportunity cost**, meaning the amount of one good that must be **sacrificed** to produce more of the other.

A **curved PPF** shows the **law of increasing opportunity cost**.

As more of one good (for example, **cars**) is produced, the economy must use resources that are **less suited** to making cars and **better suited** to producing trains.

This means the **opportunity cost increases** — more trains must be given up for each extra car made.

This happens because resources such as **workers and machinery** are not equally efficient at producing both goods.

As more workers are moved into car production, they become **less productive**, so each extra worker adds **smaller and smaller increases** in output.

This is known as the **law of diminishing returns**.

If the **PPF is a straight line**, it means **opportunity cost stays constant**, as all resources are equally suited to producing both goods

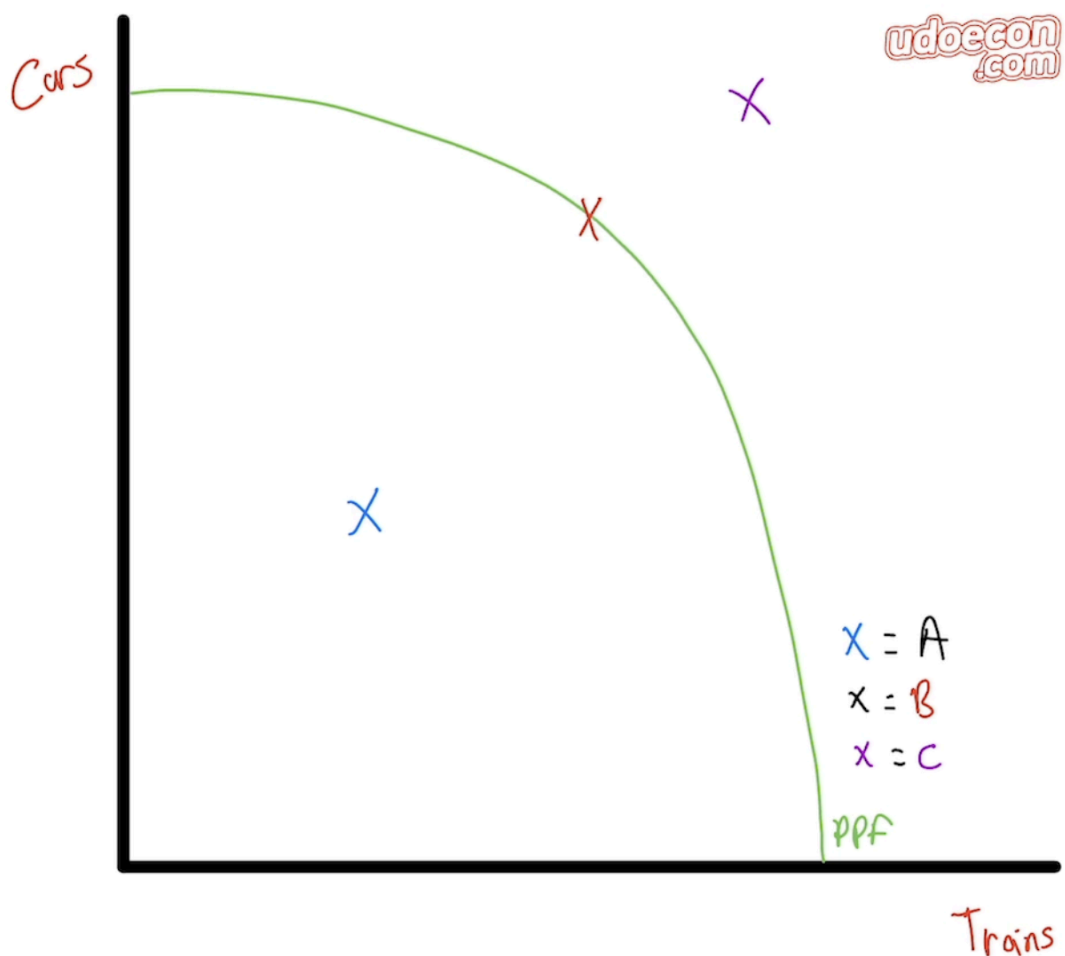
## PPFs and Efficiency

In the diagram, each point shows a different way the UK can use its resources to produce **cars** and **trains**.

- **Point A (blue)** is **inside the PPF**. This means resources are **not being used efficiently** — the UK could produce more cars and trains by making better use of workers and machinery.
- **Point B (red)** is **on the PPF**. This shows an **efficient use of resources** — all resources are being used fully. To make more cars, some trains must be sacrificed.
- **Point C (purple)** is **outside the PPF**. This point is **unattainable** with the UK's current resources and technology.

In short:

- **On the curve = efficient**
- **Inside the curve = inefficient**
- **Outside the curve = impossible (for now)**



## Economic Growth and Decline

In the diagram, each curve shows a different level of the UK's **productive potential** — how much **cars** and **trains** the economy can make with its resources.

- A **movement from point A to point B**, inside the PPF, shows **short-run economic growth**.

This means the UK is using its existing resources **more efficiently**, such as reducing unemployment or making better use of factories.

- A **shift from point C on the green curve to point D on the purple curve** shows **long-run economic growth**.

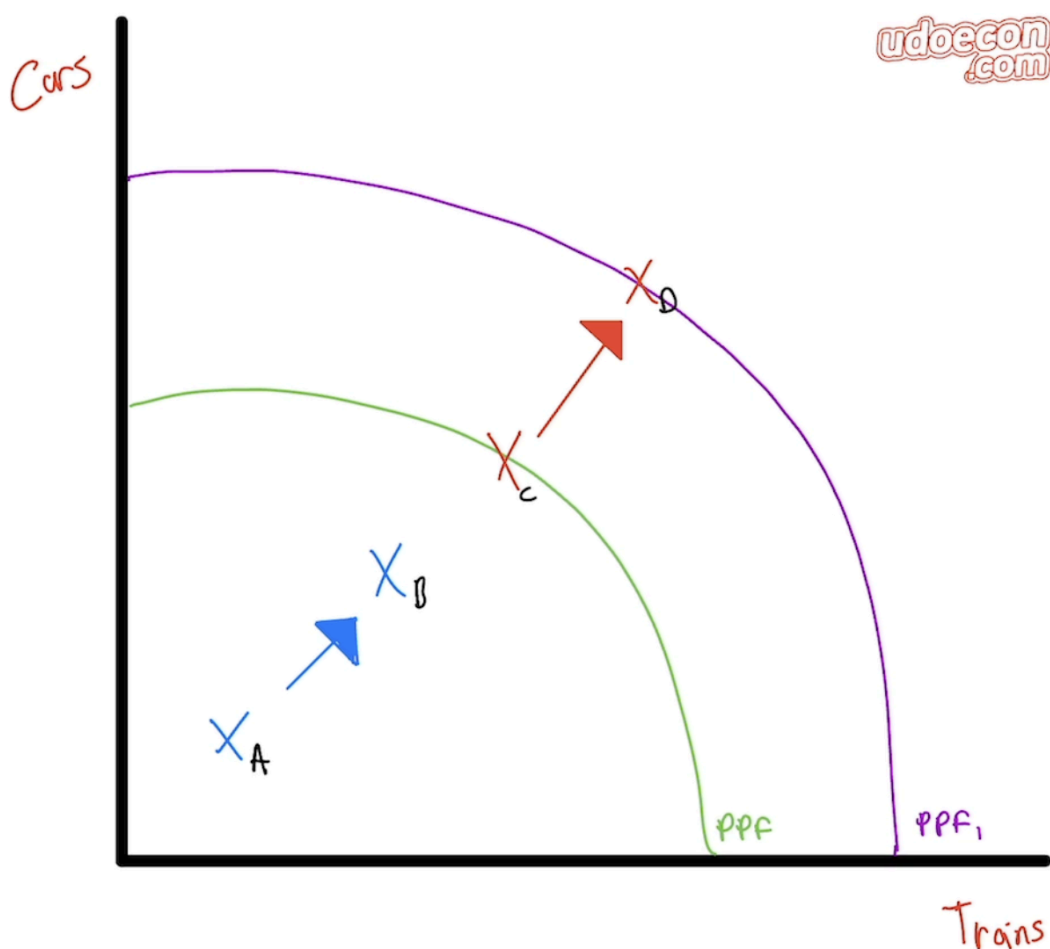
This happens when the economy's **productive capacity increases**, allowing it to produce **more of both cars and trains**.

Causes include **new technology**, **more skilled workers**, or **investment in capital**.

If the PPF were to **shift inwards**, it would show **economic decline** — meaning the UK can now produce **less than before**, perhaps due to **loss of workers**, **damage to infrastructure**, or a **recession**.

In summary:

- **A → B** = better use of current resources (short-run growth)
- **C → D** = increase in productive capacity (long-run growth)
- **Inward shift** = decline in the economy



## PPF: Capital Goods vs Consumer Goods (Summary)

A PPF can be used to show the trade-off between **capital goods** and **consumer goods**.

**Consumer goods** are products that directly satisfy wants and needs (e.g., food, clothes, phones).

**Capital goods** are man-made resources used to produce future goods and services (e.g., machinery, factories, tools).

Choosing to produce **more capital goods today** has two key effects:

1. **Short Term (movement along the PPF):**

The economy must give up some consumer goods to produce extra capital goods.

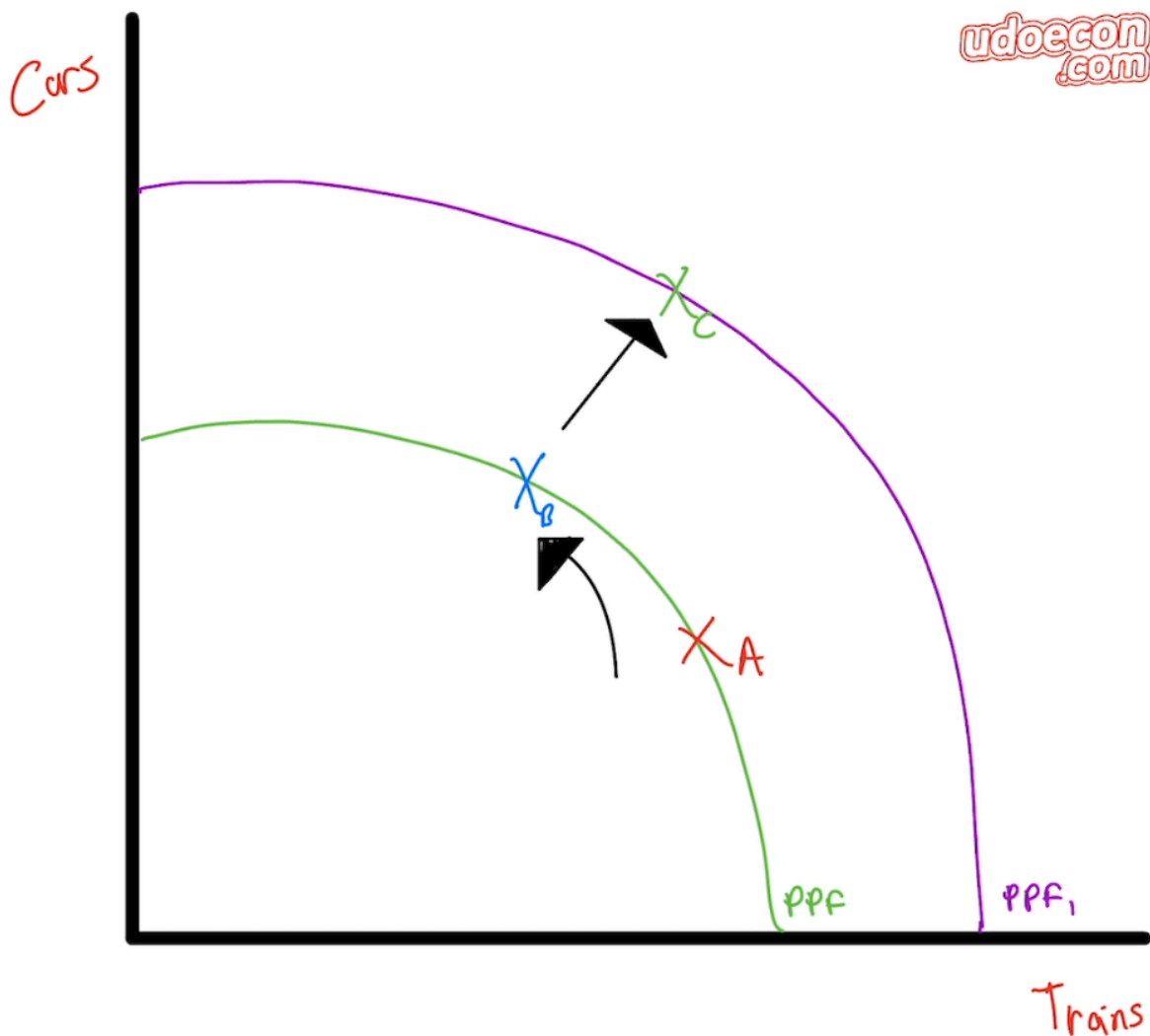
On the diagram this is a movement **from point A to B**, showing the opportunity cost.

2. **Long run (outward shift of the PPF):**

Capital is a factor of production. Investing in more capital goods increases productive capacity over time.

This pushes the PPF **outwards from PPF to PPF1**, allowing the economy to reach a higher output point (e.g., **from B to C**).

Overall, economies that prioritise capital goods tend to achieve **faster long-run growth**, because they expand their ability to produce both types of goods in the future.



**A PPF only shifts for two reasons: a change in the quality (productivity) or quantity of the factors of production. Essentially it's the same things that would shift the LRAS curve .**

But sometimes an economy only becomes more productive in making **one** of the goods. For example, imagine a new automated robot system that massively boosts **train production**, while **car production** stays exactly the same. In that case, only the **train axis** of the **PPF** shifts outwards, causing the curve to **stretch on one side** rather than shifting out fully - as shown on diagram with shift of PPF to PPF1 .

