

Cambridge IGCSE · Economics 0455 · Notes

Opportunity cost

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Read first: [The nature of the economic problem](#)

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What you need to know

By the end of this topic you should be able to:

1. **Define opportunity cost:** the **next best alternative** that is **given up** (forgone) when a choice is made, and give examples of it in different situations.
2. **Explain how opportunity cost affects decisions** made by the four groups that allocate resources: **consumers, workers, producers** and **governments**. Each has limited means, must choose, and weighs what each choice would make it give up.

Opportunity cost is the same for Core and Extended candidates. Showing it on a production possibility curve is the next topic.

Understand it

Choosing means giving something up

Wants are unlimited but resources are finite (the economic problem), so every person, firm and government has to **choose**. Any choice rules out the other things the same money, time or resources could have been used for. Economists measure the cost of a choice by what is sacrificed:

$$\text{scarcity} \Rightarrow \text{choice} \Rightarrow \text{something given up} = \text{opportunity cost}$$

Opportunity cost is the next best alternative forgone. Two words in that definition matter:

- **next best:** not everything you could have done, only the single option you would have picked if you had not picked this one;
- **forgone** (given up, sacrificed): it is what you lose, not what you get, and not the price you pay.

A student has 30 dollars and three wishes: a concert ticket (30 dollars), a video game (30 dollars) and a football shirt (30 dollars). She ranks them concert first, game second, shirt third, and buys the ticket. The opportunity cost of the concert is **the video game**, not the game plus the shirt, and not the 30 dollars. The money is the price; the opportunity cost is the best thing the money could have bought instead.

It is not always measured in money

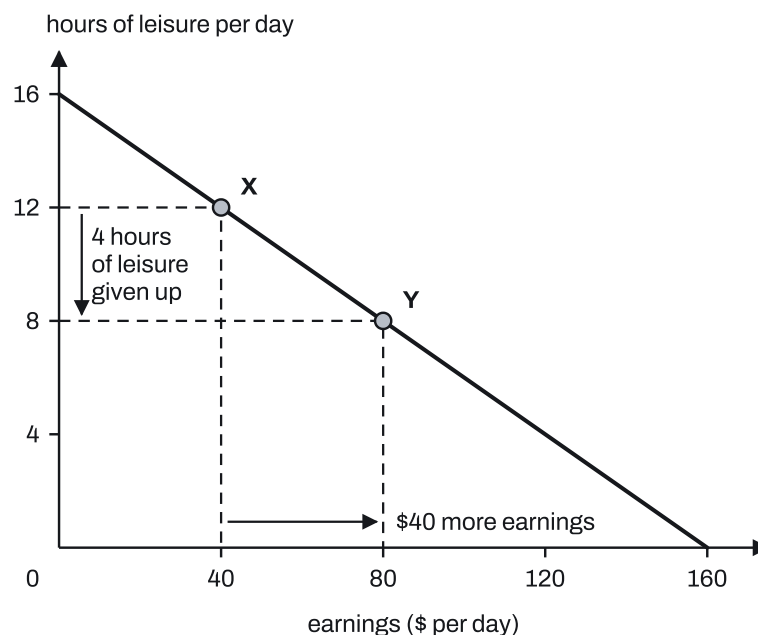
Opportunity cost can be time, goods, leisure, income or anything else that was given up:

- a worker who does 3 hours of overtime gives up **3 hours of leisure**;
- a potter who makes 6 bowls an hour and takes a 7-hour day off gives up **42 bowls** (6×7), whatever they cost to make;
- a government that spends its budget on a new road gives up **the hospital** it would otherwise have built.

It is often shown in money when the alternative earns income: a firm that chooses one product gives up the revenue the other would have brought.

Leisure or earnings

A worker has 16 hours a day to split between paid work and leisure, and the wage is 10 dollars an hour. Every hour of work earns 10 dollars and costs 1 hour of leisure, so the choices lie on a straight line.



- Moving from **X to Y**, the worker earns $80 - 40 = 40$ dollars more. The opportunity cost is what falls on the **other axis**: $12 - 8 = 4$ **hours of leisure per day**.
- Moving from **Y to X**, the worker gains 4 hours of leisure, and the opportunity cost is the **40 dollars** of earnings given up.

The gain is read on one axis and the opportunity cost on the other. Which one is the cost depends on the direction of the move.

How opportunity cost shapes decisions

Rational decision makers compare the benefit of a choice with its opportunity cost, and choose where the benefit is greater than what is given up. If the next best alternative becomes more valuable, the opportunity cost rises and the choice becomes less attractive.

Group	What is limited	A choice	Its opportunity cost
Consumers	Income (and time)	Spend on a holiday	The new phone they could have bought, or the interest the money would have earned if saved
Workers	Time, skills	Take a job as a nurse; work overtime; go to university	The next best job and its wage; leisure; the wages given up while studying
Producers (firms)	Land, labour, capital, finance	Make product X; buy a new machine; open a shop in one town	The revenue from product Y; the extra workers, advertising or raw materials the money could have paid for; the other location
Governments	Tax revenue and borrowing	Spend on healthcare; subsidise wind farms	The schools, roads or defence spending given up

A few points about each:

- **Consumers** must choose because their **income is limited**. Buying more of one product means buying less of another. Spending also has the opportunity cost of saving: the interest that money could have earned.
- **Workers** choose between **jobs** and between **work and leisure**, because time is limited. If the pay in a worker's current job rises, leaving it gives up more, so the opportunity cost of changing jobs rises. Training or university has an opportunity cost of the wages that could have been earned meanwhile.
- **Producers** choose **what to make, how to make it and where**, because their resources and finance are limited. Money spent on new technology cannot also pay for more workers, better raw materials, advertising, land for expansion, or profits paid to the owners. A farmer who grows apples on a field gives up the crop that field could have grown instead.
- **Governments** choose **priorities**, because tax revenue is limited. Money for a new hospital cannot also build a school; a country that uses more resources for exports has fewer for its home market; moving resources into one industry means less output from others. A government weighs which use gives society the greatest benefit, and may choose the option with the **lower opportunity cost**.

A whole country faces opportunity cost too. If more land, labour and capital go into farming, fewer are left for manufacturing and services, so their output falls.

When there is no opportunity cost

If something uses no scarce resource, there is nothing given up: a free good (sunlight, sea air) has no opportunity cost. But careful: something that is free to **you** can still have an opportunity cost. A party with free entry still costs the time spent there and anything bought for it, and a state school is paid for by taxes that could have funded something else.

Key facts and formulas

This topic has no formula list in the exam. "Learn it" means you must remember it.

Fact	Status
Opportunity cost: the next best alternative given up (forgone) when a choice is made	Learn it
Scarcity forces choice, and every choice has an opportunity cost	Learn it
Opportunity cost = the value of the next best alternative only, not all the alternatives and not the price paid	Learn it
Output forgone = output per hour $\times$ hours given up	Learn it
On a choice line, the gain is read on one axis and the opportunity cost on the other	Learn it
Consumers are limited by income, workers by time and skills, producers by resources and finance, governments by tax revenue	Learn it
A free good has no opportunity cost	Learn it

How to do it

In the questions we have tagged for this topic (35 questions, 2021–2025), we counted only the parts about opportunity cost: one part in each question, so 35 parts.

Question type	Questions
Multiple choice (concept)	21
Explain (4 marks)	6
Multiple choice (calculation or diagram)	6
Analyse (6 marks)	1
Discuss (8 marks)	1

1. Multiple choice (concept) (21 questions)

1. **Recall the definition:** next best alternative, given up.
2. **Decide what the question asks:** the definition, the name of the concept in a story, what the opportunity cost is in a story, or what makes it bigger.

3. **Cross out** options that name the price paid, the benefit gained, a cost to someone else (external cost, pollution) or a different topic.

Variations you will meet:

- **Which is the definition?** (4 questions) Pick "the next best alternative forgone". Wrong options describe scarcity ("lack of goods to satisfy unlimited wants"), the allocation of resources, or the price of consuming. A definition that just says "an alternative given up" is weak because it leaves out **next best**.
- **Name the concept in a story** (8 questions): a government spends more on one thing by cutting another (healthcare instead of defence, poorer regions instead of richer ones, wind farms instead of hospitals); a worker takes one job over the next best; producing more of one good means producing less of another. The answer is **opportunity cost**. When the options offer "reallocation of resources" but not opportunity cost, moving spending from one use to another is a reallocation of resources.
- **What is the opportunity cost here?** (8 questions) Find what is **given up**: the interest a consumer would have earned by saving instead of going on holiday; the crop revenue a farmer loses by selling the field; the leisure hours a builder gives up by working longer; the nurses a hospital can no longer employ if its fixed budget pays for one more doctor; the other goods \$5 could have bought. It is never the price paid, the benefit gained or a cost to other people.
- **What raises the opportunity cost?** (1 of those 8) Anything that makes the **alternative** more valuable. For a worker leaving job A for job B, a rise in the pay of job A raises the opportunity cost; better pay or holidays in job B make the move more attractive but do not raise its cost.
- **Choosing between options** (1 question): a government picks the project whose opportunity cost is **lower** relative to its benefit.

2. Explain (4 marks) (6 questions)

Point-marked: each correct, linked point earns 1 mark, up to 4. Plan: **define** → **limited means** → **choice** → **example** → **how it decides**.

1. **Define it** (2 marks): opportunity cost is the next best alternative (1) given up / forgone (1).
2. **Why a choice is needed** (1): the group's means are limited (income, time, tax revenue, resources).
3. **Apply it to the group in the question** (1–2): what it chooses between, with an example of what is given up.
4. **How it influences the decision** (1): the decision maker compares benefits with what is given up, and picks the option whose benefit is greatest compared with its opportunity cost.

Variations you will meet:

- **A named group** (4 questions): a government spending tax revenue on a project, a government's decisions in general, consumers, a farmer deciding what to grow. Your example must be about **that** group: for a government, a school versus a hospital, not tea versus coffee.
- **"Explain two possible opportunity costs for firms of ..."** (1 question): each cost is identified (1) and explained (1). For a firm spending on new technology: fewer workers or lower wages (1), so less output or less skilled staff (1); less spending on advertising (1), so demand is not increased (1); no land for

expansion; lower-quality raw materials; less profit paid to the owners.

- **The opportunity cost to a country of producing more of something** (1 question), such as exporting more of a product: those goods could have been sold at home (1), giving home consumers more choice and lower prices (1); the resources used could have made other products (1), so output and exports of those fall (1).

3. Multiple choice (calculation or diagram) (6 questions)

1. **Decide what the next best alternative is.**
2. **Put a value on it** in the units the question uses: goods, hours or dollars.
3. **Multiply by the time period** if the question covers several hours or years.

Variations you will meet:

- **Output given up:** a baker makes 40 loaves an hour and works 6 hours a day, so a day off costs $40 \times 6 = 240$ loaves. When the question names no unit, pick the **output** given up, even if its money value (loaves times price) is also among the options. Ignore costs that would be paid anyway, such as ingredients.
- **A money value: whole alternative or difference?** Cambridge has marked these questions both ways, so work out **both** figures (the whole value of the alternative, and the difference between the two options) and check which one matches an option. A working rule that fits the marked answers:
 - **The chosen option earns less than the alternative** (it still earns something, but less): the income lost is the **difference**. A trainee earns 8 000 dollars a year for 3 years instead of a job paying 14 000 dollars a year: $(14\,000 - 8\,000) \times 3 = 18\,000$ dollars. The same goes for value to the country, taxes included: a forest could give timber firms income after tax of 12 million dollars and the government 3 million dollars in tax, or give tourism firms 4 million dollars after tax and the government 1 million dollars. Using it only for tourism gives up $(12 + 3) - (4 + 1) = 10$ million dollars.
 - **The chosen option earns nothing, or earns more than the alternative** (so there is no income shortfall): the opportunity cost is the **whole value** of the alternative. A firm can make product A for revenue of 30 000 dollars a year or product B for 25 000 dollars a year for 4 years. Choosing A gives up B's revenue: $25\,000 \times 4 = 100\,000$ dollars, not A's own revenue.
- **Reading a leisure–earnings diagram** (2 questions): find the change on the axis you **give up**. Moving to more earnings costs hours of leisure; moving to more leisure costs dollars of earnings (see the diagram above).

4. Analyse (6 marks) (1 question)

Point-marked, but the marks go to developed chains. Plan: **define it, then two or three groups, each with a choice (1) and the limited means that force it (1).**

1. Define: next best alternative (1) forgone (1).
2. **Consumers:** must choose between products (1) because income is limited (1).
3. **Workers:** must choose between jobs, or between work and leisure (1), because time is limited (1).

4. **Producers:** must decide what to make, how to make it and where to locate (1) because their resources and finance are limited (1).
5. **Governments** (if asked): must decide which projects to fund (1) because tax revenue is limited (1).

If the question names several groups, cover **at least two** of them, or the mark is capped (4 out of 6 on the question we have seen). Link each chain to the idea that the decision maker gives up the next best option.

5. Discuss (8 marks) (1 question)

Marked in levels: two sides, each developed, reach Level 3 (6–8). A one-sided answer stays in Level 2 (3–5).

Plan: **define** → **why it might (two developed points)** → **why it might not (two developed points, with opportunity cost as one)** → **judgement**.

For a question on whether a country or government should **move more resources into one use** (a sector, a project, an industry):

- **Why it might benefit:** more output of that product (1), which can be exported (1), improving the current account (1); less reliance on imports of necessities such as food (1); if the industry is labour-intensive, more jobs and lower unemployment (1); the country can specialise in what it does best, raising efficiency (1).
- **Why it might not: the opportunity cost:** fewer resources for other sectors such as manufacturing and services (1), so their output and exports fall (1); the chosen sector may pay low wages (1); farming output swings with the weather (1); demand for manufactured goods and services tends to rise faster than demand for food as incomes grow (1); it may use up scarce water or land (1).
- **Judgement:** "It depends on ...": whether the benefit is greater than what is given up, whether the country has an advantage in producing it, how many resources are unemployed (if they would otherwise be idle, the opportunity cost is small), and whether it is a short-run or long-run decision.

Worked examples

Example 1

A student can spend one year on a full-time course. During that year she would earn 4 000 dollars from a part-time job. Her next best alternative is a full-time job paying 19 000 dollars a year.

What is the opportunity cost, in income, of the year on the course?

- **A** 4 000 dollars
- **B** 15 000 dollars
- **C** 19 000 dollars
- **D** 23 000 dollars

[1]

The course still lets her earn 4 000 dollars, so the income she gives up by not taking the job is 19 000 — 4 000 = 15 000 dollars. The answer is **B**. (1)

A is what she earns, not what she loses. C forgets the part-time income she still gets. D adds the two, which counts her own earnings as a cost.

Example 2

Explain how opportunity cost influences a worker's decision on whether to work overtime. [4]

Opportunity cost is the next best alternative (1) that is given up when a choice is made (1). A worker has a limited number of hours in a day, so time spent on overtime cannot be used for leisure (1). The worker will do the overtime only if the extra pay is worth more to them than the leisure hours they give up, so if the overtime rate is low, or they value time with family highly, they will choose not to work it (1).

Example 3

Analyse how opportunity cost influences the decisions made by a government and by a firm. [6]

Opportunity cost is the next best alternative (1) forgone when a decision is made (1).

A government has limited tax revenue, so it cannot pay for every project (1). If it spends 200 million dollars on a new hospital, it cannot spend the same money on schools, so it compares the benefit of each and gives up the one it values less (1).

A firm has limited finance and resources (1). If it spends its profit on new machinery, it gives up the chance to hire extra workers or advertise more, so it will buy the machinery only if it expects that to raise its revenue or cut its costs more than the alternative would (1).

Example 4

Discuss whether or not a government should spend more of its budget on building a high-speed railway. [8]

A high-speed railway is a large infrastructure project paid for from limited tax revenue, so it has an opportunity cost: the next best use of that money that is given up. (*Level 1: definition in context.*)

Why it should. Faster journeys cut travel time for workers and firms, lowering firms' costs of transport and making them more competitive, which can raise output and exports. Building the line creates jobs, and the workers' spending creates more jobs elsewhere. A train can also replace some road and air travel, which reduces pollution and congestion. (*Developed points on one side: Level 2.*)

Why it should not. The money could have been spent on healthcare or education instead, which might raise the productivity and living standards of many more people; that lost benefit is the opportunity cost. Large projects often cost more than planned and take years to finish, so the benefit arrives late. If the government borrows to pay for it, the interest will have to be paid from future taxes. (*Both sides considered and developed: Level 3.*)

Judgement. The railway is worth building only if its benefits are greater than those of the next best use of the money. It is more likely to be worthwhile where roads are congested and many people would use it, and less so where schools and hospitals are underfunded, because then the opportunity cost is high. (*A reasoned conclusion: top of Level 3, 8 marks.*)

Common mistakes

- **Defining it as "the cost of a choice" or "the alternative".** The definition needs both **next best** and **given up**. Examiners see answers that describe choosing an option rather than sacrificing one; the opportunity cost is the option you **did not** take.
- **Giving the price instead.** What you pay is the price; the opportunity cost is the best thing that money, time or resource could have done instead.
- **Listing every alternative.** Only the single next best one counts.
- **Examples that ignore the context.** A question about a government's decisions needs a government example (a hospital or a school), not a consumer choosing between tea and coffee, which earns nothing. The same goes for firms: examiners saw answers about the economy or the government when the question was about a firm.
- **Not saying why a choice is needed.** Strong answers link opportunity cost to **limited** income, time, tax revenue or resources. Many answers skip this and lose a mark.
- **Getting the alternative wrong.** For a country exporting more of a good, the alternative is selling it at home or using the resources for other products, not importing.
- **Reading the wrong axis.** On a leisure–earnings diagram, the opportunity cost is on the axis that goes **down**.
- **One-sided Discuss answers.** Opportunity cost is often the key point on the "no" side; leaving out the other side keeps the answer in Level 2.

How to get the marks

- **Command words.** *Define*: the exact meaning, both parts. *Identify*: name the point, no explanation. *Explain*: give reasons and link each step ("so", "because", "this means"). *Analyse*: develop chains of reasoning in detail. *Discuss*: both sides, then a justified conclusion.
- **Start with the definition** whenever opportunity cost is in the question. It often earns the first two marks of an Explain or Analyse part.
- **Explain (4) and Analyse (6) are point-marked.** Each correct, linked point is 1 mark. A list of unconnected words is capped; chains (limited means → choice → what is given up → the decision) score.
- **Cover what the question names.** "Two opportunity costs" means two, each identified and explained; "consumers, workers and producers" means at least two groups, each with its own example.
- **Discuss (8) is level-marked.** Level 3 needs both sides developed and some evaluation. Finish with a judgement that says what the answer **depends on**, not just "it depends".

- **Use the stimulus, then go beyond it.** Section B stems set the context; your points can bring in ideas that are not in the stem.
- **Multiple choice:** check the units asked for (goods, hours or dollars), and read which way a move on a diagram goes.

Quick check

1. A farmer can use a field to grow wheat, rice or maize. She ranks them wheat, then rice, then maize, and grows wheat. What is the opportunity cost of growing wheat?
 - **A** the rice she could have grown
 - **B** the rice and the maize she could have grown
 - **C** the money she spends on wheat seed
 - **D** the revenue she earns from the wheat
2. A tailor makes 5 shirts an hour and works 8 hours a day. The materials for each shirt cost 6 dollars and each shirt sells for 20 dollars. What is the opportunity cost of taking two working days off?
3. Use the diagram in "Understand it". A third point, Z, on the line has 4 hours of leisure per day. What is the opportunity cost of moving from X to Z, and what does the worker gain?
4. Explain the influence of opportunity cost on consumers' decisions. **[4]**

Answers

1. **A.** Only the next best alternative counts, so the rice (B includes maize too). C is a cost of production and D is the benefit, not what is given up. (1)
2. $5 \times 8 = 40$ shirts a day, so two days cost $40 \times 2 = 80$ **shirts**. The materials and the price are not needed: the question asks what is given up, which is the output.
3. At Z the worker earns $10 \times (16 - 4) = 120$ dollars. From X to Z the gain is $120 - 40 = 80$ dollars a day, and the opportunity cost is $12 - 4 = 8$ hours of leisure a day.
4. Opportunity cost is the next best alternative (1) that is forgone (1). Consumers have limited income, so they cannot buy everything they want and must choose (1). If a consumer spends 50 dollars on a jacket, the pair of shoes she would have bought next is given up, so she buys the jacket only if she values it more than the shoes (1).

Past questions to try

- **0455/12/F/M/23 Q2:** reading opportunity cost from a leisure–earnings diagram.
- **0455/11/M/J/24 Q2:** the value of the alternative over five years.
- **0455/23/M/J/23 Q3:** part (b), two opportunity costs for firms of investing in technology.
- **0455/22/F/M/21 Q2:** part (b), the opportunity cost to a country of exporting more.