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2.9 Teacher view

Market failure — public goods

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The big picture

Real-world issue 2: When are markets unable to satisfy important economic objectives – and does government intervention help?

Should all goods and services be provided by the free market? Can firms make a profit in every market?



Figure 1. Apples are private goods.

Credit: Getty Images vladans

Student view

Public goods have a few simple characteristics in economics, but they are easily confused with other types of goods.

Consider an apple: once it has been eaten, it cannot be eaten by someone else. We can also prevent people from having it. An apple is a private good.

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Public goods are very different: we cannot prevent people from consuming them, and if one person consumes them, they still exist for others to consume. Why is this a problem and a cause of market failure? Because if a good can be enjoyed by anyone, and no one can be excluded from enjoying the good, who will want to pay for it?

There are quite a few examples where the price mechanism would fail to allocate resources. Consider a street light: would you pay for the street lights to come on at night only at the point when you wanted to use them? The answer is probably 'no'. There might be ways to have a sort of 'pay as you go' street light system by employing modern technology, but this isn't really feasible and it is a better idea to have street lights available to all regardless of people's ability to pay.

You might find this a tricky topic to get your head around, largely because the use of the word 'public' can make you think the definition of the good has something to do with the state. The news media also often refers to public goods and services incorrectly. For example, you may think that hospitals provided by the state are public goods, but they are not. While the government will usually need to intervene to provide public goods, in economics the definition of public goods does not refer to the role of the government.

💡 Concept

Economic well-being Intervention

Public goods are necessary for a well-functioning society: they improve people's safety and the economy's productivity. However, the free market would never produce and sell these goods. This is because a price cannot be set for them that would allow producers to buy resources to produce the good and ration the good amongst willing consumers. The government must intervene to make sure that they are provided to everyone. Public goods are always merit goods, and society benefits from their existence.

How happy are you to pay your taxes so that public goods will be provided, knowing that there might be others who pay less towards them than you do?

Student
view

Public goods are goods that would not be provided at all in a free market but which are necessary and beneficial to society. Because the free market is unable to provide these goods without intervention, public goods are an example of market failure.

There is a lot of debate about what is and is not classified as a public good. Public goods are called 'public' not because they are provided by the government, but because they have certain intrinsic characteristics which mean that the government must intervene to ensure they are available to all.

To understand what a public good is, it is useful to consider what private goods are. A private good has two characteristics:

- It is rivalrous. This means its consumption by one person reduces its availability to someone else. For example, beverages, pencils and clothes are rivalrous, because when you buy one, another person cannot buy the same one. Most goods are rivalrous.
- It is excludable. This means it is possible to exclude others from using the good once it has been provided, because you have to pay for the good to use or consume it. Again, most goods are excludable.



Figure 1. Traffic lights.

Credit: Getty Images LeManna

A good is said to be non-excludable if it is impossible to stop other people from consuming it once it has been provided, even though you have paid for it. A flood barrier is a good example to understand this concept. If someone privately constructs a flood barrier to



protect his house, other people might also be protected by it and will gain the benefit without having paid anything.

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A good is said to be non-rivalrous if one person consuming it does not prevent someone else from consuming it as well. As we said previously, most goods are rivalrous because once one person has consumed the good, it cannot be consumed by someone else. For example, once you have eaten an ice cream, no one else can eat that same one. A park bench is a good example of a non-rivalrous good – if you sit on the park bench, that doesn't prevent others from enjoying that park bench after you.

Table 1. Characteristics of the four types of goods.

	Excludable	Non-excludable
Rivalrous	Private goods For example, an apple	Common pool resources For example, fish in the ocean
Non-rivalrous	<u>Club goods</u> For example, a park bench	Public goods For example, street lights

Public goods are both **non-excludable** and **non-rivalrous**, because if one person consumes the good, such as street lights, it does not prevent another person from using it as well – even at the same time. You cannot keep the benefit of consuming the good all to yourself once it has been provided. This means there is little incentive for a private individual to pay for the good if other people can then consume it as well, free of charge.

Be aware

A good must be both **non-rivalrous** and **non-excludable** for it to be a public good. If it has only **one** of these characteristics then it is **not** a public good. It is difficult to find products that exhibit these two characteristics perfectly. Even a traditional public good, such as a lighthouse, has the potential to be excludable, for example, if the cost of providing the lighthouse is built into the docking fees at the nearest port. Goods that partially exhibit the two characteristics are referred to as quasi-public goods; for example, a park or a highway.

Student view

Examples of public goods include:

- Street lights
- National security
- Lighthouses
- Air
- Policing and law enforcement

① Exam tip

Students often lose many marks for essays about public goods because their chosen example does not clearly illustrate the concept. Good essays usually start with a definition of a key term, followed by the introduction of a real-world example. This real-world example should be employed throughout the essay, not just casually mentioned once or twice.

The free-rider problem

The free-rider problem exists because no one is willing to pay for a good or service when they think that somebody else will pay for it. This is why the good will not be provided by the free market.

Even if the government provides the good or service by using tax revenues to pay for it, there will still be some free riders. All those who do not pay their taxes are not contributing to funding the public goods, and could be considered free riders.

What Is the Free Rider Problem?





Theory of Knowledge

In economics, a free rider is someone who benefits from a good or a service without contributing to its cost. For example, defence is considered a public good. Taxes in a country are often allocated towards the military to secure the safety of its residents. However, even if an individual does not contribute to the tax base, they still enjoy the benefits. The military will protect a free rider just as rigorously as they would protect a taxpayer. What the free rider problem reveals is that people have no incentive to pay for services like defence. Therefore, governments often make it mandatory for people to pay taxes, and hence to fund the military.

Is it ethical to require a pacifist to pay taxes towards the production of nuclear missiles?

Can you think of other examples of where an individual may make a mandatory contribution to something that they consider to be unethical?

From one perspective, free riders should be eliminated. The greatest benefits to society accrue when everyone contributes (and no one free rides). A well-funded military is a strong military. However, is it ethical to mandate individuals to contribute to something that is against their principals or beliefs?

Knowledge question: To what extent should ethics determine economic theory such as the free rider problem?

Quasi-public goods

There are some goods that fulfil some, but not all, the characteristics of a public good. These are called **quasi-public goods**. There are two types of quasi-public goods: common pool resources, which we have already discussed in the previous subtopics, and club goods.



Figure 2. Museums are quasi-public goods.

Credit: Getty Images monkeybusinessimages

Common pool resources are rivalrous but non-excludable, whilst club goods are non-rivalrous but excludable. We looked at common pool resources in detail in [subtopic 2.8](#) ([/study/app/pp/sid-186-cid-754025/book/the-big-picture-id-29875/](#)). These are resources that cannot exclude individuals, but where one person's use of a good may deprive another person's future use of it. The most widely quoted example of this is fish in the ocean. Once consumed, they are no longer left for others, so they are rivalrous, but it is difficult to exclude people from fishing in the ocean.

Examples of club goods include museums, gated parks and park benches, cinemas and streaming services. People can be excluded from the use of the good, but one person's use of the good doesn't prevent another person's future use of it. These are not good examples of market failure, because the free market would provide these goods. Parks can be closed, for example, and tickets sold for entry.

⚠ Be aware



People don't have to be excluded from the good or service for it to be a club good. The important thing to remember is whether people can be excluded from the good or service. A park can be accessible by anyone, but it potentially could be shut. Parks clearly are not private goods, so must be distinguished from them as club goods.

Public vs. Private Goods



3 section questions ▾

2. Microeconomics / 2.9 Market failure — public goods

Government intervention in response to public goods

Section

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Governments tend to intervene in markets to reduce or eliminate market failure. The government will either directly provide the goods and services themselves, or it will cover the costs for private firms to provide them. The government charges consumers through taxation.

Government provision of public goods



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In many cases, the government will provide public goods themselves. For example, the armed forces are rarely privatised. Because the government uses taxes to pay for the good, the issue of the free-rider problem is resolved to a large extent because everyone in society contributes to tax revenues in some way.



Figure 1. The armed forces is a good example of a public good.

Credit: Getty Images Johner Images

Public goods are usually also merit goods. The provision of street lights will reduce crime taking place at night and make people feel safer. Reduced rates of crime will cost the police less, and benefit several other sectors of the economy too (such as health care). These are all positive externalities when street lighting is consumed, and so there is a welfare gain to all of society. The social benefits of street lights are greater than the private gains of using them.

⚠ Be aware

All public goods are merit goods, but not all merit goods are public goods.

The scale at which the government is able to provide the good also allows economies of scale to be enjoyed. This means that at large levels of output, average costs will fall. Governments are able to take on extremely large-scale projects without necessarily worrying about profitability. If necessary, the government can also raise funding through the sale of bonds, which enable it to borrow money from financial investors.

💼 Case study

The case for reinvesting in street lights



Figure 1. Streetlights have a big impact in making cities and public places safe and comfortable for all.

Credit: Getty Images Patrick Strattner

Street lights are the most commonly cited example of public goods. Streets have been lit in various ways since Roman times, but from the 15th century onwards, various European cities have legislated that private homes lit candles outside or on street corners. At the time, you could also hire a lantern-bearer if you were wealthy enough.

The first publicly provided street lights were installed on Westminster Bridge in London by the London and Westminster Gas Light and Coke Company in 1813.

In Brazil, local municipalities are responsible for installing and maintaining the streetlight network. Street lighting is their second biggest expense, after paying staff who work for the municipalities. In 2017, street lights in Brazil were still using technology that was 40–60 per cent less efficient than LEDs. Energy costs globally have risen steadily in recent decades, so Brazil's street lighting has become progressively more expensive to maintain. Although LEDs are more energy efficient, they are also significantly more expensive than traditional lights. However, LED prices are falling as they become more widely used.

Questions to consider:

- Should Brazilian municipalities switch over to LED lighting?
- What are all the considerations they must think about when making this decision?



Figure 2. The London Underground started as a private enterprise, became a public—private partnership in 2000, and in 2010 was taken over by Transport for London as part of the Greater London Authority.

Source: "London (<https://www.flickr.com/photos/phalinn/539832847/>)" by Mohd Fazlin Mohd Effendy Ooi is licensed under CC BY 2.0 (<https://creativecommons.org/licenses/by/2.0/>)

Despite the advantages of government provision of public goods, the government is not necessarily the most efficient provider of goods or services. With any large-scale investment by the government, there will always be an opportunity cost associated with the decision to provide public goods. The government will also face political pressure about their decision, as not all members of the government will agree with the investment. There will also be pressure groups in society to contend with.

Table 1. A summary table of the advantages and disadvantages to government provision of public goods.

Advantages of government provision	Disadvantages of government provision
Improves social welfare as consumption is increased.	Has to be financed, which generates an opportunity cost.
Eliminates the free-rider problem.	Government provision may not be economically efficient, as the government is unable to determine the optimal output.
Can be more efficiently provided because the government, as the sole provider, can achieve economies of scale.	Some quasi-public goods, like toll highways, could be provided more efficiently by private firms.

① Exam tip

Students often have a tendency to adopt the following structure to their 15-mark essays.

Define key term; explain concept; one paragraph listing advantages; one paragraph listing disadvantages; conclusion.

Paragraphs that list advantages and disadvantages do not read well, nor do they show that you have understood (although it does show good memorising skills).

Instead, try to write each paragraph around a theme, in which you present an argument and a direct counterargument.

For example, in one paragraph you might explain that the government's size allows it to achieve some economies of scale when building public goods. This argument's counterargument is that large firms with monopoly power will also be able to achieve economies of scale, as well as being able to take advantage of other efficiencies they enjoy as private enterprises.

If you explain the above point clearly and offer a direct counterargument within the same paragraph, you will show the effective evaluation skills required for top-scoring answers.

Contracting out to the private sector

The government can pay the private sector to provide the good, rather than providing it directly themselves. The private sector can be more efficient than the government. The profit motive gives firms the drive to raise capital at the same time as being efficient. Even if the firms are monopolies that do not face any competition, they can still use their profits to achieve greater efficiency. Higher level students will look in more detail at these ideas about competition in [subtopic 2.11 \(/study/app/pp/sid-186-cid-754025/book/the-big-picture-id-29858/\)](#).

However, the extent to which the private sector is more efficient is debated. According to [research conducted by the European Public Service Union ↗](#) (<https://www.epsu.org/article/public-and-private-sector-efficiency>), there does not seem to be clear evidence that the private sector is more efficient than the public sector. This is because borrowing costs are higher for private firms, and they must also deliver profits for their shareholders. Both these costs must be met from sales to consumers. The government does not need to worry about borrowing costs or profits as much.



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Checklist

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What you should know

By the end of this subtopic **2.9 Market failure — public goods**, you should be able to:

- Define public goods, private goods, rivalry and non-rivalry, excludability and non-excludability, the free-rider problem, quasi-public goods and common pool resources.
- Using the concepts of rivalry and excludability, and providing examples, distinguish between public goods (non-rivalrous and non-excludable) and private goods (rivalrous and excludable).
- Explain, with reference to the free-rider problem, how the lack of public goods indicates market failure.
- Discuss the implications of the direct provision of public goods by the government.
- Discuss the implications of contracting the provision of public goods to the private sector.

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Investigation

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Real-world issue 2: When are markets unable to satisfy important economic objectives – and does government intervention help?

A non-congested toll road is an example of a quasi-public good. It is possible to prevent people from using it, but it is fairly non-rivalrous. This means that after one person's consumption, it will remain in existence for other consumers to use it too. Toll roads are quite controversial infrastructure projects, as people often do not want to pay to use a road.

Here are some examples of toll roads that are in use in various countries:

- The A22 in the Algarve, Portugal. This runs from Lagos in the west to Castro Marim, connecting to Spain.
- The SR417 near Orlando, Florida. It is a partial circular route around the city.
- The Aberdeen tunnel in Hong Kong. This connects the south side of Hong Kong Island to the north side, allowing traffic to avoid going over the hills in the centre of the island or having to circumnavigate them.
- The Chicago Skyway Toll Bridge, which was built in 1958. It runs to the south of Chicago and connects two major routes. It spans the Calumet river.



Figure 1. The Chicago Skyway toll plaza.

Source: "bring-your-wallet (<https://www.flickr.com/photos/laundry/4974136834/>)" by Beth is licensed under CC BY 2.0 (<https://creativecommons.org/licenses/by/2.0/>)

Take on one of the following three roles:

- A government official in favour of the government building a toll road that bypasses congested local roads in your area
- An employee of a private firm pitching to build the road for the government
- A local resident who is against building roads that charge for their use.

Write a report outlining your position towards the toll road project. You should include a diagram, give a balanced review of the arguments and provide a reasoned conclusion. The minimum length of your report can be decided by your teacher. To reach your recommendation you could think about:

- What might the environmental impacts of toll roads be for a local resident?
- Why might it be better for the government to pay the private firm to build the toll road than to build it themselves? What advantages could the private firm offer?

The following articles may help you:

- Three toll roads proposed for rural Florida areas generate lots of concern, little support, The News-Press, 20 February 2020 ↗ (<https://eu.newspress.com/story/news/local/2020/02/20/florida-toll-roads-could-impact-huge-swaths-of-undeveloped-lands-family-farms-rural-towns/4644077002/>)
- M6 Toll bosses 'urged' to rethink price rise, BBC News, 30 June 2018 ↗ (<https://www.bbc.co.uk/news/uk-england-44667252>)

Once your classmates and you have written your reports, your teacher can organise you into groups to carry out a debate on this topic. This can be done in small groups, which then report their agreed solutions back to the whole class, or the debate can take place as a whole class.

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