

# Externalities: why do we need coordinated public action in the pandemic?

**With infectious diseases like Covid-19, how one person behaves necessarily affects other people's wellbeing – there are what economists call 'externalities'. To achieve good overall outcomes for society, it is not enough to rely on individuals' incentives to protect themselves.**

In a recent podcast, the former Oasis guitarist Noel Gallagher discussed his take on wearing a face mask, stating bluntly: *'I choose not to wear one. If I get the virus it's on me, it's not on anyone else.'*

This attitude to individual risk-taking and protection choices during the Covid-19 pandemic is becoming increasingly widespread, making it more difficult to contain the spread of the disease and causing alarm to public health professionals.

On 21 September, Chris Whitty, Chief Medical Officer for England gave the following response: *'... if I increase my risk, a lot of people say, well, can't people just be allowed to take their own risk? The problem with a pandemic or an epidemic infection like this is if I as an individual increase my risk, I increase the risk to everyone around me and then everyone who's a contact of theirs, and sooner or later the chain will meet people who are vulnerable or elderly or have a long-term problem from Covid. So you cannot in an epidemic just take your own risk. Unfortunately, you're taking a risk on behalf of everybody else.'*

In a nutshell, what Chris Whitty articulates is that during a pandemic, no individual decision can be taken in isolation. What one person does necessarily affects other people's wellbeing and to achieve good overall outcomes

for society, it may not be enough to rely on people's incentives to protect themselves. Economists recognise this situation as one of *externalities*.

## What are externalities?

Economists talk about *externalities* when the actions of people or firms influence the wellbeing of others.

The classic example of a negative externality is pollution. While a factory may produce something valuable and bring benefit to its employees, shareholders and customers, people living near to the factory may bear the consequences of the pollution, such as reduced air quality.

A good example of a positive externality is open source software. While the programmer who writes the original code may receive personal benefits from doing so, other people can also benefit from this code at little or no expense.

## Externalities and infection

In the context of infectious diseases, the most well-known externality is what's called the *infection externality*. For communicable diseases such as Covid-19, an infected person can spread the disease to others, who can in turn spread it further and so on.

This means that what an individual does to protect him or herself from becoming infected can have widespread effects on others, effects that the person may be tempted to ignore. Thus, an infected person may have a strong negative infection externality on society but at the same time a modest private incentive to choose the right protective measure.

A good case in point is that of children. The available evidence is that otherwise healthy children are unlikely to have adverse health effects from becoming infected themselves. But since children may interact with elderly relatives or with people with underlying health conditions, they may in fact have a strong negative infection externality on others.

A classic example of this is the positive externalities of vaccination, articulated as early as 1997 by Joseph Stiglitz. As immunised individuals cannot infect others,

people who vaccinate themselves indirectly benefit others (this is known as *herd immunity* – see [Toxvaerd and Rowthorn](#), 2020).

For that reason, many vaccines are routinely given to children and to at-risk individuals free of charge in order to encourage vaccine uptake. In some countries, notably in Australia, vaccination is a pre-requisite for attending state school education, showing that there are alternative ways to encourage socially beneficial decisions by individuals.

## How can we best deal with externalities?

From society's perspective, the problem with externalities is that individuals have no personal incentive to take them into account. This means that unless people are altruistic and include the wellbeing of others in their considerations, they will tend to do too little of the activities with positive externalities and too much of the activities with negative externalities.

The key to solving this problem is to find ways to encourage activities with positive external effects and to discourage those with negative effects. Since the pioneering work of the Cambridge economist Alfred Pigou (1877-1959), economists have made the case for *Pigouvian taxes* ([Pigou](#), 1920).

Pigouvian taxes (or subsidies as the case may be) are specifically designed taxes levied on individuals so that they help take external effects into account. For example, taxes on pollution will give a factory the incentive to abate pollution, thereby indirectly considering the wellbeing of its neighbours. Similarly, granting tax exemption status to charities is a way to encourage activities with positive social effects.

Conceptually, Pigouvian taxes are attractive policy instruments because they directly target the problem they seek to solve, namely the externalities themselves. But in practice, such taxes may be very difficult to formulate and implement (see [Rowthorn and Toxvaerd](#), 2020 for a formal treatment of such schemes; and [Gersovitz and Hammer](#), 2003 for a general discussion). In such cases, policy-makers must instead rely on other indirect measures that work to soften the external effects.

In the context of infection control, there are many ways to help people factor in externalities. For example, the government can offer subsidies for personal protective equipment to encourage people to help protect themselves. Other indirect measures include furlough and statutory sick pay schemes that encourage people who may be infected or have symptoms to stay at home to avoid spreading the disease further.

As a last resort, one can consider imposing fines on those who do not wear face masks in public or who do not respect social distancing restrictions. Such fines have recently been introduced in the UK.

In addition to providing explicit incentives such as subsidies and fines, there are other measures that can be used to encourage people to protect themselves and each other better. It is well-known that much behaviour is guided by social expectations and social norms, rather than by material incentives.

Clear communication on the social costs of infections may be used to help foster better social norms. Even before the Covid-19 crisis began, it was generally expected that when you cough in public, you cover your mouth as a courtesy to others. Similarly, the wearing of face masks could similarly become a social norm, even in open spaces where their use is still not compulsory.

**Related question: Do people change their behaviour when face masks are mandatory?**

## Competing externalities

Why then, if we know that people don't do enough to protect themselves, do we not impose a much stricter lockdown to ensure that no one gets infected? In the UK, even at the height of lockdown, there were some parts of the economy that were still in operation. For example, public transport such as buses and the London Underground maintained some basic services, while primary schools remained open for longer than many other sectors in the economy, such as pubs and restaurants.

How can we make sense of the decision to allow some activity during lockdown? The answer is that there are in practice many competing externalities. While keeping schools open is very likely to have led to more infections of children and their teachers, the UK government and their scientific advisers considered the secondary effects of closing down schools to be even worse than the additional infection from keeping them open.

For example, had schools closed earlier, it was feared that many parents would rely on elderly grandparents for child-minding, thereby exposing them to additional infection risks. In addition, closing schools would force many parents, including those employed in the NHS, from staying home to look after their children, thereby increasing the stress on the vital healthcare sector in a time of crisis.

In short, there are many competing externalities and in deciding on how best to protect the country during the pandemic, these considerations must be weighed against each other.

**Related question: Coronavirus and the economy: what are the trade-offs?**

## Externalities that change behaviour

Up till now, we have mainly considered externalities that change other people's wellbeing. But in fact, one can distinguish between two different types of externalities, which may both be present in any given situation:

First, *spillovers* are present when the decisions of others directly increase or decrease the wellbeing of a person.

Second, there may be *strategic interaction*. Strategic interactions are present when the decisions of others influence a person's incentives to make certain decisions him or herself. Pollution and open source software are examples of spillovers. To consider examples of strategic externalities, we will distinguish between two cases.

Decisions are *strategic substitutes* when higher activity by others makes lower activity more desirable for someone. For example, going to the post office when many others choose to do so will make going there less attractive, because the presence of others will make you have to wait longer to be served. Vaccines and social distancing are good examples of strategic substitutes.

Decisions are *strategic complements* when higher activity by others makes higher activity more desirable for someone. Think of social media platforms like Facebook: because of *network effects*, having a profile on Facebook is more valuable when many others adopt Facebook. That's why some platforms such as Facebook become very large, while others like MySpace wither and disappear.

As an example of strategic complements, consider treating your child for lice. The treatment is costly and cumbersome, and the day after, the child will be back in school where he or she will interact with other kids. Suppose that lice are widespread in the school and that other parents do not treat their children. In that case, it is likely that your child will be re-infected the very next day.

Thus, the incentive to treat your child may be modest. In contrast, if there is a concerted effort by all parents to treat their children and eradicate the lice, then you will find it privately optimal also to treat your child. In any case, the incentive to do the treatment is higher when others also do the treatment.

In terms of policy and behaviour, when decisions are strategic complements, it is easier to ensure good outcomes than under strategic substitutes. The reason is that under strategic complements, people actually have aligned incentives and everyone would be happy to go along with the best common course of action. In such cases, policy may be effective even at minimal effort. The government can simply take on a coordinating role and need not spend significant resources to change behaviour.

In contrast, when there are strategic substitutes, then policy may be more difficult to carry out and may entail using resources. This is because a policy measure can now have what's called a *crowding-out effect*. Suppose, for example, that the government offers a subsidy to some

people to take a vaccine. If these people take up the offer, others may be tempted to *free-ride* on this and thus be less willing to get vaccinated themselves. In a sense, the more the government does to achieve a good outcome, the less effort will people make to achieve these outcomes.

## Where can I find out more?

Herd immunity – crucial yet irrelevant: Flavio Toxvaerd and Robert Rowthorn argue that, if feasible, herd immunity will be indispensable for overcoming the epidemic. But when formulating optimal health interventions, society should adopt a holistic approach and carefully trade-off all the different aspects that affect social wellbeing, including both health and economic outcomes.

Economics Nobel laureate Joseph Stiglitz's introduction to the World Bank book, Confronting AIDS, published by Oxford University Press.

## Who are experts on this question?

- Flavio Toxvaerd at the University of Cambridge has published research on the economics of infectious diseases, with an emphasis on behavioural responses, social distancing and lockdowns and vaccination and treatment strategies.
- Pierre-Yves Geoffard at the Paris School of Economics is a specialist in the economics of infection and has published important early papers on the topic.
- Mark Gersovitz at Johns Hopkins University is a specialist in the economics of infection and has published widely on the topic.
- Eli Fenichel at Yale University has published widely on behavioural epidemiology and economic control of infections.
- Frederick Chen at Wake Forest University has published widely on the economics of vaccination and social distancing.

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