In economics, an \textit{externality} is a cost or benefit from an economic transaction that parties “external” to the transaction receive or incur.

Externalities can be either positive or negative, and they can be generated from both the production and the consumption side of a transaction.

\textbf{Negative Production Externality:} An external consequence generated from producing a good or service.

Examples consist primarily of the pollution generated from manufacturing industries, or the depletion of natural resources generated by the lumber and fishing industries.

Fish and forests are examples of a “common property” resource, and the depletion of these resources is sometimes referred to as the “tragedy of the commons.”

\textbf{Positive Production Externality:} An external benefit generated from producing a good or service.

Examples:
\begin{itemize}
  \item increased pollination resulting from honeybees collecting pollen for the production of honey
  \item diverted landfill from production using recycled materials
\end{itemize}

\textbf{Negative Consumption Externality:} An external consequence generated from consuming a good or service.

An example could be the second-hand smoke that results when people smoke cigarettes in public.

\textbf{Positive Consumption Externality:} An external benefit generated from consuming a good or service.

An example could be the reduction in flu that results when some people receive a flu vaccine.

\textbf{“The first man who, having fenced in a piece of land, said “This is mine,” and found people naive enough to believe him, that man was the true founder of civil society. From how many crimes, wars, and murders, from how many horrors and misfortunes might not any one have saved mankind, by pulling up the stakes, or filling up the ditch, and crying to his fellows, \textit{Beware of listening to this imposter}; you are undone if you once forget that the fruits of the earth belong to us all, and the earth itself to nobody.”}\n
Jean Jacques Rousseau

This dilemma was described in a 1968 article entitled “The Tragedy of the Commons,” by ecologist Garrett Hardin.
The Bottom Line

In the final analysis, any form of positive externality results in an under allocation of the good or service associated with the externality. In other words, society is not producing enough of a good thing. Thus, the government might wish to encourage production or consumption of the good or service through the use of subsidies, grants, and tax credits.

Conversely, any form of negative externality results in an over allocation of the good or service associated with the externality. In other words, society is producing too much of a bad thing. Thus, the government might wish to discourage production or consumption of the good or service through the use of excise taxes, surtaxes, or tariffs (either on the good/service or input materials related to their production).

Effluent fees: A fee paid by firm’s that pollute the environment, a method by which the government can force a firm to internalize social costs associated with pollution.

Pigovian tax: A tax levied to correct a negative externality associated with a particular market activity. The hope is that such a tax would raise revenue that can be used to counteract the negative effects of the externality, while at the same time encouraging producers to reduce pollution. Pigovian taxes are sometimes referred to as “sin taxes,” such as the taxes we see on alcohol and tobacco.

Depicting an External Cost:

When a firm generates a good or service, it takes only its private costs (example: the cost of herbicides for a lawn care company) into consideration when determining its profit maximizing output.

However, a negative externality (such as groundwater pollution) imposes a social cost on people other than the producer or consumer of the lawn care service.

Correcting an Externality:

Such a situation requires government intervention in the market. Thus, the government attempts to find a way to force the market towards the socially optimum quantity. This could be achieved by imposing a greater cost on the suppliers (shifting the supply down) or by imposing the costs on the consumers (shifting the demand down).
The Pigovian rule for the pollution tax is to make the tax per unit equal to the marginal external cost at each level of output. For example, if the tax per unit is $15 and the price is $88, the tax per unit is $15 - $88 = $62. At zero output, the tax per unit is $0. At the efficient quantity, 2, the tax per unit is $150 - $88 = $62.

It is because the tax rate varies and always equals the marginal external cost that we can label the MSC curve as MC + tax. If the tax rate is set at a constant level, the government must both estimate the marginal external cost schedule and the efficient quantity.

Parkin’s Model:

Parkin’s model is completely based on the Pigovian tax rule that says that the tax must be equal to the cost of the externality, whatever that cost may be. Parkin says:

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In simpler terms...

We need to apply an excise tax that will raise the supply curve up to a point where it will intersect the demand curve at the socially optimal level of output. In this case, the cost of the externality right at the socially optimum level of output is $6.00 per unit. When applied, this tax will raise $3000.00 ($6 x 500 units).

Now you try!

Analysis:

In this case, the cost of the externality right at the socially optimum level of output is $7.00 per unit. When applied, this tax will raise $4900.00 ($7 x 700 units).

The popular parallel model shows where we end up, but it doesn’t show how we get there.
Watch my video on positive externality models.

Watch my video on the dead weight loss generated by a positive externality.

**How are the costs of externalities measured?**

Economists rely on market prices to determine the costs of externalities.

For example, if a hotel can rent smoke-free rooms for $20.00 more than non-smoke-free rooms, then the cost of smoking in the hotel would be valued at $20.00 a room.

If a landowner can rent cottages on a lake for $20,000.00 more a year if the lake is unpolluted, then the cost of pollution would be valued at $20,000.00 a year.

**How do property rights impact on externalities?**

Property rights refer to the rights associated with the private ownership of property. If property is privately owned, then the owners of that property are forced to deal with the costs of an externality, and will therefore make rational decisions that take those costs into account.

For example, the hotel renting smoke-free rooms will naturally charge $20.00 more for smokers to occupy a room because they know that they are losing the ability to charge a higher rate for a smoke-free room. This higher cost will invariably reduce the number of non-smoke-free rooms that are rented.

Coase theorem suggests that property rights will resolve the issue of externalities regardless of who possesses the property rights. For example, if the polluting factory owns the cottages by the lake, then the factory will face the consequence of incurring a $20,000.00 loss in annual rental fees. If the cottagers own the cottages, then the factory will have to pay the cottagers a fee for polluting their lake. Thus, property rights tend to resolve the issue of externalities and avoid the “tragedy of the commons.”

**Property rights:** Legally established titles to the ownership, use, and sale of factors of production and goods and services.

**Coase theorem:** The proposition that property rights will cause property owners to internalize and charge for any costs associated with externalities, thereby forcing society to allocate resources efficiently. Coase theorem suggests that such efficiency will be achieved regardless of who owns property (i.e. the polluters, or the polluted).

**Public good:** A good that provides a benefit to an entire society; consumption by one individual does not diminish the benefit to others.