Negative Externalities

Externalities are **third party effects** arising from production and consumption of goods and services for which **no appropriate compensation is paid**.





Many types of activity give rise to externalities. And these externalities can be positive and negative.

Externalities <u>occur outside of the market</u> i.e. they affect people <u>not directly involved</u> in the production and/or consumption of a good or service. They are also known as **spill-over effects**.

The importance of property rights

Property rights confer **legal control or ownership of a good**. For markets to operate efficiently, property rights must be protected – perhaps through <u>regulation</u>. Put another way, if an asset is unowned, no one has an incentive to protect it from abuse. The right to own property is an essential building block of a market-based system and in China in March 2007, the communist government passed a law that protects the property rights of private sector businesses, undoubtedly a landmark day for the Chinese economy!

Failure to protect property rights may lead to what is known as the <u>Tragedy of the Commons</u> - examples include the over use of common land and the long-term decline of fish stocks caused by over-fishing which leads to long term permanent damage to the stock of natural resources.

Negative externalities

Negative externalities occur when production and/or consumption impose **external costs on third parties** outside of the market for which no appropriate compensation is paid.

- Smokers ignore the harmful impact of toxic 'passive smoking' on non-smokers
- <u>Air pollution</u> from road use and traffic congestion and the <u>impact of road fumes on lungs</u>
- External costs of scraping the seabed for supplies of gravel
- The external cost of food waste
- The external costs of cleaning up from litter and the dropping of chewing gum
- The external costs of the miles that food travels from producer to the final consumer
- The externalities linked to the oil sands project in the Canadian wilderness



Private Costs and Social Costs

The existence of externalities creates a divergence between **private and social costs** of production and the private and social benefits of consumption.

Social Cost =	Priva	ate Cost + External Cost
Social Benefit	=	Private Benefit + External Benefit

When negative production externalities exist, **social costs exceed private cost.** This leads to over-production if producers do not take into account the externalities.

External costs from production

Production externalities are generated and received in supplying goods and services - examples include noise and atmospheric pollution from factories.

External costs from consumption



Consumption externalities are **generated and received in consumption** - examples include pollution from driving cars and motorbikes and externalities created by smoking and alcohol abuse and also the noise pollution created by loud music being played in built-up areas.

Negative consumption externalities lead to a situation where the **social benefit of consumption is less than the private benefit.**

The External Costs of Drug Dependency

There are more than 327,000 problematic drug users in England. Heroin and crack cocaine addicts are costing the country up to £19 billion a year, according to a study from experts at York University. A hard core of problem drug abusers is running up a bill of £600 a week each in crime, police and court time, health care and unemployment benefits. Last year, the NHS spent about £235 million on GP services, accident and emergency admissions and treatment linked to drug abuse.

When social costs are added, the bill rises to between \pounds 10.9 billion and \pounds 18.8 billion. There are at least 1.5 million recreational and regular users of Class A drugs. The average cost to society of all Class A drug users is \pounds 2,030 each a year, says the study.

Externalities from Alcohol Use and Misuse

For most adults drinking alcohol is part of a pleasurable social experience, which causes no harm to themselves or others. For some people though, alcohol misuse is causing serious damage to themselves, their family and friends and to the community as a whole. Britons are paying the penalty for the soaring rate of alcohol consumption. Ten million adults in England regularly consume more than the government guidelines and the cost to the NHS of alcohol misuse is put at £2.7 billion a year. Deaths from liver cirrhosis are rising faster in Britain than anywhere else in Europe. The rise has been especially sharp in men and women aged fewer than 45, where death rates now exceed the European average.

Sources: Adapted from government reports and newspaper reports, July 2008



Illustrating market failure from negative externalities



In the absence of externalities, the **private marginal costs of the supplier** are the same as the costs for society. But if there are negative externalities, we must add the **external costs** to the firm's supply curve to find the **social marginal cost curve**.

If the market fails to include these external costs, then the private <u>equilibrium</u> output will be Q1 and the price P1 where private marginal cost = private marginal benefit.

From a **social welfare viewpoint**, we want less output from activities that create an "economicbad" such as pollution. A **socially-efficient output** would be Q2 with a higher price P2. At this price level, the <u>external costs have been taken into account</u>. We have not eliminated the pollution – but at least the market has recognised them and priced them into the price of the product.

E-Waste and Negative Externalities

The United Nations Environment Programme (UNEP) has estimated that worldwide, between 20 and 50 million tonnes of electrical and electronic goods which had come to the end of their lives is being thrown away every year. The latest UNEP report now estimates the annual total at 40 billion tonnes, with America in the lead, producing 3m tonnes domestically every year, followed by China with 2.3m tonnes. (February 2010)



Case Study: Externalities in the prison service



The UK prison population continues to rise without an accompanying rise in prison capacity. This imbalance between demand and supply is generating a number of negative externalities.

In August of this year, the UK prison population hit a new high of over 84,000 prisoners, with some 65% of prisoners serving sentences under-12 months, and around half serving only 6 months. These record figures have been reached despite 2500 prisoners being released early from their sentences each month. Amongst men aged 18-21, the re-offending rate is around 75%; within 2 years of release, many prisoners are re-convicted and return to prison.

The private cost of prisons

Estimates from 2008 suggest that the average cost of prison per year per inmate stands at £23,585, with the total annual running costs of prisons currently amounting to £1,936m. The government is planning to increase the number of prisons in the UK, which will in turn incur more expenditure; initial plans to build so-called Titan prisons, costing around £350m each, to house 2,500 inmates each have been sidelined for the moment, but if the government is to retain its commitment to increasing capacity, there will inevitably be some capital expenditure in the near future. When we consider that the cost of building a new school, for example, is around £25m, there are some difficult economic choices to be made and large opportunity costs to be incurred.

The external costs of prisons

Following riots in April 2009 at HMP Ashwell, the Prisoner Officers' Association (POA) stated that people living in the vicinity of low category prisons (those prisons designed for 'less dangerous' criminals) were not safe; a spokesperson for this union claimed that "very dangerous prisoners.. Are being sent to open and semi-open prisons far too early in their sentence", presumably to reduce pressure on capacity in the high-category prisons.

Many offenders who are locked up with short sentences have committed crimes to feed drug/alcohol addictions or have severe mental health problems (less than 5% of the general population have 2 or more mental health disorders compared with around 70% of the prison population). Many argue that prison currently does very little to treat the causes of such crimes and so, on release, these prisoners continue to re-offend, causing social disruption and contributing yet further to the demand on the taxpayer.

Cost-benefit analysis could be used to help develop alternatives to short-sentencing for much of the prison population. Some research already carried out suggests that treating prisoners with drug habits whilst in prison will cost an additional £5300 per year per offender, but that the subsequent savings to the taxpayer and victims could amount to around £200,000. Similarly, pursuing a 'surveillance' programme following a prisoner's release from prison is likely to cut re-offending rates by over 30%, saving the taxpayer over £130,000 in the longer term (although the cost per offender per year is around £5000).

So, even though these 'enhanced' prison programmes cost more than prison alone to deliver, there is a belief that ultimately, they will prove to be better value for money for the UK taxpayer. However, if the prison population continues to rise, then these interventions will be more difficult to achieve. There is a fine balance to be struck.

Source: EconoMax, Ruth Tarrant, spring 2010



Economic and Social Welfare

Private economic welfare requires us to consider only the private (or internal) costs and benefits of production and consumption of goods and services.

But if we wish to look at the economic welfare of the whole community (i.e. the social welfare) then we need to calculate the positive and negative externalities and add them to private benefits and costs. Here is a simple numerical example:

A government is considering four possible capital investment projects. It has the resources to finance and implement only one of these projects. The table below shows the estimated value of the private and external costs and benefits that each project is expected to yield:

	New city by-pass (£ million)	New schools (£ million)	Improvement to an existing airport (£ million)	New hospitals (£ million)
Private benefits	50	135	130	80
Private costs	120	80	100	65
Positive externalities	90	55	35	120
Negative externalities	60	20	60	45
Net private benefit	-70	+55	+30	+15
Net social benefit	-40	+80	+5	+90

Net social benefit may be taken into account by a government when deciding which project offers the best potential return for society as a whole

Negative externalities and government intervention

To many economists interested in environmental problems the key is to **internalise external costs and benefits** to ensure that those who create the externalities include them when making decisions.

Pollution Taxes

One common approach to adjust for externalities is to tax those who create negative externalities. This is sometimes known as "<u>making the polluter pay</u>". Introducing a tax increases the private cost of consumption or production and ought to reduce demand and output for the good that is creating the externality.

Some economists argue that the revenue from pollution taxes should be '**ring-fenced**' and allocated to projects that protect or enhance our environment. For example, the money raised from a <u>congestion charge</u> on vehicles entering busy urban roads, might be allocated towards improving mass transport services; or the revenue from higher taxes on cigarettes might be used to fund better health care programmes.

Examples of Environmental Taxes include some of the following



- 1. **The Landfill Tax** this tax aims to encourage producers to produce less waste and to recover more value from waste, for example through recycling or composting and to use environmentally friendly methods of waste disposal.
- The Congestion Charge: -this is a high profile environmental charge introduced in February 2003. It is designed to <u>cut traffic congestion</u> in inner-London by charging motorists £8 per day to enter the central charging zone.
- 3. **Plastic Bag Tax**: In Ireland a pioneering new 15 cent levy on plastic shopping bags was launched in 2002. <u>Belgium introduced a similar tax</u> in June 2007. Proceeds from the tax go to the Environment Fund and are used to fund various waste management and other environmental initiatives. The tax rose to <u>22 cents per bag in July 2007</u>.
- 4. **Vehicle excise duty (VED)**: Also known as <u>'road tax'</u> VED starts from a theoretical 'nil' rate and accelerating up depending on the carbon <u>emissions</u> of the vehicle

Problems with Environmental Taxes

Many economists argue that pollution taxes can create problems which lead to **government failure**.

- 1. Assigning the right level of taxation: There are problems in setting tax so that private cost will exactly equate with the social cost.
- 2. Consumer welfare effects: Producers may pass on the tax to the consumers if the demand for the good is inelastic and, as result, the tax may only have a small effect in reducing demand. Taxes on some demerit goods (for example cigarettes) may have a regressive effect on lower-income consumers and leader to a widening of inequalities in the distribution of income.

Would a tax on aviation fuel be an effective and appropriate way to reduce carbon emissions from the airline industry?



3. Employment and investment consequences: If pollution taxes are raised in one country, producers may shift to countries with lower taxes. This will not reduce global pollution, and may create problems such as structural unemployment and a loss of international competitiveness.

Externalities and Regulation

The government may choose to intervene through the use of **regulations and laws**. For example, the **Health and Safety at Work Act** covers all public and private sector businesses. Local Councils can take action against noisy, unruly neighbours and can pass by-laws preventing the public consumption of alcohol. The British government introduced a <u>ban on smoking</u> in public places from July 1st 2007.

The European Union has introduced <u>directives</u> on how consumer durables such as cars, batteries, fridges freezers and other products should be disposed of. The onus is now on producers to provide facilities for consumers to bring back their unwanted products.

Carbon Emissions Trading

Some countries have moved toward market-based incentives to achieve pollution reduction. This new approach involves the creation of a **limited volume of pollution rights**, distributed among firms that pollute, and allows them to be traded in a secondary market. The intent is to encourage lowest-cost pollution reduction measures to be utilized, in exchange for revenues from selling

surplus pollution rights. Companies that are efficient at cutting pollution will have spare permits that they can then sell to other businesses. As long as the total bank (or stock) of permits is reduced year by year by the government or an agency, cuts in total pollution can be achieved most efficiently.

Quite simply, limiting <u>emissions</u> makes polluting a scarce resource, and scarcity brings economic value. Emissions' trading is a central feature of the **Kyoto Protocol** and the <u>European Carbon</u> <u>Emissions Trading Schem</u>e started in full in January 2005.

Subsidising positive externalities

An alternative to taxing activities that create negative externalities is to subsidise activities that lead to positive externalities. This reduces the costs of production for suppliers and encourages a higher output. For example the Government may subsidise state health care; public transport or investment in new technology for schools and colleges to help spread knowledge and understanding. There is also a case for subsidies to encourage higher levels of training as a means to raise labour productivity and improve our international competitiveness.

