

Chapter 15: Externalities

Econ 102: Introduction to Microeconomics

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1.1 Goals of this class

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- Learn about market failure.
- Learn how economic decisions can negatively affect others in a society.
- Learn how economic decisions can positively affect others in a society.
- Learn appropriate government policies to fix government failures.

2 Market Failure

2.1 Types of Market Failures

Market Failure

- A **market failure** is the situation when an unregulated market results in an outcome that is not socially optimal.
- Market failure causes:
 - Monopoly power.
 - Externalities.
 - Public goods: goods such as parks, schools, and roads where one cannot prevent others from enjoying.
 - Commons goods: goods such as fishing, hunting, where one person's use diminishes another person's use.
 - Information asymmetries: when different agents involved in an economic decision have different information about the benefits and costs.
- Successful government intervention requires *identifying* and *reversing* market failure.
- Economic recessions *do not imply* market failures.

2.2 Externalities

Externalities

- **Externality:** situation in which an economic decision results in a benefit or cost to a third party.
- **Production externality:** when an externality occurs as a result of the production of a good.
 - Example: producing electricity causes pollution which imposes a cost on those not involved in producing or even buying the electricity.
 - Example: research and development into new products leads to improvements technology across economy.
- **Consumption externality:** when an externality occurs as a result of the consumption of a good.
 - Examples: smoking, driving automobiles, vaccines.

3 Optimal Decision Making

3.1 Marginal Benefit

Marginal Benefit

- **Economic decision:** any decision involving scarce resources.
 - Examples: buying goods, producing goods, selling goods, deciding what to do with your time.
- **Marginal benefit (MB):** additional benefit from a one unit increase in an economic decision.
 - Consumption: marginal benefit \equiv marginal utility
= additional benefit from consuming one additional unit of a good.
 - Producing goods: marginal benefit \equiv marginal revenue
= additional revenue from producing one additional unit of a good.
 - Hiring people: marginal benefit \equiv marginal revenue product
= additional revenue from hiring one additional unit of labor.
- Marginal benefits usually decrease as one increases quantity concerning the economic decision.

3.2 Marginal Cost

Marginal Cost

- **Marginal cost (MC):** additional cost from a one unit increase in an economic decision.
 - Production: marginal cost is the cost of producing one additional unit of the good.
 - Hiring people: marginal cost = wage = additional cost of hiring one additional unit of labor.
 - What is marginal cost of consumption?
 - * It should be in the same units as marginal benefit.
 - * What is opportunity cost of consuming a particular good.
- Marginal costs usually increase as one increases quantity concerning the economic decision.
- Optimal decision is made when **MR=MC**.

3.3 Utility Maximization

Utility Maximization

- Marginal benefit = marginal utility = MU_1 .
- Marginal cost = utility foregone by consuming another good instead.
- Quantity of other good that could be consumed
= $\Delta Q_2 = P_1/P_2$.
- Utility that could be obtained by producing other good:

$$= MU_2 \Delta Q_2 = MU_2 \left(\frac{P_1}{P_2} \right)$$

Utility Maximization

- Set marginal benefit equal to marginal cost.

$$MB = MC$$

$$MU_1 = MU_2 \left(\frac{P_1}{P_2} \right)$$

- Divide both sides by P_1 :

$$\frac{MU_1}{P_1} = \frac{MU_2}{P_2}$$

4 Externalities

4.1 Private and Social Costs

Private and Social Costs

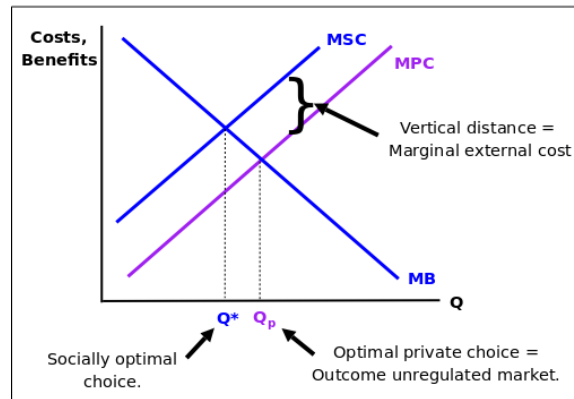
- **Marginal social cost (MSC):** marginal cost to everyone in society resulting from an economic decision.
- **Marginal private cost (MPC):** private marginal cost of economic decision.
- **Marginal social benefit (MSB):** marginal social benefit: marginal benefit to everyone in society resulting from an economic decision.
- **Marginal private benefit (MPB):** marginal private benefit: private marginal benefit of economic decision.

4.2 Negative Externalities

Negative Externalities

- **Negative Externality:** when $MSC > MPC$.
- **Marginal external cost** = $MSC - MPC$.
- It may be difficult to quantify external cost.
- Can costs be infinite?
 - Have you imposed costs on society that are “infinite”?
 - Was the benefit you received infinite?
- Some perceived external costs may in fact not be external.
 - Is there an internal disadvantage resulting from a business polluting?
 - Corporate Social Responsibility (CSR): study of private benefits that can result when organizations make socially optimal decisions.

Negative Externalities



- In an unregulated market, negative externalities result in **over-production**.

Government Policy

- What should the government do to reach socially optimal outcome?
- Enforce lower production:
 - Results in continuous oversight and enforcement costs.
 - Requires actually, and continuously, estimating marginal social benefits *and* marginal social costs.
- Market intervention: impose a regulation that *internalizes* external costs.
 - Impose a tax on production of goods that result in negative externalities.
 - Ideally, size of the tax = size of the externality.
 - This shifts the MPC to the MSC curve, results in socially optimal outcome.

Government Policy

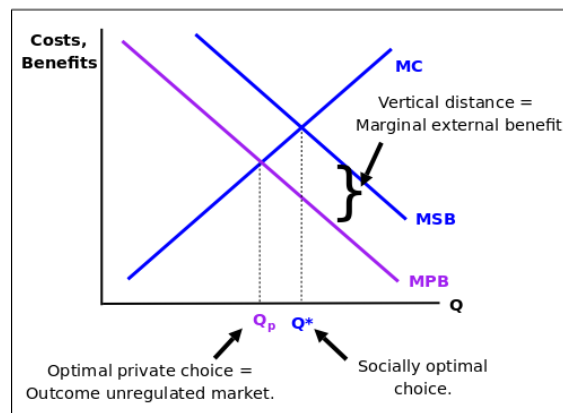
- Clean Air Act:
 - Producing electricity results in sulfur dioxide.
 - To pollute one ton of sulfur dioxide, electric utilities are required to purchase a pollution permit.
 - Don't want to pollute? Electric utilities can sell pollution permits on open market.
- Unpopular, relatively easy solutions, to reduce greenhouse gas emissions:
 - Increase tax on gasoline.
 - Carbon dioxide pollution permits.

4.3 Positive Externalities

Positive Externalities

- **Positive externality** occurs when $MSB > MPB$.
- Most people do not think of positive externalities as *market failures*, but they are.
- Examples:
 - Technological spillovers from research and development into new technology.
 - Industrial training at workplace. When workers leave employer, they take skills with them.
 - Investment in one's health leads to more productive workers, lower absenteeism.
 - New big stadium?
- Reason these are failures: the agent investing in the activity with a positive externality does not enjoy the full benefit, so the agent *under-invests* in the activity.

Positive Externalities



- In an unregulated market, positive externalities result in **under-production**.