**Externality**

Suppose steel industry consists of plants located next to rivers

Byproduct of producing steel is sludge waste-product

Plant dumps sludge into river, which kills fish

**Negative Production Externality**

Occurs when a firm’s production reduces well- being of people who are not compensated

Firm does not recognize part of the social cost of producing steel

Result is firm produces *too much* steel

**Supply Curve for Steel Industry**

price

Supply

S (=PMC)

$500

A

5

steel tons/month

**Costly to produce steel due to scarce resources**

1. Labor
2. Iron ore
3. Machinery

(interpret point A)

Supply upward sloping:

Increasing scarcity of inputs makes it more costly to produce steel as industry output expands

Supply curve represents **Private Marginal Costs (PMC)**

costs individual producers recognize and bear in producing output

price

Supply

S (=PMC)

$500

A

D (=PMB=SMB)

5

steel tons/month

**Point A** – equilibrium established by the market

Suppliers/demanders make decisions responding to private costs/benefits

Market ensures that all transactions in which PMB≥PMC will take place

At point A, we know that at least PMB=PMC

**Externality**

Social costs are greater than the privately recognized costs of producing steel

Assume every ton of steel produced generates sludge that kills $100 in fish

Marginal Damage: MD = $100

What is the definition of marginal damage?

**Social Marginal Cost**

= private marginal cost + marginal damage

**SMC = PMC + MD**

price

Supply

SMC

PMC

$600

MD =100

$500

A

D (=PMB=SMB)

5

steel tons/month

at 5 tons steel

1. **PMC = $500**
2. **MD = $100**

Opportunity cost to society of producing the last (5th) ton of steel is $600

**In terms of social benefits:**

**SMB** at 5 million tons is $500 (point A)

Represents value of the marginal (last) ton of steel to society

Equals amount purchaser(s) willing to pay to acquire the marginal ton of steel

At 5 million tons: SMC (=600) > SMB (=500)

Cost to society of producing last ton greater than the benefits

Society suffer loss in net benefits for every transaction in which social cost is greater than social benefits

price

Supply

SMC

PMC

B

E

deadweight loss

$500

A

3.5

D (=PMB=SMB)

5

steel tons/month

The efficient production of steel transacted is point E (3.5 tons/month)

At this point **SMC = SMB**

Net social benefits maximized at this point

**Deadweight loss**

Value of lost net social benefits at the inefficient level of output (5 tons)

Area AEB

[**Negative Consumption Externality**](http://milesfinney.net/433/handout/cig.jpg)

Within example, cigarette external cost is generated by consumption instead of production decision

Each cigarette smoked causes 40 cents in social damage

What is this damage?

[At market equilibrium](http://milesfinney.net/433/handout/cig.jpg), point A where PMC=PMB, the social cost of the marginal cigarette (SMC) is greater than the social benefit (SMB)

Efficiency reached at point C where **SMB=SMC**

Social net benefits maximized at point C

At efficient point, the willingness to pay by the marginal consumer (PMB) is 40 cents higher than the market price

Analysis suggests that markets with externalities (production or consumption) will over-allocate good

[Example of Disney Center](http://milesfinney.net/433/articles/idea.pdf)

[Externalities Exercise](http://milesfinney.net/433/handout/steel.html)