

14.01 Principles of Microeconomics, Fall 2007

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Lecture 34

Externalities, Market Failure and Government

Outline

1. Chap 17: *Efficient Wage Theory*
2. Chap 18: *Externalities*
3. Chap 18: *Property Rights*
4. Chap 18: *Common Property Resources*

1 Efficient Wage Theory

Use the efficient wage theory to explain the presence of unemployment.

Suppose the wage is w , and workers can choose to work or shirk provided a benefit of S . The unemployment rate is u , and the workers get caught and fired with a probability p . If a worker shirks, he can get

$$S + (1 - p)w + p(1 - u)w = S + w(1 - pu),$$

if a worker does not shirk, he gets w .

Therefore, a worker will work if

$$w \geq S + w(1 - pu),$$

that is,

$$w \geq \frac{S}{pu}.$$

This is called nonshirking constraint.

Without information asymmetry, the market wage is w_C , and full employment exists at L_C . With information asymmetry, the nonshirking constraint and the demand of labor determine the wage w^* and labor L^* (see Figure 1).

With greater asymmetric information, the probability that shirking is detected, P decreases, and thus the nonshirking constraint rises. The wage and labor are w' and L' respectively (see Figure 1).

Thereby

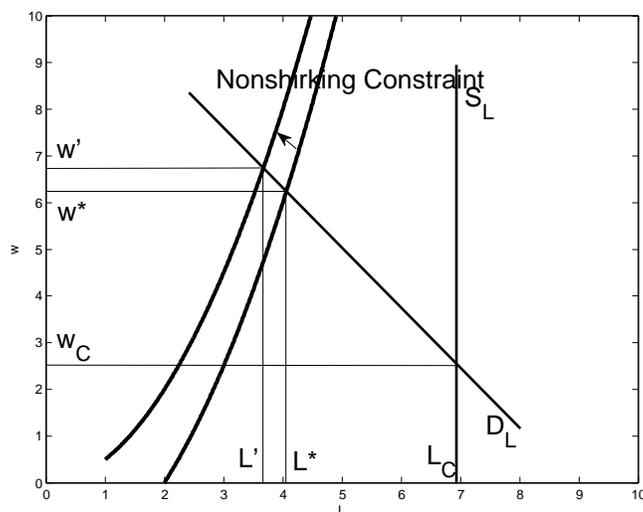


Figure 1: Unemployment in a Shirking Model.

- $w^* > w_C,$
 $L^* < L_C;$
- $w' > w^*,$
 $L' < L^*.$

2 Externalities

Externalities are the effects of production and consumption activities not directly reflected in the market.

They can be negative or positive.

Negative Externalities. Action by one party imposes a cost on another party.

Example (Pollution). Pollution is not reflected in market because at market, residents do not demand firm pay for that cost.

Positive Externalities. Action by one party benefits another party.

Example (Beautiful Garden). If your neighbor has a beautiful garden, you are happier, but you do not pay your neighbor.

Negative Externality

An example is steel plant dumping waste in the river as it makes steel.

That imposes cost on fisherman downstream. Marginal external cost (MEC) is the increase in this cost for each additional unit of steel production.

Marginal social cost (MSC) is MC plus MEC .

Given the market price P , a firm chooses to produce q_1 , but if taking external cost into account, a firm should produce at q^* (see Figure 2).

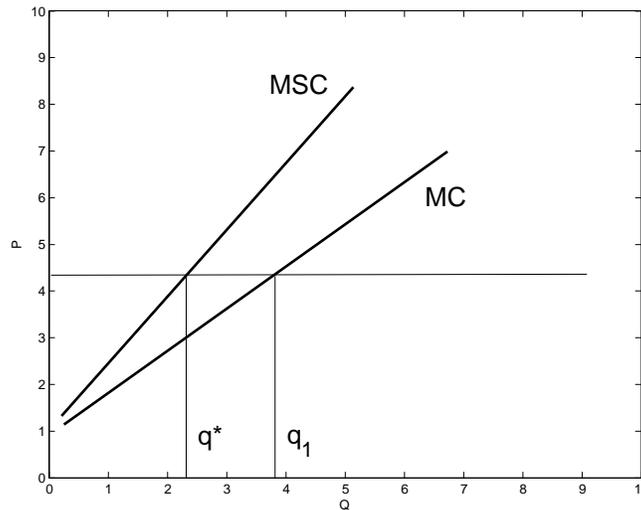


Figure 2: A Firm with Negative Externality.

In a competitive market, the equilibrium price and quantity are P_1 and q_1 , but the efficient outcome should be P^* and q^* (see Figure 3). The failure to incorporate external cost creates deadweight loss.

Positive Externality

Landscaping generates external benefits to the neighbors.

Like the example above, the marginal social benefit (MSB) is the sum of private benefit (which is the demand) and the marginal external benefit (MEB). The quantity q_1 consumed in the market is less than the efficient level q^* (see Figure 4).

Solution to Externality

Here are some solutions with government intervenes.

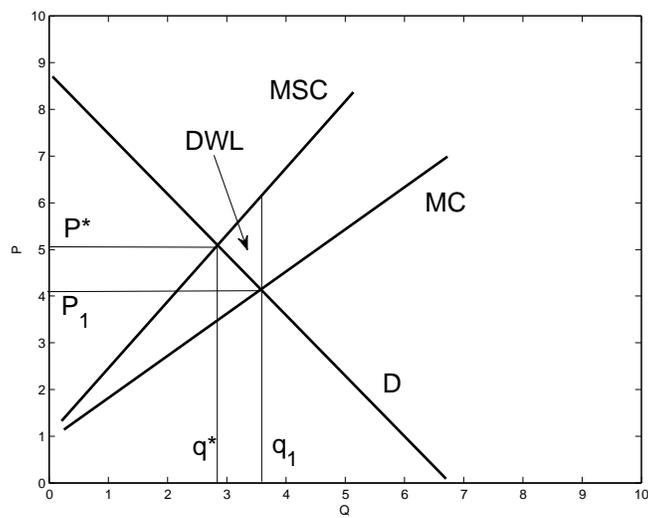


Figure 3: The Whole Industry with Negative Externality.

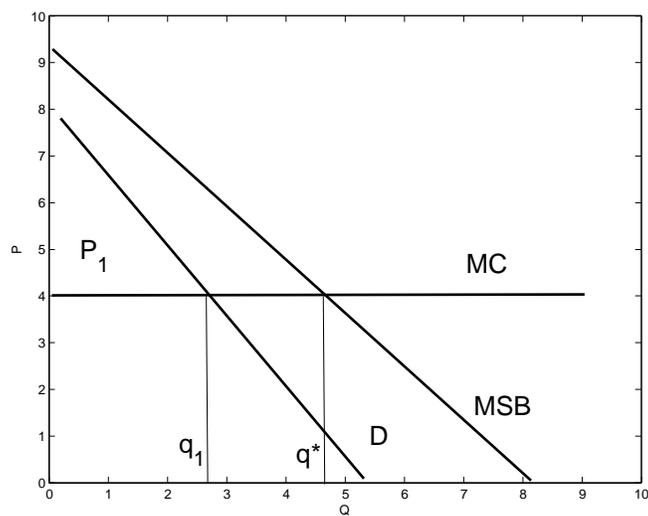


Figure 4: External Benefits.

- Tax each unit produced by MEC . The marginal cost of the firm is

$$MC + T = MC + MEC = MSC,$$

then the firm will choose efficient output.

- Create a standard and monitor pollution. Control the quantity produced or pollution emission.

3 Property Rights

When property rights are well-specified, economic efficiency may be achieved without government intervention.

- Factory can install a filter.
- Fishermen can pay for a treatment plant to intercept and clean up factory waste.

Factory	Fishermen	Factory's Profit	Fishermen's Profit	Total Profit
No Filter	No Treatment	500	100	600
Filter	No Treatment	300	500	800
No Filter	Treatment	500	200	700
Filter	Treatment	300	300	600

Table 1: Profits Under Alternative Emissions Choices.

In this case (see Table 1), the most efficient result is that factory installs filter and fishermen do not pay for treatment.

- If fishermen own the river, they can sue the plant for damages \$400. The factory has two options.

- The factory do not install the filter and pay damages. Profit

$$500 - 400 = 100.$$

- The factory install filter. Profit is 300.

Thus the factory will install the filter.

- If factory owns the river, fishermen have three options.

- Fishermen put in treatment plant. Profit is 200.

- Fishermen pay the cost of filter installation to the factory. Profit

$$500 - 200 = 300.$$

– No plant, no filter. Profit is 100.

A payment to the factory by the fisherman results in an efficient outcome and is in their own interest.

Theorem (Coase Theorem). *When parties can bargain without cost and to their mutual advantage, the outcome will be efficient, regardless of how the property rights are specified.*

4 Common Property Resources

Everyone has free access to a renewable resource, for example, lake, forest, and so on.

Without control, the quantity consumed is q_1 where private cost is equal to marginal benefit (demand). However, the efficient level of quantity is q^* where $MSC = MB(D)$ (see Figure 5).

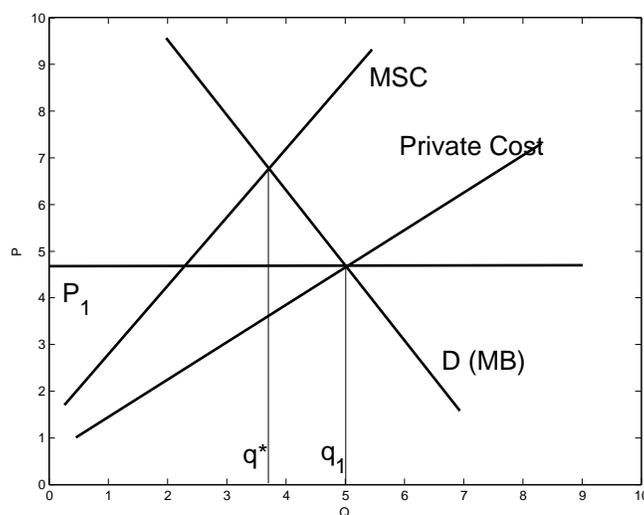


Figure 5: Common Property Resources.

Some measures to prevent from consuming too much:

- Government puts restrictions on production quantity.
- Set private ownership and the owner sets fees for use of resources.