INGENIERÍA INDUSTRIAL
UNIVERSIDAD DE CHILE

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UNIVERSIDAD DE CHILE

Externalidad y bienes públicos

Clase 13

Curso: Economía IN2201
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Agenda

1. Fallas de mercado
2. Externalidades
3. Bienes públicos
4. Derechos de propiedad y política de gobierno: *free riders* y la tragedia de los comunes

CUANDO LA SOLUCIÓN DESCENTRALIZADA FALLA

Cuando fallan los mercados

- Las industrias santiaguinas vierten sus residuos en el río Mapocho.
- El Mapocho vierte sus aguas en el Maipo que desemboca cerca de Llolleo.
- Los pescadores locales sufren cuantiosas perdidas debido a la elevada mortandad de peces a causa de la contaminación.
- Exigen compensaciones y regulaciones.
- El representante del gremio de los industriales de Santiago argumenta que actuando las empresas bajo libre competencia, no se debe ninguna compensación porque el mercado siempre es eficiente.
- ¿Quién tiene la razón?

Cuando fallan los mercados

- Externalidades: positivas y negativas. Costos y beneficios privados y sociales.
- Bienes públicos: rivalidad y exclusión. Bienes privados, monopolios naturales, recursos comunes.
- Derechos de propiedad y la tragedia de los comunes. *Free riders*.

Una externalidad ocurre cuando

- La actividad de un agente afecta directamente el bienestar d otro agente,

y

- Este efecto no es transmitido por los precios de mercado

Ejemplos de externalidades

Externalities:

- A firm pollutes the air through production
- Neighborhood dogs make your house safer

Not externalities:

- A store with noisy country music must reduce price to keep customers
- Subway has a sale, forcing Mr. Sub to have a sale also

Ejemplos de externalidades

Negative externalities harm others

- Example: a chemical plant pollutes and spoils a lake's beauty and safety for recreational use by others

Positive externalities help others

- Example: a teacher gets a flu shot and reduces his students' probability of catching the flu

Public goods and externalities can be similar

Externalities are *unintended* costs or benefits to the community, whereas public goods have *intended* benefits to the community (Mishan, 1971)

ie: **If you hire security, it has externalities. If your block hires security, it is a public good**

It is still useful to examine them independently in practice

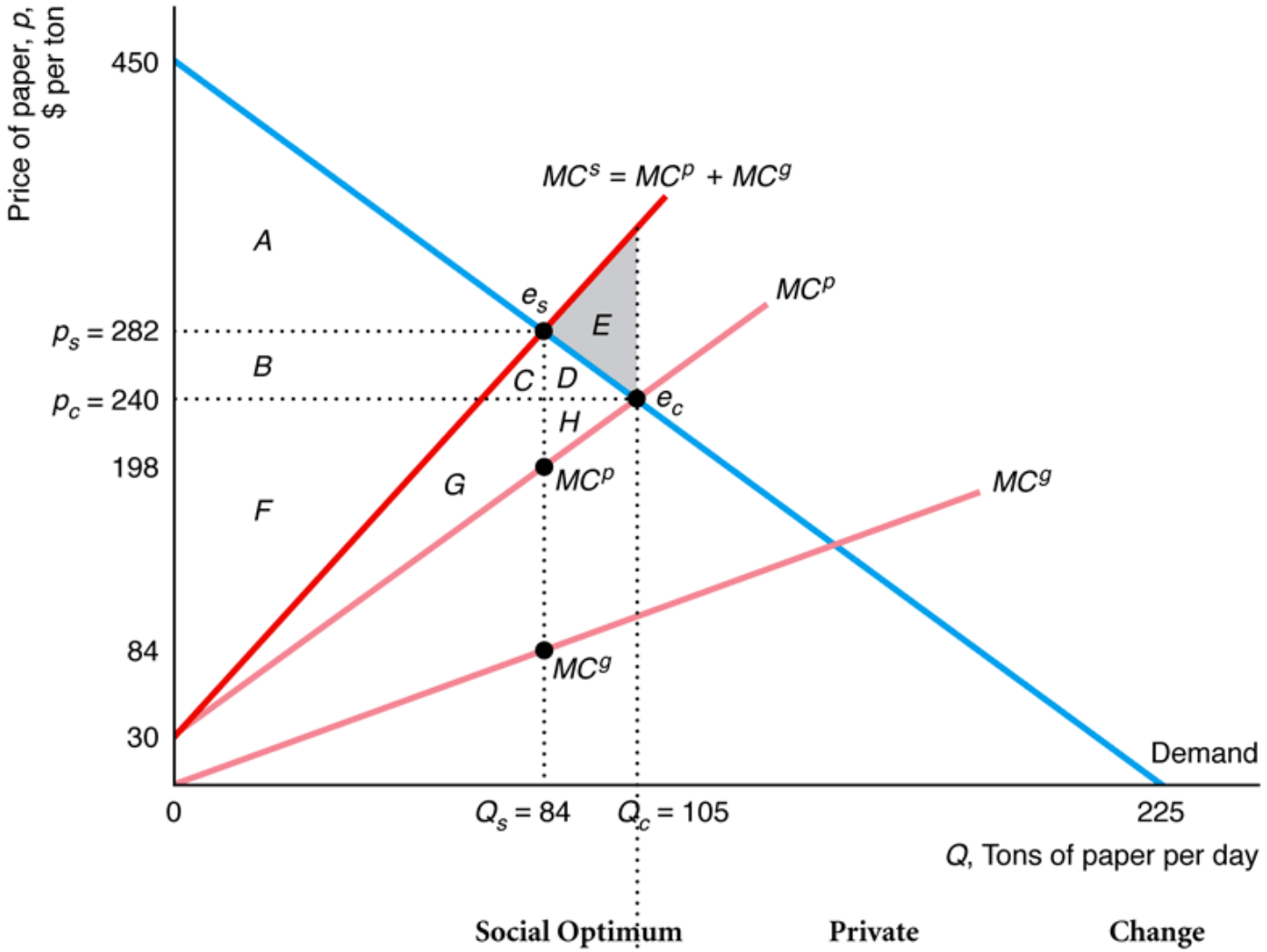
The Inefficiency of Competition with Externalities

- Competitive firms and consumers do not have to pay for the harms of their negative externalities, so they create excessive amounts.
- Producers and individuals are not compensated for the benefits of a positive externality, so too little is produced.
- Nonoptimal production is the primary result of externalities.

The Inefficiency of Competition with Externalities

- Consider a paper mill that produces paper in a way that pollutes the air and water.
- The firm's ***private cost*** is the cost of production only (direct costs of labor, energy, and wood pulp), but not the indirect costs of the harm from pollution.
  - Intersection of private MC and market demand yields the competitive equilibrium.
- The firm's true ***social cost*** is the private cost **plus** the cost of harms from externalities.
  - Intersection of social MC and market demand yields the socially-optimal equilibrium.

The competitive equilibrium, e_c, excludes externalities and involves overproduction & DWL relative to the social optimum, e_s.



	Social Optimum	Private	Change
Consumer surplus, CS	A	$A + B + C + D$	$B + C + D$
Private producer surplus, PS_p	$B + C + F + G$	$F + G + H$	$H - B - C$
Externality cost, C_g	$C + G$	$C + D + E + G + H$	$D + E + H$
Social producer surplus, $PS_s = PS_p - C_g$	$B + F$	$F - C - D - E$	$-B - C - D - E$
Welfare, $W = CS + PS_s$	$A + B + F$	$A + B + F - E$	$-E = DWL$

Pregunta

- El precio de las viviendas aumenta considerablemente (hasta 40%, en un radio de hasta 7 cuadras) cuando se construye una estación de Metro cerca de éstas, por lo tanto las estaciones de Metro generan externalidades positivas sobre las viviendas de su entorno…..
  - ¿Correcto o falso? Precios.
  - ¿Justo? Cómo se financia la construcción del Metro en Chile. Contribuciones.

Regulating Externalities

- Competitive markets produce too many negative externalities, so government intervention may provide social gain.
  - A governmental limit on the amount of pollution that may be released is called an emissions standard.
  - A tax on air pollution is called an emissions fee.
  - The government can also control pollution indirectly through quantity restrictions or taxes on outputs or inputs.

  - O puede establecer derechos de propiedad y asignar permisos transables

Emissions Standard

- How does the government achieve the social optimum using an emissions standard?

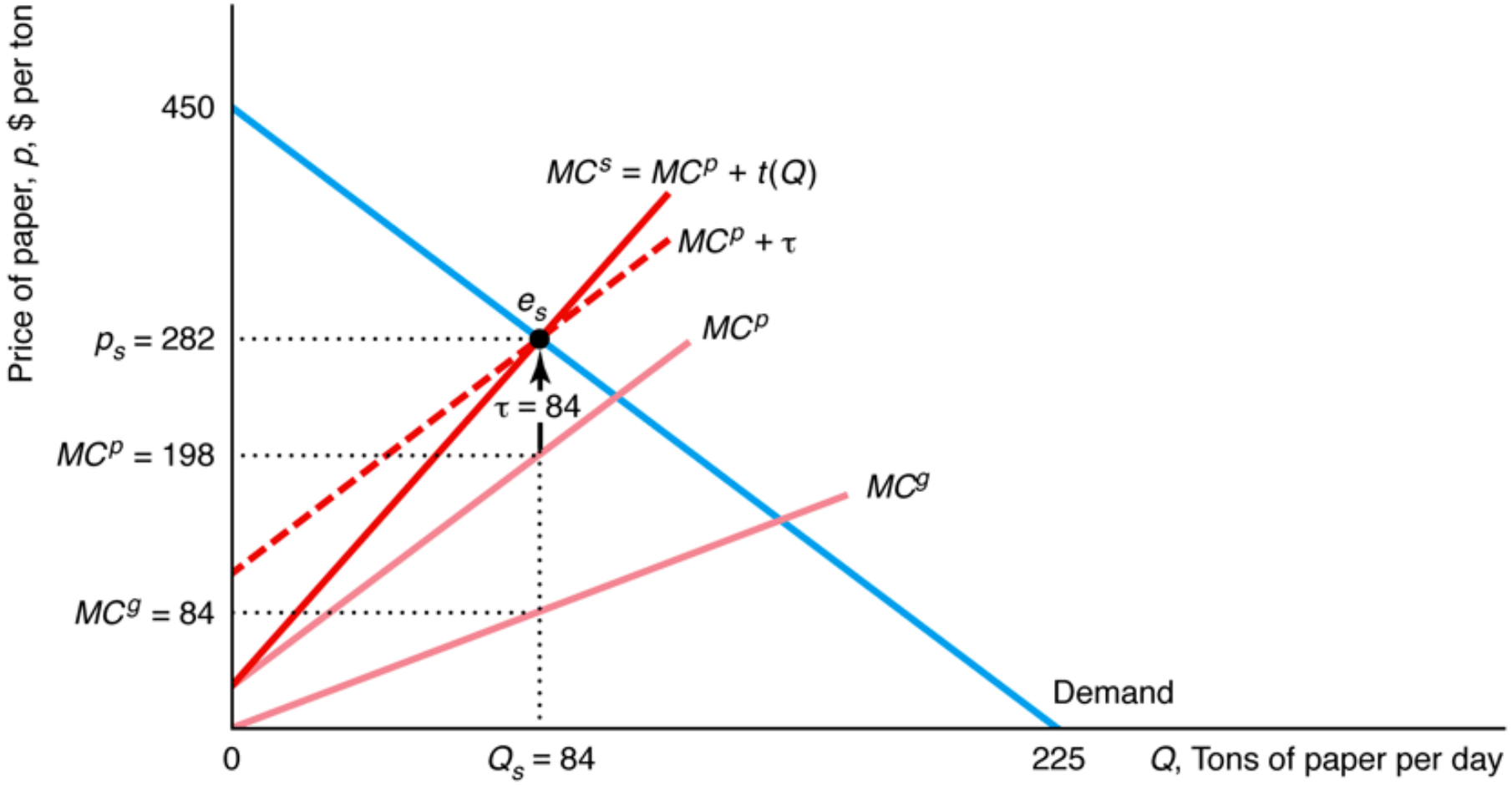
- The government doesn't usually know enough to set quantity restrictions on output optimally.
  - This would require knowledge of how marginal social cost, the demand for the product, and pollution vary with output.

- Even if the government knew enough to set optimal regulation, enforcement would still be difficult.

Emissions fee

- How does the government achieve the social optimum using an emissions fee?
- The government may impose costs on polluters by taxing their output or the amount of pollution produced.
- The output tax causes a firm to internalize the externality or bear the cost of the harm inflicted on others.

- An emissions fee is a tax on output equal to MC of gunk so that after-tax MC induces socially-optimal behavior.



Efectos en bienestar de contaminación en mercado competitivo

- Ver solución algebraica

Allocating Property Rights to Reduce Externalities

- A property right is an exclusive privilege to use an asset.
- Instead of emissions fees and standards, an indirect approach to dealing with externalities is for the government to assign a property right.
- If nobody holds a property right for a good or bad, the good or bad is unlikely to have a price.
  - Nobody has property rights to the air we breathe and pollution, a bad, has no price.

Allocating Property Rights to Reduce Externalities

- Derechos de propiedad: Normas legales que describen lo que pueden hacer los individuos o las empresas con su propiedad.

- Por ejemplo: Si los pescadores tuvieran derechos de propiedad sobre el agua limpia, podrían controlar las emisiones realizadas aguas arriba.

Allocating Property Rights to Reduce Externalities

- The Coase Theorem states that the optimal levels of pollution and output can result from bargaining between polluters and their victims if property rights are clearly defined.

- Example:
  - Chemical plant and boat rental company share a small lake
  - Chemical firm dumps by-products that only smell bad, but are otherwise harmless, into the lake
  - Boat rental firm's business is hurt because peoples' dislike for the smell means they are only willing to rent if the price is low.

Allocating Property Rights to Reduce Externalities

- Asignar derechos de propiedad siempre resuelve los problemas de externalidades y es, de hecho, preferible a cualquier otro mecanismo.
  - Una forma de solucionar externalidad es asignando derechos de propiedad. El teorema de Coase establece que si los derechos de propiedad (en el sentido legal) están bien definidos, y si los costos de transacción de negociar, monitorear y hacer cumplir un acuerdo son bajos, entonces la negociación alcanzará el nivel económicamente eficiente (o socialmente óptimo) de una actividad sin tener que recurrir a impuesto o subsidios pigouvianos, recurriendo a la burocracia gubernamental, y sin considerar qué parte tiene los derechos de propiedad (quién los tenga es un tema de distribución, no de equilibrio óptimo).

Allocating Property Rights to Reduce Externalities

- Coase: Cuando las partes pueden negociar sin coste alguno y en beneficio mutuo, el resultado es eficiente, independientemente de cómo se especifiquen los derechos de propiedad

Un bien público es ….

Hasta aquí.….

- We have seen that the role of government in promoting efficiency is to intervene in the pricing mechanism of goods that create externalities.

- Now we will investigate a class of goods where it is usually more efficient for the government to supply instead of the private sector.

- Public Goods = (Law and Order, defence, refuse collection, roads, education, public health,…)

Definition

A Public Good has 2 properties:

(1) If it has been provided to one consumer it is difficult/impossible to stop another from enjoying it too.

"Non-Excludable"

(2) The amount of the good I enjoy has no affect on the amount you enjoy.

"Non-rival"

Definition

Excludable:

- A good, service, or resource is excludable if it is possible to prevent a person from enjoying its benefits.
- A good, service, or resource is nonexcludable if it is impossible to prevent a person from benefiting from it.

- Examples of excludable items are
  - The security services of Brink's
  - Fish in a fish farm
  - A live concert

- Examples of nonexcludable items are
  - The services of the city police department
  - Fish in the Pacific Ocean
  - A concert on network television

Definition

Rival:

- A good, service, or resource is rival if its use by one person decreases the quantity available to someone else.
- A good, service, or resource is nonrival if its use by one person does not decrease the quantity available to someone else.

- Examples of rival items are
  - The services of Brink's security
  - Fish both in ocean and in a fish farm
  - A seat at a live concert

- Examples of nonrival items are
  - The protection provided by a city police department
  - A concert on network television

Definition

A Fourfold Classification:

Private Goods

- A **private good** is a good or service that can be consumed by only one person at a time and only by those people who have bought it or own it.
- A private good is both rival and excludable.
- For example, a can of coke.

Definition

A Fourfold Classification:

Public Goods

- A **public good** is a good or service that can be consumed simultaneously by everyone and no one can be excluded from enjoying its benefits.
- It is both nonrival and nonexcludable.
- For example, a flood-control levee.

Definition

A Fourfold Classification:

Common Resources

- A **common resource** is a resource that can be used only once but no one can be prevented from using what is available.
- It is both rival and nonexcludable.
- For example, fish in the Pacific Ocean.

Definition

A Fourfold Classification:

Natural Monopoly Goods

– A good or service that is nonrival but excludable is produced by a **natural monopoly**.

– A natural monopoly is a firm that produces at lower cost than two or more firms can.

Rivalry and Exclusion

Four categories: private good, common resources (open-access common property), natural monopoly (club good), and public good

	Exclusion	*No Exclusion*
Rivalry	*Private good*: apple, pencil, computer, car	*Open-access common property*: fishery, freeway, park
No Rivalry	*Club good*: cable television, concert, tennis club	*Public good*: national defense, clean air, lighthouse

CONSEQUENCES

- Non-excludable:
  - Very difficult for the private sector to provide it and make a profit: Basic Research, Information, R&D

- Non-rivalry:
  - Do not want to exclude people as it is inefficient: The marginal cost of them getting the good is zero and they get positive benefit.

The Free Rider Problem

The fundamental problem of all public goods is I'd rather someone else paid for the public goods I consumed.

This is called the free-rider problem.

Prisoners' Dilemma in Action

Imagine it costs £4 to provide a clean street outside my house. Either I or my neighbour can pay for it. We both value clean streets at £3. If one of us pays £4 we are both better off.

	He Pays	He Doesn't Pay
I Pay		
I Don't Pay		

Prisoners' Dilemma in Action

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Nota: dos aseadores no cambian el beneficio total vs. un aseador

	He Pays	He Doesn't Pay
I Pay	(-1,-1)	(-1,3)
I Don't Pay	(3,-1)	(0,0)

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Equilibrio de Nash:
solución privada
sin coordinación

Prisoners' Dilemma in Action

Ahora, si nos coordináramos y compartiéramos el gasto: contrataríamos un aseador y pagaríamos 2 cada uno, recibiendo 3 de beneficio (beneficio neto = 1 por persona)

	He Pays	He Doesn't Pay
I Pay	(1,1)	(-1,3)
I Don't Pay	(3,-1)	(0,0)

Solución privada con coordinación (à la Coase)

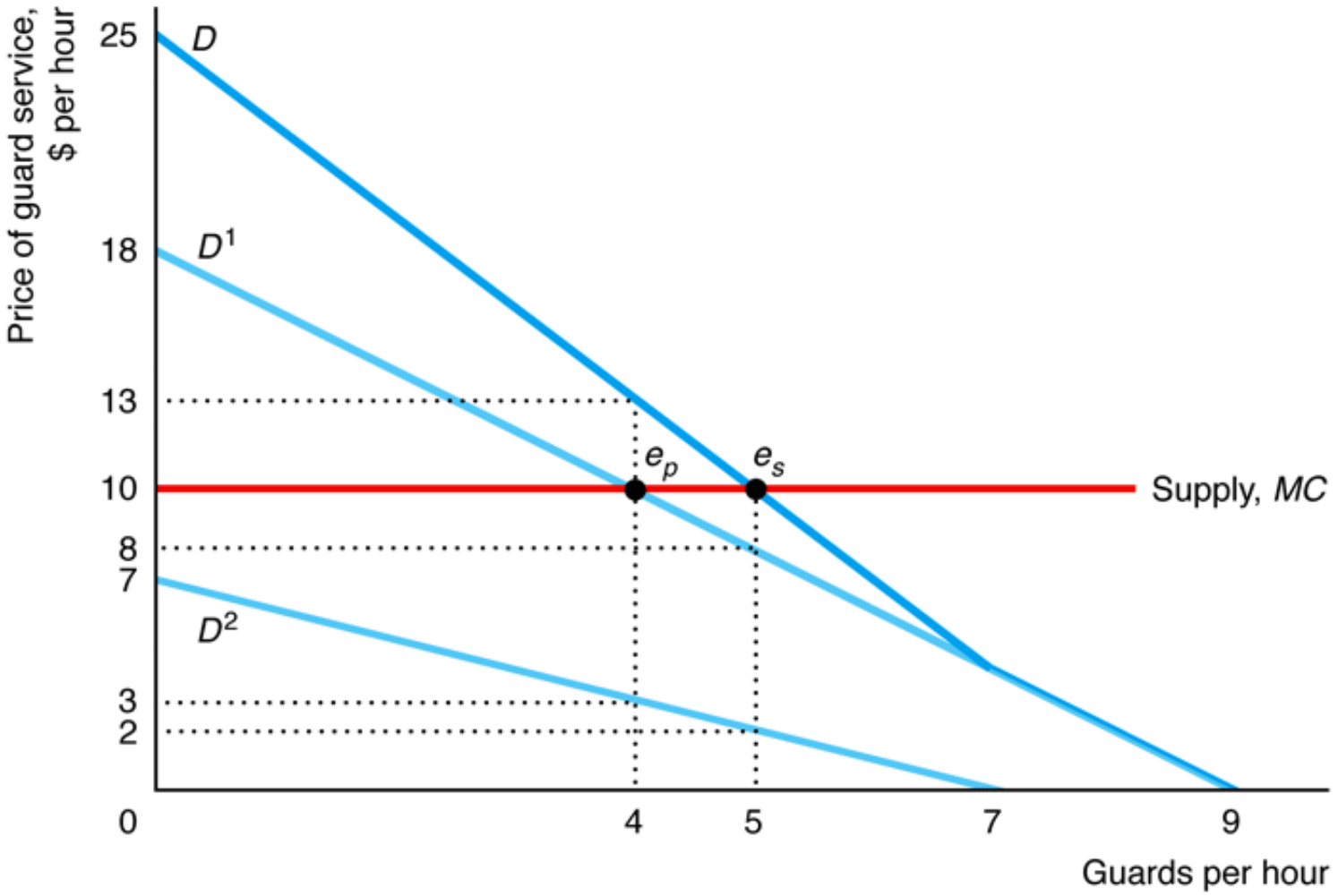
Equilibrio de Nash: solución privada sin coordinación

The Free Rider Problem

Si los costos de coordinación son altos, porque hay muchos participantes, el Estado debe proveer el bien público.

Bienes públicos

Demand for mall security guard services by two mall tenants.



Reducing Free Riding

Free riding can be reduced in several ways:

- Social pressure to contribute reduces free riding and may result in minimal provision of some public goods.
- Firms can merge into a single firm and thereby internalize the positive externality.
- Privatization (exclusion) also eliminates free riding because access to the good is restricted.
- Compulsion to avoid free riding may come in the form of contracts and taxes.

Common Resources

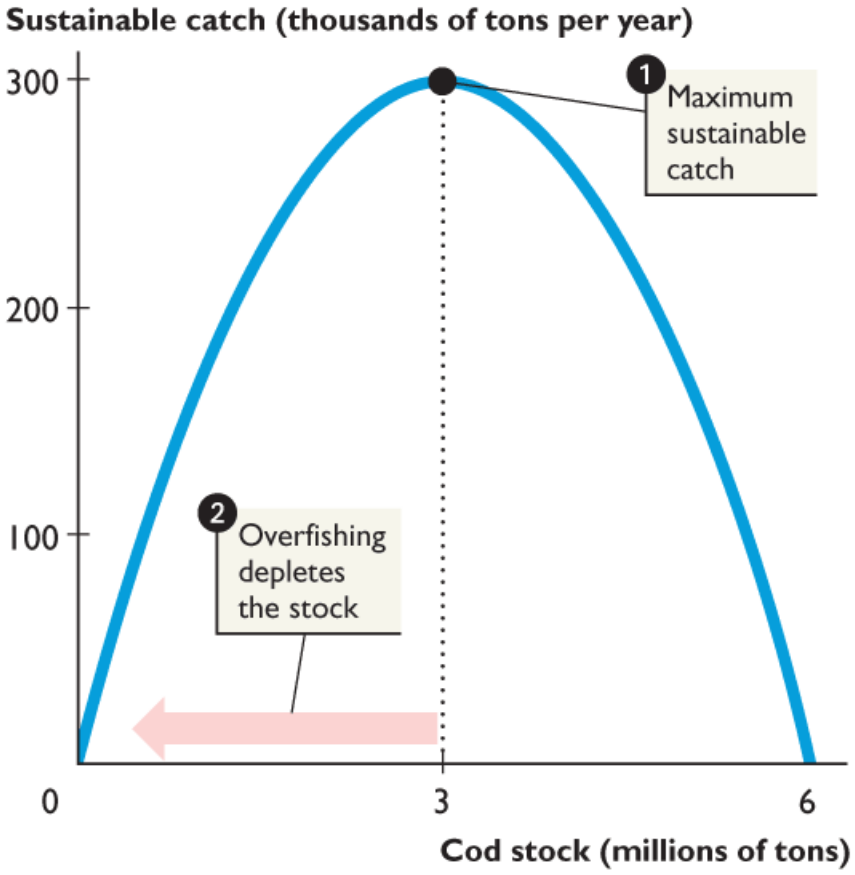
The **tragedy of the commons** is the absence of incentives to prevent the overuse and depletion of a commonly owned resource.

Examples include the Atlantic Ocean cod stocks, South Pacific whales, and the quality of the earth's atmosphere.

The traditional example from which the term derives is the common grazing land surrounding middle-age villages.

Common Resources

- If the catch equals the sustainable catch, the fish stock remains constant.
- If the catch exceeds the sustainable catch, overfishing occurs and the fish stock decreases.



Common Resources

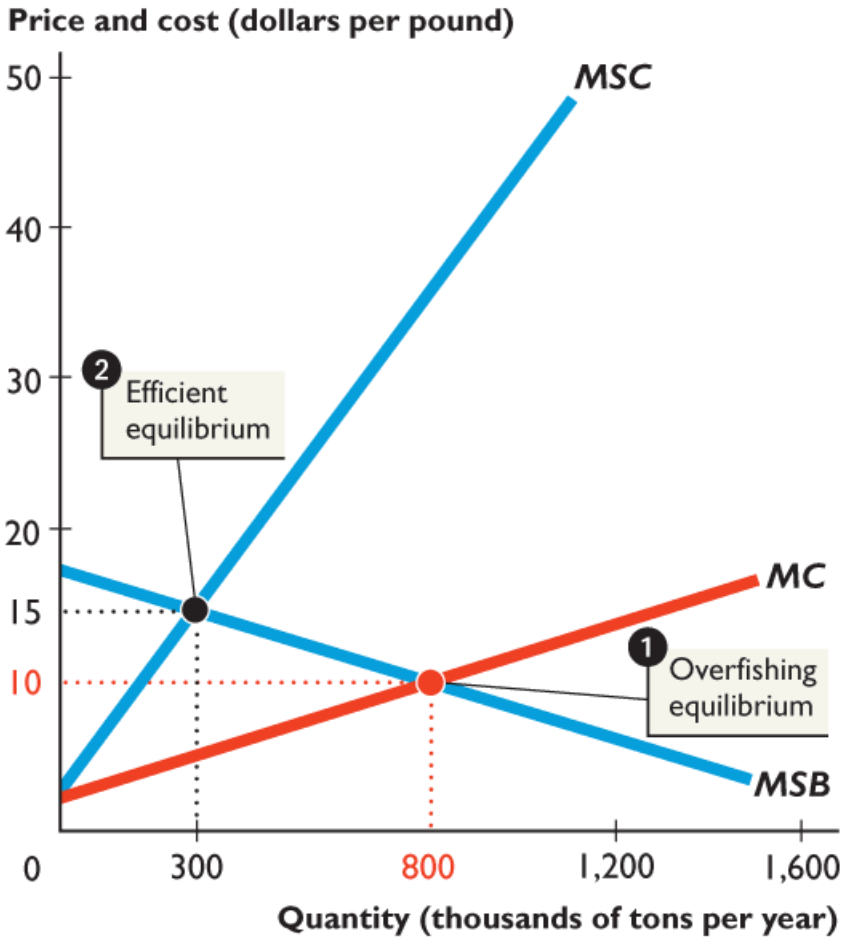
why overfishing occurs:

– The market supply curve is the marginal private cost curve *MC*.

– The market demand curve is the marginal social benefit curve *MSB*.

1. The market equilibrium

2. The efficient equilibrium

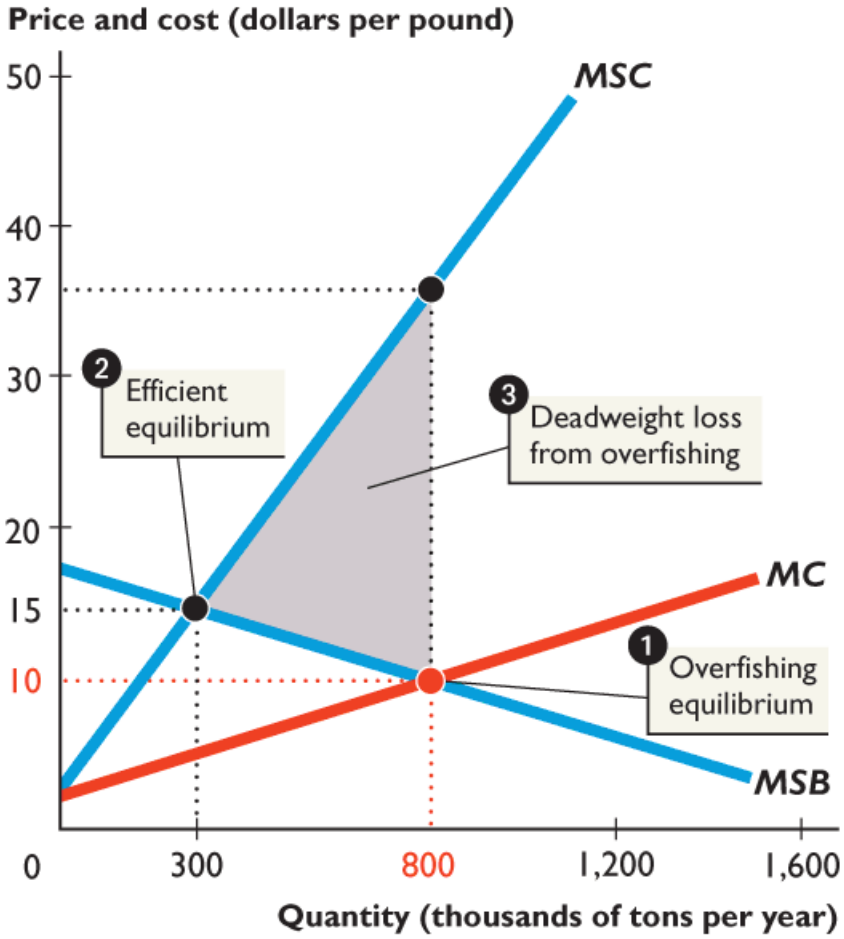


Common Resources

The equilibrium quantity of fish is 800,000 tons a year and overfishing occurs.

3. Overfishing creates a deadweight loss

Overfishing occurs because no one takes into account the effects of her/his actions on other users of the resource.



Common Resources

Using the Commons Efficiently

The efficient use of a common resource requires marginal cost to equal marginal *social* benefit.

To use a common resource efficiently, it is necessary to design an incentive mechanism that confronts users of the common resources with the marginal external cost generated.

Three methods that might be used to achieve the efficient use of a common resource are

1. Property rights
2. Production quotas
3. Individual transferable quotas (ITQs)