

Power Point Slides to Accompany:

Public Finance

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Chapter 4

Externalities



Public Finance Information Sources

<http://www.taxpolicycenter.org/>

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Introduction

- Externalities are benefits or costs generated outside of market transactions.
- An externality exists whenever the decision of a household or firm directly affects other households or firms through non-market transactions, conferring benefits or costs on others.

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Light house 燈塔



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The Economics of Externalities

- Externalities generate benefits or costs outside the working of the market mechanism. Since those benefits or costs are unaccounted for, they cause market failure.
- Externalities can also be considered as arising due to an absence of markets--lack of property rights.
- Public goods are a special case of externalities—goods that confer positive externalities.

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The Economics of Externalities

- The classic definition of externality is given by Meade (1973) as follows:
 - An external economy (diseconomy) is an event which confers an appreciable benefit (inflicts an appreciable damage) on some person or persons who were not fully consenting parties in reaching the decision or decisions which led directly or indirectly to the event in question.

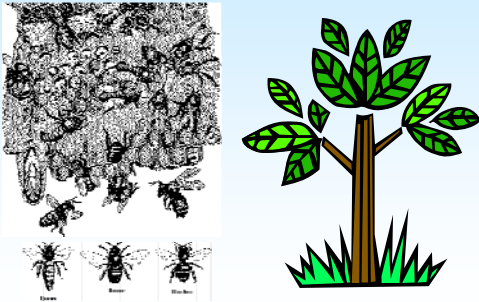
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Categories of Externalities

- Positive externalities—confer benefits.
 - E.g.. Xerox PARC research and development.
 - E.g.. Arbor Day tree planting.
- Negative externalities—confer costs.
 - Pollution of all forms (water, air, noise, etc.).
 - Point source pollution.
 - Non-point source pollution.

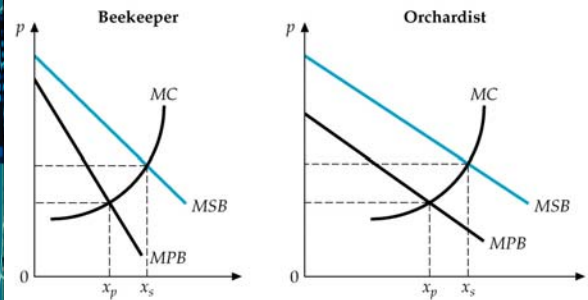
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Example: Beekeeper and Orchardist 果農



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Figure 4.1: The Beekeeper and the Orchardist



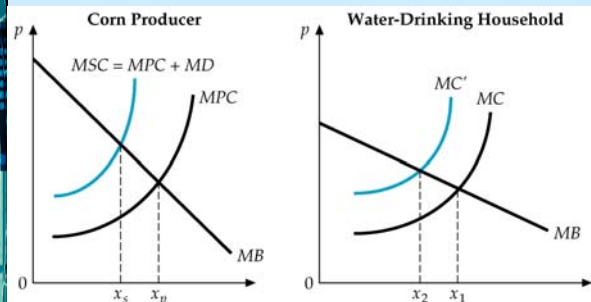
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TABLE 4.1 Beekeeper and Orchardist Payoffs

Beekeeper	Orchardist		
	Low Output	Medium Output	High Output
Low output	(1, 1)	(2, 3)	(3, 6)
Medium output	(3, 2)	(4, 4)	(6, 12)
High output	(6, 3)	(12, 6)	(18, 18)

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Figure 4.2: Corn Production and Water Contamination



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Externalities As an Absence of Markets

- Externalities exist due to poorly defined property rights.
- If rights could be assigned and enforced private solutions could be used (law suits and negotiation).
- Example: Wild birds.

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Public Goods As a Special Case of Externalities

- Public goods are a special case of externalities.
- They are goods that provide positive externalities to all residents of a community.
- Example: open space provided by a park or green space.

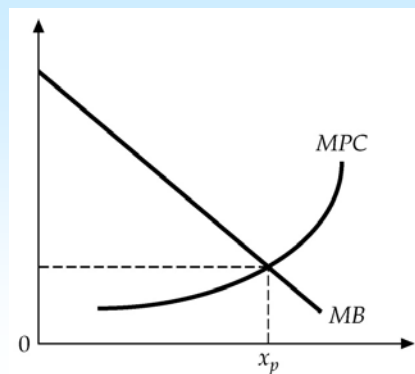
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Negative Externalities: Analysis of Marginal Damages

- Constant marginal damages case.
- In this case, marginal damages are independent of the quantity of output.
- Variable marginal damages case.
- In this case, marginal damages may vary with the amount of output, either rising or falling with output.

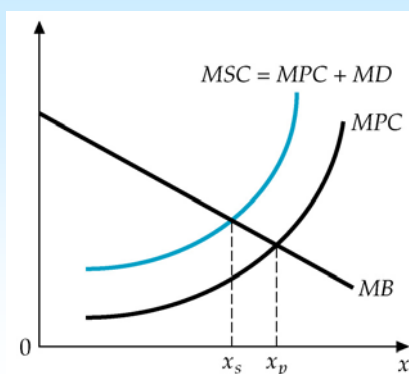
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Figure 4.3: Privately Efficient Level of Output



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Figure 4.4: Socially Optimal Output with a Negative Externality



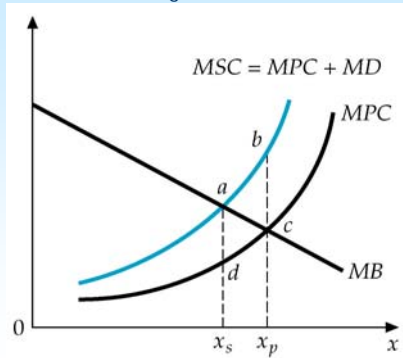
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Variable Marginal Damages Case

- In some cases, the marginal damage varies with the level of output.
- In that case, the MD rises with x .

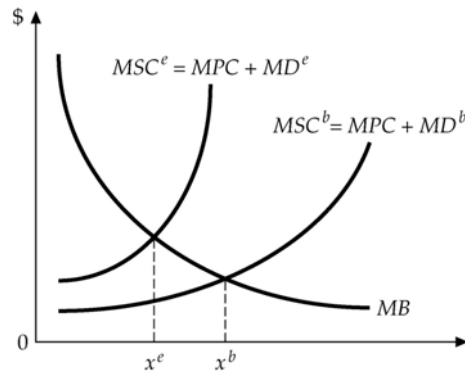
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Figure 4.5 Analysis of Negative Externality when Marginal Damages are Variable



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Figure 4.6: Debating the Size of Marginal Damages



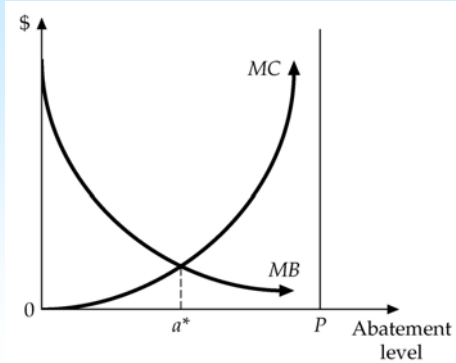
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Pollution Abatement

- Another way to view the problem of negative externalities is to think about reducing or cleaning up pollution.
- Pollution abatement is the process of reducing pollution.
- Consider the economics of determining the optimal amount of abatement.

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Figure 4.7: Pollution Abatement Analysis



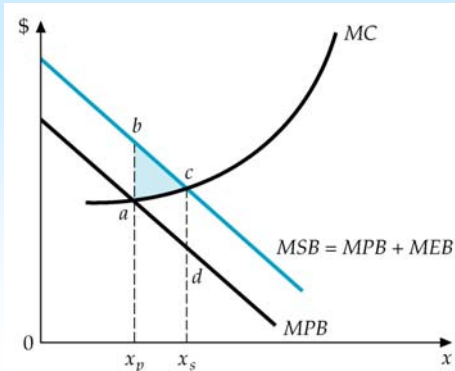
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Analysis of Marginal External Benefits

- When there is a positive externality the marginal social benefits of an activity differ from the marginal private benefits.
- There is a marginal external benefit (MEB).
- $MSB = MPB + MEB$.

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Figure 4.8: Analysis of a Positive Externality



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Remedies for Externalities

- Private solutions:
 - The Coase Theorem. 寇斯定理
 - Emissions trading permits. 排放權交易制
- Public solutions:
 - Command and control.
 - Pigouvian taxes and subsidies.

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Coase Theorem

- Statement of the Theorem:
 - In the case of an externality, the efficient solution will be achieved independently of who is assigned the property rights as long as someone is assigned the property rights.
 - The market mechanism will then internalize the externality.
- Implication of the Theorem: No government intervention is needed. All that needs to be done is to assign and enforce property rights.

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Coase Theorem

- The welfare maximizing outcome is unaffected by the assignment of property rights, as long as someone is assigned property rights.
- While the distribution of welfare among the parties is certainly affected by the assignment of property rights, the efficient outcome is not affected.

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Problems With the Theorem

- The Theorem requires that the cost of bargaining does not deter parties from finding their way to the efficient solution. If bargaining is costly, the theorem does not hold.
- The Theorem assumes that resource owners can identify the source of damages to their property and legally prosecute them. If identification and prosecution are not possible the theorem does not hold.

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TABLE 4.2 Railroad and Farmer Payoffs When the Farmer Has Property Rights

Railroad: Trains per Day	Farmer: Fields Planted		
	0	1	2
0	(0, 0)	(0, 150)	(0, 160)
1	(100, 0)	(40, 150)	(-20, 160)
2	(150, 0)	(30, 150)	(-90, 160)

Source: Adapted from Roy J. Ruffin, "Externalities, Markets and Government Policy," from *Federal Reserve Bank of Dallas, Economic Review* Third Quarter, 1996. Reprinted by permission.

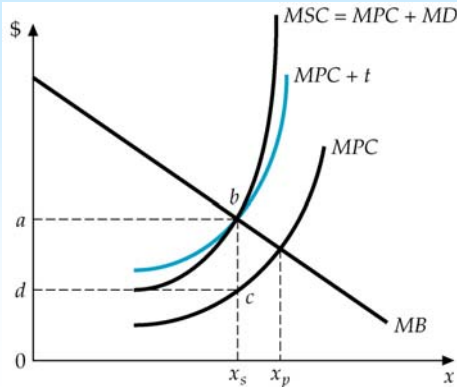
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TABLE 4.3 Railroad and Farmer Payoffs When the Railroad Has Property Rights

Railroad: Trains per Day	Farmer: Fields Planted		
	0	1	2
0	(0, 0)	(0, 150)	(0, 160)
1	(100, 0)	(100, 90)	(100, 40)
2	(150, 0)	(150, 30)	(150, -80)

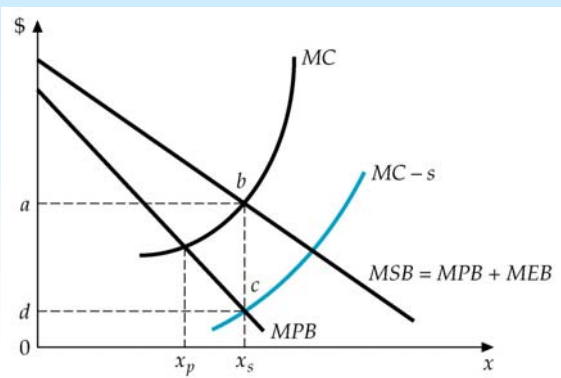
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Figure 4.9: Pigouvian Tax Corrects Negative Externality



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Figure 4.10: Pigouvian Subsidy Correction for a Positive Externality



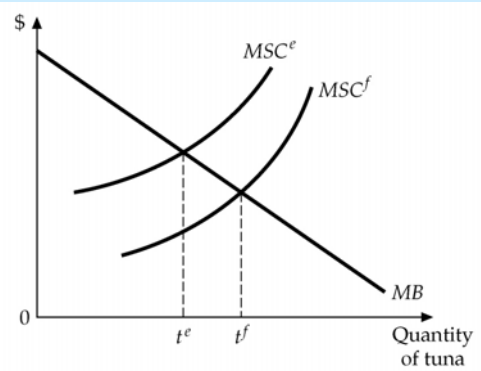
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Application

- Fishing by-catch is the term used to describe a negative externality.
- Tuna fishermen sometimes also inadvertently catch dolphins and porpoises.
- Those unintentional catches impose marginal damages on the environment.

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Figure 4.11: Dolphin By-catch Debate



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