

7 The Problem of Social Cost

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I Introduction : Concept of Externality

Externality exists whenever the exchange between two parties causes benefits or costs to the third or more parties **without** any equivalent or corresponding gain or compensation.

It is the result of the existence of a difference in cost or benefit between the private exchanging parties and the society as a whole.

Whenever externality exists, it implies a situation of " getting something for nothing ".

A Examples In Classic Texts

Pigou's Case of Two Roads

Suppose there are two roads, named as Road ABD and Road ACD both leading from A to D. Road ACD is the longer, wider and more winding road. Road ABD is the shorter, narrower but straight road. At the beginning, users will go to the "faster" (i.e. a shorter travelling time) road ABD.

Congestion on road ABD will increase the time of an extra user as well as on **all** other users because traffic is slow down as a result.

Anyone user will impose time cost (as well as petroleum expense etc.) on himself as well as on other users on the road - a social cost.

An possible example is the route from Central to Aberdeen by either Pokfulam Road (like Road ACD) or the Aberdeen Tunnel (Road ABD).

Cattle Raiser & Farmer

There are 2 pieces of land lying side by side, one for wheat growing and the other for cattle raising. The raiser's cattle eat or damage the farmer's crops as they stray when there are no fence surrounding the wheat land.

The cattle gains in weight and the raiser gains the value of meat obtained as a result.

Based on Pigou's analysis, if the raiser is not liable for the damage on crops, he will simply ignore the crop loss and run too many cattle.

Conversely, the farmer raises too few crops and external cost is created by the raiser's cattle.

Orchard & The Bees

An apple grower provides apple trees for the bees to make nectar. If there is a bee-keeper nearby the apple grower, the bee-keeper benefits from the trees grown by the apple grower.

Since the benefit may not be realised by the apple grower, planting will be too little.

Conversely, the bee-keeper provides a pollination service to the apple grower. Since the service is not paid by anyone, he doesn't take into account of this external benefit and too few hives will be established.

The two interested parties are not guided by Adam Smith's invisible hand to the optimal amount of apples

and honey production.

In traditional economic theory, such cases are examples of external (to the exchanging parties) costs or benefits leading to a question on the efficiency and power of a free market. Some suggested that it was an indication of “ market failure “.

B Externality : Social Cost & Social benefit

The existence of externality would imply that the private costs or benefits of the exchanging parties are **not** the same as the costs or benefits imposed on the society as a whole. The difference is called the external cost or benefit.

Private Cost & Social Cost

Private cost refers to the highest-valued option forgone of a resource available to a producer or a person who makes the decision.

Social cost measures the highest-valued option forgone of a resource available to the society.

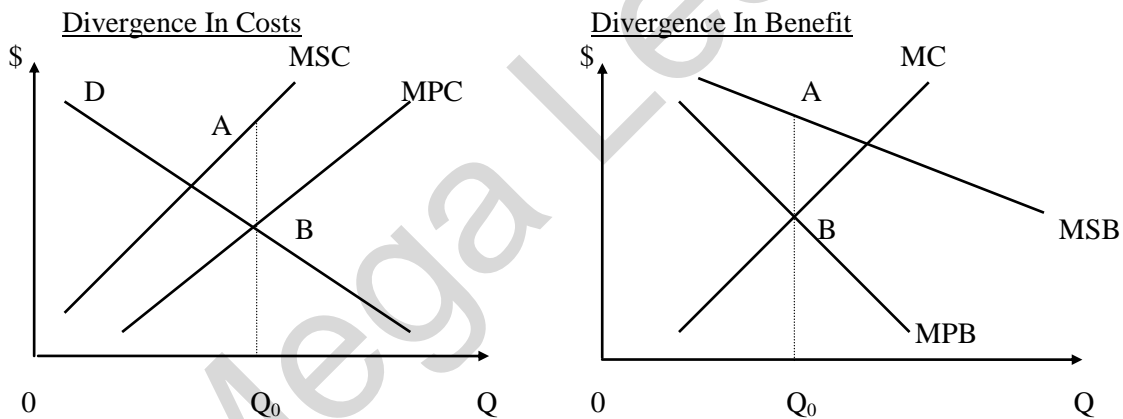
External cost is the cost inflicted to a third or more parties without compensation. It exists when an act of a person imposes cost on others, and the person does not need to bear the cost for some reasons. The private cost and social cost had a **divergence**.

$$\text{Social Cost} = \text{Private (Internal) Cost} + \text{External Cost}$$

External benefit is a spillover to a third party without payment.

$$\text{Social Benefit} = \text{Private (Internal) Benefit} + \text{External Benefit}$$

Divergence Between Private Cost (Benefit) & Social Cost (Benefit)



II Solutions To Externality

The market mechanism reacts to the private or internal costs or benefits with the forces of demand and supply. It is criticised that the market fails to take into account of the external costs or benefits so that efficiency (i.e. $MUV = MSC = MPC$) cannot be achieved.

A Traditional Approach

Pigou's Two Roads

Pigou argued that if both roads are left free to use by drivers, there will be too many cars on Road ABD (i.e. congestion) and too few cars on Road ACD.

Road ABD is said to be over-utilized and Road ACD is under-utilized.

It leads to an inefficient allocation of resources (roads).

There is a (dead-weight) loss in social welfare.

Pigou suggested that a government intervention by levying a tax (toll) on Road ABD users to discourage the potential users. Traffic congestion could be avoided with some users drive on Road ACD.

As a result, the external costs are “ internalized “ by the taxation because users of Road ABD have to bear

the full cost, i.e. social cost = original private cost + tax (toll charge).

Cattle Raiser & Farmer

The traditional approach is to minimize the damage or cost rather than to maximize the total gain. In Pigou's opinion, the government should intervene by introducing a tax on the cattle raiser and gives a subsidy to the farmer; or a legal prohibition on the cattle raiser on his cattle to eat the crops.

Orchard & The Bees

The traditional approach would agree to give subsidies to the bee-keeper and the apple-grower because they provide mutual benefits. The problem lies on the difficulties in pricing and measurement of nectar, the value of services provided by the bees.

B A Modern Approach

- 1 Frank Knight argued that the reason for a divergence is **not** a case that the market fails to work but it is **not** allowed to work. If the roads are privately owned, the wealth-maximizing owner will charge a toll (similar to a tax), assuming a very **low** collection cost. The toll forces the drivers to internalize the external cost. The problem of externality and misallocation of resources is solved as a result.
- 2 The effects of social cost on the cattle raiser and farmer are mutual.
The relevant question is not simply : “ How should we restrain A to harm B ? “
The relevant question is : “ Should A be allowed to harm B or vice versa ? “
The appropriate policy is to avoid the more serious harm.
- 3 The case of orchard and the bees is a typical example of external benefits. The use of taxation and subsidy is **not** appropriate and costly.

C Property Rights & Transaction Costs

Property Rights : Rule of The Game

When we purchase some goods, we are indeed buying some rights on the goods from the sellers. These rights control the ways particular resources that will be used and assign the resulting costs and benefits arisen from the use of these resources.

Private Property : A good or asset is defined as a private property if, and only if, within well-defined limits, its owner has these sets of rights.

Inter-relationship Among The Rights

The exclusive right to use implies neither the right to derive income nor the right to transfer. However, a right to transfer does imply, as least to some extent that a resource is exclusively owned. Otherwise, no one is willing to pay for it.

David Hume, a famous French writer, wrote (in A Treatise of Human Nature) the following in 1740 :
*Our property is nothing but those goods, whose constant possession is established by the laws of society; that is, by the laws of justice... No one can doubt, that the convention for the **distinction of property**, and for the **stability of possession**, is of all circumstances the **most necessary** to the establishment of human society, and after that the agreement for the fixing and observing of this rule, there remains little or nothing to be done towards setting a perfect harmony and concord.*

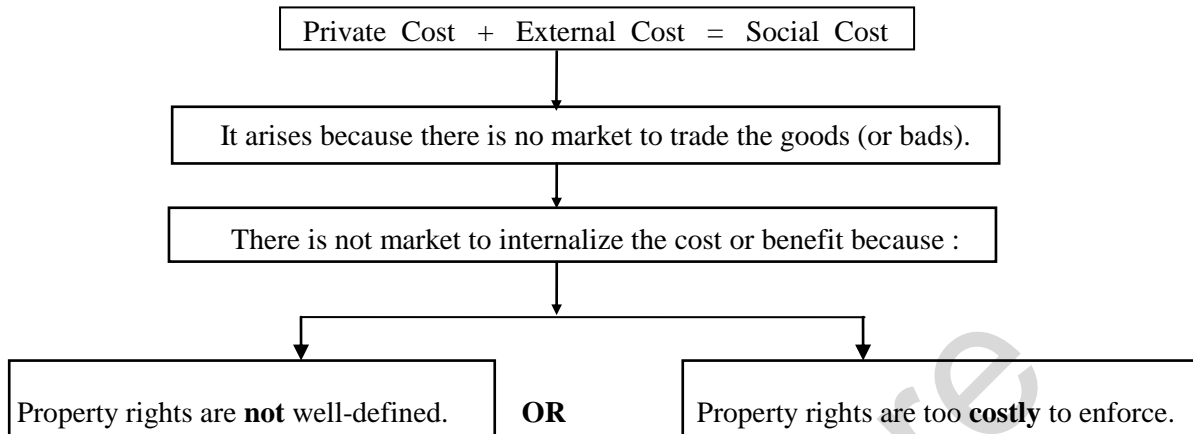
With well-defined and enforced property rights, the owner will put the resources to its highest-valued use. Efficiency is attained with private costs or benefits equal to social costs or benefits.

A divergence between private cost and social cost (or benefit) is attributed to either one or more of the following :

- 1 the absence of right to contract ;
- 2 there is a contract but no complete agreement or stipulation ;
- 3 there is agreement but inconsistent with the state of : marginal gain = marginal cost because the enforcement cost (transaction cost) is too high.

Coase's words on transaction cost : " ... in order to carry out a market transaction it is necessary to discover who it is that one wishes to deal with, to inform people that one wishes to deal and on what terms, to conduct negotiation leading up to a bargain, to draw up the contract, to undertake the inspection needed to make sure that the terms of the contract are being observed, and so on ... "

The Problem Of Externality



D Coase Approach : The Coase Theorem

Illustration of The Coase Theorem : The Chemical Factory

A chemical factory discharges poisonous waste into a river which also provides a fishing ground in its lower part. If both the factory owner and the fishermen have their rights to produce, the factory owner would simply ignore the damage imposed on fishery. As a result, the amount of fish is reduced by the over-production of chemicals. There is a divergence between the private and social costs in chemical production.

A Table Showing The Numerical Values of The Two Sides

Output of Factory	M S C		Value of Factory Σ M P B	Value of Fishery Σ M P B	Joint Value of The Two
	M P C	M D			
0	0	0	0	300	300
1	10	1	90	299	389
2	20	2	170	297	467
3	30	4	240	293	533
4	40	8	300	285	585
5	50	16	350	269	619
6	60	32	390	237	627
7	70	64	420	173	593
8	80	128	440	45	485
9	90	45	450	0	450
10	100	0	450	0	450

Assume : Price of Chemical produced = \$100/unit in a price-taking market.

Initial Value of Fishery without pollution = \$300

MPB of factory = \$100 – MPC

MSB = \$100 - MPC - MD = \$100 - MSC

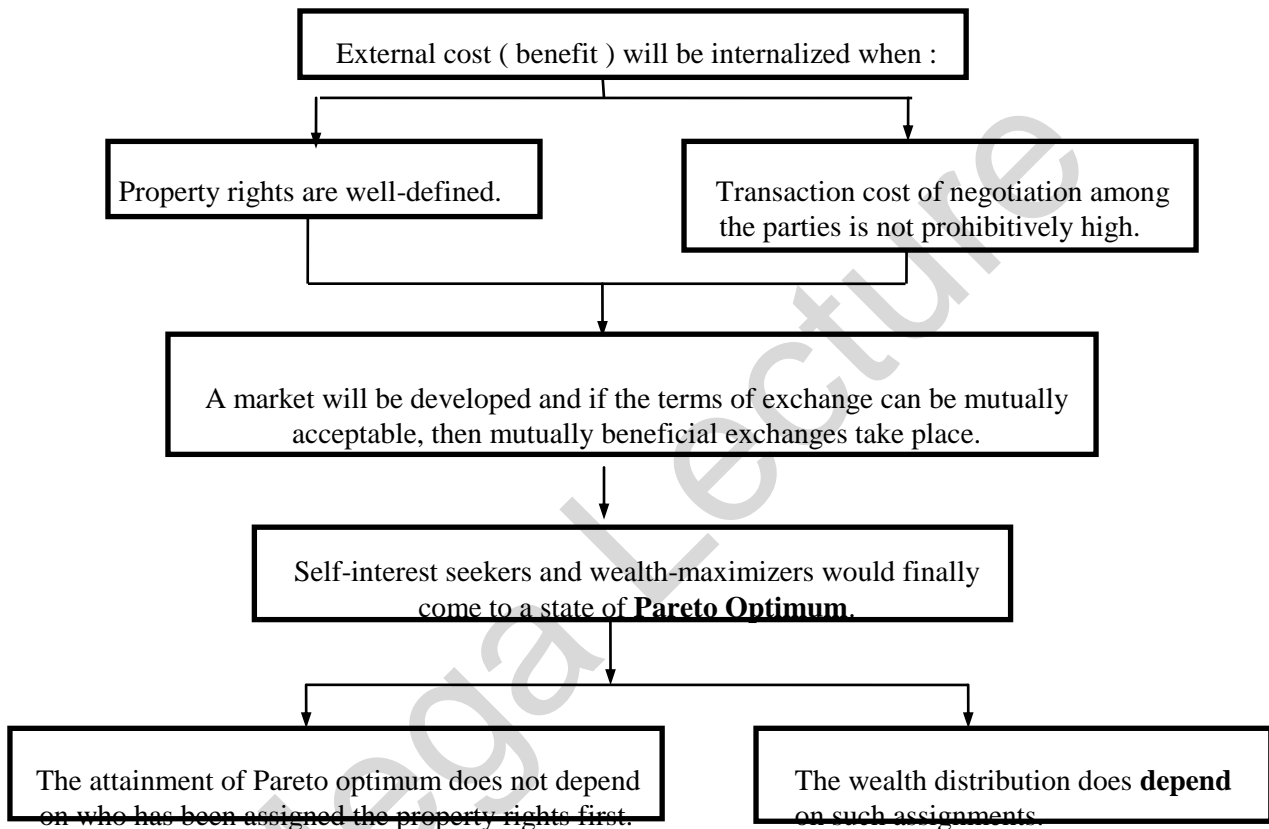
- The traditional analysis would stress the over-production of chemicals killing “ excessive “ fish. The remedy is to impose a tax on the factory to internalize the external cost into private costs.

- 2 Coase suggested a solution by the assignment of rights through the use of contract. If the right of clean water belongs to the fishermen, the factory owner may pay the fishermen to buy the right to pollute. The Coase Theorem predicts that a **transfer of right** is formed to maximize the potential gain. If the right belongs to the factory owner, he would sell the right (by a certain amount) to the fishermen.

Coase Theorem

If property rights are well-defined and transaction costs are zero, then :

- 1 the allocation of resources will be the **same**, regardless of the initial assignment of property rights; and
- 2 the allocation of resources will be efficient, so there is **no** problem of externality.



Summary

- 1 The assignment of property rights does **not** affect the allocation of resources.
- 2 The different assignment of property rights only affects the wealth distribution and the one received the payment or compensation as a result.
- 3 Once the private property rights exist and are delineated with **sufficiently low transaction cost**, the damage is allowed up to a situation where marginal cost is equal to marginal benefit.
- 4 The traditional concept of divergence is a **wrong** concept of cost. A correct concept on cost could identify the potential gain and a consistent application of the maximization postulate shows that the divergence is settled by a mutual exchange of rights or market transactions.
- 5 A market is able to internalize any external costs/benefits where government intervention or involvement is **not** essential to solve the issue of externality.
- 6 Externality can be eliminated by **completely enforced** property rights. The market transactions will guarantee an efficient use of all resources. Private property rights are a pre-requisite for market transactions.
- 7 **The Coase Theorem is basically a theorem of exchange.**

Whenever transaction costs are sufficiently low and property rights are well-defined, people will make voluntary exchange for mutual benefits. Exchanges and negotiation of property rights will be carried out until the marginal gain is equal to the marginal cost. All potential gain is captured at that situation !

* You should by now understand that there is nothing **wrong** with the market !

III Public Goods & Economic Efficiency

A Public Good

A public good is any scarce good that can be consumed by many consumers at the **same** time, without affecting the **amount** available to anyone else.

It is a good which is difficult, if not impossible, to **exclude** non-payers from receiving benefits and whose benefits are **not reduced** by any extra users (both payers & non-payers).

Exclusion : Whenever a consumer enjoys a good or service, anyone is deprived of that enjoyment due to private property rights. Examples are numerous.

Rivalry : When a consumer possesses a good or service, the amount available to anyone is reduced by that amount held.

In its **pure** form, a public good carries the characteristics of non-exclusion and non-rivalry.

A pure public good refers to a public good that everyone has an identical amount.

In other words, the cost of **supplying** a public good to an extra user is zero, but the cost of supplying an extra unit of public good is **not**.

Examples of public goods are : lighthouse, street light, roads, **local** T.V. broadcast, radio broadcast, national defence, **free** (nine years) education in H.K.

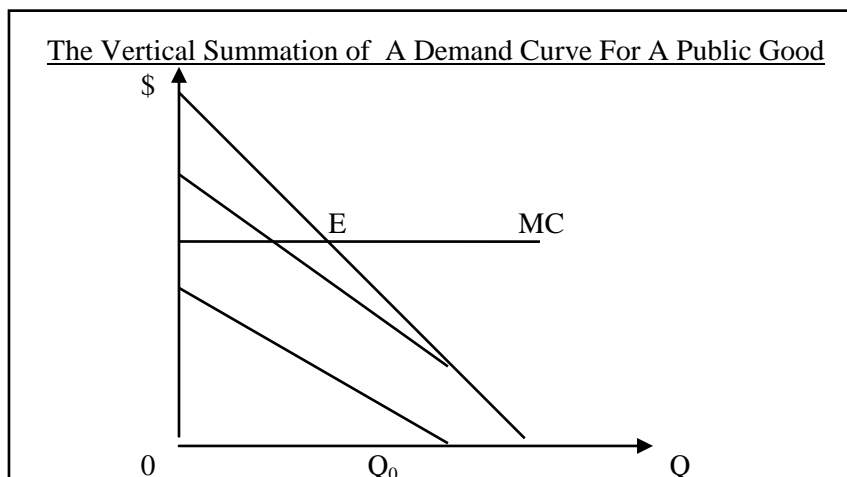
A Table Between Exclusion & Rivalry

		Exclusion	
		With (Exclusion)	Without (Exclusion)
Rivalry	Yes	Private / Economic Goods	Fishing ground
	No	Highways, swimming pools	National defence, education, disease.

A Free Rider

1 Due to the property of non-exclusion of public goods, consumers are reluctant to pay for a public good, resulting in a case of social value greater than the social cost.

These free riders” make the provision of public goods especially by private competitive firms, very difficult (though it is **not** impossible). It results in a situation under which everyone wants the good but no one pays for it.



2 Solutions

- * To exclude the non-contributors but it is usually inefficient because the costs of exclusion are normally greater than the benefits resulted.
- * The provision and production of public goods are tie-in with some private goods, e.g. the use of taxation together with a free education.
- * To implement government policy to provide the public good, e.g. social security.

The issue of public good arises because property rights **cannot** be efficiently enforced to the benefits that the public good generates. If an extra user can benefit from the good at no extra cost to the society, charging a price would discourage potential users and results in a loss of total benefit to the society. The provision of public good becomes sub-optimal - thus giving a reason or justification for government intervention.

B Welfare Economics & Pareto Optimum

- 1 Welfare economics refers to a branch of economics dealing with the evaluation on the desirability of different decisions on resource allocation.
For example, the **arguments** on the use of sales tax against direct taxes in the case of HK; the **various** means of budget financing in HK; the **most** effective policy to deal with car thefts in HK. The value judgement that is central to welfare economics is that any change that improves the well-being of one individual without reducing the well-being of anyone else is a desirable change.

2 Efficiency & Pareto Optimum

An Italian economist, Vilfredo Pareto (1848-1923) suggested the so-called Pareto optimality criterion :

Any change that makes at least one individual better off and no one worse off is an improvement in social welfare. A situation in which it is impossible to make anyone better off without making someone worse off is called a Pareto optimum.

Traditional Concept On Efficiency

Perfect competition guarantees the attainment of three states of efficiency :

* Consumptive efficiency :

For any two goods X & Y; MRS of a person = MRS of another = MRS of ...

* Productive efficiency :

For any two inputs L & K; MRTS of a firm = MRTS of another firm = MRTS ...

* Allocative efficiency :

For any two goods; MRS = MRTS.

In a modern terminology, $MUV = P = MC$ of a good.

However, the market fails to attain Pareto optimum or allocative efficiency due to some cases.

The market fails because $MUV \neq P$ and $MUV \neq MC$.

The cases include : the existence of monopoly ; the existence of externality ; the presence of natural monopoly ; the presence of public goods ; risk and uncertainty leading to imperfect information.

3 Modern Concept On Efficiency

In reality, there is always a cost in using the market - the transaction cost. So the more powerful analysis by economic theory is the application of transaction cost rather than a comparison between the reality and perfect competition.

To attain Pareto optimum or efficiency, transaction cost must be zero. Once transaction cost is zero, it also implies that property rights must be well-defined.

We then explain human behaviour with this concept.

To take the example of externality, the correction of externality is not **costless**. Many people often ignore the existence of huge costs and external side-effects of the correction itself. The costs may outweigh the benefits.

It follows that a divergence between private and social costs may **not** be inefficient (because we **cannot** be better than the present situation - Pareto optimum).

As a result, externality needs not be eliminated by government intervention.

IV Common Property Resources

A Meaning & Examples Of Common Property Resources

Common property resources refer to any resources without well-defined property rights. Once the property rights of these resources are well-defined, they become private properties.

No one has a right to exclude others from using it and any person is free to compete (if it is also scarce) for its use.

A common property resource may be a free good like air or a scarce good like ocean life such as blue whales, sharks; wildlife such as elephants, tigers ; and also the atmosphere.

B Over-utilization & Rent Dissipation

1 Common property resources, with common rights, will encourage everyone to acquire them without bearing the full cost. The resource-takers tend to over-utilize the resources. In other words, in the absence of private property rights, these resources are excessively exploited.

Without exclusive rights to use the resource (or an exclusive claim to the value of it) its use will invite competition. Finally, every competitor can earn no more than the alternative earning of his own factor inputs required in the exploitation of that property resource.

2 This competing use of a common property will reduce its economic rent or net value of the income earned to zero. This exclusive income or rent is said to be completely dissipated because the cost of inputs used to get this formerly common property matches the amount of income earned at the margin.

The condition is described as rent dissipation.

3 With the lack of exclusive use rights, the competition of a common property will lead to rent dissipation which implies :

- over-exploitation or excessive use, e.g. over-fishing; over-hunting; or
- under-exploitation, e.g. fruit trees in the New Territories.

However, complete rent dissipation is also rare. People will restrict the use of that common property by regulations or information costs, e.g. marine fishing with licences, size restriction on fish and marine life etc.

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An Overview Of Microeconomics

1 This topic begins by an introduction of the concept of externality. Then, the traditional concepts of market and government intervention are explained. This is followed by the modern approach on externality, emphasizing on Coase ideas and solutions.

2 The real problem of social cost lies on an understanding of the nature and application of transaction cost and property rights.

These two concepts can explain what is really the problem of social cost and externality.

- 3 These two constraints give us more powerful theories to explain human behaviour. The problem of social cost also lies on these two concepts.
- 4 The role of market and price, accompanied with transaction cost and property rights, forms the fundamental framework in microeconomic theory and analysis.

End of Microeconomics

Mega Lecture