

[Academic Script]

Market Failure

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Lecture – 1 Market Failure

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1. Introduction

Markets serve society by efficiently organizing economic activity. However, there are several constraints to the effectiveness of market allocation of many environmental resources and risks. Either the prices are non-existent or they understate the value of a resource. Market failure implies that decentralized decisions do not generate an efficient allocation of the resources.

In an earlier part, we discussed the importance of perfectly competitive markets in attaining Pareto optimality and achievement of maximum social welfare. However, under certain circumstances the market system does not lead to the situation of Pareto efficiency. The situations under which market fails to achieve economic efficiency or maximum social welfare is called 'market failure'.

Market failure occurs mainly due to four reasons. They are (a) asymmetric information, (b) presence of externalities, (c) common property resources and (d) consumption of public goods. It is important to note that 'market failure' is a general term that describes the situations in which market outcomes are not Pareto efficient. Therefore market failures provide a basis for government intervention.

2. Asymmetric information and Signaling

Asymmetric information refers to the fact that the buyer and the seller of a commodity possess different quantum of information about the attributes of goods, which they transact. Asymmetric or imperfect information is a common case as the seller of a good knows more about the quality of his good than the prospective buyer. Thus market failure due to asymmetric information occurs when one person in a transaction does not have full information about the actions or the 'type' of the second person. The word 'type' refers to the unknown quality of the good or the hidden intention of the agent. For example, asymmetric information exists when an insurer knows more about the fulfillment of certain procedures and conditions by insured while filing insurance claim, or a seller knows more about the quality of a product than a buyer. Without complete information, markets will be incomplete and can fail to allocate resources efficiently.

There are two types of problems related to asymmetric information. One refers to moral hazard that arises when the actions of one person are unobservable to the other person. The second one is the adverse selection that exists when one person cannot identify the type or character of the second person. A brief explanation of both theses problems is given below.

Moral Hazard

Moral hazard creates two problems for the environmental assets. First, when the regulators are unable to monitor the actions of others, an individual has the tendency to evade pollution abatement since he incurs additional costs for such abatement and receives only a small share of the benefits from clean environment. Ignoring transferable externalities, the individual has an economic incentive to reduce his or her effort to abide by the standard set by regulators due to which inadequate measures are taken for abatement that causes higher pollution than the social optimum level.

In this context suppose there is a company that provides pollution insurance and also supply pollution control technology. Given that the accidental escape of pollutants create potential financial liabilities (like medical costs of affected persons), a firm would like to pay for insurance in order to pass these risks to the insurer. But since there is a trade-off between risk bearing and incentives, the market for pollution liability insurance will be incomplete, as the insurer would attempt to hide the information related to conditions that apply for insurance claims. Thus the market will produce an inefficient allocation of risk.

Adverse Selection

Problem of adverse selection arises when different qualities of products are sold at the same price due to the ignorance of buyers. Alternatively, adverse selection would also take place when a product of uniform quality is sold at the same price to buyers of different categories and, prior to sale, the seller cannot distinguish between the consumers of different categories. Whatever the reason for adverse selection, the consequence is the same ie. low-quality products, or high-risk buyers, `crowd out' high-quality products.

Adverse selection represents market failure because good products and good customers are under-represented, while bad products and bad customers are over-represented in the market. The source of market failure is the externality between products and between customers. When a seller of a low quality product reduces price to increase sales, he adversely affect the sellers of high quality products.

Adverse selection is a problem for the development of ecoproducts, the production of which is less harmful to the environment. For example, the production high quality food products necessitate the maintenance of hygiene at the food processing plant and effluent treatment based on specified standards. All these involve additional costs. Here the problem is that eco-products are expected to be relatively expensive due to superior quality, as the environment does not subsidize their additional production costs. Now if a buyer is unable to differentiate eco-product from similar product produced by standard practices, he will not pay high price. The market for eco-products will fail if the customers remain ignorant about the superior qualities of eco-products.

With a view to reduce losses caused by adverse selection, the government specifies minimum quality standards especially for consumer products.

Signaling

In a situation of adverse selection, a firm producing high-quality products adopts signaling strategy to inform the consumers about superior quality of their products in order to earn profits. This could be in the form of reputation of the firm, informative advertising, warranty for replacement of defective products, etc. The signal may also in the form of obtaining ISO certification of quality from the International Organization for Standardization. Thus signaling occurs when an informed individual carry out a costly activity to convince others about particular facts. In many situations, signaling offers a partial solution to the problems that arise from adverse selection. Therefore, the government intervention is justified to implement beneficial public policies that authorize the authorities to take penal action against the producers of sub-standard goods. The government could also impose taxes on signaling if it leads to earning of high profits by the producers.

Screening

Screening is an action of a less-informed party to indirectly understand the other party's characteristics. Screening occurs when an uninformed party establishes a test that induces informed parties to reveal more about the product or service. Market failures associated with adverse selection and competitive screenings are frequently cited as the justifications for government intervention in the context of insurance markets.

Government provides various forms of social insurance. Government has the authority to declare some type of social insurance as mandatory for all the citizens. For example the government can make medical insurance compulsory for each individual and fix different premium for different income groups like high premium for high-income earners, low premium for low income earners and free medical facility to poor families. This way the government can use statutory power to attain breakeven by pooling policyholders to cross-subsidize one another. By doing so the government can ensure fairness, and stability of free market.

3. Joint Production and Consumption

Joint Production

The application of thermodynamics is widely recognized as an important part in ecological economics thought, since it gives insights into the nature of economy-environment interactions. From a thermodynamic point of view, energy and matter are the fundamental factors of production. Every process of production is a transformation of these factors and subject to the laws of thermodynamics, which states that (i) energy and matter can neither be created nor destroyed (First Law) and (ii) In every real process of transformation, a positive amount of entropy is generated (Second Law). In this sense, the concept of joint production takes into account the essential thermodynamic constraints on production processes as expressed by the First and Second laws. This states that the organisms and ecosystems take in several inputs and generate several outputs, just as an economy does. Such natural systems are the earliest examples of joint production.

The concept of joint production can be considered as one of the conceptual foundations of ecological economics. It refers to the production of wanted goods that give rise to additional unwanted outputs (bads), which may be harmful to the environment. The fundamental economic concept describing this relationship is that of joint production, which means several outputs automatically emerging together from a single productive activity. An example is the refining of crude oil in which petrol, diesel, kerosene and other by-products are produced along with

the generation of some harmful sulphurous wastes and carbon dioxide emissions.

Joint Consumption

Public goods have two distinct features — non-excludability and non-rivalry in consumption. Non-excludability means that it is not possible to exclude anybody from enjoying the benefits of a good or service. For example the property rights that involve air would not solve the problem of environmental pollution because rights to air cannot be defined and enforced easily. In such cases government intervention and imposition of taxes on polluting sources would be more effective.

There are some goods and services that are both non-rival and non-excludable. Perfect examples are the ocean and the mountains. These natural goods are accessible to everyone in joint use (non-excludable) and use by one person does not prevent others from using them as well (non-rival). Goods that are both non-rival and non-excludable are called public goods.

However, the property of non-rivalry would disappear if large number of users simultaneously involve in the use of a resource or amenity. For example during summer vacations and pleasant holidays, the hill stations and public beaches get congested, which make them less enjoyable. The limit to non-rivalry is reached when overcrowding or congestion of users is such that everyone disturbs others. This is called the congestion threshold. Thus the issue of rivalry among the users of a common property resource is nothing but an example of negative externalities between them.

4. Externalities

Externalities refer to the beneficial and detrimental effects of an economic unit (a firm, a consumer or an industry) on others. In other words any action by an economic factor that affects the welfare or comforts of others who are not involved in the action is called an externality. This states that the externalities can be positive or negative.

A positive externality exists when an economic factor produces an economic benefit but does not reap full reward from that benefit. Positive externalities are less known, but can be important for the individual and social well being. Perfect example for positive economy is civilized society in which parents carefully raise their children to become decent citizens. In doing so they also provide benefits to the society as the amount of violence and crime is minimal in a civilized society. Positive externality is also called external benefit.

A negative externality exists when an economic factor produces an economic cost but does not fully pay for that cost. A wellknown example is the manufacturing firm that dumps pollutants in a river, decreasing water quality downstream and also emits smoke that deteriorates the air quality, which causes health hazard. Negative externality is also called external cost.

Externalities create a divergence between the private and social costs of production. Social cost includes all the costs of production along with invisible costs. Invisible costs are

externalities like costs related to pollution of atmosphere, water and depletion of natural resources. Thus

Social Cost = Private Cost <u>+</u> Externality

External Economies in Production

External economies occur when the expansion of a firm creates benefits, part of which go to others. In case of external economies, the level of output, which is determined on the basis of private marginal cost, will be less than the socially optimal level of output. This is because the firm equates price with private marginal cost (which is higher than the social marginal cost) while deciding about the level of production.



Fig.1: External Economies Cause Under-Production

In Fig.1 the supply curve of product X is represented by SS curve, which has been obtained by summing up the private marginal cost curves of all the firms. Due to the existence of external economies, social cost will be smaller than the private costs. Therefore supply curve S'S' that reflects social cost will be lower than the supply curve SS based on private marginal costs because it considers external economies generated by the

industry. Private cost does not take into account external economies.

Fig.1 shows that demand curve DD and the supply curve SS intersect at point E that determines OQ amount as total output. But the socially optimum output is OM that is determined by the intersection of DD and S'S' at point T. It is evident that the product is produced in smaller quantity than the socially optimum level OM. Thus the existence of external economies cause QM amount of under-production.

External Diseconomies in Production

Like external economies, there are external diseconomies that are associated with the production activity of a firm. In a situation of external diseconomies, private marginal cost will be lower than the social marginal cost, since the former will not take into account costs or harms caused to others. Therefore, when external diseconomies exist, equating price with marginal cost will lead to more than socially optimum level of output.



Fig.2 External Diseconomies Cause Above Pareto Optimal Output

Figure 2 shows that supply curve SS, based on private marginal costs, intersects demand curve DD at point E that determines

OQ level of output. Supply curve S'S' which considers external diseconomies and reflects social costs lies at higher level and intersects DD at point L that determines OR as socially optimum output. Thus, in case of external diseconomies, equating price with private marginal cost will result in more than socially optimum level of output RQ.

External Economies and Diseconomies in Consumption

External economies in consumption arise when consumption by a person cause beneficial effects on others. Thus, in the presence of external economies in consumption, the social utility exceeds the private utility that causes a divergence between social and private benefits.

In a situation of external economies in consumption, the demand curve for the product which is determined on the basis of private marginal utility will be lower than that based on social marginal utility. In this case the output determined on the basis of private marginal utility and demand will result in lower output than the socially optimum level.

On the other hand, when there exist external diseconomies in consumption the private marginal utility will be higher than social marginal utility, since the former will not take into account the external diseconomies. As a result the output determined on the basis of private marginal utility (benefit) will be more than the socially optimum level.

It follows form the above discussion that in the absence of externalities, all costs incurred and all benefits received by producers and consumers will be reflected in the market prices. However in the presence of externalities, the market prices are determined on the basis of private costs and the benefits will not truly reflect the social costs. Therefore, externalities cause a divergence between social and private costs as well as benefits.

5. Common Property Resources

The term 'common-property resource' or 'common-pool resource' refers to a natural or man-made resource system that is sufficiently large to make it costly (but not impossible) to exclude potential beneficiaries from obtaining benefits from its use.

A resource system can be jointly provided or produced by more than one person or firm. The process of appropriating resource units from the 'common-pool resource' (CPR) considers the multiple appropriators at once or in sequence. However, the resource units are not subject to joint use or appropriation. For example the fish harvested by one boat are not there for someone else. Thus, the resource units are not jointly used while the resource system is subject to joint use. The crowding effects and overuse problems are chronic in CPR situations.

Property rights play an important role in determining the attitude and behaviour of people towards environment, its use and management. The absence of well-defined property rights related to environmental resources has caused overexploitation, degradation, depletion and pollution.

Environmental pollution is a form of market failure due to overexploitation of resources that are held as common property or open access. Thus the market fails when property rights are inadequately specified or are not controlled by those who can benefit personally by putting the resources to their ideal use.

Public Goods

The existence of public goods provides an important basis for market failure. It is important to note that public goods are not necessarily produced by the public sector. As the ownership of certain properties vests with the government, such properties are called public goods. Two essential characteristics of public goods are that they are non-rival and non-exclusive in consumption. Two classic examples of public goods are lighthouse and national defense. The benefits of both the public goods are non-rival and non-excludable.

A more relevant example of public good related to market failure is environmental quality. Cleaner air is both non-rival and indivisible. The government incur considerable amount to clean environment and improve the quality of atmospheric air. It is impossible to exclude anybody from the consumption of cleaner air. This problem is called the free rider's problem because people cannot be excluded from consuming public goods or enjoying benefits. There is incentive for persons in these situations to free ride and enjoy benefits from reduced pollution without paying for it.

Public goods are usually characterized by the extreme degree to which they imply externalities or spillovers. Markets can only form under certain conditions, and when these conditions are absent markets may struggle to exist. The most extreme case of a missing market is the market for pure public goods because their non-rival and non-excludable characteristics prevent natural market incentives from achieving an allocative efficient outcome. Although the Pure public goods visibly provide benefits to consumers, due to several reasons the markets for these goods are not likely to form. The missing markets are the main cause for market failure.

6. Summary

Market failure is a general term that describes the situations in which market outcomes are not Pareto efficient. Markets are formed under certain conditions in the absence of which the markets struggle to exist. Market failure occurs mainly due to asymmetric information, four reasons viz. presence of externalities, common property resources and consumption of public goods. All these reasons state that the markets fail due to inefficient allocation of resources and non-rival and nonexcludable characteristics of the goods. Due to these reasons the markets for certain goods remain missing. Missing markets are the main cause for market failure.