

MARKET FAILURES

by David Butler

THE FIRST fundamental theorem of welfare economics states that under certain conditions an economy with perfect competition in all markets has equilibrium positions; that every equilibrium position is socially efficient, (i.e. Pareto optimal) and that every Pareto optimal situation corresponds to such an equilibrium position.

This exposition is in no way intended as even an approximate description of reality. It nevertheless provides a practical analytical point of departure for discussing a real economy. In other words we can grasp from this piece some of the implications of deviations from the perfect market economy model. The violation of the conditions necessary for a perfect economy, hence Pareto optimality, occur as a result of what are deemed 'market failures'. These phenomena can be categorised into six separate areas. I however propose to examine only four of these areas. Those which I shall not examine, failures arising from information imperfections and market imbalances, whilst being of no lesser importance do not present the same scope for examination.

DECREASING AVERAGE COST INDUSTRIES; ECONOMIES OF SCALE

The assumption of perfect competition used in the first theorem of welfare economics is based on the existence of a large number of firms producing a homogeneous good, each of which produces under decreasing marginal costs. Equilibrium output arises where the marginal cost of production equals the market price for the good. This situation is demonstrated in fig.1 below. The shaded area represents the producer surplus achieved at this output.

However, suppose the firm does not face increasing marginal costs. Assume that in fact it faces decreasing marginal costs. In the real world there are many industries where such a situation arises; technology may be such that average costs are decreasing over a large output interval. The automotive industry is a good example of this. Automation made feasible by the vast quantities of production has reduced substantially the average time, (and hence the average cost) of producing a car. At present the average time taken to produce a family saloon is twelve and a half hours and is falling constantly.

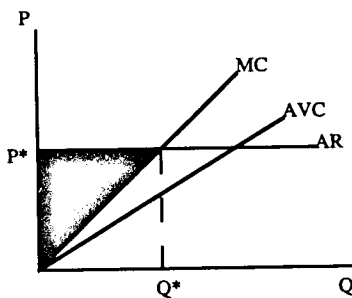


FIGURE 1

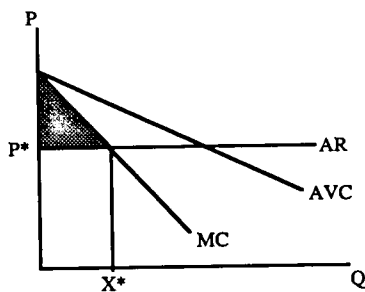


FIGURE 2

Assume constant average revenue i.e. firm is a price taker. A decreasing marginal cost curve and the average variable cost are depicted in fig.2 above. If the firm obeys the Pareto rule for optimality such that price or average revenue equals marginal cost then they will achieve a negative producer surplus. Since they will not even be able to cover their average variable costs they will cease production. Attaining the Pareto optimal level of production X^* would necessitate a subsidy, so that the firm breaks even when producing output X^* .

In the real world situation, what happens in the case of decreasing marginal costs is that these increasing returns to scale act as a barrier to entry into the marketplace, thus forming a natural monopoly. The question of whether or not the producer will behave in a monopolistic manner, implementing monopoly pricing, is ambiguous since if entry into, and exit from the market place were costless the natural monopolist, fearful of the threat of others entering, may behave competitively.

A natural monopoly may in fact imply a beneficial outcome. For example it is substantially more efficient to have one national postal system rather than a separate system operating in each district. However whilst a monopolistic, decreasing cost producer may be relatively more efficient, if the monopolist implements monopolistic pricing there still exist welfare costs associated with its existence, as I shall now demonstrate.

MONOPOLY PRICING AND THE WELFARE LOSS FROM MONOPOLIES

The reason for a welfare cost arising from a monopoly is that unregulated monopolies whether natural or otherwise will restrict output in order to attain a higher price. A monopoly producer seeking to maximise profits will produce where its marginal revenue equals its marginal cost. Under perfect competition the production equilibrium will occur where marginal revenue equals the price or

average revenue. However in a monopolistic situation the monopolist faces a downward sloping average revenue curve hence its marginal revenue will be less than its average revenue.

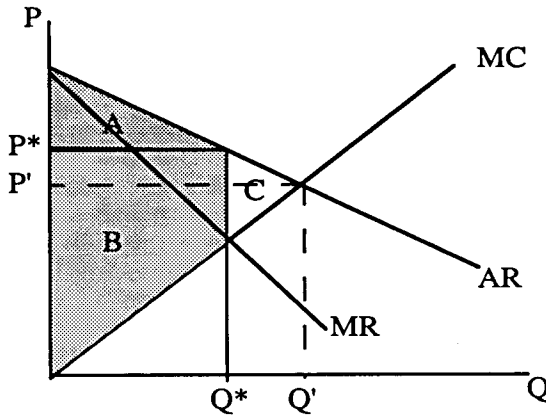


FIGURE 3

As the monopolist increases production, he knows that he must lower his price, since the average revenue or demand curve is decreasing. Therefore he will only produce a quantity equal to Q^* above (fig.3) where marginal cost equals marginal revenue, since beyond this point the cost of producing an extra unit exceeds the revenue earned from this good, yielding a loss from the production of the good (therefore there exists no incentive to produce it). The social optimal point on the other hand would be quantity Q' , where average revenue equals marginal cost. As can be seen from the diagram this yields a quantity exceeding that of Q^* . As a result of the monopolies pricing decision, the output is restricted. Therefore we must ask ourselves what is the welfare cost of this behaviour to society?

A measurement of this loss can be undertaken with reference to both consumer and producer surplus. The combined total of these at Q^* , the monopolists output, is the area $A+B$. Under the Pareto optimality condition $MC = AR$ output is Q' the total surplus now being $A+B+C$. Therefore as a result of monopoly production, the loss in surplus, translating to a loss in welfare is the area C .

Again as with decreasing cost, natural monopoly producers, one cannot say unambiguously that a monopolists' pricing decisions will be completely determined on an endogenous basis. Not only may the monopolists be fearful of the entry of others into the market, they may also be fearful of government intervention in the form of maximum pricing orders, or other such means of control. If the government believes that certain producers are exploiting their market position they may very well choose this course of action.

PUBLIC GOODS

The third feature of a real economy which leads to a market failure arises from the existence of public goods. Goods considered in the first theorem of welfare economics are characterised by the property that each unit can only be consumed by one economic agent, they are private goods. However, some goods have the property that when one person consumes them, all people can also derive benefit from them. Unlike private goods their use is non-excludable. The most common example of such a good is national defence. If resident A of a country is being protected from foreign forces then resident B of the same country is also being defended. It would be impossible to protect resident A without protecting resident B.

The second characteristic of a public good is that it does not cost anything extra for an additional individual to enjoy the benefits of the public good. There exists a zero marginal cost for allowing an additional individual to enjoy the good. Falling back upon the national defence example; it costs no more to protect one million and one individuals than one million. Under the conditions of Pareto optimality the producer must produce where the marginal cost equals average revenue, therefore since the marginal cost is zero the price charged should also be zero. However with a zero price and a non zero initial production cost output cannot be determined in the usual manner. Who will supply the good for free?

This would suggest that the market would fail to supply the Pareto optimal quantity of a good whose marginal cost is zero, or in close proximity to it. This provides a rationale for government intervention.

EXTERNALITIES

Finally I turn to the rule of externalities as a cause of market failure. In demonstrating how the market system yields a Pareto optimal equilibrium we assumed that people have selfish utility functions, that is their utility depends solely on their own consumption, and that firms' production decisions are unaffected by other firms' actions. In many cases in real economies these assumptions break down. One can demonstrate numerous examples where the actions of one individual or firm affect the behaviour of other individuals or firms. Instances where one individual's activities impose a cost on others are referred to as negative externalities, when these actions bestow a benefit upon others they are termed positive externalities.

Examining externalities we can observe two manners by which they can arise. Firstly a person's utility may depend upon the by-products produced from other individuals' consumption and which are consumed without choice by the person in question. For example smoking; many individuals' objections to others smoking arise not from the knowledge that the other individual, may be damaging

their own health, but rather due to the smoke which is produced and which they are forced to inhale.

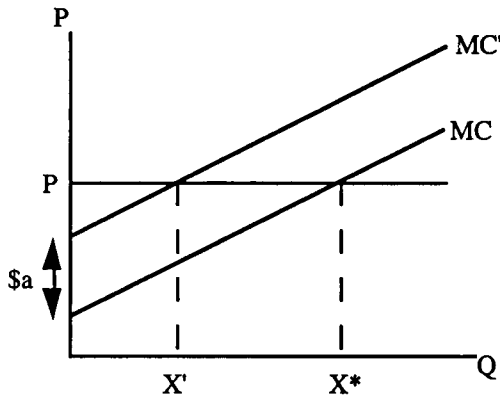


FIGURE 4

The second class of externality is that of reciprocal consumption externalities, often referred to as the problem of interdependent utility functions. Each individual's utility depends not only on their own consumption bundles but also those bundles chosen by other individuals. An example of this may include jealousy; for instance one individual's utility may be lessened due to envy if his neighbour receives a large boost in income. Conversely compassion may also be cited as an example; a person may suffer a utility loss when he sees the distress which poverty may cause to another person. However if this characteristic of interdependent utility is introduced into the welfare equation it is possible to justify almost anything, (including severe infringement of an individual's rights simply due to a community's envy) it is therefore, correctly or not, ignored.

To demonstrate how externalities lead to market failure consider fig.4 above. The marginal cost is as normal upward sloping. Assuming that the firm is in a perfectly competitive market and maximising profits, they will produce a quantity X^* such that marginal cost equals average revenue. Suppose however in the course of production, the firm emits radiation and that the cost of these emissions in the form of increased medical bills for the surrounding population is $\$a$ per unit produced. To obtain the social marginal cost of producing the commodity we must add $\$a$ to the producer's (private) marginal cost curve, shifting it from MC to MC' .

Consequently the profit maximising level of production X^* exceeds the socially optimal level X' . Hence if permitted to emit radiation the profit maximising firm produces too much of the commodity, the reason being that a part of the real

cost of production \$a per unit is an external cost, a cost not recognised by the producer. Since the producer does not bear the full cost of the negative externality which they generate they will engage in an excessive amount of production. In the case of positive externalities, where the firm does not reap the full benefits of the externalities they will engage in too little production.

As a result of the existence of externalities whether positive or negative the allocation of resources, as demonstrated above, need not be Pareto efficient, with the firm either producing too much in the case of negative externalities or too little in the case of positive externalities. This result provides widespread belief that there is a definite motive for government intervention, especially in the case of negative externalities. There are many forms which this intervention could assume. In some cases the government could attempt to regulate the activity in question through the issuing of licences, alternatively they could attempt to use the price system to penalise, perhaps even fine, those producers causing negative externalities.

CONCLUSION

The preceding text has demonstrated why a real economy may fail to arrive at an equilibrium which is Pareto efficient. The natural implication of this is that there exists a rationale for government intervention in the market place. There exists much consternation as to whether this is a valid approach to take. Firstly one must distinguish between an ideal government and a real government. Whilst an ideal government may be able to intervene and eliminate each market failure, an actual government may have no more information or knowledge about the working of the economy than anyone else would have. Also a question must be asked as to whether the government and their bureaucrats truly do attempt to maximise society's welfare or whether it is their own welfare which is first and foremost in their minds.

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