Appendix B

ALTERNATIVE FORMS OF INDUSTRY ORGANIZATION IN THE UNITED STATES

Although the general rule is that competition (despite its imperfections) is the preferred form of industry organization in the United States, there are two principal exceptions to this rule where competition cannot be expected to produce a socially desirable outcome, industries with decreasing costs and industries or governments producing certain public goods. The organization of these industries competitively would result in the misallocation of society's resources. Economic regulation of decreasing cost industries (those where important cost savings could be obtained by concentrating production in a single plant and where, up to a point, bigger plants would provide still greater cost savings as demand grows) is justified as a substitute for competition on the grounds that monopoly would otherwise naturally emerge and produce an antisocial result. This is the first major exception to the general rule that competition is preferred. Government provision of "public goods," technically defined, the second major exception, is justified on the grounds that the unsubsidized private market would not produce them at all or would produce them below the socially desirable level.

Regulated Industries

Regulated public utilities producing water, electricity, rail transportation, and local telephone service, for example, are industries where the average cost of production decreases so rapidly with the size of the firm that when such an industry has shaken out, according to a widely accepted theory, there will be only one firm left. The largest producer would be able to outcompete all others and drive them out of business. Its size would be that of the whole market, and its cost of production would be less than any potential smaller entrant. Hence new entrants would be deterred, and the firm would be a "natural monopoly." A natural monopoly has the same twin evils that all unregulated monopolies are said to be notorious for: excessive prices and inadequate output.

To be sure, natural monopolies are contestable markets in the straightforward sense that a competitor could challenge the incumbent for the whole market, but the process of contestation might be highly disruptive while it occurs, and lengthy periods of costly production at less than optimal scale might occur. When the natural monopoly was reestablished (perhaps by the new entrant), society would be in the original position of suffering the effects of monopoly.

For these reasons, the public utility industries have usually been organized in the United States as regulated monopolies within certain geographical boundaries. Prices set by a public regulatory body, are typically set under a rationale that attempts to provide investors no more than a fair return on assets and thus avoid monopoly profits.

Because prices cannot be maintained at regulated levels without controlling production to a greater or lesser degree, regulatory bodies usually also erect a rather intricate control mechanism over physical operations.

Regulation often leads to two kinds of inefficiency. First, politically motivated cross-subsidization between classes of consumers leads to wasteful consumption for those benefited, or to overcautious conservation, for those penalized. Second, the whole regulatory structure may create incentives for managers to please the regulators rather than the market. Rather large inefficiencies can develop in these circumstances.

These inefficiencies are likely to be greatest when the regulated monopolist need not fear contestation or competition at the fringes of the industry, because of regulatory controls on entry in these fringe areas. In the communications industry, for example, communications equipment manufacturers were for many years not allowed to sell telephones to consumers in competition with the manufacturing arm of the regulated monopoly. This undoubtedly retarded product development and technology absorption.

In the United States in recent years, deregulation has been embarked upon in a number of instances when opinion has shifted to the belief that competitive or contestable markets can regulate the formerly regulated industries, as in the current deregulation of long-distance communications. During the process of deregulation, cross-subsidization and inefficient production structures may become serious barriers to its completion. This is because the beneficiaries of the cross-subsidization, and many of the affected management groups, stand to lose from it and resist the changes politically.

Business entities, which would benefit from deregulation, may also muddy the waters during the period

of partial deregulation by attempting to secure cross-subsidization that had not existed before, now in the name of deregulation.

Regulation, as an alternative to competition, therefore is a difficult form of organization, both in implementing it and ending it.

Governmental Provision of Public Goods

A second type of noncompetitive industry organization is used in the United States in the case of "public goods" because competitive markets would result in the absence of production or in production at inadequate levels. "Public good" is the technical term in economic theory for a good or service for which it is impossible or undesirable for reasons of efficiency to charge consumers in the normal way.[1] Examples of public goods are streets, national defense, police services, weather forecasts, and various informational activities of government.

It may be impossible to charge for a good or service, for instance, as in the case of national defense, because a person does not have to purchase it in order to consume it. There is no way to deny people access to the service on the condition that they pay for it. Therefore there are no market signals to tell society how much to produce.

In a second case, it may be undesirable to charge for a good or service because, although it is possible to deny the consumer access if he or she does not pay, the costs of collection borne by the consumer, the producer, or society at large may be disproportionately large compared to the extra cost of providing the service to the consumer.

An example of a service of this type is the daily weather forecast. While this could be organized on a pay-TV basis, the costs of doing so are considered to be disproportionately large. First of all, the cost to the weather service of one more viewer seeing the forecast is zero. Given this fact, the collection costs that would be borne by the consumer in terms of price and inconvenience and by the pay-TV operator are obviously disproportionate to the zero cost of servicing the additional consumer,

There would also bean extra cost to society at large as well, according to prevailing belief. If the general public were not informed about weather dangers, according to this view, society as a whole would suffer avoidable costs from weather disasters. For both of these reasons, therefore, weather forecasts are provided to the public without charge.

In these examples, and in the case of public goods in general, reliance on the private market would result in production not taking place at all, or if it does take place, taking place at an inadequate level when compared to what society would be willing to pay for.

Public goods can be produced at socially efficient levels by either the government or the private sector, but since financing of production is not possible from sales revenue, production would have to be subsidized if it were to be produced by the private sector at the socially efficient level.

Mixed Public/Private Goods

Some goods and services can be part public good and part private good. This is the case when a good can be sold in the usual way by making those who "consume" it pay for it. These private purchases, potential or actual, constitute the private good part. There may also be spillover benefits to the general public from the good's consumption that cannot be charged for. These benefits constitute the public good part.

An example of this is public education. It would be possible to charge parents for educating their children and the collection costs would not be disproportionately large. The decrease in benefits to the general public that would occur, however, is widely considered to be so large that it justifies the free provision of primary and secondary education. Elementary and secondary education is, therefore, provided straightforwardly as a public good.

At the university level, however, user charges are generally imposed in public universities so as to finance at least partially the private benefits of students. Students are not allowed to attend without paying fees, but the remainder of the State universities' budgets, over and above student fees, is paid for from government tax revenues on the justification that enhanced culture and economic growth are public goods. It would not be possible to charge each member of the general public for enhanced culture and economic growth and deny them access to them if they did not pay. Public higher education is, thus, a mixed public/private good.

Marginal Cost Pricing

We can be more precise in discussing economic efficiency. Economic efficiency is defined in the textbook case as production at the level where the consumer of the last unit is willing to pay the cost of producing

[1] Public goods are also referred to by various authors as "social goods" or "collective goods."

it ("the marginal cost") but no more. We recognize it as the efficient production level when at that price and at that level there are no excess inventories and no unsatisfied potential consumers who would be willing to buy.

Larger or smaller production could not be sold at a price equal to marginal cost. Some other price would have to be charged to sell all the goods produced. This other price would either result in an economic loss to the producing entity or to consumers, including those who would be needlessly priced out of the market. In either case, there would be social loss. Although this exposition of the economic theory of production is very brief, it can be encapsuled in the the general rule that, **for** a given distribution of wealth, price should equal marginal cost for social efficiency in production.

In ordinary real-world private markets, workable competition is thought to produce prices that do not depart too far from marginal cost in the long run. This occurs because workably competitive industries, under antitrust regulation, are neither natural monopolies nor monopolies or combines based on conspiracy. At prices based on marginal cost, such industries are self-financing as well in the sense that revenues exceed costs (except during periods of industry stress such as recessions).

Decreasing-cost industries, on the other hand, are not self-financing with marginal-cost pricing. I n certain declining-cost industries, in fact, marginal cost is far enough below average cost, even in the long run, that a second strong efficiency argument (in addition to the natural-monopoly argument) can be made against unsubsidized private provision of the good or service. If the price charged to all consumers is set equal to the average cost, the pricing rule for break-even operation when only a single price is charged, the last consumer would have to pay more than the cost of servicing him or her. In this case a number of potential consumers, who should have been serviced if the industry were operating efficiently, will have been priced out of the market. Production would then be higher cost than desirable from efficiency considerations because the plant would be too small. Thus, resources would be wasted.

If the industry were to be self-financing, however, the price would have to be at least equal to the average cost, even though the extra cost of servicing a customer might be well below the average cost. Decreasing cost industries, therefore, **need to be subsidized,** if production is to be at the economically efficient level, where the good is priced equal to the cost of producing the last unit (the marginal cost). This **subsidy** can be justified as a means of providing a public good distributed free to the public–the public good of increased economic efficiency.

While the subsidization of private, decreasing cost industries has in some instances been done, it is ordinarily not politically feasible to do it and, **when** questions of the distribution of income and wealth are considered, may indeed not be socially desirable. Other mechanisms, to be discussed below, are used instead to ameliorate the efficiency loss that comes from charging users a price based on average cost rather than on marginal cost,

The Functional Similarity of Mixed Public/Private Goods and Goods of Decreasing Cost Industries

In both public-good and decreasing-cost industries, the cost of servicing an additional consumer is well below the average cost of servicing all consumers. In the case of the pure public good, the cost of servicing an additional consumer is zero; in the case of mixed public/private goods, the marginal cost may be significantly below average cost. The same situation occurs in the case of decreasing-cost industries. Hence, the problem of determining industry organization and pricing strategy is functionally the same **in both cases.**

industry-Organ ization/Pricing Strategies

The problem of public-good/decreasi rig-cost industries has **been handled** in American industrial organization in three ways: First, when the misallocation of social resources is thought to be small, the solution is to ignore the problem, since the cures, government regulation and subsidy, are themselves difficult social processes with which to achieve economic efficiency. Private competitive organization continues to be the norm in these cases. On the other hand, when the divergence between long-run marginal cost and long-run average cost is so large that it cannot be ignored, two principal alternative methods have traditionally been used in the United States.

The first is to subsidize production, which then may be carried out either by a governmental or private entity. Subsidization, of course, has political limits having to do with the distribution of benefits unevenly across social groups. It may be thought of as unfair and, hence, politically unsupportable. Nevertheless, the production of a large fraction of the gross national product is, in fact, subsidized by government–from space research and development to interstate highways to public education. Depending on the item in-

volved, the unfairness of uneven distribution of benefits in these cases is apparently considered minor, unavoidable, worth it, or compensated for by the progressive tax system.

The **second method** used to ameliorate the problem is to mandate certain kinds of nonmarket pricing by regulation. These special pricing schemes are used where subsidization is ruled out and total costs must be recovered from consumers but where the regulatory agency desires to minimize the efficiency drawbacks of average-cost pricing.

As a condition of survival, private firms do recover total costs over the long run. The norm in the general private economy is also that consumers are charged a single price (for the same good or service in the same quantity) or something close to it depending on the degree of monopoly power exercised by firms in the market. Charging a single price to all consumers may be inefficient for decreasing cost industries, however, when total cost recovery is specified. To try and ameliorate this inefficiency, pricing schemes that involve different prices for different customers or different prices for the first and last units consumed by a given consumer, have commonly been prescribed for regulated utilities. The idea is to avoid pricing some of the consumption out of the market that would have been attracted by marginal cost pricing but still recover total costs from consumers.

Such devices as two-part tariffs, where there is a certain monthly charge but where price per unit consumed is low, and price discrimination, where different classes of customers are charged different rates, are among the devices use to keep production and consumption closer to optimal under full cost recovery than it would be under unitary pricing.

Space Markets Can Be Analyzed With These Concepts

Markets for space-related goods and services can be analyzed according to these concepts. Among the equipment and services treated in this study—in space transportation, materials processing, satellite communications, and remote sensing—can be found examples of normal goods, public goods, and decreasing-cost, industry goods. As “commercialization” alternatives are considered, this mode of analysis may be useful in formulating public policy toward industrial organization in each case.