

PUBLIC GOODS, PRIVATE GOODS, AND AMBIGUOUS GOODS

IF a certain service can be rendered either in: (1) a marketing mode, whereby at the supplier's option any particular individual in a specified group of individuals may be either admitted to or excluded from enjoyment of the service; or in (2) a non-marketing mode, whereby no particular individual in the group can be so admitted or excluded, is this service a public good or a private good?

In the basic literature a public good has been defined to be such that it is literally impossible for the supplier to exclude potential consumers.¹ It is therefore implied that marketing costs are infinite, and the non-marketing mode should obviously be employed. It has often been noted, however, that price-exclusion is seldom, if ever, literally impossible.² Except in extreme cases, such as that of national defence, the problem in practice is to decide when exclusion is economic.

If, for example, a certain stretch of highway can be made either a toll road or a free road is it a public good or a private good? If a lighthouse beam can be scrambled so that only ships that purchase an unscrambler can receive the beam, how shall the service rendered by the lighthouse be classified? If an increment of protection against crime can be produced, either by increasing the police patrol or by installing additional locks and burglar alarms, is that service, with respect to that increment, a public or a private good? To base the classification on whether the service is in fact being rendered in the marketing mode is to suggest no general principle for distinguishing public goods from private goods. It also opens the way to accepting ill-considered actions as a basis for classification.

Relative cost might appear to be the answer: the service is a public good at a particular time and place if, regardless of how it is in fact being supplied, it can be rendered more cheaply in a manner whereby no particular individual in the group can be excluded. But this test is too narrow, for it excludes differences in demand under the two modes, differences that arise for the following reasons, and that make for different optimal levels of output and hence for differences in marginal cost and in average cost that arise at least in part because the amount produced is not the same.

Demand for the service will not, save by coincidence, be the same under

¹ See, especially, Paul A. Samuelson, "The Pure Theory of Public Expenditure," *Review of Economics and Statistics*, November 1954, and "Diagrammatic Exposition of A Theory of Public Expenditure," *Review of Economics and Statistics*, November 1955, and Richard A. Musgrave, *The Theory of Public Finance* (New York: McGraw Hill, 1959), pp. 8-10.

² See, for example, J. G. Head, "Public Goods and Public Policy," *Public Finance*, No. 3, 1962, pp. 205-8.

the two modes. Under the non-marketing (non-excludability) technique the maximum amount that an individual is willing to pay for the increment in question of the service is added to the similar maximum amounts with respect to each of the other potential consumers of the service to ascertain whether this increment puts the service at, above or below a Pareto-optimum level. The particular pattern of differential pricing that eventuates, over consumers and over increments of the service, may be any one of an indefinite number of patterns, and the particular pattern arrived at, by bargaining or under institutional rules (for example, selection of a certain kind of tax to finance the service) or by other means, will itself help set the optimum level of the service. Under the marketing technique, on the other hand, optimal pricing calls for uniform pricing over consumers and increments of service.¹ In other words, and over simplifying a bit, individual demand curves are added vertically in ascertaining aggregate demand for the service if it is rendered in a non-marketing mode, horizontally if it is rendered in a marketing, *i.e.*, exclusion, mode.² The influence on the optimal level of service that is exercised by differential pricing over increments and consumers, present when the good is distributed in the non-marketing mode but absent under the marketing mode,³ indicates that the optimal level will differ under the two modes. Indeed, since there are many such patterns of differential pricing possible, there are correspondingly many different optimal levels of the service under the non-marketing mode.

If, then, a Pareto-optimal level of the service can be different under the non-marketing mode from that reached under the marketing mode the average cost and also the marginal cost of the service at the respective optimal levels could well be higher under one mode than under the other, even when they would be lower under that mode in a comparison based on the same level of output for both modes.

If the cost comparison is to be based on costs at two different optimal levels of service, rather than on costs at a single level of service, demand is evidently deemed relevant, at least indirectly, in the classification of the service as a private good or a public good. The degree to which the demand for the service will differ under the two modes, and even the sign of the difference, will depend on the distribution of factor ownership, the pattern of transfer payments and of the taxes that finance them, and on the patterns in which the infra-marginal costs of other non-marketed goods are being shared. When this distribution and these patterns are assumed to be given, in the analysis to follow, these assumptions will be subsumed under the phrase "a given distribution of disposable income."

¹ Differential pricing over consumers (but not necessarily over increments) is required for optimal pricing if the service is a collective consumption good as defined below. See John G. Head, "The Theory of Public Goods," *Rivista di Diritto Finanziario e Scienza delle Finanze*, June 1968.

² But if it is a collective-consumption good, as defined below, the curves must be added vertically even if the good is marketed.

³ But see note 1 above.

A more general criterion than cost is clearly necessary; it may be stated in terms of economic efficiency. When a service can be rendered in either the marketing mode or the non-marketing mode it is a public good if it can be rendered more efficiently in the latter mode. Efficiency is here understood in welfare terms. A narrow and a broad definition in these terms may be distinguished, in this context.

Under the narrow version the test is as follows. For any given distribution of disposable income the service in question is unambiguously a public good if, and only if, under any pattern whatsoever of sharing its infra-marginal costs under the non-marketing mode it is impossible to make everyone as well off by resort to the marketing mode.

Under the broader version of the efficiency test a service is a public good if, and only if, the result just stipulated obtains no matter what the distribution of disposable income, as well as no matter how the infra-marginal costs of the service in question are to be shared.

Similarly, a good is unambiguously a private good under this broader version of the efficiency test if, and only if, when it is rendered in the marketing mode it is impossible to make everyone as well off by resort to the non-marketing mode, whatever the distribution of disposable income, as well as whatever pattern would be selected for covering the infra-marginal costs of the good in question if it were supplied in the non-marketing mode.

Because of its more general applicability, this broader version will be implied in what follows.¹

Some services will fit neither the definition just given for a public good nor that for a private good. They will be more efficiently rendered under the marketing mode or under the non-marketing mode, depending on how disposable income is distributed and on how infra-marginal costs are being shared with respect to the service in question, if it is rendered in the non-marketing mode. Such a service is here termed an ambiguous type of good: neither unambiguously private nor unambiguously public.

Fig. 1 is drawn for the ambiguous type of good, under the broader version of the efficiency test. The figure shows combinations of utility attainable by two persons, *A* and *B*. If the service in question is supplied in the non-marketing (*i.e.*, non-exclusion) mode the curve *GG'* is the utility frontier. For any given distribution of disposable income, and for any one pattern of sharing of infra-marginal costs for the good in question, there is a corresponding point on *GG'* that represents a Pareto optimum. This optimum reflects, of course, a certain level of this service and of each of all the other goods and services (these levels are not indicated in any way by the figure).

If the service in question is rendered in the marketing mode the curve

¹ This is essentially the efficiency criterion developed by Samuelson in the course of his well-known critical survey of the tests suggested by Kaldor, Hicks, Scitovsky and others. See Paul A. Samuelson, "Evaluation of Real National Income," *Oxford Economic Papers*, 1950, pp. 1-29.

MM' is the utility frontier. For any given distribution of disposable income there is a point on MM' that represents a Pareto optimum.¹

The utility frontiers of Fig. 1 imply that the mechanism used, the market mechanism or the non-market mechanism, functions perfectly, though not necessarily without cost.² Thus if the service is a collective-consumption good, as defined below, the MM' frontier will be reached only if the marketing is in the hands of an omniscient discriminating monopolist. If it is not a collective-consumption good perfect competition is required. And the GG'

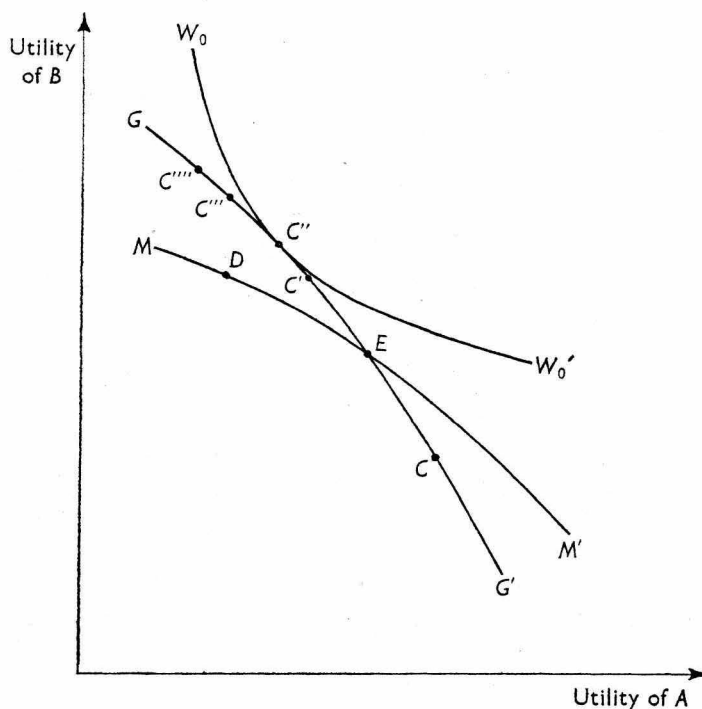


FIG. 1.

curve assumes away all the practical problems involved in reaching the Paretian frontier through the political process. Hence a service that is classified as a public good in terms of the present analysis might, in view of imperfections, be rendered less inefficiently in the marketing mode. The

¹ If the good being marketed is a collective-consumption good as defined below the MM' frontier, which implies optimal pricing, reflects differential pricing over consumers. See note 1, p. 568.

² "Perfectly" implies perfect knowledge, *i.e.*, no mistakes, and "costs" include mechanism costs (costs of setting prices and excluding those who will not pay, and costs of levying and collecting taxes, including excess-burden costs). It is clear that the concept of an ambiguous good is in no way dependent on the presence of imperfections (mistakes). If imperfections are assumed, new curves must be drawn, which will be actuality loci rather than utility possibility loci (see J. de V. Graaff, *Theoretical Welfare Economics* (Cambridge, England: University Press, 1957), p. 76), and these loci, too, of course, may intersect.

first step, however, must be to classify under an assumption that each mode is used in the best manner conceivable.

If, as in Fig. 1, the curves GG' and MM' intersect, the service is an ambiguous good under the broader definition of the efficiency test. This can be seen as follows. For points on the GG' curve from G to E it is evidently impossible to make everyone as well off by resort to the marketing mode, since the MM' curve lies entirely inside the GG' curve over that range. For patterns of distribution of disposable income, and infra-marginal cost sharing of the good in question leading to points in this range, the good thus appears to be public. However, for points on the MM' curve from M' to E , it is impossible to make everyone as well off by resort to the non-marketing mode. In this range the good appears to be private. When the patterns of distribution of disposable income and the sharing of infra-marginal costs of the good in question are free to vary without limit, as under the broader version of the efficiency test, it is therefore clear that no unambiguous classification is possible.^{1, 2}

If, in contrast to Fig. 1, GG' lies at all points outside MM' , that is, further from the origin than MM' , the service is unambiguously a public good. Whatever the point selected on GG' , there is then no distribution of disposable income such that, if the marketing mode is adopted, A and B will land at some point on MM' , where they will both be at least as well off as they are at their point on GG' .

Only if a more comprehensive, and generally more controversial, criterion is employed, embodying distributional as well as efficiency considerations, is it possible to avoid the ambiguity illustrated by the curves GG' and MM' in Fig. 1. If, for example, a social-welfare function is provided the service can be classified as public or private according as the highest social welfare contour achievable under either mode is tangent to GG' or MM' . This possibility is illustrated by the social-welfare contour W_0W_0' in Fig. 1, which is the highest one attainable and is tangent to GG' (at C''). The service is therefore public in this more controversial sense.

The analysis above applies whether or not the service is a collective-consumption good in the sense that the total cost of supplying the service is unchanged when the number of individuals making use of the service rises

¹ It is interesting to note that there may be a similar ambiguity in a pure cost test where the production frontiers for the two modes intersect.

² Fig. 1 does not show whether, for any given distribution of disposable income and given infra-marginal cost-sharing pattern along the GG' curve for the service in question, A or B will gain or lose if the non-marketing mode is substituted for the marketing mode. Let that distribution be such that under the marketing mode A and B find themselves at point D . What points they could reach on GG' , under that distribution, is not shown by this figure. It is possible, for example, that whatever the infra-marginal pattern of sharing of costs for this service in question (if it is to be rendered in the non-marketing mode), that is, whatever the particular point on GG' that is selected out of all the points achievable under the given distribution of disposable income, the point would be so far south on GG' (south of C' , e.g., at C) that B would be worse off than he is at D . Or all such points might, unhappily for A , turn out to be north-west of C''' , e.g., C'''' .

or falls. A performance in a theatre, within capacity limits (and abstracting from differences in ease of viewing and hearing at various locations within the theatre), is a collective-consumption service, but one that is dispensed in the marketing mode. An open-air fireworks display is a collective-consumption good that is dispensed in the non-marketing (non-excludable) mode. A given level of protection from crime, measured, say, by the probability of one's being the victim of a criminal, can be maintained in a given area by a police force only at increasing total cost (by adding more patrolmen, etc.) if the population of the area increases, yet the service is being dispensed in a non-marketing mode: given the manner in which it is being dispensed, the service cannot be denied wholly, at the will of the supplier, to any particular individual in the group.¹

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¹ The concept of a non-collective-consumption service (*i.e.*, one for which the marginal cost of affording the service to one more consumer is positive) that is nevertheless rendered in a non-marketing mode is developed in Carl S. Shoup, *Public Finance* (Chicago: Aldine Publishing Company, 1969), Chapter 4.