Theory of Public Goods

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Introduction

Economics, primarily deals with the efficient use of resources in satisfying the consumer wants. If the economy consisted of only one consumer, the meaning of efficiency, provided the preferences of that consumer, will be to produce that output mix which would maximize his satisfaction. Further separating the problem of efficient allocation from that of distribution, a narrower concept of efficiency popularly known as Pareto Efficiency has been developed which simply states that " A given economic arrangement is said to be efficient if there can be no rearrangement which will leave someone better off without worsening the position of others.

Efficiency Rules for Private Goods and Social Goods

Certain conditions have been laid down, fulfillment of which will ensure efficient use of resources:

- Efficiency requires that any given amount of X commodity should be produced in such a manner as to permit the largest possible amount of Y commodity to be produced at the same time, and vice-versa. This condition holds both for public and private goods
- The marginal rate of substitution in consumption between goods X and Y must be the same for consumers A and B. This means that the rate at which A and B will be willing to trade the last unit of X for additional units of Y should be the same
- The marginal rate of substitution of X for Y in consumption should be the same as their marginal rate of transformation in production

As stated above condition 1 applies for both social and private goods. But in case of social goods condition 2 and 3 will change. Since different consumers may not consume same amount of private goods, their marginal rate o substitution of social for private goods may differ. Since marginal rate of transformation is same for all, it is no longer possible that the two rates of substitution should be equal for all consumers. Therefore, efficiency rule will now state that there should be equality between marginal rate of transformation in production and the sum of consumer's marginal rates of substitution in consumption.

Theory of Public Goods

The efficient provision of social goods require us to start with assuming that there is only one social good S and one private good X being produced in the society. The consumer is omniscient planner and is capable of determining efficient set of solutions. The solution and hereby the theory was firstly developed by Prof. Samuelson.

The theory of public goods as propounded by Prof. Samuelson is hereby explained:



Fig 1: Social and private goods in general equilibrium

The production possibility curve DC in the upper part of the figure records the mixes of public good S and private good X that is produced with available resources. The axes on the second graph shows the amount of X and S consumed by the individual A and the axes on the last graph shows the amount of S and X consumed by individual B.

To start with let us suppose that consumer A is at point G in the second graph consuming OF of S and FG of X. From the first graph it is clear that the efficient output mix consists of OF of S and FE of X. Since FG of X is consumed by A, the amount left for B is FE - FG = FH, placing B at point H in the last graph of the panel.

Let us chose a particular level of welfare for consumer A denoted by A's indifference curve i_{a2} in the second graph. Further when A is at point G, consumer B will be at point H in the lower panel. If we move along this curve for consumer A we will get points P, T and V. The corresponding points for consumer B is L, Z and K. Since all point along curve i_{a2} are equally good for consumer A, welfare is maximised by choosing the points which leaves B best off and this is achieved at point L where curve ULK is tangent to B's indifference curve i_{b4} . This is the highest indifference curve which consumer B can enjoy while remaining on LZK. Thus if consumer A is on indifference curve i_{a2} then the best solution is which leaves Consumer A at point P and consumer B at point L with total output, including ON of S and MN of X which is divided between consumer A and B. Hence A receives NP of X and B receives NL of X.

Choice of Optimum

The welfare levels achieved by consumer A and consumer B under various efficient solutions may be recorded on a utility frontier as shown in the graph below. Given the social welfare function we can obtain the pattern of indifference curves i_s where each curve shows a mix of welfare derived by consumer A and B (originating from the consumption of private goods and social goods) which from society's point are equally good. B^{*} thus emerges as the best of all possible solutions. This solution simultaneously determines the output mix between social good S and private good X and their division among consumer A and B.



Fig 2: The distribution choice