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COMPARING UTILITY FUNCTIONS  
IN EFFICIENCY TERMS

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## ABSTRACT

This paper argues that there exists a general class of situations in which utility functions can be compared on efficiency grounds. That is, there is a significant sense in which some utility functions can be said to be superior, in Paretian efficiency terms, to some others; the key variable is the existence of real externalities. Our conclusion is that the range of issues susceptible to analysis and evaluation in economic terms is broader than is usually thought to be the case.

## COMPARING UTILITY FUNCTIONS IN EFFICIENCY TERMS

### I.

This paper argues that there exists a general class of situations in which utility functions can be compared on efficiency grounds. That is, there is a significant sense in which some utility functions can be said to be superior, in Paretian efficiency terms, to some others; the key variable is the existence of real externalities. Our conclusion is that the range of issues susceptible to analysis and evaluation in economic terms is broader than is usually thought to be the case.

Much of modern theoretic welfare economics hinges on the acceptance of the view that utility functions cannot be assessed except in ethical -- and, hence, "unscientific" -- terms. Having accepted an individualistic ethic, we economists have concluded that one utility function cannot be said to be superior to another without invoking a controversial value judgment. Being hesitant or unwilling to compare utility functions, economists have restricted greatly the range of issues susceptible to analysis in allocative efficiency terms.

The conventional policy recommendation suggested by economists for dealing with real externalities is to levy taxes or subsidies in order to encourage or discourage the externality-generating behavior. There are costs, however, of using the tax-subsidy approach to achieving optimality. There are costs of obtaining the information necessary for determining the optimal level (or structure) of the tax or subsidy; there are costs of developing mechanisms to actually levy the tax or provide the payments; there are costs of determining which specific persons or firms to tax or subsidize;

and there are costs of enforcing agreements to alter behavior in response to the tax or subsidy. Given such costs, we can inquire about the cost of alternative--nontax, nonsubsidy--means for bringing about an internalization of the externalities.

One alternative is to devote resources to the shaping or development of utility functions.<sup>1</sup> If individuals' utility functions were not of the "conventional" economic-man type--in which utility depends only on one's own consumption bundle (the usual neoclassical specification)--but were such as to take into account the real costs or benefits of actions imposed on others (e.g., via pollution, or via providing misinformation about product quality)--the "internalized" type--then, the economy could, in principle, achieve the same allocation of resources with the internalized utility functions as it would through the tax-subsidy route, with the conventional utility functions, at least insofar as the individuals were aware of the external effects they were causing.<sup>2</sup> It might, or might not be, less costly in real terms to influence the manner in which utility functions are developed than it is to use taxes and subsidies in order to alter behavior. In any case, we can examine, logically, the relative costs of alternative means for achieving a given end, namely, the internalization of externalities--(a) through the tax-subsidy route, or (b) through the route of shaping utility functions; and, therefore, it is possible, depending on factual conditions, to conclude that it is efficient (in the Pareto sense) to devote resources to shaping utility functions.<sup>3</sup> Hence, the internalized type of utility function--which includes as an argument the real effect of one's actions on other production and consumption units--could be superior, in efficiency terms to the conventional economic-man utility function. Thus, the efficiency of two different utility functions can sometimes be compared.<sup>4</sup> This is not to say that it is

efficient to shape utility functions; that is a factual matter. The point is that such a conclusion is possible, and it involves a comparison--in a comparative statics efficiency sense--of alternative utility functions.

It may seem strange to the reader, who is accustomed to the view that such a comparison of utility functions is not possible, to be asked to accept the comparability argument. In section II, below, it will be shown that comparability is possible in a particular sense that is, in fact, familiar in a different context, index numbers.

Another way to present the analysis above is to consider the case of "young children," whom we may define as persons whose adult utility functions are yet to be shaped. "Society"--that is, other people--can and does make decisions regarding the development of these utility functions. In effect, we might assume that a child is born with a "blank" utility function or that society acts as if that is the case. The educational system and the religious system, for example, can be (and are) used to shape preferences. The argument developed in this paper is that a social choice in favor of raising children to have the internalized type of utility function could be (but not necessarily is) superior to the narrow type, in the Pareto efficiency sense, that everyone could be better off if they acted according to the internalized-type utility function, where "better off" is evaluated relative to each type of utility function.

If we consider the case of "adults"--persons whose utility functions have already been essentially shaped--then, the case for a program to "educate" people so as to alter their utility functions can be thought of as a subsidy to encourage investment in internalized utility functions. Such a subsidy would be a socially efficient investment if, but only if, it succeeded in getting people to accept voluntarily the education, or the

religious or other training, that would lead to the adoption of internalized utility functions.

The advantages of the kind of behavior described here as the internalized type have been recognized widely, not only in the literature of economics, but elsewhere--for example, in philosophy and religion. This paper extends that analysis to show that the concept of economic efficiency can be applied, under certain circumstances, to choice among forms of utility functions and to actions involving the use of resources to shape or re-shape utility functions.

The argument may be restated in the following comparative statics framework: Consider state 1, in which each person has a "conventional" utility function (possessing the usual regularity properties) of the form:

$U_n = U_n (X_{1n}, X_{2n}, \dots, X_{kn})$ , where the  $X_{kn}$  are the quantities of good  $k$  obtained by person  $n$ ; and, alternatively, state 2, in which utility functions were of the form:

$$U_n = U_n^1 (X_{1n}, X_{2n}, \dots, X_{kn}; Y_j),$$

where  $Y$  is a term reflecting the losses or gains to others,  $j$ , from person  $n$ 's activities. It may be possible to compare the two states of the world resulting from the behavior of people with each of the two types of utility functions. In general, it can be said that if all--or even some--persons had optimally internalized utility functions, which internalized what would otherwise be real externalities, it would be possible, conceptually, for one person to be "better off" and no one worse off than in the situation of conventional narrow-economic-man utility functions, as long as the real cost of conventional, tax-subsidy or other internalization schemes is not zero. Note, however, that to say that all individuals could be better off is not to say that all actually would be better off if they acted as if they had internalized type utility functions.<sup>5</sup>

## II.

It is important to emphasize that our statement that an (optimally) internalized utility function would be preferred--in the comparative-static efficiency sense--to a narrow utility function, passes a base reversal test; that is, it is true whichever utility function is employed as the basis for comparison. That is, two propositions hold: (1) A society of persons with narrow utility functions could be better off, even in terms of their individual narrow self-interests, if the individuals acted as if they had internalized utility functions. By eliminating behavior that bestows private benefits at the expense of even greater real external costs, the adoption of optimally internalized utility functions would increase the economic welfare potential of all individuals--even with "welfare" evaluated in terms of their narrow-economic-man utility functions. This, indeed, is precisely the basis for the conventional argument in favor of taxes and subsidies to induce internalization of marginal externalities. (2) At the same time, if people actually had internalized utility functions, they could, of course, be better off in terms of those utility functions, if they acted so as to maximize their internalized utility functions than if they behaved according to the dictates of narrow utility functions.

As with other "comparability" situations, such as changes in "price levels" over time, the approach being suggested here involves comparing two situations by utilizing either the initial period or the final period "weights" as a base. If utility possibilities were greater when people behaved "altruistically," in the internalized utility function sense, whichever utility functions were used as a gauge--narrow or internalized--then we could say that potential utility was greater with the internalized behavior. In such a case, internalized utility functions would be superior, in the efficiency



sense, to narrow utility functions; everyone could be "better off" if internalized utility functions were adopted.

To illustrate the possible efficiency superiority of internalized utility functions in the real world context of positive costs of levying and enforcing taxes and subsidies, consider the problem of littering. Here is a case in which the person who litters obtains private benefits by imposing real costs on others. Given the high cost of enforcement of anti-litter ordinances relative to the magnitude of the marginal externality from each act of littering, society appears destined to suffer with litter if people act in narrow self-interest terms. If, however, some or all persons had been inculcated with values that produced an approximation to optimally internalized utility functions, the total amount of litter would decline and hence, there would occur an increase in aggregate potential economic welfare for the society--assuming that the cost of shaping the utility functions was not excessive. The point is not that it necessarily would be efficient to develop the more internalized utility functions, but only that it could be, and, hence, that comparability in efficiency terms is possible.

The "cost" of shaping (or even changing) utility functions in the internalized form rather than in the narrow form is conceived as involving only resource costs of essentially an educational-persuasive type. We assume that there are no "regret" costs, no utility losses associated with unhappiness about having one type of utility function rather than another. Or to put the matter another way, individuals are assumed not to have a higher-level utility function that specifies the kind of utility function they would like to have.

The economic benefits from acceptance of the Ten Commandments, for example, are doubtless enormous compared to a situation in which people

refrained from stealing, killing, and so forth, only because of their narrow self-interest, including the probability distribution of penalties from law violation. It is, of course, not clear what the net benefits would be from efforts to shape utility functions so as to obtain adherence to a rule discouraging littering or otherwise imposing excessive (inefficient) real externalities. To say it is not clear, however, is to say that resources devoted to developing utility functions that include such an argument could be efficient, and that possibility--with the comparability it implies--is all that is being contended here.<sup>6</sup>

The preceding analysis suggests that there exists a subset of all utility functions that, passing the base reversal test, may be termed Pareto-optimal utility functions: utility functions may be said to be Pareto-optimal if no change in one person's utility functions can make that person better off without making some other person worse off, given the state of technology and the endowments of resources. If each individual's utility function could be shaped--e.g., through education--so as to reflect an increase in satisfaction from avoiding behavior that is disliked by other people--that is, from avoiding behavior that enters other persons' utility functions negatively, and if this could be done at a resource cost less than the subsequent benefits from the adoption of internalized rather than narrow utility functions, then the narrow functions would be Pareto non-optimal and the internalized functions would be superior.

Recognition of the possibilities of comparing utility functions in conventional economic-efficiency terms, and of shaping, or reshaping, utility functions as a sometimes-efficient alternative to taxes, subsidies, or regulation, may permit expansion of the domain of policy statements that economists can make while retaining our familiar Pareto welfare economic framework.

REFERENCES

Arrow, Kenneth J., "Social Responsibility and Economic Efficiency,"  
Public Policy, (Summer 1973): 303-317.

Rawls, John, A Theory of Justice, (Cambridge, Mass: Belknap Press, Harvard  
University Press, 1971).

## NOTES

<sup>1</sup>Kenneth Arrow has implicitly recognized this in the context of the development of "ethical codes." He has argued that "ethical codes can contribute to economic efficiency" (p. 317). He did not point out explicitly, however, that the acceptance of ethical codes involves shaping or altering utility functions, and thus, to say that ethical codes can contribute to efficiency is equivalent to saying that some utility functions (those that reflect acceptance of certain ethical codes) are superior in efficiency terms to others. It is also equivalent to saying that it can be efficient to use resources for gaining acceptance of ethical codes and, thus, to shape utility functions.

Arrow addressed his remarks to situations involving the transmission of information, but his argument actually applies more broadly to all real externality situations. That is, it applies to actions by one person that result in the occurrence of real benefits or costs for others, without those benefits or costs being taken into account by the person causing them. "Social Responsibility and Economic Efficiency" Public Policy (Summer 1973): 303-317.

<sup>2</sup>An "internalized" utility function is one which includes as a positive argument either (1) the utility of other people, (2) the quality of being "honest," or (3) the adherence to a set of social norms or ethical codes of conduct that are equivalent to arguments 1 or 2. I do not offer this definition as a strict, rigorous one, but as an indication of the direction that such a definition might take.

<sup>3</sup>Indeed, society does engage in such activity--e.g., via "public interest" advertising against littering. The point is that economists can, while remaining true to the neo-classical tradition, consider the efficiency of such efforts.

<sup>4</sup>As John Rawls has put it, "...social cooperation makes possible a better life for all than they would have if each were to live solely by his own efforts" (p.4). Insofar as this is true, the development of utility functions that enhance social cooperation can be efficient. "A Theory of Justice" (Cambridge, Mass: Belknap Press, Harvard University Press, 1971).

<sup>5</sup>If some persons adopted internalized utility functions while others did not, the former group might, or might not, actually be better off unless compensation were paid, but such redistributational considerations are separable from efficiency considerations. With respect to efficiency, the argument here is analogous to the conventional "second-best" analysis; just as allocative efficiency is not necessarily enhanced when one sector of an imperfectly competitive economy becomes more competitive, so it is not necessarily efficient when one subset of the population adopts internalized utility functions.

<sup>6</sup>The relationship between molding utility functions and "thought control" is complex and certainly important, but beyond the scope of this paper.