

THE SUBOPTIMALITY OF EFFICIENCY

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The suboptimality of efficiency - Abstract

It is standard practice for economists to make policy recommendations on the basis of efficiency, that is maximization of aggregate income at the prices that would prevail in a competitive equilibrium. The purpose of this article is to show that in the absence of lump-sum taxes and transfers, the use of some instruments to pursue efficiency and others to pursue equity is never justified. For any outcome attained using such a division, there is a Pareto-superior feasible outcome. Unlike the hypothetical Pareto-improvements used to justify the efficiency approach, this Pareto-superior outcome can be attained using available policies.

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THE SUBOPTIMALITY OF EFFICIENCY

It is standard practice for economists to make policy recommendations on the basis of efficiency, that is maximization of aggregate income at the prices that would prevail in a competitive equilibrium. The neglect of distributional or 'equity' concerns is normally justified on the basis that such concerns are more appropriately dealt with through the tax-transfer system. A formal justification of this approach is given by the potential Pareto-improvement criterion, which states that, if (lump-sum) compensation of the losers from any change is feasible, while leaving the gainers better off, the change is desirable.

Implicit in the formal argument is the assumption that lump-sum compensation is feasible. Obviously this assumption is not satisfied in most real-world policy problems. However, it is often assumed that, even if taxes and transfers are not lump-sum, there is some sense in which they are superior to changes in general economic policies as instruments for addressing equity concerns. Thus, a focus on efficiency is justified.

The purpose of this article is to show that in the absence of lump-sum taxes and transfers, the use of some instruments to pursue efficiency and others to pursue equity is never justified. For any outcome attained using such a division, there is a Pareto-superior feasible outcome. Unlike the hypothetical Pareto-improvements used to justify the efficiency approach, this Pareto-superior outcome can be attained using available policies.

The critical flaw in the reasoning leading to the efficiency/equity distinction is a failure to distinguish between average and marginal costs. It may well be true that, on average, the tax/transfer system can redistribute income more effectively than any given setting of general economic policies. However, this will not be true at the margin if general economic policies are chosen to maximize efficiency. Since redistribution through the tax system is costly, it is desirable at the margin that general economic policies should be designed with distributional objectives in mind.

The Model

We consider an economy with N consumers. The welfare of consumer i is determined by consumption of a single Hicksian composite good x_i .

Governments have available two sets of policy instruments — general policies and tax policies (taken broadly to include negative taxes and transfers). To every setting of general policies corresponds a vector $\mathbf{y} = (y_1, y_2, \dots, y_N)$ where y_i is the pre-tax income of individual i . The set of feasible general policies may be summarized by the set $Y \subseteq \mathfrak{R}^N$ of feasible pre-tax income vectors. We assume

Assumption 1: Y is a smooth, compact, strictly convex set.

To every setting of tax policies, there corresponds a vector $\mathbf{t} = (t_1, t_2, \dots, t_N)$ of tax payments. Consumption for individual i is given by

$$x_i = y_i - t_i$$

Similarly, the set of feasible tax policies may be summarized by the set T of feasible tax payment vectors. We assume that

Assumption 2: T is a smooth, compact, strictly convex set such that $\mathbf{0} \in T$.

More significantly, we assume that redistribution through the tax system is always costly i.e.

Assumption 3: If $\mathbf{t} \neq \mathbf{0} \in T$, $\sum_{i=1}^N t_i > 0$.

Definition 1: A general policy vector $\mathbf{y} \in Y$ satisfies the efficiency rule if there exists no \mathbf{y}' with $\sum_{i=1}^N y_i < \sum_{i=1}^N y'_i$.

Consider the policy-makers problem of choosing \mathbf{y} , \mathbf{t} to maximize some social welfare function $V(x_1, x_2 \dots x_N)$ strictly increasing in each of its arguments.

Definition 2: A pair (\mathbf{y}, \mathbf{t}) satisfies the efficiency-equity rule for a given welfare function V if

- (i) \mathbf{y} satisfies the efficiency rule
- (ii) $\mathbf{t} \in \operatorname{argmax} \{V(\mathbf{y} - \mathbf{t}) : \mathbf{t} \in T\}$

Definition 3: A pair (\mathbf{y}, \mathbf{t}) is (strongly) Pareto-dominated if there exist $\mathbf{y}' \in Y$, $\mathbf{t}' \in T$ such that $y'_i - t'_i \geq y_i - t_i$ with strict inequality for at least one (for every) i .

The main result of this paper is:

Proposition: Let Assumptions 1-3 hold and let \mathbf{y} , \mathbf{t} , $\mathbf{t} \neq \mathbf{0}$ satisfy the efficiency-equity rule for some V . Then (\mathbf{y}, \mathbf{t}) is strictly Pareto-dominated.

Proof:

By the convexity of T , $\lambda \mathbf{t} \in T$, $0 \leq \lambda \leq 1$. By the smoothness of Y and the efficiency property of \mathbf{y} for any $\varepsilon > 0$, there exists $\delta > 0$ such that for any \mathbf{d} with $\|\mathbf{d}\| < \delta$, $\sum_{i=1}^N d_i < \varepsilon$, $\mathbf{y} + \mathbf{d} \in \operatorname{int}(Y)$. Further, the minimal such δ is $o(\varepsilon)$. Hence for λ sufficiently near 1, $\mathbf{y} - (1-\lambda)\mathbf{t} \in \operatorname{int}(Y)$ and there exists $\mathbf{y}' \in Y$, $\mathbf{y}' \gg \mathbf{y} - (1-\lambda)\mathbf{t}$. Hence (\mathbf{y}, \mathbf{t}) is Pareto-dominated by $(\mathbf{y}', \lambda \mathbf{t})$.

The argument may alternatively be expressed in the language of cost functions. Let individual 1 be the numéraire individual, and let \bar{y}_1 be her base income. Then for any vector $(y_2, y_3 \dots y_N) \in \mathfrak{R}^{N-1}$, we may define

$$C(y_2, y_3 \dots y_N) = \inf\{\bar{y}_1 - y : (y, y_2 \dots y_N) \in Y\} \text{ if } \exists (y, y_2 \dots y_N) \in Y$$

$$= \infty \text{ otherwise}$$

Similarly for given \mathbf{y} and $(t_2 \dots t_N) \in \mathfrak{R}^{N-1}$, define

$$T(t_2 \dots t_N) = \inf\{t : (t, t_2 \dots t_N) \in T\} \text{ if } \exists (t, t_2 \dots t_N) \in T$$

$$= \infty \text{ otherwise}$$

The first-order conditions for maximization of $\sum_{i=1}^N y_i$ imply that \mathbf{y} satisfies the efficiency rule if and only if $\partial C / \partial y_i = 1, \forall i$. However, Assumption 3 and the convexity of T ensure that if $\mathbf{t} \neq 0$ is a boundary element of T , $\partial T / \partial y_i \neq -1$ for at least some i .

But a pair $(\mathbf{y}^0, \mathbf{t}^0)$ can maximize $V(\mathbf{x})$ only if $(y_2^0, y_3^0 \dots y_N^0)$ and $(t_2^0 \dots t_N^0)$ solve the cost-minimization problem

$$\text{Min } C(y_2, y_3 \dots y_N) + T(t_2 \dots t_N)$$

$$\text{subject to } (y_2, y_3 \dots y_N) - (t_2 \dots t_N) = (y_2^0, y_3^0 \dots y_N^0) - (t_2^0 \dots t_N^0)$$

and the first-order conditions for this problem require $\partial C / \partial y_i = -\partial T / \partial y_i \forall i$.

Thus, the solution to the efficiency problem implies that an appropriate readjustment of general economic policies can costlessly redistribute income at the margin. Since redistribution through the tax system is costly, the marginal rate of transformation between individual i consumption and individual j consumption differs depending on whether tax policies or general policies are being considered. Such a situation is necessarily suboptimal.

It would appear to be straightforward to extend the result to the case of an n -good economy and to permit the set of feasible taxes and transfers to depend on the choice of general policy settings. However, these generalizations would serve primarily to obscure the underlying logic of the argument showing that the use of an efficiency/equity distinction is always suboptimal.

Concluding comments

In the absence of a set of lump-sum redistributive instruments, it is always suboptimal to assign some instruments to an efficiency objective and some to an equity objective. This reflects the fact that the two ‘objectives’ are not separate targets, as in Tinbergen-style policy models. Rather, efficiency refers to the maximization of a particular social welfare function, which will not in general be considered acceptable by policy-makers, while equity refers to constrained maximization of a social welfare function reflecting policy-makers beliefs.

Although the use of an efficiency-equity distinction is necessarily suboptimal, there may be a pragmatic case for its use in certain circumstances. For some policies it is relatively easy to assess efficiency consequences and relatively difficult to assess distributional impacts. For others, the reverse is true. More generally, efficiency and equity may be convenient ways of summarizing the incidence of competing policies. Nevertheless, there can be no justification for ignoring equity considerations in any area of policy formulation.