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PERSONAL UTILITIES AND PUBLIC JUDGEMENTS: OR WHAT'S WRONG WITH WELFARE ECONOMICS?*

Wassily Leontief has succinctly summarised the normative properties 'on which something like a general consensus of opinion seems to exist' in the formal discussion of public economic policies:

> In the discussion of public economic policies – in contrast to the analysis of individual choice – the normative character of the problem has been clearly and generally recognised. Here the mathematical approach has crystallised the analysis around the axiomatic formulation of the (desirable or conventional) properties of the 'social welfare function'. Social utility is usually postulated as a function of the ordinally described personal utility levels attained by each of the individual members of the society in question.
>
> The only other property on which something like a general consensus opinion seems to exist is that 'the social welfare is increased whenever at least one of the individual utilities on which it depends is raised while none is reduced' [Leontief (1966), p. 27].

A critical examination of these properties is undertaken in this paper, and it is argued that they have played remarkably restrictive roles in traditional welfare economics by imposing – directly or indirectly – severe constraints on the types of information that may be used in making social welfare judgements. In the process, Arrow's impossibility theorem and related results are reinterpreted in the informational perspective. While a good many technical issues are covered, the presentation is entirely informal, and no special familiarity with the technical literature has been presupposed.

I. THE FAVOURED PROPERTIES

The first property identified by Leontief is made up of three distinct parts, and it is best to present it in a factorised way.

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Welfarism. Social welfare is a function of personal utility levels, so that any two social states must be ranked entirely on the basis of personal utilities in the respective states (irrespective of the non-utility features of the states).

Ordinalism. Only the ordinal properties of the individual utility functions are to be used in social welfare judgments.

Noncomparable utilities. The social welfare ranking must be independent of the way the utilities of different individuals compare with each other.[1]

The second property referred to by Leontief is simply the more demanding version of the principle of Pareto preference. For all pairs of states x, y, the following is required to hold:

Pareto Preference Rule. If everyone has at least as much utility in x as in y, and if someone has more utility in x than in y, then x is socially better than y.

Welfarism is a strong version of the condition of 'neutrality' used in the collective choice literature (see Sen, 1970; 1977*b*), and demands that the social ranking of any pair of states be *neutral* to the non-utility features of the states, i.e. the concentration must be exclusively on the utility information about the states. Combining welfarism with the Pareto preference rule would be natural, since social welfare – if a function of individual utilities only – should be expected to be an *increasing* function of these utilities.

Pareto-inclusive Welfarism. Social welfare is an increasing function of personal utility levels, thus satisfying both welfarism and the Pareto preference rule.[2]

Utilitarianism – the classic approach to welfare economics – satisfies Pareto-inclusive welfarism, and in the usual applications is combined with the use of interpersonally comparable and cardinal individual utilities. It was the disquiet about interpersonal comparability and cardinality of utilities (expressed in such works as Robbins's (1932) methodological critique) that led to the addition of ordinalism and non-comparable utilities as further features to be satisfied. The so-called 'new welfare economics' accepted all these properties as legitimate. Social choice theory, pioneered by Arrow (1951), also accepted these conditions (though it used somewhat weaker versions of the Pareto principle and welfarism). The welfare economic propositions in standard general equilibrium theory (see Debreu, 1959; Arrow and Hahn, 1971), concentrating on Pareto optimality and related criteria, have also no need to go beyond a Pareto-inclusive welfarist framework with ordinal and noncomparable utilities. The choice of problems and frameworks reflects the 'general consensus of opinion' on the normative properties that Wassily Leontief has identified.[3]

[1] For more formal statements of these conditions and related ones, see Sen (1970; 1977*b*).

[2] Note that Paretianism and welfarism are independent of each other in the sense that either can be satisfied without the other. However, there are analytical links between the two *in the presence of* other conditions (see Section II below). Also the two properties are closely allied in spirit, and it is difficult to justify demanding welfarism to be satisfied (making social welfare a function of individual utilities only) without requiring that social welfare should respond positively to individual utilities. See also Section VII of this paper.

[3] See also Graaff (1957) and Little (1957) for excellent critical accounts of the traditional approaches to welfare economics.

II. ARROW'S IMPOSSIBILITY THEOREM: AN INFORMATIONAL INTERPRETATION

Arrow's impossibility theorem can be shown to be closely related to the nature of the informational restrictions implicit in these conditions. In this section this relationship will be brought out and the proof of the theorem will be set up in a way that makes the informational constraints transparent.

Arrow defined a social welfare function (SWF) as a function that determines one social welfare ordering R of the set of social states for every combination of individual utility orderings of that set – one ordering for each person. In confining attention to the combination of individual orderings taken on their own, both ordinalism and non-comparable utilities are incorporated in the very conception of a SWF. In addition another general structural condition was used, namely *unrestricted domain*, so that the domain of the SWF was required to include every logically possible combination of individual orderings. Also the set of individuals is taken to be finite and the number of distinct social states at least three.

Arrow invoked a weak version of the Pareto principle.

Weak Pareto Principle. If everyone has more utility in x than in y, then x is socially better than y.

In addition, he imposed two other conditions. The condition of *non-dictatorship* demands that there should be no one such that whenever he strictly prefers any x to any y, then invariably x is regarded as socially better than y. And finally, there was the much-debated condition of independence.

Independence of Irrelevant Alternatives. The social ranking of any pair of states must be the same as long as the individual utility information about the pair remains the same, which, in the special case of ordinal noncomparable utilities, amounts to individual orderings over the pair remaining the same.[1]

Arrow's 'impossibility theorem' establishes that there is no SWF satisfying all these four conditions.[2] I would like to argue that the impossibility can be seen as resulting from combining a version of welfarism ruling out the use of non-utility information with making the utility information remarkably poor (particularly in ruling out interpersonal utility comparisons). While the poverty of the utility information is part of the basic framework explicitly invoked, ruling out the use of non-utility information is the result of the combination of conditions used. Welfarism implies independence of irrelevant alternatives,

[1] I have defined here the condition of independence rather less demandingly than Arrow both (i) in permitting the use of cardinality and interpersonal comparability if such information is available, and (ii) in making no demands on choices over sets larger than pairs. This permits the use of this condition in frameworks other than Arrow's (e.g. to derive utilitarianism), which have a richer informational base, and also in cases where binariness of social choice is not required; see Sen (1977*a*, *b*). With Arrow's conditions (in particular, ordinalism, non-comparable utilities, unrestricted domain, and binariness of social choice) imposed additionally, this weaker version ends up delivering as much as Arrow's version in the special case of Arrow's framework. Binariness of social choice is not, however, needed for Arrow's impossibility theorem, see Sen (1977*a*), pp. 71–2, 81.

[2] This version of the theorem is to be found in Arrow (1963). The earlier version presented in Arrow (1951) has a formal error, detected by Blau (1957). The treatment of the Arrow impossibility result outlined here derives much also from Blau (1972). For critical surveys of various versions of the Arrow theorem, see Murakami (1968), Fishburn (1973), Pattanaik (1979), Plott (1976), and Kelly (1978).

but is not implied by it. However, the conditions of independence, weak Pareto principle and unrestricted domain put together imply a weak version of welfarism. Any SWF satisfying these three conditions may be called an 'Arrovian' social welfare function.

Strict-ranking Welfarism. If individual utility rankings are strict, then any two social states must be ranked entirely on the basis of personal utilities in the respective states.[1]

In fact, if the weak Pareto principle is replaced by the 'Pareto indifference rule' (demanding that personal indifference by all must together imply social indifference), then the three conditions (i.e. unrestricted domain, independence and the Pareto indifference rule) will imply welfarism fully.[2] But even the weak Pareto principle is adequate to imply strict-ranking welfarism, when combined with unrestricted domain and independence (as in the Arrow framework). This is established below for 'Arrovian' social welfare functions with individual utilities ordinal and non-comparable. In this framework strict-ranking welfarism demands that if everyone's ranking of x vis-à-vis y in one case is the same as his or her ranking of a vis-à-vis b in another, then the social ranking of x vis-à-vis y in the first case must be the same as the social ranking of a vis-à-vis b respectively in the second. Let the community be partitioned into two groups M and N, with everyone in M preferring x to y in case α and a to b in case β, while everyone in N prefers y to x in case α and b to a in case β.[3] (Cases α and β may or may not represent the same set of utility orderings over the whole set of social states in the two cases.) Strict-ranking welfarism demands that if x is socially preferred to y in case α, then a is socially preferred to b in case β; similarly if y is socially preferred to x in the first case then b is socially preferred to a in the second. Furthermore, strict-ranking welfarism also demands that if x is socially indifferent to y in case α, then a is socially indifferent to b in case β. The nature of the social states and their non-utility features should not make any difference to social preference as long as the utility information about them (in this case, the personal strict utility rankings) is the same.

In demonstrating this we do not need the full force of transitivity of social preference. Transitivity of social *strict* preference (but not necessarily of indifference) is enough; this is called quasi-transitivity.

[1] This may appear to be substantially more demanding than the 'neutrality' condition used by Blau (1972) as an intermediate product in establishing the impossibility result, especially since Blau confined his attention not merely to strict individual preferences but also to *strict social preferences* – a constraint not used in the definition of 'strict-ranking welfarism'. However, as the proof of (T. 1) makes clear, the case of social indifference is covered as a consequence of the case with strict social preference.

[2] See Guha (1972) and d'Aspremont and Gevers (1977), dealing respectively with the informational framework of individual non-comparable orderings and a more general framework covering richer informational availability as well. Guha's axioms were, however, too weak since he took the Pareto principle in the 'weak' form which did not cover the case of individual indifference (see Blau (1976)), while d'Aspremont and Gevers took axioms that were a bit too strong since they assumed the 'strong' Pareto principle whereas the Pareto indifference rule is sufficient for their result – and indeed for their own proof (see Sen, 1977*b*, and also Roberts, 1978).

[3] The word 'preference' has some ambiguity since it can be defined in different ways which are not necessarily equivalent (see Sen, 1977*c*). Here the interpretation intended is that of personal utility, in the sense of a person's conception of his own well-being (see also Sections III and VII below). The theorems, however, apply to other interpretations as well if the conditions are correspondingly redefined.

(T. 1) *Establishing Strict-ranking Welfarism.* For all 'Arrovian' social welfare functions (even with transitivity of social preference relaxed to quasi-transitivity), strict-ranking welfarism must hold.

Consider the postulated preference patterns α and β, outlined above. First, the case of strict social preference is taken up, postulating – without loss of generality – that x is socially preferred to y in case α. It has to be shown that a is socially preferred to b in case β. The proof proceeds by considering a third set of individual preferences γ – admissible thanks to unrestricted domain – as follows (in descending order of preference):

Group M	Group N
a	y
x	b
y	a
b	x

Since everyone's utility ranking of x vis-à-vis y in this regime is the same as in the α regime, by independence of irrelevant alternatives x must be judged to be socially better than y in the γ regime, as in the α regime. By the weak Pareto principle, in the γ regime, a is socially better than x, and also y is socially better than b. Thus, by quasi-transitivity of social preference (i.e. transitivity of strict social preference), a is socially better than b in the γ regime. Since the utility information regarding a vis-à-vis b in the γ and β regimes is identical, by independence it follows that in the β regime too a must be preferred to b. This covers the case of *strict* social preference,[1] leaving us only with the case in which x is socially indifferent to y in the α regime.

In the indifference case, it would have to be established that a is indifferent to b in the β regime. Suppose not. Then a is preferred to b, or vice versa, and let it be the former, without loss of generality. If a is preferred to b in the β regime, then by the above proof of strict-ranking welfarism in the case of *strict* social preference, it follows that x must be socially preferred to y in the α regime, since the utility information regarding x vis-à-vis y is the same in the α regime as that regarding a vis-à-vis b, respectively, in the β regime. But this contradicts the postulation that x and y are socially indifferent in the α regime. And that establishes strict-ranking welfarism in the case of social indifference as well.

The effect of (T. 1) is to combine the poverty of the utility information with an embargo on the use of non-utility information. This restricts the class of social welfare rules to a very narrow group. The requirement of completeness rules out such partial procedures as the Pareto ranking being the only method of social judgement. The requirement of consistency in the form of transitivity of social preference rules out such procedures as the method of majority ranking. We would be left with nothing other than dictatorial rules. This is demonstrated now.

[1] This is not strictly correct, since we have not covered the case in which x, y, a and b are *not* all distinct. The same strategy of proof, however, applies in this case too. Take, for example, the case in which x and a are the same. Assume γ regime preferences as the following. For all members of M: $a(=x)$ preferred to y and that preferred to b; for all members of N: y preferred to b and that to $a(=x)$. Hence in the γ regime: a is socially preferred to y (by independence) and y to b (by weak Pareto principle), and thus a socially preferred to b (by quasi-transitivity). By independence, a is preferred to b in the β regime also. The basic strategy in all these cases is the one used in the text. See also Arrow (1963) and Blau (1972).

Define a group M of persons as 'almost decisive' over the same ordered pair x, y, if and only if x is socially preferred to y whenever everyone in group M strictly prefers x to y while everyone not in group M strictly prefers y to x. The group M is called 'decisive' over x, y, if and only if x is socially preferred to y whenever everyone in M strictly prefers x to y, *no matter what others prefer*.[1]

(T. 2) *Irrelevance of Opposition.* For all 'Arrovian' Social welfare functions (even with transitivity of social preference relaxed to quasi-transitivity), if any group is almost decisive over some ordered pair of states, it is decisive over that ordered pair of states, i.e. it does not need to be opposed to win.

Let group M be almost decisive over x, y. To show that it is fully decisive over the pair x, y, postulate the following preference combination: everyone in M prefers x to some third alternative z and that to y, while everyone not in M prefers z to both x and y, which can be ranked in any way whatsoever vis-à-vis each other. By (T. 1) M is almost decisive also over x, z, and hence x is socially preferred to z. By the weak Pareto principle, z is socially preferred to y. By quasi-transitivity of social preference, x is socially preferred to y, and that is so irrespective of how those who are not in M rank x vis-à-vis y. Thus (T. 2).

By virtue of (T. 1) and (T. 2), there is no difference between a group being almost decisive over some pair and being fully decisive over all pairs. Call such a group a decisive group.

(T. 3) *Irrelevance of Support.* For all 'Arrovian' social welfare functions, in any decisive group containing more than one person there is a subgroup that is decisive without the support of the rest.

Let M be a decisive group containing more than one person. Partition M into two subgroups M^1 and M^2. Let the combination of preferences be the following.

Subgroup M^1	Subgroup M^2	Rest (if any)
x	y	z
y	z	x
z	x	y

By the decisiveness of M (that is, of M^1 and M^2 taken together), y is socially preferred to z. Hence the completeness and the transitivity of social preference, *either* y is socially preferred to x, or x is at least as good as y which is preferred to z, hence x is socially preferred to z. If the former, then subgroup M^2 is almost decisive over y, x. If the latter, then subgroup M^1 is almost decisive over x, z. In either case, by (T. 1) and (T. 2) some proper subset of group M must be fully decisive over every pair – winning without the need of the support of the rest of group M.

Arrow's Impossibility Theorem. There is no non-dictatorial 'Arrovian' social welfare function, i.e. there is no SWF satisfying unrestricted domain, weak Pareto principle, independence of irrelevant alternatives and non-dictatorship.

[1] The simple point that being 'decisive' is stronger than (i.e. implies but is not implied by) being 'almost decisive' seems occasionally to pose difficulty for intuitive understanding, since winning against opposition might appear to be stronger than winning whether or not opposed. But obviously this is not so since the case of winning whether or not opposed includes, *inter alia*, the case of winning when opposed.

Proof. By the weak Pareto principle, the group of all persons is decisive. By virtue of (T. 3) it is possible to go on reducing the decisive group as long as it contains more than one person. Since the set of individuals is finite, we must in this way arrive at one person being decisive over all pairs, i.e. being a dictator. And that contradicts the non-dictatorship condition. (QED.)

To take an over-all view of the proof, (T. 1) eliminates any essential use of non-utility information (such as the nature of the social states), adding to the informational penury incorporated in the conditions, explicitly, in the form of poor utility information (non-comparable individual utility orderings). (T. 2) and (T. 3) capitalise on the fact that we are – by virtue of this total informational poverty – confined to social welfare rules of very simple kinds, e.g. majority rule, dictatorship, etc. Given that, the requirements of completeness and transitivity of social preference force us to go relentlessly in the direction of recognising more and more information as unusable until we have the consistency of a dictatorial procedure, concentrating on the information in just one person's preference ordering.[1]

It is often asserted that the Arrow impossibility theorem is some kind of a generalisation of the old 'paradox of voting'. This is so in the rather limited sense that the informational exclusions do ultimately confine us to simple welfarist rules (ignoring non-utility information) with utility reflected by the set of individual orderings only (ignoring interpersonal comparisons and cardinality), and all *these* rules – with the exception of dictatorship – run into consistency problems as the majority rule does in the 'paradox of voting'. But we need not have found ourselves confined to such a limited field had there not been such informational exclusions forcing us to make social welfare judgements in an informational famine. It is only *after* the informational constraints have bitten in that the analogy with the paradox of voting becomes relevant.

III. INEQUALITY, WELFARISM AND UTILITY INFORMATION

The severity of the information restrictions in the Arrovian framework can be illustrated by taking up a problem of income distributional judgement. Consider the principle of giving priority to the interests of the poor over the interests of the rich. Do we have the information necessary for the use of this principle in the Arrovian framework?

[1] In fact, the consistency requirements for social preference can be weakened without upsetting the impossibility result. See Blau (1978) and Blair and Pollak (1979), for proofs involving a sequence of consistency conditions weaker than full transitivity, e.g. semi-orderings, even though the result does not follow merely from quasi-transitivity; see also Blau (1959), Hansson (1972), Schwartz (1974), Brown (1975), Wilson (1975), for related results and Sen (1979*c*). In fact, the strategy of proof used above can be easily extended to apply to such weaker consistency conditions. Take, for example, the case of semi-transitivity, which requires that if x is strictly preferred to y, and that to z, then for any other state s, either x is preferred to s, or s is preferred to z (or both). Since semi-transitivity implies quasi-transitivity, (T. 1) and (T. 2) remain unaffected. But to clinch (T. 3), four distinct states x, y, z, s are taken and the following preference conbinations are postulated, in descending order of strict preference. Subgroup M^1: x, y, z, s; subgroup M^2: y, z, s, x; the rest z, s, x, y. By the decisiveness of M, we have y preferred to z, and also z preferred to s. Thus by semi-transitivity, either x is preferred to s, or y is preferred to x. The former makes M^1 decisive, the latter M^2. The rest of the proof is unaffected.

I have tried to argue elsewhere that the aggregation exercise in the collective choice literature can be split into several distinct types – one of the distinctions being based on whether the exercise is one of aggregating the conflicting *interests* of different people, *or* one of aggregating the conflicting *judgements* of different people as to what should be done.[1] The informational limitation is restrictive for both, but a good deal more disturbing for the former than for the latter. When judgements are being aggregated, e.g. views of supporters of different political parties, there may be no practical possibility of having a mechanism that can actually use anything other than the set of individual preferences or votes. On the other hand, in aggregating conflicting interests of different persons, groups or classes, e.g. in planning decisions, or in comparisons of national welfare in alternative or successive situations,[2] the informational limitations of the Arrovian framework are exceptionally telling. Indeed, many acts of political and social judgements, e.g. the personal decision as to what kind of a government or a society one should want, are themselves based on aggregating conflicting interests,[3] and in making these judgements, to be constrained by the informational base of non-comparable individual orderings would be peculiarly limiting. The same applies to welfare economic criteria which are typically geared to the exercise of interest aggregation.

Returning to the income distributional conflict, it can be seen as a classic case of aggregation of conflicting interests. In terms of individual orderings of utility, it might be the case that each person is better off with the unit of additional income coming to him rather than to anyone else. And this can hold no matter whether the person is rich or poor. The question then is, on what basis do we discriminate in favour of the poor vis-à-vis the rich in the Arrovian framework applied to the case of interest aggregation?

Can we identify the rich through the observation that they have more utility than the poor? Not in the Arrow framework, since interpersonal comparisons are not admitted. Perhaps as those with a lower marginal utility of income? No, of course not, since that will go against *both* noncomparability and ordinalism. Can we then distinguish the rich as those who happen to have more income, or more consumer goods (nothing about utility need be said), and bring this recognition to bear in social judgments? No, not that either, since this will go against welfarism (and against strict-ranking-welfarism), since this discrimination has to be based on non-utility information.

'Social utility', in Leontief's characterisation, as 'a function of the ordinally described personal utility levels' without interpersonal comparisons robs us of our ability to 'tell' effectively the rich from the poor. It is this peculiarity

[1] See Sen (1977*a*). The exercise can also be of a mixed kind, aggregating both interests and judgements; see Graaff (1977).

[2] See Lerner (1944), Dobb (1955), Fisher (1956), Little (1957), Kolm (1969), Atkinson (1970), Mirrlees (1971), Pattanaik (1971), Phelps (1973), Chipman (1974), Muellbauer (1974), Meade (1976), Hammond (1976*b*), Graaff (1977) and Blackorby and Donaldson (1977), for illustrations of various types of exercises in which such interest conflicts have to be explicitly considered. I have tried to examine the assessment of interest conflicts in the economic analyses of inequality, poverty and real national income in Sen (1973; 1976*b*, *c*; 1979*a*).

[3] See Harsanyi (1955), particularly his contrast between a person's 'ethical preferences' vis-à-vis his 'subjective preferences'.

of traditional welfare economics in insisting on both that social judgements be based on utility information only *and* that the utility information be used in a particularly poor form, that can be seen as paving the way to inconsistency or incompleteness – and thus to impossibilities.

IV. BERGSON–SAMUELSON IMPOSSIBILITIES

Much the same can be said about impossibility results geared to Bergson–Samuelson social-welfare functions as opposed to Arrow social welfare functions (Bergson, 1938; Samuelson, 1947), despite assertions of the freedom of the Bergson–Samuelson framework from Arrow-type impossibility (e.g. by Samuelson, 1967). The difference between the two frameworks rests primarily in the fact that Bergson and Samuelson did not impose any 'interprofile' condition such as independence of irrelevant alternatives:[1] 'For Bergson, one and only one of the . . . possible patterns of individuals' orderings is needed' (Samuelson (1967), pp. 48–9).[2] But the main use of this interprofile condition in Arrow's impossibility theorem lies in precipitating welfarism, or – to be more precise – strict-ranking-welfarism, effectively ruling out the use of non-utility information for social judgements. But that feature of welfarism, in the context of single-profile judgements, seems to be incorporated *directly* by Bergson and Samuelson in many of their formulations of social welfare, so that impossibility results will follow even without bringing in more than one profile of individual orderings.

'If the decision', says Bergson, 'is in favour of consumers' sovereignty, the welfare function may be expressed in the form,

$$W = F(U^1, U^2, U^3, \ldots). \tag{1}$$

Here U^1, U^2, U^3, etc., represent the utilities of the individual households as they see them and W, the welfare of the community, is understood to be an increasing function of these utilities' (Bergson (1948), p. 418).[3] This welfarism can be applied over a single profile of individual utilities to get *single-profile inter-pair* welfarism. (E.g. in the case of the γ regime discussed in the proof of (T. 1) in Section II, one would be able to conclude *directly* that if x is socially preferred to y, then a must be socially preferred to b, in a welfarist, ordinal, noncomparable framework.) The Arrow impossibility will then readily translate to the Bergson–Samuelson framework as well (see Parks, 1976; Kemp and Ng, 1976; Hammond, 1976*b*; Pollak, 1979). And the explanation can be similar to that in the Arrow case, namely the combination of welfarism (ruling out the use of non-utility information) and very poor utility information (ordinal and noncomparable) eliminates all possible rules except some very crude ones, and they can be readily weeded out by the other conditions.

[1] That the condition of independence was the real bone of contention was disputed by Samuelson (1967), p. 47, but only because of the confusion that 'if the ordering is transitive, it *automatically* satisfies the condition called "independence of irrelevant alternatives"' (Samuelson (1967), p. 43). On this see Sen (1977*b*), pp. 1562–4.

[2] See Johansen's (1970) lucid and illuminating account of the contrast.

[3] See also Samuelson (1947), pp. 228–9, 246. See, however, Samuelson (1977) and Kemp and Ng (1977).

V. RICHER UTILITY INFORMATION

Not only is the Arrow impossibility theorem a remarkable result, of great analytical beauty, it is also surprisingly robust, *given* the informational constraints. Recent works in weakening the conditions of social transitivity, binariness of social choice, independence conditions and unrestricted domain, have revealed how easy it is to get trapped in an Arrow-like impossibility result as one escapes the exact impossibility pinpointed in Arrow's theorem.[1] On the other hand, genuine escape routes emerge with real possibility results once the informational constraints are lifted or weakened.[2]

It is, however, easy to establish that dropping 'ordinalism' and permitting, in principle, the use of cardinal utility has no effect on the impossibliity result so long as the rest of the Arrow framework is kept unchanged, in particular the exclusion of interpersonal comparability of utility (see Theorem 8*2 in Sen (1970); see also d'Aspremont and Gevers (1977)). Cardinality *without* interpersonal comparability in Arrow's framework does not widen the real possibilities of informed social welfare judgement

Interpersonal comparability without cardinality is, however, a way out of the impossibility. Ordinal comparisons of different persons' utilities permit the use of such criteria as Rawls's (1971) 'maximin' interpreted in terms of utilities, focusing on the welfare level of the worst-off in any group to arrive at a social-welfare ordering. This makes the 'worst-off rank' something like a dictator, and though it is not a personal dictatorship, it is possible to argue that it is a rather extreme approach. It appears that with interpersonal comparability without cardinality, the tendency towards such 'rank-dictatorships' (e.g. the dictatorship of the *m*th rank) is considerable, and it is possible to exclude all *other* possibilities by relatively small extensions of the Arrow conditions, *given* the welfarist (or strict-ranking welfarist) structure (see Gevers, 1976; Roberts, 1976).

Dropping non-comparable utilities *along with* ordinality permits a great many other rules to be considered. Utilitarianism is only one such rule. Many types of interpersonal comparability can be considered (e.g. ordinal, cardinal, ratio-scale, and various intermediate cases of partial comparability) within the generalised format of social welfare *functionals* (see Sen, 1970). Recently the problem of social judgement has been extensively studied axiomatically using alternative informational possibilities.[3]

Rules of social judgement based on richer utility information escape Arrow-type impossibility problems, but in so far as the welfarist (or strict-ranking

[1] See Kelly's (1978) excellent critical survey of the Arrow-like impossibility results, and also Pattanaik's (1978) elegant account of the related literature on strategic impossibilities. See also Blair *et al.* (1976).

[2] Arrow (1963) himself considered the possibility of using interpersonal comparisons of utility based on the approach of 'extended sympathy' – formally explored in a pioneering paper by Suppes (1966) – but concluded that 'it is not easy to see how to construct a theory of social choice from this principle' (Arrow, 1963, pp. 114–5). See, however, Arrow (1977).

[3] See Sen (1970; 1977*b*), Hammond (1976*a*; 1977), Strasnick (1976), d'Aspremont and Gevers (1977), Arrow (1977), Deschamps and Gevers (1978), Maskin (1978), and Roberts (1978), among others.

welfarist) framework is retained, other difficulties can crop up. There are principles of social judgement that require essential use of non-utility information, and while such principles (e.g. liberty, non-exploitation, non-discrimination) are typically not much discussed in traditional welfare economics, they do relate closely to the subject matter of welfare economics. The next two sections are devoted to these issues.

VI. LIMITATIONS OF WELFARISM EVEN WITH RICH UTILITY INFORMATION

The difficulties with welfarism discussed in Sections II–IV arose from combining it with poor utility information. I would now like to dispute the acceptability of welfarism *even when* utility information is as complete as it can possibly be. So ordinalism is dropped, and the use of cardinal measures is permitted, and even – more demandingly – ratio scale measures (permitting statements such as: utility U_1 is twice U_2). To go as far as is logically conceivable, we can even demand that utility numbers be simply unique (and not just unique up to any positive affine transformation as under cardinality, or unique up to any positive homogeneous linear transformation as under a ratio-scale measure). Interpersonal comparisons are also extreme in the sense that each person's utility numbers – unique as they are – correspond naturally to those of others in a one-to-one way. These requirements are very demanding indeed, but since the object is to criticise welfarism *even when* utility information is as good as it can conceivably be, this only makes the exercise more biased in favour of welfarism. If utility information is, in fact, weaker than that, then of course welfarism will be even less (rather than more) acceptable.

Consider a set of three social states x, y and z, with the following utility numbers for persons 1 and 2 (there are no others).

	x	y	z
Person 1's utility	4	7	7
Person 2's utility	10	8	8

In x person 1 is hungry while 2 is eating a great deal. In y person 2 has been made to surrender a part of his food supply to 1. While 2 is made worse off, 1 gets more utility, and the sum total of utility happens to be larger (with diminishing marginal utility).

It is clear that y must be judged to be better than x by utilitarianism (since the utility sum is larger for y), by the so called 'Rawlsian maximin' or its lexicographic extension 'leximin' (since the worst-off person's utility is larger in y than in x), and indeed by virtually all the equity criteria that have been proposed in the literature using utility data (see, for example, Phelps (1973), Sen (1973), Hammond (1976*a*), d'Aspremont and Gevers (1977), Deschamps and Gevers (1978), and Kern (1978)). Let us take y to be better than x.

Consider now z. Here person 1 is still just as hungry as in x, and person 2 is also eating just as much. However, person 1, who is a sadist, is now permitted to torture 2, who – alas – is not a masochist. So 2 does suffer, but resilient as he is, his suffering is less than the utility gain of the wild-eyed 1. The utility

numbers in z being exactly the same as in y, welfarism requires that if y is preferred to x, then so must be z. But y *is* socially preferred to x. So z is preferred to x as well, thanks to welfarism.[1]

The conclusion that z can be socially preferred to x can, of course, be directly derived using utilitarianism, maximin, leximin, or some utility-based equity criterion. However, we might wonder whether those approaches should be used in the case of judging torture. (Cf. Harsanyi's (1978), p. 8, rejection of utilitarian calculus in the case of 'sadism, resentment, or malice'.) But the decision to rank y over x by any of these criteria in a choice involving no judgement of torture, will readily translate into a preference for torture-inclusive z over x, *due to welfarism.*

Similarly, if our disapproval of the torture leads us to prefer x to z (or at least to a refusal to rank z better than x), then welfarism will require that we must rank x above y as well, thereby opposing the food transfer (or at least refuse to approve of the food transfer). Welfarism *is* a demanding restriction.

It is interesting to consider also the ranking of y vis-à-vis z. By the Pareto indifference rule, y and z must be judged to be socially indifferent. If instead of passing on some food from rich 2 to poor 1, letting 1 torture 2 gives both exactly the same utilities, then Paretianism obliges us to declare the two alternatives to be exactly as good as each other. If we wish to make a moral distinction between y and z despite their coincidence on utility space, we have to go not merely against welfarism in general, but even against that limited expression of welfarism that we find in the Paretian approach. This issue is pursued further in the next section.

While the subject of torture arouses moral feelings that are very deep, there are also other subjects on which the inadequacy of the utility information – however complete in itself – seems important. Indeed, some moral principles are formulated without making any use of utility information at all, e.g. 'equal pay for equal work', 'non-exploitation',[2] etc., and it is easy to demonstrate that these principles would conflict with welfarism, which makes the utility information decisive. Even Rawls's (1971) 'difference principle' in his theory of justice, in which a person's disadvantage is judged in terms of his access to 'primary social goods', and not in terms of utility as such (as in the apocryphal version popular among economists), will clash violently with welfarism. In its uncompromising rejection of the relevance of non-utility information welfarism is indeed a very limiting approach.

Finally, there is the question of data availability. Often utility information is very difficult to obtain both because of problems of measurability and comparability, as well as because of well-known difficulties in inducing honest revelation of preferences (see Gibbard (1973), Satterthwaite (1975), Pattanaik

[1] It is assumed that there are no indirect consequences of torture, e.g. in attitude formation. These indirect effects do not change the nature of the difficulty, even though they can be properly accommodated only in a much more complex analysis.

[2] See Marx (1887). It is, however, important to note that while being sceptical of the utility-based moral calculus, Marx also disputed the normative depth of claims based on labour entitlements; see especially Marx (1875). I have tried to discuss elsewhere (Sen, 1978*b*) the relationship between the descriptive and evaluative aspects of the labour theory of value, as used by Marx. See also Leinfellner (1978).

(1978), and others).[1] In contrast some of the non utility information, e.g. whether 'equal pay for equal work' is being observed, or what primary goods people have, may be a lot easier to obtain. Thus the restriction imposed by welfarism is not only ethically limiting, it can be deeply problematic also from the point of view of data availability, making this restriction 'doubly' regrettable.[2]

VII. LIMITATIONS OF PARETIANISM

Despite their formal independence, there is a sense in which Paretianism can be seen as essentially a weak form of welfarism. Welfarism asserts that non-utility information is *in general* unnecessary for social welfare judgements. Paretianism makes non-utility information unnecessary *in the special case* in which everyone's utility rankings coincide. (It also makes the social-welfare judgement mirror the unanimous individual utility rankings, which is an additional feature, but that does not, of course, affect the redundancy of the non-utility information.) If everyone has more utility from x than from y, then it does not matter what x and y are like in any other respect; the Pareto principle will declare x to be socially better than y without inquiring further. It was indeed this blindness to non-utility information in such special cases that was used to precipitate strict-ranking welfarism by combining the weak Pareto principle with unrestricted domain and independence in (T. 1) in Section II.

The 'impossibility of the Paretian libertarian', which I have presented elsewhere (Sen, 1970; 1976*a*),[3] relates closely to the difficulties with welfarism. The result shows the incompatibility of the Pareto principle (even in the weak form) with some relatively mild requirements of personal liberty, for consistent social decisions, given unrestricted domain. The link with welfarism can be seen in the following way. Considerations of liberty require specification of non-utility information as relevant, e.g. whether a particular choice is self-regarding or not (cf. Mill, 1859), or as falling within a person's 'protected sphere' (cf. Hayek, 1960). The claim is that this use of non-utility information goes not merely against welfarism, it can go even against Paretianism (Theorems 6.1, 6.2, and 6.3 in Sen (1970)).

Consider the first example in terms of which I tried to illustrate the result

[1] The problem of data availability will not, of course, arise in this form if individual utility is defined as the *component of social welfare* that is attributed to the conditions of that individual, in a 'separable' social welfare framework (see Hammond, 1977). Indeed, with such a framework and with that definition of individual utility, welfarism would be an analytic requirement of consistency. But welfarism in this case is not a substantial claim, and only shows social welfare to be a function of its own components (e.g. the sum of the parts – to take the simplest form). The really interesting controversial issues will, then, arise in the *correspondence* between individual utility (as the person's own conception of his own wellbeing) and the component of social welfare that is attributed to him ('utility' in this rather artificial sense).

[2] See Sen (1979*b*).

[3] For discussion of various aspects of this problem see – among others – Ng (1971, 1979), Batra and Pattanaik (1972), Ramachandra (1972), Gibbard (1974), Nozick (1974), Bernholz (1974), Blau (1975), Seidl (1975), Farrell (1976), Buchanan (1976), Campbell (1976), Fine (1976), Aldrich (1977), Breyer (1977), Miller (1977), Perelli-Minetti (1977), Suzumura (1978), Karni (1978), Ferejohn (1978), Gaertner and Krüger (1978), Kelly (1978), Stevens and Foster (1978), and Rawls (1978). The earlier of these critiques and extensions – and some others – were reviewed in Sen (1976*a*).

captured formally in the Pareto-libertarian theorems. Two persons, namely, the prude and the lewd, are considering three states of affairs, namely, *p* (the prude reading *Lady Chatterley's Lover*, *l* (lewd reading the book), and o (nobody reading it). The prude's personal utility ranking, in decreasing order, is: o, *p*, *l*, while the lewd ranks them *p*, *l*, o. The prude likes o (nobody reading the book) best; the lewd likes it least. But both prefer *p* to *l*, i.e. the prude reading the book rather than the lewd. It is postulated that in *p* the lewd is overjoyed at the prude's discomfiture in having to read a naughty book, and the prude is less unhappy, having avoided the dire outcome of that lascivious lewd actually reading and enjoying 'such muck'. This leads to the Pareto-libertarian cycle. On libertarian grounds, it is better that the lewd reads the book rather than nobody, since what the lewd reads is his own business and the lewd does want to read the book; hence *l* is socially better than o. On libertarian grounds again, it is better that nobody reads the book rather than the prude, since whether the prude should read a book or not is his own business, and he does not wish to read the book; hence o is better than *p*. On the other hand, both get more utility from the prude reading the book rather than the lewd. The Pareto preference for *p* over *l*, completes the cycle with the libertarian rankings of *l* over o, and o over *p*.

The 'impossibility of the Paretian libertarian' captures this conflict in the form of a theorem in a general framework. There is then the further question as to how to resolve the conflict. It is not my contention that the libertarian rights should *invariably* prevail over Paretian judgements, but that there are cases when this makes evident sense. The decision may have to be conditional on other features, e.g. the *motivation* underlying the utility rankings (see Sen, 1970; 1976*a*). I wish to consider now those cases in which we decide to come out against Paretianism on libertarian grounds. The question is: how can this possibly make sense since both parties have more utility in *p* than in *l*?

In the torture case discussed in the last section a distinction was made between utility arising from getting some food when hungry and that arising from torturing. In the current context, it is possible to make a distinction between utility arising from reading a book one wants to read and that arising from someone else's discomfiture. And between suffering arising from having to read something one hates to read, and suffering arising from the contemplation of someone else enjoying what one regards to be bad stuff. If it is decided to ignore the utility arising from the discomfiture of others, or disutility from the enjoyment of others (or to put a lower weight on these things rather than ignoring them altogether), then distinctions are being made between different kinds of utility, using non-utility information.[1]

Indeed, it is possible that the prude and the lewd *themselves* would make a *moral* judgement in favour of the lewd reading the book – despite its Pareto inferiority. This they can do for the reasons mentioned above, and they can do this even without apologising for their own actual utility functions. The

[1] See Sen (1976*a*), pp. 235–7. This type of consideration also provides a way of resolving Gibbard's (1974) important problem of consistency of libertarian rights, on which see Suzumura (1978).

prude, for example, can argue thus. 'My desire that I rather than the lewd should read the book arises from my dislike of the lewd's enjoyment of certain types of pleasures. As a person of good taste, it is of course natural that I should feel this revulsion: there is nothing illegitimate in that, and I am quite free to feel the way I do. But it is another matter to argue that my revulsion is as relevant in deciding whether the lewd should read the book, as the lewd's own pleasure in reading that book; it is after all a personal matter for him. I am not pretending that I don't care what he does, or that I *should not* care, but I don't think that my caring about what the lewd reads should have the same weight – or perhaps even any weight – as the lewd's own caring about what he does in his personal life.'

This reasoning is also relevant to an interesting objection that has been raised about the formulation of the Pareto libertarian problem. If people always act in a way that would maximise their utilities, then the libertarian solution that the lewd reads the book will not be an equilibrium. It would be foolish for the prude to exercise his right not to read the book, since the alternative (the lewd reading it) is even worse for the prude. Indeed, it will be in the interest of both parties to do a 'trade' and arrive at a contract ensuring that the prude reads the book. This will lead to more utility for both. Doesn't this solve the problem of the Paretian libertarian?[1] Doesn't the possibility of the trade make the allegedly libertarian solution (namely the lewd reading the book) unsustainable and, therefore, unviable? Since a Pareto-inoptimal situation in the circumstances specified would fail to be an equilibrium, doesn't this eliminate the force of the criticism of the Pareto principle?

We may begin by noting that the prude or the lewd may refuse to enter into such a 'trade' despite utility gain, if he is libertarian enough to see no moral gain in the 'trade' (namely the 'deal' involving the prude reading a book that he detests to prevent the lewd reading it with pleasure). Indeed, he can reason with John Stuart Mill:[2]

> There are many who consider as an injury to themselves any conduct which they have a distaste for, and resent it as an outrage to their feelings; . . . but there is no parity between the feeling of a person for his own opinion, and the feeling of another who is offended at his holding it; no more than between the desire of a thief to take a purse, and the desire of the right owner to keep it. And a person's taste is as much his own peculiar concern as his opinion or his purse. [Mill (1859), p. 140].

The possible refusal of the prude or the lewd to 'trade' in this way despite utility gain may perhaps appear puzzling to those 'revealed preference' theorists who can define utility only in terms of what is chosen irrespective of *why* it is chosen. Indeed, if utilities are defined entirely in terms of choice, then

[1] This way of escaping the problems of the Paretian libertarian (and avoiding the impossibility theorem presented in Sen (1970)) has been explored by several authors. For discussion of the relevant issues, see Gibbard (1974), Bernholz (1974), Buchanan (1976), and Kelly (1978), chapter 9, among others. Paul Grout (1978) has discussed rather similar issues in the context of his critique of Rowley and Peacock (1975), and while the claims made by Rowley and Peacock are quite different from mine – as they have taken pains to explain – the issue of sustainability has cropped up in both contexts.

[2] For an illuminating analysis of Mill's libertarianism especially clarifying Mill's conception of a person's 'interests', see Wollheim (1973).

a person will be seen as maximising his utility in every feasible choice. But this assertion, then, is no more than a tautology. If, on the other hand, utility is taken in the traditional sense of happiness, or in the sense of a person's own conception of his well-being, then to identify that utility as invariably the same as the binary relation revealed by his consistent choice, would produce an immensely limited model of human behaviour.[1]

It may be useful to distinguish between three types of cases. First, as outlined above, one or more of the parties may refuse to enter into the 'trade' and reject it on moral grounds. Here the libertarian solution of the lewd reading the book need not fail to be an equilibrium. Second, one or more of the parties may think the 'trade' to be immoral on libertarian grounds, but may decide nevertheless to indulge in the 'trade'; *akrasia* or the weakness of will is not an uncommon problem. Here the libertarian solution will fail to be an equilibrium, but it will not go against a unanimous moral judgement (despite going against a unanimous utility ranking). The rejection of the Paretian ranking in either or both of these cases is adequate for the purpose of rejecting the Pareto principle, since the principle is meant to apply without qualification.

Violation of the Pareto principle would be, however, a good deal more controversial in the third case in which neither party disapproves of the trade and both in fact would proceed to such a deal.[2] It raises a deeper question, viz., whether *having a right* based on the 'personal' nature of some decisions (in this case the right to read what one likes and shun what one does not wish to read) must invariably imply being free *to trade that right* for some other gain, irrespective of the nature of the gain (in this case the lewd's gain consists in getting pleasure from the prude's discomfiture, and the prude's gain in avoiding the discomfort of knowing that the lewd is reading a book that he – the prude – disapproves of). If the answer to this question is yes, then clearly the criticism of the Pareto principle would not apply to this case. I believe it is possible to question such an affirmative answer, but I resist the temptation to go further into this complex issue, since for the purpose at hand, viz., the rejection of the Pareto principle (given its unconditional character), the other two cases are sufficient.

Before ending this section, I would like to take up two general issues. First, using a deontological approach, it is possible to include considerations of liberty

[1] The characterisation of human behaviour as being based *exclusively* on the pursuit of one's own happiness (or one's own sense of well-being) irrespective of moral values, social conventions, or ties of class or community, produces a model of breathtaking simplicity. I have tried to analyse elsewhere the consequences of characterising human beings in this way; see Sen (1977*c*).

[2] There is, however, still the problem of *enforcing* such a deal, and it is not altogether obvious how the lewd could ensure that the prude having got the book would, in fact, read it. This would make the trade that much more difficult to execute. See also Olson's (1965) general discussion of the difficulties of contractive action: 'it does *not* follow, because all of the individuals in a group would gain if they achieved their group objective, that they would act to achieve that objective, even if they were all rational and self-interested' (p. 2). But while trade may fail to take place for such instrumental difficulties, that would not be, it seems to me, a reason for denying that the trade would have been in the interest of social welfare. The actual failure of the trade would not, thus, weaken the force of the Paretian welfare judgement in this situation, and if the Pareto principle has to be rejected in this third case, the argument must be found elsewhere. In fact, the issue of feasibility is a distinct one from that of social desirability, and this has to be borne in mind *both* in criticising the Pareto principle (say, in case 2) as well as in defending it (say, in case 3).

not in the evaluations of states of affairs, but instead in the evaluation of action through a 'non-consequentialist' framework.[1] Robert Nozick's (1974) proposal for the resolution of the Pareto-libertarian conflict takes this form (pp. 164–6). Judgements on action are constrained by a firm system of rights which do not get accommodated in the evaluation of 'end-states'. The Pareto principle is retained in the evaluation of *outcomes*, but it does not get translated into a corresponding assessment of right *action*. The prude reading the book may be higher in the social ordering than the lewd reading it (on Paretian grounds), but the protection of their rights to read what they like, and not read what they don't, would prevent a translation of the Paretian ranking into an immediate judgment of actions. This approach has some clear advantages, not least in giving both the Pareto principle as well as requirements of liberty well-assigned and consistent roles – protecting violations of personal rights while retaining the Pareto principle as a part of the social ordering.[2]

However, the role that is given to the Pareto principle in this approach may well be very limited (and quite possibly, vacuous) in terms of actual activities. While 'rights do not determine a social ordering but instead set the constraints within which a social choice is to be made', 'a choice can be made by a social choice mechanism based upon a social ordering, if there are any choices left to make!' (Nozick (1974), p. 166). Furthermore it can be argued that including considerations of liberty and rights in the evaluation of outcomes themselves also has some advantages, especially in dealing with 'third-party moralities', e.g. person 3's moral involvement in letting strong-armed 1 torture or rape, or exploit, person 2, *when* it is in 3's power to stop it. If the violation of rights were reflected into the evaluation of states of affairs themselves, then a consequence-based analysis of right action would involve 3 directly into the event. If, on the other hand, this violation does not make the state of affairs any worse, and rights merely 'set the constraints within which a social choice is to be made' then it is not immediate that person 3 has any involvement in this episode at all.[3]

Finally, it is perhaps worth remarking that the criticism of the Pareto principle under discussion does not dispute the use of 'dominance' as a way of separating out non-controversial choices, which do not involve conflicting considerations, from choices that do. If utility were accepted to be the only basis of moral claim, then the Pareto principle would indeed reflect 'dominance' of moral claims, and would be – accordingly – quite non-controversial. The difficulty, however, arises from accepting other sources of moral claim. This leads to the specification of claims that do not rest on utility considerations, or which require a revision of the relative weighting of different elements in aggregate utility values (e.g. attaching more weight to the prude's displeasure from having himself to read a book he does not like vis-à-vis his displeasure

[1] For a general critique of 'consequentialism' see Bernard Williams (1973).

[2] See also Ronald Dworkin's (1978) contrast between 'general welfare' and 'rights'. It is also worth noting that Dworkin's contrast between 'personal' and 'external' preferences can be used to throw light on the Pareto-libertarian conflict. See also Farrell (1976).

[3] I have tried to discuss this question and some related ones in Sen (1978*a*). Also in Sen (1976*a*), pp. 230–2.

from the knowledge that *somebody else* is enjoying reading that book). The Pareto principle (i) lists a set of virtues, and (ii) uses dominance of virtues as the criterion. What is in dispute here is the former, not the latter.

VIII. CONCLUDING REMARKS

I shall not attempt a summary of the arguments presented in this paper, but will make a few general remarks, to put the discussion in perspective.

First, all the properties on which 'something like a general consensus' seems to exist in traditional welfare economics (Section I) are eminently questionable.

Second, Arrow's impossibility theorem can be seen as resulting largely from combining 'welfarism' (ruling out the use of non-utility information) with remarkably poor utility information (especially because of the avoidance of interpersonal comparisons) (Sections II and III).

Third, the power of these combined informational exclusions can be illustrated by noting that in the exercise of aggregating the conflicting interests of the poor vis-à-vis the rich, the exclusions make it, in effect, impossible to give priority to the interest of the poor. The poor cannot be distinguished for this purpose from the rich – neither in terms of utility, nor in terms of income or other non-utility information (Section III). There are many different ways of avoiding the impasse: dropping welfarism is one, using richer utility information is another (Section V).

Fourth, the Arrow impossibility result translates readily to the Bergson–Samuelson social welfare function as well, precisely to the extent that it too tries to combine welfarism with poor utility information (Section IV).

Fifth, while welfarism is disastrous when the utility information is poor, it remains a very limiting constraint even when the utility information is very rich (Section VI). This can be brought out by explicitly considering such issues as liberty, discrimination, exploitation, or entitlement to social security. The underlying principles tend to give non-utility information a role of its own (in addition to any relevance it might have as determinant of – or as surrogate for – utility data).

Finally, Paretianism can be seen essentially as a weak version of welfarism – banning any independent use of non-utility information in a class of special cases. Even this apparently mild exclusion of non-utility information has highly restrictive consequences, especially for issues related to liberty (Section VII). While escape from these difficulties has been sought in the possibility of 'trading' one's rights, it is argued that this does not dispose of the case against the Pareto principle.

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