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THE ETHICAL FOUNDATIONS OF POPULATION POLICIES

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ABSTRACT

This essay attempts to use the pure theory of welfare economics to address the ethical issues that underlie the choice of future population size. The essay begins with a summary of welfare economic theory as it pertains to situations where population size is not subject to choice, and notes that a symmetry (or anonymity) axiom on social welfare functions has almost invariably been invoked in the theory. It then summarizes optimum population theory and emphasizes that the existing theory extends the symmetry axiom to include the well-being of potential persons. It is argued that in an Actual Problem the symmetry axiom is questionable when future population is subject to choice. The essay concludes with an analysis of the implications of a denial of the symmetry axiom.

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NON-TECHNICAL SUMMARY

For the most part welfare economic theory addresses problems of social choice in circumstances where future population sizes are given. So does applied welfare economic theory, as in models of optimal income and commodity taxation, investment appraisal, and so forth. In this essay the author explores the normative foundations of population policies; specifically, the problems that welfare economic theory would face if it were to address issues of social choice in circumstances where future population size is controllable via alterations in birth rates.

Social choice theory in general, and welfare economics in particular, has made a great deal of use of the axiom of 'symmetry' (otherwise called the 'anonymity' axiom), which asserts that all permutations of persons' levels of well-being ought to be regarded equally desirable states of affairs: in other words, a person's name, or identity, ought not to matter in social choice. The essay begins by exploring various philosophical approaches that can be invoked for justifying the symmetry axiom, and argues that the axiom is a compelling one. The consonance between anonymity and positive social discount rates is also discussed.

It is next argued that optimum population theory has almost invariably invoked an extended version of the symmetry axiom, as in the Classical Utilitarianism of Henry Sidgwick. The author suggests that this is appropriate only in what may be called the Genesis Problem, where all persons are potential. It is demonstrated that Classical Utilitarianism in many plausible circumstances advocates 'too many people', a feature that Derek Parfit has recently dubbed the Repugnant Conclusion. It is shown that a Repugnant Conclusion is implied not so much by Classical Utilitarianism, but rather by an extension of the Pareto-principle and therefore that if the Repugnant Conclusion is to be avoided, this extension of the Pareto-principle must be rejected. However, it is next demonstrated that this extension of the Pareto-principle can only be rejected if explicit distributional

considerations are invoked, the point being that even at the axiomatic level distributional issues are intrinsically related to aggregate issues, such as the Repugnant Conclusion.

The author next argues that the Genesis Problem is misleading. In an Actual Problem there are actual people who must decide on the size of future generations and the rate of investment and resource depletion. Using a simple example the author suggests that the symmetry axiom is questionable in an Actual Problem. It is then shown that new problems arise if the symmetry axiom is rejected. In particular, it is shown that a social welfare function simply does not exist if the axiom is abandoned. It is argued that social choice can be made despite this, and the essay concludes by sketching how such choice can consistently be made.

1. Types of Social Choice

In his recent book Derek Parfit distinguishes three types of policy options: Same People Choices, Same Number Choices and Different Number Choices; (Parfit (1984)). The first affects neither the number of persons nor their personal identities, as in the classic problem of dividing a cake fairly among a given group of people. Much of social choice theory is concerned with such choice. The second affects the identities of future persons but not their numbers. The last affects both.

National economic plans are most often cast within the context of Same Number Choices. This is a good approximation when the available set of economic policies is restricted, either for technical or for political reasons, to those that do not impinge on the size of future populations. The idea then is to forecast future numbers (which, by assumption, are unaffected by choice of policy) and then to rank alternative policies. In Same People Choices social states - or end states, to use Professor Nozick's terminology (Nozick (1974)) - need not include in their characterization the personal identities involved, since the same persons are affected by all the policies. By way of contrast, in Same Number Choices a social state includes in its characterization the identities of the people involved, although, of course, the number of lives associated with all end states is, by assumption, the same. To be sure, one may argue that personal identities ought not to matter in Same Number Choices, that in such choices only

the quality of lives do. The point is that the kind of moral reasoning associated with the idea of impersonal preference (Harsanyi (1955, 1977)), or extended sympathy (Arrow (1963)), which has often been restricted to analyses of Same People Choices, can also be invoked for Same Number Choices. [1] If policy option A_1 is pursued then ego 1 will be born and will enjoy a given level of well-being. If policy option A_2 is pursued then ego 2 will be born instead and will enjoy a (possibly) different level of well-being. (Thus A_1 and A_2 may differ by way of the timing of conception.) In either event there will be an ego (in addition to all the other egos that will exist under either of the policies). There will be an additional life. Confronted with A_1 and A_2 I can be asked which one I would choose if I did not know which person's circumstances I would inherit under either policy. This is the classic way of posing the problem of social choice using the extended sympathy route. An end state in a Same People Choice is an allocation of the good (e.g. welfare). The desire for impersonality implies that names do not matter; that is, we should be socially indifferent between a distribution of well-being and any of its permutations across persons.[2] In exactly the same way the extended sympathy argument implies that the allocation of the good (e.g. welfare) is morally the only relevant feature of an end state even in a Same Number Choice.

Of course, extended sympathy is not the only moral route available for exploring problems of social choice. One may invoke "anonymity" or "symmetry" as a primary moral - that is, invoke it as a moral axiom - and assert that in Same Number Choices personal identities must not matter, that what ought only to matter are the qualities of lives lived under each policy option. This is precisely the way in

which the issue has been handled by Koopmans (1960, 1972) and Diamond (1965). [3] Frank Ramsey's classic formulation of the optimum savings problem concerned Same Number Choices and also invoked the anonymity, or symmetry, axiom, (see Ramsey (1928)). An end state, in the Ramsey formulation, is an intertemporal distribution of the good (i.e. welfare): the names or identities of persons under each option are of no moral consequence, only lives matter.

Welfare economics for the overwhelming part has addressed Same People Choices and Same Number Choices and have not distinguished the two. And it has not distinguished the two because for the most part the object of study has been the quality of lives under various policy options. The quality index is often referred to as welfare and on occasions, as utility. In this essay I shall use these terms synonymously and shall suppose they correlate perfectly with agreeable consciousness, the level of well-being, the standard of living, and so forth. Nothing will be lost by this identification.

Far and away the most difficult kind of policy options is that involving Different Numbers Choices. There is a small literature in welfare economics under the heading "Optimum Population" which addresses the moral issues that arise in such types of social choice. I shall be arguing in this essay that Different Numbers Choices pose conceptual problems far more intricate than those that are involved in Same Number Choices. I shall want to argue that this is so in part because the "anonymity" or "symmetry" axiom is not readily defendable in Different Numbers Choices. This will be the substance of Section 4. But before presenting such arguments it is as well to review the conceptual problems

that arise in analysing Same Number Choices and to discuss related issues such as the choice of social discount rates and so forth. This I do in Section 2 below. In Section 3 I present the classical Utilitarian answer to the optimum population problem, a central aspect of Different Numbers Choices. I shall argue then that Classical Utilitarianism invokes the "anonymity", or "symmetry", axiom for Different Numbers Choices because it views the problem of optimum population as a Genesis Problem. In an Actual Problem the symmetry axiom is otiose. But if one drops the symmetry axiom there are new difficulties. This is illustrated in Section 4 by means of a set of examples. Section 5 presents a brief summary of the conclusions.

2. Same Number Choices

2.1 Social Welfare Functions

Begin by considering a simple but fairly general formulation of the problem of normative economics involving Same Number Choices. We suppose that there are N social states (or end states), labelled S_j (with j=1, ..., N). The number of persons in each social state is M, and we label persons by i=1, ..., M. The problem of social choice involving Same Number Choices is to rank the N social states. There is of course no reason why we should expect of a moral theory the ability to coax a complete ranking; that is, the morally defendable social ordering may only be a partial ordering. But at this level of generality it makes no sense not to impose a complete ordering on the N objects of

choice. We do this and we write by $W(S_j)$ a numerical representation of this complete ordering. This is a social welfare function in its most general form.

No restriction has been imposed on the concept of a social state. Thus, a social state embodies in its characterization everything that is morally relevant for social choice. A social state embodies not only the consequence of actions but also possibly the actions themselves.

The social welfare function is, of course, an aggregator. It aggregates, as a numerical function, a variety of possible social objectives, or goals. Take, for example, a sample of the many social objectives that are often proclaimed: national income per head must be increased; the degree of inequality and wealth (in the light of some summary measure, say) needs to be reduced; poverty must be made to disappear; the level of unemployment ought to be lessened; the rate of inflation has to be pruned; the nation's resources must be conserved; the citizen's fundamental rights (suitably defined) must not be encroached upon; life expectancy must be raised; the "basic needs" of the citizens must be met within T years; and so on.

Some of these goals are, at least approximately, quantifiable, but not all. They are most often non-basic, in the sense that they are implied by a combination of some other goals (often only implicitly held) and contingent facts - e.g. in any discussion which attempts to establish the evils of high inflation rates. Moreover, they are usually non-compulsive, in that when in conflict each of them is usually given some weight: no objective overrides all others. [4/]

In fact, of course, much of welfare economics imposes a good deal further structure on W. For the most part it sees W as being defined directly on the welfare, or utility, consequences of the social states. For my purposes in this essay nothing will be lost in imposing this restriction. I take it therefore that social welfare depends solely on the M-tuple of numerical indices of the good which I shall for concreteness call the standard of living, or alternatively, the living standard. I shall naturally assume that this correlates with utility, welfare, the quality of life, agreeable consciousness, preference satisfaction, and so forth. Let $U_i(S_j)$ be the standard of living in social state S_j of the person labelled i. Then social welfare at S_j is:

$$W(U_1(S_j), \ldots, U_i(S_j), \ldots, U_M(S_j)) \quad 5/. \qquad - (1)$$

A person's living standard is determined, among other things, by the sorts of activities he can engage in, his consumption level, the size of his family, and so forth. Until Section 4 I shall not need to discuss any of the ingredients that enter into the standard of living index. Until then we consider social orderings of end states $(S_1, \ldots, S_N)$ without asking what characterizes these end states. I am calling the numerical index of the good "living standard" because I shall assume in what follows that the good is fully comparable interpersonally. Any other term, such as utility, or welfare, might jar against this assumption, whereas the standard of living probably won't. A living standard is positive if it is good that a person lives at that state. This involves comparison with a life just worth living; that is, the worst state such that we don't count it a positively bad thing that people live at that state. The standard of living is nil at such a state. A formal definition

is provided in Section 3. I note here though that it is not to be thought of as a state at which a person is indifferent between remaining alive and committing suicide; or the state between which and the "state" of not having been born a person is indifferent.

2.2 Multiple Goals and Rights

In Section 2.1 it was seen that the social welfare function (1) incorporates basic social goals, expressed in terms of the distribution of the good, what we call here the living standard. This formulation does not deny that there may be multiple social objectives. When they conflict they are weighted, and the social welfare function expressed in (1) implicitly incorporates these weights.

Where do rights come in? Certain types of rights - those that are not inviolable - are eschewed when we define the social welfare function directly on the M-tuples of living standards. But if certain rights are deemed inviolable then they can be incorporated as additional moral constraints. Thus, we would wish to maximize (1) subject to the technological, information and institutional constraints facing the economy. But if there are certain rights that must not be violated then these rights can be described by additional constraints in the planning exercise. For example, Sen (1982) has recently argued, using torture as an analogy, that future generations may have a right to a "clean" environment, a right which is not based on welfare, or utility, claims in the manner of (1). For my purposes here the point is not so much whether this is a compelling argument; merely that if rights to a "clean" environment

(suitably defined) are inviolable, then the imposition of constraints on pollution emission and concentration levels (e.g. ambient air quality standards) is the way to articulate such rights. 6/

2.3 Accounting Prices

Suppose that a planner wishes to maximize the social welfare function (e.g. (1)) subject to the technological, informational and institutional constraints facing him. These institutional constraints consist, among other things, of the responses of the private sector to the planner's decisions. The extent to which the planner can exercise control over the economy can be great or small, depending on the economy in question. For expositional ease we assume away uncertainty. 7/ It is then a well known theorem in welfare economics that under certain circumstances (for example that W is concave and the constraint sets convex) the optimum plan can be decentralized, in the sense that there exists a system of accounting prices, or shadow prices, for goods and services which, if used in production plans, can sustain the desired programme, and thus the desired social state.

To link this to the general formulation of Section 2.1, we may consider N to be the set of all conceivable social states, where a social state is characterized by an allocation of goods and services and so forth, among the M people in society. The social welfare function (1) ranks these N states completely. But technological and institutional constraints (and possible constraints capturing the inviolability of certain types of rights) ensure that not all N social

states are feasible. These constraints together determine which ones are feasible. The planner's problem is to locate the (socially) best social state from the feasible set. A system of accounting prices can be of help in implementing the best (or optimal) feasible plan; that is, the plan which sustains the best (or optimal) feasible social state.

2.4 The Symmetry Axiom

So far there has been no mention of time. I want for the moment to avoid the special considerations that time introduces. I thus continue to assume a timeless world.

In (1) the social welfare function has been defined on the M-dimensional space of living standards. Let u_i denote the living standard of label i. Then we have $W(u_1, \ldots, u_i, \ldots, u_M)$ as the social welfare level. I now want to impose some (moral) conditions on W so as to simplify the exposition.

The first assumption I want to impose on W is that it is a continuous function, that is, standard of living M-tuples that are not too different are not far apart in the social ordering as reflected by W. A distinguished social welfare function which violates this condition is lexicographic maxi-min. [8] So it may be felt that in continuity I assume too much. In fact lexicographic maxi-min is an extreme moral ordering and, in any case, it can be approximated, as closely as one likes for all practical purposes, by a continuous function. Continuity is in fact a very mild restriction.

The second, and most important, assumption I want to make is symmetry; that is, that all permutations of an M-tuple of living standards are awarded the same numerical value by W. Figure 1 depicts the case where M = 2. Symmetry amounts to the claim that the iso-welfare contours - (u_1, u_2) pairs for which W has the same value - are symmetric about the 45° line.

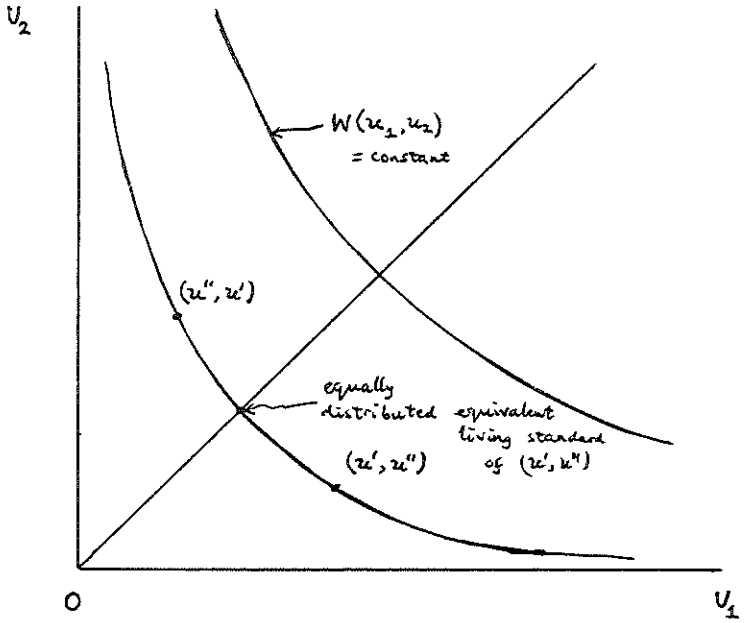


Figure 1

Symmetry is not an innocuous assumption. It can be defended, as was done by Harsanyi (1955), by an appeal to a particular form of the extended sympathy framework. While not innocuous, it is at the same time difficult to reject. For, to reject it is to claim that a person's label matters in the social treatment of the person's standard of living.[9/]

Now, these two assumptions imply, as Figure 1 demonstrates, that associated with every M-tuple of living standards, $(u_1, \ldots, u_i, \ldots, u_M)$, there is a corresponding living standard, μ, which if awarded to each of the M lives, leads to a situation that is exactly as good as $(u_1, \ldots, u_i, \ldots, u_M)$. μ is therefore an "average" living standard associated with $(u_1, \ldots, u_i, \ldots, u_M)$. (But unless W is Utilitarian, it is not the arithmetic average! See below.) This feature of W will greatly facilitate our subsequent discussion. Since there corresponds to any end state an equally desirable one in which all lives enjoy the same living standard we may as well restrict the discussion to such end states. Thus, by $W_M(\mu)$ we will now mean the numerical social welfare value associated with an end state in which each of the M lives enjoys μ.[10/]

I finally assume that $W_M(\mu)$ is increasing in μ. (In Figure 1 this means that North-Easterly points on the 45° line are more desirable.) This last is very innocuous. It is a great deal weaker than Paretianism - i.e. that $W(u_1, \ldots, u_M)$ is increasing in each of the M arguments.

A distinguished example of a social welfare function for Same Number Choice satisfying these requirements is provided by Utilitarianism. Here $W(u_1, \ldots, u_M) = u_1 + u_2 + \ldots + u_M$. It should be noted that the equally distributed equivalent living standard under Utilitarianism is the arithmetic mean; that is, $\mu = (u_1 + u_2 + \ldots + u_M)/M$. Advocating as it does the sum, Utilitarianism is indifferent between all distributions of a given aggregate living standard. There is a precise sense in which all moral theories that are equality-seeking entail that the equally distributed living standard, μ, is less than the arithmetic average (see Dasgupta, Sen and Starrett (1973)).

2.5 Time and Social Discount Rates

So far I have been considering a timeless framework for discussing Same Number Choices. In fact time can be readily incorporated by suitable reinterpretation. Firstly, not all of the M lives under consideration are lived by present persons. Some are future people. Secondly, goods, services and resource flows may be labelled not only by their physical characteristics and location but also by the date at which they make their appearance. Thus a social state is a complete specification of the goods, services, and so forth, flowing to and from each person at each date.

Consider then an intertemporal planning problem in which a social welfare function, such as (1), is to be maximized subject to the variety of constraints that the planner faces. Let t denote time and, without loss of generality, label "today" as $t = o$, the date at which the planning problem is posed. Suppose that it is possible to implement the optimal plan - that is, the solution of the planning problem - by the use of accounting prices. Let the planner select a given commodity as a numeraire, which we label by all its characteristics, excepting its date. Let P_t be its accounting price for date t. It is a present value price. It is the accounting price to be used today for the numeraire of date t. Suppose that $P_t > o$ for all $t \geqslant o$; that is, the numeraire is never a free good. Consider two adjacent moments t and $t + 1$. We define the social rate of discount between t and $t + 1$ as the percentage rate of fall in the accounting price of the numeraire over this unit interval. Denoting the social rate of discount by r_t we thus have

$$r_t \equiv - (P_{t+1} - P_t)/P_{t+1} ,$$

or,

$$r_t \equiv (P_t - P_{t+1})/P_{t+1} \ . \qquad - (2)$$

Now, equation (2) can be rearranged to yield

$$P_{t+1} = P_t/(1+r_t) \ , \qquad - (3)$$

which shows readily why r_t is a discount rate.

Several observations need to be made about social discount rates. First, contrary to what is often thought, social discount rates do not solely involve ethical considerations; in particular, notions of intergenerational justice. Representing as they do a set of accounting prices their status is no different from any other accounting prices. Social discount rates depend not only on social objectives, as say captured in (1), but also on the constraints that the economy is faced with, which include a description of where the economy is at; that is, social discount rates in particular, and accounting prices in general, reflect both welfare judgements and feasibility constraints. Second, social discount rates depend on the numeraire good. Thus suppose the optimum solution of a planning exercise yields as accounting prices \$15 and \$10 for bananas at dates t and t+1 respectively, and \$30 and \$15 for apples at dates t and t+1 respectively. Using (2) we conclude that if bananas are the numeraire good the social rate of discount between t and t+1 is 1/3, whereas it is ½ if apples are the numeraire good. It is only when the optimum policy sustains a steady (or stationary) economic state that social discount rates do not depend on the numeraire

good. For, along a steady state relative accounting prices at all dates are the same. [11/] We need hardly add that irrespective of whether the economy is at a stationary state, the choice of policies is not affected by the numeraire.

Third, it is sometimes held that social discount rates ought to be nil, since otherwise one would be discriminating against future generations. This is essentially the argument used by Professor Georgescu-Roegen in his criticism of Harold Hotelling's analysis of the optimal depletion of exhaustible resources (see Hotelling (1931) and Georgescu-Roegen (1979)). Much depends on what the numeraire is, for we may note from (2) that the claim that the social discount rate ought to be nil amounts to the assertion that P_t ought to equal P_{t+1} for all t. But as we have already observed, social discount rates (equation (2)) are exclusively a function of accounting prices, and they in turn depend on welfare judgements and feasibility constraints. Social discount rates are derived from optimization exercises. They are not a primitive concept, and they depend crucially on the numeraire chosen. Thus, suppose the numeraire good is some index of per capita aggregate consumption. Now suppose along an optimal programme (i.e. optimal social state) this is expected to grow. Then we should, under conventional hypotheses, expect the social rates of discount to be positive, because future generations will have a higher living standard (and thus diminished marginal "utility" of consumption).

On occasion though, what is meant by the assertion that the social discount rate ought to be nil is the belief that the social welfare function in (1) ought to be symmetric in living standards. Thus suppose

the index i in (1) represents the i^{th} generation and, for simplicity of exposition, let us suppose that all generations are of equal size. Now suppose that u_i represents the living standard of generation i. For the social welfare function (1) to be symmetric in living standards it must be the case that all permutations of any given allocation of living standards, $(u_1, \ldots, u_M)$, must be equally valued by W. In his classic formulation of the optimum savings problem Ramsey (1928) assumed a utilitarian formulation and took it that

$$W = u_1 + u_2 + \ldots + u_i + \ldots + u_M . \qquad - (4)$$

Here, future living standards are not being discounted when evaluated by the generation i = 1. But even if one chooses to work with (4) the social discount rate may well be positive if the numeraire is not the standard of living but rather an ingredient of the standard of living, such as aggregate consumption.

Now, it may be argued that if M is large there is a case for abandoning the symmetry in general and formulation (4) in particular, for the reason that future generations (at least those in the distant future) may not exist. The possibility of future extinction looms large if for no other reason than the redoubtable Second Law of Thermodynamics, a law which Professor Georgescu-Roegen himself has skilfully invoked to decry the manner in which economists are prone to modelling production possibilities. No doubt there is a chance that future generations will exist no matter how distant into the future we peer, the chance being smaller the farther we peer. But this is an argument for including all future generations in a planning exercise,

not an argument for awarding the same social weight, by generation i = 1, to the living standard of all future generations. Thus suppose q_i is the (subjective) probability that the i^{th} generation will exist. (Presumably $q_i \geq q_{i+1} \geq 0$ for all i.) Then a defendable generalization of (4) is

$$W = u_1 + q_2 u_2 + \ldots + q_i u_i + \ldots + q_m u_m + \ldots \quad , \qquad - (5)$$

the indefinite sum reflecting the possibility that i = 1 is not certain which the terminal generation is. Here, q_i is rather like a discount factor. In fact the form of the social welfare function, as given in (5), can be deduced from an extended sympathy argument along the lines pursued by Harsanyi (1955) in his pioneering essay. In a sense, even (5) preserves the 'symmetry' axiom, which in Harsanyi's formulation becomes the equi-probability hypothesis of being in anyone's state. But if future generations are less likely to <u>exist</u>, then 'equi-probable' must translate directly into 'less probable' of being in the shoes of future generations. If, for analytical tractability, it is assumed that the extinction process is Poisson-like, then of course

$$q_i = (1+\delta) q_{i+1} \ ,$$

where $\delta > 0$ is the rate of decay. In this case (5) reduces to the form

$$W = u_1 + \frac{u_2}{(1+\delta)} + \ldots + \frac{u_i}{(1+\delta)^{i-1}} + \ldots \qquad - (6)$$

The formulation in (6) has dominated the literature on optimum savings.

A great deal has been written on the subject of social discount rates and the arguments that are involved in 'estimating' them. (See for example, Baumol (1968), Arrow and Kurz (1970) and Lind (1982).) Much has been made of the possibility that social discount rates ought to differ from private ones. In fact the subject is open-ended, because social discount rates depend, among other things, on social objectives and of course one would expect accounting prices to differ from market prices.

We have supposed so far that for each value of M there is a complete ordering of end states, represented by $W_M(\mu)$. Population theory concerns Different Number Choices. One must, therefore, provide a link between each of the Same Number Choice orderings. The remainder of this essay addresses this issue. In what follows we shall write social welfare as $W(\mu,M)$, to express the feature that M is subject to choice.

3. Different Number Choices

3.1 The Genesis Problem and the Repugnant Conclusion

In the Genesis Problem there are no actual persons: all persons are potential. In its purest form the Genesis Problem asks how many lives there should be and at what (living) standards they should be lived. Most theoretical exercises in the Genesis Problem have been conducted within the framework of Classical Utilitarianism (see e.g. Meade (1955) and Dasgupta (1969)).

But the application of Classical Utilitarianism in a world with finite resources often implies a large population size; by this I mean that the average standard of living is embarrassingly low. (See Dasgupta (1969), p. 307. I present a simplified version of it in the Appendix below.) Rawls (1972, pp 162-163) notes in passing one implication of Classical Utilitarianism: that " ... so long as the average utility per person falls slowly enough when the number of individuals increases, the population should be encouraged to grow indefinitely no matter how low the average has fallen." Since there are possible worlds in which the average utility per person falls, "slowly enough" as the

population size increases, this feature of Classical Utilitarianism mustn't be ignored. Parfit (1984) finds it repugnant. Hence his term the Repugnant Conclusion.

One may, of course, ask why it is repugnant. The answer presumably is that the standard of living is a good and therefore it matters, that from the universal point of view mere numbers can't compensate for a barely tolerable living standard. But what of two worlds with different M's but the same μ? How should we rank them? It may be felt that if the living standard is positive the larger world is the better world; if it is negative it is the worse one. I shall suppose this, not because I need it for my main thesis here, but because it is a necessary condition for the Repugnant Conclusion which I want to discuss in this section.

The Repugnant Conclusion is implied not only by the Classical Utilitarian form, μM. It is implied wherever <u>all</u> iso-welfare curves of $W(\mu,M)$ tend to $\mu = 0$ for large M (see figure 2.)

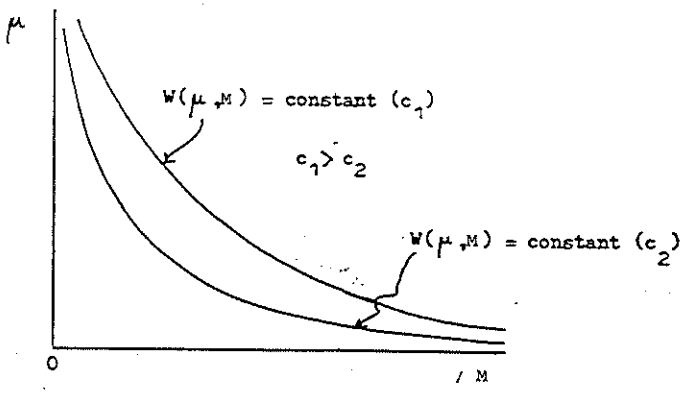


Figure 2

If we find the Repugnant Conclusion repugnant such functions should be rejected or accepted repugnantly! The obvious move to make is to consider those possessing the property that different iso-welfare curves tend to different values of μ as M is made to increase; the higher the iso-curve the larger the value of μ to which it converges, (see figure 3). Such welfare functions reflect "Average Utilitarianism" in an approximate manner for large population sizes and thereby avoid the Repugnant Conclusion.

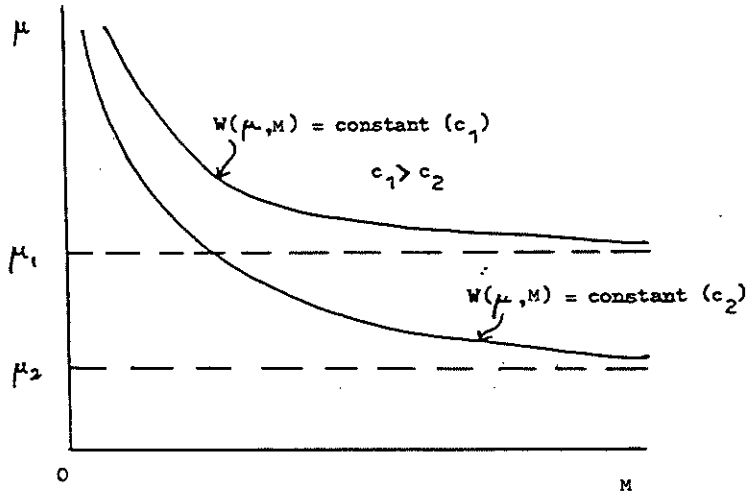


Figure 3

3.2 The Pareto-plus Principle

Personal identities ought not to matter in the Genesis Problem. Indeed it can be argued that they cannot matter: in the Genesis Problem all persons are potential. In a comparison of possible worlds there is no privileged person or group. The fact that different worlds may have different persons is of no consequence. For the purposes of comparison

all that is morally relevant is the vector (or distribution) of living standards.

Consider a possible world which would consist of M persons, where each would enjoy a standard of living μ. Social welfare associated with it is $W(\mu, M)$. Now consider another possible world which would consist of $M + 1$ persons, where again each would enjoy μ as his living standard. Social welfare associated with this second world is $W(\mu, M+1)$. In what follows I assume that there is a unique value of μ such that for all $M \geq 0$, $W(\mu, M) = W(\mu, M+1)$. I calibrate this μ as zero. This defines the zero standard of living.

Consider two possible worlds $(u_1, \ldots, u_i, \ldots, u_M)$ and $(u_1, \ldots, u_i, \ldots, u_M, u_{M+1})$. Call them X and Y respectively. They differ solely by the fact that Y has an additional person (labelled $M + 1$) with a living standard u_{M+1}. The identities of persons in the two worlds may well be different. But as we have argued this is of no consequence. We now wish to rank X and Y.

It may be agreed that X is the better world if u_{M+1} is negative. But what if u_{M+1} is positive? What then?

In a thoughtful recent essay R.I. Sikora has re-asserted the Classical thesis that " .. it is prima facie wrong to prevent the existence of anyone with reasonable prospects of happiness " (Sikora

(1978), p. 42), implying thereby that in the event u_{M+1} is positive Y ought to be ranked over X. Sikora calls theories based on this thesis "obligation theories". His wording is curious; I mean the idea of preventing the existence of someone. It suggests an image of potential immigrants to a land of reasonable plenty condemned instead to languish in an eternal limbo. The error to avoid, of course, is to regard potential persons as a special type of persons. The claim that u_{M+1} is positive amounts to no more than a comparison of the standard of living for person $M + 1$ in Y, with the worst state such that we do not count it a positively bad thing that people live at that state. It would be wrong to claim that in choosing Y we would be benefitting this person.

The only morally relevant difference between X and Y is that Y has an additional person, and his living standard is positive. Call the conception which says that in such circumstances Y is the better world the Pareto-plus principle. There are many who find the principle appealing, and some so compelling that they don't feel any requirement for justifying it (see e.g. Sikora (1978)). The problem is that under fairly weak conditions it implies the Repugnant Conclusion. 12/

There is no paradox in this, merely that, if we find the Repugnant Conclusion repugnant something will have to give. Parfit (1982, p. 164) offers a way out by suggesting that perhaps the welfare ranking is merely a partial ordering; that if u_{M+1} is not too large (but above zero) we simply acknowledge that we cannot compare X and Y.

It would be astonishing if a pluralist theory doesn't yield a

partial ordering of alternative worlds. One would suppose that when different principles are in conflict we would typically not be able to impute precise weights to them. But at this general level of discourse Parfit's suggestion is not really a way out: it does not address the problem, it merely evades it. If we find the Repugnant Conclusion repugnant we must ask why. If we do not find the Pareto-plus principle compelling we must say why.

Is the Pareto-plus principle appealing? Is Y a better world than X? In the Genesis Problem the relevant difference between X and Y is that Y has an additional person and his living standard is positive. Suppose the living standard of all persons in X is very high; (that is, u_i is large, $i = 1,\ldots,M$, and suppose u_{M+1}, though positive, is very small. Might one not have grounds for thinking the worse of Y for that? Notice that one could consistently think the worse of Y for just that while acknowledging the Pareto principle when applied to Same People Choices. Indeed, it would be consistent with acknowledging the Pareto principle when applied to Same Number Choices. X and Y contain different numbers of persons. Person M + 1 in Y is not better off in Y than in X. Nor is 'he' denied a life of positive welfare if X is chosen. The Pareto-plus principle requires further justification than is normally provided.

Parfit provides one. He finds it hard to rank Y below X if the inequality in Y involves no social injustice. He finds it hard because he can't bring himself to think that ".. on the ground that the extra group are worse off than some other group .../ it would have been better

if the extra group had never existed." (Parfit (1982), p. 159). Perhaps so. But the problem with this sentiment is that it presupposes Y to be the world that has actually been chosen, and is the world we live in. In this event X is not attainable. It isn't a possible world. We can't move from Y to X, because in X the additional person doesn't exist - in the sense of 'never having existed'. To be sure we can still ask whether X would have been the better world. But there are good reasons why our answer is likely to be different if Y is the actual world from our answer if both X and Y are available for choice. (See Section 4 below.) "Better if you hadn't existed" is a different sentiment from "better if an additional life isn't created." In an influential essay Bernard Williams has reminded us of a consideration that is overlooked in theories of morality which are scrupulously impersonal: the idea of personal integrity and, in particular, its value. (See Williams (1973)). Williams did not suggest that personal integrity is overriding, merely that it needs to find room in moral discourse. Granted that he was in the main writing about personal morality. It must then be granted that if a person ought to find such a consideration pertinent, so should others when judging his situation. We are here discussing the Genesis Problem. This is different from the moral problem confronting actual people when they choose from among possible future worlds. Considerations that are relevant for the Genesis Problem are pertinent for actual persons when they contemplate alternative savings and population policies. But an Actual Problem involves additional issues, which makes it quite different. Or so I shall argue later.

Suppose however that the identities of the first M persons in X and

Y are the same, and suppose now that in Y each of them enjoys a slightly higher living standard. Wouldn't this provide a compelling reason for ranking Y over X? In Y these M persons are certainly better off than in X. But the additional person in Y is neither better nor worse off. We conclude that the Pareto-plus principle is not the same as the Pareto principle: it is stronger. Even if we can justify the latter on the basis of prior moral reasoning it would not follow without further deliberation whether we can justify the Pareto-plus principle. This is discussed next.

The Pareto principle involves Same Number Choices. What moral theories are there that may justify it? There would appear to be three distinguished ones: (1) social contract theories based on an 'original position' argument; (2) teleological theories that identify happiness, or agreeable consciousness, or the level of well-being, or preference fulfilment as the sole good and (3) pluralistic intuitionist theories.

It is obvious that the second type yields the Pareto principle. The first doesn't, at least not without qualifications. In his celebrated work Rawls argued that parties behind the veil of ignorance will give priority to equal basic liberties over the lexical maxi-min principle concerning the distribution of income and wealth. It follows that the parties would have no allegiance to subsuming the Pareto principle, at least that is if the principle is defined on income and wealth. Nevertheless, I would be cheating if I invoked this as a way of arguing against the Pareto principle here. I take it therefore that allocations satisfying the Pareto principle don't require for their attainment either unequal basic liberties or a reduction in equal basic liberties. In such situations

a party behind the veil of ignorance will not choose a Pareto dominated outcome. In such circumstances contract theories do recommend the Pareto principle.

Intuitionist theories aren't wedded to the Pareto principle at all. Suppose for example that an increase in the aggregate standard of living and a better distribution of living standards are both valued and suppose we are in agreement about how to weight these social objectives relative to each other. So long as the aggregate doesn't have priority over the distribution and so long as the index (or measure) of distribution does not itself subsume the Pareto principle - and there is no reason why it should - the overall theory will violate it.

We conclude that, roughly speaking, only the first two categories of moral theories subsume the Pareto principle; and therefore might seem to have some chance of implying the Pareto-plus principle as well. But in fact teleological theories don't in general. For example, Classical Utilitarianism subsumes the Pareto-plus principle but Average Utilitarianism doesn't. What of contract theories?

In his account of a consideration leading to average Utilitarianism Rawls (1972, pp 161-166), extending an argument of Harsanyi (1955) and Vickrey (1960), suggests that if an individual in the original position were to maximize expected utility and if he were to assume an equal chance of being in any person's circumstance he would choose the society with the highest average utility. Hare (1973), in his review of Rawls, caricatures the conception by admitting an interpretation of the original position

which, if pursued, would imply that justice demands the world to be thickly populated with people, all existing at just about subsistence level. Thus (POPs being parties in the original position):

"We may note here an embarrassing consequence of the inclusion of possible people among the POPs, if Rawls' own normative principles are adopted, and if it is assumed that to have any life at all is better than not to be born. The unborn will then be his least advantaged class; and so his difference or maxi-min principle will require him to say that before anything is done for the rest of us we ought to secure the birth of all these possible people. This would lead us to a duty of procreation on a vast scale; we would stop only when the earth would support no more people above the starvation level."

(Hare (1973), pp 245-246)

There are two separate points to be noted. One concerns the interpretation of the various authors, the other the pertinence of the original position as a conception for population theory. To take the first point, neither Harsanyi nor Vickrey was addressing population theory when developing choice theoretic Utilitarianism. It isn't plain if Rawls' account of the reasoning leading to Average Utilitarianism for the population problem would be accepted by Harsanyi and Vickrey. At the same time nowhere in the elaboration of his <u>own</u> theory of justice does Rawls discuss the question of population policies. He assumes that a Same Number Problem is faced by <u>actual</u> people. It would appear then that Hare's observation about the size of population and the level of well-being in a Rawlsian world is beside the point,

because Rawls can argue that Bare is utilizing the Rawlsian apparatus for analysing a problem for which the apparatus wasn't designed.

The more important point is whether contract theories make a sensible basis for population policies. Rawls' 'original position' is not a congress of souls. It is a conceptual apparatus designed to capture the consideration, "suppose I were in his circumstances", when contemplating a social order in which 'he' receives the worse end of the bargain. But there must be a well defined 'he' for this consideration to make sense. Non-existence is not a 'state' one can imagine oneself in. It is not to be viewed on par with a zero living standard. (For just such a view, see Kavka (1975)). Non-existence is like nothing for us - not even like a very long night - because there is no longer any us to imagine upon. One can't be asked what it would be like to experience one's own non-existence, because there is no subject of experience in non-existence. The difficulty in imagining our own non-existence gives spurious credence to the view that non-existence must be a long dismal night from which we must try to rescue people. We can, of course, feel grateful to the persons who created us for doing just that, not because they thereby rescued us from anything, but because they are responsible for all this experience. Contract theories have credence when applied to actual lives, and in Rawls' theory it was so applied by him. The original position was designed to illuminate one's conception of justice. It can't be expected to sharpen our understanding of every moral concept.

I conclude therefore that the only avenue open to one for exploring whether or not the Pareto-plus principle is defendable is to appeal to

intuition. But intuitively there is not enough to commend it: the principle is totally insensitive to distributional issues. Unless one adds living standards, as Classical Utilitarianism would have us do, there is no reason to rank X and Y on par with each other if all the persons in X have high standards of living and the additional person in Y has nil. The mistake would lie in equating a person experiencing a zero living standard with non-existence. If one refrains from equating the two the intuitive appeal of the Pareto-plus principle weakens.

Consider an evaluation which is sensitive to distribution. Let X be a world consisting of M persons, each of whom enjoys the same (positive) living standard μ, and let Y be a world consisting of X and an additional person, whose living standard is μ^*. For X and Y to be judged equally good μ^* must be positive, less than μ and increasing as a function of μ. Such an axiom would be consistent with the welfare contours depicted in figure 3.

4. Different Numbers Choice: Actual Problems

4.1 A Fundamental Asymmetry

In the previous section we considered certain difficulties in making Different Numbers Choice and we noted that there are certain problems that arise even if all people are potential, the central hypothesis of the Genesis Problem. The question I now wish to ask is whether the Genesis Problem is the right one to pose. I ask this with some trepidation because most of the formal literature on optimum population theory has addressed the Genesis Problem.

In an Actual Problem there are actual people - existing persons whom I shall call the current generation here - who deliberate over future population sizes and current and future living standards. The size of the current generation is given; it is a datum.

Consider the following problem. There is a child whose lifetime standard of living is firmly expected to be nil unless aditional resources are diverted to his needs. Option A is to give him some resources so as to raise his living standard to $\bar{u}$. Option B is to create an additional person and award him resources, thereby enabling him to enjoy the standard of living $\bar{u}$, while the existing child remains at a zero living standard. Assume that all other effects are the same under the two options. Which option should we choose? If, as Sidgwick (1907) would have it, pleasure, or agreeable consciousness is the sole good, and if the fact that something good would be the result of one's action

is the basic reason for doing anything - the ground of binding reasons - then we should be indifferent between A and B. Indeed, this is precisely what unbridled Classical Utilitarianism would dictate. But Classical Utilitarianism presupposes a conception of a person - as solely a location of agreeable consciousness - which can be questioned.

Modern statements of Utilitarianism, such as Professor Hare's preference fulfilment theory, can't be applied to Different Number Choices. Hare (1981, 1982) argues that his conception of the principle of universalizability leads unerringly to Utilitarianism, and he says, ".. what the principle of utility requires of me is to do for each man affected by my actions what I wish were done for me in the hypothetical circumstances that I were in precisely his situation; and, if my actions affect more than one man ... to do what I wish, all in all, to be done for me in the hypothetical circumstances that I occupied all their situations ... This ... emphasises that I have to give the same weight to everybody's equal interests; and ... in so far I am one of the people affected ... my own interests have to be given the same ... weight..." (Hare (1982, p. 26).

The reason why this conception can't be used to discuss Different Number Choices is similar to the one I offered in Section 3.2 when commenting on the attempts to use an 'original position' argument for such choices. Potential persons are not a special type of persons. If, in the foregoing example, we were to regard A as the more desirable of the two alternatives we wouldn't be violating Hare's principle of

utility. What is more to the point, we wouldn't know how to use the principle: it isn't, even hypothetically, possible to occupy the 'situation' of a non-existent - and never-to-be-existent - person.

Professor Mirrlees, in his statement of Classical Utilitarianism, argues that moral ignorance in Different Number Choices may well be the correct position, for the reason that it may in practice be impossible to remove personal bias in conducting utilitarian calculations. For he says: "To get preference information relevant to comparing states of the society with different numbers, the individual has to perform a thought experiment in which the number of alternative selves varies, and to decide which of the two positions he prefers. I suppose this is the purified question of choice about length of life. Can one consider this question without the corruption of thinking about it as one's own life, rather than variation of the number of experiences?" (Mirrlees (1982), p. 81.) I doubt if one can, but in any case, it may be asked why it would be wrong if one doesn't. We have already noted that the principle of universalizability, as formulated by Hare (1981, 1982), doesn't tell us why we should be committed to Classical Utilitarianism in Different Number Choices and indeed why, in the choice of the numbers of future lives, an actual person must on linguistic and moral grounds award the same weight to his living standard (his 'interest') as to a potential living standard. Mirrlees' formulation of the population problem, on the other hand, would appear to be based on an Ideal Observer theory. But then one may ask why in a Different Number Choice the feelings of an ideal observer should be the sole guide. Mirrlees merely asserts it should; he doesn't provide an argument.

I conclude that modern statements of Utilitarianism do not provide any guidance over a choice between A and B. There would be a great many people whose moral sense would urge them to rank A over B on the ground that in A an actual child's living standard will improve, the moral sentiment being that one ought not to add new people without looking after existing ones. What I have argued is that such a basic intuition is consonant with the language of morals. To be sure, Average Utilitarianism would also rank A over B, but not for the reason that in a choice over future numbers, actual persons' living standards ought to be awarded greater attention - that is, ought to count for more - than potential living standards.

What is the source of this moral sense, that the living standards of actual and future persons ought to count for more than potential living standards? I think it stems from a distinction between different sorts of goods.[13/] Begin by distinguishing between categorical goods, which are goods that give you a reason to stay alive in order to get them (e.g. projects that you may have), and conditional goods, which are things worth having if you are alive. Both sorts of goods are components in what makes life good, and good lives are worth having, but only categorical goods make life worth living. Thus of course, nothing can be a categorical good for a potential person (i.e. an unconceived person). The concept of living standard that I have been using in this essay incorporates both sorts of goods in principle, and so for actual (or future) persons it includes more of them, namely categorical ones.

But if we accept this then we are abandoning the symmetry axiom for Different Numbers Choice: actual and future persons are thus to count for more than potential persons. It is important to emphasize that this

is consistent with imposing the symmetry axiom for Same Number Choice. What it means is that given future numbers, savings decisions ought to be arrived at on the basis of a symmetric social welfare function (Section 2) but that the symmetry axiom ought to be abandoned when choosing from among world histories that contain different numbers. We shall see how this can be achieved. But I want first to enlarge on what is implied by the abandonment of the symmetry axiom in Different Numbers Choice. The first thing to notice is that along any world history certain potential persons 'become' actual persons. When these future persons in their turn come to consider Different Numbers Choice they, like current actual persons, will count their (and future person's) living standard for more than potential living standards. And so on with the passage of time as certain potential persons become actual persons, and thus become moral agents. But if this is the characteristic of moral reasoning in Different Numbers Choice then moral goodness is conditional on what exists: it is 'state dependent', or rather agent relative; and it is agent relative because who will appear as future agents is itself subject to choice!

4.2 State Dependent Morality as an Implication of the Asymmetry: An Example.

To see this in the simplest of contexts, consider five possible worlds, X_1, X_2, X_3, X_4 and X_5. There are two persons (1 and 2) in X_1, each firmly expecting to enjoy a living standard of 40. In X_2 and X_3 there is an additional person (labelled 3). In X_2 their living standards are 30, 45 and 15 respectively; in X_3 they are 30, 14 and 45, respectively. In X_4 and X_5 there is a further person (labelled 4). In X_4 the persons' living standards are 25, 25, 40 and 10 respectively; in X_5 they are 25, 25, 9 and 40, respectively. (See table below.)

world / person	X_1	X_2	X_3	X_4	X_5
1	40	30	30	25	25
2	40	45	14	25	25
3		15	45	40	9
4				10	40

We are now discussing an Actual Problem and not the Genesis Problem. Suppose X_1 is the actual world. Then persons 1 and 2 are actual people. When choosing numbers they count their own living standards for more, although of course, in a Same Number Choice they award equal treatment to all living standards. For concreteness suppose, without loss of generality, that the living standards of actual lives count for twice that of potential living standards, and that the social ranking is based on weighted Classical Utilitarianism.

Consider first the ranking of X_2 and X_3. It is a Same Number Choice. Since (30 + 45 + 15) exceeds (30 + 14 + 45), X_2 is better than X_3. Likewise, X_4 and X_5 present a Same Number Choice and, since (25 + 25 + 40 + 10) exceeds (25 + 25 + 9 + 40), X_4 is better than X_5. Thus, what remains for persons 1 and 2 is to rank X_1, X_2 and X_4. Now, awarding the living standard of an actual life a weight of two, social welfare in X_1 is (2 x 40) + (2 x 40) = 160, that in X_2 and X_4, as viewed from the moral perspective of the persons in X_1, are (2 x 30) + (2 x 45) + 15 = 165 and (2 x 25) + (2 x 25) + 40 + 10 = 150, respectively. We conclude therefore that X_2 is superior to X_1, which in turn is superior to X_4. In particular, X_2 is superior to X_4.

But suppose X_2 is the actual world. X_1 is, of course, not a feasible alternative world now - but X_3, X_4 and X_5 are. The ranking of X_2 and X_3remains the same, since they offer a Same Number Choice. Likewise for X_4 and X_5. Therefore it remains to rank X_2 and X_4. Social welfare in X_2, from the perspective of the persons in it, is (2 x 30) + (2 x 45) + (2 x 15) = 180, whereas social welfare in X_4, from the same vantage point of X_2 is (2 x 25) + (2 x 25) + (2 x 40) +

10 = 190. Thus X_4 is superior to X_2. I conclude that X_2 is superior to X_4 if X_1 is the actual world, but is inferior to X_4 if X_2 is the actual world! This is the incoherence in ranking mentioned earlier. There <u>is</u> no overall moral ordering of alternative worlds. (This doesn't mean there can't be <u>rational</u> choice. If X_2 is the actual world then plainly X_4 should be chosen and indeed will be chosen. But if X_1 is the actual world it may be rational of persons 1 and 2 collectively to persist with X_1, since they know that if they choose what <u>they</u> see as the best world, namely X_2, they will subsequently see X_4 as the best which, from their existing vantage point, is morally the least desirable among X_1, X_2 and X_4.)

4.3 Social Choice Rules and Backward Induction

There are two attitudes one can adopt to this'incoherence'. One is that it is otiose because it flagrantly violates moral reasoning. In this case the way out is immediate: the symmetry axiom must be reinvoked for Different Numbers Choice. If we go this route we would, as I argued earlier, identify Actual Problems with the Genesis Problem. Indeed, this may well be the reason why the Genesis Problem has so long dominated discussion.

The other attitude is to accept the implication of asymmetry: that morality is person relative (or generation relative) and that all that moral reasoning can provide in Different Numbers Choice is a <u>rule</u> for selecting social states; a rule which is not based on an overall

ordering of these states. (In the language of social choice theory this amounts to being satisfied by a social choice rule which is generated by a non-acyclic binary relation.)

If we adopt this second attitude then the manner in which a representative generation chooses would be as follows. It would first partition all social states into sets, each set in the partition consisting of social states offering Same Number Choice. (Thus, in the example of Section 4.2, the partition would obviously be: $\{x_1\}$, $\{x_2, x_3\}$ and $\{x_4, x_5\}$.)[14/] That is, all social states in a given set would consist of the same number of lives, and the numbers of lives in social states belonging to different sets in the partition would be different. Choice is then made from each such set on the basis of a symmetric social welfare function, $W_M(\mu)$, (see Section 2). Thus, $W_M(\mu)$, with $M = 1,2, \ldots$, yields a best element from the set in the partition consisting of social states involving precisely M lives. One is then left with an undiluted Different Numbers Choice. This is then made on the basis of a criterion which awards a higher weight to the living standards of actual (and future) persons. This two-step procedure offers a rule for selection. The rule, however, is not based on an overall ordering. Rather, it adheres strictly to the underlying reasoning discussed in Same Number Choice problems (Section 2) and Different Numbers Choice problems.[15/]

We have one more step to take. The two-step procedure for selecting a social state was described for a representative, actual generation, and we noted earlier that the asymmetry implies that choice (via the two-step procedure) among alternative future worlds depends on which

world is the actual world. The problem of savings and population is seen from the moral perspective of actual people, because with the passage of time some potential lives become actual lives as the world unfolds along a path determined by the choices made by Mother Nature and actual people of the past. No doubt the present generation plays God in choosing the next generation's size and its resource and capital base. But there is no unique "present generation". Each future generation will in time become the present and will have to choose. So long as there are future generations no generation is privileged in this sense. Each generation will view the future in much the way the present generation does its future. In particular each generation will, given the asymmetry, on moral grounds award a greater weight to its own living standard when proposing the sizes of future generations and choosing the size of the next generation. Thus in fact each actual generation will use a different social choice rule. To be sure each actual generation will use the two-step procedure. They may even use the same weight on actual living standards. But the choice rule will change, as potential generations become actual. There is therefore a recursion here and the way to resolve it is the familiar backward induction argument, (see Section 4.2). An actual generation applies its choice rule (via the two-step procedure), taking into account that the generation that comes into being because of its choice will in turn apply its choice rule (via the two-step procedure) when deciding on its savings and procreation policy, who in turn will take into account ... and so on.

These are the immediate implications of the asymmetry. If it jars against one's intuitive moral sense it is because we usually think of

moral reasoning as being able to generate a universal ordering over social states. Certainly, that is what the overwhelming part of modern welfare economics has assumed. If agent-relative morality is found wanting, symmetry of treatment of actual living standards and potential living standards must be invoked. But the gnawing question would then be: should they be awarded equal weight?

5. Conclusions

In this essay I have suggested that for the most part welfare economics has addressed Same Number Choice problems. I have argued that in such contexts the requirement that the social welfare function be symmetric in living standards is entirely justified, (Section 2.4). Moral frameworks based on extended sympathy (Arrow (1964)), or impersonal preferences (Harsanyi (1955)) readily yield symmetry as a necessary requirement of social welfare functions. Classical Utilitarianism, provides a distinguished example of such social welfare functions. I then argued that discounting of future living standards (i.e. giving a lower weight to the standard of living of future people) can nevertheless be justified on the ground that there is a positive (exogenous) probability of extinction. Thus, for example, an often used social welfare function, the sum of discounted living standards, can be interpreted as the expected value of aggregate living standards, and this can be obtained directly from the framework of Harsanyi's: such an approach does not violate the symmetry axiom.

In Section 2.5 I defined social discount rates and noted that they depend on the choice of the numeraire good, though of course the choice of numeraire does not affect policy. Being accounting prices, social discount rates depend not only on objectives (i.e. the social welfare function) but also on feasibility constraints. They are a derived concept.

Sections 3 and 4 addressed Different Numbers Choice. Optimum population theory is an aspect of such choice theory. In Section 3

I surveyed the Genesis Problem, in which all persons are assumed to be potential. I argued that much of the discussion on optimum population theory has concentrated on the Genesis Problem (e.g. Blackorby and Donaldson (1979)). The symmetry axiom is compelling in the Genesis Problem. I next discussed the Repugnant Conclusion, which is implied by Classical Utilitarianism when applied to Different Numbers Choice. I then showed that for all intents and purposes it is implied by the Pareto-plus principle, and I argued that a rejection of the Pareto-plus principle is entirely congruent with the language of morals. I further discussed various types of social welfare functions which violate the Pareto-plus principle when applied to Different Numbers Choice and thus avoid the Repugnant Conclusion.

In Section 4 I considered Actual Problems concerning Different Numbers Choice. In an Actual Problem there are actual people who deliberate over future numbers and future living standards. I attempted then to argue that the symmetry axiom is otiose in the formulation of an Actual Problem and that there are good moral reasons for awarding a higher weight to the living standards of actual (and future) people as compared to the living standards of potential persons. But it was then noted that this necessarily introduces a new class of problems, since some of the potential persons become actual people and they, presumably, are equally justified in awarding themselves a higher weight when comparing their living standards with the living standards of potential persons. Not only is there an intertemporal inconsistency, there is a more glaring problem: moral principles pertaining to an Actual Problem are not, in a sense, universalizable. They are agent-relative. They depend on the actual person who is thinking of the

problem. In particular, this means that even if there is a social welfare function for Same Numbers Choice, there can be none for Different Numbers Choice in an Actual Problem. I then sketched how Different Numbers Choice may nevertheless be made in an Actual Problem.

Footnotes

1/ Hare (1981) and Mirrlees (1982) contain recent discussions of extended sympathy from a Utilitarian standpoint, Sen (1973) from a non-Utilitarian one.

2/ This is called "anonymity" or "symmetry" in the social choice literature. See Hammond (1976), d'Aspremont and Gevers (1977) and Maskin (1978).

3/ Koopmans (1960, 1972) and Diamond (1965) were, among other things, concerned with showing that in intertemporal social choice, if there is an infinity of future generations, "anonymity" conflicts with other seemingly plausible moral axioms, leading to the impossibility of social choice. For a non-technical account of the matter, see Dasgupta and Heal (1979), chapter 9.

4/ From this definition it follows that a compulsive social goal is one which has an overriding weight over others. A lexicographic ranking of social objectives would have this characteristic. No trade-offs are allowed in such a case.

5/ The point that you do need certain additional moral axioms to move from the domain of social states to the domain of living standards in defining the social welfare function was noted and demonstrated in the important article of d'Aspremont and Gevers (1977).

6/ Nozick (1974) contains an excellent discussion of rights as constraints.

7/ For my purposes nothing is lost in my making this assumption.

8/ It should be noted that the lexicographic maxi-min principle was invoked by Rawls (1972) to rank alternative distributions of an income and wealth index.

9/ A true monarchist would deny the moral force of the symmetry axiom.

10/ The device of restricting attention to end states in which all persons are equally treated has been used earlier by Kölm (1969), Atkinson (1970) and Mirrlees and Stern (1972). Blackorby and Donaldson (1979) have used it fruitfully to explore the axiomatic foundations of what I shall, in Section 3, call the Genesis Problem. In figure 1 this means that we may as well restrict our attention to the 45° line.

11/ In our example the economy is not at a steady state during t and t + 1, since the relative prices of bananas in terms of apples at t and t + 1 are 1/2 and2/3 respectively.

12/ Blackorby and Donaldson (1979) provide a proof of this for a restricted class of social welfare functions. Parfit (1982, pp 158-69) presents a diagrammatic argument; the precise conditions required to generate the result are therefore not entirely transparent. The algebraic reasoning is as follows. Suppose X_0 is a world consisting of M persons, each enjoying μ_0, where μ_0 is positive. Continuity of $W(\mu,M)$ and the Pareto-plus principle imply that X_0 is ranked on par with X_1, where X_1 is a world consisting of M persons, each enjoying μ_0, and an additional person, whose living standard is nil. But then there exists a positive living standard μ_1 such that X_1 is in turn ranked on par with a

world in which each of the $M + 1$ persons is awarded μ_1. (This follows from the third condition I imposed on $W_M(\mu)$ for Same Number Choices.) Now, any conception of social welfare for Same Number Choices which is 'more egalitarian' than the Royalist lexical maxi-max would have it that $\mu_1 < \mu_0$. Let us assume this. Next, construct X_2 from X_1 in the same way as X_1 was constructed from X_0, and define μ_2 analogously. Then $\mu_2 < \mu_1$, and so $\mu_2 < \mu_1 < \mu_0$. Proceeding in this way we can create more and more populous worlds. In particular, for the k-th extension, $\mu_k < \mu_{k-1} < \ldots < \mu_2 < \mu_1 < \mu_0$, and $\mu_k > 0$. It follows that μ_k must tend to a limit as k tends to infinity. If the limit is zero we have the Repugnant Conclusion; if not, we don't. (We should note that if $W_M(\mu)$ in Same Number Choices is Utilitarian or any function more equality conscious, then $\mu_0 \geq (M+k)\mu_k/M$. This means that μ_k tends to zero as k tends to infinity, which is the Repugnant Conclusion.)

13/ I owe this distinction to John Broome of the University of Bristol, who in turn bases it on Bernard Williams' distinction between two sorts of desires. See Williams (1982).

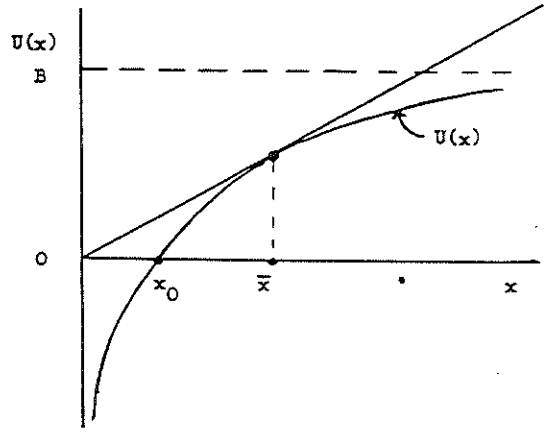
14/ An initial pruning of social states might at this stage be required to eliminate those that are dominated by the Pareto-plus principle, if this principle is invoked, and is regarded compulsive.

15/ This two-step procedure was illustrated in the previous section.

APPENDIX

The Genesis Problem

Suppose K is the quantity of a consumption good available in the world. If x is the consumption level of a person his utility index is $U(x)$, where U is a numerical function, increasing in x (i.e. $U'(x) > 0$), with diminishing returns (i.e. $U''(x) < 0$). Let x_0 denote the level of consumption at which utility is nil; that is $U(x_0) = 0$. x_0 is the utility subsistence level of consumption. We suppose that x_0 is positive. (See figure below.)



Let N denote the number of persons, and we shall, with little loss in accuracy, suppose that N is a continuous variable (i.e. it can assume fractional or even irrational values!). Since all persons have, by hypothesis, identical utility functions and since marginal utility, by hypothesis, is a decreasing function of consumption, an <u>equal</u> distribution of K among all actual persons is the optimum distribution under Classical Utilitarianism. This means that if there are N persons, each should receive K/N units of the resource. Total utility is then $NU(K/N)$ and in the Genesis Problem we search for that value of N which maximizes this.

So we differentiate $NU(K/N)$ with respect to N, which yields the derivative $U(K/N) - (K/N)U'(K/N)$. This we equate to zero. The optimum population size is the solution of this equation. Write $x \equiv K/N$. Since we know K, locating the optimum N is the same as locating the optimum x. The condition which yields optimum x is therefore

$$U(x) = xU'(x) \qquad (A.1)$$

that is, the value of x at which <u>marginal</u> utility of consumption equals <u>average</u> utility per unit of consumption.

Equation (A.1) is fundamental to Classical Utilitarianism, (see Meade (1955) and Dasgupta (1969) for successive generalizations of this). I shall call it the Sidgwick-Meade Rule here. Its intuitive basis is simple. Suppose we have located the optimum population. Then a marginal increase in the size should not change total utility, nor should a marginal decrease. So suppose we were to contemplate a marginal increase (the argument associated with a marginal decrease is analogous). Then this 'additional' person would share K equally with the 'original' population. The gain in introducing this additional person is his utility, which is $U(x)$. But there is also a loss, which is that each of the remaining persons has slightly less consumption. This utility loss is $xU'(x)$. At the optimum population size this gain and loss must equal. The Sidgwick-Meade Rule asserts this equality. In the accompanying figure I have shown diagrammatically how we may locate the optimum per-capita consumption level with the help of the Sidgwick-Meade Rule. I denote the solution by $\bar{x}$.

I now specialize the utility function to obtain some quantitative results. Consider the following class of utility functions:

$$\left.\begin{array}{l} U(x) = B - x^{-\alpha}, \\ \text{where } B \text{ and } \alpha \text{ are positive constants.} \end{array}\right\} \qquad \text{(A.2)}$$

(A.2) is a useful class of utility functions to analyse because it is defined by two parameters, B and α. Frank Ramsey romantically called B the "bliss level", for obvious reasons: B can be approached, but not attained! (See accompanying figure.)

With (A.2) as the utility function it is simple to check that the utility subsistence level of consumption, x_o, is given by the expression:

$$x_o = (1/B)^{1/\alpha} . \qquad (A.3)$$

Now use (A.2) in the Sidgwick-Meade Rule (A.1) to obtain the optimum per capita consumption level as :

$$\bar{x} = [(1 + \alpha)/B]^{1/\alpha} . \qquad (A.4)$$

Finally, use (A.3) in (A.4) to re-express (A.4) as:

$$\bar{x}/x_o = (1 + \alpha)^{1/\alpha} . \qquad (A.5)$$

But α is a positive number, and it is a well-known mathematical fact that when α is positive $(1 + \alpha)^{1/\alpha}$ is less than e (the base of natural logarithms) which in turn is approximately 2.74 .. I conclude therefore that

$$\bar{x}/x_o = (1 + \alpha)^{1/\alpha} < e \simeq 2.74 \ldots \qquad (A.6)$$

Taking exact figures, suppose $\alpha = 1$. Then $\bar{x}/x_o = 2$, which is to say that optimum per capita consumption is only <u>twice</u> as large as the utility subsistence consumption level. Quite obviously, the larger is α, the closer is $\bar{x}/x_o$ to <u>unity</u>! This is the precise sense in which Classical Utilitarianism advocates 'overly large' population sizes for the Genesis Problem in plausible worlds, and where the Repugnant Conclusion which Rawls and Parfit have drawn our attention to, is not to be ignored.

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