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Rawlsian optimal population size*

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Abstract. In this paper, I examine the implications of the Rawlsian maximin criterion for optimal population size and intergenerational allocation of resource when fertility is endogenous. I show that whenever children are better-off than their parents in laissez-faire, then the size of the population and parental bequests are also optimal according to the Rawlsian criterion. Otherwise, laissez-faire leads to overpopulation and suboptimal bequests. I then show that by using proper price-based corrective policies, society can achieve a Rawlsian optimal allocation. These policies involve either a combination of a subsidy to aggregate future consumption and a per-capita tax on children, or a subsidy to average future consumption.

1. Introduction

In "A Theory of Justice" (1971), Rawls offers an alternative theory of justice to utilitarianism. The principles of this theory are those that would be adopted by free and rational persons in an "original position", where each person is behind a "veil of ignorance" regarding his place in society, his ability, and his preferences. In this situation, Rawls argues, society will adopt the maximin criterion as its objective. This criterion calls for maximizing the welfare of the least advantaged member of society.[1] Rawls's theory of justice has generated a great deal of interest among economists who examined its implications for problems such as optimal income taxation (e.g., Phelps 1973; Cooter and Helpman 1974) and optimal capital accumulation (e.g. Arrow 1973a; Dasgupta 1974).

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[1] When the optimal allocation according to the maximin criterion is not unique, one can extend the criterion in a lexicographic form by maximizing the welfare of the next least advantaged member of society and so on.

In this paper, I develop a normative theory of optimal population size and intergenerational allocation of resources based on the Rawlsian maximin criterion, and examine the corrective policies that can move the economy to the Rawlsian optimum. Following the "new home economics" literature, I consider a model in which fertility is endogenous and parents care about the number and the welfare of their children. Given these assumptions, I show that the size of the population and parental bequests in laissez-faire are also optimal according to the maximin criterion, provided that children are at least as well-off as their parents. Otherwise, according to the maximin criterion, laissez-faire leads to overpopulation and suboptimal bequests. I then show that by using proper price-based corrective policies, society can achieve a Rawlsian optimal allocation. These policies involve either a combination of a subsidy to aggregate future consumption, e.g., a subsidy to interest rates, and a per-capita tax on children, e.g., negative child allowances or poll taxes, or a subsidy to average future consumption, e.g., a subsidy to education and health.

The desirable properties of a social welfare criterion, from which one would like to derive the optimal population size and the intergenerational allocation of resources, are discussed extensively in Nerlove et al. (1987).[2] First, they argue that a social welfare criterion should select only among Pareto efficient allocations, otherwise the proposed allocation has to be enforced against the will of all members of the society. Second, a social welfare criterion should not discriminate against any individual, or in the present context, against any generation. The maximin criterion satisfies both requirements. Since is maximizes the welfare of the least advantaged member of society, it clearly selects a Pareto efficient allocation (any departure from the optimum would worsen the welfare of this individual). It also does not discriminate against any generation since any departure from an egalitarian allocation is justified by the maximin criterion only if it results in a Pareto improvement.

Another important property of a social welfare criterion is suggested by Warren (1978) and Narveson (1978). Both argue that all moral obligations are based on the existence of *actual* human beings, who can benefit or be injured by one's actions. As a result, there is no moral obligation to make a *possible* person actual, even if it is known that this person will be happy. On the other hand, the addition of an unhappy person to society should be avoided, since after his birth, one can refer to a person on whom one inflicted misery. Hence, a social welfare criterion should not dictate the addition of potential individuals to society (not even happy individuals), and should prohibit the addition of unhappy individuals. To verify that the maximin criterion has this property, note that since fertility is endogenous, possible persons become actual only if their parents choose to given them birth. Consequently, if parents are worse-off than their children, the maximin criterion leaves the decision of how many children to have in the parents' hands. It therefore does not dictate that parents would give birth to additional children even though these children are going to be better-off than their parents. At the same time, the maximin criterion does not lead to the birth of unhappy children since by assumption children are better-off than their parents. When children are worse-off than their parents, the maximin criterion prevents the birth of miserable children since once they are born their welfare is maximized.

[2] See also the discussion in Dasgupta (1987).

It should be emphasized that the distinction between potential and actual people has critical implications for the analysis in this paper. Without this distinction, the maximin criterion may lead to the so-called repugnant conclusion (Parfit 1984). Assuming that living is better than not being born at all, the least advantaged group of people is the unborn, so as a result, the maximin criterion dictates their birth, thereby leading to a thickly populated world where people exist barely above the starvation level. The repugnant conclusion, however, is avoided when one considers only actual people. In the present context, this is justified because as Dasgupta (1987, p. 646) argues:

"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. However, there must be a well-defined "he" for this consideration to make sense. Non-existence is not a state in which one can imagine oneself. It is not to be viewed on par with zero living standard.... Contract theories have credence when applied to actual lives, and in Rawls's theory, such is the application."

The rest of the paper is organized as follows. The basic model is presented in Sect. 2. Then, in Sect. 3, I solve for the Rawlsian optimal allocation under the assumption that resources are fixed and compare it with the one that emerges in laissez-faire. In Sect. 4, I relax the assumption that resources are fixed and show that the conclusion of Sect. 3 remains valid. In Sect. 5, I consider price-based corrective policies aimed at moving the economy to the Rawlsian optimum. Finally, in Sect. 6, I offer concluding remarks.

2. The model

The basic elements of the model are borrowed from Nerlove et al. (1987). This model is fairly simple, yet its captures the essential aspects of the optimal population size problem. There are two periods and two generations.[3] In period 1, there is only one adult person who has an initial endowment K. This initial endowment is nonrenewable and it does not depreciate over time. One can think of K as representing an exhaustible natural resource capable of producing K units of consumption. The parent consumes a single private good (c^1), and raises n identical children who grow up in period 2. The number of children, n, is a decision variable of the parent. Children are born without endowments of their own.[4] When the parent dies at the end of period 1, he leaves a bequest to each one of his n children. This bequest is used by the children in period 2 to consume a single private good (c^2).

The parent cares about the number and welfare of his children. His utility function can be written as

$$u(c^1, n, v(c^2)) \ , \tag{1}$$

[3] Nerlove et al. (1987) demonstrate that with minor modifications, the model can represent the steady state of an infinite horizon model.

[4] In Sect. 4 below, I show that this assumption does not entail a serious loss of generality.

where v is the utility that each child draws from consumption. Assume that u is monotonically increasing and concave in each of its three arguments, v is monotonically increasing and concave in c^2, and both u and v are non-negative. The last assumption ensures that neither the parent nor his children are miserable.

Assuming that the intertemporal interest rate is 0, the budget constraint for the parent is given by

$$c^1 + nc^2 = K \ ; \quad c^1, c^2, n \geq 0 \ . \tag{2}$$

Although c^2 is viewed throughout most the paper as the amount of private good that the parent bequeath to each child, one can also interpret it as the amount that the parent invests in period 1 in the quality of each child, say in the form of expenditure on the child's education or health. This investment boosts the period 2 productivity of each child and hence his consumption level. Therefore, according to this interpretation, $v(c^2) \equiv V(f(c^2))$, where $f(c^2)$ is the period 2 productivity of each child (where $f' > 0$), which equals his consumption level, and V is the child's utility from consumption.

3. Laissez-faire and Rawlsian optimal allocations

A laissez-faire allocation (LFA) is obtained when (1) is maximized with respect to c^1, c^2, and n, subject to (2). Denote this allocation by (c^{1L}, c^{2L}, n^L). Note that since (2) defines a feasible set which is neither convex nor bounded, a LFA may not exist in general. However, in what follows, I assume that it does. Specific examples for the existence of a LFA are provided by Nerlove et al.

In the present model, the Rawlsian social welfare criterion is defined by

$$\text{Min}\{u(c^1, n, v(c^2)),\ v(c^2)\} \ . \tag{3}$$

Three remarks about the definition of the Rawlsian social welfare criterion are in order. First, the definition is based on the utility functions of the parent and his children. This approach seems to be inconsistent with Rawls who, in order to avoid interpersonal comparisons, rejects the use of personal utility functions in favor of an index of "primary goods". However, as Arrow (1973b, p. 254) points out, "as long as there is more than one primary good, there is an index-number problem in commensurating the different goods, which is in principle as difficult as the problem of interpersonal comparability."[5] Consequently, I follow the standard approach in economics (e.g., Atkinson and Stiglitz 1980, p. 339), and define the Rawlsian maximin criterion in terms of the utility function of the worst-off individual. Second, it should be noted that the parent's utility function represents his felicity rather than his moral preferences (e.g., his religious beliefs regarding the number of children he should have or the guilt he may feel for not bequeathing enough to his children). Third, as one referee argued, taking into

[5] In addition, Klevorick (1974) argues that the adoption of the maximin criterion does not alleviate the need for interpersonal comparisons, since one still needs to undertake the (possibly highly controversial) task of determining which group of individuals is the least-favored under every possible alternative. This task may require the measurement of utility levels, especially if there is a dispute regarding the identity of the least-favored group.

consideration the parent's altruistic feelings towards his children may be morally questionable since these feelings are not reciprocated. However, as I argued above, the parent's altruistic feelings should be viewed as real happiness, and as such, should not be treated any differently than the parent's utility from consumption. Moreover, Rawls argues that "The parties [in the original position] are regarded as representing family lines, say, with sentiment between successive generations" (p. 292), thus incorporating the altruistic feeling of parents towards their children into the original position.

A Rawlsian optimal allocation (ROA), denoted by (c^{1R}, c^{2R}, n^R), is obtained by maximizing (3) with respect to c^1, c^2, and n, subject to (2). Alternatively, it can be obtained by maximizing (1) with respect to c^1, c^2, and n, subject to (2) and subject to

$$u(c^1, n, v(c^2)) \leq v(c^2) \ . \tag{4}$$

This last constraint ensures that the ROA will satisfy the maximin principle: the parent's utility can be maximized only if the parent is not better-off than his children. Assuming the existence of an interior solution, the first order conditions for the problem are:

$$(1-\theta)u_1 = \lambda \ , \tag{5}$$

$$(1-\theta)u_2 = \lambda c^2 \ , \tag{6}$$

$$(1-\theta)u_3 v_1 + \theta v_1 = \lambda n \ , \tag{7}$$

where subscripts denote partial derivatives, and $\lambda \geq 0$ and $\theta \geq 0$ are the Lagrange multipliers associated with the constraints (2) and (4), respectively. Note that since λ, $u_1 \geq 0$, $\theta \leq 1$. Now, if constraint (4) is non-binding, then $\theta = 0$, so Eqs. (5)–(7) are also the first order conditions for the LFA. Hence, in this case, $c^{1R} = c^{1L}$, $c^{2R} = c^{2L}$ and $n^R = n^L$. Thus, if at the laissez-faire children are at least as well-off as their parent, then parental altruism leads to an optimal population size and optimal bequests according to the Rawlsian maximin criterion.

Next, suppose that constraint (4) is binding, i.e., $\theta > 0$, so that $u(c^{1L}, n^L, v(c^{2L})) > v(c^{2L})$. In this case, the ROA is obtained by increasing the utility of every child above its laissez-faire level. Since v increases in c^2, this implies that $c^{2R} > c^{2L}$. Thus, when the parent is better-off than his children in the laissez-faire, the parent's altruism leads to suboptimal bequests according to the Rawlsian maximin criterion.

To compare the population size in laissez-faire with the Rawlsian optimal population size, divide (6) and (7) by (5) to obtain

$$\frac{u_2}{u_1} = c^2 \ , \tag{8}$$

and,

$$\frac{u_3 v_1}{u_1} + \frac{\theta v_1}{(1-\theta)u_1} = n \ . \tag{9}$$

Equation (8) indicates that the social and private marginal rate of substitution between the number of children and the parent's consumption equals c^2. The latter can be interpreted as the social and private marginal cost of children because it is the amount of consumption that the parent has to give up when he decides to have an additional child. Equation (9) indicates that the social (but not the private) marginal rate of substitution between a child's consumption and the parent's consumption equals n, which can be thought of as the social and private marginal cost of children's consumption. Note that the private marginal rate of substitution between a child's consumption and the parent's consumption is described by the left side of (9) evaluated at $\theta = 0$. Thus, as long as $\theta > 0$, the private marginal rate of substitution between a child's consumption and the parent's consumption is smaller than the corresponding social rate, indicating that in laissez-faire, the parent ignores some of his children's benefits from consumption.

Substituting for c^1 from (2) into (8), Eq. (8) determines n as an implicit function of c^2. Assuming that $\partial(u_2/u_1 - c^2)/\partial n$ does not vanish at the optimum, the implicit function theorem implies:

$$\frac{\partial n}{\partial c^2} = \frac{c^2 n u_{11} - u_1 - n u_{12} + v_1(u_{23} - c^2 u_{13})}{2c^2 u_{12} - u_{22} - (c^2)^2 u_{11}} \ . \tag{10}$$

To determine the sign of $\partial n/\partial c^2$, note that since u is an increasing and concave function of its arguments, $u_1 > 0$, and $u_{11}, u_{22} < 0$. Also, since v increases in c^2, $v_1 > 0$. In addition, assume that $u_{12}, u_{13} \geq 0$, and $u_{23} \leq 0$. These assumptions seem reasonable. The first two assumptions imply that own consumption and the number and welfare of children are complements. That is, the parent enjoys having more children and cares more about their welfare as his own consumption increases. The third assumption implies that the number and welfare of children are substitutes. That is, the parent cares less about the welfare of each additional child as the number of his children grows. One can therefore interpret this assumption as implying that the parent's utility function exhibits diminishing returns to children's welfare as their number increases. The assumptions on the sign of the cross-partial derivatives of u are satisfied for example when u is an additive separable function of its arguments.

Given the various assumptions on u, it is easy to verify that $\partial n/\partial c^2 < 0$. This is true for both the LFA and ROA because Eq. (8) is a necessary condition for both allocations. The result that $\partial n/\partial c^2 < 0$ is quite intuitive. Since c^2 represents the price of children, the result can be viewed as saying that at optimum (either LFA or ROA), the number of children decreases with their price (i.e., children are not a Giffen good). Moreover, this result is consistent with King (1987), who reports that many empirical studies have found a persistently negative relationship between family size and various dimensions of a child's welfare, including health, educational attainment and physical development. Now, recall that $c^{2L} < c^{2R}$. Together with the fact that $\partial n/\partial c^2 < 0$, this implies that $n^R < n^L$. Hence, according to the Rawlsian maximin criterion, laissez-faire leads to overpopulation. Of course, as argued above, if at the laissez-faire children are at least as well-off as their parent, the LFA is also ROA, so the population size is also Rawlsian optimal. An implication of this result is that in a growing economy where the standard of living grows over time, population size is optimal. On the other hand, when the reverse is true, the population size is too large.

Finally, since $c^{2L} \leq c^{2R}$ while $n^L \geq n^R$, the aggregate consumption of children in laissez-faire is either smaller, larger or equal to its corresponding Rawlsian optimal level. Thus, from the parent's budget constraint given by Eq. (2) it follows that the relation between c^{1L} and c^{1R} is ambiguous. This discussion is now summarized in the following proposition.

Proposition 1: *If children are at least as well-off as their parent in laissez-faire, then the* LFA *is also* ROA, *i.e.,* $c^{1R} = c^{1L}$, $c^{2R} = c^{2L}$ *and* $n^R = n^L$. *If, on the other hand, children are worse-off than their parent, then laissez-faire leads to overpopulation and suboptimal children's consumption according to the Rawlsian maximin criterion. The relation between the parent's consumption level in laissez-faire and in the Rawlsian optimum is ambiguous, however. That is,* $c^{1R} \gtreqless c^{1L}$, $c^{2R} > c^{2L}$ *and* $n^R < n^L$.

4 Laissez-faire and Rawlsian optimal allocations with production

In this section, I show that Proposition 1 is robust to the assumption that total resources are fixed. To this end, I assume instead that each person is born with an endowment of one unit of labor and that technology is given by a production function f. Since there is only one parent, output in period 1 is $f(1) \equiv K$, while output in period 2 is $f(n)$, where f is an increasing and concave function, i.e., $f' > 0 > f''$. As before, when the parent dies at the end of the period 1, he leaves a bequest to each one of his n children. I assume that the bequest may be negative, say because the parent can leave his children debts which they are obligated to pay.[6] Alternatively, if bequests are interpreted as parental investment in children's quality, then a negative investment will represent situations in which the parent exploits his children by sending them to work at a very early age rather than sending them to school. It should be pointed out, however, that while the assumption that bequests may be negative is a reasonable one, it is by no means innocuous. So long as $f'' \neq 0$, relaxing this assumption renders the comparison between the LFA and the ROA ambiguous.[7] Now, the parent's budget constraint becomes

$$c^1 + nc^2 = K + f(n) \; ; \quad c^1, c^2, n \geq 0 \; . \tag{2'}$$

Given this budget constraint, the first order conditions for a ROA are still given by Eq. (5) and (7), but now, Eq. (6) is replaced by

$$(1-\theta)u_2 = \lambda(c^2 - f') \; . \tag{6'}$$

Dividing Eq. (6′) by Eq. (5) yields

$$\frac{u_2}{u_1} = c^2 - f' \; . \tag{8'}$$

6 For example, current generations in many developing countries leave huge foreign debts to future generations.

7 If $f'' = 0$, i.e., $f(n) = kn$, where k represents a per-child endowment which cannot be transferred to the parent, then the utility function of each child becomes $v(c^2) = v(c^2 + k)$. Clearly, the analysis in Sect. 3 remains unchanged.

The ROA is now characterized by Eqs. (2′), (8′) and (9), while the LFA is characterized by the same equations evaluated at $\theta=0$. Note from Eq. (8′) that the introduction of production into the model leads to a reduction in the marginal cost of children because each additional child is now productive. Since $u_1, u_2 \geq 0$, then $c^2 > f'$, implying that both at the LFA and the ROA, the average consumption of children exceeds their marginal product. As before, when $\theta=0$, the LFA is also ROA. On the other hand, when $\theta>0$, the ROA is obtained by increasing the utility of every child, so as before, $c^{2R} > c^{2L}$.

To compare n^R with n^L, substitute for c^1 from (2′) into (8′). Assuming that $\partial(u_2/u_1 - c^2 + f')/\partial n$ does not vanish at the optimum, the implicit function theorem implies:

$$\frac{\partial n}{\partial c^2} = \frac{(c^2-f')nu_{11} - u_1 - nu_{12} + v_1(u_{23} - (c^2-f')u_{13})}{2(c^2-f')u_{12} - u_{22} - (c^2-f')^2 u_{11} - u_1 f''} < 0. \tag{14'}$$

Together with the fact that $c^{2R} > c^{2L}$, this implies that $n^R > n^L$. Hence, the conclusion of Proposition 1 remains unchanged.

5. Optimal corrective intervention

Having characterized the Rawlsian optimum and shown that it may not be attained in laissez-faire, I now examine the policy implication of the Rawlsian maximin criterion. To this end, suppose that the LFA does not coincide with the Rawlsian optimum and consider the problem of a benevolent social planner who wishes to move the economy to the ROA. In other words, the social planner wishes to implement the social contract that would have been adopted by the members of society in the original position. Of course, the social planner can use coercive policies and control the population size and bequests by fiat. For example, the planner can prohibit the birth of more than a certain number of children per family, or even in extreme cases, sterilize potential parents. Similarly, interpreting c^2 as investment in the quality of children, the planner can mandate that parents should invest a certain amount in their children's education and health. Alternatively, the social planner can use price-based corrective policies to move the economy to the ROA. In what follows, I will examine such policies.

Let s be a subsidy given to aggregate children's consumption, e.g., a subsidy to the interest rate, and let t be a per-capita tax on children, e.g., negative child allowances or a poll tax. Note that since fertility is endogenous, a poll tax is not equivalent to a lump-sum tax. Also, let T be a lump-sum tax needed to balance the government's budget. Then, the parent's budget constraint becomes

$$c^1 + nc^2(1-s) = K - tn - T\ . \tag{11}$$

Maximizing (1) with respect to c^1, c^2 and n, subject to (11), the first order conditions for an interior solution are

$$u_1 = \delta\ , \tag{12}$$

$$u_2 = \delta(t + c^2(1-s))\ , \tag{13}$$

$$u_3 v_1 = \delta n(1-s)\ , \tag{14}$$

where $\delta \geq 0$ is the Lagrange multiplier associated with (11). Dividing (13) and (14) by (12) yields

$$\frac{u_2}{u_1} = t + c^2(1-s) \ , \tag{15}$$

and

$$\frac{u_3 v_1}{u_1} = n(1-s) \ . \tag{16}$$

A comparison of Eqs. (15) and (16) with Eqs. (8) and (9), respectively, shows that if

$$s = \frac{\theta v_1}{n(1-\theta)u_1} \ , \tag{17}$$

and

$$t = sc^2 \ , \tag{18}$$

then the resulting allocation is the ROA. Note that when $\theta = 0$, $s = t = 0$, since the LFA is also ROA. To verify that s is indeed a subsidy and t is indeed a tax, recall that $\theta \leq 1$ and $v_1 \geq 0$. Thus, both s and t are nonnegative as assumed. Intuitively, nc^2 needs to be subsidized because, according to the maximin criterion, the bequests in laissez-faire are suboptimal. However, since c^2 represents the "price" of each child, (i.e., it is the amount of consumption that a parent has to give up when he decides to have an additional child), a subsidy to c^2 would induce the parent to have more than the socially optimal number of children. The role of a per-capita tax on children is to eliminate this incentive. Note that both s and t decrease with the marginal rate of substitution between current and future consumption and with the size of the population, while t increases with the level of future consumption. Also, note that neither s nor t depend on u_3. Thus, counterintuitively, the optimal corrective policy does not depend on the extent of parental altruism.

An alternative priced-based corrective policy aimed at moving the economy to the ROA is to subsidies the average consumption per child, c^2. This subsidy can be in the form of a tax break to bequests, or if one views c^2 as the parent's investment in the quality of children, it can be in the form of subsidies to children's education and health. Denoting the subsidy to c^2 by τ, the parent's budget constraint becomes

$$c^1 + nc^2 = K + \tau c^2 - T \ . \tag{19}$$

Maximizing (1) with respect to c^1, c^2 and n, subject to (19), the first order conditions for an interior solution are

$$u_1 = \delta \ , \tag{20}$$

$$u_2 = \delta c^2 \ , \tag{21}$$

$$u_3 v_1 = \delta(n - \tau) \ , \tag{22}$$

where $\delta \geq 0$ is the Lagrange multiplier associated with (19). Dividing (21) and (22) by (20) yields

$$\frac{u_2}{u_1} = c^2 , \tag{23}$$

and

$$\frac{u_3 v_1}{u_1} = n - \tau . \tag{24}$$

A comparison of Eqs. (23) and (24) with Eqs. (8) and (9), respectively, shows that if

$$\tau = \frac{\theta v_1}{(1-\theta) u_1} , \tag{25}$$

then the planner can move the economy to the ROA. Again, note that when $\theta = 0$, the LFA is also ROA, in which case $\tau = 0$. To verify that τ is indeed a subsidy rather than a tax, recall that $\theta \leq 1$ and $v_1 \geq 0$. Hence, τ is nonnegative as assumed. Intuitively, since $\partial n/\partial c^2 < 0$, future consumption is raised artificially through a subsidy, thereby inducing the parent to lower the number of children to its Rawlsian optimal level. Note that τ decreases with the marginal rate of substitution between current and future consumption. In addition, note that again, τ is independent of u_3, i.e., the extent of parental altruism. The advantage of this policy relative to the one considered earlier is that it needs only one instrument rather than a combination of two. The disadvantage may be that subsidizing average future consumption may be harder to implement (it requires more monitoring) than subsidizing total future consumption and levying a per-capita tax on children. This discussion is now summarized in the following proposition.

Proposition 2: *If the* LFA *differs from the* ROA, *then there exists a price-based corrective policy that can move the economy to the* ROA. *This policy can involve either a combination of subsidy, s, to aggregate consumption of children, and a tax, t, on the number of children, where s and t are given by Eqs. (17) and (18), respectively, or a subsidy, τ, to the average consumption of children, where τ is given by Eq. (25).*

6. Conclusion

Given the rapid growth of population during the last century, many countries, especially in the Third world, have adopted policies aimed at influencing the growth of their populations. This paper provides a benchmark against which such policies can be evaluated. The benchmark is based on the Rawlsian maximin criterion, which, as I argued in the Introduction, is an appealing criterion for population problems. The analysis shows that no population policies are needed if children are better-off than their parents, i.e., the standard of living rises over time, since the population size and intergenerational allocation of resources in laissez-faire are also Rawlsian optimal. However, when children are worse-off than their parents, i.e., the standard of living declines over time, then corrective intervention is needed since laissez-faire leads to overpopulation and suboptimal bequests. The optimal price-based corrective policies aimed at moving the economy to the Rawlsian optimum involve either a combination of a subsidy to aggregate future consumption and a per-capita tax on children, or a subsidy to average future consumption.

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