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Utilitarianism and unequal longevities: A remedy?☆

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ABSTRACT

In the context of unequal deterministic longevities, classical utilitarianism exhibits, under time-additive individual preferences, a counterintuitive tendency to redistribute resources from short-lived agents towards long-lived agents, against any intuition for compensation. We examine the robustness of that result to the introduction of risky lifetime, and to a broader class of individual preferences. It is shown that classical utilitarianism remains unable to provide, in that broader framework, a general redistribution towards the short-lived. Then, we propose a remedy, which consists in imputing, when solving the social planner's allocation problem, the consumption equivalent of a long life to the consumption of long-lived agents. This compensation-constrained utilitarianism is shown to reduce welfare inequalities across agents with unequal lifetimes.

1. Introduction

Although widely used by taxation theorists, classical utilitarianism – *i.e.* the social objective introduced by Bentham (1962), and based on welfarism, consequentialism and sum-ranking – exhibits nonetheless a counterintuitive corollary in the context of unequal deterministic longevity.[1] Under standard assumptions on individual preferences, such as time-additive lifetime welfare, classical utilitarianism recommends a redistribution of resources from *short-lived* agents to *long-lived* agents.

That corollary, which contradicts any intuition of compensation, can be explained as follows. Assume that all individuals have initially the same endowment of material resources, but different longevities, which are known by them. At the laissez-faire, short-lived individuals consume, on average, more resources per period, whereas long-lived agents consume, on average, less per period. Which allocation does classical utilitarianism recommend in that case? Under time-additive lifetime welfare, a utilitarian social planner can hardly distinguish between, on the one hand, one life of x periods, and, on the other hand, x lives of one period.[2] Hence, provided Gossen's (1854) First Law – *i.e.* the law of declining marginal utility of consumption per period – holds, it is always optimal, for a utilitarian planner, to give the same consumption per period to all agents, whatever their length of life is. As a consequence, long-lived agents benefit, at the utilitarian social optimum, from more resources than the short-lived. Hence, provided life is worth being lived, short-lived individuals are penalized *twice*: once by Nature (shorter life) and once by Bentham (fewer resources).

This double penalization is quite counterintuitive, especially when longevity differentials are exogenous. Clearly, one would like short-lived agents to be *compensated* for their short life, as they cannot be regarded as responsible for this. Classical utilitarianism can hardly do justice to such intuitions. All this does not really come as a surprise: as stressed by Mirrlees (1982), utilitarianism can, at best, serve as an ethical standard in the special case of a society of *identical* individuals, because, in that case, the society as a whole can be regarded as a single individual. However, once some heterogeneity is introduced in the fundamentals (*e.g.* preferences, handicap, *etc.*), utilitarianism can only serve as a useful approximation, and may lead to counterintuitive results.[3]

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[1] Note that an earlier formulation of the principle of the largest happiness for the largest number can be found in Beccaria (1764).

[2] For simplicity, we abstract here from pure time preferences. Natural discounting through survival probabilities is assumed throughout this paper.

[3] See Arrow (1971) and Sen (1973) on the utilitarian treatment of handicap.

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Although expected, that counterintuitive corollary is really problematic, since longevity inequalities are universal.[4] Should we then abandon classical utilitarianism when considering policy issues in which agents have unequal lengths of life, that is, in almost all policy issues? Or is it possible to escape from that paradox, for instance by considering a broader domain of individual preferences (*e.g.* non time-additive lifetime welfare)?

The goal of this paper is twofold. First, we examine, by means of a simple model with risky lifetime, the conditions under which classical utilitarianism redistributes resources from short-lived towards long-lived agents. Then, having shown the generality of those conditions, our second goal is to propose a "remedy" to that counterintuitive corollary of classical utilitarianism.

For those purposes, we focus on a two-period model with risky lifetime, where agents allocate their endowment over the lifecycle, while ignoring the time of their death. We consider two groups of agents, who differ in their life expectancy. In order to isolate the role played by individual preferences, we assume that lifetime welfare can take either a standard time-additive form, or can be a concave transform of the sum of temporal utilities, so as to account for risk-aversion with respect to the length of life.[5] We solve for the laissez-faire equilibrium and for the classical utilitarian optimum, and examine under which conditions classical utilitarianism makes the short-lived worst-off than under the laissez-faire. To do so, we adopt an *ex post* welfarist approach, and compare individual realized lifetime welfare levels, rather than individual expected lifetime welfare levels, contrary to an *ex ante* approach.[6]

Then, we explore how one could overcome the general tendency of classical utilitarianism to redistribute resources towards the long-lived. The solution that we propose consists of the addition, in the utilitarian social planner's problem, of *compensation constraints*. The underlying idea is that long-lived agents are advantaged, since their longer life gives them, *ceteris paribus*, a higher capacity to convert resources in terms of welfare, and that this advantage should, on the grounds of fairness, be counted as a part of their consumption bundle. We measure the advantage of long-lived agents by the *consumption-equivalent of a long life*, and count this as part of their consumption.[7] The remedy, which can be called "compensation-constrained utilitarianism", consists of solving a social planning problem where all consumptions – either of short-lived or of long-lived agents – , are homogenized by that procedure.

Anticipating on our results, we show that, under risky lifetime, classical utilitarianism still fails to provide a general compensation to the short-lived individuals. Moreover, the tendency of classical utilitarianism to redistribute resources towards long-lived agents is shown to be a general phenomenon, which is robust to various specifications of individual preferences. Assuming non-additive lifetime welfare does not, in general, suffice to avoid the redistribution towards long-lived agents. We also show that this paradoxical redistribution can be avoided by introducing compensation constraints. Those constraints, by counting the consumption equivalent of the long life as part of the consumption of the long-lived, have a major impact on the direction of redistribution. The undesirable redistribution from short-lived to long-lived agents is, in general, turned into a redistribution from long-lived to short-lived agents.

By those results, the present paper complements the literature on optimal taxation under unequal longevities, such as Bommier (2006) and Bommier et al. (2011a, 2011b). Our specificity with respect to them is to identify the conditions under which classical utilitarianism yields counterintuitive redistribution, as well as conditions under which some compensation can take place thanks to the homogenization of consumptions. This paper contributes also to the population ethics literature, which already highlighted serious paradoxes faced by classical utilitarianism (see Arrhenius, forthcoming; Broome, 2004; Parfit, 1984). Our specificity is to focus on a particular paradox, related to the redistributive corollary of classical utilitarianism under unequal longevities, and to propose a solution to it. Finally, we also complement papers on the measurement of welfare variations due to longevity differentials, such as Becker et al. (2005), Nordhaus (2003) and Usher (1973), which all focused on the monetization of longevity gains. The present paper shows how such a monetization can be used to homogenize consumptions across agents having unequal longevities, in order to avoid counterintuitive redistributive corollaries.

Whereas one may regard the topic of this paper as a purely theoretical contribution, the scope of our results for policy-making in the real world could hardly be overemphasized. Indeed, real world longevity inequalities are substantial, and various aspects of existing social security systems – in particular, pension systems – are instances of distributions from short-lived towards long-lived individuals. Pension systems were designed as ways to smooth consumption across periods and, often, across individuals, in line with classical utilitarianism. Such a smoothing is unambiguously beneficial to those who live long; but it reinforces welfare inequalities between individuals with unequal longevities. The main point of the paper is to highlight the double penalty faced by the short-lived, and to propose a simple solution to overcome it. That solution could easily be introduced in policy-oriented models, as we will show below.

This paper is organized as follows. Section 2 presents the utilitarian redistribution problem under risky and unequal longevities. Section 3 presents the remedy, and contrasts the modified first-best with the classical utilitarian optimum. Numerical illustrations are given in Section 4. Section 5 concludes.

2. The model

We consider a two-period economy with risky lifetime. All agents live the young age (period 1) for sure, but reach the old age (period 2) with a probability π.[8] The length of each period is normalized to 1. There exist two types of agents, $i = 1,2$, who differ in their survival chances π^i,[9]

$$\pi^1 < \pi^2.$$

Without the loss of generality, we assume an equal mass of agents of both types, of size normalized to the unit interval.[10]

Each agent has one half of the total endowment W of resources. Agents choose to allocate their endowment across their lifecycle without knowing the time of their death. Agents' preferences are assumed to satisfy the expected utility hypothesis.[11] Moreover, the utility of death is normalized to zero. Hence, the lifetime welfare of an agent of type i, denoted by U^i, takes the form:

$$U^i = \pi^i G\left(u\left(c^i\right) + u\left(d^i\right)\right) + \left(1-\pi^i\right) G\left(u\left(c^i\right)\right) \tag{1}$$

[4] For instance, according to the United Nations Development Program (2008), the life expectancy of women is, in the U.S., about 5.2 years larger than the one for men in 2007 (80.4 years against 75.2). There exist also large disparities in survival conditions according to the education, the income, the ethnicity, and the employment status (see Rogot et al., 1992).

[5] This is in line with Bommier (2006) and Bommier et al. (2011a, 2011b).

[6] On the *ex post versus ex ante* approach to welfare economics, see Fleurbaey (2010).

[7] That remedy is close to what Broome (2004) proposes in his attempt to account for the value of longevity in a utilitarian framework, but in a goods metrics (and not utility metrics).

[8] Obviously, a model with $T>2$ periods would be more appropriate for an empirical study. However, for the particular issue at stake here, such a model would complicate the analysis significantly, without bringing any new result.

[9] For simplicity, we assume here that this probability is exogenous. For optimal tax policy under endogenous survival probabilities through health spending, see Leroux et al. (2011).

[10] The mass is sufficiently large, to be able to apply the Law of Large Numbers (see infra).

[11] The expected utility hypothesis is an obvious simplification. For an alternative framework based on the moments of utility approach, see Leroux and Ponthiere (2009).