



Welfare comparisons of income distributions and family size: An individualistic approach[☆]



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ABSTRACT

We investigate the problem of how to perform comparisons of income distributions across families of different sizes. We argue that social welfare ought to be computed as the average individual utility instead of the average household utility as in most known criteria. We provide dominance criteria which allow for some indeterminacy about the average optimal family size, by resorting to the bounded approach to dominance analysis proposed by Fleurbaey et al. (2003). Indeed, when differences in needs come from family size, a specific population allocation problem (how a population should be optimally divided over families for given resources) adds to the usual income allocation problem. Pro-family and anti-family stances are introduced in order to make explicit the choice of an optimal family size. An application to French data shows that shifting from the household to the individualistic point of view can substantially alter the outlook of dominance results.

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1. Introduction

When assessing social welfare from the distribution of income, the Lorenz dominance criterion provides relevant information only when the units of evaluation (households or individuals) may be assumed to have the same utility function. Since the pioneering work of Atkinson and Bourguignon (1987), a large literature has sought to refine the Lorenz dominance criterion in order to take into account the different utility functions of households of different sizes (or of individuals with different needs or handicaps). Another seminal contribution by Jenkins and Lambert (1993) extends the criterion once more, in order to make it possible to compare the situations of populations differing not only in the distribution of income but also in the distribution of household sizes. This last extension, however, raises deep conceptual and ethical issues which seem to have been overlooked in the literature. As a consequence of this oversight, several dominance

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criteria, which are satisfactory when applied to individuals with unequal needs, must be revised for an application to households,¹ and new criteria can be proposed. This is the point of this paper.

The conceptual issues can be intuitively explained as follows. A distribution Lorenz dominates another when it generates a greater social welfare for a wide class of social welfare functions, for instance, the class of utilitarian social welfare functions with a concave utility function. This is the classical result highlighted by Atkinson (1970) and Kolm (1969). In extensions of this result to heterogeneous households, the literature has mostly focused on social welfare computed as the average utility of a household. When the distribution of household size is fixed, as in Atkinson and Bourguignon (1987), this is not problematic. In contrast, when it may differ across the situations to be compared, such an approach violates the Pareto principle, as pointed out by Ebert (1997) and Ooghe (2003). Indeed, keeping individual utilities constant, the larger the average household size, the larger the average household utility. This is just simple arithmetics, but it means that a situation with larger households may yield greater household welfare on average even when every individual's utility is lower! The remedy to this

¹ This includes a criterion that we proposed for the case in which the differences in utility functions across households of different sizes can be bracketed (Fleurbaey et al., 2003). We have to share the guilt of the oversight pointed out here.

problem is obvious: one should compute social welfare as the average utility of an *individual*.²

This issue must be distinguished from the usual difficulty of determining equivalence scales for the comparison of different types of households. For every reasonable set of equivalence scales, *household* welfare increases with household size when per capita income is fixed, whereas average *individual* welfare need not always increase under the same circumstances. The latter will indeed depend crucially on the values (or range of values) of equivalence scales, but the correct answer about average individual welfare cannot be obtained simply by retaining the focus on household welfare and adjusting the equivalence scales.

Our purpose in this paper is to study the adaptation of dominance criteria to the computation of social welfare in terms of average *individual* welfare. This requires explicitly taking into account the question of the impact of household size on individual welfare, by allowing for a range of equivalence scales (or a generalized form of equivalence scales). These issues are crucial when making comparisons of social welfare over time for a given country or between countries. For instance, in Canada there are still 2.9 persons in 2011 in an average family while in the US there are no more than 2.6 persons. The number of people in a family has changed dramatically over time. For instance, the size of US households has shrunk over the last three decades of the 20th century from 3.14 to 2.57. Even if the general direction is the same practically everywhere even in developing countries, the pace and timing of change differ from country to country. In this perspective, it is important to propose criteria which are flexible with respect to the optimal family size. Such criteria ought to allow for some empirical or normative uncertainty about the optimal size, which parallels the standard agnosticism of standard dominance criteria about the degree of concavity of the utility function and the degree of inequality aversion in the definition of social welfare.

The paper unfolds as follows. Section 2 coins this discussion in more technical terms by introducing the framework and by pointing out the differences between the individualistic and household viewpoints in welfare comparisons. The ethical issues related to household size are associated with assumptions about how individual utility varies with a family size for a given per-capita income. We will define a pro-family case as one in which individual utility increases with a family size for a given per-capita income and an anti-family case as the opposite.

In Sections 3–5, we revisit the dominance criteria proposed in the literature and examine how they must be amended when social welfare is computed as the average individual utility rather than the average household utility. Three criteria are salient, corresponding to three important classes of social welfare function. The first class, dealt with in Section 3, was introduced by Atkinson and Bourguignon (1987) and, in addition to standard assumptions about concavity and rankings of marginal utility across household sizes, involves the assumption that differences in marginal utility across household sizes decrease with income. This assumption is dropped in the second class, initially introduced by Bourguignon (1989), which is therefore larger but can be reduced by bracketing the differences in marginal utility as proposed by Fleurbaey et al. (2003). This class is the topic of Section 4. Finally, Section 5 examines more restricted classes which are based on specific functional

forms involving equivalence scales. Such classes are especially interesting for applications, as the assumptions on equivalence scales are much easier to handle than assumptions about marginal utility.

An empirical application, in Section 6, shows that the refinement is not innocuous and may substantially alter the outlook of dominance comparisons. Section 7 concludes. The proofs of the three main theorems are in the Appendix.

The individualistic approach has already been explored in a few previous papers. Jenkins and Lambert's (1993) seminal extension of the Atkinson and Bourguignon criterion to the case when the demographic composition of the population varies is made in terms of average household welfare, but they also examine how their formal result, suitably reinterpreted, can be used for comparisons of average individual welfare. As we will show, the individualistic reinterpretation of their criterion implicitly assumes that the anti-family case prevails. More recently, in the context of poverty measurement, Duclos and Makdissi (2005) compare an individual versus household-based aggregation without taking sides, and in their work the two approaches are associated with different assumptions about welfare rankings for different kinds of households. For criteria in terms of average household utility, they assume that household utility is decreasing in size for a given household income (which is compatible with the anti-family case and the pro-family case), whereas for individualistic criteria computed over per-capita incomes, they assume that individual utility increases with household size (the pro-family case).

It turns out that in order to have flexibility about the optimal family size within the Atkinson–Bourguignon framework, it is useful to rely on the bounded approach proposed by Fleurbaey et al. (2003), and further developed by Ooghe and Lambert (2005).³ This approach introduces upper and lower bounds for the relative levels of income that determine how households of different sizes are ranked by order of social priority. By a suitable choice of bounds, one can obtain criteria that are pro-family or anti-family for various household sizes. We therefore study how to introduce bounds in the three classes of social welfare functions considered in Sections 3–5.

A last issue must be mentioned. Among the properties of utility functions which have to be considered in the construction of a dominance criterion in order to cope with differences in the demographic composition of two distributions, one of them plays a non-negligible role. It has to do with the idea that differences in needs due to different sizes tend to vanish when income is high. More specifically, this property states that there is a convergence of utility levels when the households are rich enough, independent of their size. In the literature, it has commonly been assumed that this convergence occurs for household utility levels while we argue that it should rather concern individual utility levels. To illustrate, a rich couple is supposed in the literature to have the same total utility as a rich single for a certain high level of household income. This assumption seems odd because presumably the couple should have greater total utility in this case. We consider more sensible to assume that an individual in a couple has the same utility as a single for a level of household income that exceeds the single's income by a margin respecting the bounds which we referred to in the previous paragraph. This change of assumption has important consequences.

All in all, we believe that the dominance criteria proposed in this paper involve more reasonable and consistent assumptions than those that can be found in the extant literature and will be useful not just in theory but also for applied studies.

² The assumption that social welfare should be written as the mean of individual utilities may sound utilitarian and therefore seem restrictive but, given that individual utilities may be any suitable index of well-being chosen by the evaluator, it really involves only three basic postulates. First, the evaluation is separable across subpopulations. Second, non-continuous criteria such as the leximin are excluded (although they are just at the boundary of the considered class of criteria). Third, the size of the population is not valuable in itself. Each of these basic postulates is debatable but we adopt them throughout this paper.

³ The literature on sensitivity of dominance results to equivalence scales also includes Bradbury (1997) and Buhmann et al. (1989), among others.

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