Inequality and welfare estimates for two different weighting schemes

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Extended Abstract

Whereas the standard tools for inequality and welfare analyses have been developed for homogeneous populations, surveys typically provide data on households and these households may differ in needs. Therefore, the applicability of the standard inequality and welfare tools necessitates the transformation of the heterogeneous population into an artificial quasi-homogeneous population. The transformation requires the choice of an ‘appropriate’ income concept and also of the ‘appropriate’ weights assigned to each observation (household). Until recently, the choice of the income variable (household income, per capita household income, or equivalent income) and the weights attached to the different household types seemed to be discretionary, lying in the hand of the researcher. A broad consensus established with respect to choosing equivalent income, the need-adjusted income obtained from dividing the original household income by the household’s equivalence scale, as the income concept. An equivalence scale, \( e \), is a number that describes the income needs of a household type \( k \) relative to an arbitrarily chosen reference-household type \( r \). However, despite the absence of a theoretical foundation little attention has been paid to the way in which the different household types should be weighted.

In a recent paper, Shorrocks (2004) introduced two basic principles that should govern studies of welfare and inequality if the survey-micro units are heterogeneous. In his theoretical analysis, Shorrocks (2004) finds a basic incompatibility between equity preference and the compensation principle. Equity preference requires that a distribution has a lower welfare and/or higher inequality than another if it is obtained from the latter by a regressive income transfer (see Shorrocks (2004), p. 201). According to the compensation principle, the level of social welfare should depend only on the utility level of the population’s members and not on other individual non-income characteristics such as age or health status (see Shorrocks (2004), p. 202). Albeit the intuitiveness of both properties, both turn out to be incompatible except in very specific circumstances. Moreover, even if one is willing to discard one of the two, specific restrictions arise as to the choice of the income concept, the weighting procedure, and the type of equivalence scales.

Shorrocks (2004) shows that once the compensation principle is adopted (and equity preference is discarded), equivalent income is the appropriate income concept and households must

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be weighted by the number of their members. The result is an artificial household-size weighted (“h-weighted”) distribution of equivalent-incomes. On the other hand, if one focuses on inequality considerations and equity preference is adopted (and the compensation principle is discarded), equivalent income again is the appropriate income concept but households must now be weighted by the household equivalence scales (see also Ebert and Moyes (2003)), creating an artificial needs-weighted (“e-weighted”) distribution of equivalent incomes. If, however, one refers to inequality of living standards, the appropriate weight again is family size. For all cases, the admissible set of equivalence scales boils down to those that are constant, independent of the level of household income (“independent of base” in terms of Lewbel (1989)).

The awareness of the implications of these theoretical results may be enhanced by a quantification of the resulting empirical effects from the two transformation procedures. This study provides e- and h-weighted estimates of two frequently applied welfare and inequality measures. Our measure of social welfare is average equivalent income, average equivalent income per capita in case of h-weighting and average equivalent income per equivalent adult in case of e-weighting. Therefore our measure of social welfare is inequality neutral. Inequality is measured by means of the Gini coefficient. The data of 20 European countries underlying our analysis are taken from the Luxembourg Income Study (LIS). Altogether, we find the empirical differences resulting from the two transformation procedures to be quantitatively minor. However, some typical patterns arise: (a) with the only two exceptions being Poland and Russia, Gini coefficients slightly drop as we switch from e- to h-weighting; (b) in all countries, average equivalent income per capita is very similar to average equivalent income per equivalent adult; (c) although both our inequality and welfare measure are not very sensitive to the weighting scheme chosen, the changes are still sufficient to influence the positions of some countries if they are ranked according to the two measures. A decomposition analysis by household types reveals some mechanics underlying the changes of both measures. It is the incomes of “large” household types being more equally distributed compared to the overall population in interaction with their weight in the overall population being rising when switching to h-weighting.

References
