The Sensitivity of the Profile of Global Poverty to the Per-capita Allocation Rule

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Two common measures of wellbeing, income and consumption, are often measured at the level of the household while poverty is typically viewed as an attribute of the individual. Most of the world's poor live in rural areas and many derive their income from farming (Desiere and Jolliffe, 2018) and nonfarm enterprises (Haggblade et al., 2010) – both of which tend to be household-level activities. Consumption is similarly measured primarily at the household level – this is typically true for consumption of food and also nonfood items such as housing and other durable goods.

The mismatch between the unit of analysis for measuring wellbeing and the interest in identifying poor individuals means that household wellbeing needs to be allocated to the individual. The methodological approach followed by the World Bank for the monitoring of the Sustainable Development Goal (SDG), target 1.1 (i.e., eradicating extreme poverty by 2030) is to divide total household consumption or income by household size, thereby converting household consumption into a per-capita measure. This approach essentially assumes that household consumption does not display economies of scale in household size, and similarly assumes that consumption needs are the same across men, women, boys, girls and infants. Ferreira et al. (2017, p. 149), state that "adoption of a per-capita scale imposes cross-country comparability and is easy to explain." The Global Consumption and Income Project also uses per-capita measures, and Lahoti et al. (2016, p.7) similarly argue that "…per-capita surveys are easier to understand" and assert that "…limiting our focus to per-capita surveys greatly aids comparability…"

The assertion of simplicity is difficult to argue against and the use of per-capita measures is now widely accepted for global poverty estimates. But the assertion that the per-capita allocation improves comparability is problematic. In the space of (meeting basic) needs, a per-capita allocation of household consumption or income will not be comparable across countries if demographic attributes vary across countries. This is also suggested by Lahoti et al. (2016, p.7) in discussing per-capita allocation, "…differences in the real value of resources arising from variations in household size and composition are not taken [into account]." And, demographics differ substantially across countries. In terms of average household size, countries range from slightly more than 2 people to slightly more than 8 people (UN-DESA, 2019a). These differences have clear regional patterns with the average person living in a household with 6.9 people in Sub-Saharan Africa, compared to 3.1 in Europe (Kramer, 2020).

This paper aims to assess the sensitivity of the profile of global poverty to the per-capita allocation rule. By using the same information used for the per-capita allocation (i.e., household size), we can examine how the poverty profile changes when household wellbeing is divided by the square-root of household size. This approach allows for coverage of 162 countries and provides a simple, transparent accounting for economies of scale. Vleminckx and Smeeding (2001) use this adjustment for cross-country poverty comparisons, and Dudel et al. (2020) find that the square-root adjustment performs well for larger households. To assess how the allocation of household resources affects the distribution of poverty (not the level), we first solve for the value of the international poverty line based on the root-N allocation (i.e., dividing household consumption by the square-root of household size) that keeps the overall headcount unchanged (from the per-capita allocation). While the resulting poverty line more than doubles in magnitude, the regional profile of poverty remains relatively stable. The largest percentage-point change is a 2-point reduction in Sub-Saharan Africa from an estimated 39% (per-capita) to 37% (root-N) of the population living in extreme poverty. This stability of the geographic profile though masks significant changes in the identification of who is poor. Our analysis indicates that changing from per-capita to root-N allocation results in reclassifying the poverty status of 270 million people (i.e., 135 million poor people would be reclassified as not poor, and vice versa). We also provide evidence that the probability of being poor as identified by the root-N allocation is more strongly negatively correlated (compared to being poor as identified by the per-capita allocation) with indicators presumed to be related to poverty status (i.e., years of schooling, literacy, asset index, working in agriculture, access to electricity, piped drinking water, improved sanitation). Our interpretation of these findings is that the decision to allocate household consumption on a per-capita basis is an assumption that is difficult to justify and has significant implications for identifying who is living in extreme poverty.

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