Three Conundrums in Measuring Poverty with a Changing Population[*]

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The basic structure of poverty measurement in economics has been built on intuitions that are strong when the population whose poverty is being measured is fixed and given. But when the universe of discourse is itself subject to change, standard measures of poverty, built on the intuitions of unchanging population, lead to uncomfortable or dissonant conclusions. To illustrate and explain this point, I want to consider income distribution at two points in time where the population has also changed in some way. I will look at three scenarios—population growth, population decline, and a constant population size that nevertheless churns around a constant income distribution.

Consider a country where the incidence of poverty is falling at 1 percentage point per annum but population is rising at 2 percentage points per annum. Poverty as normally measured, which involves normalization by population size, has fallen. But the *absolute number of the poor* has risen. This is not just a statistical curiosum, but can occur and has occurred in countries, like those in Africa, where population growth is relatively high. Such an outcome can lead, and has led, to dissonance between the claims of economists that poverty has fallen, and the ground level, lived experience of those who work with the poor and of the poor themselves.[1] "How," the latter group exclaim, "can you economists claim that poverty has gone down, when the soup kitchens are fuller than ever before and there are more street children than ever before?

The answer is found in our "population replication axiom", which undergirds every commonly used measure of poverty. Imagine two societies identical in everyway. There is poverty in each, but it is identical poverty. Now imagine that we combine these two societies into one. Would you say that poverty has stayed the same, or doubled? The population replication axiom asserts categorically that poverty is unchanged. From this comes the mathematical form of most of our poverty indices, where total population is found in the denominator of the formula. But if you would say that in this example poverty has doubled, because there are twice as many poor people, then you would not buy into the population replication axiom. I believe that most ground level activists, those who actually deal with poverty, fall into this category.

Since the issue is about an axiom, it is not necessarily about being "right" or "wrong". At the very least it is about seeing things in different ways, and it is about asking statistical agencies to produce both sorts of numbers—normalized by population size, and not so

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[*] This short note has been written for the *Poverty in Focus* publication of the UNDP's International Poverty Centre.
[1] I discuss this experience in Kanbur (2001).

normalized. It is good that the World Bank has started doing this. With this information, we might better understand the incomprehension of those who see official poverty figures going down while experienced poverty, the number of the poor, goes up.[2]

Let me now construct another scenario. Starting from a given distribution of income, suppose that some of the poor die because of poverty. Of course, the absolute number of poor goes down. It is easy to check that even the proportion of poor will go down. Thus the conflict discussed above is no longer present. Poverty has gone down whichever way you measure it, *but only because poverty has killed the poor!* And this is not just a curiosum either. This phenomenon will arise whenever mortality is higher among the poor than among the rich, which is of course a very commonly observed phenomenon. And it will arise for a wide variety of poverty measures, not just the incidence of poverty. Moreover, the issue arises also in the measurement of health status of a population, and in the discussion of whether AIDS deaths can deliver a dividend in the form of an increase in per capita income.

This cannot be right. We cannot have our standard poverty measures rewarding policies that reduce poverty by eliminating the poor. Put another way, we cannot have our standard poverty measures penalizing policies that prevent the deaths of the poor. And yet, the Number 1 Millennium Development Goal, of halving the incidence of poverty over a given length of time, is wide open to this objection. We have been led, somewhat unthinkingly, into this trap because the intuitions that work well when population is fixed go awry when the universe of discourse is changing.

The answer to this conundrum is not easy, because among other things it forces to ask how far back we want to go in evaluating today's poverty. Had some children, born to poor households, who died yesterday been alive today, poverty would have been higher. But how would we count those who died a hundred years ago because of poverty? If a year ago is too short, and a hundred years ago is too long, where in between is the right cut-off? An alternative is to have measures of income poverty stay as they are, but also include measures of mortality (among the poor) in our evaluation. This is the direction taken by the Human Development Index, which has life expectancy as one of its components alongside income (although in its simplest form it deals only with averages and not outcomes for the poorest). But the specific assumptions underlying any measure need to be made clear. In particular, what is the universe of population whose wellbeing is being evaluated? Those currently alive, which is the present empirical method, and which gets us into the difficulties noted above? Or do we include some of those who would have been alive but for their poverty? An explicit derivation of measures that satisfy key assumptions and basic intuitions is some ways away.[3]

Let us finally turn to a situation where the income distribution is unchanging as is the population, but the different income slots are occupied by different individuals at different times. In other words, there is mobility. Consider the simplest case, where there

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[2] An axiomatic derivation of an intermediate measure that encapsulates both views to some degree, is provided in Chakravarty, Kanbur and Mukerjee (2006).
[3] For a move in this direction, see Kanbur and Mukerjee (2006).

are two income levels, one below the poverty line and one above the poverty line. In one society, the rich stay rich and the poor stay poor. In another, the rich and poor swap places every period. To keep things conceptually simple, let there be no saving or investment, so that income is consumption. The snapshot poverty (income or consumption) is unchanging period to period, of course, and is the same in the two societies. But are these two societies really the same in terms of poverty?

The answer depends on our intuitions of what the experience of poverty means, and whether the experience of poverty in one period for an individual can be "washed away" by an above poverty line experience in another. Imagine yourself at the end of Shakespeare's play, King Lear. You see a once powerful man brought low and you heart goes out to him. Then someone says, "Well, you know, the first fifty years of his life weren't all that bad, and all in all…." To aggregate over Lear's life is to miss the point and the poignancy of his downfall.[4] To aggregate poverty experiences with above poverty line experiences for an individual is equally, in my view, to miss the point about poverty—at least if we take the idea of poverty seriously enough to set it apart from non-poverty, as we do in the way that we measure poverty. On the King Lear view, therefore, the two societies I described above have the *same* poverty. If this makes you uncomfortable, and at the same time you find something compelling about the Lear example, then you will agree that this issue has not been fully addressed in our measurement of poverty.[5]

The three conundrums exposited here are meant not to paralyze the measurement of poverty but to invigorate the discussion of the assumptions that underly the standard measures of poverty. I look forward to the response.

References

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[4] I recall hearing this example in one of Amartya Sen's graduate lectures at Oxford more than a quarter of a century ago.

[5] There are many contributions to the intertemporal measurement of welfare. For a start in the poverty context, see Kanbur and Mukherjee (2006).