

Measures of Poverty

The social welfare function we have presented above takes into account the income of all households. However, there is no requirement that we look at all households. Rather, we can limit our concern to those households at or below the poverty line, in effect, giving no weight to households above it. However, it should be recognized that these low-income measures are special cases of social welfare measures. In effect, we are relaxing our definition of inequality in the social welfare function and attempting to measure the degree of poverty in society. This is the case alluded to earlier where we consider our welfare function, W , to be nondecreasing in each of its arguments. Hence, our goal remains the same, to maximize social welfare.

The current study looks at three measures of poverty or low income and applies them to households with no more than 130 percent of poverty-level income. These measures are the headcount, the minimum needs gap, and the Sen index. The headcount is simply:

$$H = \frac{q}{n},$$

where q is the number of poor households in society and n is the total number of households. Given a poverty line, the headcount ratio is at best a limited measure of poverty. Its shortcoming is that it does not take into account the degree of poverty; that is, the headcount does not give any indication of how severe poverty is in terms of lack of income. In addition, the headcount ratio, H would be unaffected by a policy that might make the poor even poorer.

The minimum needs gap is a measurement that attempts to overcome the shortcomings of the headcount. This measurement can be written:

$$P = 1 - \Theta$$

where Θ is the arithmetic mean of the ratio of household income to the poverty line or other measure of minimum needs. (In this report, P is the ratio of household income to 130 percent of the poverty line). The minimum needs gap can be interpreted as the average percentage deviation of income from the

poverty line for the poor population (Blackburn, 1990). Hence, the minimum needs gap as defined above provides a measure of the severity of poverty. However, it does not depend on the actual number of poor people and will not change when the numbers of poor are increasing or decreasing.³ In addition, transfers from poor to nonpoor, or from poor to poor who then become nonpoor, will increase the income gap. But transfers among the poor that make the distribution of income more unequal will not affect the income gap. The fact that the income gap does not take into account the actual numbers of the poor or income transfers among them is a severe shortcoming.

In an attempt to rectify the above problems, Sen (1992) proposed a poverty measure that is a combination of the headcount, income-gap, and Gini coefficient. This measure of poverty can be written:

$$S = (H \times G) + P \times (1 - G).$$

Written this way, the Sen index, S , is shown to be the average of the headcount and the income-gap measures weighted by the Gini coefficient of the poor. If there were no income inequality among the poor, G would be zero and the Sen index would reduce to the income-gap measure. Conversely, if only one household among the poor had all the income, G would be equal to one and the Sen index would reduce to the headcount. Given a population somewhere between these extremes, the Sen index takes into account the numbers of the poor, their shortfall in income relative to the minimum needs line, and the degree of inequality in the distribution of their income.

The above measures of inequality and minimum needs are not the only ones used by social scientists. Other measures do exist, and each has both strong and weak points for the job that it was designed to do. (For a review of various measures of poverty, see Foster and Sen (1997) and Cowell (1995)). However, in this report, where we look at the demographic characteristics of the population eligible for food stamps, we make use of the measures that we set for the above. While not perfect, they do allow the researcher to describe the different dimensions of poverty or minimum needs in our society.

³ A reviewer pointed out that this is not true if all households who have zero income are removed from the data.