Economic Concepts of Social Welfare and Inequality

This section presents some relevant economic concepts and draws heavily upon work by Deaton (1997). Perhaps the easiest way to explain the economic background of inequality and poverty measures is to start with the concept of a social welfare function. This is a concept that provides a consistent way to think conceptually about welfare and inequality measures. We can denote social welfare by W and write it as a nondecreasing function of all the income for the population denoted by x. Thus,

$$W = V(x1, x2, ... xn),$$

where n is the population size. Hence, we wish to maximize W or welfare, which is a function of V, or more directly of household income. If we assume V to be increasing in each of its arguments, social welfare is assumed to be greater when at least one household is better off and no household is worse off. Sometimes this assumption is slightly changed, and we assume that the social welfare function W is unresponsive to changes in welfare among the nonpoor. In this case, we assume V to be nondecreasing in each of the arguments, x. This concept of nondecreasing social welfare becomes relevant in our discussion of poverty measures.

There are two other properties that may define social welfare functions that should be noted. The first is that the social welfare function is a list of welfare levels in society. This simply means that welfare does not depend on which household has what level of income in society and is often referred to as the property of symmetry or anonymity. Second, and perhaps most important, society and policymakers are usually assumed to prefer more-equal distributions to less-equal distributions. If society believed that any inequality were undesirable, then W, as defined above, would be maximized when all incomes were equal. Lacking a desire for complete equality, economists usually assume that any transfer of income from a wealthier household to a poorer household will increase social welfare. This is known as the "principle of transfers."

In order to transfer from welfare to inequality measures, it will be helpful if we define our welfare function. Hence, we can let:

$$W = \mu V\left(\frac{x1}{\mu}, ... \frac{xn}{\mu}\right),$$

where μ is the average of the x's or average income. Defining the welfare function this way gives a separation between the average value of household income and the distribution of that income. This allows us to talk about changes in social welfare as changes in the average value of income and some acceptable measure of inequality. If we choose a functional form for W, such that $V(1,1...1) = 1$, then if everyone had the mean level of welfare, social welfare would also equal that value. From this assumption, we can surmise that if the income distribution is unequal, then social welfare cannot be greater than the average of the distribution of income. Hence, with an unequal distribution of income, the social welfare function can be written as:

$$W = \mu(1 - I),$$

where I is some appropriate measure of inequality. One way to think about the social welfare function as written above is that is it the cost of inequality. I is thus the measure of inequality, taking the value of zero when the income is equally distributed and increasing with disequalizing transfers. Note that I is not a measure of welfare. It is only part of the equation. Hence, inequality might increase even as average income becomes larger, thereby increasing social welfare.

This report will use one measure of inequality: The Gini coefficient. This measure is desirable from the point of view that it satisfies the principle of transfers. The Gini coefficient can be written as:

$$G = \left(\frac{n+1}{n-1}\right) - \left(\frac{2}{n(n-1)\mu}\right) x \sum_{i=1}^{n} \rho i x i,$$

where ρ is the rank of household i in the income distribution, with the household with the highest income having a rank of 1. Note, that if everyone has the same income, m, the Gini coefficient, G, is zero, while if one person has all the income, the Gini coefficient would be 1. Hence, low values of the Gini are associated with more equal distributions of income.