Methodology of Study

In the first part of this empirical study, we look at what has actually occurred to Sen's welfare index and its component parts between 1981 through 1995 for households with income no greater than 130 percent of the poverty line. Any household with a ratio of one or less of household income to 130 percent of the poverty line would meet the gross income test for food stamp eligibility. In addition to this, we look at household and per capita income as well as household size. In the second half of this empirical report, we employ multivariate statistical techniques to investigate the influence of demographic factors. Using data from the Consumer Expenditure Survey, we estimate regression models for every other year beginning in 1981 and ending in 1995. (See appendix A for a list of the estimated parameters by year.) Hence, we estimate a model that can be symbolically written as:

$$\frac{\textit{Household}\ \text{Income}}{130\%\ \text{Poverty Line}} = \beta 0 + \beta 1 * NE + \beta 2 * MW + \beta 3 * S + \beta 4 * Black + \beta 5 * Age + \beta 6 * Age\text{Squared} + \beta 7 * \text{FS} + \beta 8 * \text{FH} + \beta 9 * \text{SP} + \beta 10 * \text{OF} + \beta 11 * \text{NOHS} + \beta 12 * \text{HS} + \beta 13 * \text{NOE} + \varepsilon,$$

Where:

NE	=	Dummy variable for the Northeast,
MW	=	Dummy variable for the Midwest,
S	=	Dummy variable for the South,
Black	=	Dummy variable for Blacks,
Age	=	Age of household head,
Age Squared	=	Age of household head squared,
FS	=	Family size,
FH	=	Dummy variable for a female-headed household,
SP	=	Dummy variable for a one-person household other than older females,
OF	=	Dummy variable for single females 50 years and older,
NOHS	=	Dummy variable for head of household without high school diploma,
HS	=	Dummy variable for head of household with a high school diploma,
NOE	=	Number of earners in the household,
ε	=	Error variable for the model,

and the B's (lower-case Greek Beta in the equations) are coefficients estimated by the regression technique. Each B represents the net effect of that variable on the ratio of household income to 130 percent of the poverty line, given all the other variables in the model. The effect of any variable not included in the model is captured in the error term of the model.

The above variables were selected a priori because they were thought to represent the main demographic characteristics of poor U.S. households. Regions were added to the regression under the hypothesis that particular areas of the United States may have more poor households than others. Likewise, race was divided into Black and non-Black households on the theory that there are proportionally more poor Black households than non-Black households. Age was entered in a quadratic form since this specification has been shown to provide a good statistical fit in models with income and household composition entered separately. Adding household size to the regression controlled for variations in size between households. It was hypothesized that female-headed households might represent proportionally more poor households than nonfemale-headed households, so this variable was added to the regression equation. Likewise, we hypothesized that one-person households might represent a large proportion of poor households, so this variable was added. From the one-person household group, single females 50 years or older were entered separately, on the theory that older females might represent a growing proportion of the population who might be poor and eligible for food stamps. Household heads were classified as high school dropouts, high school graduates, or college graduates (including graduate degrees).[4] These were entered under the hypothesis that high school dropouts are severely disadvantaged in terms of human capital and more likely to be poor than those heads of household with a high school education or more. Finally, the number of wage earners in a household was entered under the assumption that the more wage earners there are, the less likely the household will be poor.

After estimating the above model, we calculate summary statistics for each year. These include the headcount ratio, the income gap ratio, the Gini coefficient for the population eligible for food stamps, the Sen index, household size, real household income (adjusted for inflation), and real per capita income. Then using

[4] Household heads with some college were classified as having a high school diploma.

our regression models, we isolate the effects of selected demographic factors on the ratio of household income to 130 percent of the poverty line. In reality, we are examining the counterfactual case whereby we isolate the net influence of selected demographic variables on the dependent variable (the ratio of household income to 130 percent of the poverty line). We do this by using the estimated parameter values from the regression models and then constructing a vector of adjusted eligible households by removing the net influence of any selected demographic factor (Bishop, Formby, and Smith, 1997). Since the estimated sign of these selected demographic factors is negative, these attributes really represent a disadvantage in terms of the ratio of household income to the poverty line. To give a concrete example, if we want to know the effect of single-person households (which has a negative coefficient in our models) on our welfare measures, we can create a new variable, P^*, by taking the ratio of household income to 130 percent of the poverty line, P, and adding the statistically estimated coefficient from the single household variable, B_9. Hence, we would have:

$$P^* = P + \beta 9^*(\textit{Single Person}).$$

The effect of creating P^* is to isolate the "single person" effect, or more technically, to remove the net income disadvantage associated with single-person households. All other attributes of single-person households, such as education and race, remain. We then determine the net effect of isolating this demographic characteristic associated with an income disadvantage by recalculating the summary statistics for this modified variable and comparing them to the original calculations. In this way, we can identify which demographic characteristics have the largest impact on the size of the population eligible to receive food stamps. We would like to make the point that this is not the same as dropping one demographic group, say singles, from the regression equation and then reestimating the equation. This is because any demographic group will be composed of more than one demographic characteristic. Here we wish to identify those demographic characteristics most responsible for increasing the above-mentioned measures of poverty. While we cannot observe such an exercise in the "real world," it is the case that the regression coefficient represents the net effect of that variable on the dependent variable, all other things being equal.

We would like to note that income is reported here on both a household basis and a per capita basis. Food stamp eligibility is based on household income given household size. And indeed, an argument can be made that household welfare is largely determined by household income, even though some economists prefer to discuss social welfare on a per capita basis. Both arguments have merit. However, it is problematical to compare household incomes when household size differs; therefore, we also report income on a per capita basis to facilitate such discussions.