

Data Issues Affecting the Calculation of Alternative Poverty Measures

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I. Recommendations of National Academy of Sciences Panel on Poverty and Family Assistance

The National Academy of Sciences (NAS) Panel on Poverty and Family Assistance (panel) focused their recommendations on data issues in just a few areas (see Citro and Michael, 1995).¹ First, the NAS panel recommended that the Survey of Income and Program Participation (SIPP) become the source of official poverty statistics in place of the Current Population Survey (CPS) Annual Social and Economic Supplement (ASEC), then referred to as the March CPS (Citro and Michael, pp. 11-12). They made this recommendation because they determined that SIPP obtains income data of higher quality than the CPS ASEC and because, as an income survey rather than a supplement to a labor force survey, it is better able to satisfy the data requirements for an improved measure of poverty.

Second, they proposed that new poverty thresholds be determined from actual Consumer Expenditure Survey (CEX) data, and updated each year with more recent expenditure data (Citro and Michael, pp. 5-6). Their method for establishing the initial thresholds would be to determine the average actual median expenditure for food, clothing, shelter, and utilities over a 3-year period for a reference family of two children and two adults, then reduce that amount by a pre-specified fraction, add an additional percentage for other goods and services, and adjust that amount for family size and composition differences using an equivalence scale by formula. The NAS Panel also made some recommendations on how to improve the CEX data for these purposes.

Third, the NAS panel urged investigation of the ability of other surveys to estimate disposable income (as defined by the NAS panel) because analysis with other surveys and with the decennial census often requires indicators of poverty status.

This paper has four parts. The first examines the shortcomings of the CPS ASEC that might have led to the panel's recommendations to substitute the SIPP for the CPS. The second and third parts discuss how one might use the SIPP and the CEX, respectively, to implement the NAS panel recommendations. The final part identifies the difficulties other major household surveys would have in implementing a revised poverty measure.

II. Shortcomings of the Current Population Survey Annual Social and Economic Supplement

The CPS ASEC has two major shortcomings from the point of view of extended poverty measurement. First, it does not collect all the information needed to compute the NAS-recommended measure, or related measures. Second, income is underreported by respondents and does not match independent benchmarks.

1 The text of the relevant recommendations is in Appendix A.

The CPS ASEC interviews roughly 78,000 households about income in the previous calendar year and current demographic characteristics, carried out over a 3-month period (February-April) by telephone and personal visit.² The CPS is jointly sponsored by the Census Bureau and the Bureau of Labor Statistics (BLS) and is used to collect the basic labor force information about the country each month. Interviewers return to the same unit for 4 months, skip 8 months, and then return for 4 additional months. Households moving out of their units are therefore replaced by households moving in. One-eighth of the sample is new each month.

Income data collection focuses on up to 50 sources of income (including many non-cash benefits) and up to 27 individual income values. In addition, since 1999, the ASEC collects an indicator of paid child care use. It does not collect any information on taxes paid, the cost of child care or other work expenses, or medical out-of-pocket costs (MOOP). These data items, along with the value of noncash benefits, must be imputed to the survey before it could be used to compute alternative poverty measures. The CPS is basically a labor force survey; collection of supplementary data, for whatever client, is secondary.

The CPS has been collecting data on money income since April 1948 on a more-or-less comparable basis and the receipt of major noncash income since March 1980 (see Weinberg et al., 1999). The sample size does not permit single-year state-level estimates; such estimates reported by the Census Bureau focus on 3-year averages to determine levels and a comparison of 2-year moving averages to determine change.

As noted in Roemer (2000), the CPS ASEC underreports income for several categories of income, though not wages and salaries. Roemer found that aggregate wages from the 1990-1996 CPS ASECs are consistently higher than those from the SIPP. As he notes, the CPS ASEC “seems to have increasing difficulty with family assistance, military retirement, and state and local pensions” (Roemer, 2000, p. 40). However, in another study, Roemer (2002) notes the following: “An excess of high wages and a shortage of low wages occurs in the March CPS [and] SIPP has an excess of low wages and a shortage of high wages” (p. 1). He determined that this was at least partly because the CPS ASEC underestimates the wages of part-year part-time workers.

² The Medicare, Medicaid, and SCHIP [State Children’s Health Insurance Program] Balanced Budget Refinement Act of 1999 (P.L. 106-113), Section 703, mandated that the sample size for the ASEC be increased to a level whereby more reliable estimates could be derived for one element of the funding formula – the number of children under 19 in families with incomes less than 200 percent of poverty. In order to make better estimates, the sample size for the Basic CPS was increased, and additional sample was added in February, March, and April, rather than only in March. Consequently, the supplement is no longer referred to as the “March” supplement, or as the Annual Demographic Survey.

III. Using the Survey of Income and Program Participation (SIPP) to Implement the NAS Panel Recommendations

Every 4 months (each “wave”), the SIPP collects all the information needed to estimate money income and data on more categories of noncash benefits than the CPS. Data on work expenses including child care and transportation and on MOOP is collected once per year. While the SIPP attempts to collect information on taxes paid once a year, nonresponse is so high that both income and payroll taxes must be modeled and imputed.

The SIPP consists of 9 or 12 interviews spaced 4 months apart over a 3- or 4-year period and asks a set of “core” questions about the previous 4 months by telephone and personal visit. At current response rates, the roughly 31,700 completed wave 1 interviews in the 2001 panel yielded roughly 25,500 completed wave 9 interviews.³ Interviewers return to the same *household* (not housing unit) nine or twelve times at 4-month intervals (thus for 36 or 48 months), and attempt to follow each *individual* interviewed in wave 1, even if they move. Income data collection focuses on up to 81 sources of income and up to 73 individual income values.

The SIPP is designed as an income survey. According to benchmarking research, it generally though not uniformly does a more complete job of accounting for income than the CPS ASEC (Roemer, 2002). However, the CPS ASEC does gather better data on wages and salaries, apparently because SIPP respondents tend to confuse gross pay and take-home pay. Since wages and salaries are by far the largest component of income, the effect of this differential reporting may bias poverty estimates from the SIPP upward, but that possible bias is to some extent offset by more complete reporting on other income sources, when compared to CPS estimates. An improved questionnaire implemented for the 2004 SIPP panel may ameliorate this problem and thereby result in a cross-section estimate of poverty from the SIPP that is lower than one from the CPS for a comparable time period and comparably representative sample.

Prior to the 2004 panel, the SIPP was not designed to include a representative sample of households in each state. Even with the new design implemented for the 2004 panel, sample sizes in many states will be too small to provide reliable statistics for all states, even if estimates are averaged over 3 years. The major shortcoming of the SIPP is attrition over the length of the panel as households and individuals who attrit (through non-response or moving out-of-scope) are not replaced. Studies have shown that there is a higher rate of attrition for low-income households than for higher-income households (see Lamas et al., 1994, and Vaughan and Scheuren, 2002). This would lead to a biased estimate of change from the end of one panel to the beginning of the next (non-overlapping) panel. This bias could be overcome by reintroducing the original (1984) design of SIPP – overlapping panels, though of 36 months in length, rather than of 32 as

³ The 2004 panel of the SIPP is larger as it is supplemented in selected states by funds from the 1996 welfare reform act in order to improve estimates for low-income families in those states.

originally planned – though this alternative would substantially increase the cost of the survey.

Using the SIPP for estimates of official poverty would require that data be pooled across three different panels. That is, the core data from panel T's third year would be pooled with the core data from panel (T+1)'s second year and the core data from panel (T+2)'s first year (see Figure 1 for an example). In addition, should the definition of poverty be modified along the lines suggested by the NAS panel, topical module data from waves 3, 6, and 9 would also be required for its calculation. Such an approach would not eliminate any bias from attrition in the cross-section estimate from any *one* panel (only perfect retention of the initial sample can do that), but it would eliminate bias from the year-to-year change estimate.

A major advantage of SIPP is its ability to provide poverty estimates for periods varying from 1 month to 3 or 4 years, as opposed to the CPS's ability to provide only annual poverty estimates.⁴ An additional advantage is its topical module on material measures of well-being, which could provide an additional perspective and supplement the economic measures at least once per panel.

IV. Using the Consumer Expenditure Survey (CEX) to Implement the NAS Recommendations

The U.S. collects information on consumption and expenditures on a continuous basis, using the CEX, sponsored by BLS and conducted by the Census Bureau. Most expenditure information is collected from about 7,500 households using an interview administered five times at 3-month intervals; expenditures on small and frequently purchased items such as food are collected once for every household using a 2-week written diary.⁵

The key purpose of the CEX is to be the basis for the Consumer Price Index (CPI): “Output from the Consumer Expenditure Survey has been used to select new market baskets of goods and services for the CPI, to determine the relative importance of the index's components, and to derive new cost weights for the baskets.” (U.S. Bureau of Labor Statistics, 2004). Since 1984, the Bureau of Labor Statistics (BLS) has published integrated consumer expenditure data from the interview and diary components of the CEX.

4 Census Bureau analysts recommend ignoring spells of 1 month because of the increased likelihood of response error and administrative churning (when considering spells of program participation).

5 The sample size was increased in 1999 from about 5,000 households; this increase only affected the urban portion of the sample because the Consumer Price Index market basket is calculated from the CEX only for urban consumers.

In addition to a sample size increase, which took place in 1999, the NAS panel also suggested (1) development of methods to reduce reporting errors and to improve response rates and (2) an evaluation of the CEX in terms of overall design, which might include following family members over time to collect expenditures on an annual basis, the reference period used in the U.S. to assess poverty status. The first recommendation is the goal of any good survey organization: two of the most recent changes to the CEX are the addition of brackets for income and transforming the CEX Interview into computer-assisted personal interview. BLS has no plans to undertake research to incorporate a longitudinal element in the CEX.

In the Census Bureau's experimental poverty reports to date, CEX data have been used in three ways (see Short et al., 1999, and Short, 2001). The key use is to set the poverty threshold for a family of four (two adults and two children) in a way consistent with the definition of resources (income) chosen for the particular measure (3 years of data were used in order to compensate for the relatively small sample size of the survey and to smooth any fluctuations from year to year). The NAS recommended a threshold that accounted for food, clothing, shelter, and utilities. One experimental measure also used MOOP in the thresholds; the value of MOOP was also estimated from the CEX for the most recent version of these thresholds (a previous version used the 1996 Medical Expenditure Panel Survey – MEPS).

The second use of CEX data was to model MOOP for families and households with and without health insurance and use those models to impute estimates of MOOP to the CPS and the SIPP.⁶ While expenditures on aggregates for food, clothing, shelter, and utilities are very likely to be similarly measured across four quarters in a given year (excepting seasonal variation), expenses on health care are much more episodic. Since health care expenditures for a family are likely to occur on an irregular basis, quarterly estimates of MOOP are often negative due to health insurance reimbursements. An annual measure of expenditure would be more appropriate in the context of an annual measure of poverty but would require a good deal of work to develop an appropriately calculated sample weight that takes account of the longitudinal nature of CEX interviewing. (Right now, the experimental poverty threshold estimates use quarterly data.)

The third use is through indexing the thresholds for inflation by use of either the Consumer Price Index for Urban Consumers (CPI-U) or the growth in median expenditures on food, clothing, shelter, and utilities. Both approaches in some way involve the CEX, but a discussion of the issues is beyond the scope of this paper.

⁶ Initially, the plan was to use the 1996 MEPS to model MOOP, but data limitations (especially the lack of reliable data for health insurance premiums) led to the abandonment of the alternative. Data from later MEPS panels (which have remedied that particular shortcoming) are not available in an expeditious enough manner for use on a regular basis for determination of thresholds or as the source of imputation. In any event, now that SIPP collects MOOP (though at a less detailed level than MEPS), imputation to that survey is not needed.

A related topic is inter-area price indexes. The Census Bureau reports on alternative poverty measures include some that adjust the poverty thresholds for geographic differences in cost of living. The most recent approach is based on Fair Market Rents as prepared by the Department of Housing and Urban Development for use in housing assistance program administration. While some believe that this represents an improvement in measuring geographic variation in the cost of housing on an ongoing basis over the estimates derived from the most recent decennial census, a poverty measure using this approach would presumably also benefit from considering how prices of other goods and services such as utility gas or electricity vary geographically. Another area worthy of investigation is whether housing cost indexes could be derived from the ongoing American Community Survey (ACS) once national implementation is achieved (scheduled for July 2004), perhaps by applying the NAS panel's methodology for rental housing costs in finer geographic detail.

Kokoski et al. (1994) used a hedonic methodology and monthly CPI-U price data for July 1988 through June 1989 to produce experimental price indexes for the 44 CPI publication geographic areas.⁷ These experimental inter-area price indexes were created at the lowest level of CPI price data available and were aggregated to form index factors for 11 major expenditure categories. This was accomplished by weighting lower level indexes using expenditure shares from CEX data. The resulting 11 expenditure categories constitute about 85 percent of total consumer spending. Further work in this area by the Bureau of Labor Statistics (BLS) together with the Bureau of Economic Analysis is underway, but developing a comprehensive set of such indexes (for the entire country) would likely be a costly undertaking, particularly as the data do not yet exist to underlie such an effort. Currently, efforts are focused on estimating interarea indexes for the same geographic areas for which BLS now publishes time-series CPIs – 38 urban areas of which 26 are major cities and 12 are region-by-city-size groupings. The goal is to produce an all-items index.⁸

V. Difficulties Other Major Household Surveys Would Have in Implementing a Revised Poverty Measure

Three issues must be addressed in deciding whether a particular survey could implement a different poverty measure. First, does it collect data on money income and family structure sufficient to compute the existing measure? Second, could the survey be modified to collect additional information needed to implement the new measure? Third, for those items that are neither already collected nor can be added, is there an adequate source of imputation for the missing information?

Surveys whose key focus is on other subject matter (e.g., crime, health, housing) often ask a short sequence of income questions to obtain data that analysts can use to

7 A more recent paper is Kokoski et al., 1999.

8 Personal communication from John Ruser, Bureau of Economic Analysis.

understand the information from the main survey questions. Often their purposes are adequately served by a short sequence, because the income estimate is not required to be accurate, merely to differentiate between disparate groups.

It is beyond the scope of this paper to determine whether it is worthwhile for these other surveys to undertake complex post-collection processing in order to estimate poverty measures consistent with the NAS panel approach, especially when it is based on only a short sequence of questions about money income. Furthermore, would there be a centralized mechanism for ensuring that comparable and statistically valid approaches are used by all surveys that purport to measure poverty? On the other hand, it is known that poverty estimates from the decennial census long form were used for funds allocation and other purposes, so it is likely that such estimates from the ACS will be used as well, and there is therefore a need to consider how to implement any changes for that survey at the very least.

Neither the CPS nor the SIPP collects high quality estimates of taxes paid; the existing tax simulation model could likely be adapted to most other surveys that collect family structure information and earnings separately from other income (family structure is critical not only to setting the appropriate threshold but also for simulating the tax filing unit).

Most other household surveys (such as the ACS) do not collect any information on the receipt of noncash benefits. While questions about the critical noncash benefits – employer contributions to health insurance, Medicare, Medicaid, Food Stamps, and housing assistance – were tested for Census 2000 on its 1995 National Content Survey, they were not added to the long form questionnaire nor are they asked on the ACS. Such questions could be based on CPS or SIPP prototypes, but one should be confident of the survey's ability to collect the basic money income information well before one changes the questionnaire.

If one truly wants to go beyond using income in these other surveys as an indicator, then to implement a poverty measure like that recommended by the NAS panel, not only does the value of each noncash benefit need to be imputed, but work expenses and MOOP would also have to be imputed. The former, particularly child care costs, could be derived from a regression model based on the SIPP topical module questions on these subjects. MOOP, on the other hand, is so skewed that it would be difficult, though not impossible, to impute a reasonable distribution from a regression equation for that factor. It might be possible for these other surveys to perform statistical matches with other data sets to impute a reasonable distribution of MOOP.

Some approaches may be easier to implement than others. For example, putting MOOP in the thresholds means that MOOP need not be imputed to each and every family and unrelated individual. Yet that approach means that the survey must include a series of questions on health insurance coverage and health status to ensure that the “right” thresholds are used to compute poverty – a complex undertaking in itself.

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APPENDIX A
NAS PANEL RECOMMENDATIONS RELEVANT TO A DISCUSSION OF DATA
ISSUES

[from Constance F. Citro and Robert T. Michael (eds.), *Measuring Poverty: A New Approach*,
Washington, D.C.: National Academy Press, 1995]

Recommendation 2.1. A poverty threshold with which to initiate a new series of official U.S. poverty statistics should be derived from Consumer Expenditure Survey data for a reference family of four persons (two adults and two children). The procedure should be to specify a percentage of median annual expenditures for such families on the sum of three basic goods and services—food, clothing, and shelter (including utilities)—and apply a specified multiplier to the corresponding dollar level so as to add a small amount for other needs.

Recommendation 2.2. The new poverty threshold should be updated each year to reflect changes in consumption of the basic goods and services contained in the poverty budget: determine the dollar value that represents the designated percentage of the median level of expenditures on the sum of food, clothing, and shelter for two-adult/two-child families and apply the designated multiplier. To smooth out year-to-year fluctuations and to lag the adjustment to some extent, perform the calculations for each year by averaging the most recent 3 years' worth of data from the Consumer Expenditure Survey, with the data for each of those years brought forward to the current period by using the change in the Consumer Price Index.

Recommendation 5.1. The Survey of Income and Program Participation should become the basis of official U.S. income and poverty statistics in place of the March income supplement to the Current Population Survey. Decisions about the SIPP design and questionnaire should take account of the data requirements for producing reliable time series of poverty statistics using the proposed definition of family resources (money and near-money income minus certain expenditures). Priority should be accorded to methodological research for SIPP that is relevant for improved poverty measurement. A particularly important problem to address is population undercoverage, particularly of low-income minority groups.

Recommendation 5.2. To facilitate the transition to SIPP, the Census Bureau should produce concurrent time series of poverty rates from both SIPP and the March CPS by using the proposed revised threshold concept and updating procedure and the proposed definition of family resources as disposable income. The current series should be developed starting with 1984, when SIPP was first introduced.

Recommendation 5.3. The Census Bureau should routinely issue public-use files from both SIPP and the March CPS that include the Bureau's best estimate of disposable income and its components (taxes, in-kind benefits, child care expenses, etc.) so that researchers could obtain poverty rates consistent with the new threshold concept from either survey.

Recommendation 5.4. Appropriate agencies should conduct research on methods to develop poverty estimates from household surveys with limited income information that are comparable to the estimates that would be obtained from a fully implemented disposable income definition of family resources.

Recommendation 5.5. Appropriate agencies should conduct research on methods to construct small-area poverty estimated from the limited information in the decennial census that are comparable with the estimates that would be obtained under a fully implemented disposable income concept. In addition, serious consideration should be given to adding one or two questions to the decennial census to assist in the development of comparable estimates.

Recommendation 5.6. The Bureau of Labor Statistics should undertake a comprehensive review of the Consumer Expenditure Survey to assess the costs and benefits of changes to the survey design, questionnaire, sample size, and other features that could improve the quality and usefulness of the data. The review should consider ways to improve the CEX for the purpose of developing poverty thresholds, for making it possible at a future date to measure poverty on the basis of a consumption or expenditure concept of family resources, and for other analytic purposes related to the measurement of consumption, income, and savings.

Figure 1. Possible Modification to the Survey of Income and Program Participation (SIPP) for Improved Measurement of Poverty

