

**Alternative Poverty Measures in the
Survey of Income and Program Participation: 1996**

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This paper reports the results of research and analysis undertaken by Census Bureau staff. It has undergone a more limited review than official Census Bureau publications. This report is released to inform interested parties of research and to encourage discussion.

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In 1995 the National Academy of Sciences released a report recommending revisions to the official measure of poverty. The recommendations included using the Survey of Income and Program Participation (SIPP) for the basis of official income and poverty statistics. Since then, the Census Bureau has conducted research, and published in a series of reports, a set of alternative measures that are comparable in concept to those used in the Current Population Survey (CPS). This paper compares alternative poverty measures based on the SIPP and the CPS and makes recommendations for future design implementation and estimation procedures.

In 1995, the National Academy of Sciences Panel on Poverty and Family Assistance released a report recommending revising the current official poverty measure. Their revised measure, though still somewhat narrowly defined, broadened the scope of the poverty measure to include non-cash benefits and spending on such items as work-related expenses including child care, taxes, and medical expenses -- items not explicitly included in the current measure.

The National Academy of Sciences Panel also recommended using the Survey of Income and Program Participation (SIPP) to measure official poverty. The current measure uses the Annual Demographic Supplement to the Current Population Survey (CPS). The CPS is designed as a labor force survey to estimate monthly employment statistics. Supplementary questions asked each February-April provide useful information on the income of households, but do not collect all of the information needed to implement the NAS recommendations.

The SIPP collects information on an extraordinarily broad set of dimensions. All of the information the NAS Panel recommended to include in a poverty measure is directly collected in the SIPP, including questions on work-related expenses, child care, health care expenses, taxes, health status, and other material measures of well-being. The longitudinal feature allows estimates of transitions, spells, and outcomes that are not possible in a cross-sectional data set. Current work on alternative measures of poverty using the CPS relies on the SIPP for estimates of child care and other work-related expenses.

The SIPP allows calculation of not only a measure of income poverty, but also a whole set of indicators of material well-being. Alternative measures of poverty from SIPP can be compared to those previously calculated using CPS

data, as is done in this paper. Besides exploring the SIPP, this exercise provides insight into how well or badly we are measuring income poverty in the CPS.

In addition, this exercise illustrates the importance of the SIPP to our understanding of measurement issues in general. Differences in sample design and data collection, however small, have a significant effect on our measurement outcomes. As is shown here, comparing measures of poverty from the CPS and the SIPP, more than one measurement tool is important to form a real understanding of economic and social phenomena.

Data

This paper uses several surveys to construct alternative poverty measures. First, the Consumer Expenditure Survey quarterly interview data for 1994-1996 are used to construct alternative poverty thresholds as recommended by the NAS panel; this procedure is not covered in detail in this paper (instead see Garner et al., 1998, Johnson et al., 1997, Short et al., 1999).

Second, to measure family income or, as more broadly defined, family resources, the analysis uses the Annual Demographic Supplement to the Current Population Survey (CPS) for March 1997 (the source for the 1996 official measure of poverty) and the Survey of Income and Program Participation. This paper shows alternative poverty measures estimated from the 1996 panel of the SIPP, with relevant information from selected topical modules.

A unique problem with the 1996 panel is that initial interviews had been delayed by several months at the beginning of the panel because of a government shutdown. As a result, there are no data for the first month of calendar year 1996 for the third rotation group, and no data for the first two months of the year for the fourth rotation group. To account for this, first month interview values have been “carried” back as needed to the missing months for these respondents. No adjustments have been made to the figures. These estimates may also differ from previous fully-edited longitudinal files in that no attempt was made to impute for missing waves. Earlier longitudinally edited SIPP files have included these imputations, thus allowing for the inclusion of more observations in our analyses that typically include only individuals who were fully interviewed over calendar year 1996.

Finally, many of the calculations here are based on family group composition as of December of 1996. That is, family level calculations shown here for expenditures based on topical module data or included in the tax model are computed across the individuals found in each family in the last month of 1996. On the other hand, most of the income calculations allow the family members to change over the calendar year. Other configurations might have been used, and would have resulted in somewhat different outcomes.

The alternative family income or resource definition

The current official definition of poverty finds a family to be poor if total family pre-tax money income is below that family's poverty threshold, defined to be a particular dollar amount depending upon the family size and composition. The alternative concept of family income is "discretionary income" -- income that can be used to meet a family's basic needs (food, clothing, shelter, utilities plus a little bit more) after subtracting necessary expenses such as taxes, and work-related and medical expenses. Thus, family income is the sum of money income from all sources plus value of near-money benefits less expenses that cannot be used to buy the threshold bundle of goods and services.

The next sections of this paper describe the measure of family resources in alternative poverty measures in the CPS and the SIPP. This exercise illustrates some of the important differences between the two surveys and sheds light on problems encountered and needed measurement research. This process reveals not only the steps taken to measure poverty in the SIPP, but where we are lacking when we calculate alternative poverty measures in the CPS.

Gross money income from all public and private sources

The calculation of alternative poverty measures starts with current money income as defined and measured in the CPS and used to calculate official poverty statistics. This is cash income received on a regular basis and includes income from earnings, any cash transfers, and property income. This is money income received in the previous calendar year of the family residing together as of March [the interview date] of the current year. It is before-tax income that was regularly received, and thus does not include net capital gains, gifts, lump sum inheritances, or insurance payments.

The CPS, for our purposes, is treated as a cross-sectional survey that measures income on an annual basis. Respondents report income received in the previous calendar year and their families' participation in most government programs.

The SIPP is a longitudinal survey. That is, income information is collected over time in a series of interviews that span a multi-year period. While advantageous in important ways, this method of data collection also introduces some difficult statistical problems, such as sample attrition bias. It is, however, generally believed that there are better income data in SIPP, particularly for lower income families (see Roemer, 2000, for a detailed comparison of cash income between the SIPP and the CPS). Three-times-a-year interviews that collect income on a monthly basis gives respondents more opportunity to recall and report income that is received in relatively small amounts for short periods of time. More information is collected in the SIPP (participation in more programs, income received from many more sources) than in the CPS. And finally, the SIPP supplementary questions collect information on the multiple dimensions of alternative poverty measures, such as work-related expenses and child care. These data are used currently to impute values to the CPS, where no such information is collected.

In terms of income data, the CPS has good income information relative to many surveys. The appendix table shows all income sources collected in the CPS. For each of these income types annual amounts are reported as received in the previous calendar year. These data are collected in March of each year, near the date when income taxes are due, under the assumption that annual income amounts are available to individual respondents at that time. This official income measure is defined, according to an Office of Management and Budget (OMB) directive¹, as income received on a ‘regular’ basis. In the SIPP there is also information about one-time receipts, and lump sum amounts received. As in the CPS, non-means-tested cash transfers such as Social Security benefits and means-tested cash transfers such as Temporary Assistance to Needy Families (TANF) benefits are included in this definition.

Addition of the Value of In-kind Government Subsidies and Return to Home Equity

Constructing alternative measures of poverty starts with gross cash money income, calculated in the CPS and the SIPP, and to this we add various in-kind transfer payments. Following the recommendations of the NAS panel, these will only be non-medical in-kind transfers, so that we are not including the value of medical benefits such as Medicare and Medicaid. As will be seen, we will take care of health care needs as a ‘necessary expense’ or add it to the group of basic goods in the alternative poverty thresholds. The noncash benefits considered are primarily from the large federal

¹ Office of Management and Budget Statistical Policy Directive No. 14, DEFINITION OF POVERTY FOR STATISTICAL PURPOSES, May 1978.

programs that are means-tested and aimed at helping poor families meet their needs. These include the food stamp program; the school lunch and breakfast programs; Supplementary Nutrition Program for Women, Infants, and Children; housing subsidy programs; and the energy assistance program. In this section of the paper, each program is considered in turn and the SIPP and the CPS are compared in terms of data collection methods and resulting benefit estimates.

Food stamps

Food stamps are designed to allow eligible low-income households to afford a nutritionally adequate diet. Households who participate in the food stamp program are assumed to devote 30 percent of their countable monthly cash income to the purchase of food, and food stamps make up remaining cost of an adequate low-cost diet. This amount is set at the level of the U.S. Department of Agriculture's Thrifty Food Plan. Total food stamp expenditures in 1996 were reported to be \$27 billion, including all federal administrative costs.²

The food stamp program has financial, employment, and 'categorical' tests for eligibility. To establish financial eligibility, gross monthly income is the primary determinant. This includes all household cash income (excluding certain 'disregards' such as irregularly received income, income earned by school children, etc.) net of deductions such as work expenses, child support payments, dependent care expenses, and shelter expenses. For elderly or disabled members, out-of-pocket medical expenses in excess of a certain amount are also deducted from 'countable' income. 'Countable' income must not exceed the Federal poverty guidelines (based on the official poverty thresholds). There are also liquid asset tests that apply to such assets as cash on hand, bank accounts, as well as a portion of the value of vehicles owned.

Food stamp benefits are a function of household size, income, and maximum levels (which may vary by geographic location). Benefits are calculated by subtracting 30 percent of countable income from a maximum allotment. The maximum is tied to the Agriculture Department's Thrifty Food Plan for a four-person family, adjusted to other family sizes via an equivalence scale. These are adjusted annually for food price inflation. In 1996, the maximum monthly food stamp allotment for the 48 contiguous states and the District of Columbia for a four-person household was \$397.

Food stamp benefits are by far the easiest non-cash program to value. The information is collected somewhat differently in the two surveys. In the CPS, respondents report if they ever received food stamps in the previous calendar year and if so how much. In the SIPP, respondents report receipt of food stamps in each of the previous 4 months and report a monthly amount. We expect to find that more spells of short duration, and therefore, smaller average annual amounts, captured in the SIPP than in the CPS.³ Nevertheless both surveys yield similar estimates of the total dollar amounts distributed to needy families in the U.S.

The calculation of food stamp benefits is straightforward, using the reported face value amounts that are added directly to income. In the CPS calculation, the method adds an annual figure to family income. In the SIPP, the calculation is more complex. Since family membership changes across the calendar year and is captured in the SIPP, food stamp amounts are summed across family members in each month, and then family amounts are summed across months for each person. The resulting calendar year annual amounts are added to each person's family cash income.

Despite these differences, both surveys yield similar estimates of the dollar amounts distributed to needy families in the U.S. Table 1 shows the percentage of all families receiving these benefits, and the percentage of all poor families receiving benefits in both surveys. The 'percent poor' refers to families classified as poor using the current official poverty thresholds and compared to pretax money income in each survey.

A general pattern that is observed is that the SIPP captures more recipients but demonstrates lower mean amounts than the CPS. This is a typical result, since the sub-annual reporting in SIPP allows for greater recall of short spells of receipt that yield lower annual amounts. Also note that SIPP indicates a higher percentage of the 'official' poor receiving food stamps than is measured with the CPS, suggesting that SIPP is, perhaps, better able to identify the 'poor' than the CPS.

Finally, the aggregate amounts in the SIPP show that, for food stamps, the more frequent reporting of reciprocity results in higher aggregate amounts for all families than is measured in the CPS. Further, as with most of the information on income, both cash and non-cash, used in these calculations, there is generally evidence of significant underreporting of

² Green Book 1996 p 861.

transfer receipt in our surveys when compared with administrative data. Aggregate amounts reported in the SIPP of \$18 billion and in the CPS of \$14 billion are significantly lower than the \$27 billion total food stamp expenditures (though this last amount includes administrative costs as well as benefits).

Housing Subsidies

Federal housing assistance consists of a number of programs administered primarily by the Department of Housing and Urban Development (HUD). These traditionally take the form of rental subsidies and mortgage-interest subsidies, targeted to very-low-income renters and is either project-based (public housing) or household-based subsidies. The programs generally reduce tenants' rent payments to a fixed percentage of their income after certain deductions, currently 30 percent. In 1996, about 5.7 million households received such assistance and average per unit outlays were about \$5,480.⁴

Including the value of housing subsidies in cash income is a more complex task than including the value of food stamps. In the CPS, respondents are asked only to report their current status as of the interview date concerning whether or not they live in public housing or receive help from the government with rent. There is no further information collected that helps to determine a dollar amount to add to family income. Furthermore, since we know only current status we must make assumptions about the duration of receipt of subsidies. In this case we assume the subsidy was received for all 12 months in the previous calendar year. The amounts used in this calculation are based on average 1999 Fair Market Rents (FMRs) for states by metropolitan area or nonmetropolitan status in 1996 dollars. The subsidy amount is calculated by subtracting 30 percent of family income from the appropriate average FMR. The appropriate FMR is chosen depending upon the composition of the family and the size of the unit they are, therefore, eligible to rent.

In the SIPP more information is available. The reference person reports current status every four months, so it is possible to capture spells of subsidy receipt that are less than a year. It also allows capture of more spells. There is additional information in the SIPP that is not available in the CPS. Respondents are asked to report the monthly rent paid, and whether it includes utilities. While at some point this information may be used to calculate more precise

³ Another reason may be the more precise assignment of coverage units in the SIPP compared with the CPS.

subsidy amounts in the SIPP, the value of housing subsidies presented here are based on FMRs applied in the same way as in the CPS calculations.⁵ However, these calculations are made on a monthly basis. In each month of the calendar year, individuals are grouped into households designated as receiving a subsidy or not. For each individual a housing subsidy value is assigned based on the composition of the family in each month. These amounts are then summed over the 12 months of 1996 and added to income.

Given the information available and assumptions made about calendar year coverage, we expect that the CPS will produce larger subsidy amounts for fewer people than the SIPP. Table 1 shows 4 percent of families receive housing subsidies in the CPS and 5 percent in the SIPP. Also, again note that the SIPP captures a higher percentage of poor participating in programs than we find in the CPS, 21 versus 17 percent.

School Lunch and Breakfast Programs

These programs offer children free meals if family income is below 130 percent of Federal poverty guidelines, reduced-price meals if family income is between 130 and 185 percent of the guidelines, and a subsidized meal for all other children. In the 1995-1996 school year per-lunch subsidies ranged from 32 cents for full-price lunches to \$1.94 and \$1.54 for free and reduced-price lunches, respectively. Subsidies for breakfasts were slightly less, 20 cents, \$1.00, and 70 cents respectively.⁶ Total federal costs for these programs for 1996 were \$5.4 billion for lunches and \$1.1 billion for breakfasts.⁷

In the case of school lunches there is a large discrepancy between the two surveys with respect to how information is collected. In the CPS the reference person is asked how many children 'usually' ate a complete lunch, and if it was a free or reduced priced school lunch. Since we have no further information, we assume that the children received the lunches every day during the last school year. Then we multiply the number of children by a dollar amount per lunch. That figure is then multiplied by the number of days in the typical school year.

⁴ Green Book 1996 p 923

⁵ See Stern (2001) for a discussion of methods to value housing subsidies.

⁶ Green Book 1996, p. 924.

⁷ Green Book 1998.

SIPP collects information on participation in the school lunch program every four months. In 1996 the SIPP questionnaire asked about how many children 'usually' ate a school lunch and whether they were regular, free, or reduced price lunches. Clearly the number of children who 'usually' ate a school lunch in the last 4 months may differ from the number of children who 'usually' ate lunch in the previous year. For both the CPS and the SIPP we obtain amounts on the cost per lunch from the Department of Agriculture Food and Nutrition Service that administers the school lunch program.

The difference in data collection methods yields different estimates of this subsidy from the two surveys. As might be expected, we estimate more children receiving free and reduced price lunches in the SIPP. This is so because children who may not have 'usually' received a lunch in the previous year may be reported in the SIPP as 'usually' getting a school lunch in the previous four months. On the other hand, the average value of school lunches for a given year received per child is lower, since less than full-year participation is captured in the SIPP and these smaller amounts are included in the mean. The general pattern suggests that the valuation procedure in the CPS is probably assigning too high a subsidy to too few families.

Nothing is collected in the CPS for school breakfasts so no income is assigned. In the SIPP respondents report the number of breakfasts eaten by the children per week, similar to the report of school lunches. Calculating a value for this subsidy in the same way as was done for the school lunch program adds approximately \$2 billion to income of families in the SIPP.

Special Supplemental Nutrition Program for Women, Infants, and Children (WIC)

This program is designed to provide food assistance and nutritional screening to low-income pregnant and postpartum women and their infants, and to low-income children up to age 5. Incomes must be at or below 185 percent of the poverty guidelines and must be nutritionally at-risk (having abnormal nutritional conditions, nutrition-related medical conditions, or dietary deficiencies). Benefits include supplemental foods in the form of food items or vouchers for purchases of specific food items. In fiscal year 1996, the national average Federal cost of a WIC food package was \$31

per month, the program served approximately 1.6 million women and 3.7 million children. Total federal cost of the program was \$3.7 billion.⁸

There are questions on receipt of WIC in the CPS but there is currently no valuation method. In the SIPP, participation in this program is reported every month. The total value of the transfer is calculated using program information obtained from the Department of Agriculture. The aggregate amount was about \$2 billion in 1996.

Low-Income Home Energy Assistance Program (LIHEAP)

This program provides three types of energy assistance. Under this program, states may help pay heating or cooling bills, provide allotments for low-cost weatherization, or provide assistance during energy-related emergencies. States determine eligibility and can provide assistance in various ways, including cash payment, vendor payment, two-party checks, vouchers/coupons, and payments directly to landlords. In 1996, total heating assistance was \$0.9 billion, assisting approximately 5.2 million households, with average benefits ranging across states from \$64 in Kentucky to \$411 in Connecticut and North Dakota.⁹

Here is another major difference in data collection schemes. The CPS asks if, since October 1 of the previous year, the reference person received help with heating costs and, if yes, the amount received. In the SIPP, with interviews every four months all year round, information on help with both heating and cooling are collected, both whether or not help was received and the dollar amount received. This difference in data collection leads us to expect slightly more recipients and slightly higher average benefits reported in the SIPP. This pattern has been observed using earlier panels, such as the 1991 and 1992 SIPP panels. However, in the 1996 panel, questions about amounts were changed. If the respondent reported that the subsidy was paid directly to the utility company, then no amount was collected. This change would require a valuation procedure for energy assistance in an alternative poverty measure using the SIPP. The estimates shown are the reported amounts and, thus, on average are lower than expected.

⁸ Green Book 1998, p 1001.

⁹ Green Book, 1996, p 941.

Return to home equity

One final addition we make to family income in certain measures represents return to home equity. This addition is made to account for the flow of services from owned home in a poverty measure. On the threshold side, the cost of renting replaces out-of-pocket shelter costs that are used in the alternative poverty thresholds.¹⁰ This amount is calculated using rental equivalence information from the CE. In many cases, for home owners, this represents a larger amount, particularly if homes are owned without debt. To account for benefits of home ownership on the income side, return to home equity is added. The calculation follows work by the Census Bureau that values net return to home equity as an alternative income definition. However, in this case, property taxes are not subtracted from the figure. The return to home equity is calculated, again following Census Bureau techniques, using the average rate of return on high-grade municipal bonds from the Standard and Poor's series, or 5.75 percent in 1996.¹¹

The CPS collects information on whether the housing unit is owned or rented, but does not collect information on home equity. The rate of return approach is implemented by conducting a statistical match to the American Housing Survey (AHS) based on characteristics such as age of householder, state, Metropolitan Statistical Area (MSA), and central city status of the household, household income, household size, number of living quarters in the building, and the race, sex, and educational attainment of the householder. The variables obtained from this statistical match are market value of owned residence and land, and the amount of the balance remaining on any mortgage.

In the SIPP, a topical module on real estate holdings is asked in wave 3 of the panel. These questions collect information on real estate and shelter costs. Householders report information on market value of home and mortgage balance. In both the CPS and the SIPP calculations, home equity is calculated by subtracting mortgage balance from market value. In both cases the resulting value of home equity may be negative, which occurs if the value of a home has declined below the original purchase price. In this application, however, we treat those values as zero, since our intent is to account for the flow of services of an owned home, not to account for debt.

¹⁰ Alternative poverty thresholds used in this paper are calculated using Consumer Expenditure Survey estimates of spending on food, clothing, and shelter. Spending on shelter is out-of-pocket, with this exception. For more details see Garner and Short, 2001 and Garner and Rozaklis, 2000.

¹¹ This value is a conservative estimate of a real-estate capitalization rate. See Devaney, 2002.

Table 1 shows the resulting estimates of return to home equity. There is a higher percentage of families benefiting from home ownership in the CPS than the SIPP calculations and the estimated value of returns are also greater. When these values are added to the income measure, a different threshold will be used to determine poverty status.¹² That threshold will value shelter costs using a rental equivalence estimate from the CE. In all the other measures, out-of-pocket expenditures are used to value shelter costs, following the calculations of the NAS panel. The alternative threshold is used in order to consistently treat the homeowner as a renter on both income and threshold sides. The thresholds used will be the same for both SIPP and CPS.

Subtract necessary expenses

The items described above represent all of the additions to income or family resources that are made to calculate an alternative poverty measure. The next step is to subtract items that must be paid before determining how much is available to purchase basic necessities. The NAS panel said that families must first pay taxes and expenses required to work and to maintain health. They further suggested that any amount of child support paid should be deducted from income since it is included as income by the receiving family. In Census Bureau income statistics using the CPS this is not done because the amount of child support paid by one household is not collected, while the amount received by another household is collected and added into income. Thus, child support transfers are doubly counted in our household income statistics.

It is important to note that, while all of the items included in income are collected in the SIPP on a monthly or 4-month basis (except for valuing home equity), none of the items that will be subtracted from income as necessary expenses are collected this often. All of these items are collected in topical modules, supplementary questions usually asked only once per year or less often.

In the CPS no information on necessary expenses is collected. All of these items, in current calculations of alternative poverty measures, are either assigned or modeled, as will be shown below. Thus the relationship of estimates of these items between the SIPP and the CPS is different from the estimates of noncash benefits described above.

¹² See Garner and Short, 2001.

In previous panels of SIPP, the topical module information was not always reported or included for a given family and were not imputed values for missing data items. This presented a problem for alternative poverty measurement calculations. Fortunately, in the 1996 panel there is an imputation procedure in place to calculate these expenditures for families with missing data. Typically the missing data items are imputed item-by-item, as would be done with the same module if only one item were missing.

Subtraction of Taxes Paid

The panel recommended that the calculation of family resources for poverty measurement should subtract federal, state, and local income taxes, and Social Security payroll taxes (FICA) before assessing the ability of a family to obtain basic necessities such as food, clothing, and shelter. Taking account of tax liability also allows us to account for receipt of an earned income credit (EIC). The EIC is available to low-income working taxpayers.

The CPS does not collect information on taxes paid but relies on a tax model to simulate taxes paid. These simulations include federal and state income taxes, and social security taxes. These simulations are based on a tax calculator and statistical matches to the American Housing Survey (AHS).

The SIPP includes a supplementary questionnaire, or tax topical module, that includes questions about taxes paid. Besides amounts to be reported from specific lines on the tax return, respondents are asked about filing status, exemptions, forms that were filed, e.g. 1040ez, Schedule A (itemized deductions), and Schedule D (capital gains and losses). They are asked to report amounts from the calculated child care credit, elderly credit, Adjusted Gross Income, capital gains/loss, taxes owed, EIC, and property taxes paid. While there is an attempt to collect a great deal of information in this tax module, in fact very little is collected. Respondents are reluctant or find it difficult to report these items.

The low response rates in the tax topical module for SIPP and the less accurate results associated with the current tax model for CPS created a need for a more complex and accurate tax model.¹³ A new tax model addresses many of the needs identified above. The new tax model has a more complete and accurate calculation of state and local taxes,

¹³ Coder, John. 2001. "Summary Comparisons Between IRS Published Statistics and Current and New Tax

imputes the presence and amount of capital gains simultaneously using IRS data, and calculates more exclusions and deductions than the current model used with the CPS. The tax model used here was prepared for calendar year 1997 but uses 1996 income.

The first step in applying the tax model to SIPP is to create a SIPP calendar year file. The creation of the calendar year file requires adding all monthly income sources into a calendar year total, and creating new family and household variables that represent a person's situation at the end of the calendar year. It is for this unit that taxes are computed. Individuals who left the sample before December 1996, or entered after the survey began, are not included in these calculations.

The tax model initially creates both a person and household level file. The data that are extracted focus mainly on income and family and household structure. The first step in the process of calculating taxes is to complete a statistical match with the AHS. The statistical match allows a variable flagging the presence of a mortgage to be added to the file. The additional variables will allow the deductions for mortgage interest to be imputed later in the process. The statistical match uses age of householder, household income, and household size as the main matching criteria for determining the presence of a mortgage.

The second step in calculating taxes is to split the file into potential tax units and complete a statistical match with the Statistics of Income (SOI) file from the IRS. The statistical match is done to provide the following information:

- Presence and amount of capital gains
- Presence and amount of itemized deductions
- Presence and amount of IRA deductions
- Presence and amount of child care expenses
- Presence and amount of self-employed health insurance cost deductions
- Presence and amount of Keogh-SEP/SIMPLE deduction

These items are necessary to generate a detailed and complete tax return for each tax unit. The main variables used in the statistical match vary based on the universe being matched. Gross income and individual state of residence are used for all the matching routines. Other variables that are used based on the universe being matched include:

- Presence of wage and salary income

- Itemized or standard deduction
- Presence of social security
- Number of age exemptions
- Presence of non-farm self employment income
- Partner of household head
- Number of child exemptions
- Presence of mortgage interest
- Type of return

The final process in the tax model is the calculation of the actual tax liability. The model has recreated the actual tax filing process as closely as possible, including rules for dependents and claiming exemptions. The various potential tax units are pushed through the process of calculating tax liability and tax units are recreated as individuals pass or fail various tests for dependency or exemptions. The final outcome of the tax model is a person level file that contains the major tax variables and identifiers for the filer of all tax units. This file is used here to create family level taxes.¹⁴

Summary statistics comparing taxes paid in the CPS and SIPP models are shown in table 1. The estimates are similar for families in both surveys though there are a slightly higher percentage of families with federal income tax liabilities in the SIPP, with the mean value higher for poor families in the SIPP as well. The EIC and Social Security payroll taxes are not statistically different in the two surveys.

Expenses Related to Work Including Child Care

Typically, in order for a family to purchase a basic set of needed goods, some members of the family must work. Earning a wage may entail incurring expenses, such as travel to work and purchase of uniforms or tools. For work-related expenses (other than child care) the NAS panel recommended subtracting a fixed amount, \$750 for 52-week work-year per earner 18 years of age or older (or about \$14.42 per week worked) in 1992. Their calculation was based on 1987 SIPP data that collected information on work expenses in a set of supplementary questions. Then they calculated 85% of median weekly expenses -- \$14.42 per week worked for anyone over 18 in the family in 1992. Total expenses were obtained by multiplying this fixed amount by the number of weeks respondents reported working in the year. The panel argued that, since many families make other sacrifices, move near work, work opposing shifts, to minimize work expenses, reported expenses wouldn't reflect these costs and thus it would be better to use a fixed dollar amount. Following their recommendation, this method is used in the calculations of poverty rates later on, for both the CPS and the SIPP, even though the SIPP offers an alternative.

In the 1996 panel of SIPP, a new topical module, similar to the one last administered in 1987, was included to collect work-related expenses. Each person in the SIPP reports their own expenditures on work-related items in a given week. For each person we then sum the number of hours reported worked by the number of weeks worked in each month. The number of weeks worked is multiplied by the weekly work-related expenses, and these are summed over the calendar year for each person. These amounts are then summed across family members as of December of 1996.

Due to assumptions made in the CPS calculations, more people are assigned work-related expenses than actually report them in the SIPP. The average CPS amounts, representing 85 percent of the median in the SIPP, are considerably lower than the mean of reported amounts in SIPP. The SIPP average is almost four times that of the CPS values. Thus, the imputation recommended by the NAS panel, while covering a larger percentage of workers, is a conservative estimate of the amount people spend to go to work.

One other thing to note here is that a lower percentage of the official poor actually report work expenses in the SIPP than are imputed in the CPS, and the amounts that are reported by the poor are higher, but not as much higher, as compared with all people. This may represent the fact that the working poor are constrained in their spending for these expenses and are reporting smaller amounts than they might spend if they could afford to. As shown in the table, estimates of work-related expenses, when calculated as recommended by the panel, are very similar and will have a similar effect on poverty rates.

Child care expenses

Another important part of work-related expenses is paying someone to care for children while parents work. These expenses have become important for families in which both parents work and for single-parents who work. To account for child care expenses while parents worked in the CPS, we subtracted an amount modeled using data from the SIPP 1992 panel topical module on child care expenses.¹⁴ For the SIPP calculation we show estimates based on reported spending in the child care topical module.

¹⁴ See Sisson and Short, 2001 for more details. Calculations from the tax model will be supplied to users in a supplementary SIPP research file when testing is complete.

¹⁵ The child care model has been updated for alternative measures for 1999 and later years that take advantage of a question that was added to the CPS about paying for child care.

The 1996 panel of SIPP included an expanded module of questions on child care in wave 4 of the panel.¹⁶ The amount paid for any type of child care, while parents are at work or attending school, are summed over all children. Weekly reported costs are then multiplied by the number of weeks worked by the parent or guardian.

The table shows results that are similar for both surveys, which is to be expected, since the CPS estimates are modeled using SIPP data. For the official poor, the results are comparable to spending for other work-related expenses. While the imputation for child care in the CPS does not assign amounts to all workers, like that of other work-related expenses, it does assign expenditures to more poor working families and it assigns larger amounts. Again, the amounts actually reported in the SIPP may represent constrained expenditures on the part of the poor.

Subtraction of Medical Out-of-Pocket Expenditures (MOOP)

Other necessary expenses that we will account for in this poverty measure are those required to maintain the health of family members. While many individuals and families have health insurance that covers most of the very large expenses, there are the costs of health insurance premiums and other small fees that the typical family pays out of pocket. Further, there are some who are not covered by medical insurance. In 1996, about 16 percent of the people in the U.S. had no health insurance.¹⁷ Expenditures on health care have increased and become a more significant portion of a family's budgets and spending for health care should be accounted for as an important expense.

For this necessary expense we use three methods. The first models medical expenses using 1996-1997 CE data. This is a two-step procedure, first estimating the probability of incurring MOOP expenses for families of various characteristics such as age, race, income, and insurance coverage status, and then models amounts spent. This calculation will be incorporated in an alternative measure that subtracts MOOP from income (referred to later as the MSI alternative measure). A second method uses CE data and the 1996 Medical Expenditure Panel Survey to assign MOOP values to all families based on a similar set of characteristics but adds self-reported health status to the list. This

¹⁶ See, Smith, Kristen, 'Who's Minding the Kids; Child Care Arrangements Spring 1997', p70-86, July 2002.

¹⁷ Bennefield, 1997, and health insurance coverage estimates from the CPS, www.census.gov.

method also adjusts the amount of MOOP assigned to families without health insurance to account for the fact that their reported expenditures are less than optimal. This method, incorporated in an alternative measure, is later referred as the MIT, or MOOP in threshold measure. In another alternative, both methods are combined in a measure referred to as CMB.

The third method is only available with the SIPP. In the SIPP there is a topical module on utilization of health care. In this module adults report their own spending for their health care needs. Unfortunately, these data do not include spending for children in the 1996 panel. Imputed values for MOOP for children are included in the SIPP values, however, in later data collection efforts, children's expenses will also be ascertained and will not be imputed.¹⁸

Child support paid

This information is collected only in the SIPP. While questions about child support paid have been tested on the CPS, there are currently no plans to add them to the questionnaire. In the 1996 panel of the SIPP, respondents reported this information in supplementary questions. A topical module on child support is very comprehensive but not asked every year. There are also very brief summary questions included once every calendar year. These questions attempt only to ascertain the amounts paid. The data shown here are from those brief questions. Even so the amounts presented do seem to be substantial and suggest that there should be some attempt to include these items in the CPS.

Some comparisons have been made of the short set of questions used here to the complete battery of questions from the topical module on support of non-household members.¹⁹ There are some discrepancies in the reporting of child support paid. Regardless of differences in the structure of the questions that are posed, however, the aggregate amounts are similar. Across those responding to the short questions a total of \$18.5 million is reported, from the complete child support topical module a total of \$17.9 million is reported paid as child support.

¹⁸ See O'Hara and Doyle 2001.

¹⁹ There are slightly fewer respondents who report paying child support with the short set of questions, 1,214, compared with 1,341 who reported amounts in the complete topical module. A total of 738 (61 %) of those reporting paying child support in wave 3 also reported amounts in wave 5. Of those who responded to the short questions, on average they

How it all adds up

This paper described in some detail all of the calculations performed in two surveys to arrive at a measure of family resources similar to that recommended by the NAS panel to calculate an improved measure of poverty. Table 1 shows calculations in the aggregate by income source for all families, regardless of income. It is clear that we are subtracting more than we are adding to family income to move from an official measure of poverty to an alternative one. This is particularly true for taxes – where amounts are lower in the SIPP than in the CPS. Medical out-of-pocket expenses also are quite large regardless of the method applied and are larger in SIPP than the CPS. In-kind transfers, on the other hand, are very small when viewed across all families.

More interesting to this comparison of poverty measures is to examine what happens to family incomes or resources of those people who are classified as poor. The additions and subtractions for those who are classified as poor using the official measure show a more balanced picture, with additions exceeding subtractions. The major subtraction for the poor is for MOOP. Additions to income are not statistically different between the two surveys, but CPS subtracts more work-related expenses and SIPP subtracts more taxes. The SIPP includes WIC and school breakfast subsidies that are not available from the CPS.

Finally, a closer look at the “near poor” who are most likely to become poor by the changes to income calculations, is provided in the last column of table 1. These calculations are for people with family income just above the official poverty line; family income is between 100 and 125 percent of the poverty line. Excluding return to home equity, the table shows more subtractions than additions and therefore suggests that more “near-poor” people will be classified as poor under this new measure, and it will often be caused by the deduction of medical out of pocket expenses from income, which again, are greater in SIPP than in CPS. Accounting for home ownership will keep more families in the CPS from falling below the rental equivalence poverty line than should be true in the SIPP.

Alternative poverty rates 1996

reported \$4,738 per year (with a median amount \$3,600). Responding to the broader set of questions in the topical module, an average amount of \$4,084 and a median of \$3,000 were reported.

To determine poverty status, the comprehensive measure of family resources is compared to a poverty threshold under the current official definitions and using alternative family resources with alternative thresholds.²⁰ In either case, the same poverty thresholds will be used in both surveys even though the income measures differ.

The official thresholds were originally developed by Mollie Orshansky in the 1960s and updated to 1996 by changes in the Consumer Price Index. These thresholds are used to calculate current official poverty statistics. The measures in table 2 show the percent of people in families with before tax cash income below official poverty thresholds. Note that a smaller percentage is classified as poor in the SIPP than in the CPS. As seen in all previous such calculations, the SIPP appears to collect income information more comprehensively than the CPS and thus finds fewer families with incomes below the official poverty line, 12.8 percent compared with 13.7 percent poor in 1996.

The poverty rates shown in the top section of table 2 are meant to illustrate the effect of the various additions and subtractions in the two surveys, though none are intended to stand as a measure of poverty per se. All are compared to the official thresholds and make one change at a time in the definition of income. Many of these poverty rates are lower in the SIPP, with the exception of that using the MOOP model to subtract MOOP from income in both surveys. Also, adding return to home equity lowers the poverty rate in the CPS more than it does in the SIPP, since, as we have seen, home equity values are higher in the CPS than reported in the SIPP.

Finally, table 2 compares official and alternative poverty measures from both surveys. Four alternative measures are shown. Three of these have appeared in previous Census Bureau reports.²¹ The first three measures differ only in the way that MOOP is valued. They are MSI (MOOP subtracted from income), MIT (accounts for MOOP in the thresholds only), and the CMB measure which is a combination of the first two in that it both subtracts (net) MOOP from income and includes MOOP in the threshold. The fourth measure is like the MSI measure, but takes account of the flow of services from owned homes.

²⁰ For a discussion of the alternative poverty thresholds see Short and Garner, 2002. As noted earlier, these thresholds value shelter costs as reported out-of-pocket costs less payments to mortgage principal.

²¹ Short, 2001.

The experimental poverty thresholds used are shown below. These thresholds were calculated using quarterly data from the CE for 1993 to 1996. Median expenditures for two-adult and two-child families were estimated and adjusted for other family sizes using a three-parameter equivalence scale. Values for this reference family are:

Poverty thresholds used in these calculations for two-adult two-child family 1996	
Official	\$15,911
Alternative	\$15,710
Alternative with medical expenses	\$17,352
Alternative with rental equivalence shelter cost	\$17,631

All poverty rates are lower in the SIPP, except for the last, which accounts for home ownership. Two of the three alternative measures are significantly lower than the official using the SIPP. None of the alternative measures is statistically different from the official in the CPS in 1996. Accounting for home ownership increases poverty rates, since the rental equivalence thresholds are higher than those based on out-of-pocket shelter costs, while adding return to home equity to income brings the poverty rates back to nearly the official level in the CPS. Not so in the SIPP. This is due to the high returns to home equity that result from the statistical match to the AHS.

Table 3 presents selected population subgroups as a proportion of the poverty population under different poverty measures. Patterns noted in earlier work with the CPS are found here using the SIPP.²² Notably, children are a smaller percentage of the poor under the alternative measures, while the elderly are a larger portion. Other patterns follow findings from earlier work with the CPS.

Summary and further work

This paper has described in some detail the challenge of changing and moving the measurement of poverty in the CPS to measuring poverty in the SIPP. Considerable detail was presented on the different design and collection methods of each element of a poverty measure. These differences have important effects on the estimation of alternative poverty measures. We have also described differences in measurement methods, and this is an area where more work needs to

²² See Short 2001.

be done. Other measurement improvements, such as alternative valuations of MOOP and valuing the flow of services from owned homes are continuing and will further affect different estimation outcomes between the two surveys. Investigation of changing the unit of analysis from family to some other group can proceed with the SIPP since questions on sharing expenses used in the CE to determine the consumer unit will be available in the 2001 panel of the SIPP. Most important, however, is the possible redesign of the SIPP, primarily a longitudinal data set, from which one would require reasonable cross-sectional estimates as a basis for official poverty statistics.

New Panels of the SIPP

A primary recommendation of the NAS panel was to make the SIPP rather than the CPS the official source of poverty statistics. Methodological investigation by the Census Bureau has concluded that a time series of official statistics, such as poverty, must be based on surveys with consistent design characteristics. For a longitudinal survey like the SIPP this means that the characteristics of the sample (consisting of households which stay in sample for several years) must not change from year to year. But we know from past research that families in poverty leave the sample at higher rates than non-poverty families (Huggins and Winter, 1995). As a consequence, direct survey estimates cannot be used without accounting for and correcting the bias introduced by this differential attrition.

One solution would be creating a survey design with constant attrition bias (like the Bureau of Labor Statistics has done with the CPS) that lets us measure year-to-year changes accurately (if both years' estimates are biased in the same way, their difference is not biased). Constant attrition bias for an annual statistic like poverty can be obtained by starting a new SIPP panel each year (just as the CPS adds new sample each month to allow it to accurately measure month-to-month changes in unemployment and the CPS rotation scheme permits comparisons of annual averages). In the President's FY1999 and FY2001 budgets, the Census Bureau has proposed fielding a new panel each year, with each panel to collect data for three years.

This proposal recommends a sample size that is the minimum necessary to produce a time series of statistics with the same variance as the CPS estimates. Ideally, each panel should begin in February to provide a complete measure of calendar year income. The plan is to supplement the existing longitudinal panel of 36,700 SIPP households with two

additional panels of 12,700 households each. These additional panels would enable production of stable cross-section estimates and to allow time-series comparisons.

Comparing poverty measures in the SIPP with the official measure and a similarly constructed alternative measure using the CPS yields several conclusions. Alternative measures of poverty appear to be more accurate in the SIPP than in the CPS, due to improved income data and direct information on the necessary expenses that affect these measures. Even without the change in the design of the sample, this exercise yields a more informed view of what we are measuring in the CPS. We are able to say something about the nature of any biases of the estimates in the CPS, due to the analysis of SIPP. Of course, many of the important elements of the revised poverty measure, such as child care and other work expenses, are based directly on information from the SIPP. Further analysis of SIPP that takes advantage of the longitudinality of the survey, can add insights into how families of varying types experience poverty over time and if a different measure tells us something new about the persistence of poverty. Other extended measures of well-being, such as ownership of durables and difficulty in meeting expenses, could add further insights into accurately measuring how families and individuals get along.

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Table 1: Noncash Benefits and Necessary Expenses of Families in the SIPP and CPS: 1996

	SIPP						
	% paid/received		Mean amount (\$)		Aggregate (bil\$)		
	All	Official Poor	All	Official Poor	All	Official Poor	Near Poor
MOOP model	87.1	66.2	1,895	977	179.9	9.4	5.0
Reported MOOP	79.0	58.7	1,838	1,228	158.1	10.4	5.0
MIT method	100.0	100.0	1,205	720	131.3	10.4	6.0
Foodstamps	10.4	46.8	1,564	1,895	17.7	12.8	1.7
Child support	3.2	1.2	4,929	2,076	17.3	0.4	0.3
WIC	5.1	17.3	380	431	2.1	1.1	0.2
School lunch	24.3	37.3	242	491	6.4	2.7	0.7
School breakfast	9.1	25.5	182	256	1.8	0.9	0.2
Energy assistance	4.4	17.8	128	158	0.6	0.4	0.1
Housing subsidies	5.0	21.4	2,737	3,618	15.0	11.2	1.7
Work expense (NAS)	78.9	47.0	1,086	536	92.3	2.7	2.4
Work expense report	33.1	23.4	4,133	1,350	150.0	4.6	3.7
Childcare	8.0	4.1	3,025	1,516	26.4	0.9	0.6
Federal income tax	75.7	12.0	6,967	1,232	574.7	2.1	1.9
EIC	14.0	36.5	1,306	1,478	20.0	7.8	3.3
FICA	74.4	46.6	2,561	482	207.6	3.3	2.7
Home equity return	57.5	27.5	4,576	3,224	286.8	12.8	8.0

	CPS						
	% paid/received		Mean amount (\$)		Aggregate (bil\$)		
	All	Official Poor	All	Official Poor	All	Official Poor	Near Poor
MOOP model	86.4	64.8	1,688	858	162.1	9.1	4.7
Reported MOOP	NA	NA	NA	NA	NA	NA	NA
MIT method	100.0	100.0	989	612	110.4	10.1	5.1
Foodstamps	7.9	35.7	1,621	1,825	14.2	10.7	1.3
Child support	NA	NA	NA	NA	NA	NA	NA
WIC	NA	NA	NA	NA	NA	NA	NA
School lunch	19.2	27.0	291	576	6.2	2.6	0.6
School breakfast	NA	NA	NA	NA	NA	NA	NA
Energy assistance	2.6	10.2	187	174	0.5	0.3	0.1
Housing subsidies	3.9	16.6	3,677	4,350	14.3	11.5	1.1
Work expense (NAS)	78.4	48.4	1,143	595	99.9	4.7	2.8
Work expense report	NA	NA	NA	NA	NA	NA	NA
Childcare	7.8	5.8	2,769	2,111	24.1	2.0	1.0
Federal income tax	71.9	4.9	7,808	210	626.7	0.2	0.6
EIC	14.4	34.4	1,347	1,530	21.6	8.7	3.7
FICA	75.3	47.7	3,056	499	256.9	3.9	3.1
Home equity return	62.3	35.7	6,414	4,165	445.6	24.4	13.2

MOOP = medical out of pocket expenses, MIT = MOOP in threshold, EIC = Earned Income Credit, FICA = Social Security payroll taxes

Source: Author's calculations of the 1996 SIPP and the March 1997 CPS.

Table 2: Poverty rates with different measures 1996

	SIPP	CPS
Official definition	12.8	13.7
After tax	12.7	13.3
MOOP model	15.1	15.0
Reported MOOP	14.3	NA
Child support	12.9	NA
School lunch	12.4	13.4
Home equity return	12.7	11.8
School breakfast	11.6	NA
Energy assistance	12.8	13.7
Food stamps	11.8	13.1
Housing subsidies	11.8	12.8
Work expense (NAS)	13.4	14.6
Childcare	13.0	14.1
Experimental Measures		
MSI	11.6	13.4
MIT	12.4	14.3
CMB	12.3	14.2
Rental equivalent	13.6	13.8

MSI = Medical out-of-pocket expenses (MOOP) Subtracted from Income

MIT = MOOP Included in the Thresholds

CMB = MIT with net MSI (combination)

Source: Author's calculations of the 1996 SIPP and the March 1997 CPS.

Table 3: Selected groups as a proportion of the poverty population using different measures in SIPP: 1996

	Official	MSI	MIT	CMB	Rental Equiv
Percent of All Persons	12.8	11.6	12.4	12.3	13.6
Number Poor (millions)	33.7	30.7	32.8	32.4	35.8
Percent of Poverty Population					
Age					
Children (<18)	42.3	34.2	34.2	34.3	37.2
Adults, 18-64	48.5	53.1	52.2	53.0	53.6
Elderly, 65+	9.2	12.8	13.6	12.8	9.2
Race/Ethnicity					
White	66.2	73.6	72.0	73.2	71.0
Non-Hispanic White					
Black	27.5	20.1	21.2	19.7	22.5
Hispanic	22.9	22.8	23.6	22.9	24.4
Family Type					
Married-couple	34.1	40.2	38.6	40.3	40.4
Male-headed	12.5	14.2	14.6	14.2	14.0
Female-headed	53.4	45.6	46.8	45.5	45.6
Number of workers					
No workers	35.9	33.0	33.5	32.8	29.8
One or more workers	64.1	67.0	66.5	67.2	70.2
Region					
Northeast	17.1	20.6	21.3	20.8	19.6
Midwest	20.0	17.8	17.1	17.6	17.7
South	39.5	35.1	34.2	34.7	35.0
West	23.4	26.6	27.4	26.9	27.6
Residence					
Metropolitan Area	78.3	83.2	84.5	83.6	84.3
Nonmetropolitan area	21.7	16.8	15.5	16.4	15.7

MSI = Medical out-of-pocket expenses (MOOP) Subtracted from Income

MIT = MOOP Included in the Thresholds

CMB = MIT with net MSI (combination)

Source: Author's calculations of the 1996 SIPP.

Appendix Table A

CPS Income Sources

Earnings
Unemployment compensation
Workers compensation
Social Security benefits
SSI benefits
Public Assistance, such as TANF
Veterans payments
Alimony payments received
Disability benefits
Survivor Payments
Pensions
Interest/Dividends
Rents, royalties
Educational assistance
Child support received
Regular private transfers

SIPP Income Sources

Earnings
Social Security/Railroad Retirement
SSI/federal and state
Unemployment Insurance
Supplementary unemployment insurance
Veterans compensation
Black lung benefits
Worker compensation
State temporary disability
Employer or union temp
Payments from insurance
AFDC/TANF/GA
Indian/Cuban or refugee assistance
Foster child care
WIC
Child support
Alimony
Pension, military retirement
Paid up life insurance policies
Annuities
Estates and trusts
Other retirement/survivor
GI bill
Educational assistance
Charitable income
Private transfers
Lump sums
National guard or reserve
Interest income from
 -savings accounts
 -money market deposit accounts
 -certificates of deposit
 -interest earning checking accounts
 -money market funds
 -US government securities
 -municipal or corporate bonds
Dividends from stocks or mutual funds
Rental property income
Mortgages
Royalties
Other financial investments