Improving the Measurement of Poverty

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Abstract

This study estimates 2007 national poverty rates using an approach largely conceptualized by a 1995 National Academy of Sciences panel and similar to the supplemental poverty measure that will soon be produced by the U.S. Census Bureau. The study uses poverty thresholds based on expenditures for shelter, food, clothing, and utilities, as well as a measure of family income that includes earnings, cash transfers, near-cash benefits, tax credits, and tax payments. The measure also accounts for child care, work, and out-of-pocket medical expenses; variation in regional cost of living; and mortgage-free homeownership. Under this method, the rate of poverty is estimated to be higher than the rate calculated in the traditional manner, rising from 12.4 percent in the official measure to 16 percent in the new measure; the rate of child poverty is more than 3 percentage points higher, and elderly poverty is nearly 7 points higher.

Nearly 50 years after Mollie Orshansky designed the official measure of poverty in the United States, there is widespread agreement among policy makers and researchers that the measure does not adequately gauge the needs and resources of American families. Designed for "temporary emergency use" in the 1960s, the current measure determines poverty based on whether a family's pretax cash income is less than 3 times the cost of a minimally adequate diet (p. 6, Orshansky 1965). This design made sense in the mid-twentieth century, when food expenditures accounted for one-third of a family's total budget and total family income was primarily a function of cash income only. In the last 50 years, however, housing has replaced food as the largest household expenditure as food prices have declined substantially; and taxes, cash and near-cash benefits, child care, and medical expenditures now all influence the income available to meet basic family needs (Christian & Rashad 2009).

In 1995, a National Academy of Sciences (NAS) panel offered an alternative method for measuring poverty, to better account for the contemporary needs and resources of American families (Citro & Michael 1995). Since that time, several efforts have been made to validate assumptions in the panel's recommendations and to estimate poverty based on the recommended method (Betson 1996, 2004; Blank and Greenberg 2008; Betson 2009). In addition, the U.S. Census Bureau has been working toward an NAS-style poverty measure. Since 1999, the Census Bureau has released two sets of statistics annually; one uses the official measure and the other uses an alternative poverty measure. Efforts to refine the alternative measure continue.

Implementation of an NAS-style measure has recently accelerated. New York City's Center for Economic Opportunity (CEO) measures poverty in New York City using an NAS-style estimate, and its success in doing so has been instrumental in providing support for wider usage of alternative poverty measures. In September 2008 and again in August 2009, members of

Congress submitted but failed to pass the Measuring American Poverty Act (HR 6941, 110th Cong., 2nd sess. [September 18, 2008]; S 1625, 111th Cong., 1st sess. [August 6, 2009]). This legislation would mandate an incremental implementation of many of the NAS panel's recommendations. In February 2010, the Obama administration included funding for a new measure in its 2011 budget proposal, and the U.S. Commerce Department announced in March 2010 that, if the budget were approved, it would implement a modified version of the NAS panel's recommendations in a new supplemental poverty measure (SPM); implementation would begin in September 2011 (Roberts 2010; U.S. Department of Commerce 2010).[1] The Office of Management and Budget's Chief Statistician established the Interagency Technical Working Group on Developing a Supplemental Poverty Measure to design guidelines for use by the Census Bureau and the U.S. Department of Labor in creating the supplemental measure. Estimates from the new measure would be released alongside those from the existing official measure, which will continue to be used to determine benefit eligibility and the distribution of federal funds related to poverty (U.S. Department of Commerce 2010).

This article estimates the new measure's implications for an alternative set of national poverty rates and poverty rates for subgroups, including children and the elderly. The analysis adheres as closely as possible to plans for the SPM and differs from prior work in two important ways. First, estimates in this study blend the NAS panel's recommendations with findings from newer research; in particular, the estimates consider the need to adjust thresholds for families that own homes without a mortgage. As the following discussion suggests, this adjustment, which will be part of the SPM, more accurately reflects the needs of these families and has important implications for poverty rates, especially the rates among the elderly. Second, this

[1] New measures typically come from work inside the federal statistical agencies. They are implemented in consultation with the Office of Management and Budget, other agencies, and Congress. Although producing new poverty statistics does not require

study uses data on all two-child families to set poverty thresholds. The NAS panel originally proposed using data only from two-adult, two-child families to set thresholds, but the Interagency Technical Working Group recommends using the broader set of families because the two-parent, two-child family, although still modal, represents an ever diminishing and ever more select share of American households (Kennedy and Bumpass 2008; U.S. Census Bureau 2010). This study discusses the rationale and implications of this choice. The resulting estimates provide a contemporary understanding of poverty in the United States. The estimates also enable a contrast between the SPM poverty statistics and those produced using the official measure.

Review of the NAS Panel's Recommendations

The framework recommended by the NAS panel (see Citro & Michael 1995) is more precise than that traditionally used to measure the needs and income considered in establishing poverty status among American families. The panel makes many recommendations regarding poverty thresholds and the definition of family income. Because the nature of family budgets has changed over the past 50 years, the panel recommends that the poverty threshold take into account expenditures on a "basic bundle" of essential goods (Citro and Michael 1995, 23). This bundle includes annual expenditures on shelter, utilities, and clothing, as well as food. Specifically, the NAS panel recommends that the threshold be based on the basic bundle for families that fall within the 30–36th expenditure percentile of two-adult, two-child families (a child is defined as any person under the age of 18). The panel chooses that benchmark as a way of proxying for an adequate standard of living. This benchmark represents a low but not

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congressional approval, use of the new measure will require ongoing funding from Congress.

extremely low level of spending on essentials; the panel notes that basic bundle expenditures of families in this range should typically hover around 80 percent of median basic bundle expenditures by all two-adult, two-child families.[2] The panel recommends using two-adult, two-child families as the reference group in determining poverty thresholds, because they are the modal type of family with children. However, as noted above, because two-adult families are a declining and increasingly select share of families, the Commerce Department's current proposal for the SPM uses all two-child families as the reference group (U.S. Census Bureau 2010).

The NAS panel recommends further adjustments to the threshold (Citro & Michael 1995). Because expenditures on shelter, utilities, food, and clothing do not account for all necessities, they recommend that the thresholds include a 15–25 percent multiplier (i.e., the value of the threshold is increased by 15–25 percent of the amount needed for the basic bundle of goods). In addition, they endorse adjusting the portion of the threshold that represents housing costs, so that the estimates account for geographic variation in housing costs, and thresholds reflect differential costs of living. They also recommend adjusting thresholds for family size and composition through an equivalization process that accounts for realistic assumptions about consumption and economies of scale.

A family's housing costs can vary according to mortgage obligations or government subsidy. For example, the housing costs of homeowners with a mortgage can be expected to differ from those of homeowners who do not pay a mortgage, as well as from renters and those receiving subsidies. The NAS panel recommends that a new poverty measure should take these differences into account, but does not reach agreement about how to do so (Citro & Michael

[2] The panel recommends using 80 percent of median expenditures as the metric to be used going forward but most efforts to construct NAS-style measures have focused on the other metric, the 30-36th percentile of expenditures. While these need not necessarily be the same, currently they are: in our data, families with expenditures between the 30th and 36th percentiles of basic bundle expenditures have expenditures that are 79.7 percent of the median expenditures on the basic bundle for two adult, two child families.

1995). This leads them to recommend measuring thresholds without regard for dwelling status, but the consensus on this issue now favors distinguishing among the costs for different types of dwellers (in particular, between homeowners with and without a mortgage because otherwise, estimates of poverty for some housing groups would be inaccurate; Blank and Greenberg 2008; Betson 2009).

The NAS panel recommends several changes to the method for calculating family income (Citro & Michael 1995). To accurately measure a family's income, one must define what constitutes an individual, couple, family, and household. The current poverty measure defines a household unit as a related primary family (e.g., two married parents and their two children) or a related primary family and related subfamily (e.g., a female head of household, her daughter, and her daughter's children). If two parents reside together but are not married, the mother and her children are counted as one family unit and the father is considered a separate family unit (Walt, et al 2010). The NAS panel reframes the definition of a family unit to identify it as any group of people that shares income and expenditures on necessities (Citro & Michael 1995). This implies that the previously described cohabiting family (unmarried couple residing together with their children) would be counted as one family unit. Under this more inclusive definition, the only household members who would not be considered part of the family would be unrelated secondary individuals, such as roommates or boarders.

The current poverty measure defines income simply as pretax cash income, which includes earnings as well as cash transfers from such sources as Temporary Assistance for Needy Families (TANF), unemployment insurance, and Social Security payments (Walt et al 2010). However, this definition of income does not accurately reflect the full resources available to families for purchasing necessities. The NAS panel recommends calculating income by

subtracting income and payroll taxes paid and by adding all tax credits received (Citro & Michael 1995). They also state that income should include the value of all near-cash benefits, such as housing assistance and food stamps (now known as Supplemental Nutrition Assistance Program [SNAP] benefits). The current poverty measure double-counts child support and alimony by considering them to be part of the income of recipients but not deducting them from the income of the payers. Given that child support and alimony payments are mandatory, the NAS panel recommends deducting these payments from the income of the payors. The panel similarly holds that medical out-of-pocket expenditures (MOOP) should be deducted from income because such expenditures are considered to be a necessity and constitute a major part of household budgets among certain groups (e.g., the elderly). Estimates of poverty that do not adjust for such expenses may underestimate the hardship faced by these groups. Finally, to address the additional needs of families with working members, the panel asserts that work-related expenditures (e.g., on uniforms, transportation, and child care) should be deducted from the income.

A New Supplemental Poverty Measure

The proposed SPM is, in most respects, very close to the measure recommended by the NAS panel (U.S. Census Bureau 2010). Some differences reflect changes in consensus since the NAS panel completed its work. For instance, the equivalence scale to be used (the Betson three-parameter scale; see Betson 1996) reflects a more up-to-date understanding of how to adjust for

family size and composition. In addition, the SPM will set separate thresholds for families that own their homes free and clear of a mortgage. This again reflects the current consensus.[3]

Other points of difference reflect decisions made by the interagency working group that is outlining plans for the new measure. Three such decisions are particularly consequential. First, as mentioned, the SPM will use all two-child families as the reference group (instead of two-adult, two-child families). Thus, the reference group used to establish thresholds for the new measure will include two-parent families with two children, single-parent families with two children, and other extended families with two children. Second, the SPM will set thresholds at the 33rd percentile of expenditures on the basic bundle by this reference group. (The NAS panel recommends selecting a point between the 30th and 36th percentiles, so as to set the threshold at roughly 80 percent of median expenditures on the basic bundle by the reference group.) Finally, the SPM threshold will be based on expenditure data for the previous 5 years. This gives SPM thresholds stability over time and bases them on a larger sample than would be used under the NAS proposal. Table 1 presents many of the most important methodological differences among the official poverty measure, the NAS proposal, and the SPM.

<Table 1 about here>

The discussion that follows will detail how this study implements these recommended adjustments to thresholds and family income. To the extent possible, this study adopts the methods proposed for the SPM. However, this study's estimates will differ from the SPM's estimates in several ways. First, this study must impute both child care costs and MOOP; the

[3] The SPM may also set separate thresholds for renters and for mortgage payers. However, this change is less consequential than establishing separate thresholds for those who own their homes free and clear.

SPM is expected to use data from new questions added to the Current Population Survey (CPS). Second, this study imputes values for homeownership by families that own their home free and clear of a mortgage, but the SPM is expected to use data from a new question added to the CPS. Third, the thresholds estimated in this study ignore the distinction between renters and homeowners who pay a mortgage, while (as noted earlier) the SPM may set separate thresholds for these two groups. Fourth, to ensure that the study's estimates possess sufficient statistical power, this study employs a broader expenditure range than that to be used by the SPM. Specifically, thresholds in this study are set at the average value of the 30–36th percentiles of expenditures on the basic bundle; the proposed SPM sets thresholds at the 33rd percentile. Fifth, this study's estimates are based on recent publicly available data and thus reflect poverty rates for 2007.[4] It is important to note that any one, or all, of these points of difference might cause this study's estimates to differ from the estimates that will be produced under the SPM. However, such differences are likely to be small.

Data and Sample

This study utilizes data from the Consumer Expenditure Survey (CEX) for 2003–07 to estimate thresholds. The CEX is a nationally representative, cross-sectional household survey conducted by the Bureau of Labor Statistics to collect data on family expenditures. It consists of two components: a quarterly Interview Survey and a weekly Diary Survey. This study's analysis is based on data from the Interview Survey. The survey provides detailed information on

[4] This study also relies on 2007 data so as to avoid incorporating any effects on poverty from the recent recession, which lasted from December 2007 to June 2009 according to the National Bureau of Economic Research (NBER 2010). The SPM will be released in September 2011 and will reflect poverty rates for 2010.

expenditures incurred by a sample of consumer units, which are defined as all members of a housing unit related by blood, marriage, adoption, or some other legal arrangement; two or more persons who live together and use their incomes to make joint expenditures; or a single person who lives with others but is financially independent (U.S. Bureau of Labor Statistics [BLS] 2005). The Interview Survey sample is a rotated panel in which approximately 7,500 units are interviewed every 3 months for 5 consecutive quarters. After that period, the respondent units are replaced by new households. Thus, by design, 20 percent of the sample is replaced every quarter. A contact interview is conducted in the first quarter. Interviews in the second through fifth quarters survey households about their expenditures over the previous 3 months.[5]

The CEX provides information about quarterly expenditures on 10 major categories: housing and utilities; food; alcohol and tobacco; clothing and footwear; transportation; health; leisure; personal care; education and reading; and miscellaneous. From these data, the authors compute expenditures on the basic bundle, which is comprised of housing, utilities, food, and clothing.[6]

The current analysis treats each quarterly observation as independent and computes annualized expenditures by multiplying each quarterly value by 4. Expenditures are expressed in 2007 dollars using the Personal Consumption Expenditures chain-type price index (Federal Reserve Bank of St. Louis n.d.).[7] All analyses are weighted using final CEX sample weights.

The CEX provides detailed information on demographic characteristics of the head of household. These characteristics include age, sex, family type, and number of children. The

[5] Response rates on the CEX Interview Survey are approximately 75 percent in recent years. The CEX provides weights to account for any nonresponse bias, and this study applies these weights in the analyses (BLS 2005).
[6] The basic bundle excludes vacation home utility payments as well as principal and interest on home equity loans and line of credit expenditures, as they are not considered necessary expenditures. In addition, this study attempts to avoid the traditional BLS definition of expenditures, as that definition includes the value of durable goods that are financed. For example, BLS counts the total value of a financed automobile as an expenditure, instead of the monthly payments made by a household. This study counts actual out-of-pocket outlays.

characteristics are used to stratify families into compositional groups necessary to estimate poverty thresholds. The final sample for years 2003–07 includes 172,947 observations of 55,897 households; approximately 13 percent of the sample is composed of two-child families.

The Annual Social and Economic Supplement of the Current Population Survey (CPS), also a nationally representative cross-sectional survey, is used to estimate poverty rates. These analyses use data from the 2008 survey, which provides information on the family's income in the prior year (2007). The CPS collects data across a wide range of demographic, economic, labor force, and family domains. It is the source of data for official government poverty estimates and is particularly useful for estimating alternative poverty rates because its data contain nearly all of the components necessary to calculate an SPM-style definition of family income.

The CPS does not currently include data on child care expenditures or MOOP.[8] Two additional data sources are used for that information. Sponsored by the Census Bureau, the Survey of Income and Program Participation (SIPP) measures income, wealth, and service utilization within households across the country. The SIPP collects extensive data on child care expenditures, including expenditures on formal center-based care, preschool, and afterschool care, as well as on informal, paid, family, and nonfamily care. Estimates of these child care expenditures are imputed into the CPS using a number of relevant household characteristics. The study also imputes estimates of MOOP, using data from the Medical Expenditure Panel Survey (MEPS), a nationally representative sample of the U.S. civilian noninstitutionalized population. The MEPS gathers information on insurance coverage, health status, and medical providers. It also includes a household component that collects information on the frequency of utilization,

[7] For the use of personal consumption price indices to inflate expenditure data, see, e.g., Meyer & Sullivan 2003.

cost, and method of payment for health care services. To calculate MOOP, this study uses the MEPS 2007 Full Year Consolidated Data File and the MEPS 2007 Person Round Plan Public Use File. Further details on the use of these data to impute child care and medical expenditures are provided below.

Defining Poverty Thresholds

The Benchmark Threshold

The threshold used in this study's estimates is benchmarked at basic bundle expenditures that fall between the 30th and 36th percentiles of such expenditures by all two-child families. To identify the families that fall within these percentiles, it is necessary to equivalize expenditures for different types of two-child families. The preferred three-parameter equivalence scale is used to calculate what all two-child families' expenditures would be if they all were two-adult, two-child families. To obtain a sample of sufficient size to ensure statistical power, this study set the threshold to be not one point in this distribution, but instead uses the average value of the basic bundle within the 30–36th percentiles. The authors compared the value of spending on the basic bundle and other expenditures for the sample restricted to the 33rd percentile and the larger sample from the 30–36th percentiles and found that these were broadly consistent (data available upon request).

Table 2 details equivalized, mean, annualized expenditures for two-child families with basic bundle expenditures that fall between the 30 and 36th percentiles of such expenditures. The estimated expenditure on the basic bundle for the median two-adult, two-child equivalent family

[8] Questions on child care and MOOP were added to the March CPS in 2010. Data from these items will be used to calculate the new supplemental measure in September 2011 (U.S. Census Bureau 2010).

in this group is $20,290. This expenditure constitutes nearly 50 percent of total expenditures for such families. Housing and utilities (31 percent) and food (16 percent) are estimated to make up the bulk of that amount. Apparel expenses (including clothing, outerwear, footwear, and accessories for all household members), at 3 percent, are a relatively small component of total expenditures compared to spending on transportation (13 percent), health care (6 percent), and insurance (including health insurance) and retirement (12 percent).

<Table 2 about here>

Multiplier

The addition of a multiplier to the threshold is designed to capture other necessary expenses, such as personal care or reading, beyond basic bundle expenditures. Table 2 displays an initial poverty threshold calculated by adding an additional 20 percent to a two-child family's expenditures on the basic bundle. The 2007 Census Bureau threshold, calculated under the current official measure, is $21,027 for a two-adult, two-child family (U.S. Census Bureau 2007). By contrast, this study's SPM-style threshold for the same family is $24,348.

The NAS panel's report proposes two possible definitions for the multiplier (Citro & Michael 1995). One proposal defines the multiplier to include sufficient funding for items of personal care, such as toiletries, as well as for one-half of transportation expenditures unrelated to work (work-related transportation is treated separately, as a work expense). This study's estimates from CEX (shown in Appendix table A1) suggest that expenditures on items included in this first definition represent an amount about 14 percent higher than basic bundle expenditures. The second proposal defines the multiplier in such a way that it includes the same

items as the first but also a provision for spending on education and reading. Using this second definition results in a multiplier that is 17 percent higher than basic bundle amount. Both definitions of the multiplier would be adequately accounted for in a measure that uses a multiplier in the range of 15–25 percent of the basic bundle expenditure. Others suggest using a multiplier value of 20 percent, which represents the midpoint of the 15-25 percent range (Blank & Greenberg 2008). That value is modeled in Table 2 and employed in this study's estimates.

However, this multiplier does not leave much room for expenditures on items that are important for families with children. In particular, while the 20 percent multiplier includes a provision for spending on education and reading, it is not sufficient to cover spending on other items that might be important for child development (e.g., computers, sports, music, or arts). A body of research suggests that these out-of-school investments complement in-school learning by providing additional educational and socialization opportunities, but such investments are closely tied to a household's socioeconomic status (see, e.g., Kaushal, Magnuson, & Waldfogel 2011). Given the effect that these investment items may have on children and expectations that families purchase such items for their children, it might be important to include the items as a component of household necessities. Although this study does not do so, the issue merits further research.

Equivalence Scales

The purpose of equivalence scales is to adjust thresholds for families of different size and composition so that those with income at the threshold have relatively equal levels of economic well-being. Equivalence scales establish this equity by comparing the consumption needs of a given family to the consumption needs of the reference family. It is well established that equivalence scales should take into account economies of scale and different consumption

patterns among members of a family unit (Betson 1996). However, the current official thresholds do not employ a direct equivalence scale; rather, thresholds are set using a predetermined basic food budget for each unique combination of adults and children. The thresholds assume that the elderly have lower levels of consumption than do other groups. This equivalization process does not consider economies of scale or differences in consumption patterns; the marginal cost of children does not fall with the number of adults in the household (Ruggles 1990). As critics also note, the current official equivalence scales presume that the consumption needs of a childless couple excessively exceed those of a one-adult, one-child household (Betson 1996).

David Betson (2004) proposes a set of three-parameter scales to more accurately adjust for consumption levels in single-parent families. Betson's scales are intended to recognize, for example, that the consumption and economies of scale in a single-parent household are different from those in other households. These differences are due in large part to differences in shelter needs. Betson modifies the scales to reflect the fact that the first child in a single-parent family would consume somewhat more than the first child in a two-parent family but less than an adult. Betson's scales are as follows:

Single-parent households: $[A + \alpha + 0.5(C-1)]^{0.7}$ (1)

All other households: $(A + 0.5C)^{0.7}$. (2)

In these scales, A represents the number of adults in the household, C represents the number of children in the household, and α is 0.8. There is wide support for the use of these scales in constructing improved poverty thresholds (Blank & Greenberg 2008), and the Census Bureau plans to adopt them in constructing the SPM estimates.

Table 3 illustrates the application of these equivalence scales to the benchmark threshold for a range of family types. Specifically, this table includes the equivalence scale value, the

equivalence relative to the two-adult, two-child family, the SPM-style thresholds, the official Census Bureau thresholds, and the difference between the thresholds. Estimates are presented for one-, two-, and three-adult families with varying numbers of children. The scale value is the solution to equation 2 or 3, depending on the number of adults in the family. The equivalence value is calculated as the ratio of a family's scale value to the scale value of a two-adult, two-child family. This equivalence is then multiplied by the threshold for a two-adult, two-child family ($24,348) to arrive at a family type's SPM-style threshold.

<Table 3 about here>

Because the new SPM-style thresholds are based on the equivalized basic bundle expenditures plus the multiplier, it is important to confirm that the thresholds adequately reflect what families on the poverty threshold actually spend on shelter, utilities, food, apparel, and other expenses, and to do so in a similar manner across family size and type. Table 4 examines differences in spending patterns for a variety of families living on these new SPM-style thresholds. The first column of the table shows expenditures for the reference family; this is the two-child family whose basic bundle expenditures fall between the 30th and 36th percentiles (their threshold also includes the multiplier). The table's remaining columns present estimates for the mean expenditures by families that, under the new SPM-style thresholds, would be on the poverty threshold (if one assumes that total expenditure closely approximates total income). These families will tend to be poorer than the reference family, because their total expenditures are equal to the amount that the reference family is spending just on the basic bundle (plus the multiplier).

<Table 4 about here>

The two-adult, two-child family on the threshold is used as a reference to validate the utility of the equivalence scale. Two-adult, two-child families at this poverty threshold spend 65 percent of their total expenditures on the basic bundle. This proportion is relatively consistent across different family types, with two exceptions; one-adult, two-child families spend 71 percent of their total expenditures on the basic bundle (suggesting that they have relatively little income available for other goods), and elderly couples spend only 59 percent of their total expenditures on the basic bundle (suggesting that they have more income available for other goods than does the reference family). The proportion of total expenditures spent on the basic bundle for a two-adult, two-child household differs to a highly statistically significant degree ($p < .001$) from those of single-parent and elderly couple households.[9]

The difference for single-parent families seems to be driven largely by differential housing costs. Even with the additional support built into Betson's (2004) single-parent family equivalence scale, the thresholds of single-parent families may not be adjusted appropriately. Thus, single-parent families at the threshold spend a larger portion of their income on the basic bundle than does the reference family, and this implies that single-parent families are in fact poorer than other equivalized families. This result also implies that adjusting by Betson's equivalence scale will lead to estimates that suggest single-parent families have lower needs (as measured by poverty rates) than they actually do. In analyses not shown here, the findings are consistent across single-parent families with additional children, and the disproportionality grows with the size of the family. It appears that the equivalence scales assume too large a difference between the expenses of a one-adult household and those of a two-adult household. This increase was more accurate when food costs made up a larger portion of the basic bundle,

[9] Two-group independent sample *t*-tests were used to test differences; $p < .001$.

but housing costs now claim a large portion of basic bundle spending. The difference between the costs for one- and two-adult families is much less, because economies of scale are so much greater in housing. For example, a one-adult, one-child family may require a second bedroom, but a childless couple requires only one bedroom.[10]

Accounting for Homeownership in the Thresholds

Although the NAS panel recommends estimating poverty thresholds similarly for all homeowners and renters (Citro & Michael 1995), the current consensus on this issue is that thresholds should vary for different types of dwellers because their necessities vary (Betson 2009; U.S. Census Bureau 2010). In this study, there are four possible types of dwellers: those with subsidized housing, renters, homeowners with a mortgage, and homeowners without a mortgage. Because they have smaller monthly housing payments or no payment, subsidized dwellers and homeowners without mortgages face substantially lower housing expenses than renters and homeowners with a mortgage (although they do have other shelter costs, for which this study does account). Remember that the threshold is based on two-child families, a group that usually faces a monthly housing payment. The threshold is then equivalized to other family types that are more likely to own homes with no mortgage. Therefore, if all four dweller groups are treated similarly, thresholds and poverty rates will be artificially high.

Failing to account for differential housing costs will particularly distort poverty rates for the elderly. The elderly in this study's sample are estimated to be over 5 times more likely to own a home without a mortgage than are families with children. Eighty-one percent of families

[10] Single-parent families are also more likely than other family groups to live in central city areas, where housing costs are high. Thus, geographic adjustment should address some of the discrepancy noted here. The authors experimented with revising the equivalence scales to reconcile these discrepancies for single-parent families by adjusting various scale parameters but are unable to identify a reasonable solution. It is quite probable that any parameter adjustment to reduce the discrepancy for single-parent families will create another discrepancy for a different family type.

with children are estimated to have market-rate housing payments through rent or mortgage; this is true of only 34 percent of elderly households (see Appendix table A2). The implication of this is that the threshold for the elderly, if it is not corrected, will account for housing costs that the majority of the elderly do not experience and, thus, will overstate elderly poverty.

To adjust thresholds for housing status, this study uses a method recently developed by Betson (2009). In the initial step, dwellers receiving housing subsidies or living in public housing, a group that constitutes only 8 percent of the CEX sample, are excluded because they face a level of expenditure that is extraordinarily different from that faced by other groups. (As the discussion details below, the subsequent calculation of poverty rates applies the same threshold to subsidized dwellers as to those who do not receive a housing subsidy; then, to compensate for the housing subsidy, the analyses add its value to the income of subsidized dwellers).

Consider that the counterfactual to homeowners with a mortgage at a given level of basic bundle expenditures are homeowners who have no mortgage but would have that same level of basic bundle expenditures if they had a mortgage. However, because the latter group does not actually face the same level of necessary expenditures, they would never have the opportunity to fall within the same distribution. The 30–36th percentile range of basic bundle expenditures will then be constituted of dissimilar households. Therefore, the analyses equivalize homeowners without mortgages to homeowners with a mortgage. This step is taken to account for the lower housing expenditures of homeowners who lack mortgages. To equivalize the two groups, the equivalization process adjusts the basic bundle upward for each homeowner without a mortgage by the proportion of their basic bundle that they would have spent if they had a mortgage. This adjustment ranges between 0.0001 percent and 36 percent for each home-owning household

without a mortgage.[11] Finally, once all similar households are within the 30–36th percentile range of basic bundle expenditures, the population-level thresholds for homeowners without a mortgage are reduced by the average amount that homeowners with a mortgage spend on mortgage principal and interest. This results in a 40 percent reduction in the thresholds for homeowners without a mortgage. The final threshold (for the two-adult, two-child equivalent reference family) for renters and homeowners with a mortgage is $24,928, and the threshold for homeowners without a mortgage is $17,382.[12]

Defining Family Income

This study's definition of family income closely follows the definition endorsed by the NAS panel (Citro & Michael 1995) and employed in SPM recommendations (U.S. Census Bureau 2010). It begins with pretax cash income, adding tax credits and near-cash benefits received. It then subtracts income and payroll taxes paid, work-related expenses, child care costs, and MOOP. With the exception of benefits from the Special Supplemental Nutrition Program for Women, Infants, and Children (commonly known as WIC), all income, near-cash benefits, taxes

[11] This adjustment can generally be conceptualized as a ratio of the expected basic bundle budget share of total expenditures if a given homeowner had a mortgage to the expected basic bundle budget share if they did not have a mortgage. Mathematically, this ratio equals $1+ \exp(-PV - \mu) / 1+ \exp(-PV)$, where μ is the estimated effect on the basic bundle share of not having a mortgage and PV is the predicted log value of the budget share of the basic bundle. The analysis derives PV and μ by regressing the actual budget share of the basic bundle on logged total outlays, log total outlays squared, and an indicator for owing a home without a mortgage. For a more complete description of this process and its conceptual underpinnings, see Betson (2009).

[12] As discussed earlier, the Census Bureau will make one further distinction in the SPM. It will set separate thresholds for renters and mortgage payers (U.S. Census Bureau 2010).

paid, and tax credits received are calculated from responses to the March CPS.[13] Respondents to the CPS indicate whether they received WIC, but the value of the benefit is not specified. The analyses therefore impute an annual national average WIC benefit to the income of respondents who report receiving WIC (U.S. Department of Agriculture 2010). The remaining components of income are discussed below.

The CPS captures data on child support and alimony received. Those items can therefore be added to income in this study's estimates, but the CPS does not indicate the amounts received. The authors experimented with a variety of ways to impute child support and alimony paid but do not feel comfortable that any method accurately reflects the profile of payers or the levels of child support and alimony paid. This study therefore follows the current official poverty measure's method on this issue, adding child support and alimony received to income considered in the estimates but not subtracting child support and alimony paid from income. Because the numbers of families receiving child support (6.4 percent) and alimony (0.32 percent) are quite small in this sample, the authors feel confident that these values do not drive the results.

Work Expenses and Child Care

This study subtracts from income all expenses that are necessary to work. To identify work-related expenses, the analyses use Census Bureau estimates of weekly work expenses from a topical module of the 1996 SIPP.[14] Work-related expenses include expenditures on uniforms,

[13] In the March CPS, income includes wages, salaries, interest, dividends, rental income, unemployment compensation, workers compensation, Social Security benefits, retirement income, survivors benefits, Supplemental Security Income, veterans benefits, disability payments, public assistance, educational assistance, child support, alimony, financial assistance from others, and other sources. Near-cash transfers include WIC, food stamps (SNAP benefits), housing subsidies, and energy assistance. The value of free or reduced-price school breakfasts and lunches are not included as transfers, per the recommendation of the Interagency Technical Working Group on Developing a Supplemental Poverty Measure. Tax credits consist of federal and state earned income tax credits, child tax credits, and capital loss credits. Taxes paid consist of the amount paid for federal and state taxes on income, payroll, capital gains, and property (U.S. Census Bureau 2010).

[14] The U.S. Census Bureau provides public-use March CPS data files for the purpose of calculating SPM-style rates. These files are used to estimate work expenditures (U.S. Census Bureau 2008).

union dues, mileage (for those who drive to work), and other expenses, including those for public transportation and parking. The Census Bureau imputes the values for these expenses to the March CPS data using a regression-based method that estimates work expenses separately for single- and two-parent households. The method controls for the number of children in the household, geographic region, family income, number of hours worked, education, and age. After the imputed expenses are adjusted for inflation, average weekly work expenses were roughly $23 per worker per week in 2007. This represents approximately 85 percent of the median expenditures on other work-related items and is similar to the inflation-adjusted value recommended by the NAS panel: $25 per worker per week (Citro & Michael 1995).[15]

This study also uses data from the SIPP to estimate child care expenditures. These estimates employ a hot-deck imputation of values into the March CPS from the distribution of child care expenditures within demographic cells of the SIPP. Using an ordinary least squares regression approach would impute average values to families but ignore the fact that the distribution of expenditures is skewed; a small number of families have extremely high expenditures, and many families have rather low expenditures.[16] The process used here produces imputed family-level child care expenditures that range from $832 to $10,582 for families that report having child care expenditures in the March CPS.[17]

[15] The estimates suggest that there is little geographic variation in work expenditures for full-time workers. Average annual work expenses for this group are estimated to range from $1,242 in the West to $1,256 in the Midwest.

[16] To implement a hot-deck imputation, the sample of those who paid for child care in the donor (SIPP) and recipient (CPS) files is divided into mutually exclusive cells comprised of combinations of poverty status (< 100 percent, 100–125 percent, 125–200 percent, and > 200 percent), number of children (1, 2, and ≥ 3), and marital status. A small number of cells contain fewer than 100 observations. In those instances, the analysis groups together cells that are most similar (e.g., by combining families that are poor, unmarried, and have two or more children). The analysis then calculates deciles of child care expenditures for each cell in the donor file and randomly matches those values to the same cell in the recipient file. Specifically, each member of a recipient cell is randomly assigned a number (1–10), and each number corresponds to a particular decile of child care expenditures.

[17] In this area of research, child care expenditures are often top-coded so that they do not exceed the value of the lowest earner's earnings. This is done to reinforce the notion that these are justified deductions because they are work-related expenditures (see, e.g., Iceland and Ribar 2001). However, it may be the case that families are obligated to an ongoing child care payment, especially for center-based care, regardless of whether there is job loss or reduced earnings in the family. Therefore, this study does not top-code child care expenditures in this way. In this sample, family child care expenditures are estimated to exceed the earnings of the lowest earner in only 14 percent of cases with child care expenditures.

Medical Out-of-Pocket Expenditures (MOOP)

Several types of expenditures are captured in this category. These include payments for health care visits and services, prescription drugs, and health insurance premiums. Because the March CPS does not currently include data for medical expenses, it is necessary to impute these values, and the imputation process is the subject of much study (Betson 2009; O'Donnell & Beard 2009). Imputing MOOP is made difficult by the fact that most people have few or no such expenses, but a small minority has very high MOOP. Therefore, the distribution of MOOP is highly skewed, and the highest expenditures are observed among the elderly. Betson (2009) and New York City's CEO (2008) recently implemented a hot-decking method that imputes MOOP from a donor data set based on an extensive demographic profile, including age, poverty status, and family size. This study follows that method closely.

Specifically, this study estimates MOOP by dividing the donor (MEPS) and recipient (CPS) files into mutually exclusive cells based on family size, poverty status, and an indicator that identifies an elderly head of household. Cells that have counts under 100 are combined. This process is much like that used to impute child care expenditures; each donor cell is divided into deciles of MOOP expenditures, and the values are randomly imputed to matched cells in the March CPS.[18] Estimates from the MEPS data suggest that nonelderly families and families with children spend approximately $2,700 annually on MOOP; elderly families are estimated to spend $3,800 on average. The Census Bureau estimates from 1997 CEX data (updated for inflation) suggest that nonelderly families and families with children spend approximately $1,900 on

[18] For comparison, the analysis also utilizes MOOP estimates that the Census Bureau employs in calculating some of that agency's experimental poverty rates.[18] The Census Bureau's MOOP estimates are calculated via a method designed by Betson (2001). They use medical expenditure data from the 1996 CEX. Those data are adjusted for changes in the Consumer Price Index. This study arrives at estimates that are consistent with those obtained from the 1996 CEX data.

MOOP each year; elderly families spend $3,400 annually. This study's estimates are likely larger than the Census Bureau estimates because MEPS data provide a more comprehensive accounting of medical expenditures than the CEX data and because the growth in the costs of health care over the past 15 years has exceeded inflation.

Regional Price Variation

To account for geographic differences in cost of living, particularly in housing costs, this study applies a regional housing index to the housing portion of the threshold. This index was developed by the Census Bureau using U.S. Department of Housing and Urban Development fair-market rent estimates (FMR) from 100 regions across the country. Fair-market rent is generally defined as the amount of rent paid by tenants who moved into a two-bedroom apartment within the last 15 months in the 40th–50th percentiles of the rental distribution. They are estimated using a combination of housing data from the American Community Survey and the decennial Census; estimates are confirmed once or twice per decade using random-digit dialing within a number of nonmetropolitan and metropolitan areas. The average value of the index equals 1. Values lower than 1 are taken to indicate that housing costs are less than the national average. Those greater than 1 are taken to indicate that such costs are higher than the national average. The Census Bureau imputes this index to March CPS using restricted geographic data. Because CEX does not provide detailed geographic information on surveyed households, the geographic adjustment is applied to 45 percent of the sample-level threshold for

each family type after the thresholds are cross-walked to the March CPS. Forty-five percent of the threshold approximates the proportion of the basic bundle that is spent on housing.[19]

Imputing Homeownership

In order to apply these thresholds to the March CPS sample for the purposes of calculating poverty rates, it is necessary to distinguish different types of dwellers in that data set. However, the CPS does not currently collect data on whether homeowners have mortgage payments, so it is necessary to impute that variable.[20] To do so, the study creates an indicator from CEX data for free and clear homeownership. The indicator is regressed on a number of demographic variables, including age, race, and ethnicity, as well as family variables, total expenditures, and a number of interactions. The regression coefficients are used to predict the probability of home ownership free and clear of mortgage payments in the March CPS data. Families in the CPS then are matched with families in the CEX on the estimated probability of owning a home without a mortgage. Matching continues until the percentage of families that own their home without a mortgage reaches 16 percent in the CPS, as 16 percent of families in the U.S. Census American Community Survey (ACS) sample own their home free and clear of a mortgage.[21] To generate age-appropriate estimates of free and clear homeownership, and to ensure that those estimates

[19] It is worth noting that the Department of Housing and Urban Development does not support the use of FMRs in setting thresholds, because FMRs are primarily used to set Section 8 voucher values, and they do not account for geographic variation in costs of living that are not related to housing. The Census Bureau is currently exploring other ways to adjust for geographic differences. These include using data from the American Community Survey and regional price parities (Renwick 2009).
[20] As the discussion mentioned earlier, the CPS began collecting data on this in March 2010.
[21] This data point is measured using the ACS online data analysis feature available at the Integrated Public Use Microdata Series Web site: http://usa.ipums.org/usa/index.shtml.

are consistent with population estimates, the analysis imputes free and clear homeownership separately for the elderly and for nonelderly families.[22]

Results

To estimate poverty rates in the March CPS, the study applies family size- and composition-specific poverty thresholds developed by the authors using the CEX. Because the thresholds are set at the family level, each member of a family (with the exception of secondary, unrelated individuals) receives an identical threshold. These thresholds are then compared to total family income. An individual is identified as impoverished if his or her family income is less than the threshold for that family.

Table 5 presents poverty estimates for the overall population of sample members and for a number of subpopulations. Official Census Bureau poverty estimates are presented in the first column as points of comparison. Estimates in the remaining columns suggest the ways in which poverty rates change as the analyses implement various elements of the NAS panel recommendations as well as the adjustment for homeownership without a mortgage. The final SPM-style measure, shown in the right-most (SPM) column includes all elements of the SPM-style measure as well as the homeownership adjustment. Results in that column should closely approximate the rates that would be produced by implementing the SPM for 2007 (the year analyzed here). A comparison of the results for the official measure (first column) with those for the final SPM-style measure (last column) suggests that the supplemental measure produces a

[22] In the ACS data, approximately 8 percent of families with children, 13 percent of nonelderly adults, and 50 percent of the elderly own their homes without a mortgage. The results of this imputation suggest that 5 percent of families with children, 15 percent of nonelderly adults, and 50 percent of the elderly own homes without mortgages. Although the authors believe these minor discrepancies will make little difference in poverty rates, they experimented by imputing free and clear homeownership

substantially higher overall poverty rate than the official measure (16 percent in the SPM; 12.4 percent in the official measure).

<Table 5 about here>

Most of this discussion focuses on the differences between the rates in the first and last columns, but estimates in the four intermediate columns illustrate how the poverty rate changes as various elements of an SPM-style measure are implemented. Column 2 presents estimates for intermediate poverty rates that reflect only the expenditure-based threshold and more comprehensive measure of income (this measure accounts for taxes paid and received, and near-cash benefits). Column 3 deducts child care and work-related expenditures from comprehensive income. Column 4 deducts MOOP, in addition to child care and work-related expenditures, from comprehensive income. The fifth column adjusts the estimates in Column 4 for geographic variation in housing costs. The final (SPM) column also adjusts thresholds for those who own their homes free and clear of a mortgage.

The detailed data provided in table 5 suggest which aspects of the new supplemental measure drive the changes in poverty rates. A comparison of the estimated overall rate from the official measure and that for the first intermediate SPM-style measure (i.e., the difference between results in columns 1 and 2) suggests that this intermediate measure leaves the poverty rate essentially unchanged (12.4 percent in the official measure and 12.6 percent in the first intermediate measure); this is because the effect of the higher threshold is offset by the use of a more comprehensive measure of income. If expenditures on child care and work-related

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separately for these three groups (as opposed to just separately for the elderly and nonelderly), but small cell sizes among nonelderly families without children made the imputation process too error-prone.

expenses are subtracted from family income (column 3), the estimated overall poverty rate is higher than that obtained from the official and first-intermediate measures. It also is estimated to be higher if MOOP expenses are excluded from family income (column 4). Adjusting for geographic variation in the price of housing (column 5) is not estimated to affect the overall poverty rate. Finally, adjusting thresholds for homeownership without a mortgage (SPM column) is estimated to produce an overall poverty rate of 16 percent; this rate, while lower than those produced in columns 4 and 5, is approximately 3 and one-half percentage points higher than the rate obtained from the official measure.

Child Poverty

Moving from the official Census Bureau measure to the SPM is estimated to increase child poverty rates by 3 percentage points. Under the official measure, 18.1 percent of individuals under age 18 are found to be poor, but the first intermediate SPM-style measure (column 2) produces a poverty rate of 15.1 percent. The difference is likely due to the shift to the more comprehensive measure of family income. Particularly important is the inclusion of near-cash benefits in family income. Many of these transfers, such as food stamps (SNAP benefits) and WIC, benefit children and their families more than other groups.[23] The estimated child poverty rates are smaller if these benefits are considered as income in the calculations, but these rates then move upward again with the implementation of steps that include additional adjustments. In particular, poverty rates among children are estimated to be higher than the official estimates in estimates that subtract spending on child care, work-related expenses, and MOOP from the

[23] For example, estimates by the authors (not shown) indicate that families with children in this sample receive an average of $795 in near-cash benefits each year. By contrast, the elderly and families without children are estimated to receive an average of $312 and $264 respectively. Families with children also are estimated to receive about $2,200 annually in tax credits, but families without children receive less than half that amount, and elderly households are estimated to receive only $130.

income considered by the measure. For example, average child care expenditures for families with children are estimated to be nearly $1,000. Work-related expenses for a family with two full-time workers amount to more than $2,600.

Elderly Poverty

The shift to the SPM is estimated to produce an elderly poverty rate that is higher than that obtained from the official Census Bureau measure (9.4 percent under the official measure; 16.1 percent under the SPM). The change is much more dramatic than that observed in the estimates for poverty rates among nonelderly adults (whose poverty rate under the SPM is 2.5 percentage points higher than under the official measure). This large shift in the rate of elderly poverty is attributable to several factors. First, the Census Bureau's official poverty thresholds, which are based on estimates for a basic food budget, assume that the elderly consume less food than the nonelderly do. Thus, the official measure sets lower thresholds for the elderly. Under an SPM-style measure, this assumption is eliminated; the elderly are assumed to have needs similar to those of other types of individuals and families. Under the official measure, the poverty threshold for nonelderly single individuals is $10,787, about 10 percent higher than the official threshold of $9,944 for an elderly individual. Similarly, nonelderly couples face an official threshold of $13,884, but elderly couples face a lower official threshold of $12,533. In the shift to an SPM-style measure, thresholds generally increase, but because the new measure does not differentiate the elderly from the nonelderly, the difference between the official thresholds and the new SPM-ones (and thus between poverty rates) is greatest for the elderly. Under the SPM-style measure, thresholds are $11,284 for single individuals and $16,015 for couples. The difference between the official thresholds and the SPM-style alternatives is approximately 13 percent for elderly

individuals and approximately 28 percent for elderly couples (see Appendix table A3).[24] Because the estimated incomes of many elderly hover just above the official threshold and tend not to increase in the shift from the official measure to the SPM (e.g., their incomes do not rise substantially when income from transfers is included in the measure of income), it is not surprising that the shift to the new measure is estimated to result in large increases in the rates of elderly poverty.

A second factor affecting elderly poverty rates in the shift to the new measure is the inclusion of MOOP. The elderly face the highest costs for MOOP; on average, MOOP are estimated to be approximately $1,200 higher for the elderly than for others (see Appendix table A4). If the calculations subtract MOOP from income, the rate of poverty is estimated to increase for all groups, but the estimated effect on the elderly is 4 times greater than that on children and nearly 9 times greater than that on nonelderly adults. Subtracting MOOP from income increases the estimated rate of poverty among elderly adults by more than 9 percentage points. Thus, comparing estimates that adjust income only for child care and work expenditures (column 3) to estimates that also adjust income for MOOP (column 4) in Table 5, elderly poverty increases from 13.7 percent to 22.8 percent, a much larger increase than seen for other groups.

The estimated effects of these changes are offset if the thresholds are adjusted to account for sample members whose housing costs are low because they own a home free and clear of a mortgage. The prevalence of homeownership free and clear of a mortgage is much greater among the elderly than among the nonelderly; approximately 50 percent of the elderly own homes without a mortgage, but few in the younger populations do (Appendix table A4). The benefits reaped from not having a house payment (and the subsequent lowering of thresholds for

[24] The thresholds in Appendix Table 3 are for illustrative purposes only and do not include adjustment for homeownership without a mortgage.

those who do not) nearly offset the costs of MOOP and decrease the estimated poverty rates for the elderly by almost 9 percentage points. Thus, elderly poverty rates are lower in estimates from the full SPM measure (16.1 percent) than in those that only account for expenses on child care, work, and MOOP, as well as for geographical variation in housing costs, but mortgage-free home ownership (22.7 percent, column 5).

Racial and Ethnic Differences

Under the official poverty measure, there are quite large differences between the estimated poverty rates for whites and those for blacks, as well as between the rates for whites and those for Hispanics. These gaps persist, and are somewhat higher, in estimates from the new measure. If one compares the official Census Bureau poverty rates (column 1, table 5) with the final SPM-style rates (SPM column in that table), the estimates suggest that the poverty rate for whites under the SPM is 1.8 percentage points higher than that calculated under the official measure; the rate for blacks is 5.1 points higher. As a result, the estimates with the new measure suggest that the white-black poverty gap is 3.3 points higher than in the official estimates. The SPM estimate for Hispanic poverty is 9.3 percentage points higher than that from the official measure, and the white-Hispanic poverty gap is estimated to be over 7 percentage points higher with the new measure. Estimated rates of Asian poverty also are higher (nearly 6 percentage points) under the SPM than under the official measure.

A number of factors appear to explain why the difference between the official and SPM rates is so much greater among Hispanics and Asians than among other groups. According to author calculations of CPS data (not shown), on average, the near-cash benefits received by Hispanics ($718) and Asians ($312) are lower than those received by blacks ($1,305). Work

expenditures for Hispanics and Asians also are estimated to exceed those of whites or blacks by several hundred dollars. Although MOOP for Hispanics are consistent with those for other groups, MOOP are highest among Asians ($4,049). Hispanics and Asians are also more likely than other groups to live in settings with high housing costs (e.g., cities in the Northeast or on the West Coast), and are less likely to own a home without a mortgage. These patterns are hardly surprising given that 37 percent of Hispanics and 60 percent of Asians in this sample report that they are foreign-born.

Racial and ethnic disparities seen in the general sample are evident among children and the elderly, but the shift from the official measure to the SPM-style measure affects estimates of the extent of such disparities among children and the elderly in different ways. Specifically, the SPM's estimates of disparities among children are smaller than those produced by the official measure; the SPM estimates of disparities among the elderly are larger than those from the official measure. Additional analyses examine the reasons why the shift to the SPM changes the racial and ethnic disparities in estimated poverty rates (see Appendix table A5). In these analyses, whites serve as the reference group. Results from these analyses suggest that estimated poverty rates among children are about 1 percentage point smaller for whites and blacks under the SPM than under the official instrument. Rates estimated with the SPM are 7.5 percentage points higher among Hispanic children and 5.4 points higher among Asian children. SPM measure considers near-cash benefits as income, and black children in this sample are estimated to receive far more near-cash benefits than any other group ($2,487). The results in table A5 suggest that these transfers have a powerful effect on poverty rates among these children. However, these transfers help to reduce the estimated white-black disparity in child poverty by only three-tenths of a percentage point.

Across the measured racial and ethnic groups, estimates for elderly poverty are consistently and dramatically higher under the SPM than under the Census Bureau's official measure. The largest difference is observed in estimates for the Hispanic elderly, whose rates of poverty are 16.8 percentage points higher in the SPM estimates. The SPM estimates are 11.6 percentage points higher among black elderly and 11.5 points higher among Asian elderly. SPM estimates for elderly poverty are higher across the board because the supplemental measure's assumptions concerning consumption differ from those in the official measure. Differential changes among racial and ethnic groups are thus due to other adjustments within the SPM. There are two likely explanatory factors. As the discussion above notes, the estimated rates of mortgage-free homeownership are generally lower among Hispanic and Asian households than among white ones. According to author calculations using CPS data (not shown), among the elderly, blacks (17 percent), Hispanics (15 percent), and Asians (13 percent) are estimated to own mortgage-free homes at lower rates than do whites (59 percent). Due to this disparity, Whites will have a much larger average reduction to their thresholds through the aforementioned adjustment made for home owners without mortgages and, thus, lower poverty rates. Second, only 16 percent of white sample members are estimated to live in central cities, but the rate is 50 percent among black, Hispanic, and Asian members. These geographic differences are likely related to differences in costs of living. The thresholds of families living in these urban areas will be adjusted upward because of the higher cost of living and will therefore experience higher poverty rates.

Differences by Nativity

As table 5 suggests, rates of poverty are estimated to differ greatly by place of birth. The SPM's estimates for the poverty gap between U.S. born and foreign-born individuals are twice as high as those from the official Census Bureau measure are. Although recently arrived immigrants are ineligible for various cash and in-kind safety net programs, the average amount of near-cash transfers received by U.S. born sample members ($455) is similar to that received by foreign-born members ($407). However, the SPM's adjustment for near-cash transfers and benefits does not offset the change in the thresholds to the same extent for foreign-born sample members as it does for native-born members. As a result, the estimated poverty rate for native born families is lower under the first intermediate SPM measure than under the official measure, whereas foreign-born families experience a two point increase in poverty (see first and second columns in table 5). Foreign-born sample members' spending on child care and MOOP is similar to that by U.S. born members, although foreign-born members have slightly higher work-related expenditures. Therefore, deducting these expenditures from income has a similar effect on the poverty rates for both groups (as presented in columns 3 and 4). The geographic (column 5, table 5) and homeownership adjustments (SPM column) have a slight effect on the estimated gap in poverty between these two groups.

Family size, family composition, area of residence, and homeownership patterns are also factors that help explain differential poverty rates between native- and foreign-born families under the SPM. On average, foreign-born families face a higher average poverty threshold (results not shown). This is in part because such families tend to have more adults living in the household (2.4 adults, on average) than do U.S. born families (2.1 adults), although foreign-born families have the same number of children. In addition, more foreign-born than U.S. born sample

members live in cities or suburbs, where the cost of housing is high. Foreign-born families are also less likely to own a home without a mortgage.

Regional Differences

The analyses also consider regional variation in poverty rates. Under the Census Bureau's official measure of poverty, the South is estimated to be the poorest region of the United States. Specifically, 13.9 percent of southerners are estimated to have had incomes at or below the poverty threshold in 2007. The rate is 12.3 percent in the West, 11 percent in the Midwest, and 11 percent in the Northeast. Under the first intermediate SPM-style measure (column 2 of table 5), the estimated gap between the South and other regions of the country is higher than under the official measure. Under the first intermediate measure, the estimated rate of poverty is more than one-half of a percentage point higher in the South than under the official measure; in all other parts of the country, results from the first intermediate measure are marginally lower than the official estimates. Spending on child care, work expenditures, and MOOP are similar across regions, but the adjustments for geographic variation in cost of housing (column 5, table 5) and mortgage-free homeownership (SPM column, table 5) have a sizable effect on the estimated differences in regional poverty rates. The cost of housing in the South is 5 percent lower than the national average, and the cost in the Midwest is 9 percent lower than average. The cost is 6 percent higher than average in the West and 8 percent higher in the Northeast. The South also is estimated to have the highest proportion of homeowners without a mortgage (22.9 percent). Between 17.7 and 22.7 percent of sample members own mortgage-free homes in the other regions. Adjustments for geographical differences in housing costs and for mortgage-free homeownership reduce the estimated size of the regional differences in poverty, but the extent of regional variation remains striking. For all regions, the poverty rates estimated under the SPM

are higher than those produced by the official Census Bureau instrument, but the difference between the measures' estimates is largest in the West (5.2 percentage points). The SPM estimate is 3.5 percentage points higher in the Northeast, 3.4 points higher in the South, and 1.9 points higher in the Midwest. Ultimately, the estimated disparity in poverty between the most and least impoverished regions of the country expands from 2.9 points under the official measure to 4.3 points under the SPM[25]

Discussion and Implications

This study estimates poverty rates in the United States in line with the proposed SPM (U.S. Bureau of the Census, 2010). The SPM draws on the recommendations by the 1995 NAS panel (Citro & Michael, 1995) and additionally adjusts for the lower housing costs of individuals who own their homes free and clear of a mortgage (the NAS panel recognizes the importance of this factor but does not reach consensus on a recommendation). The SPM measure implemented in this study is premised on poverty thresholds that account for the housing, utilities, food, and clothing needs of two-child families with expenditures that fall between the 30th and 36th percentiles of expenditures on these items. The measure also includes a multiplier (i.e., an additional 20 percent adjustment intended to cover a share of expenditures for transportation and other essential items). The thresholds for sampled families and households are equivalized using a three-parameter equivalence scale (Betson 2004) that accounts for the different needs of single- and two-parent households. These thresholds are adjusted for regional differences in the cost of housing. The study also adjusts thresholds downward for families that own a home without a

[25] For a discussion of state differences that appear under an NAS-style measure, see Ziliak (2010).

mortgage. This adjustment accounts for the fact that these families face lower housing costs than families in other living situations. To determine a family's poverty status, these thresholds are compared to income more comprehensively measured than in the current official poverty measure. Under the SPM definition, family income includes earnings, tax credits, cash transfers, and near-cash transfers. From that income figure are subtracted amounts spent on income and payroll taxes, work-related expenses (including those for child care), and involuntary necessary expenditures, including MOOP. The SPM also considers received child support as income, but the analyses are not able to subtract the amount of child support paid, because the CPS data do not provide sufficient information to identify which sample members pay child support.

The study finds that the overall poverty rate in 2007 is 3.6 percentage points higher under the new SPM than under the official Census Bureau measure. In addition, the implementation of the SPM is found to dramatically change estimated poverty rates for some population subgroups but to have only marginal effects on the estimated rates for others. The following discussion examining specific elements involved in the move to the SPM provides insight into why this is the case. Doing so also illustrates how the U.S. social safety net works or does not work for some populations.

The estimated rate of child poverty is 21.3 percent under the new measure, 3.2 percentage points higher than the rate estimated under the official measure. The first two columns of table 5 are helpful in understanding the difference between the two estimates. The official child poverty rate is 18.1 percent, but the results from the first intermediate SPM-style measure in column 2 (which adjusts family income for near-cash benefits received but not for child care, work expenses, or MOOP) suggest that child poverty is 3 percentage points lower. Black poverty also is 2 percentage points lower in the first intermediate estimate than in the official one. Although

the rates of poverty estimated for other groups are lower in the first intermediate SPM-style results than in those from the official measure, the changes in estimated rates of child and black poverty make a strong case that near-cash transfers reduce poverty among these groups.

A finite number of factors distinguish the first intermediate measure's estimates from those produced by the official measure. The first intermediate SPM measure considers family size, family composition, age (in that the official measure assumes lower thresholds for the elderly than for the nonelderly, and the SPM-style does not), income, taxes, and near-cash benefits. The results suggest that, on average, the most consequential difference for estimates of child poverty is affected by the intermediate measure's adjustment of family income for near-cash benefits. This is an important change, and one that raises questions about the accuracy of scholarly understanding of historical trends in child poverty. An important agenda for future research will be to estimate SPM-style child poverty rates for prior years and to compare trends in those rates with trends in official rates. Although Census Bureau estimates allow comparisons of rates derived from the two types of measures for recent years, those estimates do not take into account all the changes made here and do not cover the years prior to 1999 (Short 2001).

This analysis also illustrates the dramatic effect of the supplemental measure on the understanding of elderly poverty rates. The findings suggest that rates of elderly poverty increase if the measure abandons the food-based thresholds and considers MOOP, but adjusting housing costs to account for mortgage-free homeownership is found to attenuate this change. It would also be worthwhile to study historic poverty levels under the SPM-style measure. Although these estimates represent a dramatic improvement in the measurement of poverty, there are nevertheless some important issues still to be resolved. In addition to those highlighted above,

the authors would particularly emphasize six issues. Several of these are related to the measurement of poverty among children; others are related to the elderly and disabled.

The first issue relates to the adequacy of the multiplier used to capture expenditures that promote child development. As the preceding discussion notes, a multiplier of 20 percent is not adequate to meet the cost of such expenditures for families with children. Because this study's emphasis is on estimating poverty rates in line with the new supplemental measure, it does not produce estimates using a higher multiplier for families with children. However, many argue that the multiplier should also account for expenses related to child developmental needs. It would be important to explore doing so in future research. In a letter to the Census Bureau on the SPM, Senator Christopher Dodd and Congressman Jim McDermott (the authors of the Measuring American Poverty Act) advocate further exploration of this issue (Dodd and McDermott 2010).

Second, as the preceding discussion mentions, some evidence suggests that the equivalence scale may not adequately capture the living costs faced by single parents with children. This creates potential problems in adjusting thresholds for family size and structure as well as in setting the reference family threshold; under the SPM, the equivalence scale is used to make all two-child families look like two-adult, two-child families.

Third, there are some questions related to the application of the equivalence scale to estimates for elderly adults. The results suggest that the portion of the household budget available for spending on items other than the basic bundle is larger among elderly adults who have expenditures at the new thresholds than among other households with expenditures at that level.

Fourth, the decision to use all two-child families, rather than just two-adult, two-child families, substantially affects estimated thresholds and poverty rates. All else equal, two-adult,

two-child families have higher average incomes, so basing thresholds on all two-child families results in lower thresholds and hence in lower estimated poverty rates. This change explains why the poverty rates reported here may appear lower than others estimated using NAS-style measures. As Appendix table A6 suggests, if poverty is measured with methods identical to those presented here but the threshold is based on two-adult, two-child households, overall poverty rates are estimated to be 3 percentage points higher than those obtained from a measure with thresholds based on all two-child families. The two-adult, two-child thresholds produce even higher estimated child poverty rates. For the overall population, the supplemental poverty rates estimated here are closer to current official poverty rates. This may be a positive outcome in terms of continuity of poverty rates but could be viewed as a negative outcome if the expectation is that an improved measure of poverty will provide a different understanding of the overall extent of poverty.

Fifth, although very detailed data from the MEPS are used to calculate MOOP, the estimates may not fully reflect all expenditures related to health. In particular, they may understate such expenditures for the elderly or those with disabilities. For example, measures of MOOP do not include payments for transportation to medical appointments or payments for day programs that enable elderly and disabled individuals to live at home.

Sixth, any income-based measure of poverty relies on accurate data on income. It is well-known that income reporting is noisy at the bottom of the income distribution, and some research raises concerns about the extent of underreporting of retirement income among the elderly (see Meyer & Sullivan 2010).

Conclusion

The official poverty measure has been in use for nearly 50 years and will continue to play an important role as part of a historic time series. It will also continue to serve as an easy-to-use indicator for the determination of benefit eligibility and the distribution of federal antipoverty funds. But there is now widespread agreement that it is time for the official measure to make room for another, more nuanced measure. The new measure planned to come into effect in September 2011 will not replace the official measure, but rather will supplement it by providing a deeper understanding of poverty and of the role that social welfare programs play in addressing need. In doing so, there will be some good news and some bad news. On the up side, the new measure will help to gauge the effect that social welfare programs have in reducing poverty, particularly among children, and will point to a more positive view of the role of the welfare state. On the down side, however, the new measure suggests that there is more elderly poverty than was previously assumed.

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Table 1

Comparison of Approaches to Measuring Poverty

	Official	NAS	SPM
Baseline threshold	Cost of minimally adequate diet	30–36th percentile of for two-adult, two-child families	30–36th percentile of for all two-child families
Multiplier	Multiplied by 3, as food was approximately one-third of a family's budget in the 1960s	15–25% to account for additional necessities	15–25% to account for additional necessities
Equivalence scale	Implicit, in that each family type receives a unique value based on food consumption	Three-parameter scale	Three-parameter scale
Regional variation	None	Adjust for geographic differences in cost of housing	Adjust for geographic differences in cost of housing
Annual adjustment	Update for inflation only	Update annually with new expenditure data and for inflation	Update annually with new expenditure data and for inflation
Elderly	Elderly thresholds are discounted slightly due to perceived lower levels of consumption	Elderly thresholds are not discounted	Elderly thresholds are not discounted
Income	Pretax income, including cash transfers	Income net of taxes paid and credited, cash and near-cash transfers, child support paid and received, child care expenses, work expenses, and MOOP	Income net of taxes paid and credited (except capital gains tax), cash and near-cash transfers (except the value of school nutrition programs), child support paid and received, child care expenses, and MOOP
Homeownership	None	None	Set separate thresholds for families that own their homes free and clear of a mortgage

Note.—BB = basic bundle expenditures; NAS = National Academy of Sciences recommendations (Citro and Michael 1995); SPM = supplemental poverty measure (U.S. Census 2010); MOOP = medical out-of-pocket expenditures.

Table 2

Equivalized Expenditures for Two-Child Families

	30–36th Percentiles ($)	% of Total Expenditure
Total expenditure	41,131	100
Basic bundle	20,290	49
20% more	4,058	10
Initial threshold*	24,348	59
Itemized expenditures:		
Housing and utilities	12,581	31
Food	6,536	16
Apparel	1,192	3
Transportation†	5,335	13
Health care	2,293	6
Education and reading	621	2
Personal care	227	1
Insurance and retirement	4,958	12
Entertainment	2,117	5
Cash contributions	909	2
Alcohol and tobacco	520	1
Miscellaneous	487	1

Note.— n = 1,597 families. Estimates are based on 2003–07 Consumer Expenditure Survey data, and values are adjusted to January 2007 dollars (Federal Reserve Bank of St. Louis n.d.). Original expenditure values for each two-child family are equivalized to represent the amount that would be spent if that family were a two-adult, two-child family. The 1995 NAS panel's poverty threshold is defined as the sum of expenditure on the basic bundle and a multiplier of 1.2 at a given expenditure percentile.

* The NAS poverty threshold is defined as expenditure on the basic bundle, plus a multiplier of 1.2 at a given expenditure percentile.

† There is extreme variability in transportation expenditures and its source is unclear. Transportation expenditures in the top decile are therefore recoded at the 90th percentile and those in the bottom decile are recoded at the 10th (Angrist and Krueger 1999).

Table 3

Comparison of Supplemental and U.S. Census Thresholds

		Supplemental				
Adults	Children	Scale Value	Equivalence*	SPM Thresholds ($)†	Official Census Thresholds ($)‡	Difference ($)
1	0	1.00	.463	11,284	10,590	694
1	1	1.55	.720	17,536	13,540	3,996
1	2	1.79	.830	20,216	16,705	3,511
1	3	2.16	1.003	24,426	21,100	3,326
2	0	1.41	.655	15,959	13,540	2,419
2	1	1.90	.880	21,431	16,689	4,742
2	2	2.16	1.000	24,348	21,027	3,321
2	3	2.40	1.114	27,122	24,744	2,378
3	0	2.16	1.000	24,348	16,218	8,130

Note.—SPM = supplemental poverty measure. Estimates are based on the 2003–07 Consumer Expenditure Survey data, and values are adjusted to January 2007 dollars (Federal Reserve Bank of St. Louis n.d.).

* Each equivalence is calculated as a ratio of a given household type's scale value to the scale value of the reference family (two adults and two children). For example, the equivalence for one adult and two children is calculated as 1.79/2.16 = 0.83.

† The equivalized thresholds are calculated by multiplying the poverty threshold of the reference family (two adults and two children, $24,348) by the equivalence for a given family type.

‡ The U.S. Census poverty thresholds for a single adult and for a married couple are presented as weighted averages. The actual levels vary by age. See: http://www.census.gov/hhes/www/poverty/data/threshld/thresh07.html (U.S. Census Bureau 2007). .

Table 4

Actual Expenditures of Households on the SPM-Style Thresholds (30–36th Percentiles)

	Mean Expenditures of Poor Households						
	Ref. Family	Two-Child Family	One Adult, Two Children	Two Adults, Nonelderly	One Adult, Nonelderly	Two Adults, Elderly	One Adult, Elderly
n	1,597	364	97	447	749	597	665
Total expenditure ($)	41,131	24,305	20,121	15,929	11,244	15,896	11,268
Basic bundle ($)	20,290	15,862	14,200	10,178	7,642	9,398	7,190
% of total expend.	49	65	71	64	68	59	64
Housing and utilities ($)	12,581	9,661	8,947	6,224	4,936	5,531	4,777
% of total expend.	31	40	44	39	44	35	42
Food ($)	6,536	5,341	4,398	3,671	2,366	3,687	2,272
% of total expend.	16	22	22	23	21	23	20
Apparel ($)	1,192	852	859	285	325	185	137
% of total expend.	3	4	4	2	3	1	1

Note.—Ref. = reference (baseline for constructing SPM-style poverty thresholds); expend. = expenditure. Estimates are based on 2003–07 Consumer Expenditure Survey data, and values are adjusted to January 2007 dollars (Federal Reserve Bank of St. Louis n.d.). The proportion of total expenditure spent on the basic bundle by a two-child family is statistically significantly different from that for one-adult, two-child families, single, nonelderly adult households, single, elderly adult households, two-adult nonelderly households, and elderly couple households at the $p = .001$ level (at least). Two-group independent sample *t*-tests were used to test differences.

Table 5

U.S. Poverty Rates, 2007

		Intermediary Steps				
	Official	2	3	4	5	SPM
Overall (%)	12.4	12.6	14.3	16.9	17.0	16.0
Age (%):						
< 18	18.1	15.1	17.9	20.5	21.0	21.3
18–64	10.8	11.4	13.0	14.3	14.4	13.8
> 64	9.4	13.4	13.7	22.8	22.7	16.1
Race or ethnicity (%):						
White	8.3	8.7	9.8	12.1	11.9	10.1
Black	23.7	21.8	24.9	28.5	28.4	28.8
Hispanic	21.2	21.4	25.3	28.6	29.9	30.5
Asian	10.0	11.5	12.4	14.4	16.0	15.9
Other	16.8	16.3	18.3	20.3	19.8	19.3
Gender (%):						
Male	11.1	11.8	13.5	15.5	15.7	14.8
Female	13.7	13.3	15.1	18.3	18.4	17.1
Nativity (%):						
U.S. born	11.9	11.8	13.4	15.9	15.8	14.6
Foreign born	16.2	18.2	21.2	23.8	25.4	25.3
Region (%):						
Northeast	11.0	10.7	12.1	14.4	15.6	14.5
Midwest	11.3	11.0	12.7	15.2	14.5	13.2
South	13.9	14.6	16.6	19.7	188.9	17.3
West	12.3	12.2	14.0	16.1	17.6	17.5

Note.—SPM – supplemental poverty measure. Estimates are based on 2008 March CPS.

Appendix

Table A1

Multiplier Definitions

	Reference Family
n	1,597
Total expenditure ($)	41,131
Basic bundle ($)	20,290
20% ($)	4,058
Multiplier 1 = personal care + 50% of transportation (NAS; $)	2,894
% of basic bundle	14
Multiplier 2 = personal care + 50% of transportation + education and reading (NAS; $)*	3,515
% of basic bundle	17
Personal care ($)	227
50% of transportation ($)	2,667
Education and reading ($)*	621

Note.—NAS = National Academy of Sciences recommendations (see Citro and Michael 1995). Estimates are based on 2003–07 Consumer Expenditure Survey data, and values are adjusted to January 2007 dollars (Federal Reserve Bank of St. Louis n.d.). The original expenditure values for each two-child family have been equivalized to represent the amount that would be spent if that family were a two-adult, two-child family.

* Education expenditures include school books, supplies, and equipment for college, secondary, and primary school; school books, supplies, and equipment for day care, nursery, and other schools; tuition for college, secondary, primary, and other schools; rentals of books and equipment; and other school-related expenses. Reading expenditures include books, magazines, newspapers, encyclopedias, and other sets of reference books.

Table A2

Composition of Dwellers

Dweller	All (%)	Elderly (%)	Children (%)
Subsidized	8	7	7
Renter	27	13	26
Homeowner with a mortgage	40	21	55
Homeowner without a mortgage	25	58	12

Note.—Estimates are based on 2005–07 Consumer Expenditure Survey.

Table A3

Elderly and Nonelderly Thresholds

	Official Nonelderly ($)	Official Elderly ($)	SPM-Style ($)	% Change (Official elderly to SPM-Style)
Single	10,787	9,944	11,284	13
Couple	13,884	12,533	16,015	28

Note.—NAS = National Academy of Sciences recommendations (see Citro and Michael 1995). These thresholds are for illustrative purposes and do not include an adjustment for homeownership without a mortgage. Estimates are based on 2003–07 Consumer Expenditure Survey, and values are adjusted to January 2007 dollars (Federal Reserve Bank of St. Louis n.d.).

Table A4

Impact of MOOP and Homeownership on Elderly and Nonelderly Poverty Rates

	Children	Nonelderly Adults	Elderly
MOOP ($)	3,474	3,467	4,693
Poverty rate effect (%)*	2.6	1.3	9.2
Free and clear homeownership (%)	4.6	14.7	50.2
Poverty rate effect (%)†	.3	−.5	−6.6

Note.—MOOP = medical out-of-pocket expenditures. Estimates are based on 2008 March Current Population Survey. Values are adjusted to January 2007 dollars (Federal Reserve Bank of St. Louis n.d.).

* If MOOP are excluded from income.

† If free and clear homeownership is excluded from income.

Table A5

Racial and Ethnic Poverty Rates by Age

			Official to Supplemental Measure	
	Official	Supplemental	Change in Rate	Change in Disparity
Children:				
White	10.5	12.0	1.5	…
Black	35.0	36.1	1.2	−.3
Hispanic	29.1	36.6	7.5	6.0
Asian	13.0	18.4	5.4	4.0
Other	19.7	21.3	1.6	.1
Elderly:				
White	7.4	12.2	4.8	…
Black	23.3	34.9	11.6	6.8
Hispanic	17.1	34.0	16.8	12.1
Asian	11.5	23.0	11.5	6.7
Other	17.0	22.3	5.3	.5

Note.—Estimated based on 2008 March Current Population Survey.

Table A6

Comparison of Poverty Rates Based on Varying Methods

	1	2	3
Overall	12.4	18.9	16.0
< 18	18.1	25.3	21.3
18–64	10.8	16.3	13.8
> 64	9.4	19.3	16.1

Note.—Estimates are based on the 2008 March Current Population Survey. Column 1 presents the current official rates produced by the U.S. Census Bureau; column 2 presents estimates from the supplemental measure (for two-adult, two-child thresholds); column 3 presents estimates from the supplemental measure (for two-child thresholds).