

# Consistency in Supplemental Poverty Measurement: Adding Imputed In-Kind Benefits to Thresholds and Impact on Poverty Rates for the United States

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## Abstract

The Supplemental Poverty Measure (SPM) statistics, released by the U.S. Census Bureau since 2011, use resources that account for federal in-kind (noncash) benefits for food, rent, and utilities; however, the SPM thresholds are based on food, clothing, shelter, and utilities (FCSU) spending (with Supplemental Nutrition Assistance Program, SNAP, benefits implicitly included in reported food spending). No in-kind benefit other than SNAP is accounted for in the thresholds. Thus, thresholds and resources are inconsistently defined; consistency in the thresholds and resources was listed as necessary in the March 2010 Interagency Technical Working Group (ITWG) guidelines on developing a SPM. Accounting for noncash benefits in the thresholds is a challenge as the Consumer Expenditure Interview Survey (CE), the source upon which the thresholds are based, collects limited or no information on these other benefits.

The purposes of this study are to: impute in-kind benefits to consumer units participating in the CE; estimate SPM thresholds using these data; and produce poverty rates using the consistently defined Census Bureau SPM resource measure. SPM thresholds are produced for 2012 along with poverty rates. Poverty rates for the U.S. as a whole and for age and housing tenure subgroups are produced. For owners with mortgages and renters, resulting SPM thresholds are statistically significantly higher than those that do not account for these additional benefits. The differences in poverty rates based on the two sets of thresholds, and the same resource measure, are statistically significantly different from zero. This study represents the first time SPM thresholds and resources are consistently defined for poverty measurement.

**Key Words:** U.S. Consumer Expenditure Survey, Poverty Measurement, Imputation using Administrative Data, In-kind Benefits

## 1. Introduction

The Supplemental Poverty Measure (SPM) is designed to account for taxes and transfers aimed at alleviating the hardship of people living in low-income families, households, and consumer units. This is in contrast to the official measure of poverty that does not account for government spending for these programs. The SPM is designed neither to replace the U.S. official poverty measure nor to be used for government program assistance eligibility. The SPM is designed to provide information on aggregate levels of economic need at a

national level or within large subpopulations or areas. Since 2011, the Bureau of Labor Statistics (BLS) and Census Bureau have been working together to produce SPM thresholds, resources, and poverty statistics.<sup>1</sup> This work is based on observations (guidelines) published by an Interagency Technical Working Group (ITWG 2010) in March 2010, and research conducted since the guidelines were published. As stated in the report,

The Working Group was charged with developing a set of initial starting points to permit the U.S. Census Bureau, in cooperation with the Bureau of Labor Statistics (BLS), to produce a Supplemental Poverty Measure (SPM).

In deciding on these observations, the Working Group placed value on consistency between threshold and resource definitions, data availability, simplicity in estimation, stability of the measure over time, and ease in explaining the methodology.

The inconsistency in SPM thresholds and resources (2011-2015) results from the inclusion of the values of in-kind benefits for food, rents, and energy in SPM resources, while SPM thresholds only account for Supplemental Nutrition Assistance Program (SNAP) in-kind benefits. This is because the U.S. Consumer Expenditure Interview Survey, the data source for the thresholds, collects limited or no data on these programs. Such an inconsistency can result in an overestimate of the economic well-being of people in the U.S. when defined in terms of SPM resources, and thus an underestimate of SPM poverty. A goal of the current research is to impute values to SPM thresholds for the same federal in-kind benefit programs that are represented in SPM resources. Such an improvement will result in a consistently defined SPM, with thresholds and resources reflecting the same underlying concept of needs and resources available to meet those needs.

In this study, we impute benefits for the missing in-kind benefits using data available in the CE, from administrative records, and from the literature. This imputation approach involves three steps: 1. assign program eligibility to consumer units using their characteristics and federal government program eligibility guidelines; 2. adjust eligibility for participation using rates that are based on administrative data; and 3. assign benefit values, also from administrative data, to consumer units assumed to be participating in the noncash benefit programs. The value of noncash benefits are included, along with food, clothing, shelter, and utility (FCSU) expenditures, to estimate new SPM thresholds. These thresholds, in turn, are used to produce poverty rates for the U.S. as a whole and for demographic subgroups. Although in-kind benefits have been accounted for in SPM resources since 2011, this study represents the first time SPM thresholds and resources *together* account for these benefits, thus, resulting in a consistently defined SPM.<sup>2</sup>

The remainder of this paper is organized as follows. Section 2 presents background information on poverty measurement for the U.S., and the challenges that the BLS faces with regard to the production of SPM thresholds. Section 3 presents an overview of the data used in this study to produce the thresholds, and methods to impute in-kind benefits

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<sup>1</sup> See <http://www.census.gov/hhes/povmeas/methodology/supplemental/index.html> and <http://www.bls.gov/pir/spmhome.htm> for ongoing SPM research.

<sup>2</sup> Garner and Short (2010) produced a consistently defined National Academy of Sciences (NAS) poverty measure; they did this by not including in-kind benefits in either thresholds or resources.

and SPM thresholds. Section 4 presents a summary of imputed in-kind benefits and SPM thresholds. Section 5 includes SPM poverty rates, and the final section concludes.

## 2. Background

### 2.1 Measuring Poverty in the U.S.

The current official poverty measure was developed in the early 1960s and only a few minor changes have been implemented since it was first adopted in 1965 (Orshansky 1965; Fisher 1992). At the time they were developed, the official poverty thresholds represented the cost of a minimum diet multiplied by three (to allow for expenditures on other goods and services). Family resources were defined for this measure as before-tax money income. Concerns about the adequacy of the official measure have increased during the past several decades (see Ruggles 1990), culminating in a Congressional appropriation for an independent scientific study of the concepts, measurement methods, and information needs for a poverty measure. In response, the National Academy of Sciences (NAS) established the Panel on Poverty and Family Assistance, which released its report titled *Measuring Poverty: A New Approach* in the spring of 1995, (Citro and Michael 1995).

In March 2010, an Interagency Technical Working Group (ITWG, 2010) listed recommendations for a Supplemental Poverty Measure (SPM). The ITWG developed a set of initial starting points to permit the U.S. Census Bureau, in cooperation with the Bureau of Labor Statistics (BLS), to produce the SPM that would be released along with the official measure each year. The ITWG stated that the SPM is not designed to replace the official poverty measure. The SPM is designed to provide information on aggregate levels of economic need at a national level or within large subpopulations or areas, and not to be used for program eligibility. The ITWG report describes a poverty measure that is based largely on the NAS Panel's recommendations, with deviations reflecting more recent research and suggestions from the ITWG.

Until fiscal year 2015, work on the SPM, conducted at the BLS and Census Bureau, had been conducted as "research." This meant that improvements could be made fairly easily in our production of the thresholds and resources. However, with the U.S. President's Budget for fiscal year 2015, the Census Bureau received funding to produce SPM poverty resources and statistics. With this change in status from "research" to "production" at the Census Bureau, greater scrutiny of the SPM resource measure and poverty statistics are anticipated. However, the situation at the BLS has not changed: the SPM work is still "research," with all work being conducted in the Division of Price and Index Number Research. Although requests for funding have been included in previous year BLS budget plans, funding for production quality SPM thresholds has not been forthcoming.

### 2.2 Our Charge and Challenge

Consistent with the findings of the NAS panel (Citro and Michael 1995), the ITWG guidelines recommend that thresholds be based on U.S. Consumer Expenditure Survey (CE) data, and that resource calculations be based on data from the Current Population Survey Annual Social and Economic Supplement (CPS ASEC). The CE data are from the Interview, as opposed to the Diary, since most of the expenditures data necessary for the production of the thresholds is available in the Interview.

As with other poverty measurement, the ITWG guidelines note that to determine poverty status using the SPM, a consumer unit's resources are compared to an appropriate

threshold. If resources are below the threshold, all people in the consumer unit are counted as poor. According to the guidelines, resources should indicate the resources the consumer unit has available to meet its food, shelter, clothing, and utilities (FCSU) needs, plus a little more. Consumer unit resources should be estimated as the sum of cash income, plus any Federal Government in-kind benefits that consumer units can use to meet their food, clothing, shelter, and utility needs, minus taxes (or plus tax credits), minus work expenses, minus out-of-pocket expenditures for medical expenses. The poverty threshold should be established on the basis of expenditures on a set of commodities that all consumer units must purchase: FCSU and a multiplier to represent other goods and services considered necessary like non-work transportation, personal care, etc. The ITWG noted that so far as possible with available data, the calculation of *FCSU should include any in-kind benefits that are counted on the resource side for FCSU*; this is necessary for consistency of the threshold and resource definitions. It is this last guideline that poses a challenge for the production of the SPM thresholds.

Currently the SPM resources account for more in-kind benefit programs than do SPM thresholds. SPM thresholds only account for SNAP benefits. However, SPM resources also account for benefits from the following: Low Income Housing Energy Assistance Program (LIHEAP), National School Lunch Program (NSLP), SNAP, Women, Infants, and Children Program (WIC), and rental assistance from government sources. Remember, the in-kind benefits listed are only available for food, shelter, and utilities. Not accounting for in-kind benefits in SPM thresholds overstates the well-being (and understates poverty) of consumer units relative to their resources that do account for these benefits.

The fact that the CE has limited to no information regarding in-kind transfers poses a challenge for the BLS to produce SPM thresholds that are conceptually consistent with resources produced by the Census Bureau for SPM poverty statistics. To understand the importance of this lack of consistency, let's use an example related to rents. Currently the SPM renter threshold is based on what renter consumer units report as out-of-pocket spending for contract rents. This means, for example, for consumer units receiving rental vouchers to obtain lower contract rents from landlords, the voucher amounts are not counted as part of the rental expenditure; only the final contract rent that the consumer unit is required to pay the landlord out-of-pocket is counted in the SPM threshold. A comparable resource measure would not include the value of the rental voucher as the voucher cannot be used to pay the out-of-pocket rent represented in the SPM threshold; it can only be used to pay for the difference in the full rent that the landlord charges for the rental unit before accepting the voucher and what the consumer unit pays out-of-pocket. The rental subsidies cannot be used to meet the non-rent needs of the consumer unit; thus, including the value of rental subsidies in SPM resources but not SPM thresholds overstates the well-being of the consumer unit defined in terms of poverty.

### **2.3 Previous Research to Impute In-Kind Benefits to SPM**

Researchers have previously added the value of in-kind benefits in SPM defined resources and thresholds. Short and Renwick have produced much of the work on in-kind benefits in SPM resources, and thus, accounted for these in SPM poverty statistics (e.g., Short, 2015; Short and Renwick, 2010). For all of these studies, only SNAP has been accounted for in the SPM thresholds.

Research to impute in-kind benefits to SPM thresholds began a few years ago by Garner (2010) and Garner and Hokayem (e.g., 2012). Garner produced imputed values for all consumer units eligible for benefits, while Garner and Hokayem applied benefits to

consumer units predicted to participate in benefit programs using data from the CPS. Neither study addressed LIHEAP. To date, none of these SPM thresholds have been used in the production of SPM poverty statistics. The current study is the first.

### **3. Data and Methods: In-Kind Benefits and SPM Thresholds**

#### **3.1 Consumer Expenditure Survey**

The SPM thresholds produced in this study are based on data from the CE Interview Survey (a BLS product), and additional data required for in-kind benefit imputation. Five years of CE quarterly data, collected from 2008 quarter two through 2013 quarter one (20 consecutive quarters), are used to produce the 2012 thresholds. In most cases, CE data collected using the Interview instrument refer to expenditures made (or obligated, in the case of utilities and mortgages) during the three months prior to the interview month. It is assumed that data from each reference quarter are independent of the data from other quarters; this same assumption is made for official publications of CE data and was also made by the Panel in their Report. In order for the expenditure data to be in 2012 threshold year dollars, data from the 20 quarters are adjusted using the annual All Items Consumer Price Index, U.S. City Average (CPI-U).

#### **3.2 In-Kind Benefit Programs**

To meet the ITWG guideline for consistency in SPM thresholds and resources, the value of in-kind benefits must be counted in the thresholds. We follow the Census Bureau's lead for which in-kind benefits to consider. The Census Bureau limits in-kind benefits to the following:

- Supplemental Nutrition and Assistance Program (SNAP)
- National School Lunch Program (NSLP)
- Women, Infants, and Children Program (WIC)
- Low Income Home Energy Assistance Program (LIHEAP)
- Rent subsidies.

SNAP benefits are already implicitly included in the value of food expenditures in the CE. Thus, no imputation is needed.

Two types of imputation are used for the remainder of in-kind benefit programs: one for NSLP, WIC, and LIHEAP, and another for rental subsidies. The CE-based approach first assigns the full take-up of program benefits by all consumer units who are eligible based on program guidelines and consumer unit characteristics. Initial eligibility is then adjusted for participation, using data from administrative records and previous research. Participation in rent subsidy programs is reported in the CE, so we only need to impute rent subsidy values as the difference between market rents and rents paid. NSLP, WIC, and LIHEAP benefits are dependent on program or income eligibility, although definitions of income used are different.

Each set of estimated in-kind benefit values is assigned to those consumer units determined eligible according to certain guidelines and assumptions. Eligibility guarantees that these consumer units receive a benefit value of greater than zero. With the CE-based approach, less than 100 percent participation results for the NSLP. In contrast, due to limited information, WIC and LIHEAP are assigned to most eligible consumer units but their benefits are reduced through the application of participation factors. In effect, the aggregate

LIHEAP benefits added to the sample are less, as if the full value of the benefit were assigned to only *participating* consumer units.

Benefits are imputed for all consumer units in the CE Interview Survey sample for the quarters used to produce the 2012 SPM thresholds. It is important to note that we assume that in-kind benefits reflect consumption needs and are time-specific. Thus, when in-kind benefits are imputed, they reflect the value of benefits that were in effect during the reference period to which the CE Interview questions refer.

### *3.2.1 Supplemental Nutrition Assistance Program (SNAP)*

The Supplemental Nutrition Assistance Program (SNAP) is designed to allow eligible low-income households to afford a nutritionally adequate diet. Households who participate in the SNAP program are assumed to devote 30 percent of their countable monthly cash income to the purchase of food, with SNAP benefits to make up the remaining cost of an adequate low-cost diet. This amount is set at the level of the U.S. Department of Agriculture's (USDA) Thrifty Food Plan. The SNAP is funded by the USDA and is its largest food benefit program in terms of aggregate benefits (USDA 2013). SNAP benefits are not imputed for SPM thresholds, due to the assumption that consumer units use SNAP benefits like cash and that their value is included in reported food expenditures.

### *3.2.2 National School Lunch Program (NSLP)*

The second largest food and nutrition program in terms of expenditures is the National School Lunch Program (NSLP). The NSLP offers free, reduced-price, and subsidized meals for school-aged children. Children qualifying for a free or reduced price lunch receive a larger subsidy. Parents or guardians apply in the beginning of the school year for their children to receive school meals during the year. The school administers the program and records which children receive which type of subsidy. The majority of students participating in the program are in public schools; however, students in private schools can also participate when the program is administered by the school.

The CE collects no information about subsidized school meals. However, the CE does collect information on the amount spent on meals purchased at school by the consumer unit. Imputed NSLP benefits are based on consumer unit demographics, information available about school meals in the CE Interview data base, USDA program and income eligibility guidelines (e.g., USDA 2011a) and school meal values (e.g., USDA 2011b), and participation rates produced by the National Research Council (NRC 2012). As an additional filter for eligibility in this study, benefits are only assigned to those consumer units who are found program- or income-eligible, have children between the ages of 5 and 18, *and* have no reported expenditures for private tuition (for elementary and high school education). Thus, only public and "private free" education children qualify for NSLP benefits in this study. Finally, reduced or paid lunch eligible consumer units are restricted to only those that have school meal expenditures reported in the CE Interview. After consumer units are determined eligible, adjustment factors from a National Research Council on SNAP (NRC 2012) are applied to account for participation rates in free, reduced, and paid school meal programs. Participation rates only are available from the NRC study for 2005-2010; thus, the 2010 rates are also applied to later years.

The imputed NSLP values are based on payment rates per meal and commodity school lunch program values. Payment rates and commodity values are available online via the

U.S. Department of Agriculture (USDA) web site (<http://www.fns.usda.gov/nslp/national-school-lunch-program-nslp>). For this study (and for Census Bureau estimates), the average (over the 48 contiguous states) reported school lunch payment rates, for schools in which less than 60 percent of the lunches served during the second preceding school year were served free or at a reduced price, are assigned to each student. The appropriate per-meal value (for either free, reduced, or paid meals, depending on the level of eligibility) is multiplied by the participation-adjusted number of children between the ages of 5 and 18, and then by 167, the number of days students are assumed to be in school. This is the same number of days used for estimating NSLP benefits in SPM resources by the Census Bureau.

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

The Special Supplemental Nutrition Program for Women, Infants and Children (WIC) is designed to provide food assistance and nutritional screening to nutritionally at risk, low-income women, infants, and children ages one to four. Assistance is provided in the form of food, nutrition education, and referrals to health care and other social services. Like SNAP, WIC is funded by the USDA; it is the third largest program based on aggregate benefits, after SNAP and the NSLP. CE does not collect information on WIC. Unlike for SNAP, we assume WIC benefit values are not included in food expenditures and thus are not currently accounted for in SPM thresholds. WIC benefits are not associated with specific dollar amounts like SNAP benefits, but rather are provided in the form of prescribed food packages in which participants may only purchase specific food items, package sizes, and quantities.

To include a value for WIC benefits in the SPM thresholds, program and income eligibility are imputed; benefit values are assigned to consumer units using USDA guidelines for WIC eligibility (see USDA 2011c). It is assumed that consumer units with children less than five years of age and mothers with infants are automatically program eligible if the consumer unit receives welfare or SNAP benefits, or participates in Medicaid. If the consumer unit is not automatically program eligible, CE before tax money income, net of the value of SNAP benefits, is compared to the federal HHS poverty guidelines to determine income eligibility. “Early mothers” and young children are considered income eligible for WIC if this income is at or below 185 percent of the poverty guidelines.

After initial eligibility is determined, the eligibility indicator for each group (children, women, and infants) is reduced by an estimated participation factor. The participation rates are from Betson et al. (2011) and USDA (2014 and 2015). These rates are further adjusted by nutritional risk and 9-month eligibility; we use the adjustments presented in Betson et. al. for all the years. Participation rates (coverage rates in USDA terminology) are defined as the number of individuals enrolled in WIC divided by the number eligible. CE characteristics data are used in combination with average monthly WIC benefits to produce quarterly values for the CE sample. Average WIC benefit data are available on the USDA web site (<http://www.fns.usda.gov/wic/women-infants-and-children-wic>).

### *3.2.4 Low Income Home Energy Assistance Program (LIHEAP)*

The Low Income Home Energy Assistance Program (LIHEAP) provides three types of energy assistance to low income residents. This program is administered by the U.S. Department of Health and Human Services (HHS). Under LIHEAP, states may help to pay heating or cooling bills, provide allotments for low-cost weatherization, or provide assistance during energy-related emergencies. States determine eligibility and can provide

assistance in various ways including cash payments, vendor payments, two-party checks, vouchers/coupons, and payments directly to landlords. In some states, LIHEAP benefits are not restricted to paying for heating and cooling when received as additional money income to the consumer unit; this additional income can be used by the consumer unit for expenses other than utilities. In these cases, LIHEAP benefits would be included in resources but not in SPM thresholds. No information regarding LIHEAP benefits is collected in the CE. However, the CE Interview does collect information regarding types of fuels and expenditures, and if utilities are included in rents. Whether the fuel is used for heating and cooling versus for cooking is not known.

To assign LIHEAP benefit values to eligible consumer units, again program and income eligibility are determined, as with WIC and NSLP. If a consumer unit receives welfare, SNAP benefits, or SSI, they are considered program eligible, although empirically, program eligibility is not always enough to qualify a household for LIHEAP benefits. Income eligibility for LIHEAP benefits is determined by comparing CE before tax income minus the value of SNAP with the appropriate LIHEAP income standard specific to family size and state. Some states use a percentage of the federal poverty guidelines (ranging from 110 percent to 200 percent), and some use a percentage of state median income (60 percent), depending on whichever is greater (HHS 2014).

If a consumer unit is determined either income or program eligible for LIHEAP benefits, they are assigned a weighted average of average cooling and heating benefit values and participation rates obtained from HHS (2014). Because of limited availability of data, 2009<sup>3</sup> values are used for all years (but updated with the All-Items CPI). The benefit value assigned to the consumer unit is underestimated, and the number of consumer units receiving a value is overestimated, just as with WIC benefits.

### *3.2.5 Rent Subsidies*

Federal, state, and local governments provide housing assistance to consumers. Housing assistance primarily consists of a number of programs administered at the federal level by the Department of Housing and Urban Development (see HUD 2015), with additional programs administered by the USDA (see USDA 2015). HUD and USDA programs traditionally take the form of rental subsidies and mortgage-interest subsidies targeted at the very-low-income. In our study we focus on programs designed for renters only; these are either project-based public housing (funded by HUD mostly), project-based private housing (funded by the USDA mostly), or household-based subsidies (HUD and USDA programs). Housing assistance programs generally reduce tenants' rent payments to a fixed percentage of their income after certain deductions (see Short and Renwick 2010). No information is collected in the CE regarding housing subsidies; however, data are collected regarding the type of housing in which the consumer unit lives, whether assistance was received to help pay part of the costs, and contract rents paid.

For the thresholds, only the market rent is needed. However, for comparison with other data sources, we produce rent subsidies. To identify our sample of subsidized renters, we use indicator variables in the CE regarding whether the consumer unit received assistance

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<sup>3</sup> After the thresholds were produced using the 2009 LIHEAP, 2010 data (HHS 2015) became available. However, as a full five years of LIHEAP data are needed for the SPM thresholds, we made a decision to just use the 2009 data and adjust them by the CPI to reflect changes in prices. Changes in LIHEAP and utilities by consumers and heating and cooling days can only be accounted for using the yearly data to which we do not have access.



with rents or lived in public housing. The contract rent paid is added to the amount billed for housing utilities. Fair Market Rents (FMRs), published by the U.S. Department of Housing and Urban Development (HUD), are our source of market rents (see: [http://data.hud.gov/data\\_sets.html](http://data.hud.gov/data_sets.html)).<sup>4</sup> FMRs are based on value of rents (including expenses for fuel and water utilities) and differ by the number of bedrooms and by Census tract. The sum of reported or estimated rent (including fuel and water expenditures) are compared to FMR rent. If the FMR exceeds this rental sum, then the imputed rental subsidy for the unit is the value of that difference. Again, note, rental subsidies cannot be used to pay the contract rent; they can only be applied to cover the difference in the market value and the contract rent -- the rent subsidy on the threshold side.

### 3.3 SPM Sample and Threshold Estimation

#### 3.3.1 *The Estimation Sample and Equivalence Scale*

The estimation sample is composed of consumer units with exactly two children. Since the number of people in a consumer unit can differ from one case to the next (i.e., the number of adults can vary although the number of children is fixed at two), an equivalence scale is needed to equalize expenditures across all consumer units. The number of equivalent adults is determined by the number of adults and children in the household. For each consumer unit, FCSU expenditures are divided by the number of adult equivalent units. Each person in the consumer unit is assigned the adult equivalent value of FCSU expenditures for his or her consumer unit. Adult equivalent expenditures are then converted to those for two-adult two-child consumer units by applying the equivalence scale factor for this CU type to the single adult equivalent value. As recommended in the ITWG guidelines, the three-parameter equivalence scale is used to adjust FCSU expenditures. The three-parameter scale allows for a different adjustment for single parents (Betson 1996). This scale has been used in several BLS and Census Bureau studies.

#### 3.3.2 *SPM Thresholds*

The SPM thresholds are based on a range of expenditures around the 33<sup>rd</sup> percentile of food, clothing, shelter, and utilities (FCSU) expenditures for two-adult two-child consumer units (but based on expenditures for all consumer units with exactly two children, as described above). A multiplier is applied to account for personal care and other basic needs (see Garner 2010). Unless otherwise noted, whenever “FCSU” is used in this paper, FCSU expenditures are assumed to include imputed subsidies for NSLP, WIC, LIHEAP, and rent subsidies; SNAP as already included in food expenditures.

To identify the range around the 33<sup>rd</sup> percentile, FCSU expenditures are ranked from lowest to highest, weighting the data by the number of consumer units in the U.S. The range is defined as within the 30<sup>th</sup> and 36<sup>th</sup> percentile points in the FCSU distribution. Restricting the estimation sample to this range of expenditures results in thresholds that are based on the expenditures of a subsample of the original estimation sample composed of all two-child consumer units.

The ITWG requests that separate SPM thresholds be produced for owners with mortgages, owners without mortgages, and renters. The reasoning behind this guideline is that thresholds should reflect differing spending needs, and housing represents the largest share of the FCSU-based thresholds (see Garner and Short 2010). The ITWG method to account

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<sup>4</sup> Although the Census Bureau also used FMRs in early estimates of rental subsidies, these are no longer used. Renwick (2011) noted that there are numerous concerns with FMRs for poverty estimations.

for spending needs by housing status uses the within range means of FCSU and shelter plus utilities overall, and the means of shelter plus utilities for groups of consumer units distinguished by housing status.

Two adjustments to the two-adult two-child SPM thresholds are needed before SPM poverty rates can be produced. The first adjustment is to account for difference in the number of adults and children for all consumer units in the U. S. For this, again the three-parameter equivalence scale defined is used. This scale has been used in several BLS and Census Bureau studies (see Short 2015 for references). The second adjustment to the thresholds accounts for differences in prices across geographic areas. Only the housing (shelter plus utilities) component or share of the SPM thresholds are adjusted for differences in prices across geographic areas (see Short 2015 and Renwick 2011).

## 4. Results: Imputed Benefits and Thresholds

### 4.1 Imputations Relative to Other Data Sources

To evaluate CE-based imputations, we compare values to those from other sources. Table 1 includes results of imputing benefits to all consumer units participating in the CE Interview from 2008 quarter two through 2013 quarter one, the time period upon which the SPM thresholds are based, with CE values in 2012 dollars. For each subsidy type, results from the CPS for the 2012 resource measure are also presented. Two entries are listed for rental subsidies, capped and uncapped. The Census Bureau caps rental subsidies in SPM resources to the share of expenditures for housing (shelter plus utilities) in the thresholds. The reasoning is that “recipients cannot use *extra* amounts of an in-kind benefit to meet their basis needs for other items.”

Based on results presented in Table 1, the CE-imputations are in the same order of magnitude compared to the CPS ASCE. However, they are lower than those based on administrative data. Average consumer unit benefits for NSLP and LIHEAP are similar for CE and CPS; the difference is greater for WIC and rental subsidies.

Data Source	WIC Benefits			NSLP Benefits			Rental Benefits			LIHEAP		
	Aggregate in Billion \$	% of all CUS	Annual Average Benefit per CU	Aggregate in Billion \$	% of all CUS	Annual Average Benefit per CU	Aggregate in Billion \$	% of all CUS	Annual Average Benefit per CU	Aggregate in Billion \$	% of all CUS (or households)	Annual Average Benefit per CU
Using 5 years of CE data that support the 2012 SPM Thresholds	\$3.6	6.4%	\$465	\$8.0	14.3%	\$460	\$35.1	4.2%	\$6,926	\$1.7	3.5%	\$395
CPS 2012 no cap	\$3.1	2.8%	\$861	\$10.7	17.5%	\$476	\$40.4	4.0%	\$7,875	\$1.6	3.3%	\$383
CPS 2012 capped							\$26.3	3.7%	\$5,480			
USDA FY 2012	\$4.8											
USDA FY 2013	\$4.5											
2012 HUD + USDA				\$10.8								
2012 HHS 2010 in 2012\$*							\$43.3					
Heating										\$2.9	6.3%	\$391
Cooling										\$0.3	0.8%	\$293

Source of data: CE 5-yrns supporting 2012 SPM thresholds, CPS with 2010 data, and HUD, HHS, and USDA administrative data.

\* CPI Household Energy prices increased by 0.0117% from 2010 to 2012 (see: <http://stats.bls.gov/cpi/>). Percentages are for 2010.

### 4.2 SPM Thresholds with and without Imputed In-Kind Benefits

Table 2 includes SPM thresholds with and without imputed in-kind benefits. SPM thresholds with imputed benefits are higher for all three housing tenures. However, only thresholds for owners with mortgages and renters are statistically different from their corresponding thresholds that account for only SNAP. All thresholds and standard errors

are based on replicate weights; the BLS provides 44 replicates for the production of statistics for the CE data. Thresholds are for two adults with two children but the estimation sample is based on a sample composed of all consumer units with two children, as noted before.

**Table 2. 2012 SPM Poverty Thresholds for Two Adults with Two Children: With and Without Imputed In-Kind Benefits**

Housing Tenure	2012 SPM Thresholds for 2 Adults and 2 Children		Difference	
	With Only SNAP	With SNAP, WIC, NSLP, LIHEAP, and Rent Subsidies (without public housing ratio adj.)	Dollars	Percent
<b>Owners with mortgages</b>	\$25,784	\$26,812	*\$1,028	*4.0%
Standard error	\$368	\$331		
<b>Owners without mortgages</b>	\$21,400	\$21,892	\$492	2.3%
Standard error	\$233	\$406		
<b>Renters</b>	\$25,105	\$26,276	*\$1,171	*4.7%
Standard error	\$398	\$319		

\* An asterisk preceding an estimate indicates change is statistically different from zero at the 90 percent confidence interval.

Source: These thresholds, standard errors, and means were produced by Thesia I. Garner and Marisa Gudrais, Division of Price and Index Number Research, Bureau of Labor Statistics, for research purposes only, using the U.S. Consumer Expenditure Interview Survey. The thresholds, standard errors, and means are not BLS production quality. This work is solely that of the authors and does not necessarily reflect the official positions or policies of the Bureau of Labor Statistics, or the views of other staff members within this agency.

## 5. Production of Poverty Rates

Poverty rates are presented in Table 3 for the total population and for two demographic groups, age of people and housing tenure. These groups are most likely to be affected by the imputation of in-kind benefits to the CE data. Poverty rates are presented for two sets of SPM poverty thresholds, one based on FCSU (with only SNAP benefits) and the other based on FCSU-IK, with imputed in-kind benefits. SPM resources are defined the same for both sets of SPM thresholds.

As expected, the FCSU-IK poverty thresholds result in higher poverty rates. This is true for the total population, with the rate going from 16.0 percent when using the FCSU thresholds to 17.0 percent with the higher FCSU-IK thresholds. Rates are shown also for the total for three age groups: children, individuals aged 18-64 years, and individuals aged 65 years and older; and for housing tenure represented by owner with mortgages, owners without mortgages (and people living in housing units for which they pay no rent), and renters. The differences in the SPM poverty rates, based on SPM thresholds with FCSU (with SNAP alone) versus FCSU-IK, are statistically significantly different from zero at the 90 percent confidence level.

## 6. Conclusion

The CE-based approach presented in this paper, to impute in-kind benefits to consumer units, is a legitimate option for the estimation of SPM thresholds consistent with SPM resources. Ideally, the U.S. Consumer Expenditure Survey would collect information regarding in-kind benefit participation and the benefit values. Another option would be to use administrative records, in combination with CE survey data, to impute these benefits for the thresholds (Meyer, Mok, and Sullivan 2015). However, as noted by participants at the JSM session in which this paper was presented, administrative records are not the cure-all for potential misreporting in household surveys. In addition, administrative data are not

designed to be used in combination with household surveys. However, with current funding, it is unlikely that the BLS will be able to move forward with either of these latter two options.

**Table 3. Percentage of People in Poverty Based on SPM Thresholds and Resources with WIC, NSLP, Rental Benefits, and LIHEAP Benefits: 2012**

(Numbers in thousand)

Characteristic	SPM based on FCSU (with SNAP) Thresholds		SPM based on FCSU-IK Thresholds		Difference	
	Number	Percent	Number	Percent	Number	Percent
<b>All People</b>	49,730	16.0%	53,301	17.1%	*-3,571	* -1.1%
<b>Age</b>						
<b>Under 18 years</b>	13,358	18.0%	14,533	19.6%	*-1,174	* -1.6%
<b>18 to 64 years</b>	29,953	15.5%	31,900	16.5%	*-1,947	* -1.0%
<b>65 years and older</b>	6,419	14.8%	6,868	15.9%	*-449	* -1.0%
<b>Tenure</b>						
<b>Owner</b>						
<b>Owner/mortgage</b>	11,676	8.5%	12,651	9.2%	*-975	* -0.7%
<b>Owner/no mortgage/rent free</b>	9,694	13.4%	10,089	13.9%	*-395	* -0.5%
<b>Renter</b>	28,360	28.1%	30,561	30.3%	*-2,200	* -2.2%

\* An asterisk preceding an estimate indicates change is statistically different from zero at the 90 percent confidence level.

Source: Current Population Survey, 2013 Annual Social and Economic Supplement with data collected for the previous calendar year. For information on confidentiality protection, sampling error, nonsampling error, and definitions, see <ftp://ftp2.census.gov/programs-surveys/cps/techdocs/cpsmar13.pdf>.

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## References

- (Many of the unpublished working papers and presentations listed here are available at the BLS or Census Bureau website: <http://stats.bls.gov/pir/spmhome.htm> , <http://www.census.gov/hhes/povmeas/data/nas/index.html> , and <http://www.census.gov/hhes/povmeas/data/supplemental/index.html> .)
- Betson, David, "Is Everything Relative? The Role of Equivalence Scales in Poverty Measurement," University of Notre Dame, Poverty Measurement Working Paper, Census Bureau, 1996.
- Betson D, Martinez-Schiferl M, Giannarelli L, Zedlewski S., *National and State-Level Estimates of Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) Eligibles and Program Reach, 2000–2009*, U.S. Department of Agriculture, Food and Nutrition Service, Office of Research and Analysis, Special Nutrition Programs Report No. WIC-11-ELIG, December, 2011.
- Citro, Constance F., and Robert T. Michael (eds.), *Measuring Poverty: A New Approach*, Washington, D.C.: National Academy Press, 1995.
- Fisher, Gordon M. 1992, "The development and history of the poverty thresholds," *Social Security Bulletin* 55(4) (Winter): pp. 3-14.
- Garner, Thesia I., "Supplemental Poverty Measure Thresholds: Laying the Foundation," December 2010, [http://stats.bls.gov/pir/spm/spm\\_pap\\_thres\\_foundations10.pdf](http://stats.bls.gov/pir/spm/spm_pap_thres_foundations10.pdf) .
- Garner, Thesia I. and Charles Hokayem, "Supplemental Poverty Measure Thresholds: Imputing School Lunch and WIC Benefits to the Consumer Expenditure Survey Using Current Population Survey," BLS Working Paper 457, July 2012, [http://stats.bls.gov/pir/spm/spm\\_pap\\_wic12.pdf](http://stats.bls.gov/pir/spm/spm_pap_wic12.pdf) .
- Garner, Thesia I. and Kathleen S. Short, "Creating a Consistent Poverty Measure Over Time Using NAS Procedures: 1996-2005," *Review of Income and Wealth*, Series 56, Number 2, June 2010.
- Meyer, Bruce D., Wallace K.C. Mok, and James X. Sullivan, "Household Surveys in Crisis," NBER Working Paper Series, Working Paper 21399, July 2015, <http://www.nber.org/papers/w21399.pdf>
- National Research Council (NRC), *Using American Community Survey Data to Expand Access to the School Meals Programs*, Panel on Estimating Children Eligible for School Nutrition Programs Using the American Community Survey, A.L. Schirm and N.J. Kirkendall, Editors, Committee on National Statistics, Division of Behavioral and Social Sciences and Education, Washington, DC, the National Academy Press, 2012.
- Observations from the Interagency Technical Working Group on Developing a Supplemental Poverty Measure* (ITWG), March 2010, available at [http://www.census.gov/hhes/www/poverty/SPM\\_TWGObservations.pdf](http://www.census.gov/hhes/www/poverty/SPM_TWGObservations.pdf) .
- Orshansky, Mollie, 1965. "Counting the poor: another look at the poverty profile", *Social Security Bulletin* 28(1)(January): pp. 3-29.
- Renwick, Trudi, "Geographic Adjustments of Supplemental Poverty Measure Thresholds: Using the American Community Survey Five-Year Data on Housing Costs," SEHSD Working Paper Number 2011-21, U.S. Census Bureau, July 2011.
- Ruggles, Patricia, *Drawing the Line--Alternative Poverty Measures and Their Implications for Public Policy*, Washington, D.C.: Urban Institute Press, 1990.
- Short, Kathleen S., "The Supplemental Poverty Measure: 2014," U.S. Census Bureau, Current Population Reports, P60-254, Government Printing Office, Washington, DC, September 2015, <https://www.census.gov/content/dam/Census/library/publications/2015/demo/p60-254.pdf>

- Short, Kathleen and Trudi J. Renwick, "Supplemental Poverty Measure: Preliminary Estimation for 2008," paper prepared for the 32<sup>nd</sup> Annual Research Conference of the Association for Public Policy Analysis and Management, Boston, MA, November 4-6, 2010.
- U.S. Department of Agriculture (USDA), *Eligibility Manual for School Meals, Child Nutrition Programs*, Food and Nutrition Service, USDA, October 2011a.
- U.S. Department of Agriculture, *The Food Assistance Landscape: FY 2012 Annual Report*, USDA Economic Research Service, Economic Information Bulletin No. 109, March 2013, <http://www.ers.usda.gov/publications/eib-economic-information-bulletin/eib109.aspx> .
- U.S. Dept. of Agriculture (USDA, Food and Nutrition Service, Office of Research and Analysis. *National and State-Level Estimates of Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) Eligibles and Program Reach, 2010*, by Michael Martinez-Schiferl, Linda Giannarelli, and Sheila Zedlewski. Project Officer: Grant Lovellette. Alexandria, VA: January 2013, <http://www.fns.usda.gov/sites/default/files/WICEligibles2010Sum.pdf> .
- U.S. Department of Agriculture (USDA, Food and Nutrition Service, Office of Research and Analysis, *National and State-Level Estimates of Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) Eligibles and Program Reach, 2011, Volume I, Final Report*, Special Nutrition Programs Report No. WIC-14-ELIG, March, 2014, <http://www.fns.usda.gov/national-and-state-level-estimates-special-supplemental-nutrition-program-women-infants-and-childr-0> .
- U.S. Department of Agriculture (USDA, Food and Nutrition Service, Office of Research and Analysis, *National and State-Level Estimates of Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) Eligibles and Program Reach, 2012, Volume I, Final Report*, Special Nutrition Programs Report No. WIC-15-ELIG, January, 2015, <http://www.fns.usda.gov/national-and-state-level-estimates-special-supplemental-nutrition-program-women-infants-and-childr-1> .
- U.S. Department of Agriculture (USDA, "Housing Assistance," 2015, [http://www.usda.gov/wps/portal/usda/usdahome?navid=HOUSING\\_ASSISTA](http://www.usda.gov/wps/portal/usda/usdahome?navid=HOUSING_ASSISTA) .
- U.S. Department of Agriculture (USDA, "School Meals: Rates of Reimbursement," *Federal Register* / Vol. 76, No. 139 / Wednesday, July 20, 2011b / Notices, <http://www.fns.usda.gov/sites/default/files/NAPs11-12.pdf> .
- U.S. Department of Agriculture (USDA, *WIC Program, How to Apply*, Child Nutrition Programs, Food and Nutrition Service, USDA, October 2011c <http://www.fns.usda.gov/wic/howtoapply/whogetswicandhowtoapply.htm> .
- U.S. Department of Health and Human Services (HHS), *LIHEAP Report to Congress for FY 2009 and LIHEAP Home Energy Notebook for FY 2009* (OCS\DEA\LL\05-14-15), 2014.
- U.S. Department of Health and Human Services (HHS), *Low Income Home Energy Assistance Program: Report to Congress for Fiscal Year 2010*, June 30, 2015, <http://www.acf.hhs.gov/programs/ocs/resource/liheap-report-to-congress-2010> .
- U.S. Department of Housing and Urban Development (HUD), "Rental Assistance," 2015, [http://portal.hud.gov/hudportal/HUD?src=/topics/rental\\_assistance](http://portal.hud.gov/hudportal/HUD?src=/topics/rental_assistance) .