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

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Disclaimer: This paper reports the results of research and analysis undertaken by the U.S. Bureau of Labor Statistics (BLS) and Census Bureau staff. It has undergone reviews more limited in scope than that given to official BLS and Census Bureau publications. This paper is released to inform interested parties of ongoing research and to encourage discussion of work in progress. A*ny views expressed are those of the authors and not necessarily those of the BLS or Census Bureau.*

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 and Supplemental Nutrition Assistance Program (SNAP) in-kind benefits. No other in-kind benefits for food, rental, or energy assistance are 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), data source upon which the thresholds are based, collects limited or no information on these other benefits.

The purposes of this study are to impute rental in-kind benefits and additional food benefits to consumer units participating in the CE, estimate SPM thresholds using these data, and produce poverty rates. Imputing these additional noncash benefits to the CE involves three steps: 1. estimate program eligibility to consumer units using their characteristics and program eligibility guidelines; 2. apply participation rates based on administrative data and estimates from the literature; and 3. assign benefit values from administrative data to consumer units "participating" in the identified benefit programs. The value of in-kind benefits are included, along with 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 age subgroups. 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.

JEL Codes:

D12 Consumer Economics: Empirical Analysis

I3 Welfare and Poverty

I. Introduction

The Supplemental Poverty Measure (SPM), a new poverty measure for the U.S., is designed to account for taxes and transfers aimed at alleviating the hardship of people living in low-income families, households, and consumer units. [1] 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. Since 2011, the Bureau of Labor Statistics (BLS) and Census Bureau have been working together to produce SPM thresholds, resources, and poverty statistics. This work is based on observations (guidelines) published by an Interagency Technical Working Group (ITWG) in March 2010, and research conducted since the guidelines were published. "The Working Group was charged with developing a set of initial starting points to permit the Census Bureau, in cooperation with the BLS, to produce a 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 ITWG considered the SPM a work in progress with the expectation that there would be improvements to it over time. The measure would improve "as new data, new methods, and further research become available."

As has been produced since 2011, SPM thresholds and resources have not been defined consistently in terms of concept. Resources are to include all resources available to meet consumer economic needs as defined in the SPM thresholds. The inconsistency results from the inclusion of the value of in-kind benefits for food, rents, and energy, along with other money income, in SPM resources. In contrast, SPM thresholds are based on out-of-pocket spending for food, clothing, shelter, utilities (FCSU), and other basic needs represented by a multiplier applied to FCSU expenditures. The source of the spending data for the thresholds is the U.S. Consumer Expenditure Interview Survey. [2] These expenditures reflect the use of SNAP benefits for food as these benefits are considered to be like cash. However, in-kind benefits form other food programs, rent, and energy assistance are not accounted for in the thresholds. Such an inconsistency can result in an overestimate of the economic well-being of people in the U.S. thus an underestimate of poverty. A goal of the current research is to

[1] Families are related by blood or other legal arrangement. Households general live in the same housing unit. In contrast, a consumer unit can be one of these or a combination, or more. A consumer unit comprises either: (1) all members of a particular household who are related by blood, marriage, adoption, or other legal arrangements; (2) a person living alone or sharing a household with others or living as a roomer in a private home or lodging house or in permanent living quarters in a hotel or motel, but who is financially independent; or (3) two or more persons living together who use their income to make joint expenditure decisions. Financial independence is determined by the three major expense categories: Housing, food, and other living expenses. To be considered financially independent, at least two of the three major expense categories have to be provided entirely, or in part, by the respondent. http://stats.bls.gov/cex/csxgloss.htm

[2] The CE is composed of two parts: the Interview and the Diary. The Interview is used to collected information over a longer period of time than is the Diary. Also, detailed clothing, shelter and utilities expenditures data are available in the Interview. Food expenditures are most extensive in the Diary; however, since it is necessary to produce the SPM thresholds using consumer unit specific data, global food expenditures collected in the Interview were used. In the future, the Division of Consumer Expenditure Surveys will be conducting research on how to combine data from the Diary and Interview to produce a better estimate of food expenditures. See http://www.bls.gov/cex/ for a detailed description of the CE Diary and Interview survey instruments.

propose a method 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 propose a method to impute benefits for these additional in-kind benefits using data available in the CE, from administrative records, and from the literature. We refer to this method as the CE Eligibility-Participation Adjusted Method, or CE-EP for short. This imputation approach involves three steps: 1. assign program eligibility to consumer units using their characteristics and federal government program eligibility guidelines; 2. adjusted 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 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. Resulting thresholds are somewhat higher than those that do not account for the additional in-kind benefits, but the two sets of SPM thresholds are not statistically different. Poverty rates are also slightly higher; however, differences in poverty rates based on thresholds with and without noncash benefits in the thresholds are significantly different from zero.

The remainder of this paper is organized as follows. Section II presents background information on poverty measurement for the U.S., and the challenges that the BLS has faced with regard to the production of SPM thresholds. Section III presents an overview of the data used in this study. The Consumer Expenditure Survey (CE) Interview data is described, as are the in-kind benefit programs that are accounted for in SPM resources and are to be included in the SPM thresholds. Section IV describes the methods used to impute in-kind benefits, namely the CE Eligibility-Participation Adjusted Method (CE-EP Method). First eligibility is determined using program eligibility guidelines and data available in the CE. Then participation rates and imputed in-kind benefits are assigned to consumer units in the CE prior to the production of SPM thresholds. Section V reviews the methods used to produce SPM thresholds. Section VI presents a summary of imputed in-kind benefits, and SPM thresholds including in-kind benefits based on the CE-EP Method. Finally, the paper closes with a discussion of research issues and future research on SPM thresholds at the BLS.

The main conclusions from this study are the following:

1. The CE-Eligibility- Participation Adjusted Method is a viable alternative to impute in-kind benefits to consumer units for the estimation of SPM thresholds. Such thresholds results in a SPM that is conceptually consistent with regard to resources and thresholds.

2. The CE Eligibility-Participation Adjusted Method yields 2012 higher SPM thresholds than do SPM thresholds with SNAP benefits only. The differences in the thresholds are statistically significant for both owners with mortgages and renters at the 0.01 level.

3. Poverty rates overall and for select demographic subgroups increase with SPM thresholds accounting for the in-kind benefits. Differences in poverty rates are statistically significant.

II. Background

A. Measuring Poverty

Identifying the "poor" has been a challenge since at least the time of Adam Smith, with poverty referring to both one's ability to meet basic needs and also to social exclusion (1776). Thus, regardless of mechanics of the measure, poverty is a social concept.[3] In the U.S., poverty has been defined in terms of economic deprivation with a comparison resources to meet particular basic needs of people living in this country. The earliest official measure of poverty in the U.S. was based the income available to meet a family's basic needs with basic needs defined as a multiple of food spending at one point in time (the earlier 1960's with an update for changes in prices only). For official poverty, in-kind benefits are ignored as are taxes, and medical care and work related expenses. In response to these and other criticisms, a National Academy of Sciences Panel recommended that basic needs be identified as a share of spending on food, clothing, shelter, and utilities (plus a little more for personal care and other needs) but that resources available to meet spending needs be compared to this measure (1995). As societies needs change, so do thresholds but not in the same way that resources would change. Most recently, an Interagency Technical Working Group (ITWG) has prepared guidelines to develop a Supplemental Measure of Poverty (SPM). In this section of the paper, we present a brief overview of these three poverty measures and describe the challenge that faces us with regard to producing a conceptually, consistently defined measure of poverty for the U.S.

B. Official, NAS, and SPM Poverty Measures

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, 1963, 1965a, 1965b; Fisher, 1992). This measure consists of a set of thresholds for families of different size and composition that are compared to a resource measure to determine a family's poverty status. 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 two decades (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). Based on its assessment of the weaknesses of the current poverty measure, this NAS panel of experts recommended

[3] For discussions regarding the measurement of poverty generally, and not specific to the U.S., see for example, Atkinson (1987), Atkinson and Bourguignon (2001), Chen and Ravallion (2012), Deaton (2005). Eurostat (2005), Ferreira and Ravallion (2009), Foster (1998), Foster et al. (1984), Jenkins and van Kerm (2014), Nolan (2007),
Ravallion (2011), and Sen (1976, 1983). Also see two books by Jenkins (2011) and Jenkins and Micklewright (2007).

a measure that better reflects contemporary social and economic realities and government policy.[4]

The SPM is based on the recommendations of the NAS Panel. Like for the current SPM, a goal of the NAS panel was to produce a measure of poverty that explicitly accounted for government spending aimed at alleviating the hardship of low-income families. Thus, taking account of tax and transfer policies, such as the food stamp program and the earned income tax credit (EITC), the measure can show the effects of these policies on various targeted subgroups, for example, families with children. The current official measure, which does not explicitly take account of these benefits, yields poverty statistics that are unchanged regardless of many of these policy changes.

In March 2010, an Interagency Technical Working Group (ITWG) listed suggestions for a Supplemental Poverty Measure (SPM). The Interagency Technical Working Group 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 official poverty measure, as defined in Office of Management and Budget (OMB) Statistical Policy Directive No. 14, would not be replaced by the SPM. They noted that the official measure is sometimes identified in legislation regarding program eligibility and funding distribution, while the SPM will not be used in this way. The SPM is designed to provide information on aggregate levels of economic need at a national level or within large subpopulations or areas and, as such, the SPM will be an additional macroeconomic statistic providing further understanding of economic conditions and trends. 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.

The SPM does not take account of assets that may be used to meet necessary expenses. Assets can add to the resources that are used to meet basic needs, so some analysts advocate counting them in measuring poverty. Others may argue that many assets are not very liquid or suggest that poor families have so few assets that including them would not change poverty measures much. If our purpose is to target families who are in need, then it is clear that families with no assets are worse off than those who have some. On the other hand, families who have incurred large debts are more vulnerable to financial trouble than those who have not. The NAS panel discussed a "crisis definition of resources." This definition included those assets families have on hand that could be converted to cash to support current consumption. They suggested that this "crisis definition" is only relevant for a very short-term measure of poverty, because, in their words, "…assets can only ameliorate poverty temporarily."[5] They suggested that it is important, however, to develop measures of the distribution of wealth and to examine the relationship between asset ownership and

[4] See Johnson et al. (1997) for early work conducted at the BLS regarding the production of NAS poverty thresholds using CE expenditure survey data.
[5] Citro and Michael, pp. 214-218.

poverty status. While spending down assets can enhance income to make ends meet, servicing debt can be a drain on family income that would otherwise be sufficient to purchase basic necessities. [6]

In the Table 1, the primary features of the U.S. official poverty measure and the SPM are presented. The features of a relative measure are presented for comparison. This is a relative poverty measure that is comparable to those used internationally. Relative poverty measures are described in et al. (2002) and the second edition of the Canberra Group Handbook on Household Income Statistics[7]. The relative measure is most commonly used in developed countries to measure poverty. It uses information about the distribution of household resources and counts as poor those individuals with household income below some percentage of the median of that distribution.

In October of 2014 the BLS released SPM thresholds for the third time[8] and the Census Bureau released the third report on research on the SPM.[9] That report showed poverty estimates for calendar year 2013 using the official definition and the SPM. The report compared the poverty population using the two measures, showing poverty rates, distributions of income-to-poverty ratios, and state level poverty estimates. Focusing on the SPM, the report showed the effects of program benefits and nondiscretionary expenses on SPM rates as well as changes between 2012 and 2013.

Work on the SPM, conducted at the BLS and Census Bureau, has been conducted as "research" since the ITWG guidelines were published. This means 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 2014, the Census Bureau received funding to produce SPM poverty statistics. This is the first year with such funding has become available. Now, changes in the SPM resource measure and presentation of the related poverty statistics will undergo greater scrutiny than they would have in the past. But, funding for the BLS to produce SPM thresholds has not been forthcoming, although requests for funding have been included in previous year budget plans. Thus, the threshold work presented in this paper, continues as research under the auspices of the Division of Price and Index Number Research within the BLS for the foreseeable future.

C. Our Charge and Challenge

As noted above, guidelines to develop and produce the SPM were published by an Interagency Technical Working Group (ITWG) in March 2010. Consistent with the findings of

[6] Interest payments on mortgages are included in SPM thresholds as a part of shelter costs, while income from assets, such as interest and dividends, are included in cash income. Short and Ruggles (2005), examined methods of taking account of net worth in experimental poverty measures using the Survey of Income and Program Participation.

[7] The handbook was prepared by an international Task Force operating under the auspices of the Conference of European Statisticians (CES) and sponsored by the United Nations Economic Commission for Europe (UNECE).

[8] See the following for more information regarding the working going on in the Division of Price and Index Number Research, BLS: http://stats.bls.gov/pir/spmhome.htm

[9] See the following for the most recent report from the Census Bureau: http://www.census.gov/content/dam/Census/library/publications/2014/demo/p60-251.pdf

the National Academy of Sciences (NAS) panel (Citro and Michael 1995), these 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 Interview is the source of the CE data, as opposed to the Diary, since most of the data necessary for the production of the thresholds is available in the Interview.[10] In-kind benefits included in SPM resources and methods to account for these are described in Short (2014).

Table 1. Poverty Measures: Official, Supplemental, and Relative

	Official Poverty Measure	Supplemental Poverty Measure	Relative Poverty
Measurement Unit	Families and unrelated individuals	All related individuals who live at the same address, any co-resident unrelated children who are cared for by the family (such as foster children), and any cohabitors and their relatives-=consumer unit	Household
Resource Measure	Gross before-tax money income	Sum of cash income, plus any federal government in-kind benefits that families can use to meet their food, clothing, shelter, and utility needs (FCSU), minus taxes (or plus tax credits), minus work expenses, minus out-of-pocket expenditures for medical expenses.	Disposable Income
Poverty Threshold	Cost of minimum food diet in 1963	Range of the 30-36th percentile of expenditures for food, clothing, shelter, and utilities (FCUS) plus "a little more" for other basic needs of all consumer units with exactly two children	50 % median equivalized disposable income
Threshold Adjustments	Vary by family size and composition	Three parameter equivalence scale Adjust for geographic differences in housing costs using 5 years of ACS data	Square root of household size
Updating thresholds	Consumer Price Index: All items	Five year moving average of expenditures on FCSU	Annual update

[10] The U.S. Consumer Expenditure Survey is a composed of two components, the Interview and the Diary. Consumer units participating in the Interview do not participate in the Diary. Diary data are collected for two consecutive one-week periods while Interview data are collected for the previous three months. The Diary is considered a better source of data for food and perhaps clothing. However, the Interview is considered a better source of data for shelter and utilities; in addition, food and clothing expenditures are also collected using the Interview. The Interview was chosen as the source of data for the SPM thresholds due to the extensive of needed data available and the longer time period over which expenditures are reported.

As with other poverty measurement, the ITWG guidelines note that to determine poverty status using the SPM, a consumer unit or family's resources are compared to an appropriate thresholds. If resources are below the threshold, all people in the family are counted as poor. Continuing with the guidelines regarding resources, the document includes the following:

- The resource definition should indicate the resources the family has available to meet its food, shelter, clothing, and utilities needs, plus a little more.

- Following the recommendation of the NSAS report, family resources should be estimated as the sum of cash income, plus any Federal Government in-kind benefits that families 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.

Regarding thresholds, ITWG guidelines provide the following:

- The poverty threshold sets the annual expenditure amount below which a family is considered poor. Following the recommendations of the NAS panel, this should be established on the basis of expenditures on a set of commodities that all families must purchase: food, shelter, clothing and utilities (FCSU)...[and a multiplier to represent other goods and services considered necessary like non-work transportation, personal care, etc.]

- 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 food, shelter, clothing, and utilities, 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, produced by the Census Bureau, accounts for more in-kind benefit programs than do SPM thresholds, produced by the BLS. SPM thresholds only account for Supplemental Nutrition Assistance Program (SNAP) benefits. However, SPM resources 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, in some cases, utilities.[11] 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

[11] In some states, consumers receive checks to help pay for heating and cooling, while in others the benefit is paid directly to the utility company. When checks are received by consumer units, depending on the state, they may be able to use the value of these to pay for expenses other than heating and cooling or they may be restricted to paying for heating and cooling only.

benefits. Accounting for these additional in-kind benefits in the thresholds will result in thresholds that are conceptually consistent with resources.

The Consumer Expenditure Interview Survey (CE) is the source of data for the SPM thresholds. Thus far, only reported expenditures on FCSU[12] have been used to produce the thresholds. Limited noncash benefit information is available in the Consumer Expenditure Survey (CE) Interview component, the data source upon which the thresholds are based. Specifically, the CE collects information on food expenditures that implicitly include the cash value of benefits from the Supplemental Nutrition Assistance Program (SNAP), but no information on other food programs. There is information regarding living in rental public and subsidized housing, but no attempt is made to collect the value of these rental subsidy values. And there is no information on participation in energy assistance programs.

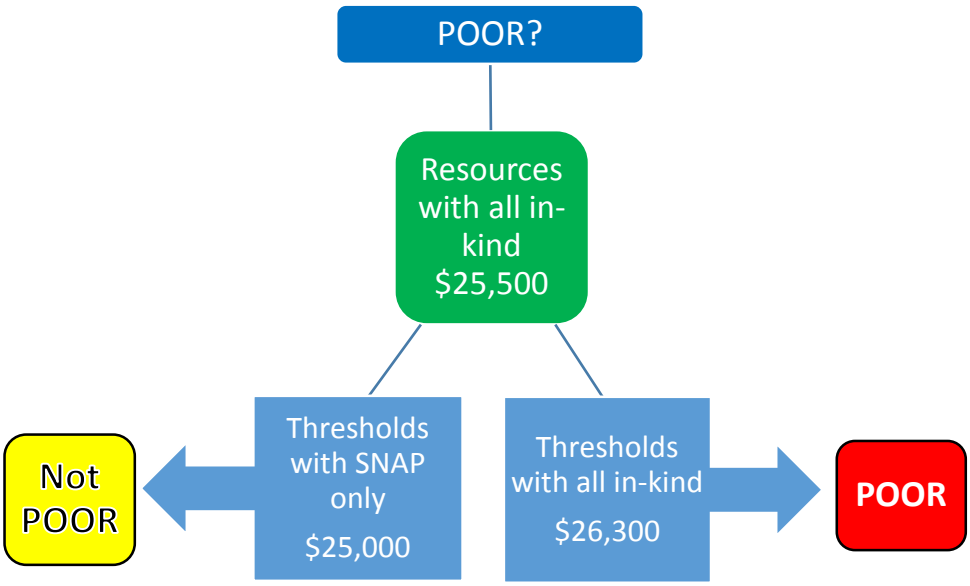
Due to the fact that limited to no information is available regarding in-kind transfers poses a challenge for the BLS to produce SPM thresholds that are conceptually consistent with resources produced by the Census Bureau for SPM poverty statistics. To understand the importance of this lack of consistency, 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 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

[12] FCSU refers to food, clothing, shelter, and utilities. Food expenditures are those for food at home and food away from home. Meals as pay are not counted nor are alcoholic beverages. Food expenditures are not expected to be exact but are collected through the use of global question and refer to "usual weekly" expenditures. Clothing expenditures include those for all the goods and services identified as "apparel" by the CE Division of the BLS. Apparel includes clothing for girls and boys aged 2 to 15, women and men 16 and over, and for children less than 2 years of age. This category also includes footwear and other apparel products and services such as jewelry, shoe repair, apparel laundry and dry cleaning, and clothing storage. Shelter includes expenses for owners and for renters. To create the shelter variable for the SPM thresholds calculation, I restricted shelter expenses to be those for the consumer unit's primary residence only. For renters, expenditures include those for rent paid, maintenance and repairs paid for by the renter, and tenants insurance. Rent as pay is not included although this rent since no information on this rent is collected in the CPS for resources. For owners, shelter expenses include those for property taxes and insurance, maintenance and repairs, and for those with mortgages, and mortgage interest and principal payments. As for renters, all expenditures are restricted to those for the CU's primary residence. Unlike for the expenses of renters and owners without mortgages, mortgage shelter expenditures reflect obligations, not necessarily what the consumer unit paid. The CE Survey collects information about the terms of the mortgage or mortgages on the primary residence. Then staff members at the BLS who work with the CE data calculate the obligated payments. If property taxes and insurance are included in the mortgage payment, these too are calculated by these staff members for the consumer unit. Utility expenditures are those for: energy including natural gas, electricity, fuel oil and other fuels; telephone services including land lines, cell service, and phone cards; and water and other public services such as trash and garbage collected, and septic tank cleaning. For owners, these are for the primary residence only. For renters, these are for any utilities for which they are obligated to pay with the exception of rented vacation homes. The amount recorded by the respondent is for what is charged or billed, not what the consumer unit necessarily pays. The exception regarding questioning for utilities is for telephone cards; consumer units are asked about the purchase price of pre-paid telephone and cellular cards and their spending for using public telephones.

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; and thus, including the value of rental subsidies in SPM resources and not SPM thresholds overstates the well-being of the consumer unit.

Let's think about this more broadly. In the figure below, resources include the value of all the in-kind benefits as noted previously. Total SPM resources are valued at $25,500 for a particular consumer unit. Now we compare this consumer unit's resources to its appropriate SPM threshold to determine the poverty status of the people living in the consumer unit. If we use the SPM threshold that only accounts for SNAP benefits, valued at $25,000, no one in the consumer unit would be poor. However, if we use the SPM threshold that accounts for the same benefit programs as accounted for in SPM resources, valued at $26,300, everyone in the consumer unit would be poor. As noted by our example, the exclusion or inclusion of in-kind benefits in the SPM thresholds matter.

Figure 1. Impact of Including In-Kind Benefits in SPM Thresholds: Example



Thus, as the two previous examples suggests, the BLS and Census Bureau must make a choice regarding how to deal with the conceptual inconsistency in defining resources and thresholds with respect to in-kind benefits. Either the Census Bureau will need to account only for SNAP benefits in resources, as is done in the thresholds currently, or the BLS will need to develop methods to impute values for these additional in-kind benefits such that resources and thresholds are conceptually consistent. In this research, we follow the latter approach and impute in-kind benefits to consumer units in the CE, and thereby include the *same types* of in-kind benefits in the thresholds as are in resources. A question of whether the values for the benefits should be the same in resources and thresholds is an issue that will be addressed later in the paper.

D. Previous Research to Impute In-Kind Benefits to SPM

Researchers previously added the value of in-kind benefits in SPM defined resources and thresholds.[13] Here we focus on the work conducted at the BLS and Census Bureau. Since the beginning of our work on SPM, researchers at the Census Bureau have been adding the value of SNAP, WIC, NCLP, rental subsidies, and LIHEAP benefits to money to arrive at SPM resources. Short and Renwick have produced much of this work (e.g. Short 2011a, b; Short 2014; Short and Renwick 2010). These benefits have been included in resources in publications of SPM poverty statistics although only SNAP has been accounted for in the thresholds.

Select in-kind benefits have been incorporated in SPM thresholds in work by Garner and Hokayem. However, none of these have been used for SPM poverty statistics, but rather have been presented at professional conferences and workshops. For example, Garner (2010a, c, d; 2011) used program eligibility guidelines and consumer unit characteristics to impute NSLP and WIC benefits using what she called the CE Eligibility Method.[14] However, thresholds produced using the CE Eligibility Method are expected to overestimate the value of benefits since eligibility rates do not equal participation rates. In more recent research, Garner and Hokayem (2011a, b and 2012) introduced an alternative method, the CPS Program Participation Method, to impute the value of NSLP and WIC program benefits that is based on program participation. The CPS Program Participation Method estimates a model predicting program participation using data from the CPS ASEC and imputes a probability of program participation for consumer units in the CE before assigning program benefits. The imputation method incorporates features of the CPS universe definitions for NSLP and WIC. Data from the CPS ASEC for 2006-2010 were used to estimate a multinomial

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[13] See http://www.census.gov/hhes/povmeas/methodology/supplemental/index.html and http://www.bls.gov/pir/spmhome.htm for ongoing SPM research.

[14] In each of the Garner studies cited on SPM thresholds, rental subsidies were estimated and counted in shelter expenditures for renters when renters noted that they lived in subsidized rental units. Only subsidies for consumer units living in rental housing are considered. The rent subsidy is defined as the difference in the actual rent paid by the CU and the "market rent" of a unit with similar characteristics (i.e., number of bedrooms in this case). CE data used in the imputation are the responses to general housing questions and the rent actually paid.

As proxies for the market rents, Garner used data from HUD on Fair Market Rents (FMRs) for 2004 though 2009 (See http://www.huduser.org/portal/datasets/fmr.html). FMRs are assigned to consumer units who report in the CE that their housing costs are lower because a government is paying part of the costs. Public housing units are assigned market rents that are adjusted to reflect the average gross rent paid plus the average subsidy value as reported by HUD (The adjustment factor is 767/971 for 2008 and is assumed to be the same for 2004 quarter one through 2009 quarter one for this study; see: http://www.huduser.org/portal/picture2008/form_7totH4.odb. Garner followed the same procedure used by Short and Renwick 2010, footnote 4.) FMRs data were matched with CE data by the number of bedrooms in the rental unit, county, and state. FMR data are available for zero to four bedrooms. When there were more than four bedrooms in a CE rental unit, the CU was assigned the FMR for four bedroom rental units in the county. When there was more than one FMR for a county, the average FMR for the county was used and then assigned to the subsidized rental units in the CE. CUs living in rent-controlled units also receive implicit housing subsidies. However, no attempt was made to impute housing subsidies for these CUs. The reason is that data on rent-control are not available over the full five years that underlie the 2008 SPM thresholds. The CE began asking about rent-control in 2007 quarter two. NOTE: no ratio adjustment for the value of public housing is made for the SPM thresholds; the ratio remains for SPM resources.

logit model for NSLP participation and a logit model for WIC participation. [15] The CPS-based logit coefficients were applied to the CE Interview sample. The U.S. Department of Agriculture served as the source of the NSLP and WIC benefit levels assigned to consumer units in the CE. Rates were imputed for consumer units participating in the CE any time between 2005 quarter two through 2010 quarter one. Imputations were produced using pooled data over these years, with the variable year serving as a control in the models.

The current study goes back to the CE Eligibility Model, but with improvements to account for program participation. Program participation rates are based on estimated participation rates from other studies. For example, average participation rates of students eligible to participate in public school lunch programs are based on administrative data from the U.S. Department of Agriculture but published by the National Research Council (2012). In contrast, the earlier in-kind benefits imputations based on eligibility did not adjust for participation. By using the data available in the CE Interview, along with administrative data and findings from previous research, it is anticipated that closer estimates to administrative data will result. This study differs from the approach used by Garner and Hokayem (2012); in that study the goal was to impute participation rates for consumer units in the CE that match those in the CPS. If the rates in the CPS are under-reported, then the rates in the CE would also be under-reported. A key objective in the current study is to produce participation rates that are as close as possible to those in the administrative data.

III. Data: Consumer Expenditure Survey (CE) Interview and In-Kind Benefits

A. Consumer Expenditure Survey Interview

This research uses the U.S. Consumer Expenditure (CE) Interview Survey as the basis of the SPM thresholds for 2012. Additional data are needed however to impute values for in-kind benefits. CE data from quarterly interviews, collected from 2008 quarter 2 through 2013 quarter 1 (20 consecutive quarters), are used as the basis of the thresholds. The CE Interview Survey is designed so that consumer units would be included in the sample for up to five consecutive quarters. Data used for this study from the last four interviews only, following the suggestions of the NAS Panel. CE data collected in an interview refer to expenditures made during the three months prior to the interview month in most cases. 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).

B. In-Kind Benefit Programs

For consistency with the SPM resource measure, in-kind benefits are to be accounted for in the thresholds. As noted earlier, SPM thresholds, which have been published previously on BLS website account only for SNAP benefits, while resources have accounted for several types of benefits. Thus, to meet the guideline for consistency, benefits from the other programs must be accounted for in some way. In this section, each of the benefits and their

[15] See Garner and Hokayem (2011a) for a presentation of reported and predicted participation rates using the CPS data and probit models.

treatment in the SPM thresholds are described. The Census Bureau limits in-kind benefits to the following; we follow this lead for SPM thresholds:

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

Each of these programs is described briefly next. Note, the SPM thresholds produced for this study do not yet include the value of LIHEAP benefits. These imputations are being developed. Thus, the SPM thresholds are not yet fully consistent, in concept, with the SPM resource measure.

C. 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 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 in terms of aggregate benefits.[16]

SNAP benefits are not imputed for inclusion in the SPM thresholds. This is because the BLS assumes that consumer units reporting in the Interview Survey use SNAP benefits like cash, and thus consider SNAP benefits to be included in what is reported for food expenditures. The reasoning behind this assumption is that SNAP benefits are administered as electronic benefit transfers (EBT) and thus are treated "like" cash when food purchases are made. In other words, consumer use SNAP EBT like any other source of payment for food expenditures. According to the USDA (Federal Register, 2013), SNAP benefits are authorized for use by SNAP participants for a specific dollar amount to purchase food or food products for human consumption. "Benefit redemption transactions at the retail point of sale are essentially a financial transaction settled in a manner similar to other electronic payment types such as debit."[17] The BLS definition of CE "money" income includes the dollar value of SNAP benefits received,[18] unlike the Census Bureau's definition of official money income

[16] "The Food Assistance Landscape: FY2008 Annual Report," Economic Research Services, U.S. Department of Agriculture, Economic Information Bulletin No. 6-6, April 2009.

[17] Special Supplemental Nutrition Program for Women, Infants and Children (WIC): Implementation of the Electronic Benefit Transfer-Related Provisions of Public Law 111-296 - Proposed Rule, Federal Register, Vol. 78, No. 40, February 28, 2013, p. 13550, http://www.fns.usda.gov/sites/default/files/EBT-proposedrule.pdf

[18] *Money income before* taxes is the total money earnings and selected money receipts during the 12 months prior to the interview date. Money income includes the following components:

- *Wages and salaries*
- *Self-employment income*
- *Social Security, private and government retirement*
- *Interest, dividends, rental income, and other property income*
- *Unemployment and workers' compensation and veterans' benefits*
- *Public assistance, supplemental security income, and Food stamps* includes public assistance or welfare, including money received from job training grants; supplemental security income paid by Federal, State, and local welfare agencies to low-income persons who are age 65 or over, blind, or disabled; and the value of Food stamps obtained.

that does not include the value of these benefits. The BLS uses this "money" income definition in published comparisons of expenditures and income, again, the assumption being that SNAP benefits can be used to meet food reported expenditures. No other in-kind benefits are included in CE income and thus none are implicitly included in reported FCSU expenditures. The SPM definition of resources (broader than income) does include SNAP however.

D. 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 years of age. 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. We make this assumption because 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.[19] For example, a WIC participant may be issued a food package that contains two dozen eggs and three gallons of milk for purchase. WIC benefits are limited to food items authorized for purchase by each WIC state agency. According to the USDA, as of 2013, the majority of WIC participants receive paper food instruments that indicate their "food prescription." These instruments can be transacted at an authorized retail vendor who has been approved to accept these instruments. Federal WIC regulations allow WIC state agencies to use one of three types of food delivery systems – retail, home delivery, or direct distribution. Ten states are participating in the use of EBT for WIC as a fourth type of food delivery system.[20] "Due to the restrictive nature of WIC benefits issuance, a WIC EBT transaction is often considered one of the most complex transactions at the retail point of sale" (*Federal Register*, 2013, p. 13550).

E. National School Lunch Program (NSLP)

According to the USDA, the second largest food and nutrition program in terms of expenditures is the National School Lunch Program.[21] The National School Lunch Program

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- *Regular contributions for support.*
- *Other Income*.
  Source: http://stats.bls.gov/cex/csxgloss.htm .

[19] Authorized fruits and vegetables can be purchased with cash-value vouchers. These are fixed dollar checks, vouchers, or EBT card or other document that can be used by a participant for these foods only (*Federal Register*, 2014, p. 356).

[20] As of 2015, the following states are participating in projects that deliver WIC benefits via EBTs: Florida, Massachusetts, Michigan, Kentucky, Nevada, New Mexico, Texas, Virginia, West Virginia, and Wyoming (USDA, 2015a). According to proposed rules published in the *Federal Register* (2013), all WIC state agencies are to implement EBT systems by October 1, 2020. Receipts from purchases are to include the information on what is purchased, quantities or weight, and value.

[21] "The Food Assistance Landscape: FY2008 Annual Report," Economic Research Services, U.S. Department of Agriculture, Economic Information Bulletin No. 6-6, April 2009.

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 participant 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.

F. 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 (HUD), with additional programs administered by the USDA. 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. Rents paid are collected for each month in the reference period (the three months prior to the interview). In contrast, the other information is only asked in the first interview. This information is carried forward in subsequent interviews (two through five); this means that if the consumer unit's situation changes regarding rental assistance in subsequent interviews, this is change is not captured. Specifically, the Interviewer is requested to ask the consumer the following questions, if not apparent:

> Is this house in a public housing project, that is, is it owned by a local housing authority or other local public agency?
>
> 1. Yes
> 2. No
>
> Are your housing costs lower because the Federal, State, or local government is paying part of the cost?
>
> 1. Yes
> 2. No

As can be seen from the question wording, consumer units are asked to considered more than federal housing assistance. Due to a lack of information regarding state and local housing programs, we compare our imputed estimates to the federal aggregates available from HUD and USDA. Information on rent paid is used in combination with answers to these questions to estimate rent subsidies.

For this study, only subsidies for consumer units living in rental housing are accounted for in the SPM thresholds, not those for owners. When a consumer unit begins participating in the CE Interview Survey, respondents are asked whether they live in public housing or have received government assistance to help with shelter expenses. This information is carried forward in subsequent interviews; in other words, the CU is not asked if its situation has changed regarding assistance with rent.

G. 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 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. 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.

IV. Methods: Imputation of In-Kind Benefits

A. Overview of Imputation Methods

Benefits are imputed for all consumer units participating in the CE Interview Survey over the 2008 quarter two through 2013 quarter one time period. When appropriate, imputed benefits are added to each consumer unit's reported expenditures for food, clothing, shelter, and utilities. Quarterly expenditures and benefits are annualized and converted to 2012 year dollars. 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. Also, participation in benefit programs is situation- and consumer unit-specific, resulting in an interaction of reported FCUS expenditures and benefits at the consumer unit level.

Two types of imputation are used in this study: one for WIC and NSLP and another for rental subsidies. WIC and NSLP benefits are estimated using a method that we refer to as the CE Eligibility-Participation Adjustment Method, or CE-EP Method for short. The method 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.

A description of WIC and NSLP imputations with the CE-EP Method are presented below. Both WIC and NSLP benefits are dependent on program or income eligibility, although definitions of income used are different, and WIC benefits have a wider range of program eligibility. The method used to produce the rent subsidies follows.

B. CE Eligibility-Participation Adjusted Method (CE-EP Method)

As noted earlier, the CE provides no information regarding participation in WIC or the NSLP. Thus, we first impute eligibility followed by participation. For consumer units or consumer unit members we identify as participation in the programs, we assign benefits available from administrative data.

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-EP Method, less than 100% participation in WIC and NSLP is accounted for by participation factors, which reduce the values of the benefits for consumer units. In effect, the aggregate benefits added to the sample are less, as if the full value of the benefit were assigned to only *participating* consumer units. Note that SNAP benefits are already implicitly included in the value of food expenditures in the CE.

C. WIC Benefit Imputation

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, for example, 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, 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 factor is a product of numbers from Urban Institute studies using data from the USDA and CPS (Betson et al. 2011, USDA 2014 and 2015a). Using those data, researchers produced WIC coverage rates which they defined as the number of individuals enrolled in WIC divided by the number eligible (coverage rates are alternately referred to as participation rates (USDA 2015a.) WIC coverage rates are available from these studies for 2000-2013.

The USDA produces average monthly WIC benefits per person. CE characteristics data are used in combination with average monthly WIC benefits to produce quarterly values for the CE sample.[22] Each person determined to be a WIC participant is assigned the annual

[22] In some states, WIC benefits are transferred to participants via debit cards while other states give participants checks to be used for WIC-approved food. In this study, we assume that participants use checks and thus their WIC benefits are not assumed to be automatically included in reported food expenditures for the CE. The only states currently, as of January 2011, that use debit cards for WIC are Michigan, New Mexico, Nevada, Texas, and Wyoming. See: http://www.fns.usda.gov/wic/EBT/EBTActivityMap.pdf.

average national food cost value for monthly WIC benefits. The average national monthly food cost for 2012, for example, was $45.00 per person. WIC data are available on the USDA web site: http://www.fns.usda.gov/wic/. Note that all monthly values are eventually multiplied by three to reflect the same time period as the quarterly expenditures reported in the CE data files.

The average monthly WIC subsidy values are assigned by WIC eligible group- (1) eligible consumer units with children less than 5 years of age, and (2) eligible consumer units with infants (children less than 1 year of age) and a potential "early mother". For the first group, the average monthly WIC value is simply multiplied by the participation-adjusted number of children. For the second group, the average monthly WIC value is multiplied by the sum of the participation-adjusted number of infants, the participation-adjusted number of children between the ages of 1 and 5, and the participation-adjusted number of "early mothers". Note that the adjustment factors differ for infants, children, and women. For both of these groups, previous calendar year WIC values are assigned for interview months January – March, and current calendar year WIC values are assigned for interview months April – December.

D. NSLP Benefit Imputation

NSLP benefits, imputed also with the CE-EP Method, are based on consumer unit demographics, information available about school meals in the CE Interview data base, program eligibility guidelines and school meal values (for example, see (USDA 2011a), and participation rates produced by the National Research Council (2012).

According to USDA school lunch guidelines, students are automatically eligible to receive free meals if their family receives welfare or SNAP. For the purposes of this study, a consumer unit is defined as program-eligible if the consumer unit reported receiving welfare benefits and/or participated in the food stamp program. For consumer units not program-eligible, school lunch income eligibility is imputed using the consumer unit's adjusted income and the federal (HHS) poverty guidelines. Adjusted income is computed as before-tax money income minus the value of SNAP, pension and retirement income, Supplemental Security Income (SSI), income losses from farm and non-farm rents, interest income, and other select income (for example, income from the care of foster children, and the cash values of fellowships and scholarships or stipends not based on working). If the consumer unit's adjusted income is below 130 percent of federal HHS poverty guidelines, school children in the CU qualify for free meals. If net CU income is between 130 and 185 percent of the federal poverty guidelines, the children qualify for reduced priced meals. All other meals provided to school children under the NSLP also are also subsidized but at a much lower level.

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.

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.

A question about school meal expenses is contained in the CE Interview.[23] For interview quarters before 2013 quarter two, the variable is the reported weekly expense for school meals, but for 2013 quarter two forward, the variable is more flexible, allowing the consumer unit to report daily, weekly, biweekly, or monthly school meal expenses. This information is used to assign benefit levels to those defined as income- or program- eligible, based on program guidelines, to receive reduced price or paid subsidized (but not free) meals. Those identified as receiving free meals are done so based on eligibility guidelines and participation rates from the literature.

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/cnd/lunch/). Payment rates are set by the USDA per meal for free, reduced, and paid lunches, and also differ based on the percentage of lunches that are free or reduced within the school. The commodity school meal program was created as part of the National School Lunch Act. The Act establishes the national average minimum value of donated foods for the school year to be given to states for each lunch served in the NSLP. For this study, 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, were assigned to each student.

The payment rates used reflect the calendar year during which the interview took place. For example, if the interview took place in 2012, a weighted average of the 2011-2012 school year values (5/9 for January - May), and the 2012-2013 school year values (4/9 for September - December) was assigned to the consumer unit. For free lunches, the assigned 2012 value is a weighted average of $2.77 free lunch value + $0.2225 commodity value, and $2.86 free lunch value + $0.2225 commodity value.

Note that the USDA refers to school meals as “paid” under the NSLP since all school-provided meals are subsidized at some level. Throughout the remainder of this paper, we refer to this group as “paid subsidized” or subsidized as opposed to free or reduced.

To assign annual school lunch values to consumer units, 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.

E. Rent Subsidy Imputation

For the purposes of the SPM thresholds, it is not necessary to impute the value of rental subsidies. Only the market value of subsidized rental housing is needed to account for the

[23] The number of children for whom the CU paid for school meals was not used in earlier imputations of reduced-price meals for the production of the SPM thresholds (Garner and Hokayem 2011b).

full cost of rental housing in the thresholds. Market rent equals contract rent paid (including the value of utilities is not already included in rent payments) plus the value of rental subsidies (also assumed to include the value of housing utilities). By estimating rental subsidies, we can compare our estimates to those included on the resource side of the SPM available to cover the subsidized part of market rent on the SPM threshold side. 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. For the purposes of evaluation, we produce rental subsidies and compare these to data from other sources.

We use reported participation in rental subsidy programs as reported in the CE Interview, reported or estimated rents, amount billed for housing utilities, and market rents to determine which consumer units are assigned rental subsidies. For the purposes of this study, Fair Market Rents (FMRs), published by the U.S. Department of Housing and Urban Development (HUD), are our source of market rents.[24, 25] 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. A rental subsidy value is first assigned to consumer units that report "Yes" to either having lived in public housing or received government assistance with shelter expenses, *and* also have rent (for the current rental unit) greater than zero.[26] Unlike for WIC and NSLP benefits, where a value is assigned to all eligible CUs and the size of this value is minimized to account for participation, for rental subsidies, only those consumer units deemed participating are assigned a value. Second, rental subsidy values can be adjusted based on comparisons to FMRs. The sum of reported or estimated rent (again, including fuel and water expenditures) are compared to FMR rent to determine whether the unit is, in fact, participating in a public housing or government voucher program. If the FMR exceeds this rental sum, then the imputed rental subsidy for the unit is the value of that difference. Ultimately, 4.44% of the 2012 estimation sample (of consumer units with two children) are assigned a rental subsidy value; 2.71% of the estimation sample are subsidized as a result of living in a public housing project, whereas 1.73% receive rental assistance in another form.

In examining the sample of renters, and their reported rent for the three months preceding the CE Interview, we discovered that a significant proportion of consumer units had one or more months of rent missing, and in many of these cases, the imputed quarterly rent did

[24] FMRs are available online via the following link: http://data.hud.gov/data_sets.html

[25] 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. "One concern is that not all local housing authorities use the FMRs as a ceiling for rental assistance. Some housing authorities request and receive permission to use a higher payment standard. A second concern is that some FMRs are set at the 50th percentile of market rent rather than the 40th percentile of market rents. A third concern for some low cost areas is that a floor has been imposed on the FMRs with the FMR set equal to this minimum amount rather than a set of percentile of the rent distribution. A fourth concern is that FMRs are the ceiling for housing assistance. Some subsidized renters will be living in units below the FMR and therefore the FMR method may overstate the value of their housing subsidies." (p. 9).

[26] Rental assistance participation rates are adjusted when reported rents exceed market rents. This is the same method used by Garner (2010a,c,d) previously. Other sources of market rents will be explored in the future including imputing market rents using CE data from non-subsidized renters. Market scan data could also possibly be used.

not appear to be correlated with the sum of reported monthly rents.[27] Thus, in cases where one or more rents were missing, a new imputation was made. If rent was missing for one month, then the sum of two months' rent was multiplied by 3/2 to obtain a quarterly rent value. If the rent was missing for two months, then the single month's rent was multiplied by 3. In the case where all 3 months of rent were missing, 10% of adjusted gross income was used as a proxy, based on the HUD rent payment calculation worksheet. The adjusted income measure used was total family income before taxes (mean of the five CE income imputation iterations) plus the estimated value of Earned Income Tax Credit (EITC), minus food stamps.

The value of federal refund reported in the CE and maximum EITC values based on a strict set of eligibility rules were used to estimate the value of EITC for those units with all months of rent missing. The first filter for eligibility was that only those consumer units with earned income greater than zero, both earned income and total before-tax income less than the maximum EITC income, and reported investment income less than the maximum investment income were allowed to receive a value for EITC. Then the sample of remaining eligible consumer units was further reduced into two subgroups, "married" and "single". Those consumer units containing a married couple (assumed to have "married" tax status), with the age of the reference person between 25 and 64, and with the age of the spouse also ranging from 25 to 64, were assigned an EITC value. If the reported federal refund value was less than the EITC max for the category of eligibility than the federal refund value was assigned as the value of EITC. If the federal refund was greater than the max EITC value, or missing, then the max EITC value was assigned to the consumer unit.

V. Methods: Production of SPM Thresholds

A. 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 (for example, see the following: Garner and Short, 2010; Johnson et al., 1997; Short

[27] The BLS CE program is interested in quarterly rents. When monthly rents are missing, the CE program imputes rents using data from other consumer unit reports. Whether the rental unit is public housing or the consumer unit receives assistance with housing costs is not variables in the imputation approach.

et al., 1999; Short 2001). The three-parameter scale is shown below.

One and two adults: $scale = (adults)^{0.5}$ (1a)

Single parents: $scale = \left(adults + 0.8 * firstchild + 0.5 * otherchildren\right)^{0.7}$ (1b)

All other families: $scale = \left(adults + 0.5 * children\right)^{0.7}$. (1c)

The equivalence scale for two adults is set to 1.41. The economy of scales factor is set at 0.70 for other family types.

B. Threshold Estimation

The SPM thresholds are based on a range of expenditures around the 33rd percentile of FCSU expenditures for two-adult two-child consumer units (but based on expenditures for all consumer units with exactly two children, as described above). In this study, the imputed in-kind NSLP and WIC benefits are included in FCSU expenditures. As in earlier studies, SNAP benefits are assumed to be implicitly included in food expenditures and rent subsidies are also imputed and included. Thus, whenever "FCSU" is used in this paper, FCSU expenditures are assumed to include imputed subsidies for NSLP, WIC, SNAP, and rent subsidies, unless otherwise noted.

To identify the range around the 33rd 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 30th and 36th 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 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. To produce housing-based FCSU thresholds, first an SPM threshold base that is not distinguished by housing status is produced. The overall threshold base equals the mean of the range of FCSU expenditures times 1.2, to represent a multiplier accounting for other basic goods and services. Second, expenditures for overall shelter and utility expenditures are substituted by the shelter plus utility expenditures for each housing status subgroup.

Separate SPM thresholds are produced for owners with mortgages, owners without mortgages, and renters. The research experimental SPM housing tenure thresholds are produced using the equation (2).

$$SPM\ Threshold_h = 1.2 * FCSU_E - (S + U)_E + (S + U)_h \quad (2)$$

where
h = one of three housing tenure groups:
Owners with mortgages
Owners without mortgages, or
Renters

1.2 = multiplier used to account for expenditures for other basic goods and services, like those for household supplies, personal care, and non-work related transportation.

E = entire estimation sample, within the 30th to 36th percentile range of FCSU expenditures, with FCSU expenditures converted to those for consumer units with two adults and two children without distinction by housing tenure.

FCSU = mean of the sum of expenditures for food, clothing, shelter and utilities for the estimation of sample of CUs within the 30th to 36th percentile range of FCSU expenditures.

S + U = mean of the sum of expenditures for shelter and utilities portions of FCSU for the estimation of sample CUs within the 30th to 36th percentile range of FCSU expenditures.

Statistical tests are conducted to determine if thresholds not accounting for in-kind benefits and those accounting for them are statistically different from each other, and whether there are differences between thresholds based on housing status. The null hypothesis is that the difference is equal to zero. When comparing the two sets of thresholds, a statistical test of differences in means for correlated data is used; see equation (3). The specification of the variance in the denominator accounts for the correlation of the two CE subsamples. The test is applied, for example, by comparing the two renter thresholds.

$$z_{correlated} = \frac{\overline{X}_j - \overline{X}_k}{\sqrt{\hat{V}(\overline{X}_j - \overline{X}_k)}} \qquad (3)$$

where

rep = replicate number

j = CE not accounting for in-kind benefits

k = CE program participation method

$$\hat{V}(\overline{X}_j - \overline{X}_k) = \frac{1}{44}\sum_{1,rep}^{44}[(\overline{X}_{j,rep} - \overline{X}_{k,rep}) - (\overline{X}_{j,Full\ sample} - \overline{X}_{k,Full\ sample})]^2 = \text{pooled variance}$$

When the samples are uncorrelated, as in the case of renters and owners with mortgages within the CE imputation set, for example, the z-test statistic for uncorrelated data is used. See equation (4) below.

$$z_{uncorrelated} = \frac{\bar{X}_j - \bar{X}_k}{\sqrt{\hat{V}(\bar{X}_j) + \hat{V}(\bar{X}_k)}} \quad (4)$$

where

rep = replicate number

$j \neq k$ housing type = renter, owners with mortgages, owners without mortgages

$$\hat{V}(\bar{X}_j) + \hat{V}(\bar{X}_k) = \frac{1}{44}\sum_{rep=1}^{44}(\bar{X}_{j,rep} - \bar{X}_{j,Full\ sample})^2 + \frac{1}{44}\sum_{rep=1}^{44}(\bar{X}_{k,rep} - \bar{X}_{k,Full\ sample})^2$$

VI. Results: Imputed Benefits and Thresholds

A. Imputations Relative to Other Data Sources

To evaluate how well the CE-EP method work, we compare the CE-based imputed values to those from other sources. Table 2 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 (dollars are annualized to 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." However, according to Renwick (2010), capping is based on the premise that the housing share in the SPM thresholds is the amount spent for unsubsidized families. Whether this assumption still applies, now that rental subsidies are included in SPM thresholds, is left for future discussions. Another assumption underlies the Census Bureau's application of the cap: that the three-parameter equivalence scale, applied to the 2-adults with 2- children SPM threshold, adequately accounts for the housing needs of consumer units with different compositions.

Aggregate amounts spent for subsidies by federal agencies are also presented in Table 2. Administrative data from the U.S. Department of Agriculture (USDA) and U.S. Department of Housing and Urban Development (HHS) are the sources of the dollar aggregates. Limited WIC data were available; the USDA reports that $4.8 billion dollars were spent on WIC subsidies in FY[28] 2012 and $4.5 the next year; this compares to the CE estimate of $3.6 and CPS estimate of $3.1. NSLP benefits reported by the USDA total $10.8 billion when limited to the 9 months accounted for in the SPM resource and threshold measure (9 months are used as the usual school term). This is similar to the CPS aggregate and more than that for the CE. Since rental subsidies are administered by both the HHS and USDA, the combined value of these is presented for 2012: $43.3 billion for 2012. The CE aggregate is $36.4, while the COS

[28] A fiscal year is October 1 in one year to September 30 the following year; this time period is used by the U.S. government for reporting on programs over the year as opposed to a calendar year.

aggregate is $30.0 when not capped and $21.4 when capped. In the future, LIHEAP benefits will be imputed and compared to other sources.

Program participation rates for the entire U.S. population and average benefits are presented for the CE and CPS. CE estimated participation in the WIC program is more than twice that in the CPS, although both rates are lower than 10%. Participation rates for the NSLP and rental subsidies are more similar for the two surveys. The program most extensively represented in the U.S. is the NSLP. However, average benefits are substantially higher for rental subsidies.

Table 2. Comparison of CE Imputed In-Kind Benefits ,Administrative Data, and CPS Data

	WIC Benefits			NSLP Benefits			Rental Benefits		
Data Source	Aggregate in Billion $	% of all CUS	Annual Average Benefit per CU (with WIC benefit >$0)	Aggregate in Billion $	% of all CUS	Annual Average Benefit per CU (with NSLP benefit >$0)	Aggregate in Billion $	% of all CUS	Annual Average Benefit per CU (with rent subsidy benefit >$0)
Using CE data for 2012 Threshold	$3.6	6.4%	$465	$8.0	14.3%	$460	$36.4	4.2%	$7,110
CPS 2012 no cap	$3.1	2.8%	$861	$10.7	17.5%	$476	$30.0	3.8%	$6,204
USDA FY 2012	$4.8								
USDA FY 2013	$4.5								
USDA 9 months 2012				$10.8					
CPS 2012 capped							$21.4	3.5%	$4,710
HUD + USDA							$43.3		

B. SPM Reference Sample In-Kind Benefit Program Participation and Means

Table 3 includes results from imputing NSLP, WIC, and rental subsidies to the CE Interview sample whose experience is reflected in the 2012 SPM thresholds. Weighted sample sizes, percentages of consumer units with benefits, and annual mean subsidies for consumer units with benefits are presented. Since the SPM thresholds are based on five years of CE data, these statistics are presented for each year and for all consumer units covered in the five years. Means are in 2012 dollars and five-year percentages have been converted to annual 2012 estimates. Results are shown for all consumer units with two children—the estimation sample – with their expenditures and subsidies converted to represent 2 adults and 2 children, and for the subset of these consumers units whose expenditures and subsidies underlie the SPM thresholds. SPM thresholds are based on the 30-36th percentile of the distribution of the sum of FCSU expenditures and subsides for these converted 2 adult 2 children consumer units.

Focusing on the last column of Table 3 only, the relative participation and average benefit levels are in line with those from the entire sample. The greatest participation by two-child consumer units is for the NSLP, while the highest average benefit is for rental subsidies. Of consumer units whose experience underlies the SPM thresholds, approximately 23 percent participate in WIC, 45 percent have children who participate in the NSLP, and 8 percent report living in public housing or having received assistance from the federal, state, or local government to help pay for housing. Annual average consumer unit in-kind benefits, for those with positive benefit values, range from $450 for WIC, $480 for NSLP, and $8,000 for rental subsidies.

Table 3: Participation and Annual Mean Imputed Benefits for Consumer Units with Two Children in the CE: 2008Q2 to 2013Q1 (Data Used for 2012 SPM Thresholds)

	Consumer Expenditure Interview Survey[a]					
Time Period Data Collected	2008Q2-2009Q1	2009Q2-2010Q1	2010Q2-2011Q1	2011Q2-2012Q1	2012Q2-2013Q1	2008Q2-2013Q1 (data used for 2012 SPM Thresholds)
Women, Infants, and Children Program (WIC)						
	Consumer Units with Two Children for Estimation Sample ($ Adjusted to Reflect 2 Adults & 2 Children)					
Sample Size (weighted)	15,247,342	14,966,092	14,391,199	15,107,079	14,945,709	74,657,420
% with WIC Benefits > $0	16.1%	18.8%	18.4%	18.9%	18.6%	18.2%
Mean (2012 $)[b]	$477	$444	$458	$474	$423	$455
	Consumer Units within 30th-36th % Range of FCSU Expenditures and Subsidies for Estimation Sample ($ Adjusted to Reflect 2 Adults & 2 Children)[c]					
Sample Size (weighted)	752,033	842,473	808,060	1,031,025	1,053,038	4,486,630
% with WIC Benefits> $0	26.3%	24.4%	22.1%	20.7%	24.0%	23.4%
Mean (2012 $)[b]	$513	$423	$405	$456	$444	$449
National School Lunch Program (NSLP)						
	Consumer Units with Two Children for Estimation Sample ($ Adjusted to Reflect 2 Adults & 2 Children)					
Sample Size (weighted)	15,247,342	14,966,092	14,391,199	15,107,079	14,945,709	74,657,420
% with NSLP Benefits > $0	46.2%	45.7%	43.6%	44.3%	44.2%	44.8%
Mean (2012 $)[b]	$340	$373	$379	$393	$413	$379
	Consumer Units within 30th-36th % Range of FCSU Expenditures and Subsidies for Estimation Sample ($ Adjusted to Reflect 2 Adults & 2 Children)[c]					
Sample Size (weighted)	752,033	842,473	808,060	1,031,025	1,053,038	4,486,630
% with NSLP Benefits > $0	44.4%	50.1%	48.6%	42.8%	41.4%	45.1%
Mean (2012 $)[b]	$385	$497	$503	$518	$466	$477
Rental Subsidies						
	Consumer Units with Two Children for Estimation Sample ($ Adjusted to Reflect 2 Adults & 2 Children)					
Sample Size (weighted)	15,247,342	14,966,092	14,391,199	15,107,079	14,945,709	74,657,420
% Owners with Mortgages	59.0%	55.6%	56.9%	54.1%	54.3%	56.0%
% Owners without Mortgages	11.3%	12.8%	11.3%	12.0%	11.7%	11.8%
% Renters	29.7%	31.5%	31.8%	33.9%	34.0%	32.2%
% Reporting PH or Govt Asst.	5.7%	4.7%	5.8%	4.2%	4.4%	4.9%
% with Rent Subsidy > $0	5.0%	4.4%	5.2%	3.8%	3.9%	4.4%
Mean (2012 $)[b]	$8,432	$8,205	$9,321	$9,429	$9,031	$8,866
	Consumer Units within 30th-36th % Range of FCSU Expenditures and Subsidies for Estimation Sample ($ Adjusted to Reflect 2 Adults & 2 Children)[c]					
Sample Size (weighted)	752,033	842,473	808,060	1,031,025	1,053,038	4,486,630
% Owners with Mortgages	44.9%	45.3%	48.0%	49.5%	46.3%	46.9%
% Owners without Mortgages	9.0%	12.1%	10.9%	10.3%	12.0%	10.9%
% Renters	46.1%	42.6%	41.1%	40.2%	41.8%	42.2%
% Reporting PH or Govt Asst.	14.7%	6.3%	9.1%	7.2%	5.6%	8.2%
% with Rent Subsidy > $0	12.1%	5.9%	9.1%	6.5%	5.1%	7.5%
Mean (2012 $)[b]	$8,690	$6,196	$9,062	$7,138	$7,996	$7,980

[a] Bureau of Labor Statistics, U.S. Department of Labor, Consumer Expenditure Interview Survey. Quarterly data assumed to be independent; expenditures are annualized following methods to produce previously presented SPM thresholds. Results are consumer unit weighted. For information on sampling and nonsampling error, see http://www.bls.gov/cex/anthology/csxanth5.pdf.

[b] Restricted to CUs with benefits > $0.

[c] Restricted to CUs within the 30-36th percentile range of expenditures for food, clothing, shelter and utilities and subsidies for rents, school lunches, and WIC.

C. SPM Thresholds with and without Imputed In-Kind Benefits

Table 4 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.

SPM thresholds and standard errors, based on the CE Eligibility-Participation Adjusted Method, are presented in Table 4. 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 that include food stamps and rent subsidies are presented for comparison to those with imputed benefits for NSLP and WIC using the two methods. 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. Figure 2 shows the relative magnitude of the SPM thresholds.

Table 4. 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, Rent Subsidies (without public housing ratio adj.)		Dollars		Percent
Owners with mortgages	$25,784	$26,786	***	$1,002	*	3.9%
Standard error	$368	$339				
Owners without mortgages	$21,400	$21,831		$432		2.0%
Standard error	$233	$412				
Renters	$25,105	$26,277	***	$1,172	*	4.7%
Standard error	$398	$307				

*** An asterisk preceding an estimate indicates change is statistically different from zero at the 99 percent confidence interval. Z-test based on correlated data.

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.

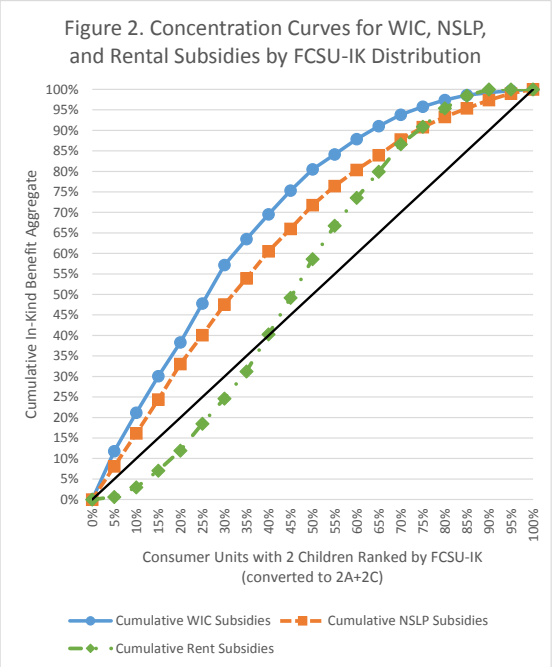
D. Average Annual Expenditure and Imputed Subsidies in SPM Thresholds

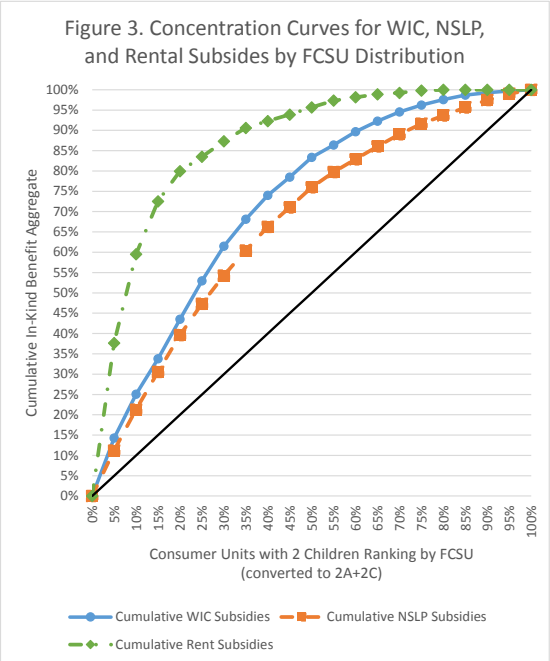
Included in Table 5 are annual mean expenditures for food, clothing, housing (shelter + utilities), and subsidies for SPM thresholds with and without imputed in-kind benefits. Average imputed benefits for consumer units within the 30-36th percentile range are also included; these means include zeroes for consumer units not receiving the benefits. Average reported benefits differ for the two sets of numbers as the FCSU and FCSU-IK distributions differ and thus the 30-36th percentile averages differ.

Table 5. 2012 Annual Means for Components of SPM thressholds with and Without Iimputed In-kind Benefits

	With Only SNAP	With SNAP, WIC, NSLP, Rent Subsidies
Food	$7,565	$7,822
Food: Reported expenditures	$7,565	$7,501
Food: Imputed WIC subsidy	$0	$105
Food: Imputed NSLP subsidy	$0	$215
Clothing	$1,069	$1,041
$S+U_{\text{Owners with mortgages}}$	$12,990	$13,585
$S+U_{\text{Owners without mortgages}}$	$8,605	$8,630
$S+U_{\text{Renters}}$	$12,310	$13,076
S+U: Reported expenditures	$12,310	$11,659
S+U: Imputed rental subsidy	$0	$1,417

To provide insight into how the distributions differ, concentration curves of WIC, NSLP, and rental subsides for consumer units with two children are plotted by ranks of FCSU-IK and FCSU (converted to values for two adjusted and 2 children) in Figures 2 and 3 respectively. The plot of benefits in Figure 2 suggest that WIC and NSLP benefits are concentrated in the lower end of the FCSU-IK distribution of consumer units with two children; in contrast, rental subsidies are concentrated in the upper part of the distribution starting around the 40th percentile. Now if we plot these same benefits across the consumer units with two children FCSU distribution, which only accounting for SNAP, the plot of rental subsidies suggests that these are the concentrated of the benefits among consumer units in the lower end of the FCSU distribution.





E. Production of SPM Poverty Rates

The production of SPM poverty rates begins with adjustments to the two adults and two child SPM thresholds for owners with mortgages, owners without mortgages, and renters. 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, the three-parameter equivalence scale defined in equality (2) is used. This scale has been used in several BLS and Census Bureau studies (see Short 2014 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. The housing shares of the SPM thresholds with and without imputed in-kind benefits in the thresholds are presented in Table 6. The American Community Survey (ACS) is the source of the geographic adjustment factors and are based on 5-year ACS estimates of median gross rents fro two-bedroom apartments with complete kitchenn and plumbing facitities. Separate medians are estimated for each of 264 metropolitan staticals areas (see Short 2014 and Renwick 2011).

Table 6. Housing (shelter + utilities +rental subsidies) Shares by Housing Tenure in 2012 SPM Thresholds		
by Housing Group	With Only SNAP	With SNAP, WIC, NSLP, Rent Subsidies
$S+U_{\text{Owners with mortgages}}$	0.504	0.507
$S+U_{\text{Owners without mortgages}}$	0.402	0.395
$S+U_{\text{Renters}}$	0.490	0.498

Poverty rates are produced using the adjusted housing tenure SPM thresholds and resources that also include in-kind benefits. At the present time, the SPM threshold and resource concept is not defined consistently as LIHEAP benefits are lacking in the thresholds; however, preliminary results suggest that these benefits likely will not change the value of the thresholds significantly. Once the SPM thresholds account for LIHEAP benefits, and there is agreement on imputation methods for NSLP and WIC, the Census Bureau will be able to use SPM thresholds with in-kind benefits in the determination of SPM poverty rates.

Poverty rates are presented in Table 7 for the total population and for two demographic groups, age of people and housing tenure, most liked 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; these include the value of LIHEAP benefits which are not yet accounted for in the SPM thresholds. Also, another difference in the SPM thresholds and resources, upon which the results in Table 7 are based, is that there is an adjustment for the value of public housing in resources that results in public housing being valued as less that non public housing rental units. This adjustment is not made in the thresholds. The impact of making this price adjustment to SPM thresholds is shown in the Appendix Table.

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 to17.1 percent with the higher FCSU-IK thresholds. This represents an increase of almost 3 million individuals classified as poor for 2012. 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.

Table 7. Percentage of People in Poverty Based on SPM Thresholds with CE-EP Imputed WIC, NSLP, and Rental Benefits and SPM Resources with WIC, NSLP, Rental Subsidy, and LIHEAP Benefits: 2012

(Numbers in thousand)

Characteristic	SPM based on FCSU (with SNAP) Thresholds		SPM based on FCSU-IK Thresholds		Difference		
	Below Poverty Level						
	Number	Percent	Number	Percent	Number		Percent
All People	49,730	16.0%	53,301	17.1%	*-3,571	*	-1.1%
Age							
Under 18 years	13,358	18.0%	14,533	19.6%	*-1,174	*	-1.6%
18 to 64 years	29,953	15.5%	31,900	16.5%	*-1,947	*	-1.0%
65 years and older	6,419	14.8%	6,868	15.9%	*-449	*	-1.0%
Tenure							
Owner	20,512	9.9%	21,858	10.6%	*-1,347	*	-0.7%
Owner/mortgage	11,676	8.5%	12,651	9.2%	*-975	*	-0.7%
Owner/no mortgage/rent free	9,694	13.4%	10,089	13.9%	*-395	*	-0.5%
Renter	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 .

VII. Summary and Conclusions

The primary aim of this study was to produce SPM thresholds that are conceptually consistently to SPM resources currently in production by the Census Bureau. This involved three steps: (1) developing methods to impute benefits to consumer units participating in the CE Interview; (2) producing housing-specific SPM thresholds that account for imputed in-kind benefits at the consumer unit level; and (3) producing SPM poverty rates that are based on thresholds and resources that both account for in-kind benefits. In-kind benefits were produced for all but LIHEAP benefits in the SPM thresholds thus the results presented in this paper do not yet represent a consistently defined SPM. However, preliminary results suggests that including LIHEAP benefits will change the thresholds little. We find that SPM thresholds are higher than thresholds that only account for SNAP benefits. Resulting SPM poverty rate are also higher.

Ideally, the U.S. Consumer Expenditure Survey would collect information regarding the participation in and value of in-kind benefits. However, with current funding, the BLS is not able to add questions to the survey.[1] Even with questions regarding participation added, it is not clear whether adjusting participation based on administrative data, and thus, the level of benefits included in the thresholds, is desirable. Further research and discussion are needed regarding this issue.

In conclusion, we leave you with a question to ponder: Which is the best method to use in developing the societal standard for a supplemental poverty measure for the U.S.? The NAS Panel recommended, and the ITWG agreed, that needs would be defined in terms of consumer unit spending of food, clothing, shelter, and utilities (FCSU). But, on the other

hand, the ITWG noted that in-kind benefits accounted for in resources be added to spending for the estimation of the thresholds. Thus, in effect, the ITWG suggested that the underlying basis of the SPM threshold is the market value of FCSU, not just want the consumer unit spends. In-kind benefits could be imputed using the methods presented in this study, the CPS Program Participation Method (regression model) from Garner and Hoyakem (2011, 2011b), or through the use of a predictive mean matching model. Another approach, much simpler than the others noted, is to base the thresholds on the experience of consumer units not participating in any of the in-kind benefit programs for which subsidies are included in resources. This approach is mentioned in the ITWG guidelines: "The threshold is determined based on expenditures among a population that is not poor, but is somewhat below the median." If we define "poor" as consumer units participating in benefit programs, the threshold estimation sample would exclude such consumer units. Thus, the resulting SPM thresholds would reflect the market value of spending for food, clothing, shelter, utilities, and "the little bit more" for the non-poor. Following this approach, the value of in-kind subsidies would not need to be imputed or added; resources would continue to include the value of all in-kind benefits. Following this approach, SPM thresholds would be substantially higher that the currently published SPM thresholds with only SNAP benefits and higher than the ones produced in this study (see the Appendix Chart).

VIII. 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 .)

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IX. Appendix

Appendix Table. Differences in 2009 SPM Thresholds for 2 Adults and 2 Children: with and without Imputed In-kind Benefits and with and without Public Housing Ratio Adjustment

	With SNAP, WIC, NSLP, Rent Subsidies (without PH ratio adj.)		With SNAP, WIC, NSLP, Rent Subsidies (with PH ratio adj.)		With SNAP, WIC, NSLP, Rent Subsidies Based on CPS Regression Model (with PH ratio adj.)[1]	
	in 2009 Dollars	Percent	in 2009 Dollars	Percent	in 2009 Dollars	Percent
Owners with mortgages	$816	3.3%	$655	2.7%	$1,259	5.1%
Owners without mortgages	$296	1.5%	$336	1.7%	$674	3.3%
Renters	$1,002	4.2%	$803	3.4%	$1,359	5.7%

[1] Differences based on 2009 SPM thresholds with imputations based on regression model of WIC and NSLP participations as reported in the CPS (Garner and Hokayem July 2012). In that study, rent subsidies were not modeled but were imputed to be the difference between CE reported rents and HUD Fair Market Rents.