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### Choice in Defining and Estimating Poverty Thresholds: Focus on the U.S. Supplemental Poverty Measure

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# **Choice in Defining and Estimating Poverty Thresholds: Focus on the U.S. Supplemental Poverty Measure<sup>1</sup>**

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<sup>1</sup> This research builds on earlier work presented at the 2019 ECINEQ Conference, 2019 Southern Regional Science Association Conference, 2018 Southern Economics Association Annual Meetings, 2018 Society of Government Economists Conference, and the 2018 Federal Committee on Statistical Methodology (FCSM) Research and Policy Conference. It was developed to promote research and advancements in our understanding of poverty measurement. This paper reports the results of research and analysis undertaken by the U.S. Bureau of Labor Statistics staff. It has undergone more limited review than official publications. Any views expressed on statistical, methodological, technical, or operational issues are those of the authors and not necessarily those of the U.S. Census Bureau or U.S. Bureau of Labor Statistics. Any errors or omissions are the sole responsibility of the author. Thanks are extended to Kathleen Short who provided much guidance in the development of the SPM while she was with the Census Bureau. Thanks are also extended to Juan Munoz for research assistance and to Mark Bowman who produced specialized FCSU CPI-U and C-CPI-U indexes for this project.

## ABSTRACT

The Supplemental Poverty Measure (SPM) was developed in 2010 as a supplement to the official poverty measure for the United States, with statistics produced since 2011. The SPM is considered to be a work in progress with the expectation that there would be improvements to it over time based on the availability of new data and/or methods and as justified by further research. Research to improve the resource and threshold measures has been conducted over the past 10 years. While there has been much agreement on improving the resource measure, debate continues regarding thresholds. The purpose of this study is to continue the discussion surrounding the SPM with results to test alternative estimation assumptions, and to highlight issues and options for other countries faced with similar challenges in poverty measurement. Specifically this paper focuses on choices to consider when defining and estimating poverty thresholds based on household or consumer expenditure survey data. The experience presented in this paper is that from the perspective of representatives from the U.S. federal economic statistical community. Choices outlined and discussed include the following: which goods and services to include in the thresholds and how to value these; if based on a point in a distribution, for example, at a lower point like the 33<sup>rd</sup> percentile versus the median; upon whose experience thresholds are based, for example, households and families most likely to receive government transfers (e.g., two adults with two children) or all households in the population; the treatment of in-kind benefits; how to account for owner-occupied housing; whether and how to adjust for geographic differences in prices across areas; and updating of thresholds over time. Thresholds based on these choices are produced.

## I. INTRODUCTION

Poverty is most often defined in terms one's ability to meet his/her basic or minimum needs for survival or participation in society. Basic needs can be defined in terms of inputs or outputs, or the costs of providing for these at some minimum level. For example, there may be a minimum number and amount of nutrients needed for a certain level of output or energy. To measure poverty, several fundamental questions must be addressed, for example: (1) how to define poverty; (2) how to measure economic resources available; (3) how to adjust for household size; (4) where to set the poverty line; and (5) how to adjust for consumer prices and regional cost of living in thresholds. Monetary poverty thresholds are the focus of this study; and thus, most of the attention will be directed at the last two questions. Various options are available to set and update thresholds (for example, see the following for a discussion of these see: Atkinson 2019, Ravallion 2016, and UNECE 2017). Absolute thresholds could be set based on the concept of reference budgets (defined as, for example, what families need to maintain a certain standard of living) with price adjustments across geographic areas and time; such an approach reflects recent work in Europe (e.g., Cuttillo et al. 2019; and Goedemé et al. 2015). Another approach is to derive thresholds as a percentage of the resource measure used to compare to the thresholds, for example, income or consumption; such an approach results in what is referred to as a relative threshold. And a third option reflects a combination of the two or a hybrid. One example of a combination measure is the societal poverty line proposed and used by the World Bank (2018), based on absolute and relative measures, which builds on the research of others (Jolliffe and Prydz 2017; Atkinson and Bourgiugonon 2001; Chen and Ravallion 2013; Foster 1998; and Ravallion and Chen 2011). An example of a hybrid measure is the Supplemental Poverty Measure (SPM) threshold currently in production for the U.S. that is produced along with the official poverty measure; the SPM is based on spending within a specified range of expenditures for a particular set of goods and services with resources based on income and in-kind benefits. Thresholds can be based on analyses of income, spending and/or consumption data, using

nutritional standards for members of households, using reference budgets based on sets of goods and services and prices, or responses to subjective questions regarding minimum needs.

In the United States (U.S.), we have most often been concerned with the costs, at least officially, of some minimum or basic bundle of goods and services (inputs) that can be used to meet one's needs, and the income or resources available to meet those needs. The definition of poverty assumed is one based on economic deprivation. As noted in *Measuring Poverty* (Citro and Michael 1995. p. 19), "A way of expressing this concept [economic deprivation] is that it pertains to people's lack of economic resources (e.g., money or near-money income) for consumption of economic goods and services (e.g., food, housing, clothing, transportation). Thus, a poverty standard is based on a level of family resources (or, alternatively, of families' actual consumption) deemed necessary to obtain a minimally adequate standard of living, defined appropriately for the United States today." In this study, poverty thresholds are produced for the U.S. following the suggestions of the Interagency Technical Working Group (ITWG) on Developing a Supplemental Poverty Measure (SPM), with the primary source of data being the U.S. Consumer Expenditure Interview Survey. To derive these thresholds, spending patterns are examined for various consumer units or households and alternative updating mechanism are considered for updating.

This work is being conducted as part of a larger research effort to consider major changes to the SPM, originally proposed in 2010 with thresholds and poverty statistics first published in 2011 and annually thereafter. Since this first publication, no major changes have been made to the SPM, but research has been ongoing regarding potential improvements and validation of prior assumptions. Another ITWG, focused on implementation, has set 2021 as a target for making methodological improvements to the measure. Current proposals under consideration include several changes to the methodology for establishing the SPM poverty thresholds including, but not limited to: changing the range of expenditures which serve as the basis for the thresholds, expanding the estimation sample upon which the thresholds are based, imputing in-kind benefits into thresholds, and applying alternative geographic adjustments using Regional Price Parities produced by the Bureau of Economic Analysis and/or an adjustment to

reflect amenities. This paper provides an opportunity for a review of these and other possible changes to the measure. Another goal of this paper is to share the U.S. experience with researchers in other countries who are using or thinking of using household expenditure/consumption survey data to set and/or update their own poverty thresholds.

The remainder of the paper is divided into five sections. First is an overview of the history of the SPM with a focus on thresholds. This is then followed by the choices underlying the production of the thresholds including the needs concept, estimation sample, role of prices, and updating. A description of the data used for the study are next presented, followed by a series of alternative thresholds, from 2010 to 2018, based on select choices. We close with a discussion of factors that influence decision regarding choices in estimating the thresholds. Our current results suggest that SPM thresholds based on food, clothing, shelter, and utilities (FCSU)<sup>2</sup> spending plus the value of in-kind benefits more fully reflect consumption and are more consistently defined with regards to the resources included in the current measure. Also these findings suggest that thresholds based on larger estimation samples are expected to have lower standard errors than thresholds based only on consumer units with two children. Debate continues regarding the role of prices in the estimation of the initial thresholds, whether a different

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<sup>2</sup>The components of FCSU are defined here. 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, shelter expenses are restricted to 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.

treatment of owner-occupied housing would be needed, the approach to update, and the geographic adjustment.

## **II. BACKGROUND<sup>3</sup>**

### *A. Overview*

For over 40 years, the official poverty measure was the only annual measure of poverty produced by the U.S. government, specifically the Census Bureau. However, criticisms of the official poverty measure, which compares pre-tax cash income to the absolute thresholds, grew over time. In 1990, a Congressional appropriation funded an independent scientific study of the concepts, measurement methods, and information necessary for a poverty measure. In 1995, the National Academy of Sciences (NAS) Panel on Poverty and Family Assistance released its report detailing suggested improvements in the measure of poverty in the United States (Citro and Michael, 1995). Recommendations included the production of thresholds based on recent consumer unit spending of food, clothing, shelter, utilities, and a little bit more for personal care and non-work related transportation (FCSU). Thresholds were also to be adjusted by area to account for differences in the cost of living across areas. This measure would not use before-tax income, as the definition of resources, to compare to thresholds for poverty measurement. Instead resources would include income and also the value of in-kind benefits, with reductions in resources due to income and payroll taxes, work-related spending, and medical out-of-pocket spending. Building off of the NAS panel's recommendations, the ITWG on Developing a Supplemental Poverty Measure was formed in the last days of 2009 and then developed a set of recommendations for the production of the SPM over the next few months (ITWG, 2010).

The Supplemental Poverty Measure (SPM) was developed in 2010 as a supplement to the official poverty measure. The first SPM ITWG was charged with operationalizing the NAS panel's findings and

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<sup>3</sup> See Garner and Fox (2019) for a brief history of the SPM.

developing a set of initial starting points to permit the Census Bureau to produce statistics based on the SPM that would be released along with the official measure each year. This work was to be done in cooperation with the Bureau of Labor Statistics (BLS), and with support from other federal government agencies. Recommendations included, among others, the creation of new poverty thresholds and adjustments to resources. Changes to the estimation of the thresholds included an expansion of the estimation sample from two adults with two children to all consumer units with two children, moving from a percentage of median expenditures to a lower point in the FCSU expenditure distribution (around the 33<sup>rd</sup> percentile), and the estimation of three thresholds to account for the different spending needs of owners with mortgages, those without mortgages, and renters. The ITWG considered the SPM to be a work in progress with the expectation that there would be improvements to it over time. The measure would change and adapt with the availability of new data and/or methods and as justified by further research. Since 2011, SPM poverty statistics have been produced and published annually.<sup>4</sup>

#### *B. Current SPM Thresholds*

The current SPM thresholds are produced by the Bureau of Labor Statistics (BLS), Division of Price and Index Number Research (DPINR) as a research series. Thresholds are based on spending for FCSU and a multiplier for other basic goods and services like personal care and non-work related transportation. These are produced for reference SPM units composed of two adults with two children. However, the actual thresholds are based on the spending of an estimation sample composed of all consumer units with exactly two children. Three thresholds are produced each year: one for owners with mortgages, one for owners without mortgages, and one for renters. Separate thresholds by housing tenure status are produced as ITWG members acknowledged that a significant number of low-income consumer units own their homes without mortgages, and therefore have relatively lower shelter expenditures compared to owners

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<sup>4</sup> See Fox (2019) for most recent SPM report.



with mortgages and renters. Not accounting for this difference would result in an overstatement of the poverty status of owners without mortgages.

SPM thresholds are based on five years of quarterly Consumer Expenditure Survey (CE) Interview data. Thresholds are updated each year through the production of a new set of SPM thresholds which again are based on the most recent five years of CE data. The five years, or 20 quarters, of FCSU expenditures are converted to threshold year dollars using the All Items Consumer Price Index for All Urban Consumers (CPI-U): U. S. City Average. FCSU expenditures for the estimation sample composed of consumer units for two children are converted to FCSU expenditures for the reference unit composed of two adults with two children. This conversion is done using a three-parameter equivalence scale. A distinguishing feature of the three-parameter equivalence scale is the adjustment for single parents (Betson 1996); no adjustment for single parents was included in the two-parameter scale proposed by the NAS Panel. The three-parameter scale is shown below.

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

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

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

After the equivalence scale conversion, and the conversion to threshold year dollars, consumer units are ranked from lowest to highest by their equivalized threshold year FCSU expenditures. FCSU expenditures within the 30<sup>th</sup>-36<sup>th</sup> percentile range, approximating the 33<sup>rd</sup> percentile, are then used to derive the SPM thresholds. The 30<sup>th</sup>-36<sup>th</sup> percentile range of the equivalized FCSU expenditure distribution is then multiplied by 1.2 to account for additional basic needs, with adjustments for shelter and utilities expenditures for three housing tenure types: owners with mortgages, owners without mortgages, and renters. See equation (2).

$$SPM_{E_h} = 1.2 * FCSU_E - SU_E + SU_{E_h} \quad (2)$$

where

$h$  = one of three housing tenure groups:  
Owners with mortgages  
Owners without mortgages  
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 30<sup>th</sup> to 36<sup>th</sup> 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 30<sup>th</sup> to 36<sup>th</sup> 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 30<sup>th</sup> to 36<sup>th</sup> percentile range of FCSU expenditures.

These three thresholds, along with housing shares of the thresholds, are sent to the Census Bureau for two additional adjustments. One is to create thresholds based on the number of children and adults in a unit, again using the three-parameter equivalence scale. And the second adjustment is to account for price differences across geographic areas. The geographic adjustments are based on five-year American Community Survey (ACS) estimates of median gross rents for two-bedroom units with complete kitchen and plumbing facilities.<sup>5</sup>

SPM thresholds, distributions, and expenditure shares are presented in Tables 1 and 2 for 2010 through 2018.<sup>6</sup> Table 1 includes the thresholds and standard errors along with percentage distributions of the weighted samples by household tenure. Table 2 includes the expenditure shares of the thresholds for each housing tenure group. Each year the 2-adults with 2-children housing tenure thresholds and housing share (the sum of the shares of shelter and utilities) are sent to the Census Bureau to produce thresholds for

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<sup>5</sup> Separate medians were estimated for each of the metropolitan statistical areas large enough to be identified on the public-use version of the CPS ASEC file, as well as state-level medians for all smaller metropolitan areas and for nonmetropolitan areas. In 2016, 260 MSAs, 47 nonmetropolitan, and 42 smaller metro areas were identified resulting in 349 geographic adjustment factors. For details on the calculation, see Renwick (2011).

<sup>6</sup> Thresholds are referred to as BLS-DPINR Research Experimental Supplemental Poverty Measure (SPM) Thresholds. For further information, see <<https://stats.bls.gov/pir/spmhome.htm>>.

consumer units with differing numbers of adults and children. The geographic price adjustment is only applied to the housing share of the thresholds; this adjustment results in SPM thresholds that reflect differences in the rents (and for utilities) in over 300 geographic areas across the U.S.

< Tables 1 and 2 >

### **III. CHOICES**

#### **A. NEEDS CONCEPT**

A poverty threshold based on “costs” could be measured in terms of the dollar spending necessary to pay for a basic bundle of goods and services, or it could be measured in terms of the dollar value of a consumption bundle. For a spending-based threshold, expenditures would most appropriately be used to derive the thresholds. Compared to an expenditures-based threshold would be cash and near-cash income, with subtractions for income taxes paid and work related expenditures subtracted to reduce a family’s income to meet its basic spending needs. In contrast, a poverty threshold could be based on consumption with the implicit rental income or flow of service values for owned shelter and durables, for example. The appropriate resource measure would include net implicit rental incomes from owned shelter and durables. Although the SPM is based on FCSU, other goods and services could also be included. Most attention has focused on health/medical care.

##### *a. Defined in Terms of Spending*

The underlying “needs” concept, or standard of living, represented by the SPM thresholds is a spending or payments based one. The assumption is that out-of-pocket spending is a good approximation of the value of what it takes to meet one’s basic material needs. As noted earlier, for the SPM, needs are defined in terms of food, clothing, shelter, and utilities (FCSU) with a multiplier to represent of other basic goods and services for example for personal care and not work-related transportation. However, a problem

arises with the thresholds when out-of-pocket spending does not fully account for the value of material needs, such as for those with shelter or meal subsidies. Out-of-pocket spending based thresholds would be too low, in the presence of subsidies, relative to resources that include these subsidies; subsequently, consumer units would be misidentified as not poor. Thus, an alternative needs to be considered.

*b. Defined in Terms of Spending and In-Kind Benefits*

To be consistent with the definition of resources as defined by the initial SPM ITWG, FCSU spending needs to be supplemented with the value of in-kind benefits. Included in SPM resources are benefits such as Supplemental Nutrition and Assistance Program (SNAP), National School Lunch Program (NSLP), Women, Infants, and Children Program (WIC), rent subsidies, and energy assistance<sup>5</sup> (e.g., Short 2015; Renwick 2015; Renwick and Fox 2016). Unlike SPM resources, previously published thresholds, those used by the Census Bureau for poverty statistics, do not account for the values of in-kind benefits for food, rents, and energy, with the exception of Supplemental Nutrition Assistance Program (SNAP).

Including in-kind benefits in thresholds has posed a particular challenge for the production of the SPM since only limited in-kind benefit information is available in the CE. For example, SNAP benefits are automatically included as food expenditures. And for subsidized rental housing, the CE collects information on whether rental housing is subsidized and the rent paid for the unit; however, the market value of the unit is needed to account for the full value of rental housing in the thresholds. No information is collected regarding the NSLP, WIC, or LIHEAP. By only accounting for OOP spending in thresholds, an inconsistency in thresholds and resources results. This inconsistency can result in an overestimate of the economic well-being of people in the U.S. when defined in terms of the SPM, and thus an underestimate of SPM poverty.

One option to address this problem is to impute the value of subsidies to meet FCSU needs and add this to FCSU out-of-pocket spending. Another is to base the thresholds on the spending behavior of consumer units who are more likely not to participate in the programs, such as those around the median of FCSU

expenditures. The primary approach followed thus far, and recommended for implementation, is to impute subsidy values for in-kind transfers and add these to OOP spending. For all but rental subsidies, program participation imputations are produced using a multiple imputation approach for missing data and combining Current Population Survey Annual Social and Economic Supplements (CPS ASEC) and CE data sets. Benefits benefit levels from the U.S. Department of Agriculture (for NSLP and WIC) and U.S. Department of Health and Human Services (for LIHEAP) are assigned to consumer units imputed to be participating in each program; the methods used here are the same as those used by Garner and Gudrais in a recent study (2018). The market value of subsidized housing is used to replace OOP rents; rental subsidies are not needed for the thresholds. To impute market rents, the Garner and Gudrais (2018) model is used; all data for the imputation are from the CE Interview Survey.

The in-kind benefits considered in this study are presented in the text table that follows and are distinguished by how the benefit is “paid”, whether the value is included in CE OOP expenditures, proposed treatment for SPM thresholds, and current accounting in SPM resources.

<b>Benefit</b>	<b>Form of Benefit</b>	<b>Value of Commodity or Service in CE Reported Expenditures?</b>	<b>Commodity or Service Value in Thresholds</b>	<b>In Resources</b>
<b>SNAP</b>	EBT cash-value to CU	yes, as food expenditures= full value	OOP	cash value
<b>NSLP</b>	Direct payment to school	< full value	OOP+imputed benefit	imputed benefit
<b>WIC</b>	Voucher paper or EBT for commodities to CU (& cash value voucher for fruits and veggies to CU)	< full value yes, as food expenditure for WIC fruits and veggies	OOP+imputed benefit	imputed benefit
<b>LIHEAP</b>	Direct payment to vendor (& check to CU to pay for “utilities” included in rent)	< full value Yes, as expenditures for LIHEAP utilities	OOP+imputed benefit	cash value
<b>Rental Assistance</b>	Landlord accepts voucher or CU lives in public housing	< full value	OOP+imputed benefit	imputed benefit

*c. Accounting for Consumption: Owner-occupied Housing and In-kind Benefits*

A consumption-based poverty threshold would refer to what is needed in dollar terms to meet minimum consumption needs in contrast to spending needs. Let's say public policy dictates, through the creation of a poverty line, that there is a basic consumption level of food, clothing, shelter, and utilities that individuals and families living in the U.S. should have for them not to be considered poor. Expenditures for food, clothing, and utilities could be used as proxies of the value of the consumption of these goods and services. Thus spending- and consumption-based thresholds that are based on these three commodities alone would be expected to be the same. However, when shelter is included in the set, the thresholds would be expected to differ, given the current renter-owner housing mix in the U.S. The full costs or value of the consumption would be the market value of the shelter service, not what the family spends for shelter. Let me explain, families living in subsidized rental housing consume more than they spend for the shelter. Homeowners with very little shelter expenditures are likely to consume more shelter than would be reflected in their spending. The value of shelter consumption, not the spending for shelter, would be reflected in a consumption-based threshold.<sup>7</sup> If needs are to be represented by consumption rather than spending, in-kind benefits also would be included along with the value of implicit rent for owner-occupied shelter.

For a consumption based FCSU threshold, in-kind benefits would be included along with the rental equivalence for one's primary residence (the latter replacing the OOP spending for shelter for owners). Rental equivalence is collected using the CE Survey using the following question: "If someone were to rent this [property], how much do you think that it would rent for monthly, unfurnished and without utilities?"

*d. Including Health Care*

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<sup>7</sup> See Garner (2005) and Garner and Gudrais (2012) where a consumption based measure has been used in the production of poverty thresholds using CE data.

In the SPM, select expenditures are subtracted from resources as being not available to meet one's FCSU spending or consumption needs, these include not only income taxes but also expenditures for health/medical care. This is the approach recommended in the NAS Panel's report (Citro and Michael 1995) and further followed by the initial SPM ITWG. Yet, debates continue regarding whether health care should be included in the thresholds or subtracted from resources. See Garner and Fox (2019) for a discussion of the debates and references. Due to demand from the user community, thresholds that include OOP spending for health care have been produced following the NAS approach with thresholds estimated as a percentile of median FCSU plus medical care (M) expenditures and are referred to as FCSUM NAS thresholds. And research was conducted following the SPM approach but with the inclusion of medical expenditures in the thresholds. Garner, Short, and Gudrais (2015) produced SPM thresholds that included MOOP; but concluded that the underlying SPM methodology, of basing the thresholds around the 33<sup>rd</sup> percentile of FCSUM expenditures, did not adequately account for medical care needs of consumers at the lower end of the spending distribution as consumers in this range of expenditures were more likely to have no medical insurance or public insurance. In this study, we again examine the impact of including health care expenditures in SPM thresholds.<sup>8</sup>

## **B. WHOSE NEEDS**

### *a. The Estimation Sample*

The NAS Panel recommended that poverty thresholds be set using a reference group of consumer units with two adults and two children and adjusted for other consumer unit types using equivalence scales. The estimation sample upon whose expenditures the thresholds were based was the same as the reference unit. Two criteria that the NAS panel emphasized when selecting this reference group were that this family type would fall near the center of the family size distribution rather than at one of the extremes;

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<sup>8</sup> Others who have considered a health-inclusion version of the SPM are researchers at Baruch College, CUNY (Remler, Korenman, Hyson, 2017). They based their measure on health insurance under the Affordable Care Act and include the need for health insurance in the thresholds and counts health insurance benefits as resources available to meet that need.

and that a relatively large proportion of the population falls into this family type. The Panel noted that by staying near the center of the family size distribution the impact of the equivalence scales would be reduced. The larger proportion of the population covered by the reference unit, the more representative the spending needs would be of the total population. When the NAS Panel was preparing its report, the two-adult/two-child unit was the third most common household type, comprising 13 percent of households in 1992. However, in terms of the number of individuals, these households were the most common household type, with 20 percent of all people living in a two-adult/two-child household.<sup>9</sup>

The ITWG provided a distinction regarding the estimation sample and the reference unit. Although the NAS Panel recommended a broader definition of family, their prototype was the traditional family as defined by birth, marriage, or adoption. With the ITWG recommendations, a broader consumer unit or SPM unit is used. For resources, a new unit of analysis was defined to include all related individuals who live at the same address, any co-resident unrelated children who are cared for by the family (e.g., foster children), and any co-habitors and their children. In the CE context, SPM units are the same as consumer units<sup>10</sup>. The estimation sample, as opposed to the reference unit, includes consumer units with exactly two children. Moving to a consumer unit concept reflects the fact that the composition of housing units or “families” continues to change in the U.S. and is different from what it was in the early 1990s. Expanding the estimation sample to include any number of adults reflected the situation in 2010: the largest percentage of consumer units with children were those with two children. The reference unit would remain the one with two adults and two children, but again, the unit being a consumer unit, not a family.

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<sup>9</sup> See Citro and Michael (1995), p. 101.

<sup>10</sup> A consumer unit consists of any of the following: 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. 3) Two or more persons living together who use their incomes to make joint expenditure decisions. Financial independence is determined by spending behavior with regard to the three major expense categories: housing, food, and other living expenses. To be considered financially independent, the respondent must provide at least two of the three major expenditure categories, either entirely or in part (<https://stats.bls.gov/cex/csxfaq.htm>).



While the NAS panel based their choice of a reference family based on the modal living arrangements of individuals in 1992, household compositions have changed over time. To examine movements in household composition since that time, Fox and Garner (2018) examined data from the CPS and the CE Interview data from the 20 quarters that serve as the starting point to produce the 2016 SPM thresholds. Based on CPS population weighted data, in 2016, only 12 percent of people lived in a two-adult/two-child household, compared with 18 percent in a two-child household and 50 percent in a household with one or more children.<sup>11</sup> An examination of the CE data suggests to use that the size of the reference family group is a cause of concern as the thresholds are based on 13.4 percent (the 30<sup>th</sup>-36<sup>th</sup> percentiles) of consumer units with exactly two children in the CE. The smaller the samples upon which the thresholds are based, the greater the expected standard errors and precision. Expanding the reference group to consumer units with one or more children or to all consumer units regardless of the presence of children would substantially improve the sample size and reduce the magnitude of the threshold standard errors.

*b. Percentiles of FCSU Spending*

The NAS Panel also recommended that the new poverty threshold should be based on a constant percentage of median annual FCSU expenditures for two adults with two children plus a small multiplier to account for other needs. They noted that the percentage selected is a matter of judgment. However, based on an examination of FCSU expenditures for the reference unit in 1992, the NAS Panel recommended that the percentage be somewhere between 78 and 83 percent of the median.<sup>12</sup> These percentages of the median corresponded to the 30<sup>th</sup> to the 35<sup>th</sup> percentile ranges of FCSU expenditures for the reference unit using 1992 CE data. All NAS thresholds produced by Garner, alone or with Short, have been based on both percentages of the median.<sup>13</sup>

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<sup>11</sup> Author's calculations using U.S. Census Bureau, Current Population Survey, 2017 Annual Social and Economic Supplement.

<sup>12</sup> Citro and Michael (1995), p. 149.

<sup>13</sup> Short and Garner (2002)

Why did the NAS Panel recommend that a new poverty threshold be based on a percentage of the median? Based on our reading of the NAS Panel’s report, the Panel reasoned that when the thresholds are based on a percentage of median income or expenditures, changes that affect the distribution of income or expenditures below the median can increase or decrease the poverty rate (Citro and Michael, 1995:46).

In contrast to the Panel, the ITWG recommended that SPM thresholds be based on FCSU expenditures around the 33<sup>rd</sup> percentile rather than the median, and that the experience of consumer units with two children serve as the basis of the thresholds. The ITWG justified their choice as a point in the distribution below the median, but above those in “extreme need” (ITWG, 2010). The 33<sup>rd</sup> percentile was chosen so that thresholds would be set at a level that two-thirds of families are able to meet or exceed. However, there is a question as to the choice of around the 33<sup>rd</sup> percentiles of the FCSU expenditures distribution as opposed to some percentage of the median, as had been recommended and used by the NAS Panel previously (Citro and Michael 1995).

Moving to the median has some methodological advantages. First, fewer consumer units at the median receive in-kind benefits, so moving to the median would reduce the need to impute some of these noncash benefits, as well as the impact of these imputations on the thresholds. Thresholds that are based on FCSU expenditures around the 33<sup>rd</sup> percentile range result in a SPM measure that is more inconsistent with the resource measure than the median without additional imputations. As noted earlier, resources include the value of in-kind benefits that can be used to “purchase” or meet the needs as defined by the SPM thresholds. However, current SPM thresholds do not fully account for the value of these needs, for example those of renters with subsidies, and thus the value of these benefits need to be including in the thresholds.<sup>14</sup> Second, if one were to add health care to the bundle of goods and services represented by the SPM thresholds, the median would more adequately account for health care spending needs than the range of expenditures around the 33<sup>rd</sup> percentile. Based on earlier research, Garner and Short found that

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<sup>14</sup> See the following paper for a discussion of these issues: <[https://stats.bls.gov/pir/spm/spm\\_imputed\\_inkind\\_benefits.pdf](https://stats.bls.gov/pir/spm/spm_imputed_inkind_benefits.pdf)>.

consumer units with FCSU plus health/medical care (FCSUM) expenditures around the median have private health insurance while those the lower end of the FCSUM spending distribution either do not have health insurance or have public insurance for which they do not pay.<sup>15</sup>

The ITWG recommended that the sample upon whose expenditures the SPM thresholds would be based would be consumer units with two children. In contrast, the NAS Panel derived thresholds based on FCSU expenditures of families with two adults and two children. The change was made to account for the change in consumer unit or household composition since the Panel's initial report and to increase the estimation sample. Increasing the sample size should result in a decrease in the margin of error in the thresholds. With bigger sample sizes, the sample mean becomes a more accurate estimate of the parametric mean, so the standard error of the mean becomes smaller. However, the standard error will also be affected by the differences in the characteristics of estimation samples. In this study, thresholds are derived based on the FCSU expenditures of all consumer units and on those of consumer units with any number of children.

In this study, we consider the impact on the thresholds of moving from the 33<sup>rd</sup> percentile (30<sup>th</sup>-36<sup>th</sup>) of the FCSU expenditures distribution to percentages of the median for 2010 through 2018. The primary justification for this move is that expenditures at the median are more representative of the general population than they are around the 33<sup>rd</sup> percentile. In addition, expenditures in the lower end of the FCSU distribution must be augmented to account for the value of in-kind benefits for food, shelter, and utilities in order to produce SPM thresholds that are consistently defined with resources that include the value of such benefits. To show how the estimation samples differ across the distribution and by consumer unit composition, we turn to the work of Fox and Garner (2018), examining the characteristics of the samples who represent around the 33<sup>rd</sup> percentile and around the median (47<sup>th</sup>-53<sup>rd</sup>) using the data

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<sup>15</sup> Garner and Short, 2014, paper prepared for the ASSA meetings; presentation available at: [https://stats.bls.gov/pir/spm/spm\\_pp\\_oop14.pdf](https://stats.bls.gov/pir/spm/spm_pp_oop14.pdf). Other approaches to account for health care needs in poverty thresholds have been proposed, for example, by Korenman and Remler.

underlying the 2016 SPM thresholds. Table 3 shows the difference in the share of consumer units receiving noncash benefits at the 33<sup>rd</sup> versus the 50<sup>th</sup> percentile of the FCSU distribution. In the estimation sample for 2016, 4.4 percent of units reported receiving public housing or government assistance with rent. At the median, this share drops to 2.8 percent. Thus, the importance of these imputations would decline with a shift to the median. Analysis conducted for the current study reveals that OOP spending is more prevalent for consumers around the median as opposed to around the 33<sup>rd</sup> percentile, and when the threshold estimation sample is expanded beyond consumer units with two children. Also noted in the table is that a greater percentage of consumer units around the median have private insurance compared to those in the lower end of the spending distribution (74 percent vs. 65 percent with the current estimation sample); thus, if in the future health care needs were to be accounted for in the SPM thresholds, spending on private health insurance by consumer units would be a better measure of these needs in contrast to the spending by consumer units who have no health insurance or public insurance for which they do not pay.

<Table 3 here>

### **C. THE ROLE OF PRICES**

In the current production of the SPM thresholds, prices play two roles: one, to update five-years of consumer spending to threshold year dollars, and two, to adjust “national” thresholds so that they reflect geographically varying prices. The first adjustment uses the Consumer Price Index for All Urban Consumers-U.S. City Average (CPI-U)<sup>16</sup> applied to the sum of expenditures for FCSU at the consumer unit level for consumer units with two children; the results is that the five year of CE data are now in threshold year dollars. As noted earlier, these expenditures are further adjusted, through the use of an equivalence scale, to reflect the spending of consumer units composed of two adults with two children. Thresholds are produced for three housing tenure groups: owners with mortgages, owners without mortgages, and renters. These “national” reference unit thresholds are next adjusted to account for the

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<sup>16</sup> See: <https://stats.bls.gov/cpi/>

differences in composition (adults and children). An additional adjustment is applied to only the housing (shelter plus utilities) portion of the thresholds to reflect differences in prices across areas. This interarea price adjustment, a median rent index, is based on American Community Survey data (see Fox 2019). This results in the production of price adjusted thresholds for 364 areas across the U.S.

*a. Before Estimation of Thresholds*

The current methodology to produce the thresholds ignores geographic differences in prices across areas in the *initial production* of the two-adult-two child SPM thresholds. Thus, differences in prices across areas are implicit in the BLS produced thresholds. This was pointed out by Bishop et al. (2017). Not accounted for in the SPM thresholds are differences in the types of housing available across areas, housing prices across areas, or housing tenure before the thresholds are estimated; thus, spatial distributions in shelter and utility prices are ignored. Garner and Munoz (2018) explored this third role of prices by producing normalized prices for shelter and utilities for renters, owners with mortgages, and owners without mortgages using five years of CE Interview data from 2010 through 2014. They applied the quality adjusted normalized prices before estimating 2014 SPM thresholds. Normalized prices were based on a regression of OOP shelter and utilities expenditures on housing unit characteristics and dummy variables representing 42 geographic areas representing the entire U.S. The focus in that study was on adjusting the prices for non-tradables across areas and thus only shelter and shelter utilities were adjusted; expenditures for telephone services were not considered part of shelter utilities and thereby not adjusted geographically. The maximum and minimum quality adjusted normalized prices are presented in Table 4. At the consumer unit level, shelter and utilities expenditures were converted to “national” prices and then added to reported food and clothing expenditures. See equation (3) below.

$$FCSU'_i = F_i + C_i + Tele_i + \frac{S_i + U_i}{QANP_{a,j}} \quad (3)$$

Table 5 includes an example using quality adjusted normalized prices for two geographic areas, the DC area and the rural south, with annual expenditures unadjusted and adjusted. The result is that FCSU expenditures for consumer units living in the DC metro would be lowered while those for the rural south would be higher. Using the estimation sample, these “national” expenditures next would be ranked to derive the SPM thresholds based on FCSU expenditures around the 33<sup>rd</sup> percentile. The resulting thresholds would hold constant differences in shelter and utilities across geographic area. The housing (shelter plus utilities) portion of the housing tenure thresholds would change with this price adjustment, as well as the move of telephone services out of household utilities. Remember, it is the housing share only that is adjusted to produce sub-national housing tenure thresholds. Thresholds and shares from the Garner and Munoz (2018) study are reproduced in the results section.

*b. After Estimation of Thresholds*

The American Community Survey (ACS) is used to adjust the FCSU thresholds for differences in prices across geographic areas. The geographic adjustments are based on five-year ACS estimates of median gross rents for two-bedroom units with complete kitchen and plumbing facilities. Separate medians are estimated for each of 260 metropolitan statistical areas large enough to be identified on the public-use version of the CPS ASEC file. For each state, a median is estimated for each nonmetropolitan area (47) and for a combination of all smaller metropolitan areas within a state (42). This results in 349 adjustment factors. Only the housing shares ( $\alpha_h$ ) of the SPM thresholds for each housing tenure group ( $h$ ) are adjusted to account for differences in prices across geographic ( $g$ ) areas. See equation (4) below with an example for 2018.

$$SPM_{h,g,2018} = [(\alpha_h * MRI_g) + (1 - \alpha_h)] * SPM_{h,2018} \quad (4)$$

For details regarding the current methodology, see Renwick (2011).<sup>17</sup> Each year the Census Bureau publishes on its SPM website thresholds that account for geographic differences in prices across areas.<sup>18</sup> Research continues on how best to account for geographic differences in prices across areas, for example, see Renwick (2011) and Renwick et al. (2014a, 2014b, 2017).<sup>19</sup> Research from this research is reproduced in the results section.

#### **D. UPDATING THRESHOLDS**

Unlike the official measure which accounts primarily for changes in prices holding utility or standard of living constant, SPM thresholds are designed to be updated each year based on expenditures among consumer units at the 33<sup>rd</sup> percentile of spending on necessities. As noted by Blank (2011), “This is well-below the median, so increases in spending or income that occur only among median- or upper-income consumer units will not affect the poverty thresholds.” Thresholds are re-estimated annually using the most recent 5 years of CE data so year-to-year movement in expenditures will not lead to major changes in annual thresholds. This updating approach is designed such that such thresholds would gradually account for changes in living standards over time, unlike a strictly absolute measure set in the distant past and unlike a strictly relative measure that would account for these changes yearly. But a criticism of SPM thresholds is that it is not clear if poverty rates change because the thresholds change or because resources change,<sup>20</sup> particularly in times of economic recession, a criticism of strictly relative measures as well<sup>21</sup>. Thresholds based on this updating are produced along with others than are anchored and then updated

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<sup>17</sup> Renwick, Figueroa, and Aten (2017) examined an alternative method of calculation for the geographic indexes using Regional Price Parities from the Bureau of Economic Analysis.

<sup>18</sup> <https://www.census.gov/data/tables/2018/demo/supplemental-poverty-measure/poverty-thresholds.html>

<sup>19</sup> As noted by Renwick et al. (2014b), a research forum sponsored by the University of Kentucky Center for Poverty Research (UKCPR), in conjunction with the Brookings Institution and the U.S. Census Bureau made suggestions on the geographic adjustments to the poverty threshold. These included the use of quality-adjusted price levels, differentiation by metropolitan areas within states and the inclusion of other components of the consumption bundle.

<sup>20</sup> See Meyer and Sullivan (2012).

<sup>21</sup> See Garner and Gudrais (2012) for research on the SPM using spending and consumption expenditures, SPM thresholds, and inequality during the recession of the late 2000’s; also see Jenkins (2013, 2018) for research on the impact of the same recession on relative poverty thresholds and poverty rates in Europe and the U.S.

using alternative approaches. These alternatives include versions of the consumer price indexes, equivalized median consumption expenditures, and equivalized median after tax income.

#### **IV. DATA**

The primary data used to produce the SPM thresholds are from the U.S. Consumer Expenditure Survey (CE). The CE is a nationwide household survey conducted by the U.S. Bureau of Labor Statistics (BLS) to find out how people living in the U.S. spend their money. It is the only U.S. government survey that provides information on the complete range of consumers' expenditures as well as their incomes and demographic characteristics. The CE consists of two separate surveys, the Interview Survey and the Diary Survey. The Quarterly Interview Survey is designed to collect data on large and recurring expenditures that consumers can be expected to recall for a period of three months or longer, such as rent and utilities, and the Diary Survey is designed to collect data on small, frequently purchased items, including most food and clothing. In the Interview, global food questions are asked to allow for an accounting of all FCSU expenditures. Each consumer unit sampled for the Interview is designed to be visited and interviewed four consecutive quarters, with the expenditure reference period to be the previous three months. The reference period for income is the previous 12 months.<sup>22</sup> For this study, only the data from the Interview are used to estimate the SPM thresholds; quarterly reports of expenditures are considered to be independent.

The current methods used to produce the SPM thresholds are followed to produce "base" thresholds. Base thresholds are produced with the estimation sample composed of consumer units with exactly two children and the point in the FCSU expenditure distribution set around the 33<sup>rd</sup> percentile. The 3-parameter equivalence scale is used to convert CE expenditures to those for 2 adults with 2 children. With different choices, alternative thresholds are produced for comparison. For each set of thresholds, five years (20 quarters) of CE data are used. Since data collected in the first quarter of each year refer to data collected in the previous calendar year and up to two months in the current calendar year, we start with the second quarter's worth of data. For example, data collected in 2014 quarter two through 2019

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<sup>22</sup> For further information see: [https://stats.bls.gov/cex/ce\\_methodology.htm](https://stats.bls.gov/cex/ce_methodology.htm)



quarter one are used to produce 2018 SPM thresholds. For most of the results, thresholds are presented for 2010 through 2018 to examine not only levels but trends.

## **V. ALTERNATIVE THRESHOLDS: RESULTS**

This paper explores the impact of alternative threshold options that reflect concept, whose needs, the role of prices, and updating. As noted earlier, the SPM thresholds produced for this study are based on the spending and consumption patterns of particular estimation samples; they are not based on reference budgets or nutrition needs, nor are they strictly absolute or relative.

In this section we first considered the addition of in-kind benefits impact the thresholds followed by the impact on thresholds using out-of-pocket (OOP) shelter expenditures for owners replaced by rental equivalence. Second considered are alternatives related to whose needs the thresholds are based and include redefining the estimation sample from consumer units with 2 children to all consumer units. Also presented are thresholds based on OOP spending around the 33<sup>rd</sup> percentile of FCSU versus a percentage of the median. Included along with expanding the estimation sample and moving to the median are thresholds that account for health care. As will be shown, the impact of adding health expenditures to FCSU is most evident when moving to a percentage of the median. The role of prices in the production of the thresholds is addressed next. The final results section focuses and updating the thresholds. For most alternatives, thresholds are produced for 2010 through 2018.

### **A. THRESHOLD CONCEPT THRESHOLDS**

The SPM thresholds for consumers units with two adults and two children, following the current methods, are presented in Chart 1, along with thresholds based on alternative threshold concepts. Thresholds, not accounting for housing tenure, are presented to focus on the impact of adding in-kind benefits to FCSU, and replacing OOP owner shelter expenditures with rental equivalence. Distinctions by housing tenure are presented in Tables 2 and 3. For 2010 through 2018, thresholds based on rental equivalence are produced.

As seen in Chart 1, replacing rental equivalence for OOP shelter spending for owners shifts the FCSU distribution to the right; this shift results in thresholds that are about \$2,000 higher than those based on OOP spending alone.

Thresholds that account for in-kind transfers are limited to 2014 through 2017 due to data limitations.

The first year for which we have in-kind administrative data at the State level for WIC benefits is 2010, the first year needed to produce the 2014 thresholds. Thresholds that account for in-kind benefits end at 2017 as the data needed to imputation participation in the LIHEAP, NSLP, and WIC are based public use CPS ASEC data for each of the years underlying the thresholds; the data for 2018 are not yet available.

In the future, to get around this limitation, program participation for as reported in the CPS ASEC will be lagged for the imputation. For example, to impute WIC participation in the CE in 2018, CPS ASEC WIC participation from 2017 will be assumed. Adding imputed in-kind benefits to OOP spending results in thresholds that are on average \$1,134 higher over the 2014-2017 period. Accounting for both in-kind benefits and rental equivalence results in consumption expenditure thresholds that are about \$3,317 higher than accounting for only in-kind benefits or rental equivalence alone. Over the 2014 to 2017 time period, OOP spending based thresholds increased 5.7% compared to consumption expenditure based thresholds that increased 6.6%.

<Chart 1 here>

To examine the impact on housing tenure based thresholds, in-kind benefits and rental equivalence results are show separately in Charts 2 and 3. Chart 2 includes SPM thresholds for consumer units with 2 adults and 2 children for each of the housing tenure groups using both OOP spending and OOP spending plus in-kind benefits. With consumption based thresholds, all consumer units are treated like renters and thus separate housing tenure thresholds are not needed. When looking at the thresholds presented in the chart, it is important to remember that when the value of FCSU at the consumer unit level changes, the entire distribution shifts; and thus, the 33<sup>rd</sup> percentile (30-36<sup>th</sup> percentile range) changes for renters, owners with

mortgages, and owners without mortgages. From 2014 through 2017, thresholds for owners with mortgages and renters, regardless of the expenditure concept, are most similar with those accounting for in-kind benefits being higher. Chart 3 includes 2010-2018 thresholds based on OOP spending and rental equivalence by housing tenure versus a single series of consumption expenditure thresholds (based on both rental equivalence and in-kind benefits). Owners without mortgages are most impacted by the replacement of rental equivalence for OOP shelter spending, as expected. With the shift in the FCSU distribution, based on rental equivalence, owners without mortgages and renter thresholds are most similar. The single set of consumption based thresholds track those for owners with mortgages based on rental equivalence.

<Charts 1, 2 and 3 here>

## **B. WHOSE NEEDS ARE RELECTED IN THE THRSHOLDS**

The impact of redefining the estimation sample and point in the spending distribution are addressed in this section as well as how including health expenditures could change the resulting thresholds. Chart 4 includes thresholds without housing tenure distinctions. By expanding the estimation sample from consumer units with exactly two children to all consumer units has little impact of FCSU thresholds based on OOP spending; yet, the advantage of expanding the same results is a reduction in threshold standard errors. Adding OOP spending on health care results in higher SPM thresholds and there is a difference when thresholds are based on the 33<sup>rd</sup> percentile range versus the median. For thresholds based on the spending patterns of consumer units with two children, FCSUM thresholds are higher than FCSU thresholds by \$2,000 in 2010 and \$3,300 by 2018. Expanding the sample to all consumer units, leads to FCSUM thresholds higher by \$3700 in 2010 to \$5,600 in 2018. In order to explore what underlies these differences, we examined the data from 2017 threshold samples. While 57 percent of the consumer units with two children around the 33<sup>rd</sup> percentile report having health insurance, of these, approximately 67 percent report health insurance spending. This is in contrast to an expanded sample based on all

consumer units around the median; for these, 71 percent report having health insurance with 74 percent having health insurance expenditures. These results suggest that if one were to add health care to the bundle of goods and services upon which the SPM thresholds are based, expenditures at the median would be more reflective of spending needs as opposed to the range around the 33<sup>rd</sup> percentile.

<Chart 4 here>

To examine the impact of expanding the estimation sample from consumer units with two children to all consumer units, and moving to a percentage of the median as opposed to the 33<sup>rd</sup> percentile, see Charts 5 through 8. Housing tenure thresholds are produced based on the distribution of FCSU and the averages of expenditures of FCSU and shelter and utilities within the range around the 33<sup>rd</sup> percentile; see equation (2).

Chart 5 includes thresholds based on different estimation samples and percentiles in the FCSU distribution. The percentage of the median expenditures selected for the median based thresholds are set at the ratio of FCSU expenditures at the 33<sup>rd</sup> percentile to those at the 50<sup>th</sup> percentile. For thresholds based on consumer units with two children, this percentage for 2010 is 80.7 while for all consumer units, it is 78.5. The only reason that the thresholds for the separate estimation samples differ is because the percent of the median in 2010 was applied to all years; in reality, these percentages change year to year.

<Chart 5 here>

As shown the Charts 6 through 9, over time, moving to the larger estimation sample (i.e., all consumer units) results in thresholds that have the same trends. What is most striking about the results in Charts 5 and 6 is that the thresholds for owners without mortgages are higher with the larger sample. As seen in Charts 8 and 9, thresholds based on median FCSU expenditures are smoother.

<Charts 6-9 here>

## C. THE ROLE OF PRICES AND THRESHOLDS

### a. *Before Estimation of Thresholds*

Thus far, only thresholds that account for the spatial price correction before the estimation of the thresholds have been produced for 2014. Both the thresholds and housing shares of the thresholds are impacted by the normalized price adjustment. Chart 10 includes thresholds for the three housing tenure groups that reflect the currently methodology, moving telephone services from household utilities, and adjusted by quality adjusted normalized prices. The latter thresholds represent “national” prices. Thresholds for owners are higher than without the adjustment while those for renters change little. Table 6 includes the housing shares with and without the price adjustment and change in the treatment of telephone services. Looking at the second column of the table, it is clear that the housing shares of the FCSU thresholds are smaller when telephone services are not included in the share to be adjusted to produce sub-national thresholds. However, the housing shares for owners with mortgages decrease by an additional 2 percentage points with pre-estimation price adjustment. While under the current methodology, housing accounts for about 50 of the FCSU thresholds for owners with mortgages and renters and about 40 percent for owners without mortgages, with the two pre-estimation adjustments, the shares drop to 44-45 percent for the first two groups and drop to 34 percent for owners without mortgages.

<Chart 10 and Table 5 here>

Garner and Munoz (2018) reported that not including expenditures in the housing expenditures that are adjusted to produce subnational thresholds alone results in poverty rates of 15.8 percent versus 15.3 percent when they are including in housing and adjusted for prices. While the price normalization had no impact on overall poverty small increases in poverty rates resulted for consumer units living outside metropolitan areas, those living in the South and Midwest, and renters.

b. *After the Estimation of Thresholds*

During a recent Brookings workshop, Renwick (2019) presented examples of how the current set of median rent indexes results in different housing tenure thresholds across areas and alternative to the current approach. These are reproduced in Table 7. Renter thresholds for consumer units with 2 adults and 2 children are presented for Washington, DC the Mississippi Non-metro Areas for 2017. For comparison, the official poverty thresholds, which are not geographically adjusted, are presented. These are followed by SPM renter thresholds without the adjustment; the thresholds for both geographic areas are \$27,005. With the median rent index (MRI) adjustment applied only to the housing share of the thresholds, Washington, DC thresholds rise to \$35,512 and those for the Mississippi areas drop to \$24,034. Using the BEA's Regional Price Parities (RPP), Washington, DC thresholds are not as high (\$32,136) as with the MRI but those for Mississippi drop even more (\$22,414). Applying a specially produced RPP based only on food, apparel and rents, the renter thresholds for the two geographic areas are even more different; the Washington, DC threshold is now \$36,722 and the Mississippi threshold is \$18,904. Debates regarding the appropriate geographic price index continue. For example, a question has arisen regarding whether high costs areas are also areas with greater amenities. If this is the case, then perhaps the geographic price adjustment should result in thresholds that are lower. Renwick (2018) has conducted research on this topic and continues to explore other options for adjustment, for example, using an index based on differences in wages across geographic areas.

**D. ALTERNATIVES FOR UPDATING THE THRESHOLDS**

The Supplemental Poverty Measure (SPM) is neither a strictly absolute nor a strictly relative measure. Updating of the SPM thresholds is done implicitly through the reproduction of the thresholds each year based on a five-year moving average of FCSU expenditures for the estimation sample. This updating approach was recommended by a NAS Panel, and reflects the Panel's position that such thresholds would gradually account for changes in living standards over time, unlike a strictly absolute measure set in the

distant past and unlike a strictly relative measure that would account for these changes yearly. An alternative to the current mechanism is to anchor the SPM thresholds and update each year based on annual changes in prices, changes in consumption expenditures, or changes in income. By anchoring the thresholds and then adjusting one of these would allow one to consider more clearly what is driving the change in thresholds. With the current approach, changes in thresholds due to changes in income as opposed to changes in prices or changes in tastes and preferences cannot be distinguished. However, these updating options are not without criticism. For example, updating only for prices, as with a strictly absolute poverty measure, raises two common issues of concern. First, critics commonly cite consumer price indexes (CPI), which are used by most countries, as not accurately capturing the changes in prices paid by the poor, nor what is purchased by the poor (Atkinson 2019, UNECE 2017). It is also the case that CPIs may not accurately reflect economic changes resulting from new and disappearing goods as well as substitutions.<sup>23</sup> Therefore, considerations in determining which index is most appropriate to adjust poverty thresholds include identification of the population upon which the index is based, whether the measure reflects the prices faced by the poor, and consistency with the definition of the poverty threshold. Second, strictly absolute poverty measures are frequently critiqued for failing to account for changes in living standards. A possible solution to this problem is to update the poverty thresholds by reproducing them at regular intervals, as with a strictly relative poverty measure. However, there are other concerns when reproducing the thresholds. Although a strictly relative poverty measure will naturally update over time as the income (or consumption) distribution changes, the effects of policy on poverty are frequently obfuscated because the income distribution is influenced by a variety of factors. As a result, shocks to the income or consumption distribution can result in counterintuitive outcomes such as the poverty measure falling in response to an economic downturn or recession.<sup>24</sup>

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<sup>23</sup> The BLS produces the Chained CPI (C-CPI-U), which accounts for consumer substitution across product categories by using more current weights.

<sup>24</sup> The NBER states that “A recession is a significant decline in economic activity spread across the economy, lasting more than a few months, normally visible in real GDP, real income, employment, industrial production, and wholesale-retail sales. A recession begins just after the economy reaches a peak of activity and ends as the economy reaches its trough. Between trough and peak, the economy is in an expansion. Expansion is the normal state of the economy; most recessions are brief and they have

Charts 11 and 12 include SPM thresholds for 2010 to 2018 updated by different updating mechanisms with SPM thresholds anchored to 2010, along with thresholds updated each year using the most recent 5 years of CE data on FCSU expenditures. The thresholds presented do not account for differences by housing tenure. Chart 11 includes alternatively updated thresholds use different price indexes at the U.S. City level: the All Items CPI-U, All Items Chained CPI-U, FCSU CPI-U, and FCSU Chained CPI-U. These later two indexes were produced specifically for this project by staff in the BLS Consumer Price Index Division. Chart 12 includes SPM thresholds adjusted by OOP spending on consumption goods and services (does not include expenditures for life insurance, allocations to retirement plans, Social Security or other required payments, etc.), after tax median income, and changes in FCSU expenditures at the median and 33<sup>rd</sup> percentile. For comparison, thresholds adjusted using the FCSU spending by consumer units with two children around the 33<sup>rd</sup> percentile are shown. All anchored thresholds are higher than those re-estimated each year using 5 years of CE data. As shown in Chart 12, SPM thresholds updated each year with more recent CE data increase but more slowly than thresholds adjusted by consumption expenditures and income. Such a result meets the NAS Panel’s and SPM ITWG’s aim that the SPM thresholds would account for changing in living standards over time in a more conservative way than would thresholds adjusted based on annual changes in consumption expenditures or after tax income.

<Charts 11 and 12 here>

As the 2010 through 2013 thresholds are based on expenditures from a period of recession, thresholds anchored to 2014 are presented in Charts 13 and 14. Higher thresholds result when 2014 anchored thresholds are adjusted each year by changes in price indexes that only account for a bundle of FCSU goods and services. Here we need to note that all the price indexes are based on rental equivalence versus OOP spending for home owners. When anchored to 2014, the re-estimated SPM thresholds rise more

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been rare in recent decades” (NBER, 2008). The most recent recession began in December 2007 and ended in June 2009 (NBER 2010),



quickly than 2014 thresholds adjusted each year by the change in equivalized after tax median income but less than 2014 thresholds adjusted by equivalized OOP consumption expenditures (see Chart 14).

<Charts 13 and 14 here>

## **VI. DISCUSSION and FUTURE DIRECTIONS FOR SPM**

As noted in the ITWG recommendations, the SPM should be seen as a research measure, improving due to changes in data, methodology and/or research. A priority should be placed on “consistency between threshold and resource definitions, data availability, simplicity in estimation, stability of the measure over time, and ease in explaining the methodology (ITWG, 2010).” In this study we have focused on varying concepts underlying the thresholds, varying the estimation sample and point in the FCSU distribution, and the role of prices and updating mechanisms. At the current time we are leaning towards moving to a percentage of the median. This would all for a larger sample size upon which to base the thresholds for owners without mortgages, would reduce the percentage of the same needing imputations for in-kind benefits, and would open up the possibility of adding medical expenses into the threshold at a later date, as medical expenses around the median are more reflective of the overall population than medical expenses at the 33<sup>rd</sup> percentile. Our research leads us to recommend expanding the estimation sample from consumer units with exactly two children, to either all consumer units with children or all consumer units, regardless of child presence. This move will increase sample size in the estimation sample and provide more reliable estimates for the three housing tenure types. However, which estimation sample to use is an open question. One potential concern is that households with children spend differently than households without children. Future work should re-evaluate the three-parameter equivalence scale to see whether it adequately reflects these spending differences. Whether to move to a consumption based threshold concept is still being debated as is whether to continue with the current updating or to anchor thresholds and adjust by another mechanism.

The focus of this study has been how household expenditure survey data and spending patterns can be used to inform the production of poverty thresholds. Each decision made regarding the needs concepts and estimation sample have an impact of the level of and trends in thresholds produced. Understanding the driving forces that underlie the movement in the thresholds is needed. As we in the U.S. continue our research, we hope to learn from other countries as we expect others will learn from us.

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## TABLES/CHARTS

**Table 1. Two-Adult-Two-Child Research Experimental Supplemental Poverty Measure (SPM) Thresholds<sup>1</sup>, 2010-2018**

	2010	2011	2012	2013	2014	2015	2016	2017	2018
Owners with mortgages	\$25,018	\$25,703	\$25,784	\$25,639	\$25,844	\$25,930	\$26,336	\$27,085	\$28,342
<i>Standard error</i>	\$323	\$347	\$368	\$289	\$345	\$297	\$280	\$276	\$329
<i>Percentage of Sample</i>	0.486	0.459	0.439	0.438	0.415	0.371	0.382	0.382	0.394
Owners without mortgages	\$20,590	\$21,175	\$21,400	\$21,397	\$21,380	\$21,806	\$22,298	\$23,261	\$24,173
<i>Standard error</i>	\$341	\$298	\$233	\$337	\$470	\$417	\$390	\$471	\$424
<i>Percentage of Sample</i>	0.093	0.110	0.120	0.115	0.108	0.119	0.129	0.113	0.137
Renters	\$24,391	\$25,222	\$25,105	\$25,144	\$25,460	\$25,583	\$26,104	\$27,005	\$28,166
<i>Standard error</i>	\$379	\$378	\$398	\$400	\$363	\$282	\$302	\$263	\$253
<i>Percentage of Sample</i>	0.421	0.431	0.442	0.447	0.476	0.510	0.489	0.505	0.469

<sup>1</sup> Based on out-of-pocket expenditures for food, clothing, shelter, and utilities (FCSU). Shelter expenditures include those for mortgage principal payments. SPM thresholds, shares, and means are produced within the Division of Price and Index Number Research (DPINR), Bureau of Labor Statistics (BLS). These thresholds and statistics are produced for research purposes only using the U.S. Consumer Expenditure Interview Survey. The thresholds, shares, and means are not BLS production quality. This work is solely that of DPINR researchers and does not necessarily reflect the official position or policies of the Bureau of Labor Statistics, or the views of other staff members within this agency. For methodological details and related research regarding the SPM thresholds, see: <http://stats.bls.gov/pir/spmhome.htm>. The 2018 SPM threshold statistics are final as of September 10, 2019.

**Table 2. Expenditure Shares For Two-Adult Two-Child Supplemental Poverty (SPM) Thresholds<sup>1</sup>, 2010-2018**

	2010	2011	2012	2013	2014	2015	2016	2017	2018
Owners with mortgages									
Food	0.284	0.288	0.293	0.292	0.291	0.292	0.295	0.294	0.295
Clothing	0.045	0.043	0.041	0.040	0.040	0.041	0.041	0.041	0.042
Shelter	0.349	0.348	0.342	0.343	0.341	0.338	0.335	0.334	0.339
Utilities	0.161	0.159	0.162	0.163	0.166	0.167	0.167	0.167	0.161
Other	0.162	0.162	0.161	0.162	0.162	0.162	0.163	0.164	0.163
	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Owners without mortgages									
Food	0.345	0.350	0.354	0.350	0.351	0.347	0.348	0.343	0.346
Clothing	0.054	0.052	0.050	0.048	0.048	0.049	0.048	0.048	0.049
Shelter	0.171	0.172	0.175	0.179	0.183	0.187	0.179	0.194	0.184
Utilities	0.233	0.229	0.227	0.229	0.222	0.224	0.232	0.225	0.229
Other	0.197	0.197	0.194	0.194	0.196	0.193	0.192	0.191	0.191
	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Renters									
Food	0.291	0.294	0.301	0.298	0.295	0.296	0.297	0.295	0.297
Clothing	0.046	0.044	0.043	0.041	0.040	0.041	0.041	0.041	0.042
Shelter	0.360	0.360	0.353	0.362	0.364	0.367	0.365	0.365	0.364
Utilities	0.137	0.137	0.138	0.134	0.136	0.131	0.132	0.135	0.133
Other	0.166	0.165	0.166	0.165	0.165	0.165	0.164	0.164	0.164
	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

<sup>1</sup> Based on out-of-pocket expenditures for food, clothing, shelter, and utilities (FCSU). Shelter expenditures include those for mortgage principal payments. SPM thresholds, shares, and means are produced within the Division of Price and Index Number Research (DPINR), Bureau of Labor Statistics (BLS). These thresholds and statistics are produced for research purposes only using the U.S. Consumer Expenditure Interview Survey. The thresholds, shares, and means are not BLS production quality. This work is solely that of DPINR researchers and does not necessarily reflect the official position or policies of the Bureau of Labor Statistics, or the views of other staff members within this agency. For methodological details and related research regarding the SPM thresholds, see: <http://stats.bls.gov/pir/spmhome.htm>. The 2018 SPM threshold statistics are final as of September 10, 2019.

**Table 3. Weighted Distribution of Consumer Units within Percentile Ranges for 2016 Threshold Estimation Samples**

	30-36 Percentile of FCSU Expenditures			47-53 Percentile of FCSU Expenditures		
	CU's with 2 Children (n=860)	CU's with One or More Children (n=2,396)	All CU's (n=7,632)	CU's with 2 Children (n=864)	CU's with One or More Children (n=2,425)	All CU's (n=7,711)
	Weighted Percentage Distributions (%)					
<i>Number of Children in CU</i>						
0	0.0	0.0	62.7	0.0	0.0	66.0
1	0.0	40.0	15.4	0.0	45.3	15.3
2	100.0	35.2	13.4	100.0	36.0	12.3
3	0.0	16.6	5.6	0.0	13.3	4.7
4 or more	0.0	8.2	2.9	0.0	5.4	1.7
<i>Housing Tenure</i>						
Owner with Mortgage	38.2	34.5	23.9	50.3	47.5	34.0
Owner without Mortgage	12.9	13.7	34.1	9.0	9.1	26.3
Renter	48.9	51.8	42.0	40.7	43.4	39.7
<i>Participation in Public Assistance Program</i>						
Public Housing	2.4	2.2	2.1	1.4	1.2	1.1
Government Assistance with Rents	2.0	2.4	1.9	1.4	1.6	0.8
SNAP	21.9	22.4	13.3	12.5	13.4	6.7
Welfare Income	2.0	2.8	1.2	1.4	1.2	0.8
Medicaid	34.7	39.0	21.6	21.9	25.3	13.6
<i>Someone in the CU Has...</i>						
Medicare	8.3	9.5	31.2	4.2	8.1	27.2
Private Health Insurance	65.2	63.8	65.9	74.3	73.4	73.1

NOTE: Consumer units living in college or university student housing are out of scope.  
 Source: Bureau of Labor Statistics, Consumer Expenditure Survey Interview Data, 2012Q2-2017Q1.  
 Reproduced from Fox and Garner (2018).



**Table 4. Comparison of CE-Based Quality-Adjusted Normalized Prices and Median Rent Indexes: 2014**

	CE Interview Survey (U.S.=1.000)			ACS
	Renter S+U	Owner with Mortgage S+U	Owner without Mortgage S+U	MRI 2014 <sup>a</sup>
Maximum	1.791	1.781	2.290	1.782
Minimum	0.615	0.721	0.680	0.595
Range	1.176	1.060	1.610	1.187
Ratio of Max to Min	2.912	2.470	3.368	2.996

<sup>a</sup> Median Rent Index (MRI) based on 5-year American Community Survey median rents for 2-bedroom apartments with complete kitchens and full baths (Renwick 2017).

Reproduced from Garner and Munoz (2018).

**Table 5. Example: Using CE Normalized Quality-Adjusted Prices to Adjust Housing Expenditures at CU Level for 2A+2C**

	Quality-Adjusted Normalized Price based on 2010-2014 CE data	Annual Housing Expenditures		F+C+Telep Expenditures		FCSU <sub>i</sub>	
		Unadjusted	Adjusted	Unadjusted	Unadjusted	Unadjusted	With Adjusted SU
Washington, DC-MD-VA-WV							
Renter	1.461	\$14,040	\$9,612	\$6,000	\$20,040	\$15,612	
Owner with Mortgage	1.195	\$25,392	\$21,252	\$6,000	\$31,392	\$27,252	
Owner without Mortgage	1.234	\$8,052	\$6,528	\$6,000	\$14,052	\$12,528	
Rural South							
Renter	0.615	\$5,280	\$8,580	\$6,000	\$11,280	\$14,580	
Owner with Mortgage	0.73	\$10,692	\$14,652	\$6,000	\$16,692	\$20,652	
Owner without Mortgage	0.683	\$3,528	\$5,160	\$6,000	\$9,528	\$11,160	

Based on Garner and Munoz (2018)

**Table 6. Housing Shares of 2-Adult-2-Child SPM Thresholds:2014**

	Housing Expenditures Un-Adjusted		Housing Expenditures Adjusted	
	Published	Utilities do not include Telephone	Utilities include Telephone	Utilities do not include Telephone
Owners with Mortgages				
Shelter	34.1%	34.1%	34.1%	34.1%
Utilities	16.6%	13.5%	16.6%	11.1%
<i>housing total</i>	50.7%	47.7%	50.6%	45.1%
Renters				
Shelter	36.4%	36.3%	35.5%	35.5%
Utilities	13.6%	8.2%	13.9%	8.3%
<i>housing total</i>	50.0%	44.5%	49.5%	43.8%
Owners without Mortgages				
Shelter	18.3%	18.5%	17.9%	17.9%
Utilities	22.2%	14.2%	23.0%	16.4%
<i>housing total</i>	40.4%	32.7%	40.9%	34.3%

**Table 7. Examples Using Alternative Geographic Price Adjustments**

2017– Two Adults Two Children - Renter	Washington, DC	Mississippi Non-metro Areas
Official Poverty Threshold	\$24,858	\$24,858
SPM Threshold: Renters	\$27,005	\$27,005
<b>Rent-based Index Using Median Rent Index (MRI)</b>	<b>\$1,297/972=1.63</b>	<b>\$598/972=0.78</b>
Apply to Only Housing Portion of Thresholds	<b>50%*1.63+50%*1.0</b>	<b>50%*0.78+50%*1.0</b>
<b>Median Rent Index (MRI)</b>	<b>1.32</b>	<b>0.89</b>
<b>Adjusted SPM Threshold</b>	<b>\$35,512</b>	<b>\$24,034</b>
RPP Index – Broad based	1.19	.83
Adjusted SPM Threshold – Broad Based	\$32,136	\$22,414
<b>FAR RPP Index</b>	<b>1.36</b>	<b>.70</b>
<b>Adjusted SPM Threshold – FAR RPP</b>	<b>\$36,727</b>	<b>\$18,904</b>

Reproduced from Renwick (Brookings 2019)

Chart 1. SPM Thresholds for 2 Adults with 2 Children not Accounting for Housing Tenure: OOP, In-Kind Benefits, and Rental Equivalence (33rd percentile)

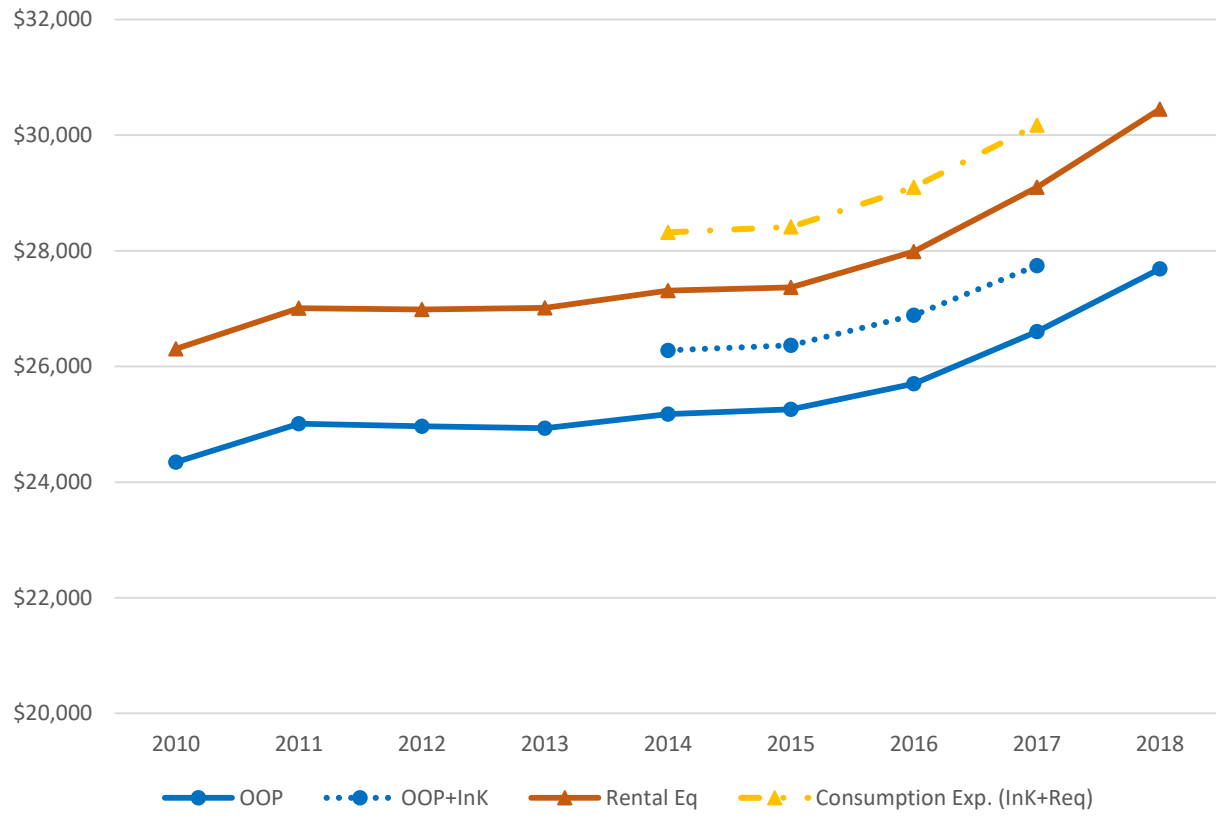


Chart 2. SPM Thresholds for 2 Adults with 2 Children: OOP FCSU and In-Kind Benefits by Housing Tenure vs. Consumption Expenditures (33rd percentile)

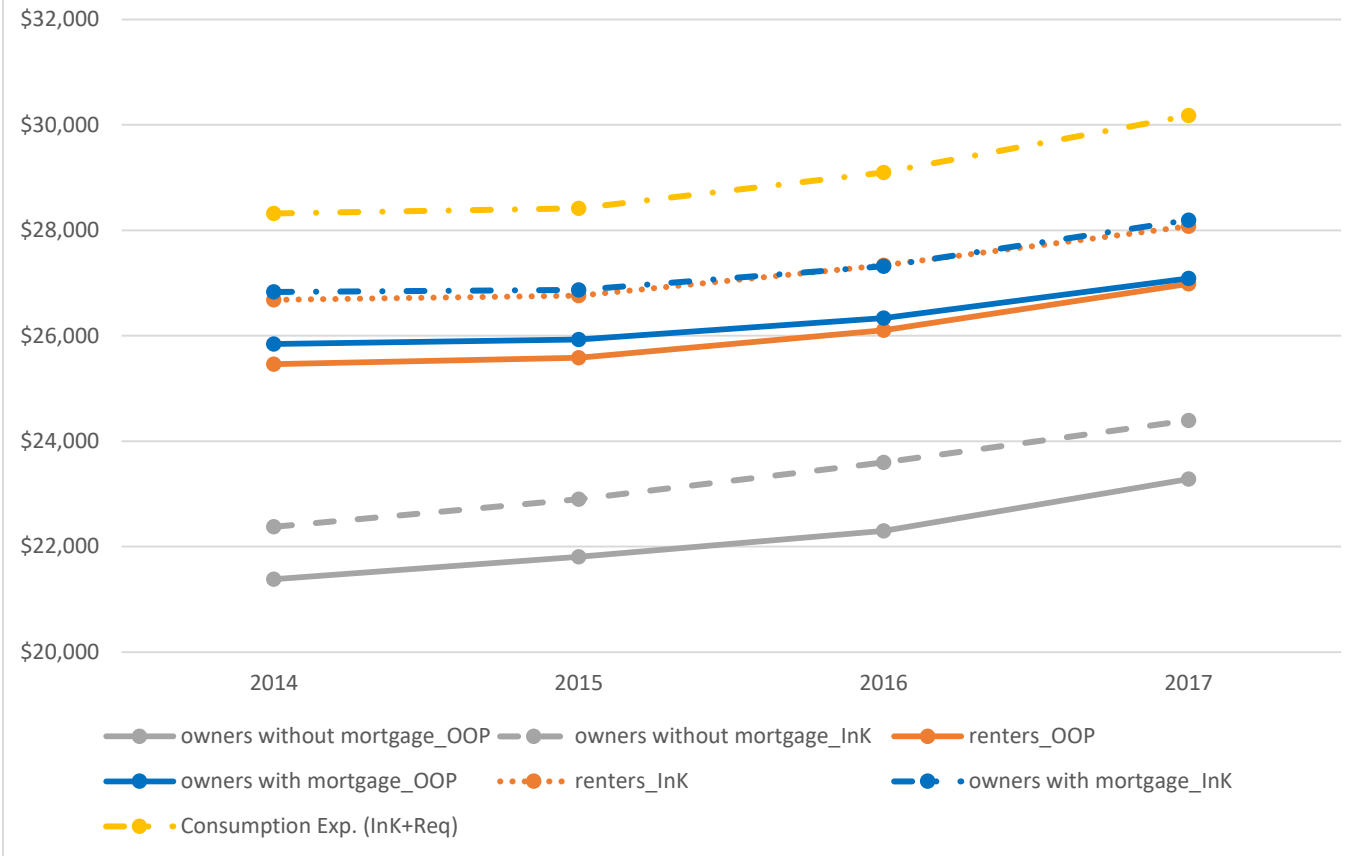


Chart 3. SPM Thresholds for 2 Adults with 2 Children: OOP FCSU and Rental Equivalence by Housing Tenure vs. Consumption Expenditures (33rd percentile)

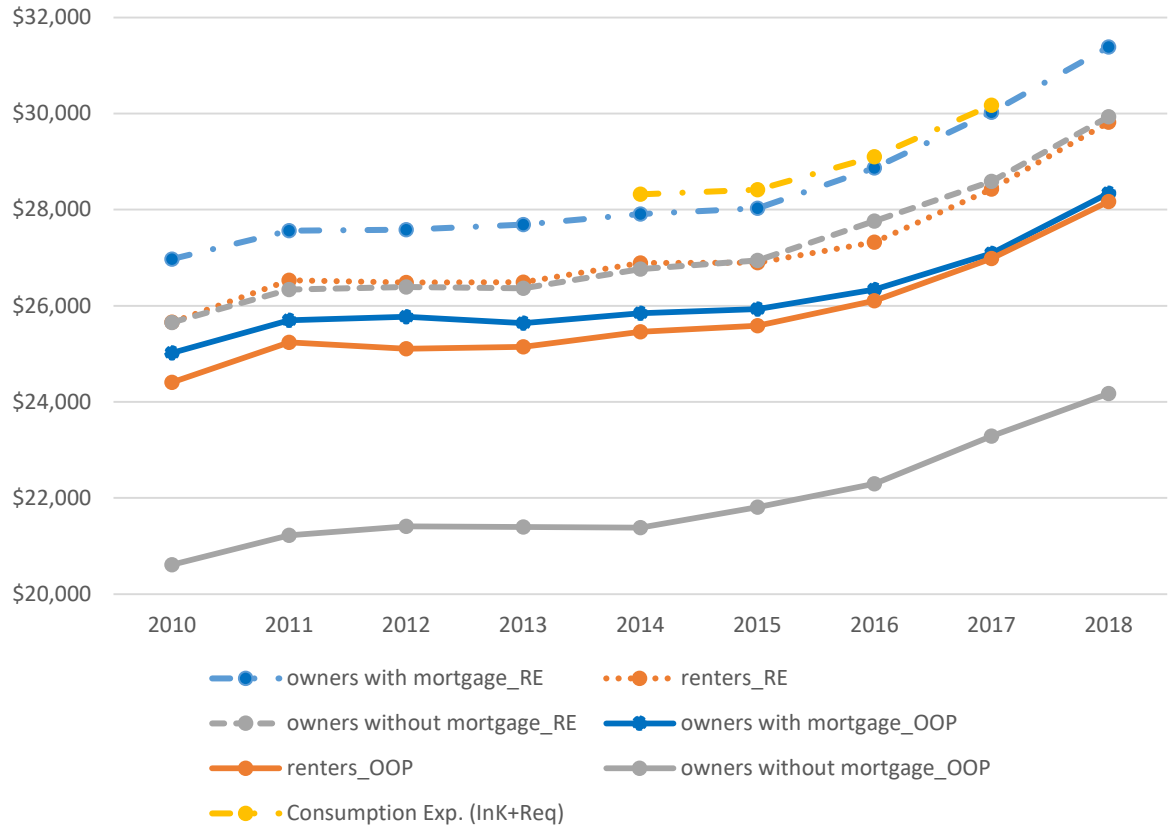


Chart 4. SPM Thresholds Based on FCSU and FCSUM for CUs with 2 Adults and 2 Children: Estimation Sample=CUs with Varying Compositions

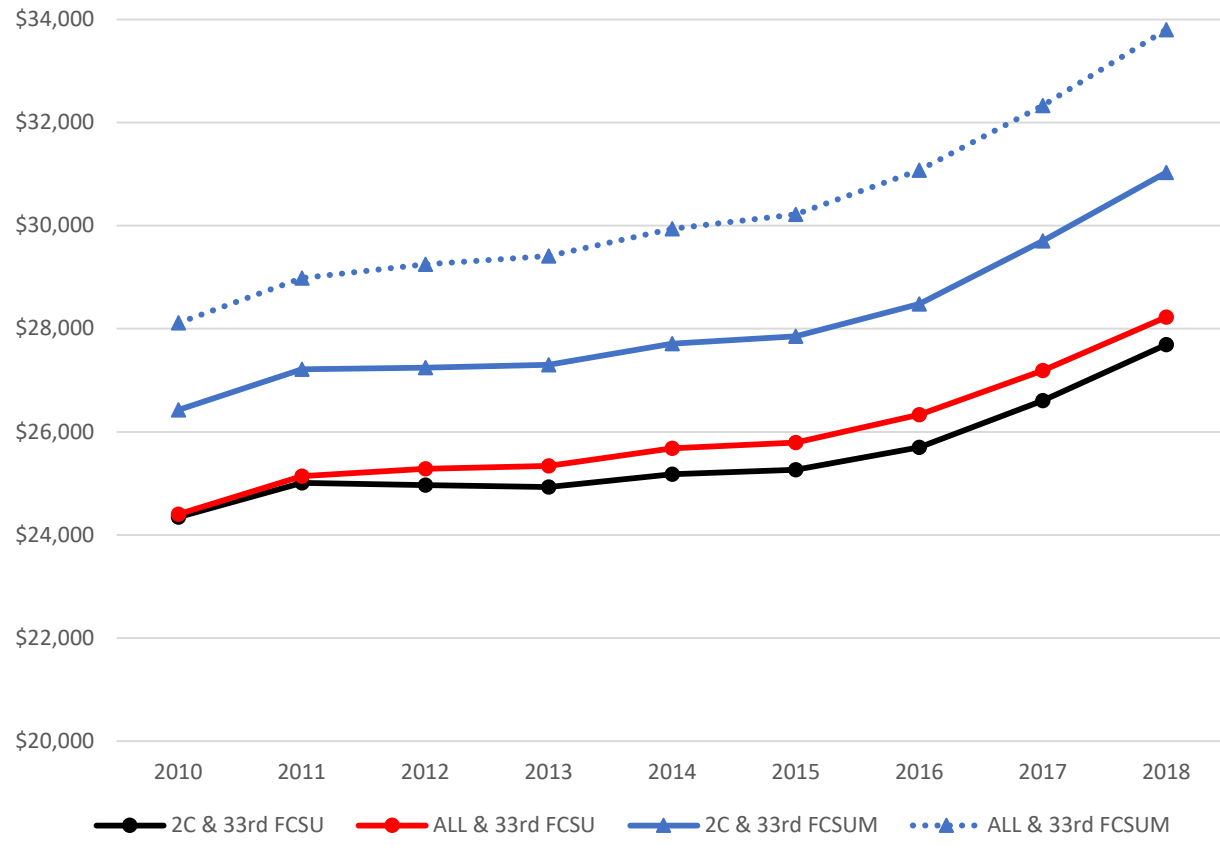


Chart 5. SPM Thresholds for CUs with 2 Adults and 2 Children: Estimation  
 Sample=CUs with Varying Compositions and Percentiles in FCSU Distribution

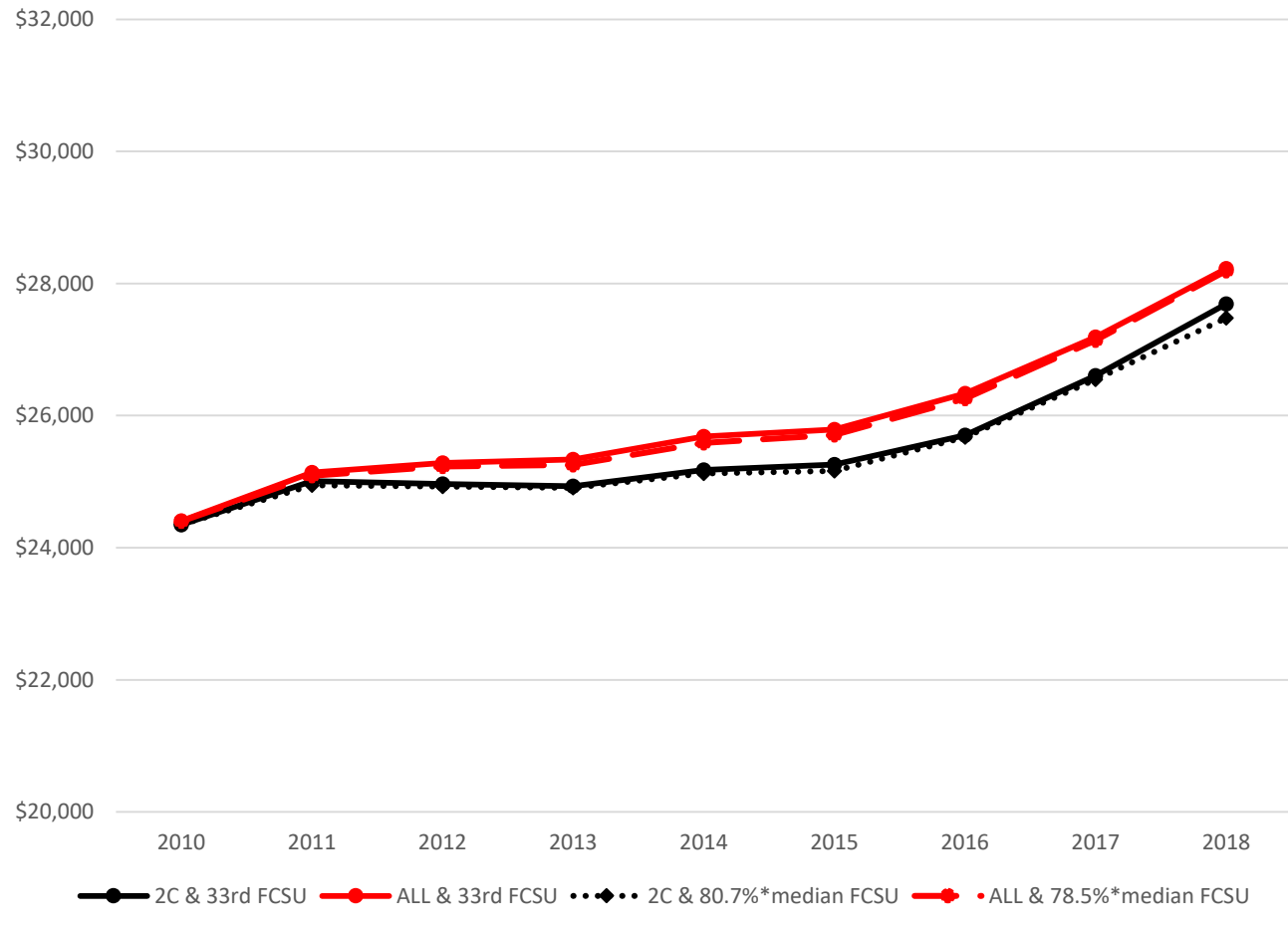




Chart 6. SPM Thresholds for CUs with 2 Adults and 2 Children: Estimation Sample=CUs with 2 Children and around the 33rd Percentile FCSU

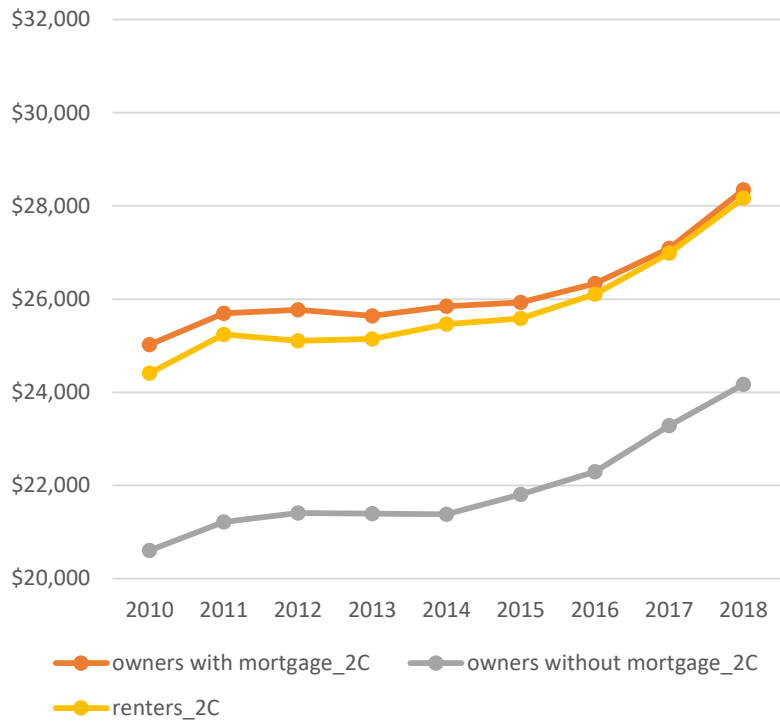


Chart 7. SPM Thresholds for CUs with 2 Adults and 2 Children: Estimation Sample=All CUs and around the 33rd Percentile FCSU

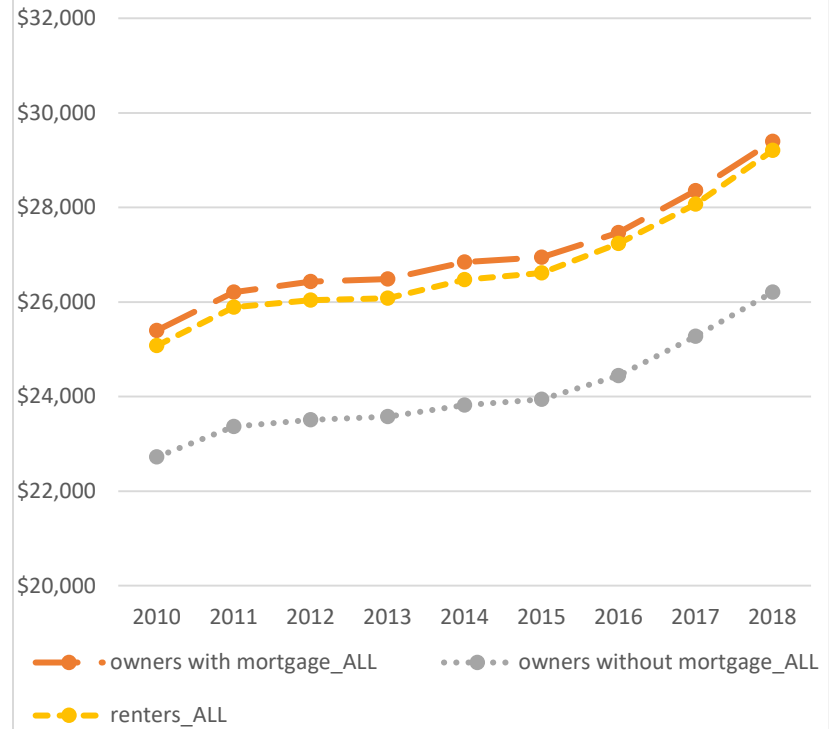


Chart 8. SPM Thresholds for CUs with 2 Adults and 2 Children: Estimation Sample=CUs with 2 Children and 80.7%\*Median FCSU

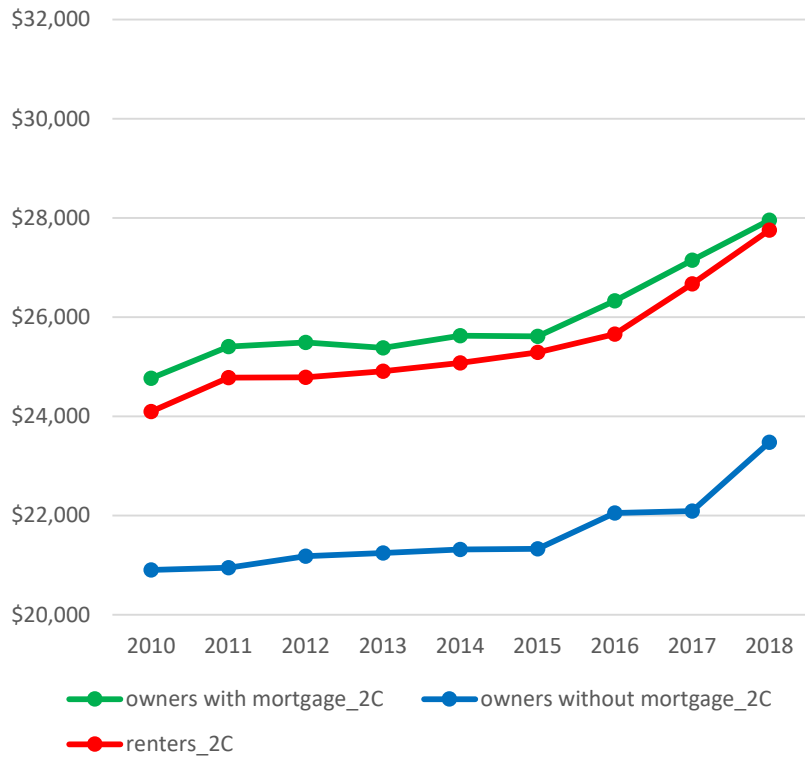


Chart 9. SPM Thresholds for CUs with 2 Adults and 2 Children: Estimation Sample=All CUs and 78.5% \*Median FCSU

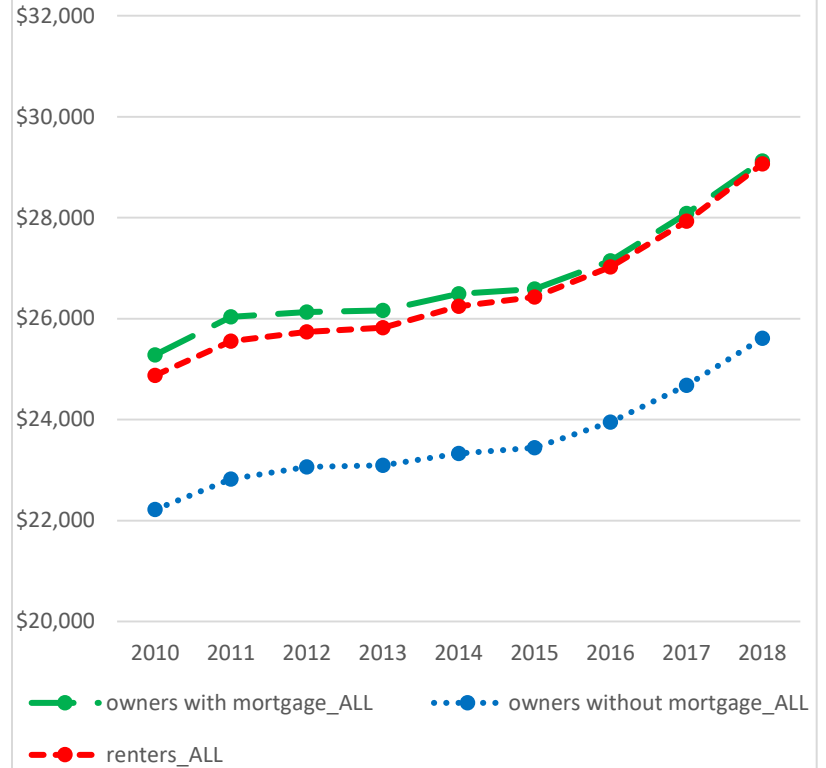


Chart 10. SPM Thresholds for CUs with 2 Adults and 2 Children with and without Normalized Price Adjustment: 2014

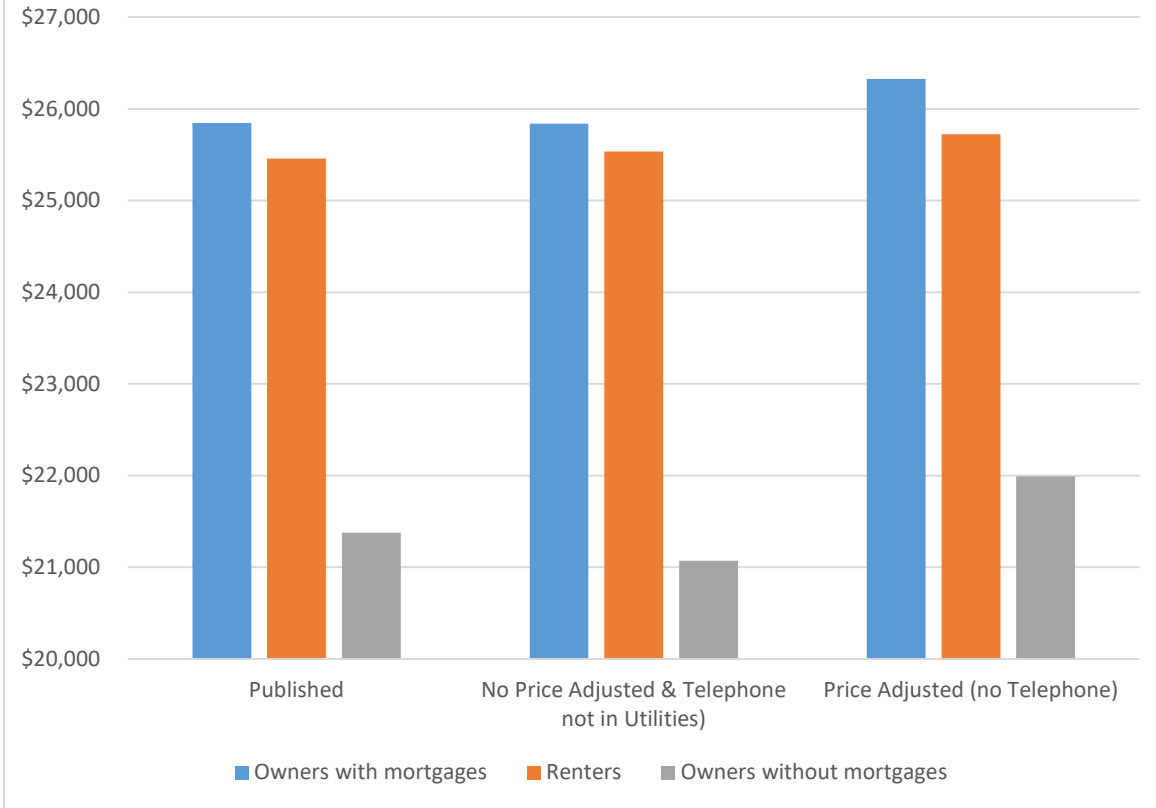


Chart 11. SPM Thresholds for CUs with 2 Adults and 2 Children with Anchored to 2010 Using the CPI-U and Chained CPI-U for All Items and FCSU Only

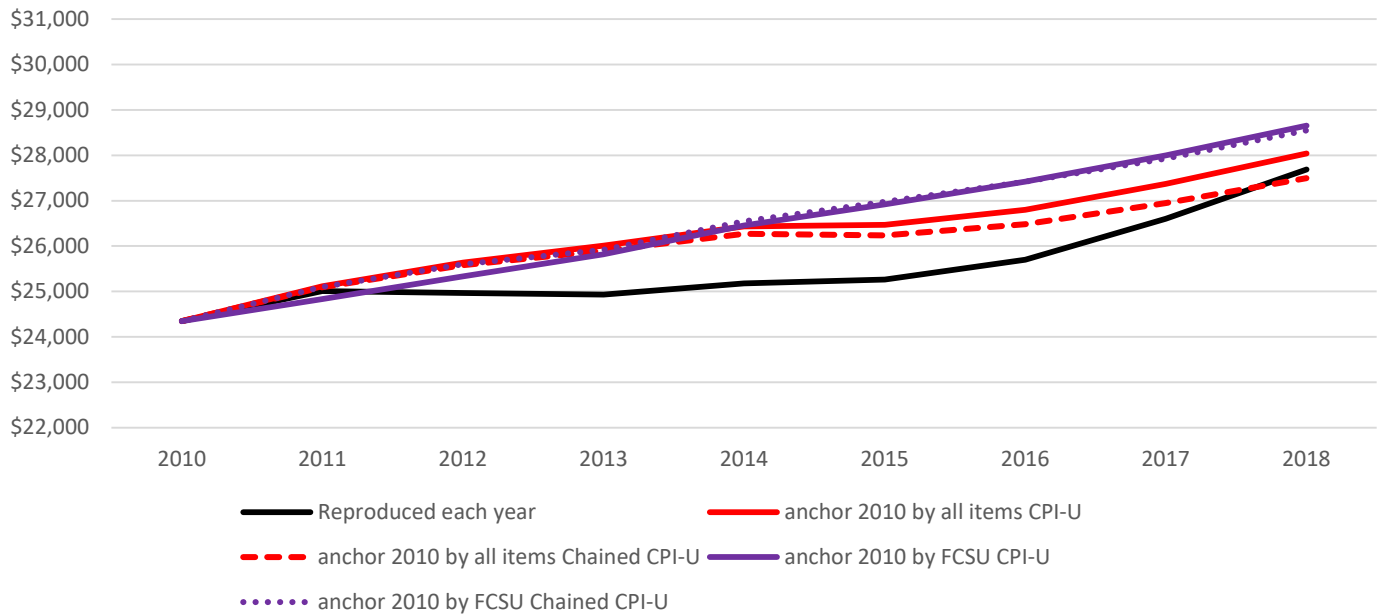


Chart 12. SPM Thresholds for CUs with 2 Adults and 2 Children with Anchored to 2010 Using Equalized Median Consumption Expenditures and After Tax Income

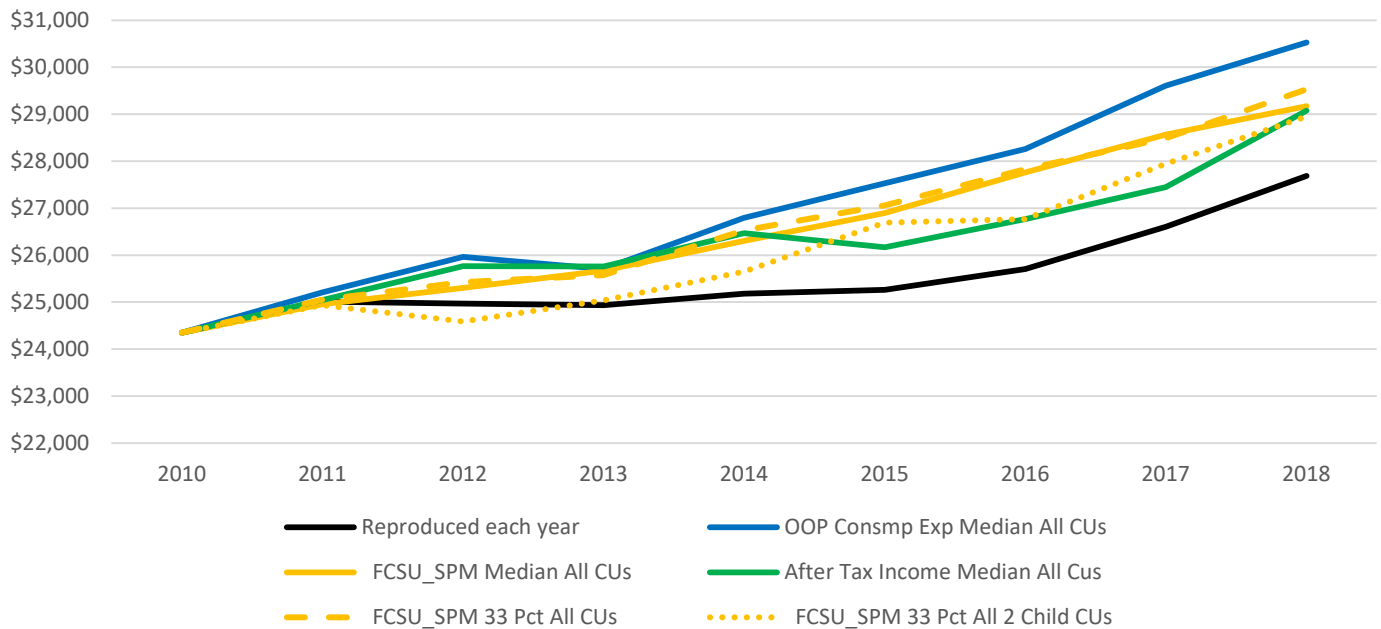


Chart 13. SPM Thresholds for CUs with 2 Adults and 2 Children with Anchored to 2014 Using the CPI-U and Chained CPI-U for All Item and FCSU Only

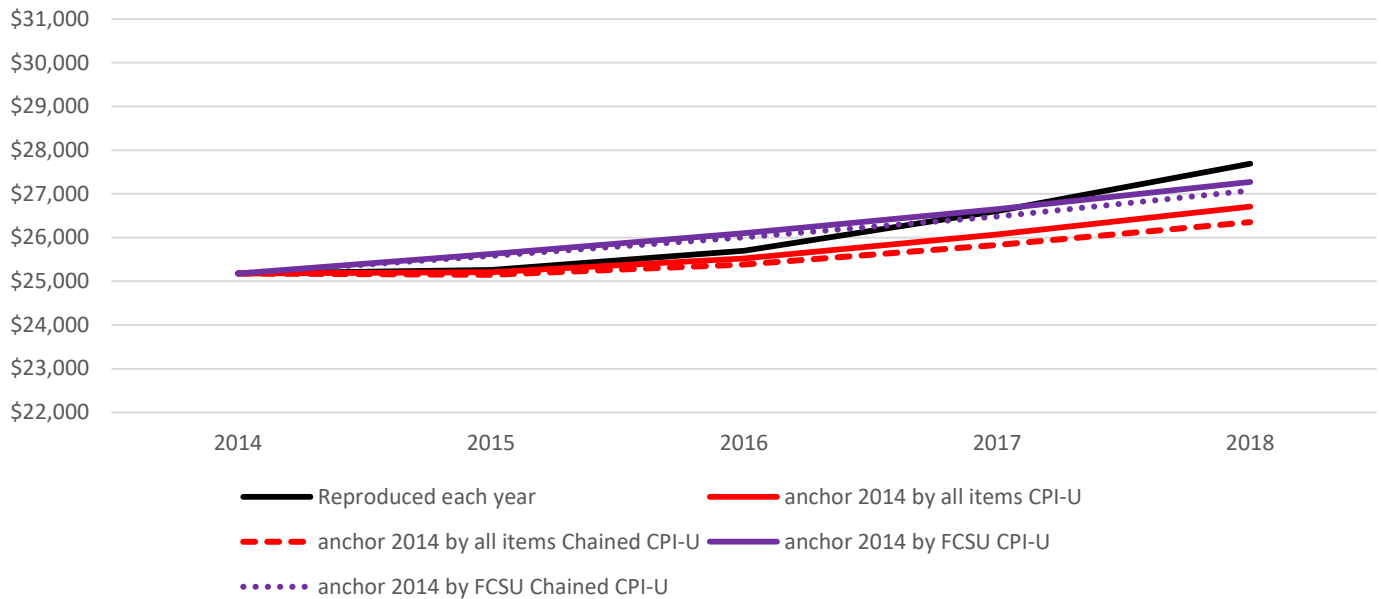
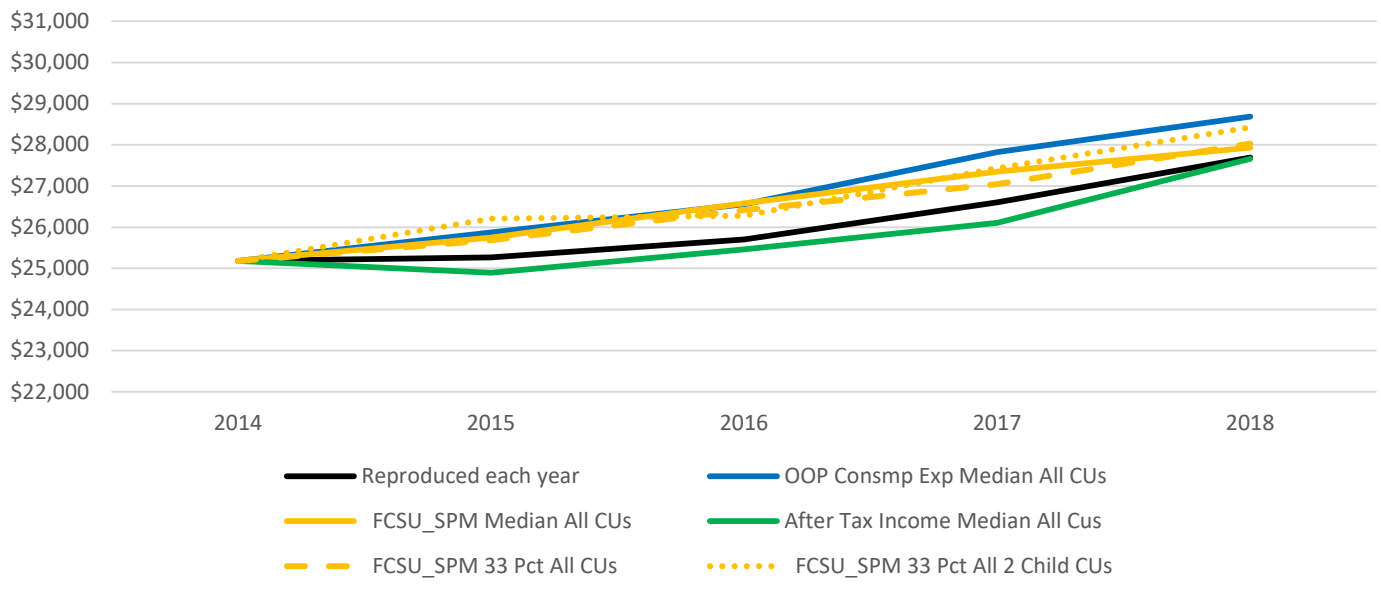


Chart 14. SPM Thresholds for CUs with 2 Adults and 2 Children with Anchored to 2014 Using Equivalized Median Consumption Expenditures and After Tax Income



**APPENDIX: Shift in FCSU Distribution**

**Density of FCSU and FCSU-IK for 2A+2C  
around "33rd" Percentile**

