Supplemental Poverty Measurement (SPM) Thresholds and a Missing Data Problem

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All Poverty Measures

Threshold

Resources

Not Poor

Resources

Poor
The official measure does not account for

- Higher standards and levels of living since 1965
- Provision of noncash benefits (food benefits, housing subsidies, energy assistance)
- Necessary expenses (taxes, work-related, health care)

Recommended Changes to Improve the Measure of Poverty in the U.S.

- Thresholds: Bureau of Labor Statistics (BLS)
- Resources and poverty statistics: Census Bureau
Supplemental Poverty Measures (SPM)

Interagency Technical Working Group - March 2, 2010

- Will not replace the official poverty measure
- Will not be used for resource allocation or program eligibility
- Justification: Evaluate impact of benefit programs on poverty
- Based on National Academy of Sciences expert panel recommendations Measuring Poverty: A New Approach (Citro and Michael, 1995)

BLS: Research Experimental SPM Thresholds

Census Bureau: Resources and Poverty Statistics

The Supplemental Poverty Measure: 2014
SPM and Concepts

- Poverty Concept, based on NAS recommendations
  - “…proposed thresholds, although developed in somewhat different ways, reflect concept of budget for consumption needs” (NAS Report, 1995, pp. 66-67) ...
  - “Hence, ... resources should add to money income the value of near-money in-kind benefits that are intended to support consumption” (pp. 67)

- Measurement concept for thresholds assumed
  - Expenditures are a good proxy for consumption (with the exception of owner shelter)

- Interagency Technical Working Group (ITWG) placed value on:
  - Consistency between threshold and resource definitions in terms of poverty concept
  - Data availability, simplicity in estimation, stability of the measure over time, and ease in explaining the methodology
Threshold Estimation... thus far...

- Food, clothing, shelter, and utilities (FCSU) expenditures
- Consumer Expenditure Interview Survey data: 5 years of data
- *FCSU* “expenditures” in constant year dollars
- Estimation sample: Consumer Units (CUs) with 2 children
- Reference sample: 2 adults with 2 children (3-parameter equivalence scale applied to +2 children FCSU expenditures)
- Rank CUs by their *FCSU* “expenditures”
  - Identify 33rd percentile represented by 30th to 36th percentile range
  - Produce means of *FCSU* and *SU* by housing status
  - Estimate thresholds by housing tenure

- Send to Census Bureau to derive other CU thresholds and make geographic adjustment
Housing Status Thresholds

- **Housing Status Groups, j**
  - Owners with mortgages
  - Owners without mortgages
  - Renters

- **SPM Threshold, j**

\[
= (1.2 \times FCSU_A) - SU_A + SU_j
\]

*FCSU_A, SU_A, SU_j* are means within 30th to 36th percentile range of *FCSU_A* for reference CUs
In addition to owner-occupied housing...

Expenditures ≠ Consumption

when in-kind benefits not accounted for in spending
This Research

■ Purpose
  ▶ Highlight poverty concept underlying SPM and issue of consistency
  ▶ Examine options to value consumption needs when data are missing
  ▶ Produce 2012 SPM thresholds that reflect the “consumption” of FCSU, with exception of owner-occupied housing

■ Contribution
  ▶ Improved SPM thresholds that more nearly reflect consumption value of FCSU basic needs
  ▶ Improve overall SPM to better evaluate impact of in-kind benefit programs considered in resources
Poverty Concept: Economic Deprivation

- **Thresholds**: represent “needs”
- **Resources meet “needs”**

“Consumption Needs” defined as:
- Food
- Clothing
- Shelter
- Utilities
- + “a little bit more” for personal care, non-work related transportation, etc.

**Poverty Concept**: deprivation based on comparison of resources and consumption “needs”

**Consumption “needs” proxied by spending (or expenditures)**
- NAS Panel assumption: “CE expenditures include housing assistance subsidies (rent and utilities)” ... and “benefits from food stamps and other meals provided free” (paraphrase of NAS Report, 1995, pp. 393-394)
- BUT: CE expenditures only account for food stamps or SNAP
Consistency in Poverty Concept:
Resources to Meet FCSU and Evaluate In-Kind

Thresholds

Consumption Value of FCSU+ "little bit more"

Resources

Consistent

Housing & Energy Subsidies

Other Food Subsidies

With SNAP In-Kind Benefits

Cash income

Missing Data Problem in Thresholds Leads to Inconsistency in Poverty Measure

(current measure)

Expenditures for FCSU (including SNAP) + “little bit more”

- Consistent
- Inconsistent

Thresholds

Resources

Housing & Energy Subsidies

Other Food Subsidies

With SNAP In-Kind Benefits

Cash income

Expenditures for FCSU (including SNAP) + “little bit more”

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Example of Subsidized Renter: the Case of Rent Spending in Thresholds

1/3 of market rent paid OOP Spending

Money income used to pay contract rent = 1/3 of market rent

rental voucher covers 2/3 of market rent (not fungible)
Example of Subsidized Renter: Consumption Rent Value in Thresholds

**Thresholds**

1. 1/3 of market rent paid OOP Spending
2. 2/3 of market rent paid with voucher (in-kind benefit)

**Renter Resources**

- Money income used to pay contract rent = 1/3 of market rent
- Rental voucher covers 2/3 of market rent (not fungible)
Challenges in Using U.S. Consumer Expenditure Interview Survey for SPM

- Expenditures collected: out-of-pocket
- Limited data on Rental Assistance Programs
  - Indicator variables for rented living quarters
    - Is this house a public housing project, that is, it is owned by a local housing authority or other local public agency? (CE variable: pub_hous)
    - Are your housing costs lower because the Federal, State, or local government is paying part of the cost? (CE variable: govtcost)
  - Total rent payments for each of last 3 months (do not include direct payments by local, state, or federal agencies)
  - Expenditures for utilities
- No data on programs but data on potential participants
  - National School Lunch Program (NSLP)
  - Supplemental Nutrition Program for Women, Infants, and Children (WIC)
  - Low income Home Energy Assistance (LIHEAP)
- SNAP implicitly included in reported food expenditures

ITWG stated ...

“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.” (March 2010)

\[ FCSU = \text{sum (food, clothing, shelter, utilities)} \text{ at micro-level} \]

<table>
<thead>
<tr>
<th>SPM Threshold = FCSU + little bit more</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supplemental Nutrition Assistance Program (SNAP)</td>
</tr>
<tr>
<td>Housing Subsidies</td>
</tr>
<tr>
<td>National School Lunch Program (NSLP)</td>
</tr>
<tr>
<td>Supplemental Nutrition Program for Women, Infants, and Children (WIC)</td>
</tr>
<tr>
<td>Low-Income Home Energy Assistance (LIHEAP)</td>
</tr>
</tbody>
</table>
ITWG Solution to CE Missing Data Problem

Thresholds

- Housing & Energy Subsidies
- Other Food Subsidies
- FCSU Expenditures (Including SNAP)

Resources

- Housing & Energy Subsidies
- Other Food Subsidies
- With SNAP In-Kind Benefits
- Cash Income
- Consistent

Consistent
Options: Valuing “Needs” when Data Are Missing

- **All Imputed**
  - Impute NSLP, WIC, LIHEAP using CPS recipiency; CE rental program reported participation
  - Impute NSLP, WIC, LIHEAP; Rental Subsidy values (based on FMRs)

- **Impute “better” measured**
  - Impute NSLP using CPS recipiency; CE rental program reported participation
  - Impute NSLP; Rental Subsidy values (based on FMRs)

- **Rental Impute - FMRs**
  - CE rental program reported participation
  - Impute Rental Subsidy values (based on FMRs)

- **“No” Imputes**
  - Limit population to CUs without benefits (exception NSPL paid)
  - Assumption: spending = consumption

- **Rental Impute - CE Data Only**
  - CE rental program reported participation
  - Impute Rental Subsidy values (based on CE imputed rents)

Greater data availability & simplicity in estimation
In-Kind Benefits, Expenditures, and Resources

<table>
<thead>
<tr>
<th>Benefit</th>
<th>Form of Benefit</th>
<th>Value of Commodity or Service in CE Reported Expenditures?</th>
<th>SPM Resources Include</th>
</tr>
</thead>
<tbody>
<tr>
<td>SNAP</td>
<td>EBT cash-value to CU</td>
<td>Yes, food expenditures=food consumption</td>
<td>yes</td>
</tr>
<tr>
<td>NSLP</td>
<td>Direct payment to school</td>
<td>No, &lt; consumption</td>
<td>yes</td>
</tr>
<tr>
<td>WIC</td>
<td>Voucher paper or EBT for commodities to CU</td>
<td>No, &lt; consumption</td>
<td>yes</td>
</tr>
<tr>
<td>LI HEAP</td>
<td>Direct payment to vendor</td>
<td>No, &lt; consumption</td>
<td>yes</td>
</tr>
<tr>
<td>Rental Subsidies</td>
<td>Landlord accepts voucher or CU lives in public housing</td>
<td>No, &lt; consumption</td>
<td>yes</td>
</tr>
</tbody>
</table>

EBT: Electronic benefit transfers
Consumption value could be at recipient or market value
Impute for Missing In-Kind Benefit Program Participation: NSLP, WIC, & LIHEAP

- Impute recipiency to CE from U.S. Current Population Survey Annual Social and Economic Supplement (CPS ASEC) reported recipiency

Data
- Household level data with household and member characteristics
- Same years as in CE: collected 2009-2013 refers to 2008-2012
- CPS ASEC public use data accessed from NBER

Method
- Treat CE as having missing data so combine CPS and CE into one data file to impute from CPS to CE
- SAS Proc MI
  - Logistic regression method when the classification variable has binary response (assuming monotone missing pattern for classification variable)
    - Renter with subsidy (=1)
    - Renter without subsidy (=2)
  - Draw random uniform error between 0 and 1 to impute recipiency= 1 or = 2 for each observation
Impute for Missing NSLP, WIC, & LIHEAP Benefits

- **NSLP: U.S. Department of Agriculture for 2008-2012**
  - Average per school lunch payment rates for 180
    - Over 48 contiguous states plus Hawaii and Alaska
    - Rates for schools in which less than 60% of lunches served were free or reduced price for all but District of Columbia, Louisiana, Mississippi, and New Mexico (60% or more with free or reduced, USDEd)
  - Different values (same values for commodities’ subsidy)
    - Free
    - Reduced
    - Student paid full price for lunch (=commodities subsidy)

- **WIC: U.S. Department of Agriculture for 2008-2012**
  - Average national monthly value per person

- **LIHEAP: U.S. Department of Health and Human Services for 2009**
  - Average annual benefit levels per household per state
  - Benefits assigned based reference months in CE
    - Heating (October to March) – all states
    - Cooling (April to September) - not all states offer this benefit
Impute Missing Market Rents for Subsidized Renters

- Need market rent for consumption of rental services
  - Market rent=(rent paid + rental subsidy)
  - Do not need rental subsidies for thresholds (produce for data comparison)

- Market values assigned to subsidized rental units, approaches:
  1. Imputed market rents from CE data using 2-stage regression model
     - Stage 1: Logit regression of subsidized renters versus non-subsidized renters (CU sample selection)
     - Stage 2: Market rents paid controlling for sample selection, rental unit characteristics, and geography
  2. U.S. Department of Housing and Urban Development 2008-2012 Fair Market Rents (FMRs) matched to CE by Census tract and number of bedrooms
RESULTS
Results

- U.S. Population Comparisons
  - Aggregates
  - Program participation
  - Annual average benefits

- SPM Threshold Estimation Sample (within FCSU 30th-36th percentiles of FCSU+IK) compared to all CUs
  - Aggregate shares
  - Shares of in-kind benefits by participate type
  - Distribution of CUs with in-kind benefits by housing tenure group

- Thresholds with and without in-kind benefits imputed
## CE-Imputed In-Kind Benefits for U.S.: Aggregates

<table>
<thead>
<tr>
<th>Data Source</th>
<th>NSLP</th>
<th>WIC2</th>
<th>LI HEP</th>
<th>Rent Subsidies</th>
</tr>
</thead>
<tbody>
<tr>
<td>CE Imputed Participation (5 years of data) with ...</td>
<td>$11.0</td>
<td>$4.6</td>
<td>$1.0</td>
<td>$35.1</td>
</tr>
<tr>
<td>free=$4.2 reduced=$4.8 paid=$2.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>children=$2.7 infants=$1.5 women=$0.4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CPS 2012</td>
<td>$10.7</td>
<td></td>
<td>$1.6</td>
<td>$40.4</td>
</tr>
<tr>
<td>USDA 2012 (9 months Jan.-May, Sept.-Dec.)</td>
<td>$10.5-$10.6¹</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>USDA Calendar Year 2012</td>
<td></td>
<td>$6.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HHS FY2010 in 2012$</td>
<td></td>
<td></td>
<td>$3.1</td>
<td></td>
</tr>
<tr>
<td>Heating</td>
<td></td>
<td></td>
<td>$2.8</td>
<td>$35.5</td>
</tr>
<tr>
<td>Cooling</td>
<td></td>
<td></td>
<td>$0.3</td>
<td>$6.6</td>
</tr>
<tr>
<td>HUD &amp; USDA 2012</td>
<td></td>
<td></td>
<td></td>
<td>$28.9</td>
</tr>
<tr>
<td>USDA 2012</td>
<td></td>
<td></td>
<td></td>
<td>$1.1</td>
</tr>
</tbody>
</table>

¹ Lower value assumes all schools less than 60% free/reduced lunch; higher value assumes all school 60% or higher free/reduced lunch

² WIC: CE estimates and USDA based on pre-rebate values for infant food; CPS values based on cost to USDA, not benefit value.
# CE-Imputed In-Kind Benefits for U.S.: CU/HH Participation

<table>
<thead>
<tr>
<th>Data Source</th>
<th>NSLP</th>
<th>WIC*</th>
<th>LI HEAP</th>
<th>Rent Subsidies</th>
<th>FMR</th>
<th>CE imputed rent</th>
</tr>
</thead>
<tbody>
<tr>
<td>CE Imputed Participation (5 years of data) with ...</td>
<td>19.0%</td>
<td>2.8%</td>
<td>2.2%</td>
<td>4.2%</td>
<td>4.5%</td>
<td></td>
</tr>
<tr>
<td>free=3.2% reduced=4.6% paid=11.2%</td>
<td>children=1.8%</td>
<td>infants=0.5%</td>
<td>women=0.6%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CPS 2012</td>
<td>17.5%</td>
<td>2.8%</td>
<td>3.3%</td>
<td>4.0%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HHS 2010**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heating</td>
<td></td>
<td></td>
<td>6.3%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cooling</td>
<td></td>
<td></td>
<td>0.8%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HUD &amp; USDA 2012</td>
<td></td>
<td></td>
<td></td>
<td>4.25% (if use CE total =4%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HHS 2012</td>
<td></td>
<td></td>
<td></td>
<td>4.0%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Public Housing</td>
<td></td>
<td></td>
<td></td>
<td>0.9%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Voucher and other</td>
<td></td>
<td></td>
<td></td>
<td>3.1%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>USDA 2012</td>
<td></td>
<td></td>
<td></td>
<td>0.2%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*WIC: CE estimates based on pre-rebate values for infant food

**HUD 2010 latest data availables; 34% of all housing units received heating and cooling assistance in FY2010.
## CE-Imputed In-Kind Benefits for U.S.: Annual Average Benefit per CU/HH

<table>
<thead>
<tr>
<th>Data Source</th>
<th>NSLP</th>
<th>WIC*</th>
<th>LI HEAP</th>
<th>Rent Subsidies</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CE Imputed Participation (5 years of data) with ...</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>$475</td>
<td>$1,334</td>
<td>$367</td>
<td>$6,926</td>
</tr>
<tr>
<td></td>
<td>free=$1,073 reduced=$861 paid=$147</td>
<td>children=$1,269 infants=$2,389 women=$557</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CPS 2012</td>
<td>$478</td>
<td>$861</td>
<td>$383</td>
<td>$7,675</td>
</tr>
<tr>
<td>HHS FY2010 in 2012$</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heating</td>
<td></td>
<td></td>
<td></td>
<td>$382</td>
</tr>
<tr>
<td>Cooling</td>
<td></td>
<td></td>
<td></td>
<td>$312</td>
</tr>
<tr>
<td>HUD &amp; USDA 2012</td>
<td></td>
<td></td>
<td></td>
<td>$7,475</td>
</tr>
<tr>
<td><strong>HUD 2012</strong></td>
<td></td>
<td></td>
<td></td>
<td>$7,674</td>
</tr>
<tr>
<td><strong>Public Housing</strong></td>
<td></td>
<td></td>
<td></td>
<td>$6,141</td>
</tr>
<tr>
<td><strong>Voucher and other</strong></td>
<td></td>
<td></td>
<td></td>
<td>$8,155</td>
</tr>
<tr>
<td><strong>USDA 2012</strong></td>
<td></td>
<td></td>
<td></td>
<td>$4,008</td>
</tr>
</tbody>
</table>

*WIC: CE estimates based on pre-rebate values for infant food.
Percent of 2012 Aggregate Dollars Using 5 Years of CE Data

- Food Only, 31.0%
- Clothing, 4.9%
- Shelter & Utilities Only, 62.2%

Aggregates based on CE imputed rent subsidies

IK = 4.9% for SPM Thresholds

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Aggregate Shares of In-kind Benefits by Participant Type

**All Cus: IK=1.8% of Aggregate**
- Rent Subsidy, 68%
- NSLP Free, 8%
- NSLP Reduced, 9%
- NSLP Paid, 4%
- WIC Children, 5%
- WIC Infants, 3%
- WIC Pregnant, 1%
- LIHEAP, 2%

**CUs in 30-36th Percentile “2+2”: 4.9% of Aggregate**
- Rent Subsidy, 57%
- NSLP Free, 11%
- NSLP Reduced, 12%
- NSLP Paid, 5%
- WIC Children, 9%
- WIC Infants, 4%
- WIC Pregnant, 1%
- LIHEAP, 1%

Aggregates based on FMRs for rent subsidies
Distribution of CUs with In-kind Benefits

All CUs

<table>
<thead>
<tr>
<th>Benefit Type</th>
<th>Owners with Mortgages</th>
<th>Owners without Mortages</th>
<th>Renters</th>
</tr>
</thead>
<tbody>
<tr>
<td>NSLP Free</td>
<td>45%</td>
<td>40%</td>
<td>35%</td>
</tr>
<tr>
<td>NSLP Reduced</td>
<td>40%</td>
<td>35%</td>
<td>30%</td>
</tr>
<tr>
<td>NSLP Paid</td>
<td>35%</td>
<td>30%</td>
<td>25%</td>
</tr>
<tr>
<td>WIC Children</td>
<td>30%</td>
<td>25%</td>
<td>20%</td>
</tr>
<tr>
<td>WIC Infants</td>
<td>25%</td>
<td>20%</td>
<td>15%</td>
</tr>
<tr>
<td>WIC Pregnant</td>
<td>20%</td>
<td>15%</td>
<td>10%</td>
</tr>
<tr>
<td>LIHEAP</td>
<td>15%</td>
<td>10%</td>
<td>5%</td>
</tr>
<tr>
<td>Rent Subsidy</td>
<td>10%</td>
<td>5%</td>
<td>0%</td>
</tr>
</tbody>
</table>

CUs with 2 children in 30-36th

<table>
<thead>
<tr>
<th>Benefit Type</th>
<th>Owners with Mortages</th>
<th>Owners without Mortages</th>
<th>Renters</th>
</tr>
</thead>
<tbody>
<tr>
<td>NSLP Free</td>
<td>45%</td>
<td>40%</td>
<td>35%</td>
</tr>
<tr>
<td>NSLP Reduced</td>
<td>40%</td>
<td>35%</td>
<td>30%</td>
</tr>
<tr>
<td>NSLP Paid</td>
<td>35%</td>
<td>30%</td>
<td>25%</td>
</tr>
<tr>
<td>WIC Children</td>
<td>30%</td>
<td>25%</td>
<td>20%</td>
</tr>
<tr>
<td>WIC Infants</td>
<td>25%</td>
<td>20%</td>
<td>15%</td>
</tr>
<tr>
<td>WIC Pregnant</td>
<td>20%</td>
<td>15%</td>
<td>10%</td>
</tr>
<tr>
<td>LIHEAP</td>
<td>15%</td>
<td>10%</td>
<td>5%</td>
</tr>
<tr>
<td>Rent Subsidy</td>
<td>10%</td>
<td>5%</td>
<td>0%</td>
</tr>
</tbody>
</table>
Going from FCSU to FCSU-IK in Thresholds
Density of FCSU and FCSU-IK for 2A+2C around “33rd” Percentile

Shift in Distribution
2012 SPM Thresholds with and without In-Kind Imputed Benefits: 2 Adults with 2 Children ("2A+2C")
2012 SPM Thresholds with and without In-Kind Imputed Benefits: 2 Adults with 2 Children ("2A+2C")
Summary

- Expenditures ≠ Consumption in the presence of in-kind benefits
- Examined impact of different options to deal with missing data in the CE, imputing participation (with exception of subsidized rental housing) and benefits
- Estimating consumption of FCSU, when benefits present, results in better measure of “needs”

Questions remain
- To what source should consumption values be compared?
  - Administrative data
  - CPS reports
  - Other CUs
- Should two thresholds for renters be produced (renters with and renters without subsidies) like the treatment of owners?
- Are benefit valuations sufficient to estimate consumption needs?
Conclusions

1. Spending ≠ Consumption in the presence of in-kind benefit participation
2. Estimating consumption of FCSU, when benefits present, results in better measure of “needs”
   - Improved SPM thresholds that reflect values of FCSU “purchased by/made available to” CUs (consumption for all but owner-occupied housing)
   - Consistency in threshold and resource concepts: resources to meet “needs”
3. Imputing for missing data in CE for in-kind benefit recipients -- one approach to value consumption
4. Questions remain
   1. To what should consumption values be targeted?
      - Administrative data
      - CPS statistics
5. Continue research to address missing data problem in the CE
   1. Explore possibility of 2 renter thresholds (with and without subsidies)
Contact Information

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