IDENTIFYING THE POOR: POVERTY MEASUREMENT FOR THE U.S. FROM 1996 TO 2005

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The poverty measure presented compares spending needs to resources available to meet those needs. The analysis is for the U.S.; however, lessons from other countries regarding desirable properties of a poverty measure are considered. A primary focus is internal consistency between thresholds and resources. This study is among the first for the U.S. to describe an internally consistent poverty measure, drawing from recommendations of the U.S. National Academy of Sciences (NAS). Thresholds reflect spending needs as "outflows." Resources measure "inflows" available to meet spending needs. The U.S. Consumer Expenditure Survey is used for thresholds, and the Current Population Survey is the basis for resources. Trends are reported with comparisons to the official and a relative measure. An important finding is that increases in expenditures for shelter, captured in the NAS thresholds, suggest a greater increase in the number of families not able to meet basic needs than is reflected by official poverty statistics over this time period.

1. Introduction

Researchers and policymakers in countries around the world strive to develop procedures and measures that best describe the economic well-being of individuals and families both within and across countries. There is considerable agreement that comparably defined relative measures are most relevant for cross-national comparisons (e.g., Smeeding, 2005; OECD, 2008). However, broader measures across countries have also been developed. For example, addressing the need for

comparability across member countries of the European Union, Atkinson *et al.* (2002) developed a set of recommendations for the measurement of social inclusion. The result was a three-tier system of measures, beginning with a measure of the risk of financial poverty. For this measure, household income would be used to construct a relative poverty measure set at a percentage of median disposable income. Also included in the recommendations for the European Union was a vast array of social indicators, such as non-monetary indicators of deprivation, and indicators of sufficient housing, health, and education in three levels of indicators of social inclusion.

The development and use of poverty indicators that are meaningful within countries has been the focus of recent debates in several countries, for example, in Australia, Canada, India, the United Kingdom, and the United States. There is no official measure of poverty for Australia; however, the most commonly used measures of poverty are the Henderson Poverty Lines (HPLs). Since the inception of the HPLs in the early 1970s, there has been widespread debate on the appropriateness of these for Australian society, with alternatives proposed and evaluated (McDonald, 1997; Daniels, 2002; Saunders, 2004b). Also in Canada there is no official measure of poverty; however, both absolute and relative measures have been used unofficially (Statistics Canada, 1998, 2004, 2006; HRSD-Canada, 2006; Osberg, 2007). The debate in India has been about which of two definitions of consumption expenditure poverty results in a better or truer picture of poverty for that country (see Deaton and Kozel, 2005). In the U.K., there seems to be agreement that the main income poverty indicator should be defined in terms of thresholds which rise or fall as average U.K. incomes rise or fall, a relative poverty measure, but with a caveat that the use of fixed thresholds combined with relative ones can help to provide a fuller picture of what is happening to the extent of income poverty (Palmer *et al.*, 2008). Notten and De Neubourg (2007) make the case that both absolute and relative poverty should be monitored to determine incidence and benefit adequacy within countries.

Like other countries debating the most appropriate measure to assess the poverty status of its population, the U.S., too, has considered alternatives to the current official measure. Issues of relevance and updating have also been discussed. The current official measure of poverty is now considered to be an absolute measure and was designed in the 1960s as part of the War on Poverty. Many people over the years have argued that the official U.S. poverty measure is outdated, given the changes in U.S. society and in government policies (see Ruggles, 1990; Citro and Michael, 1995; Fisher, 1996; Blank, 2008).

In the first half of the 1990s, an extensive evaluation of the current official measure was conducted by the National Academy of Sciences (NAS) Panel on Poverty and Family Assistance, under the auspices of the Committee on National Statistics (CNSTAT). The results of the Panel's work and recommendations are presented in the report, *Measuring Poverty, A New Approach* (Citro and Michael, 1995). In the report, the Panel considered several alternatives to the official measure: relative versus absolute poverty measures, expert-based budgets, subjective measures, and indexes of deprivation. In the end, this group of experts recommended an approach that a hybrid of the budget and relative approaches be used for official poverty measurement in the United States. In contrast to the

current U.S. official thresholds, updated only by price changes each year, the Panel noted that the poverty threshold be updated in a ". . . conservative or quasi-relative manner—one that drives the thresholds by changes in spending on necessities . . ." (p. 143). Properties deemed desirable for a new U.S. poverty measure include: consistency between thresholds and resources in construction, statistical defensibility, understandability, broad acceptance by the public, and operational feasibility (Citro and Michael, 1995, p. 4).

This paper presents a poverty measure that is based largely on the NAS Panel's recommendations, with deviations reflecting more recent research. Particular emphasis is on internal consistency between the thresholds and resources. The Panel noted that "It is important that family resources are defined consistently with the threshold concept in any poverty measure" (Citro and Michael, 1995, p. 9). Blank (2008) more recently addressed the issue of consistency in recommending that a poverty definition should be used that produces both a credible and coherent poverty threshold and a consistent and appropriate resource measure.

The aim of the study is to produce an internally consistent poverty measure that is based on spending "outflows" and money "inflows." Spending outflows, or outlays,[1,2] are those for basic needs only: food, clothing, shelter, utilities (FCSU), medical expenses, and other basic necessary goods and services. Resources include money income from all sources plus the value of near-money benefits that help the family meet spending needs, less necessary expenses, like work-related expenses and taxes that must be paid. A family is designated as poor if its annual money inflow, including relevant near-cash benefits and net of necessary expenses, falls below the threshold level of money outflow. A difference in the threshold definition used here and the one used by the Panel is that mortgage principal repayments and medical care expenditures are included; neither was included in thresholds by the Panel. The Panel did not include repayments on mortgage principal for "processing convenience" (see discussion below). Rather than subtract medical care expenditures from resources, as done in the 1995 report, these are added to thresholds.[3]

Not until the work of Garner (2006) and Short (2006) was an internally consistent NAS-based poverty measure produced. The current research represents a culmination of this and other related work (e.g., Johnson *et al.*, 1997; Garner *et al.*, 1998; Short *et al.*, 1998, 1999; Iceland *et al.*, 2001; Short, 2001). In the latter studies in particular, the researchers aimed to account for the concerns of the research and policy communities regarding the desirable properties of a poverty measure (CNSTAT, 2005; Iceland, 2005).

The paper begins with a brief overview of the current official measure, followed by a description of the spending-based threshold and the elements that make up the resource side of the experimental poverty measure proposed in this research. Data from the U.S. Consumer Expenditure Survey (CE) are used to produce the

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[1]For the BLS definition of expenditure outlays, see Rogers and Gray (1994).

[2]Throughout this study, spending, expenditures, and outlays are used interchangeably. The implicit cash value of food stamps is included in out-of-pocket spending for food. The cash values of other in-kind programs are not included.

[3]The original recommendation of the NAS Panel was that medical out-of-pocket expenses would be subtracted from income as a necessary expense. For earlier research with medical care included in the thresholds, see Short (2001), Short and Garner (2002), and Banthin (2004).

threshold. The primary data source for the resource measure is the U.S. Current Population Survey Annual Social and Economic supplement (CPS). Results for 1996 through 2005 are presented. The NAS-based thresholds are compared to the current official thresholds and to relative thresholds based on one-half median resources. The thresholds are examined with regard to underlying concepts and changes over time. Poverty rates are calculated that compare the measure presented here with the current official measure and a comparable relative poverty measure to illustrate differences in trends. Poverty rates are presented for the total population and for specific subgroups of the population that have historically been most susceptible to hardship in the U.S.

2. The Current Official Poverty Measure and Concerns

The current official measure was developed in the early 1960s as an indicator of the number of people with inadequate income to cover the costs of a minimum food diet and to allow for other needed expenses (see Orshansky, 1965; Citro and Michael, 1995). The official thresholds are based on the share of food spending in after-tax money income using data from the 1955 Household Food Consumption Survey, and a food adequacy standard, the U.S. Department of Agriculture (USDA) Economy Food Plan. Food was found to be one-third of a family budget, and thus, food costs were multiplied by three. The food plan was issued by the USDA for "temporary or emergency use when funds are low" (Orshansky, 1965, p. 20). The food plan did not allow for meals eaten out or other food eaten away from home, and it was assumed that "the homemaker is a good manager and has the time and skill to shop wisely, and she must prepare nutritious, palatable meals on a budget" for herself and her family (Orshansky, 1965, p. 24).

Since the first official thresholds were released, they have been updated for changes in prices, holding the multiplier constant at three and the food adequacy standard constant as the Economy Food Plan. In 1969, the Bureau of the Budget gave "official" status to the following change in the poverty thresholds: to use the overall Consumer Price Index to update the thresholds for price changes instead of changes in the value of the Economy Food Plan that had been used earlier. Office of Management and Budget Policy Directive No. 14 (OMB, 1978) specifically states that "The official poverty thresholds do not vary geographically, but they are updated for inflation using [the] Consumer Price Index (CPI-U)."[4]

The measure of income used in the official poverty measure is before-tax money income, although the threshold is based on the share of after-tax income available for food spending. Non-cash benefits (such as food stamps) are not included in before-tax money income, nor are capital gains or losses. If a person

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[4]The CPI-U represents the change in prices of a fixed market basket of goods and services, with relative prices changing while utility remains constant. In addition to regular changes in the CPI market basket, other changes have been made in the production of the index over the years (see BLS, 2009 for references). The updating mechanism for the official poverty measure is based on the relative change in prices of goods and services purchased by an average consumer unit using plutocratic, not democratic, weights (see Eatwell *et al.*, 1987, pp. 774–5). The official thresholds are never revised for earlier periods so improvements in the CPI are only reflected when new methods are incorporated in the official index.

lives with family members, the family members' incomes are added together and compared to thresholds that reflect this person's family size and composition.

Concerns have been raised regarding the use of the current official poverty measure to describe the economic situation of individuals and families in need. Such concerns include: (1) the appropriateness of using before-tax income for official poverty measurement when thresholds are based on after-tax income and resulting measurement inconsistencies; and (2) out-of-date thresholds (e.g., Citro and Michael, 1995; Hill and Michael, 2001).

3. Concepts, Methods, and Data

The basic concepts, methods, and data for this study are based on those proposed by the National Academy of Sciences (NAS) Panel on Poverty and Family Assistance in their report, *Measuring Poverty, A New Approach* (Citro and Michael, 1995). However, since the report was completed, additional work has been conducted to further explore issues originally raised by the Panel. Findings and conclusions from this additional work are reflected in the thresholds and resource measures produced here. For example, in the CNSTAT Workshop in 2004 it was agreed that medical care be accounted for in the thresholds rather than in resources (Iceland, 2005; see also, Short, 2001; Banthin, 2004). Another primary difference from earlier work is that mortgage principal repayments are included in outlays.[5] The National Academy of Sciences Panel recommended that the unit of analysis should be broadened for purposes of measuring poverty to include cohabiting couples (Citro and Michael, 1995, p. 13). Internationally, the unit of analysis is the household. Short *et al.* (1999) compared different units of analysis and showed that the more inclusive the unit the lower the resulting poverty rates. For comparison to the official measure, the traditional definition of family is employed here.

3.1. *NAS-Based Poverty Thresholds*

Poverty is most often defined in terms of one's ability to meet his/her basic or minimum needs for survival or participation in society. For this study, expenditures for a prescribed set of goods and services are used to construct a spending-based poverty threshold for a reference family. Equivalence scales are then applied to this initial threshold to derive thresholds for other family types. A crucial part of this measure is that thresholds are automatically updated over time by the growth in

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[5]The Panel used the CE publication definitions of food, clothing, shelter, and utilities, as did the Census Bureau reports on experimental poverty measures (Short *et al.*, 1999; Short, 2001). For this study, the authors refined the definition to reflect the spending outflows of reference families. Shelter expenditures include mortgage principal repayments of owners. Such payments are not included in the CE publication definition of expenditures because the BLS considers these allocations to savings. However, mortgage principal repayments are not discretionary, and cannot be used to meet other basic needs of the family. Other differences from the Panel calculations include: expenditures for home equity loans and lines of credit are not included in the study threshold, nor is spending on utilities for vacation homes or food and rent as pay. Differences from the Census Bureau experimental thresholds include adjustments for premiums paid for Medicare Part B and for shelter expenditures of families who both owned and rented during the reference period.

spending for basic goods and services that pertain to a specific concept of poverty rather than solely by price changes.[6] Such a procedure allows for improvements in societal levels of spending for a basic bundle of goods and services.

Producing the threshold has several steps. These include: (1) selecting a reference family; (2) identifying the goods and services to be included in the threshold; (3) choosing an appropriate equivalence scale; (4) choosing an updating mechanism; and (5) adjusting for geographic differences across areas.

The reference family includes two related adults and children.[7] This family type falls near the center of the family size distribution rather than at one of the extremes; and it accounts for a relatively large proportion of the population (Citro and Michael, 1995). Using the data that underlie the 2005 thresholds for this study, this type of family represents 8.6 percent of household types. Of families with children, those with two adults and two children are the largest group; people in these families account for approximately 14 percent of the U.S. population. Since children have historically made up a large portion of the poverty population, it is reasonable that the selected reference family would represent spending patterns for families with children.

Once the reference family is chosen, median expenditures for a set of goods and services are estimated. As noted earlier, this set includes food, clothing, shelter, utilities, and medical care. The threshold is referred to as the "FCSUM" threshold or "experimental" threshold. The thresholds are based on out-of-pocket spending for:

- Food, at home and away from home
- Clothing
- Utilities (including telephone)
- Medical care
- For renters, shelter expenditures
- For homeowners, non-vacation shelter expenditures that include:
  - mortgage interest payments
  - repayments of mortgage principal
  - mortgage prepayment penalties
  - property taxes
  - maintenance, repairs, insurance, and other related expenditures.

Percentages of median expenditures, based on their relationship to predetermined percentile values, drive the poverty thresholds. The Panel recommended a percentage of median expenditures, rather than a percentile point or range of the distribution, in order that changes that affect the distribution of expenditures below the median can increase or decrease the poverty rate (Citro and Michael, 1995, p. 147). The Panel used 78 percent and 83 percent of the median. The 78th and 83rd percentages correspond to the reference family's expenditures at the 30th and 35th percentiles of the distribution of the sum of FCSU expenditures. The

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[6]The Panel recommended that the thresholds be updated for real growth in the consumption of basic goods and services (Citro and Michael, 1995, p. 103); the Panel used changes in consumer spending for updating.

[7]A related adult is either the spouse of the reference person or an adult who is related by blood or other legal arrangement.

Panel selected the 30th and 35th percentile range to represent the spending of people at a particular level of basic spending needs. Identifying percentages of median expenditures that related to the 30th to the 35th percentiles of the spending distribution was a matter of expert judgment on the part of the Panel members. In this study, the midpoint of the Panel recommended percentages is used to set the value of the reference family threshold.

Once the percentages of median expenditures have been determined, multipliers are applied to add a small additional amount to allow for other needs. The multipliers account for expenditures for personal care, non-work related transportation (estimated at one-half of total transportation expenditures), education, and reading materials.[8] Multipliers of 1.15 and 1.25 are applied; these are based on the relationship between the sum of FCSU expenditures and expenditures for smaller and larger other bundles of other needed goods and services (see Citro and Michael, 1995).

The general formula for deriving the reference family threshold, using food, clothing, shelter, utilities, and medical care is as follows:

(1)

$$Threshold = (1 - s_{medical}) \frac{(Z_L * P_L * M) + (Z_H * P_H * M)}{2} + (s_{medical}) \frac{(P_t * M) + (P_H * M)}{2}$$

where:
$s_{medical}$ = medical share of the threshold value
$\quad Z_L$ = multiplier representing a smaller basic needs bundle
$\quad Z_H$ = multiplier representing a larger basic needs bundle
$\quad P_L$ = lower percentage of median expenditures
$\quad P_H$ = higher percentage of median expenditures
$\quad M$ = median expenditures for reference family.

An equivalence scale is applied to the reference family threshold to obtain thresholds for families of other sizes and compositions. We use a three-parameter scale that allows for a different adjustment for single parents (see Betson, 1996, 2004). The three-parameter scale has been used in several BLS and Census Bureau studies (Johnson *et al.*, 1997; Short *et al.*, 1999; Short, 2001). The three-parameter equivalence scale is applied to the non-medical part of the threshold only. This is because the medical care needs of children are not expected to be less than those of adults and because there are few inherent scale economies in medical care spending with increasing family size. Medical risk indexes are created to account for variations in family expenditures related to these differences; the indexes are applied to the medical part of the threshold only.[9] The three-parameter scale is as follows:

[8]See BLS (2007b, Glossary of Terms) for definitions of transportation, personal care, education, and reading material expenditures.

[9]The medical risk indexes are calculated, using CE data, as the ratio of median medical out-of-pocket expenditures for different groups compared to the median medical expenditures of the reference family. See Short and Garner (2002) in which the medical risk indexes were based on Medical Expenditure Panel Survey data.

(2a)   *Single individual scale* $= 1.00,$

(2b)   *Childless couple scale* $= 1.41,$

(2c)   *Multiple adults* (*no children*) *scale* $= (adults)^{0.7}$

(2d)   *Single adult with children scale* $= (adults + 0.8 * firstchild +$
$$0.5 * otherchildren)^{0.7},$$

(2e)   *All other families scale* $= (adults + 0.5 * children)^{0.7}.$

     The procedure to calculate the experimental thresholds is repeated each year using the three most recent years of quarterly Interview CE data. Quarterly expenditures are updated to threshold-year dollars using the All Items All City Consumer Price Index (CPI-U). Next, the median of the distribution of the sum of food, clothing, shelter, utilities, and medical care expenditures, in threshold-year dollars, is calculated. By design, the resulting experimental thresholds are more reflective of current needs than are the official thresholds.

     The procedure for updating the thresholds is referred to as "quasi-relative." Under this procedure, the thresholds rise in real terms as the general standard of living rises, unlike price-adjusted thresholds, but they do not rise as rapidly as total (real) consumption or income. In other words, the income elasticity of such a poverty line (see Fisher, 1996; Kilpatrick, 1973) is between zero and 1.0. The income elasticity of the FCSUM threshold with respect to reference family median resources was 0.66 over the 1996–2005 period when thresholds and resources are in constant dollars. This means that the FCSUM threshold rose by 0.66 percent for every 1.0 percent increase in the resources of the reference family during that period. By comparison, the income elasticity of the official poverty line with respect to before-tax money income is (by definition) zero; and, the income elasticity of the relative threshold based on reference family resources is one.

     As a final step, the thresholds are adjusted for cost-of-living differences by geographic areas within the U.S. The adjustments reflect only inter-area rent differences by county within each state. The county-level rents are produced annually by the U.S. Department of Housing and Urban Development to administer its program of rental subsidies. Inter-regional price indexes that adjust for a larger market basket of goods are not currently available (see Short, 2001).

     This study adds to the literature of expenditure-based poverty thresholds. Other studies that focus on expenditure-based thresholds include, for example, the work of Allegretto (2005), Bernstein *et al.* (2000), Bradshaw (1991, 1993; see also Bradshaw *et al.*, 1987), Braithwaite *et al.* (1999), Garner and Short (2003, 2004), Gustafsson *et al.* (2004), HRSD–Canada (2006), Middleton (2000), Morissette and Poulin (1991), Pearce (2005), Pradhan and Ravallion (2000), Renwick and Bergmann (1993), and Saunders (2004a, 2004c). Spending- and/or budget-based thresholds also have been developed and used in many countries, for example, Australia, Britain, Canada, Czech Republic, Germany, Hong Kong, Hungary, Ireland, Malaysia, the Netherlands, Norway, Poland, Sweden, the U.S. (Fisher, 2007) and India (see Deaton and Kozel, 2005; Sen and Himanshu, 2005).

3.2. *NAS-Based Family Resources*

The next step in constructing the experimental poverty measure is to calculate the resources that families possess to meet the needs specified in the thresholds. The main theme in this section is that, while the selection of a poverty threshold is a choice (see Ruggles, 1990), once that selection is made, the measure of resources employed for comparison should be consistent (Citro and Michael, 1995).

When the U.S. official poverty measure was first adopted, the Current Population Survey (CPS) was identified as the source of the income data to be compared to the poverty thresholds. When Orshansky was developing the poverty thresholds, the CPS was the only good source of nationally representative income data and only before-tax money income was available (Fisher, 1997). Thus, from the start, the resource measure has not been consistent with the official thresholds that are based on spending relative to after-tax income. Orshansky was aware of the inconsistency of applying after-tax thresholds to before-tax income data. According to Fisher (1997), Orshansky decided she had no other alternative; she reasoned that the result would yield "a conservative underestimate" of poverty.[10]

Family resources are defined as the sum of money income from all sources plus the value of near-money benefits that help the family meet spending needs, less necessary expenses that must be paid. This alternative concept of family income can be referred to as "discretionary income"—income that can be used to meet a family's basic needs (specifically for food, clothing, shelter, utilities, and medical care, plus a little bit more) after subtracting necessary expenses such as taxes and work-related expenses. This resource measure is similar to the net disposable income (DPI) measure used by researchers conducting international comparisons of poverty that are based on Luxembourg Income Study (LIS) data (e.g., Gornick and Jäntti, 2009); the main difference is that only taxes are subtracted for the LIS measure (LIS, 2009).

The criterion of consistency with the thresholds dictates that near-money benefits included in the expenditure thresholds are included in resources. The only near-cash benefits available in the CE data are for food stamps. Expenditures for food are based on all food purchases, regardless of whether the payment was from federal assistance or not. Given that thresholds include all food spending, it is appropriate to include food stamps in the measure of resources. The decision to not include the value of other government-benefit programs, for example, in-kind school-based nutrition programs and housing subsidies[11] and utilities assistance, in resources is due to the fact that the thresholds are based on spending needs net of subsidy receipt, not consumption needs. If the thresholds were to reflect consumption needs, the implicit value of such programs would be included in the thresholds and resources.

Necessary expenses are subtracted from income to determine how much discretionary income, or inflow, is available to purchase goods and services

[10]See Fisher (1997, footnote 57).
[11]Using CE Interview data from 2003 quarter two through 2006 quarter one, the data used to estimate the 2005 threshold, approximately 1.8 percent of all reference families were renters living in subsidized or government housing. Rozaklis and Garner (1999) reported that a threshold which accounted for the consumption of subsidized or government rental housing would only be about $1.00 higher than a spending based threshold.

represented by the threshold.[12] Necessary expenses include taxes and expenses related to work. Taxes are defined to include federal and state income taxes and all payroll taxes paid. Earning a wage entails incurring expenses, such as travel to work and the purchase of uniforms or tools as well as care provided for children while parents are at work. These expenses are viewed as necessary and are paid by families before expenditures are made on other goods and services. The remaining discretionary income or resources represent the ability of the family to purchase, on an annual basis, what they need to spend for basic goods and services, given that they may already be receiving various non-cash benefits.

3.3. *Data*

This paper uses several surveys to construct the experimental poverty measure. First, the Consumer Expenditure Survey (CE) quarterly Interview data, collected from 1994 quarter two through 2006 quarter one (BLS, 2007a), are used to construct thresholds for 1996 through 2005. Each quarterly data collection refers to expenditures made during the three months prior to the interview month. It is assumed that data from each reference quarter are independent of the data from other quarters; this same assumption is made for official publications of CE data and was also made by the Panel in their report. Quarterly expenditures are annualized by multiplying them by four. Three years of quarterly data are used to produce each annual reference family threshold.

Second, to measure family income or, as more broadly defined, family resources, the analysis uses the Current Population Survey Annual Social and Economic Supplement (CPS ASEC) for the income years 1996 to 2005 with data collected in March each year from 1997 through 2006 (Census Bureau, 2007b). The Panel recommended using the Survey of Income and Program Participation (SIPP) to measure family resources, but found general agreement that the timeliness and complexity of the survey were important shortcomings (CNSTAT, 2005). However, information from the SIPP is used to value work-related expenses.

The calculation of resources for an experimental poverty measure starts with current money income as defined and measured in the CPS ASEC; this income is also used to calculate official poverty statistics. Current money income includes cash income received on a regular basis, such as income from earnings, any cash transfers, and property income. The reference period for money income is that received in the previous calendar year by the family residing together as of February, March, or April of the interview year. Before-tax income, regularly received, does not include net realized capital gains, gifts, lump sum inheritances, or insurance payments. The CPS collects no information on taxes paid, so a tax calculator is employed. As part of the tax calculator, net realized capital gains are simulated and added to income.

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[12]One important necessary expense is child support paid to another household. The amount of child support paid by one household to another is not collected in the CPS and is not used for official income statistics by the Census Bureau; child support transfers are doubly counted in household income and official poverty statistics.
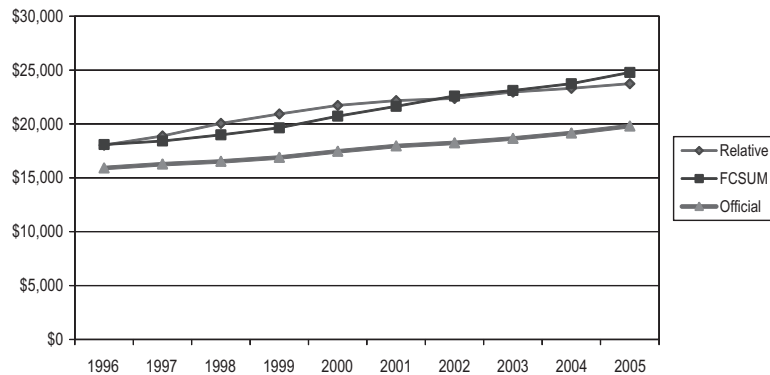
Figure 1. Official, Relative, and Experimental Poverty Thresholds for the Reference Family[1] in the United States: 1996–2005

Note: [1] Official and experimental poverty thresholds are for 2-adult, 2-child families; relative poverty thresholds are for 4-person families.

4. Results and Discussion

4.1. *Thresholds*

Experimental and official poverty thresholds for a family with two adults and two children are shown in Figure 1. Spending-based thresholds are estimated using out-of-pocket expenditures for food, clothing, shelter, utilities, and medical care; these thresholds are referred to as FCSUM in the figure. To place the U.S. experimental results in an international context, four-person relative thresholds are also presented. Population-based relative thresholds are set at 50 percent of median equivalized household resources; resources are equivalized using a single parameter scale, the square root of family size. This scale implies that the needs of a household composed of four people are twice as large as those of a single person household. There is considerable agreement that the appropriate poverty measure for cross-national comparisons is a relative measure (for example, see Atkinson *et al.*, 2002; Smeeding, 2005; OECD, 2008). It is of interest to note the similarity between the FCSUM and the relative thresholds. However, there are slight differences: from 1997 to 2001, relative thresholds are higher; after 2004 the opposite is true. Importantly, the official poverty thresholds are always lower than the other thresholds presented (see Appendix Table A1 for levels, rates of change, and confidence intervals). It should be noted that, while the FCSUM threshold is calculated as a three-year moving average, the relative threshold is based on a single year. When a moving-average relative threshold, based on resources, is produced using two years of data, the differences between the relative and FCSUM threshold are even smaller for the earlier part of the series (results not shown). This finding suggests a strong relationship between spending and resources at the median, averaged over a number of years, for the reference family. Also, one might conclude that a moving-average relative threshold may better reflect the minimal level of resources required to function normally within society than one based on single year data. (See Corak, 2006, for a discussion of these concepts.)

To compare how the thresholds move relative to other household economic series, income data from the Census Bureau (2007b) and expenditure data from the Bureau of Labor Statistics (2007b) are examined. These data reveal that from 1996 to 2001, before-tax money income for all households increased more rapidly than did total expenditures for all consumer units; however, after 2001, expenditures rose more quickly. FCSUM thresholds increased at about the same rate as did total expenditures. In contrast, relative thresholds moved more slowly than income, expenditures, and FCSUM thresholds.

In order to understand better why the new thresholds differ in trends from the official threshold, we examine assumptions regarding movements over time and by examining what is included in the thresholds. FCSUM thresholds are based on reference family spending over the three most recent years of expenditure data, including the threshold year. The threshold for each year is based on a moving average of the median sum of FCSUM expenditures over the 12 quarters of data. Although quarterly expenditure data are price-adjusted to the threshold year using the All Item CPI-U, movements in the experimental thresholds primarily reflect changes in expenditures for food, clothing, shelter, utilities, and medical care.

By design, the experimental thresholds are comprised of basic necessities. In contrast, the official threshold is based on the assumption that one-third of total spending is allocated to food; the remainder is for all other goods and services. However, changes in the official thresholds are affected by changes in the CPI-U which are affected by changes in expenditure patterns over time and associated price movements of all items for all consumers living in urban areas.[13] CE expenditure data are used to produce expenditure shares for use in the production of the CPI-U; weight-base periods are selected for index construction.[14] For example, 1996 price indexes are based on expenditure shares of the average consumer unit during the 1982–84 period; 2004 and 2005 price indexes are based on expenditure shares during 2001–02 period.

The shares of the FCSUM threshold components over the 1996 to 2005 time period were fairly constant, with food and shelter expenditures combined account-

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[13]The CPI-U measures the average change in prices paid by urban consumers for a fixed market basket of goods and services (see BLS, 2009). Unlike the thresholds, the CPI-U is based on the spending and prices faced by consumers living in metropolitan statistical areas (MSAs) and urban places of 2500 inhabitants or more. Non-farm consumers living in rural areas within MSAs are also included. Military consumer units living off base with 50 percent or more of their total family income coming from the armed forces are not included in the CPI-U population.

[14]The CPI-U expenditures shares were produced for low level aggregations by Cage, Falwell, and Schmidt (Cage *et al.*, 2008), in the Division of Consumer Prices and Price Indexes at the BLS, using internal CE data. These weights are identified as biennial weights, chapter 10, by this division. Two years of CE (Diary and Interview combined) are used. For the CPI-U index years of 1996 and 1997, the base weights are from 1982–84 CE data; expenditure groups are based on the 1987 CPI Item Structure. For the 1998–2001 indexes, weights were based on 1993–95 data and the 1998 CPI Item Structure. For the 2002–03 indexes, the weights were based on 1999–2000 data, also the 1998 structure. For the 2004–05 indexes, weights were based on data from 2001–02 and the 1998 item structure. For the 1987 structure only, apparel services and sewing machines were included in apparel, and telephone services, community antennae and cable television services were included in utilities; they were not for the 1998 structure. Adult day care center expenditures were included in the 1998 item structure but not in the 1987 structure. For the share tabulations, food did not include expenditures for alcoholic beverages.

ing for over 50 percent of the threshold;[15] these account for about 45 percent of CPI-U base expenditures during the same time period. Utilities account for about 13–14 percent of the thresholds but only 5 to 8 percent of the CPI-U defined expenditures (depending upon whether telephone services were included or not). The largest shares of expenditures in the CPI-U were for goods and services not included in food, clothing, shelter, utilities, and medical care (around 39 percent). Other goods and services account for about 16 percent of the FCSUM thresholds.

Movements in the FCSUM thresholds and in the official threshold reveal that food prices, as measured by the CPI-U for food, and food expenditures in the threshold increased at about the same rate, approximately 25 percent over the 1996 to 2005 time period. Prices and threshold expenditures for utilities and medical care increased by about 40 to 42 percent. Clothing prices and threshold expenditures decreased about 9 percent. The largest increase in implicit threshold expenditures is for shelter (55.6 percent); the increase in shelter prices was only 31.2 percent.

A major difference in the experimental thresholds and the CPI-U, and consequently in movements of the official poverty thresholds, is related to the treatment of shelter. Recall that out-of-pocket shelter expenditures of the reference family consist of such items as mortgage interest, mortgage principal repayments, property taxes and insurance for homeowners, rent and tenants insurance for renters, and maintenance and repairs for both. The CPI-U for shelter reflects changes in space rents for primary residences of renters and owners along with appropriate expenditure weights.[16] The thresholds represent the spending patterns of and prices faced by four-person families with two children, a group with a high rate of homeownership while the CPI-U is based on the urban population with lower rates of homeownership than the reference family population.

An examination of the CE data used in this study reveals that about 75 percent of reference families in 1996 owned their homes; an additional 5 percent were homeowners by 2005. Of all reference family homeowners, 85 percent had mortgages in 1996. Those with mortgages increased to 89 percent by 2005. For owners with mortgages, median out-of-pocket expenditures for mortgage principal repayments and mortgage interest increased 45 percent over this time period. Median property taxes increased 58 percent for all owners but 67 percent for those with mortgages. Home market values rose approximately 80 percent for reference family homeowners with and without mortgages from 1996 to 2005 (authors' own calculations using the CE data).

Examining expenditure and demographic data that underlie the CPI-U reveals that approximately 60 percent of urban consumer units were owners for the 1996

[15]Following the Panel's estimation procedure (see Citro and Michael, 1995, p. 198, footnote 14), the shares of expenditures in the threshold reflect the expenditures for the threshold components at the 30th and 35th percentiles of the distribution of the sum of expenditures for food, clothing, shelter, utilities, and medical care (FCSUM) for two adult–two child families. Average expenditures for each component of the threshold are calculated using expenditures between the 27.5 and 32.5 percentiles and the 32.5 and 37.5 percentiles (representing the 30th and 35th vingtiles) of the sum of FCSUM expenditures. These shares are converted to share fractions of the FCSUM thresholds using multipliers of 1.15 and 1.25.

[16]Reported rents for primary residences are adjusted by the BLS to omit the cost of utilities in reported rents and thus are made comparable to owners' reported rental equivalence. The change in space rents for non-rent-controlled and non-subsidized or public rental housing is applied to owner-occupied housing in the same location as the rental units.

index; for the 2005 index the rate increased to 64 percent. Shelter expenditures in the CPI-U are based on rental equivalence only and thus mortgage information is not relevant to the production of the CPI-U. For the 1996 index, owners' equivalent rents accounted for about 20 percent of total expenditures; this share increased to 23 percent by 2005 (authors' own calculations using the CE data: BLS, 2007b).

These differences in shares and movements in shelter expenditures and prices are consistent with our finding that the FCSUM thresholds increased more rapidly over the 1996 to 2005 period than did the official poverty threshold, based on the CPI-U. Such an outcome would result from a market where mortgaged home prices are increasing at a faster rate than owners' rents, a phenomenon that occurred over the 1996 to 2005 period.

4.2. *Family Resources*

Changes in poverty thresholds would be expected to change trends in poverty statistics over time. However, these statistics are also affected by changes in income and other tax and transfer policies. Besides before-tax money income, changes in food stamp benefits, taxes, and work-related expenses may change trends in poverty rates. An examination of the elements in the family resource measure sheds light on changes in overall family resources from 1996 to 2005.

Table 1 shows the aggregate dollar amounts added to or subtracted from before-tax money income for the period 1996 to 2005 to calculate family resources for the experimental poverty measure. Overall, these additions and subtractions result in relatively large net subtractions from income. For example, in 1996, additions of food stamps, net realized capital gains, and the earned income tax credit (EITC) sum to total additions of \$215.2 billion.[17] For that same year, subtractions of all taxes and work expenses totaled \$1178 billion, five times as large as additions to income. By 2005, subtractions totaled seven times additions to income. Note that while aggregate income taxes fell in 2002 and 2003, payroll taxes and work expenses continued to increase substantially across the period. Since over time we are subtracting larger and larger amounts relative to additions, the experimental measures may result in higher poverty rates due in part to these calculations.

4.3. *Experimental Poverty Rates*

To determine poverty status, total family resources are compared to the spending-needs thresholds. If the "inflow" to family resources is below the "outflow" amount needed, then all individuals within the family are classified as poor. Taking account of spending on basic goods and resources available to families for spending provides information about families who, while not poor using the official measure, may have difficulty meeting basic needs because necessary outflows exceed inflows.

Table 2 and Figure 2 show poverty rates, based on the official, relative, and experimental poverty measure, for the years 1996 to 2005. The results show that the official poverty rate fell from 1996 to 2000 (13.7 to 11.3 percent). After 2000,

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[17]Note that a large part of additions to income are made up of net realized capital gains and that these values vary depending on changes in imputation methodology at the Census Bureau.

TABLE 1

Aggregate Additions and Subtractions to Family Resources ($ billion) for the Total Population: 1996 to 2005

Year	Additions			Subtractions				
	Food Stamps[1]	Net Capital Gains[2]	Earned Income Tax Credit[3]	Federal Income Tax[3]	State Income Tax[3]	Payroll Taxes[3]	Work Expenses[4]	Childcare[4]
1996	14.2	179.4	21.6	627.0	163.2	266.0	98.0	19.5
1997	12.3	239.6	21.7	703.0	180.4	285.0	102.0	21.0
1998	10.8	339.9	22.5	757.0	200.6	304.0	106.0	22.1
1999	9.6	457.7	23.5	858.0	224.6	328.0	106.0	18.5
2000	8.7	468.8	22.5	907.5	237.0	343.0	105.0	19.1
2001	9.7	483.8	23.7	923.0	248.7	357.0	120.0	19.8
2002	11.2	58.3	25.7	744.0	179.3	386.0	128.0	19.2
2003	12.9	78.0	26.1	745.0	188.4	396.0	128.0	19.1
2004	14.7	185.0	27.0	968.0	198.2	409.0	134.0	20.0
2005	16.2	179.8	29.3	864.0	207.8	431.0	152.0	22.2

Notes:
[1]Reported face value of food stamps received over the year in CPS ASEC.
[2]Capital gains and losses are imputed to the CPS ASEC at the Census Bureau using the IRS Statistics of Income (SOI) file.
[3]Tax figures are simulated based on reported income amounts and imputed capital gains and losses.
[4]Work expenses and child care expenses while parents work are based on data collected in the CPS and the SIPP. A percentage of median expenses reported in the SIPP are assigned to individuals and are computed based on the number of weeks worked reported in the CPS. After 1998 a question in the CPS regarding payment for childcare was used. Prior to that, whether or not families paid for childcare was modeled using SIPP data and applied to CPS families.

Source: Authors' own calculations using the 1997–2006 CPS ASEC (Census Bureau, 2007a).

TABLE 2

OFFICIAL AND EXPERIMENTAL POPULATION POVERTY RATES USING
INCOME-BASED RESOURCES: 1996–2005

Year	Official	Experimental	Relative
1996	13.7	17.1	17.5
1997	13.3	16.2	17.4
1998	12.7	15.8	17.7
1999	11.9	15.2	17.7
2000	11.3	15.3	17.2
2001	11.7	16.1	17.1
2002	12.1	17.1	17.1
2003	12.5	17.0	17.3
2004	12.7	17.2	17.0
2005	12.6	17.7	16.7

Source: Authors' own calculations using the 1997–2006 CPS
ASEC (Census Bureau, 2007a) and thresholds based on CE Interview
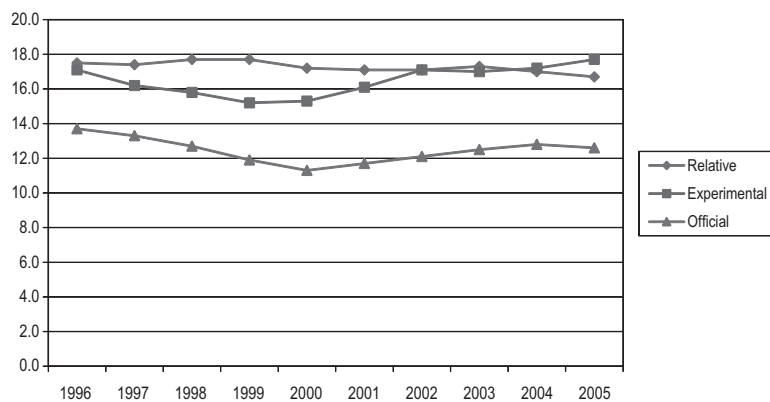data (BLS, 2007a).

Figure 2. Official, Relative, and Experimental Poverty Rates for the U.S. Population: 1996–2005

the official rate begins to increase, reaching 12.7 percent by 2004 and remaining stable at about the same rate in 2005. The experimental poverty measure displays a similar pattern. Differences in trends are due to increases in the experimental thresholds as well as increased payroll taxes and work expenses that families faced. While the official rate is lower in 2005 than in 1996, the spending need-based rate is highest in 2005. The increase in taxes and work expenses, and the experimental thresholds after 2000, bring the experimental rate back to the 1996 level and beyond, to 17.7 percent by 2005.

The relative threshold and resource measure result in an average poverty rate of 17.3 percent for the period. From 1996 to 2005, poverty rates using the relative measure range from a low of 16.7 percent in 2005 to a high of 17.7 percent in 1999. Recent estimates of relative poverty (e.g., Smeeding, 2005; OECD, 2008) reveal higher relative poverty rates for the United States than for many other countries. Using a disposable income poverty measure, Smeeding (2005) reported a poverty rate for the U.S. population to be about 17 percent in 2000. The OECD published relative poverty rates for 2004, ranging from a low of 5 percent for Denmark and

TABLE 3

OFFICIAL AND EXPERIMENTAL POVERTY RATES FOR SPECIFIC DEMOGRAPHIC GROUPS: 1996 TO 2005

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Children										
Official	20.5	19.9	18.9	17.1	16.1	16.3	16.7	17.6	17.8	17.6
Experimental	22.8	21.8	21.2	19.8	19.6	19.9	21.1	20.7	20.5	21.1
Non-elderly adults										
Official	11.4	10.9	10.5	10.1	9.4	10.1	10.6	10.8	11.3	11.1
Experimental	14.4	13.7	13.3	13.1	12.8	13.9	14.8	14.8	15.3	15.5
Elderly										
Official	10.8	10.5	10.5	9.7	10.2	10.1	10.5	10.3	9.8	10.2
Experimental	18.0	16.6	16.4	16.4	18.5	19.2	20.9	20.8	20.2	21.5
White										
Official	11.2	11.0	10.5	9.8	9.4	9.9	10.2	10.5	10.8	10.6
Experimental	14.3	13.8	13.3	13.1	13.2	14.0	15.0	14.8	15.0	15.2
Black										
Official	28.4	26.5	26.1	23.6	22.0	22.7	23.9	24.3	24.8	24.9
Experimental	32.8	30.1	30.3	27.5	26.8	28.0	29.7	29.5	30.1	31.9

Source: Authors' own calculations using the 1997–2006 CPS ASEC (Census Bureau, 2007a) and thresholds based on CE Interview data (BLS, 2007a).

Sweden to a high of 18 percent for Mexico and Turkey, followed by the U.S. at 17 percent for 2005. For these two cross-country studies, resources were country-specific household disposable income with taxes subtracted and cash and near-cash transfers added to money income; work-related expenses were not subtracted from income.

Figure 2 shows the differences in trends in poverty rates over this time period for the three poverty measures. While the experimental poverty rates are more like the relative measure in terms of level, there is a tendency to follow the trends apparent in the official poverty measure, falling in the first half of the period, and then increasing to 2005. Unlike the relative measure, the official poverty rates fall and then rise with the recession that occurred between March and November of 2001, as do the rates based on the experimental measure.

Finally, in Table 3 we focus specifically on official and experimental poverty rates for demographic groups. These groups are identified in terms of age and race. Children and families identified as black are of particular interest as these groups have had historically high poverty rates. For both groups, poverty rates based on the official and experimental measures are lower in 2005 than in 1996. Among the groups considered, poverty is highest among blacks over this time period regardless of the measure used. Official child poverty rates are also high. The child poverty rate, based on the experimental measure, is higher than the elderly rate in 1996; however, by 2005, elderly poverty surpasses child poverty by 0.4 percentage points. Poverty rates for children and blacks are lowest from 1999 to 2001 for both poverty measures, while official poverty is lowest for the elderly in 1999 and experimental poverty is lowest in 1997 to 1999.

5. SUMMARY AND CONCLUSIONS

The new poverty measure in this study follows recommendations presented in the report, *Measuring Poverty: A New Approach* (Citro and Michael, 1995)

and subsequent research. Using the same methods over time, poverty rates were produced that reflect the spending-need outflows and income inflows of families in the United States. Poverty rates based on the experimental measure were compared to rates based on the official measure and a relative measure for 1996 through 2005. This is among the first studies to produce a NAS-based poverty measure for the U.S. that emphasizes the consistency property deemed desirable for poverty measurement.

The experimental thresholds reflect recent spending levels and patterns, and changes in living standards over time, unlike the official poverty thresholds. Reflecting increased spending needs of families for basic goods and services from 1996 to 2005, the FCSUM thresholds rose more rapidly than the official poverty thresholds and the CPI-U, the updating mechanism for the official measure. Differences in the experimental threshold and CPI-U were highlighted to provide insight regarding why the official and experimental thresholds move differently. One of the more pronounced findings was that the largest shares of expenditures that are accounted for in the CPI-U are for goods and services that are not included in the basic needs bundle. Thus, the U.S. official poverty threshold is influenced more by expenditures for and prices of goods and services that primarily do not include food, clothing, shelter, utilities, and medical care. Another striking result is that implicit shelter expenditures in the thresholds rose almost twice as fast as the shelter expenditures underlying the CPI-U. This difference is due to the treatment of owner-occupied shelter. Reference family spending for property taxes, mortgage interest, and mortgage principal repayments increased more rapidly than rents of homeowners in the CPI-U from 1996 to 2005. Relative thresholds were shown to be very similar in level to the experimental FCSUM thresholds, both higher than the official thresholds.

The resource measure was constructed to represent the ability of families to meet the needs implicit in the FCSUM threshold. Income inflows, net of taxes and work-related expenses, were compared to spending need- or outflow-based thresholds. Unlike in the *Measuring Poverty* report, the only government near-cash benefits included in resources was for food assistance. The cash value of government food stamps was included in resources as purchases using food stamps were included in food expenditures in the threshold measure. All other spending in the thresholds is reported net of subsidy or transfer receipt; thus any in-kind subsidies or transfers for shelter, food, utilities, clothing, and medical care are already accounted for in the spending measure. The receipt of a subsidy or transfer means that the family has lower spending needs; and subsequently lower resource needs.

The experimental poverty measure, calculated over the ten-year period, showed trends and levels of poverty that differed from the official measure for the overall population and for specific demographic groups. An important finding of this work is that increases in the amount needed to pay for basic goods and services, particularly increased shelter expenditures, resulted in a greater increase in the number of families not able to meet basic needs than is reflected by the official poverty statistics.

A relative measure of poverty was shown to be more like the experimental measure in terms of levels, but it did not follow the same trends as the experimental or official measures. These latter two measures reflected changes in economic

conditions over the period, falling from 1996 to 2000 and then increasing afterwards, reflecting the recession of 2001. In terms of poverty rates, official poverty was lowest over this period, followed by the rates based on the experimental measure. Relative resource poverty was comparable to that reported in international comparisons for the 2000s.

The poverty measure produced for this study reflects assumptions, which like other poverty measures, involve subjective judgment. For example, expert judgment guided the selection of food, clothing, shelter, utilities, and medical care as the basis of the threshold. Identifying percentages of median expenditures that related to the 30th to the 35th percentiles of the spending distribution was also a matter of judgment. A goal of this study was to produce a poverty measure based on an inflows and outflows concept as one option in the production of an internally consistent poverty measure. When relative measures of poverty are used, consistency is implicit in the design; however, when other types of measures are used, researchers need to pay particular attention to consistency. Otherwise, poverty could be reduced by simply adding the value of in-kind transfers of goods and services to resources without accounting for the benefit in the thresholds, and thereby biasing downward poverty rates and gaps.

Our constant guides, while producing and describing the measure presented in this research, were the properties that the Panel deemed desirable for a revised poverty measure for the U.S.: consistency in the construction of thresholds and resources; statistical defensibility; understandability; broad acceptance by the public; and operational feasibility. In producing outflows-based thresholds and inflows-based resources, and explaining the procedures that underlie these, we hope to have produced a measure that has these important properties.

APPENDIX

TABLE A1
Official, Relative,[1] and NAS-Based[2] Poverty Thresholds for the Reference Family:
1996–2005

Year	Official	Relative	FCUSM	Confidence Interval: FCSUM	
1996	$15,911	$18,034	$18,096	$17,428	$18,763
1997	$16,276	$18,894	$18,424	$17,912	$18,935
1998	$16,530	$20,060	$18,994	$18,465	$19,523
1999	$16,895	$20,934	$19,648	$19,149	$20,147
2000	$17,463	$21,722	$20,731	$20,169	$21,293
2001	$17,960	$22,174	$21,640	$21,140	$22,141
2002	$18,244	$22,370	$22,600	$22,076	$23,125
2003	$18,660	$22,964	$23,109	$22,578	$23,640
2004	$19,157	$23,314	$23,738	$23,167	$24,310
2005	$19,806	$23,742	$24,784	$24,300	$25,269
1996 to 2005 percentage change	24.5%	31.7%	37.0%		

Notes:

[1]Relative threshold is based on the median before-tax money income of adult equivalized income. That median is multiplied by 2 to obtain the 4-person threshold.

[2]Based on out-of-pocket expenditures (including repayment of mortgage principal for owned housing).

Source: Census Bureau and authors' own calculations using U.S. Consumer Expenditure Survey data (BLS, 2007a).

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