

*Creating a Consistent Poverty Measure over Time*  
*Using NAS Procedures: 1996-2005*

by

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*Abstract* -- This paper presents an experimental poverty measure and compares it to the current official measure, now more than 40 years old. The experimental measure is based on an approach, drawn from work by a National Academy of Sciences (NAS) expert Panel, to consistently define basic needs and family resources. The experimental thresholds are based on out-of-pocket spending by families on basic goods and services and are based on an “outflows” concept. The resource measure is based on an “inflows” concept and reflects money coming into the household that is available to meet one’s basic needs. The U.S. Consumer Expenditure Survey serves as the basis for the experimental thresholds and the Current Population Survey Annual Social and Economic Supplement serves as the basis for the resource measure. Results for 1996 to 2005 are reported with trends examined. An important finding is that increases in expenditures for shelter and utilities, captured in the new thresholds, suggest a greater increase in the number of families not able to meet basic needs than is reflected by the official poverty statistics.

*Keywords:* Consumer Expenditures, Income Measures, Poverty Thresholds, Poverty Measurement

## I. Introduction

In 1995, the National Academy of Sciences (NAS) Panel on Poverty and Family Assistance, under the auspices of the Committee on National Statistics (CNSTAT), published a report, *Measuring Poverty, A New Approach* (Citro and Michael, 1995). This expert Panel argued that the official U.S. poverty measure is outdated, given the changes in U.S. society and in government policies (Citro and Michael, 1995; also see Ruggles, 1990). They noted that the current measure does not account for the increased labor force participation of mothers and working families, nor does it account for changes in health care costs and needs. This Panel agreed that, as living standards and notions of minimum needs change, poverty thresholds too should change and that income measures that reflect the resources available to families, should take account of government policies that make it easier for families to meet those basic needs.

The current poverty threshold “no longer represents the concept on which it was originally based—namely, food times a food share multiplier [the percentage of after-tax money income spent on food]—because that share will change (and has changed) with rising living standards. Rather, the poverty threshold reflects in today’s dollars the line that was set some 30 [now more than 40] years ago” (Citro and Michael, 1995, p. 25). Total expenditures of families have increased in real terms, and spending on nonfood items has risen more rapidly than spending on food. While expenditures on food accounted for one-third of the after-tax money income in the 1950s, it is estimated that food would account for less than one-sixth of this income today.<sup>1</sup> “If the original approach were used to develop the poverty thresholds today, their value would be significantly higher.” (Citro and Michael, 1995, p. 30)

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<sup>1</sup> The authors conducted an exercise to determine what the threshold would be if the same procedure were used today as was used to derive the official threshold more than 40 years ago. Internal to Bureau of Labor Statistics (BLS) Consumer Expenditure Survey quarterly income and expenditure data from 2003Q1 through 2004Q1 were used along with the U.S. average value of the U.S. Department of Agriculture (USDA) Thirty Food Plan in January, June, and December (USDA, 2003). The Food Plan assumes that all meals and snacks are purchased at stores and prepared at home. Since the Food Plan is based on the ages for older children and adults and the gender of family members, the value of the Plan for a specific four-person family was used to determine the value of the food adequacy standard for this exercise. The family was composed of a husband and wife who are both in the 20-50 year age range, one child who is 2 years old, and another who is in the 3-5 year age range. For this time period, when income data were missing they were imputed by the BLS. However, missing income taxes were not imputed thus after-tax income data were not available for the analysis. Instead, food spending shares were based on before-tax money income, total expenditures, and consumption expenditures to provide a range of multipliers to derive new food spending-based thresholds. Total before-tax money income includes the cash value of food stamps but not food or rent as pay. Total expenditures are defined by the BLS for publication of CE data (USDL, 1997; BLS 2004). Consumption expenditures are a subset of total expenditures; they do not include cash contributions, insurance premiums for life or other personal insurance, or contributions to retirement accounts or Social Security. The food share of before-tax money income for a four-person consumer unit was 10.2 percent, the food share of published CE total expenditures was 13.8 percent and the share of consumption expenditures was 16.1 percent. These shares translate into multipliers of 9.77, 7.23, and 6.23. Applying these multipliers to the annual value of the Food Plan

Further, the current measure of family resources that is compared to the official poverty thresholds is also outdated and is not consistent with the threshold measure. The measure of resources used for official poverty measurement is defined as before-tax money income while the thresholds are based on spending relative to after-tax income. Few families at the lower end of the distribution paid taxes when the resource measure was first developed for poverty measurement. Now many of these families qualify for the earned income tax credit (EITC) that did not exist when the measure was first developed, but is now an important anti-poverty program.

Since the NAS Panel's report was released, research has been conducted on the experimental measure that they recommended. Much of this work has been conducted at the Census Bureau and Bureau of Labor Statistics (e.g., Garner, 2005; Garner et al., 1998; Iceland et al., 2001; Johnson et al., 1997; Short, 2001, 2005; Short et al., 1998, 1999; and Short and Garner, 2004). The current research represents a culmination of this previous work, taking into account the concerns of the research and policy communities regarding the desirable properties of a poverty measure (CNSTAT, 2005; Iceland, 2005). Properties deemed desirable by the Panel 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). The primary aim of this research is to present a poverty measure that is fundamentally based on the NAS recommendations with these desirable properties. The Panel emphasized that their purpose was to propose a *procedure* that could be used to produce a poverty measure that is more appropriate for current society. The procedure calculates a poverty threshold that is, by design, updated on a continuous basis and reflects changes in levels of basic needs over time. The proposed measure of income or family resources reflects the effect of taxes and transfers and takes account of necessary work expenses such as child care and commuting to work in a way that is consistent with the threshold concept.

Just as the Panel recommended in the 1995 Report, the starting threshold is for a reference family with particular characteristics and accounts for food, clothing, shelter, and utilities. Participants at a 2004 NAS Workshop recommended that medical care be accounted for in the threshold as well (see CNSTAT, 2005 and Iceland, 2005); thus, the threshold measure produced and presented in this research accounts for medical care. In the 1995 Report, the Panel also recommended that the thresholds be based on data from the U.S. Consumer Expenditure Survey.

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(\$4,893.20) resulted in thresholds of \$47,796 using before tax money income, \$35,393 using total expenditures, and \$30,469 using consumption expenditures. The official poverty threshold for a two-adult two-child family (\$18,660),

In this study, spending “outflows” and money “inflows” are the focus. Spending outflows are those for basic needs only; food, clothing, shelter, utilities, and medical expenses. If a family’s annual cash inflow, including relevant near-cash benefits and net of necessary expenses, falls below the threshold level of cash outflow, then that family is designated as poor. Spending needs and outflows are defined in terms of out-of-pocket expenditures<sup>2</sup> using U.S. Consumer Expenditures Survey data (CE). The resource measure includes annual inflows based on after-tax money income plus near-cash benefits that are available to meet spending needs defined in the thresholds. This measure uses the Current Population Survey Annual Social and Economic supplement (CPS). Consistent with the threshold measure, 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. This outflow concept is constructed with the main purpose that it is measured in a consistent way with the experimental thresholds. Much care has been taken to thoroughly understand the NAS procedures used to construct both sides of the experimental poverty measure and to ensure that the thresholds and resources are consistent. This is the first attempt, in the economics literature, to produce a consistent measure of poverty over time using the NAS procedure.<sup>3</sup>

The paper begins with a review of the current official measure of poverty followed by a description of the threshold and the elements that make up the resource side of the experimental poverty measure proposed in this research. Efforts are made to ensure that the threshold and resources are consistent in concept and in measurement. The technical and conceptual issues that underlie the NAS-based approach to poverty measure construction are highlighted. Results for 1996 through 2005 are presented. The NAS-based thresholds are compared to the current official thresholds and examined with regard to underlying concepts and movements in both series over time. Poverty rates are calculated that compare the measure presented here with the current official measure to illustrate differences in trends. Poverty rates are presented for the total population and for specific subgroups of the population that have been most susceptible to hardship historically.

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61.2 percent of the least generous of these thresholds.

<sup>2</sup> Throughout the remainder of this study, spending and expenditures 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, for example housing subsidies or energy assistance, are not included.

<sup>3</sup> Our first attempt to produce a consistent measure of poverty, using the NAS procedure, was presented during the American Statistical Association annual meeting in 2005 during a session focused on the NAS recommended procedures (see Garner 2006; Short, 2005).

## II. The Current Official Poverty Measure

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 (one-third for families of three or more; other shares were used for smaller families) using data from the 1955 Household Food Consumption Survey, and a food adequacy standard based on the same survey. The food adequacy standard selected was the USDA Economy Food Plan, issued by the Department 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. Thus, if family members ate at school or on the job, those meals were to be prepared at home. Also for this standard it was assumed that “the homemaker is a good manager and has the time and skill to shop wisely, 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, thresholds 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 change 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).” 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.<sup>4</sup> The updating

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<sup>4</sup> The CPI market basket changes on a periodic basis. In addition to this regular change in the market basket, other changes have been made in the production of the index over the years (see <http://stats.bls.gov/cpi/home.htm> for references). Shapiro and Wilcox (1996) note that, “The consumer price index is not a static construct” (p. 137) with changes having been made over the years to improve the index. 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. For example, in January 1983, the BLS changed the way in which homeownership costs were measured in the CPI-U, with a rental equivalence method replacing the asset-price approach to homeownership costs that had been used in previous years. The BLS has released a series of price indexes that incorporated this change for earlier periods, but these re-estimated indexes do not replace the official CPI’s that were released earlier (USD, 1997).

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<sup>5</sup>).

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. Before-tax money income includes the following: earnings, unemployment compensation, workers' compensation, Social Security, Supplemental Security Income, public assistance, veterans' payments, survivor benefits, pension or retirement income, interest, dividends, rents, royalties, income from estates, trusts, educational assistance, alimony, child support, assistance from outside the household, and other miscellaneous sources received on a regular basis. Non-cash benefits (such as food stamps) are not included, nor are capital gains or losses. If a person lives with family members, the family member incomes are added together and compared to thresholds that reflect the family size and composition.

Concerns have been raised regarding: (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 threshold and resource measures in general. Citro and Michael (1995, p. 9) noted that, "It is important that family resources are defined consistently with the threshold concept in any poverty measure. The current [official] measure violates this principle, as has some recent work to investigate alternatives." Referring to the importance of income taxes specifically, Hill and Michael (2001, p. 728) state that, "...in the early 1960s, when the measure was first introduced, the amount of taxes paid by families at or below the poverty level was so low as to make only a trivial difference. That is decidedly not the case today, however." Hill and Michael further note that, "The inconsistency between the thresholds and the income measure is one of the often-cited major flaws in the official measure of poverty." Blank (forthcoming 2008) has also addressed this issue, recommending the following: "Explicitly direct the statistical agency to provide a poverty definition that produces both a credible and coherent poverty threshold and a consistent and appropriate resource measure." Continuing Blank stated that,

Too many poverty measurement alternatives have changed only the resource definition side of the equation. The NAS Panel was quite clear that both the resource definition and the

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<sup>5</sup> Plutocratic weights are based on the value of goods and services across all consumer units for each commodity and service represented in the index. For example, the weight for food is total spending on food for all consumer units in the CPI-U population sample divided by the value of all goods and services for this population. These weights are then combined with prices to produce the index. Democratic weights reflect the distribution of consumer units in the population. For example, consumer unit specific price indexes could be created based on the value of goods and services consumed or purchased by each consumer unit and the prices that the consumer unit faces. To obtain an overall index for the population, the consumer unit specific price indexes would then be averaged using demographic population weights to reflect the values of goods and services and price experiences of all consumer units.

thresholds were out-of-date and that a consistent definition of both is necessary for an improved poverty measure. Substantially altering how we count resources without providing a consistent measure of thresholds will only create long-term incoherence in any new poverty statistic. In my opinion, the 1963 poverty thresholds are less defensible than the 1963 definition of economic resources as “cash income only.” The thresholds should use the latest available data to calculate a reasonable cut-off level, based on a measure that is consistent with the definition used to define resources.

A major goal of the current research is to produce consistently defined thresholds and resources. In the next section the concepts, methods, and data underlying the thresholds and resources are described.

### **III. 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, during the 2004 NAS Workshop participants (see CNSTAT, 2005 and Iceland, 2005) agreed that medical care be accounted for in the thresholds rather than in resources, a change from the original recommendations. Also, a three-parameter equivalence scale was to replace the Panel’s original two-parameter scale.

As noted earlier, an issue raised by Panel members and researchers, since the 1995 report was published, is the need for consistently defined thresholds and resources. In this study, strict adherence to consistency is followed. The result is a resource measure that differs in important ways from the resource measure proposed by the Panel. The threshold measure presented in this study is based on expenditures defined as expenditure outlays;<sup>6</sup> this is a slightly different from the “processing convenience” definition of expenditures used by the Panel (Citro and Michael, 1995, p.148).<sup>7</sup> Given that the thresholds are outlays-based, consistent resources are defined in terms of cash and near-cash income, net of income taxes and work related expenses.

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<sup>6</sup> For the BLS definition of expenditure outlays, see Rogers and Gray, 1994.

<sup>7</sup> The basic difference between the definition in this study and the one used by the Panel is that the shelter expenditures of owners include mortgage principal payments here while the Panel’s expenditures did not. The Panel indicated that their preferred definition of owner shelter expenditures “would include actual outlays for mortgage payments, taxes, insurance, and maintenance and repairs, together with an imputed amount for the estimated rental value of the home net of such outlays” (Citro and Michael, 1995, p.148). By adding and then subtracting the same outlays, only the imputed rental value of owner-occupied homes would be included in the threshold for owners’



In addition to consistency, another advantage of the poverty measure produced in this study is that it is well documented and described, promoting understandability, just as the Panel's measure is. This is of particular importance with regard to the thresholds. While we can surmise what is contained in the current official thresholds, there remains controversy about the exact measurement process used by Orshansky in the construction of the thresholds and assumptions regarding the goods and services accounted for in the official thresholds and the value of these (For a discussion of this issue, see Betson, 2000 and Bavier, 2001).

#### ***A. 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. In the U.S., the official measure of poverty is concerned with the costs of some minimum bundle of goods and services that are necessary to meet one's most basic needs. A poverty threshold based on costs, such as the current official measure, is expressed in terms of the spending necessary to pay for a basic bundle of goods and services. 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.

An important advantage of following the procedure outlined by the NAS Panel is that the thresholds are automatically updated over time by the real growth in spending for basic goods and services that pertain to a concept of poverty rather than solely by price changes.<sup>8</sup> Such a procedure allows for improvements in societal levels of spending for a basic bundle of goods and services. Triest (1998) notes that this approach, "is consistent with the intuitive notion that if the poor are better off in terms of basics, then the poverty rate should fall" (p. 102).

This research is not the first to produce out-of-pocket spending-based thresholds; although it is the first to produce out-of-pocket spending-based thresholds following the NAS Panel procedure. Other researchers have constructed spending-based thresholds or standards. For example, Renwick and Bergman (1993; Renwick, 1998) constructed spending-based thresholds by building basic needs budgets, specifying adequacy standards for each of the major groups of goods and services that families consume and adding an appropriate amount for direct taxes. Spending-based self-sufficiency standards have been constructed by building basic family budgets using local prices

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shelter; such a definition would result in a consumption-based threshold measure. For examples of consumption-based thresholds see Garner, 2006, and Garner and Short, 2001.

<sup>8</sup> The Panel recommended that the thresholds be updated for real growth in the consumption of basic goods and services that pertain to a concept of poverty (Citro and Michael, 1995, p. 103). However, they used consumer spending for updating rather than changes in consumption.

and expenditures, and expert judgment (for example, see Bernstein et al., 2000; Pearce, 2005a and 2005b). Personal assessments of what is needed financially to provide for minimum levels of living too have been used to produce thresholds based on minimum spending needs (for examples, see Garner and Short, 2003 and 2004, and Morissette and Poulin, 1991).

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; and (4) choosing an updating mechanism. A fifth step in the Panel's procedure was to adjust for geographic differences across areas. In this study, this step is not implemented based on a discussion of the topic during the 2004 NAS Workshop (CNSTAT, 2005). Several Workshop participants suggested that further research on approaches to make geographic adjustments is necessary, while others said that the methods currently available are sound. However, by the end of the discussion, it was decided that research to make geographic adjustments should continue but that such adjustments should not be implemented at present.<sup>9</sup>

For this study, the reference family includes two related adults and children.<sup>10</sup> The NAS 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). Some work has been done in this area and suggests that the more inclusive the unit of analysis the lower the resulting poverty rates (Short et al., 1999), though the traditional definition of family is employed here. The criteria used by the Panel to select the family type was that the reference family would "fall near the center of the family size distribution rather than at one of the extremes ... it is preferable for the reference family to be one that accounts for a relatively large proportion of the population because its spending patterns observed in a sample survey will be the basis for the poverty threshold..." (Citro and Michael, 1995, p. 101). Using the data that underlie the 2005 thresholds for this study, this type of family represents 8.45 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.

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<sup>9</sup> There was also concern about how worthwhile it would be to spend significant resources improving geographic adjustment methods due to the "political infeasibility" that geographically adjusted thresholds would ever be adopted (CNSTAT, 2005, p.16).

<sup>10</sup> A related adult is either the spouse of the reference person or an adult who is related by blood or other legal arrangement. Children are related by blood or legal arrangement.

Once the reference family is chosen, median expenditures for a select group of goods and services are estimated. The Panel defined this group to include food, clothing, shelter, utilities, and other needs (e.g., household supplies, personal care, and non-work-related transportation).<sup>11</sup> As noted earlier, the 2004 NAS Workshop participants agreed that medical care be treated as a basic need, along with food, clothing, shelter, and utilities; thus medical care is added to the threshold group.<sup>12</sup> The threshold is referred to as the “FCSUM” threshold or “experimental” threshold in the remainder of this study.

The thresholds are based on expenditure outlays. Specifically, 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
  - Payments of mortgage principal<sup>13</sup>
  - Mortgage prepayment penalties
  - Property taxes

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<sup>11</sup> 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 and Short, 2001). For this study, the authors refined the definition to reflect the spending outflows of reference families. Shelter expenditures include mortgage principal payments of owners. Such payments are not included in the CE publication definition of expenditures because they represent allocations to savings. However, mortgage principal payments are not discretionary, and cannot be used to meet other basic needs of the family. Other differences from the Panel calculations include: payments for home equity loans and lines of credit are not included in the study threshold; spending on utilities for vacation homes; food and rent as pay are not included. 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.

<sup>12</sup> Inclusion of medical care in the thresholds represents a deviation from the original recommendation of the NAS Panel that medical out-of-pocket expenses be subtracted from income as a necessary expense. For earlier research with medical care included in the thresholds, see: Banthin, et al. (2001), Bavier (2000, 2001), Short (2001), Short and Garner (2002). See Banthin (2004) for a discussion of medical care in poverty measurement.

<sup>13</sup> Mortgage principal payments are not included in the BLS definition of expenditures because these payments represent allocations to savings in the form of increases to home equity for owner-occupied housing. However, unlike allocations to other savings accounts or assets that are discretionary, mortgage principal payments are not discretionary once a commitment to live in a mortgaged housing unit is made. Such payments are part of shelter spending and cannot be used to meet other basic needs of the household or family.

- 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 selected percentages that correspond to the reference family's expenditures at the 30<sup>th</sup> and 35<sup>th</sup> percentiles of the distribution of the sum of food, clothing, shelter, and utilities (FCSU) expenditures. Following the same procedure for this study, approximately 78 and 83 percent of median expenditures correspond to the 30<sup>th</sup> and 35<sup>th</sup> percentiles of the distribution of FCSUM expenditures for reference families in the U.S. The midpoint of the recommended percentage range is used to set the value of the thresholds; the same procedure was followed by the Panel and other researchers (e.g., Short et al., 1999).

Once the percentages of median expenditures have been determined, multipliers are applied to add a small additional amount to allow for other needs. The Panel suggested a range of multipliers to account for expenditures for personal care, transportation (one-half of transportation expenditures are considered to be non-work related), education, and reading materials.<sup>14</sup> The Panel used multipliers of 1.15 and 1.25 in their derivation of the reference family threshold. These multipliers are based on the relationship between the sum of food, clothing, shelter, and utilities expenditures and expenditures for smaller and larger other bundles of other needed goods and services (see Citro and Michael, 1995). These same multipliers are applied in this study, but only to the non-medical part of the threshold.

The general formula for deriving the reference family threshold, using food, clothing, shelter, utilities, and medical care is shown in the equation below.

$$Threshold = (1 - s_{medical}) \frac{(1.15 * P_L * M) + (1.25 * P_H * M)}{2} + (s_{medical}) \frac{(P_L * M) + (P_H * M)}{2} \quad (1)$$

where

$s_{medical}$  = medical share of threshold value

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<sup>14</sup> *Transportation* expenditures were defined by the Panel to include vehicle finance charges, expenses for gasoline and motor oil, maintenance and repairs, vehicle insurance, public transportation (including air fares), vehicle rentals, and licenses and other charges. In addition, transportation included the total purchase price (minus the trade-in value) on new and used vehicles.

*Personal care* includes products for hair, oral hygiene, and shaving, cosmetics and bath products, electric personal care appliances, other personal care products, and personal care services.

*Education* includes tuition, fees, textbooks, supplies and equipment for public and private nursery schools, elementary, and high schools, colleges, and universities, and others schools.

*Reading materials* includes subscriptions for newspapers, magazines, and books through book clubs, purchase of single copy newspapers, and magazines, newsletters, books, encyclopedias, and other reference books.

$P_L$  = lower percentage of median costs

$P_H$  = higher percentage of median costs

$M$  = 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 (Betson, 1996). The three-parameter scale has been used in several BLS and Census Bureau studies (Johnson et al., 1995; Short et al., 1999; Short 2001). The three-parameter equivalence scale is applied to the non-medical part of the threshold. 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, particularly in the presence of health insurance. The three-parameter scale is shown below.

$$\text{One and two adults: } scale = (adults)^{0.5} \tag{2a}$$

$$\text{Single parents: } scale = (adults + 0.8 * firstchild + 0.5 * otherchildren)^{0.7} \tag{2b}$$

$$\text{All other families: } scale = (adults + 0.5 * children)^{0.7} . \tag{2c}$$

The economy of scales factor is set at 0.70; the Panel recommended a range of 0.65 to 0.75.

Medical risk indexes are created to account for variations in family expenditures related to family size, and the age and health insurance coverage of family members.<sup>15</sup> The medical risk indexes are calculated as the ratio of median medical out-of-pocket expenditures for different groups compared to the median expenditures of the reference family. Only the medical part of the threshold is adjusted by the medical risk indexes.

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<sup>15</sup> One of the goals of the current research was to use the CE Interview Survey data for the production of the thresholds without auxiliary data from another survey. In earlier research (Short and Garner, 2002), health status of members was also accounted for in the medical risk indexes; these earlier indexes were based on Medical Expenditure Panel Survey data. An additional challenge in using the CE to produce the medical risk indexes is that the CE does not collect health insurance information for each member; data are collected on whether the consumer unit as a whole has various private health insurance policies. However, data are collected concerning the total number of people who are covered by Medicaid and Medicare.

The procedure to calculate the experimental thresholds is repeated each year using the three most recent years of CE data. Each year's expenditures are brought forward (or backward)<sup>16</sup> to the threshold year using the U.S. Consumer Price Index (CPI-U) for all items. After expenditures are price adjusted to the threshold year, the median of the distribution of the sum of food, clothing, shelter, utilities and medical care expenditures is estimated. The procedure for annually updating the thresholds is referred to as a quasi-relative approach. By design, the resulting experimental thresholds are more reflective of current needs than are the official threshold. Citro and Michael (1995) state that this approach allows for such changes "in a conservative manner" (p. 154).

### ***B. 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 resource measure presented here represents an attempt to construct a poverty measure that is internally consistent with the poverty thresholds, a priority of the Panel's. 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. As noted by Fisher (1997), when Orshansky was developing the poverty thresholds, the CPS was the only good source of nationally representative income data. However, only before-tax income data were available. 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.<sup>17</sup>

Family resources are 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 is 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.

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<sup>16</sup> Expenditures for earlier years than the threshold year are adjusted to reflect threshold year prices. Data, collected in the first quarter of the year after the threshold year, are adjusted back to the threshold year.

<sup>17</sup> See Fisher (1997) footnote number 57.

Constructing the experimental measure of family resources starts with gross money income and adds values for near-money transfers from federal programs aimed at helping poor families meet their basic spending needs. Experimental poverty thresholds based on CE data include all expenditures for food, including purchases with food stamps. Since the thresholds include all food spending, it is appropriate to include food stamps in this measure of resources. The values of other benefits are not included in resources since these are not reflected as spending needs in the threshold. Important non-cash benefits are often included in resources for poverty measurement such as housing subsidies and school lunch and breakfast subsidies.<sup>18</sup> However, the experimental thresholds produced for this study, and the thresholds produced by the Panel, do not include the value of food paid for by subsidies for children's school meals nor does it include the value of housing subsidies.<sup>19</sup> For consistency, the values of these are not added to resources. To understand the impact of not accounting for housing subsidies, for example, in the experimental poverty measure, let's assume that a housing program reduces tenants' rent payments so that the payments are a fixed percentage of their income, say 30 percent. If the threshold only reflects that 30 percent of income, it is not consistent to add the value of the housing subsidy to income since the subsidy does not help the family meet its spending requirement.

After calculating the income component of the resource measure, the next step is to subtract expenses that must be paid before determining how much discretionary income is available to purchase goods and services represented by the threshold.<sup>20</sup> Before purchasing these basic goods and services, families must first pay taxes and expenses related to work. Federal and state income taxes and all payroll taxes paid are accounted for in the resource measure (O'Hara, 2004). Earning a wage may entail 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 (see Short, 2004 for a detailed examination). The remaining monies represent the ability of the family to purchase, on an annual basis,

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<sup>18</sup> See, for example, the Census Bureau's alternative income definitions (Census, 2006).

<sup>19</sup> Earlier studies included imputed values for housing subsidies in the thresholds (Garner and Rozaklis, 1999 and 2001).

<sup>20</sup> One important necessary expense is child support paid to another household. Child support monies that are paid out should be deducted from income since they are included as income by the receiving family. In Census Bureau income statistics using the CPS this is not done because data regarding the amount of child support paid by one household to another is not collected, while the amount received by another household is collected and added into income. The consequence of this is that child support transfers are doubly counted in household income and official poverty statistics. These expenses and reported receipts were about \$22 billion in 2001.

what they need to spend for basic goods and services, given that they may already be receiving various non-cash benefits.

While borrowing and dissaving are options that may be used to meet spending needs in the short run, the Panel's recommended resource measure suggests an amount that is required over the year to get along. Shortfalls in available resources on an annual basis suggest circumstances that are untenable in the longer term (Citro and Michael, 1995, p. 214-218).

### *C. Data*

This paper uses several surveys to construct the experimental poverty measure. First, the Consumer Expenditure Survey (CE) quarterly Interview data, collected from 1994 through 2006 (BLS, 2007a), are used to construct thresholds for 1996 through 2005. CE data collected in an interview refer 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. Three years of quarterly data are used to produce each threshold.<sup>21</sup>

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 from 1996 to 2005 with data collected in 1997 through 2006 (Census, 2007b). Information from the Survey of Income and Program Participation (SIPP) 2004 Panel 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 and used to calculate official poverty statistics. This includes cash income received on a regular basis, such as income from earnings, any cash transfers, and property income. It includes money income 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 in the computation of adjusted gross income (AGI).

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<sup>21</sup> For example, for the 2005 threshold, 36 months of data from 2003 quarter two through 2006 quarter one are used. Data from earlier years in the three-year cycle are updated to the threshold year using the annual All Items Consumer Price Index, U.S. City Average (CPI-U); data collected in the post-threshold year are price adjusted to the threshold year.



## IV. Results and Discussion

### A. Thresholds

Experimental and official poverty thresholds for a family with two adults and two children are presented in Table 1 and Chart 1. Spending needs-based thresholds are the focus of this study and are estimated using out-of-pocket expenditures for food, clothing, shelter, utilities, and medical care spending; these thresholds are referred to as FCSUM in the results. For comparison, the thresholds that do not account for medical care spending (referred to as FCSU) are presented as well. Both series of experimental thresholds increase over the 1996 to 2005 period,<sup>22</sup> just as the official threshold increases. Yet, the rates of increase for the experimental thresholds are greater. The official threshold in 1996 is \$15,911 and in 2005 it is \$19,806, a 24.5 percent increase. In contrast, the FCSUM experimental threshold for 1996 is \$18,096 and \$24,784 by 2005, a 37.0 percent increase. The experimental thresholds increase at a faster rate than the official threshold from around 1998. In 1996 the official threshold is 88 percent of the FCSUM threshold but by 2005 the ratio drops to 80 percent

Table 2 and Chart 2 compare the official and FCSUM experimental thresholds (the only ones considered in the remainder of this research) to published mean Current Population Survey (CPS) before-tax money income (Census, 2007b) and published mean Consumer Expenditure Survey (CE) total expenditures (based on integrated data from the Diary and Interview Surveys) (BLS, 2007b). From 1996 to 2000, before-tax money income for all households increases more rapidly than total expenditures for all consumer units and reference family thresholds. From 2001 to 2002, income flattens and then increases, following a similar pattern to that of expenditures. CE total expenditures and experimental thresholds increase from 1996 to 2005 at about the same rate (37 percent), while income increases only 34.4 percent over this period. The official threshold rises only 24.5 percent over this time.

When comparing the experimental with the official thresholds, it is important to understand the differences in the two sets of thresholds. Since movements in the official thresholds are based on the CPI-U,<sup>23</sup> expenditure shares underlying the index and movements in this index are compared to implicit expenditure shares and movements in the experimental thresholds. Expenditure shares for food, clothing,<sup>24</sup> shelter, utilities, and medical

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<sup>22</sup> Threshold levels continue to increase for 2006 as well: the 2006 FCSU threshold is \$24,026 and the FCSUM threshold is \$25,834.

<sup>23</sup> “The Consumer Price Index is a measure of the average change over time in the prices paid by urban consumers for a market basket of consumer goods and services ... it is important to understand that BLS bases the market baskets and pricing procedures for the U ... population[s] on the experience of the relevant average household, not on any specific family or individual” (BLS, 2008).

<sup>24</sup> We refer to “Apparel” as “Clothing,” as did the Panel in their 1995 report.

care are presented in Tables 3 and 4. Tables 5 and 6 reflect movements in threshold levels and index values respectively. Before beginning this comparison, it is important to bear in mind the differences in expenditure definitions<sup>25</sup> and populations<sup>26</sup> that underlie the price index and experimental threshold. For example, the CPI-U includes the value of owner-occupied shelter services (rental equivalence), while shelter in the experimental threshold includes out-of-pocket expenditures. The population underlying the expenditures threshold is composed of two-adult-two-child families living in both urban and rural areas. In contrast, the population underlying the CPI is composed of all consumer units living in urban areas. As we will see, these two groups have somewhat different spending patterns and, importantly, they differ in the propensity to own or rent their homes.

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<sup>25</sup> For the 1996 and 1997 CPI-U, the 1987 CPI market basket item structure was used to create the index. For 1998 to 2005, the 1998 item structure was used. The primary differences between the 1987 index item structure for food, clothing, shelter, utilities and medical care and the structure underlying the thresholds are for shelter. The CPI is based on owners' rental equivalence of their homes while the thresholds are based on mortgage principal and interest of primary residence, prepayment penalties, property taxes, and property management for primary residences. Shelter in the thresholds does not include expenses associated with lodging away from home or rent as pay while the CPI does. The thresholds include expenses for home maintenance and repairs and some materials for remodeling; the CPI does not. The 1987 CPI item structure did not include tenants' insurance in shelter, but this insurance is included in shelter under the 1998 item structure. Tenants' insurance is included in shelter in the experimental threshold for all years in the study. The definition of utilities in the CPI changed with the adoption of the 1998 CPI item structure. Utilities in the 1987 item structure, and in the thresholds for all years, include fuels, electricity, natural gas service, water and sewerage maintenance, telephone services, and community antenna and cable television. In the 1998 item structure, telephone and cable television services are no longer part of utilities. Utilities in the thresholds do not include those for vacation homes; expenses for vacation homes are included in the 1987 and 1998 CPI item structures. Other details regarding differences between the CPI-U groupings and the experimental threshold groupings follow: the CPI food includes the value of meals as pay while the experimental threshold measure for food does not; and the CPI clothing (apparel) 1998 item structure includes clothing for men, boys, girls, women, and infants and toddlers, footwear, jewelry and watches while the 1987 CPI item structure and the experimental threshold clothing groups include these plus material for making clothes, sewing notions and patterns, shoe repair and other shoe service, coin-operated apparel laundry and dry cleaning, alteration and repair of apparel and accessories, clothing rental, watch and jewelry repair, apparel laundry and dry cleaning not coin-operated, and clothing storage. Medical care is defined the same in the 1987 item structure and the thresholds. In the 1998 CPI item structure, adult day care is included in the CPI medical care category.

<sup>26</sup> Over the 1996-2005 period of this study, the Consumer Price Index for All Urban Consumers (CPI-U) was used to adjust the official poverty thresholds from year to year. The CPI-U is based on the spending and prices faced by consumers living in metropolitan statistical areas (MSA's) and urban places of 2,500 inhabitants or more. Non-farm consumers living in rural areas within MSA's 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. In contrast, the experimental thresholds are based on the spending and prices faced by consumers living in both urban and rural areas, and include military consumer units living off base. The CPI-U measures the average change in prices paid by urban consumer for a fixed market basket of goods and services. As noted in the *BLS Handbook of Methods* (USDOL, 1997, p. 170), "The CPI uses a fixed market basket to hold the base-period living standard constant. The CPI equals the ratio of the cost of the base-period basket at this month's prices to the actual cost of the base-period basket in the base period. It is an index of price change only and does not reflect changes in buying patterns that consumers probably would make to adjust to relative price changes." The weight of an item in the CPI is derived from expenditures from the CE. These are known as quantity weights. These weights are used along with the prices of goods and services to calculate the index.

In order to understand why the experimental thresholds increase faster over the period than the official thresholds we can examine differences in the components of the experimental threshold compared to the CPI-U. The expenditure shares presented in Table 3 are implicit in the thresholds produced for the reference family.<sup>27</sup> Shelter accounts for the largest percentage of threshold expenditures, followed by food. In contrast to the official poverty threshold, the share of food accounts for less than a third (28.3 percent) while shelter accounts for almost a third at 29.0 percent in 1996. By 2005 the importance of shelter is greater than that of food, with shelter accounting for 32.9 percent of the experimental threshold and food for 25.9 percent. Among the remaining FCSUM components, utilities are between 13.2 percent and 13.9 percent of the total, followed by medical care (6.3 percent to 7.5 percent) and clothing (4.5 percent to 7.4 percent). Expenditures for other basic goods and services account for about 15.6 percent of the experimental threshold from 1996 to 2005.

For comparison, expenditure shares that underlie the CPI-U, City Average, All Items index are presented in Table 4. The shares are based on aggregated annual CE survey expenditure data from four periods: 1982 to 1984, 1993 to 1995, 1999 to 2000, and 2001 to 2002. . The shares for 1996 and 1997 are created using the 1987 CPI market basket structure and the 1998 through 2005 indexes are created using the 1998 market basket structure.<sup>28</sup> Shelter accounts for approximately the same share of aggregate total CPI-U expenditures as it does in the experimental thresholds. In contrast, food accounts for about 15 percent of total CPI-U expenditures, almost half that in the experimental threshold. The average expenditure share for utilities in the CPI-U is almost a third of the

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<sup>27</sup> 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 30<sup>th</sup> and 35<sup>th</sup> 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 30<sup>th</sup> and 35<sup>th</sup> percentiles) 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.

<sup>28</sup> For distinctions between the 1987 and 1998 market basket structures, see footnote 25. The CPI expenditure shares are based on the official production data used for the 1996 through 2005 CPI-U. The data files used to create the shares contain aggregate annual expenditure estimates (from the Consumer Expenditure Survey) for the CPI-U population for the weight base periods associated with the index years 1996 to 2005. For 1998 to 2005 indexes the composite estimated and raked annual expenditure data are those that were used to construct the biennial aggregation weights. Weights based on 1993 to 1995 CE data were used to construct the 1998-2001 CPIs. Those from 1999-2000 were used to construct the 2002 and 2003 CPIs. Weights based on 2001 and 2002 CE data were used to construct the 2004 and 2005 CPIs. The 1996 and 1997 price indexes are based on 1982-84 expenditure data; the BLS did not composite estimate and rake expenditure data annually during these earlier years. Cage (2006) noted that composite estimation and raking probably does not have significant effect on the shares. He did state however that "the 1996 to 1998 data may have slightly higher variance than the 1999 [and] forward data. But then again, the sample size of the CE was increased in 1999 so the difference in variance would be expected." The expenditure shares were produced using lower level aggregations provided by Rob Cage, Patrick Falwell, and Mary Lynn Schmidt in the CPI Division at the BLS.

experimental threshold share (4.7 percent versus 13.6 percent). Clothing (4.6 percent) and medical care (5.7 percent) account for slightly smaller percentages of total expenditures in the CPI-U. The largest share of expenditures in the CPI-U, about 38 percent, is for goods and services not represented by food, clothing, shelter, utilities, and medical care as defined officially.<sup>29</sup>

By design, the experimental thresholds are comprised of basic necessities. Shelter and utilities together account for an average of 44 percent of expenditures in the experimental threshold and only 35 percent of CPI-U expenditures. Food, clothing, and medical care account for an additional 41 percent of the threshold expenditures but only 26 percent of the CPI-U defined expenditure aggregates. Other goods and services are a much larger component of the CPI-U than of the experimental thresholds.

Movements in the official poverty thresholds are reflected by a combination of expenditure shares and commodity and service prices incorporated in the official CPI-U. To compare changes in the CPI-U with changes in the experimental thresholds over time, percentage changes in the CPI-U and in annual expenditures implicit in the thresholds are calculated.<sup>30, 31</sup> Changes since 1996 in the CPI-U for all items and for food, clothing, shelter, utilities, and medical are presented in Table 5. There we see increases in the index for food, shelter, utilities, and medical care. The percentage change in the index for each of the components, other than food, rose at a faster rate than the overall index. Changes in the price indexes inform changes in the expenditure thresholds and implicit expenditures for these same commodity and service groups (Table 6). From 1996 to 2005, the experimental threshold increased at a faster rate than the all items CPI-U (37.0 percent versus 24.2 percent), and thus rose faster than the official poverty threshold because the elements that make up the threshold experienced greater or similar price increases as the major components of the CPI-U. The largest increases in the CPI-U were for the categories of shelter, utilities, and medical care, a group taken together that comprises over half of the experimental thresholds.

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<sup>29</sup> Using the 1998 market basket structure, approximately 17.9 percent of the CPI-U aggregate is for transportation, 6.3 percent for recreation, 5.9 percent for education and communications, 5.0 percent for household operations, and 4.2 percent for other goods and services (authors' own calculations using expenditure aggregates provided by Cage (2006). Even if all education and communications expenditures were added to CPI-U utilities in the 1999 through 2002 weight base periods to account for the fact that the threshold includes telephone expenditures, the CPI-U utilities share would still be smaller than the share in the experimental threshold.

<sup>30</sup> According to the CPI web site (BLS, 2008), "Movements of the index from one date to another can be expressed as changes in index points, but it is more useful to express the movements [in the CPI] as percent changes. This is because index points are affected by the level of the index in relation to its base period, while percent changes are not."

<sup>31</sup> The implicit threshold expenditures underlying the expenditure percentage changes in Table 6 are derived by applying the shares for each year (in Table 3) to the matching year threshold (in Table 1).

The largest increase in the implicit threshold expenditures is for shelter (55.6 percent). Other categories rose by amounts more similar to the increases in prices.

Comparing changes in the CPI-U and the experimental thresholds suggest that the major differences in the two series from 1996 to 2005 are related to shelter. Recall that out-of-pocket shelter expenditures of the reference family consist of such items as mortgage interest, mortgage principal payments, 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.<sup>32</sup> 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 a population with lower rates of homeownership in general. Data from the CE reveal that 74 percent of reference families in 1996 owned their homes while 80 percent were homeowners by 2005. In 1996, 86 percent of the owners had mortgages but by 2005, 90 percent did (BLS, 2007b).<sup>33</sup> These additional results, combined with our study findings, reveal that reference families are more likely to be homeowners with greater increases in out-of-pocket expenditures than is the average household represented by the CPI-U from 1996 to 2005. It is expected that such an outcome would result from a market where mortgaged home prices are increasing at a faster rate than rents, a phenomenon that occurred over the period of interest in this study.

### ***B. 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 near-cash benefits, taxes, and work-related expenses may change trends in poverty rates. An

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<sup>32</sup> Reported rents for primary residences are adjusted to omit the cost of utilities in reported rents and thus 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. The change in prices is used in combination with the CE rental equivalence weight to produce the CPI-U for owners' equivalent rent for primary residences. Also included in shelter for the CPI-U are housing away from school (excluding board) and lodging away from home; these represent 8.5 percent of the total shelter weight in the CPI-U weight base period 2003-2004.

<sup>33</sup> Comparable results for the CPI-U underlying population, using the CE data, reveal that approximately 60 percent of urban consumer units were owners for the 1996 index (based on 1982-84 CE data); for the 2005 index (based on 2001-2002 CE data), the rate increased to 64 percent (authors' own calculations using CE data: BLS, 2007b). A ranking all consumer units by the sum of expenditures for food, clothing, shelter, utilities, and medical care reveals that shelter expenses at the 30<sup>th</sup> to 35<sup>th</sup> percentiles (the percentiles for which changes in expenditures for the reference family are estimated) increased 42 percent from 1996 to 2005, compared to a 55.6 percent increase for

examination of the elements in the family resource measure sheds light on changes in overall family resources from 1996 to 2005.

Table 7 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.<sup>34</sup> For that same year, subtractions of all taxes and work expenses totaled \$1,178 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 are expected to result in higher poverty rates due in part to these calculations.

Further comparison across aggregate values for subgroups sheds light on how the additions and subtractions may affect poverty statistics. Tables 8 and 9 show family incomes or resources for people who are classified as “poor” and those who are classified as “near poor” using the official measure. The “near poor” are people with family income just above the official poverty line; family income is between 100 and 125 percent of the official poverty thresholds. The additions and subtractions for those classified as poor under the official thresholds are in Table 8. The table displays trends over time in the various components of the resource measure. For the officially poor the main additions to family resources are from the EITC and food stamps. The major subtractions are work expenses and payroll taxes. The additions exceed subtractions for this group and are about two times total subtractions in 1996 and in 2005.

Finally, a closer look at the “near poor,” a group most likely to be reclassified as poor by the changes to income calculations, is provided in Table 9. That table shows additions and subtractions and suggests that at least some “near poor” people will be classified as poor under the experimental measure, caused by deductions of necessary expenses from income that exceeds additions. The main additions to income for this group are due to the EITC. The main subtractions are for payroll taxes and work expenses. For this group subtractions are greater than additions.

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the reference family. From 1996 to 2005, the CPI-U's for space rent of primary residences increased 34 percent while the index for owners' equivalent rent increased only 30 percent (BLS, 2008).

### *C. 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 amount needed, then all individuals within the family are classified as poor. The experimental measure uses poverty thresholds that provide a more current estimate of the cost of an explicitly defined set of basic goods and reflects out-of-pocket spending needs. Taking account of spending on basic goods, the value of food stamps, net tax liabilities, and work expenses provides information about families who, while not poor using the official measure, may have difficulty meeting basic needs because necessary outflows exceed inflows.

Table 10 and Chart 3 show poverty rates 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, 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 though more pronounced pattern. Differences in trends are due to increases in the experimental thresholds as well as increased payroll taxes and work expenses that families face. 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 brings the experimental rate back to the 1996 level and beyond to 17.7 percent.

Finally, Table 11 shows trends in poverty measures for demographic groups identified in terms of age and race. Children and blacks are of particular interest as these groups have had historically high poverty rates. For both children and blacks, 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.

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<sup>34</sup> Note that a large part of additions to income are made up of net realized capital gains and that these values

## V. Conclusions

The experimental poverty measure presented in this research was based on NAS recommended procedures with an emphasis on consistency, which the Panel emphasized, and spending needs. However, to date, no other researchers have produced or used a NAS-based measure with consistently defined and constructed thresholds and resources. Using the same methods over time, consistently defined thresholds and resources were used to produce poverty rates that reflect the spending need outflows and income inflows of families. The experimental measures and resulting poverty rates were compared to the official measure and rates for 1996 through 2005. Unlike the official poverty thresholds, the experimental thresholds reflect recent spending needs in levels and patterns, and changes in living standards over time. 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 single share of expenditures accounted for in the CPI-U is represented by goods and services that are not included in the experimental threshold as basic needs. This means that the official poverty threshold is influenced more by the expenditures for and prices of goods and services that primarily do not include food, clothing, shelter, utilities, and medical care. Experimental thresholds increased more rapidly during the 1996-2005 time period than did the official poverty threshold. Another striking result is that even though shelter accounted for about the same shares of CPI-U total expenditures and of threshold expenditures, implicit shelter expenditures in the thresholds rose almost twice as fast as did the shelter CPI-U.

The resource measure produced in this study is constructed to represent the ability of a family to meet the needs implicit in a particular threshold. In this study, income inflows, net of taxes and work-related expenses, were compared to spending need or outflow-based thresholds. Unlike in the Panel's report, the only non-cash benefits included in resources were food stamps; these were included in resources as purchases with food stamps were reflected in food expenditures in the threshold measure. The experimental poverty measure, calculated over a 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 was that increases in the spending for basic goods and services resulted in a greater increase in the number of families not able to meet basic needs than is reflected by the official poverty statistics.

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vary depending on changes in imputation methodology at the Census Bureau.



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 United States: 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.

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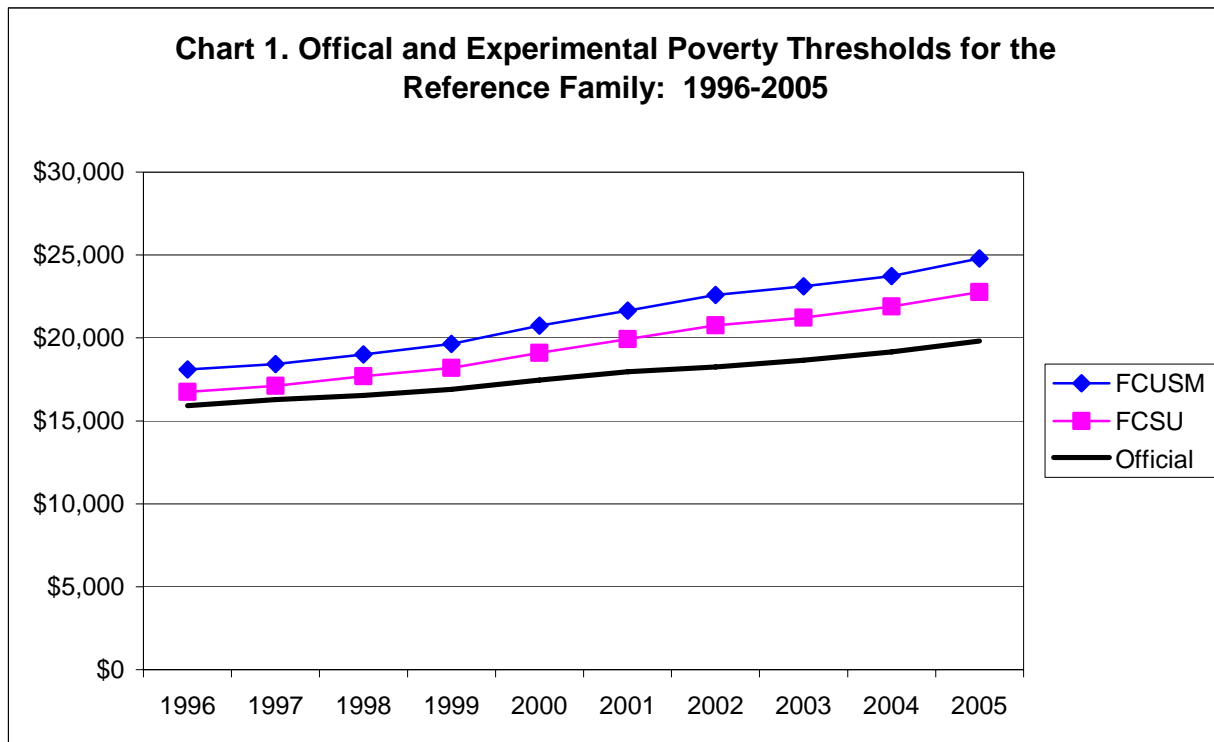
<http://www.census.gov/hhes/www/povmeas/papers.html>

**Table 1: Official and NAS-Based<sup>1</sup> Poverty Thresholds for the Reference Family: 1996-2006**

Year	Experimental		
	Official	FCSU	FCSUM
1996	\$15,911	\$16,749	\$18,096
1997	\$16,276	\$17,109	\$18,424
1998	\$16,530	\$17,697	\$18,994
1999	\$16,895	\$18,196	\$19,648
2000	\$17,463	\$19,097	\$20,731
2001	\$17,960	\$19,935	\$21,640
2002	\$18,244	\$20,757	\$22,600
2003	\$18,660	\$21,218	\$23,109
2004	\$19,157	\$21,895	\$23,738
2005	\$19,806	\$22,769	\$24,784
<i>1996 to 2005</i>			
<i>percent change</i>	24.5%	35.9%	37.0%

<sup>1</sup> Based on out-of-pocket expenditures (including repayment of mortgage principal for owned housing).

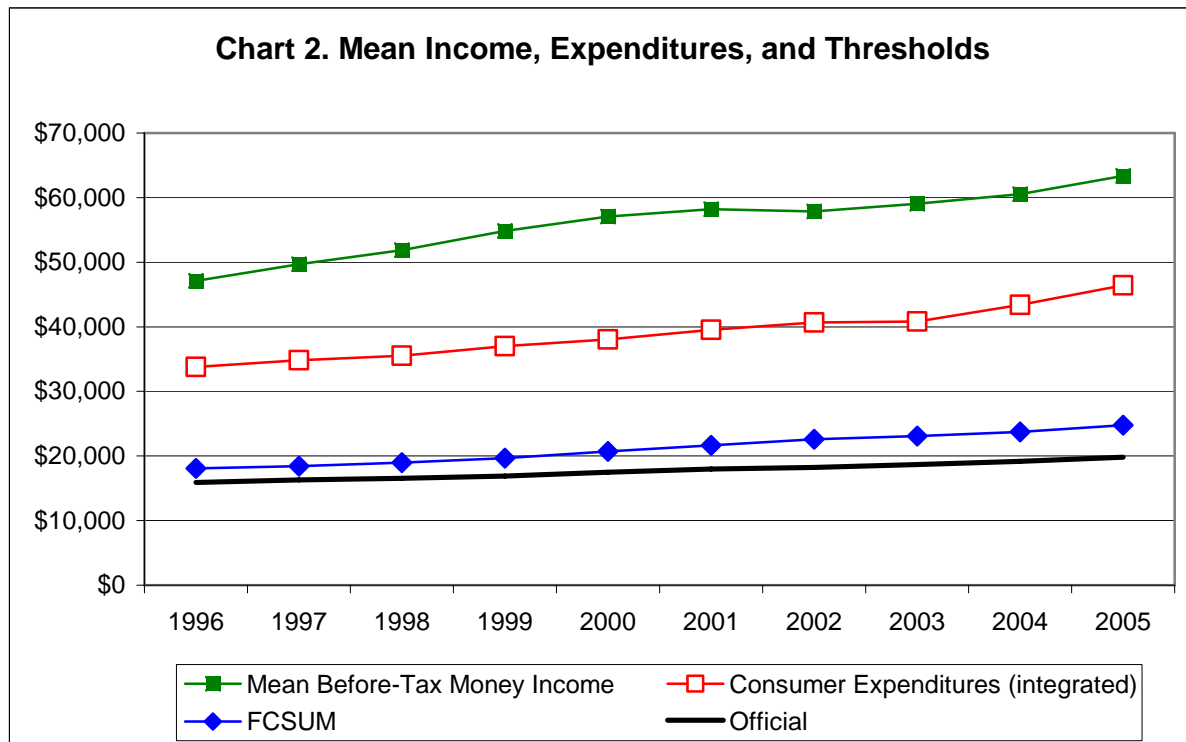
Source: Census Bureau and authors' own calculations using U.S. Consumer Expenditure Interview Survey data (BLS, 2007a).



**Table 2. Mean Annual CPS Household Income and CE Total Expenditures for All Households and Consumer Units Compared to Experimental Poverty Thresholds for the Reference Family: 1996-2005**

Year	Mean Before-Tax Money Income	Consumer Expenditures (integrated)	Thresholds	
			FCSUM	Official
1996	\$47,123	\$33,797	\$18,096	\$15,911
1997	\$49,692	\$34,819	\$18,424	\$16,276
1998	\$51,855	\$35,535	\$18,994	\$16,530
1999	\$54,842	\$36,995	\$19,648	\$16,895
2000	\$57,047	\$38,045	\$20,731	\$17,463
2001	\$58,208	\$39,518	\$21,640	\$17,960
2002	\$57,852	\$40,677	\$22,600	\$18,244
2003	\$59,067	\$40,817	\$23,109	\$18,660
2004	\$60,528	\$43,395	\$23,738	\$19,157
2005	\$63,344	\$46,409	\$24,784	\$19,806
<i>1996 to 2005</i> <i>percent change</i>	34.4%	37.3%	37.0%	24.5%

Source: Census Bureau (Census, 2007b) and Bureau of Labor Statistics (BLS, 2007b) web sites for published annual averages with CE total expenditures are based on integrated data from the Interview and Diary. Thresholds are based on authors' calculations using internal U.S. Consumer Expenditure Interview Survey data (BLS, 2007a).



**Table 3. Shares of Aggregated Annual Expenditures Implicit in the Experimental Threshold for the Reference Family: 1996-2005**

<b>Year</b>	<b>Food<sup>1</sup></b>	<b>Clothing<sup>2</sup></b>	<b>Shelter<sup>3</sup></b>	<b>Utilities<sup>4</sup></b>	<b>Medical<sup>5</sup></b>	<b>Other<sup>6</sup></b>
<b>1996</b>	0.283	0.068	0.290	0.132	0.072	0.155
<b>1997</b>	0.285	0.074	0.278	0.135	0.071	0.157
<b>1998</b>	0.284	0.065	0.293	0.137	0.064	0.157
<b>1999</b>	0.280	0.064	0.299	0.138	0.063	0.156
<b>2000</b>	0.280	0.062	0.301	0.134	0.067	0.156
<b>2001</b>	0.276	0.063	0.297	0.136	0.072	0.156
<b>2002</b>	0.267	0.061	0.305	0.137	0.075	0.155
<b>2003</b>	0.262	0.055	0.317	0.139	0.072	0.155
<b>2004</b>	0.266	0.051	0.318	0.136	0.074	0.155
<b>2005</b>	0.259	0.045	0.329	0.137	0.075	0.155
<b><i>1996 to 2005</i></b>						
<b><i>percent change</i></b>	-0.085	-0.337	0.136	0.038	0.038	0.000
<b><i>1998 to 2005</i></b>						
<b><i>percent change</i></b>	-0.088	-0.312	0.124	-0.001	0.176	-0.013

Source: Authors' own calculations using U.S. Consumer Expenditure Interview Survey data (BLS, 2007a).

<sup>1</sup> Includes food at home and away from home; does not include alcoholic beverages.

<sup>2</sup> Officially referred to as "Apparel" and includes clothing, footwear, and other apparel products and services.

<sup>3</sup> Includes rent, maintenance and repairs, mortgage interest, principal payments, prepayment penalties, property taxes for owned home, and tenants and homeowners insurance.

<sup>4</sup> Includes natural gas, electricity, other fuels, telephone services, and water and other public services.

<sup>5</sup> Includes health insurance, medical services, prescription drugs, and medical supplies.

<sup>6</sup> The difference in total threshold expenditures and expenditures for food, clothing, shelter, utilities and medical care.

**Table 4. Shares of Aggregated Annual CE Expenditures Based on CPI Item Structures, U.S. City Average, CPI-U Population: 1996-2005**

<i>CPI Item Weights' Base</i>							<b>Medical</b>	
<i>Structure</i>	<i>Period</i>	<b>Index Year</b>	<b>Food<sup>1</sup></b>	<b>Clothing<sup>2</sup></b>	<b>Shelter<sup>3</sup></b>	<b>Utilities<sup>4</sup></b>	<b>Care<sup>5</sup></b>	<b>Other<sup>6</sup></b>
<i>1987</i>	<i>1982-1984</i>	<b>1996</b>	0.163	0.065	0.260	0.085	0.048	0.379
		<b>1997</b>	0.163	0.065	0.260	0.085	0.048	0.379
<i>1998</i>	<i>1993-1995</i>	<b>1998</b>	0.151	0.054	0.290	0.051	0.054	0.400
		<b>1999</b>	0.151	0.054	0.290	0.051	0.054	0.400
		<b>2000</b>	0.151	0.054	0.290	0.051	0.054	0.400
		<b>2001</b>	0.151	0.054	0.290	0.051	0.054	0.400
<i>1998</i>	<i>1999-2000</i>	<b>2002</b>	0.144	0.048	0.306	0.044	0.056	0.402
		<b>2003</b>	0.144	0.048	0.306	0.044	0.056	0.402
	<i>2001-2002</i>	<b>2004</b>	0.141	0.043	0.323	0.046	0.058	0.389
		<b>2005</b>	0.141	0.043	0.323	0.046	0.058	0.389
		<i>1996 to 2005</i> <i>percent change</i>	-0.136	-0.339	0.243	-0.456	0.204	0.026
<i>1998 to 2005</i> <i>percent change</i>	-0.069	-0.199	0.114	-0.092	0.063	-0.028		

Source: Basic calculations produced by Rob Cage, Mary Lynn Schmidt, and Patrick Falwell, U.S. Bureau of Labor Statistics; upper level aggregations produced by authors.

<sup>1</sup> Includes food at home and away from home, and the value of meals as pay; does not include alcoholic beverages.

<sup>2</sup> Officially referred to as "Apparel" and includes clothing, footwear, jewelry, and watches. For the 1987 structure, apparel services and sewing were also included.

<sup>3</sup> Includes rent, lodging away from home, owners' equivalent rent, and tenants and homeowners insurance. In the 1987 structure, tenants' insurance was not included in shelter.

<sup>4</sup> Includes natural gas, electricity, other fuels, and water and other public services. The 1987 structure included telephone services and community antennae and cable television services.

<sup>5</sup> Includes health insurance, professional services, hospital and related services (including adult day care), prescription drugs, medical supplies, nonprescription drugs, and medical supplies. The 1987 structure did not include adult day care.

<sup>6</sup> Based on the difference in CPI defined total expenditures and the sum of CPI defined expenditures for food, clothing, shelter, utilities, and medical care.

**Table 5. Percent Changes of Annual CPI-U, U.S. City Average for All Items and Selected Categories from 1996 to 2005**

<b>Year</b>	<b>All Items</b>	<b>Food</b>	<b>Clothing</b>	<b>Shelter</b>	<b>Utilities</b>	<b>Medical Care</b>
<b>1996</b>	--	--	--	--	--	--
<b>1997</b>	0.023	0.026	0.009	0.031	0.026	0.028
<b>1998</b>	0.039	0.048	0.010	0.065	0.008	0.061
<b>1999</b>	0.062	0.070	-0.003	0.095	0.010	0.098
<b>2000</b>	0.098	0.095	-0.016	0.131	0.082	0.143
<b>2001</b>	0.129	0.129	-0.033	0.173	0.178	0.195
<b>2002</b>	0.147	0.149	-0.058	0.217	0.126	0.252
<b>2003</b>	0.173	0.174	-0.082	0.246	0.212	0.302
<b>2004</b>	0.204	0.215	-0.086	0.280	0.270	0.359
<b>2005</b>	0.245	0.244	-0.093	0.312	0.404	0.416

Source: U.S. Bureau of Labor Statistics web site (BLS, 2008) and authors' own calculations.

**Table 6. Percent Changes from 1996 of Annual Expenditures Implicit in Experimental Thresholds for Reference Families, All U.S. from 1996 to 2005**

Year	Threshold	Food	Clothing	Shelter	Utilities	Medical Care
1996	--	--	--	--	--	--
1997	0.018	0.027	0.114	-0.022	0.041	0.009
1998	0.050	0.053	0.012	0.061	0.091	-0.074
1999	0.086	0.073	0.023	0.119	0.132	-0.047
2000	0.146	0.134	0.051	0.190	0.162	0.059
2001	0.196	0.167	0.116	0.224	0.236	0.196
2002	0.249	0.177	0.126	0.316	0.295	0.302
2003	0.277	0.183	0.033	0.396	0.341	0.280
2004	0.312	0.234	-0.012	0.439	0.348	0.346
2005	0.370	0.253	-0.092	0.556	0.422	0.421

Source: Authors' own calculations using U.S. Consumer Expenditure Interview Survey data (BLS, 2007a).

**Table 7. Aggregate Additions and Subtractions to Family Resources (\$ billions) for the Total Population: 1996 to 2005**

Year	Additions			Subtractions				
	Food stamps <sup>1</sup>	Net capital gains <sup>2</sup>	Earned Income Tax Credit <sup>3</sup>	Federal Income Tax <sup>3</sup>	State Income Tax <sup>3</sup>	Payroll taxes <sup>3</sup>	Work Expenses <sup>4</sup>	Childcare <sup>4</sup>
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

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

<sup>1</sup> Reported face value of food stamps received over the year in CPS ASEC.

<sup>2</sup> Capital gains and losses are imputed to the CPS ASEC at the Census Bureau using the IRS Statistics of Income (SOI) file. Imputation methods vary for the figures shown in the chart.

<sup>3</sup> Tax figures are simulated based on reported income amounts and imputed capital gains and losses.

<sup>4</sup> Work expenses and child care expenses while parents work are based on data collected in the Survey of Income and Program Participation. A percentage of median expenses are assigned to individuals and are computed based on the number of weeks worked reported in the CPS.



**Table 8. Aggregate Additions and Subtractions to Family Resources (\$ billions) of Officially Poor Families: 1996 to 2005**

Year	Additions			Subtractions				
	Food stamps	Net capital gains	Earned Income Tax Credit	Federal Income Tax	State Income Tax	Payroll taxes	Work Expenses	Childcare
1996	10.7	0.2	8.7	0.2	0.3	3.9	4.7	1.7
1997	9.5	0.5	8.9	0.1	0.3	3.9	4.7	1.8
1998	8.1	1.1	9.4	0.2	0.3	3.9	4.7	2.1
1999	7.0	1.2	9.1	0.2	0.3	4.0	4.5	1.3
2000	6.3	0.7	8.8	0.1	0.3	3.8	4.2	1.2
2001	7.2	0.8	9.0	0.2	0.4	4.1	4.9	1.3
2002	7.8	5.4	9.3	0.6	0.0	4.5	5.4	1.3
2003	9.4	6.7	9.7	-0.4	0.0	4.6	5.3	1.3
2004	10.6	0.0	10.5	-1.5	-0.3	5.1	6.0	1.5
2005	11.7	0.1	11.3	-0.9	-0.2	5.1	6.7	1.4

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

**Table 9: Aggregate Additions and Subtractions to Family Resources (\$ billions) of Near Poor Families: 1996 to 2005**

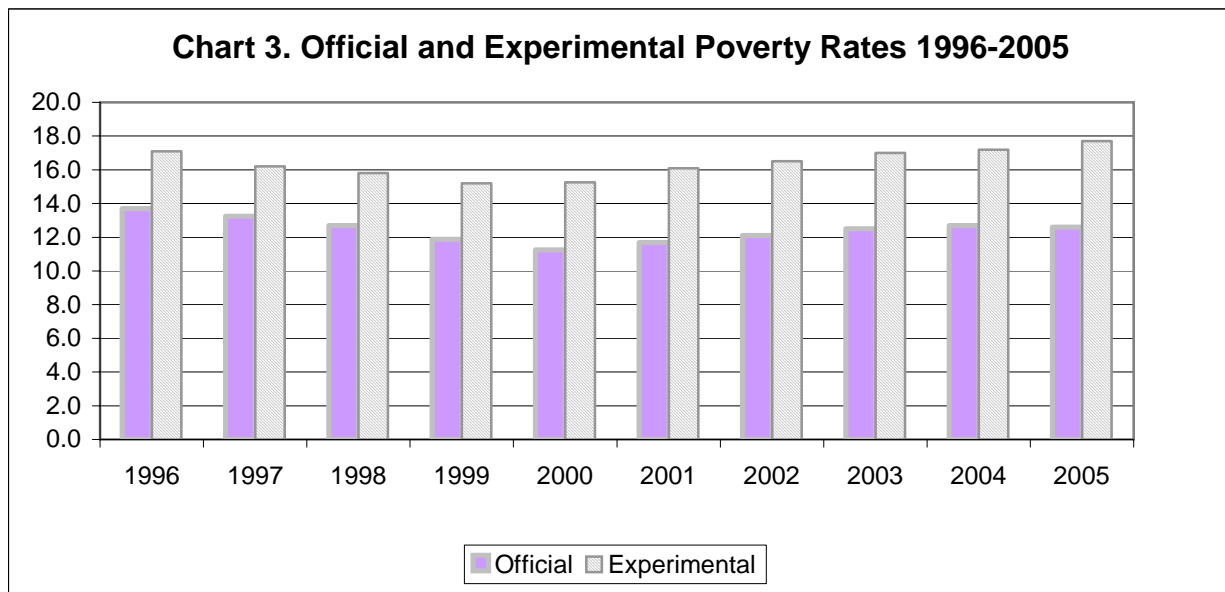
Year	Additions			Subtractions				
	Food stamps	Net capital gains	Earned Income Tax Credit	Federal Income Tax	State Income Tax	Payroll taxes	Work Expenses	Childcare
1996	1.3	0.2	3.7	0.6	0.4	3.1	2.8	0.8
1997	1.1	0.4	3.9	0.6	0.4	3.2	2.8	0.8
1998	0.9	0.6	3.8	0.5	0.5	3.1	2.7	0.8
1999	0.9	0.5	4.2	0.5	0.5	3.4	2.7	0.7
2000	0.8	0.7	4.0	0.6	0.5	3.5	2.7	0.8
2001	0.9	0.5	4.3	0.0	0.6	3.5	3.0	0.7
2002	1.1	1.3	4.4	0.0	0.2	3.8	3.2	0.7
2003	1.2	2.2	4.6	-0.9	0.2	4.0	3.4	0.7
2004	1.4	0.3	4.4	-1.5	0.2	4.1	3.6	0.7
2005	1.4	0.2	5.0	-1.3	0.2	4.0	3.8	0.7

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

**Table 10. Official and Experimental Population Poverty Rates Using Income-Based Resources: 1996-2005**

Year	Official	Experimental
1996	13.7	17.1
1997	13.3	16.2
1998	12.7	15.8
1999	11.9	15.2
2000	11.3	15.3
2001	11.7	16.1
2002	12.1	16.5
2003	12.5	17.0
2004	12.7	17.2
2005	12.6	17.7

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



**Table11. Official and Experimental Poverty Rates for Specific Demographic Groups: 1996 to 2005**

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
<b>Children</b>										
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	20.3	20.7	20.5	21.1
<b>Non-elderly Adults</b>										
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	14.2	14.8	15.3	15.5
<b>Elderly</b>										
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	20.0	20.8	20.2	21.5
<b>White</b>										
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	14.4	14.8	15.0	15.2
<b>Black</b>										
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	28.7	29.5	30.1	31.9

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