Supplemental Measures of Material Well-Being: Expenditures, Consumption, and Poverty 1998 and 2001

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INTRODUCTION

This report, which is being issued as a companion piece to *Poverty in the United States: 2002* (P60-222), describes some possible next steps in the Census Bureau's decades-long tradition of investigation into the measurement of poverty. The current official poverty measure, described in the text box, is based on an examination of the adequacy of an individual's or family's income relative to poverty thresholds. The Census Bureau also publishes two series of alternative poverty estimates (see text box on page 2). These are described more fully in *Poverty in the United States: 2002.*

This report describes a third new avenue for research — consumption-based measures using expenditures and other indicators of material well-being — that is intended to complement the official income-based measures and the two existing series of alternative poverty estimates to expand our understanding of the nature of poverty in the United States.

In 1995, the National Academy of Sciences (NAS) issued a report entitled *Measuring Poverty: A New Approach.*[1] That report recommended revision of the official poverty measure that would consist of a poverty threshold representing the cost of basic needs and a measure of resources available to families to meet those needs. If resources fall below the poverty threshold, then that family would be classified as in poverty. The

[1] Citro and Michael, 1995.

How the Census Bureau Measures Poverty

Official poverty estimates are based on data collected by the Current Population Survey (CPS) Annual Social and Economic Supplement.

Following the Office of Management and Budget's (OMB) *Statistical Policy Directive 14* (1978), the Census Bureau uses a set of money income thresholds designed in the 1960s that vary by family size and composition to determine who is poor. If a family's total income is less than that family's threshold, then that family, and every individual in it, is considered poor. The *poverty thresholds* do not vary geographically, but they are updated annually for inflation using the Consumer Price Index (CPI-U). The official poverty definition counts money income before taxes and does not include capital gains and noncash benefits (such as public housing, medicaid, and food stamps). Poverty is not defined for people in military barracks or institutional group quarters or for unrelated individuals under age 15 (such as foster children). They are excluded from the poverty universe — that is, they are considered neither as "poor" nor as "nonpoor."

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report spelled out in detail the characteristics of an improved poverty measure.[2]

In the course of their consideration of the measurement of poverty, the NAS panel examined many other alternatives. While they chose an income-based poverty measure, the panel of experts also supported the investigation of other approaches. They encouraged the development of other types of indicators to monitor trends over time and for different population subgroups across different dimensions of deprivation. They also encouraged work that examined relationships among various indicators of well-being. In their words, "For fuller understanding and to inform policy, a breadth of information and analysis is needed on the well-being of the population, including and going beyond the economic dimension."[3]

One of the alternate approaches to measure economic well-being was to use direct indicators of material well-being (such as deprivation indexes).[4] These measures focus on indicators that show a household has a shortfall in particular material needs.

In their discussion of the calculation of a family resource measure, the NAS panel presented an alternative to using *income.* This was to use actual *consumption* of goods and services. As noted by the panel, many researchers suggest that it is preferable to construct a measure of poverty based on what families actually consume, rather than on their income.[5] The underlying notion of this approach is that families and individuals derive well-being from the actual consumption of goods and services rather than from the receipt of income.[8]

Following the release of the NAS panel's report on poverty measurement, the General Accounting Office (GAO) assessed their conclusions. In general, they concurred with the recommendations that the revised measure should be based on income as the measure of family resources. However, they too discussed some of the alternatives to income-based measures. They reiterated the fact that, while low levels of consumption or material deprivation reflect the core concept underlying poverty, there are serious measurement difficulties.[9]

This report is an attempt to provide some basic information on supplemental measures of material well-being. The purpose is to initiate an active discussion of the issues involved with supplementing income-based poverty measures with other measures that focus more heavily on consumption and material well-being. It is by no means a comprehensive document; the Census Bureau and involved statistical agencies will be seeking public input to provide direction for future research.

Section II provides some background on the underlying concepts of defining and measuring consumption, including a discussion of some of the research and data requirements for calculating expenditure-based poverty measures. **Section III** includes currently available information on some direct indicators of material well-being from three surveys: the Survey of Income and Program Participation, the Consumer Expenditure Survey, and the Residential Energy Consumption Survey. **Section IV** describes research that is relevant to formulating all of these supplemental measures. The final section of the report is an extensive **bibliography**, including some relevant references not cited in this report. This presentation illustrates some of the information that could be used, along with income, to examine the economic well-being of families in the United States.

ALTERNATIVE POVERTY ESTIMATES

Poverty in the United States: 2002 provides two sets of alternative estimates of poverty. One presents the effects of changing the income measure in ways consistent with the alternative income measures presented in *Income in the United States: 2002* (P60-221), as well as on how changes in the inflation adjustment factor used for the thresholds over the past several decades would affect poverty.[6] The second focuses on recommendations from the National Academy of Sciences on how to measure resources (income) and how to change the poverty thresholds (the measure of need).[7] We note that some researchers think it is important to consider changes on the resource side and the threshold side together, whereas others focus on how to measure resources while using the historical poverty thresholds. The Census Bureau does not choose which changes in poverty measurement methodology are most appropriate. That responsibility rests with the Office of Management and Budget.

[2] Ibid., p. 39.
[3] Ibid., pp. 19-20.
[4] Some other measures discussed by the NAS panel but not addressed in this report included subjective measures such as minimum income and minimum spending (Vaughan, 1993; Garner and Short, 2003), and family budgets (Johnson et al., 2001).
[5] For example, Jorgenson and Slesnick, 1987; Cutler and Katz, 1991; Slesnick, 1993, 1994.
[6] See U.S. Senate Statement cited in U.S. Census Bureau (1985).
[7] Citro and Michael, 1995.
[8] Ibid., p. 210.
[9] U.S. General Accounting Office, 1997, p. 6.

CONSUMER EXPENDITURE MEASURES

Background and History

The NAS panel distinguished between a measure based on the *ability* to maintain a certain level of living and one based on the *actual* level attained.[10] Many early measures of poverty focused on the measurement of actual well-being. As stated by Deaton and Grosh, "Household budget analysis has been used to document and to publicize poverty since the late 18th century."[11]

One of the first notions of poverty occurs in Adam Smith's *Wealth of Nations* (1776), where he links the concept of economic poverty to the want of "necessaries." He claimed, "By necessaries I understand, not only the commodities which are necessary for the support of life, but whatever the custom of the country renders it indecent for creditable people, even of the lowest order, to be without." Commonly, this concept is measured by determining an amount that is deemed adequate to obtain necessary goods and services (the *ability*). Alternatively, one could examine people's possessions (or consumption) to determine whether they had these "necessaries" (the *actual*).[12]

Although the NAS report recommends measuring poverty using income, not everyone agrees that this is the appropriate resource measure to use. Many researchers argue that it is preferable, for a combination of theoretical and empirical reasons, to look at what families actually consume or spend rather than at their income in order to determine their poverty status.[13] A basic premise of this view is that families and individuals derive material well-being from the actual consumption of goods and services rather than from the receipt of income per se; hence, it is appropriate to estimate their consumption directly.

One argument that is often made for preferring consumption as the resource definition rather than income is that consumption is a better estimate of families' long-term or "permanent" income. Friedman's (1957) permanent income hypothesis suggests that current income is comprised of a permanent component and a transitory component. As stated by the NAS report:

> Families with low levels of current income are disproportionately comprised of families with temporary income reductions. If consumption is based on permanent income and not on transitory income, families with negative "income shocks" will have consumption levels that are high relative to their income levels, because they expect their long-term income to be higher, on average, than their current income. Consequently, they "dissave" in order to smooth consumption and thereby material well-being: for example, they may liquidate their savings accounts or borrow on their credit cards. Such families may be income-poor but able to maintain a constant standard of living through dissaving. The reverse will be true of high-income families, who will have consumption levels that are low relative to their income levels and positive savings. Modigliani and Brumberg's (1954) closely related life-cycle model of behavior assumes that current consumption is equal to average lifetime resources. Thus, younger families, by borrowing, and older families, by spending down assets, tend to exhibit high consumption-to-income ratios, while middle-aged families with the highest earnings potential tend to exhibit relatively low consumption-to-income ratios. Again, it is supposed that families smooth consumption and well-being on the basis of wealth and on expected earnings by saving and dissaving at various points during their life cycles.[14]

However, current consumption may understate well-being and permanent income to the extent that non-life-cycle savings are present. Consider aged people who are saving to pay for unexpected health risks, which are not easy to insure against (e.g., hospitalization and long-term care). Consider also young families with children who may strategically save or deplete savings to pay for their children's education (the latter, for example, to qualify for college financial aid).[15] In these cases, current income may be a better measure of permanent income than actual consumption.

Most researchers, however, do not use actual consumption as their measure. In practice, estimating consumption does not usually mean inspecting people's clothes or what they actually eat, but estimating what they spend on such items. Many researchers have defined consumption as a subset of families' total expenditures, excluding taxes, contributions to pension funds (which represent savings), and, often, gifts, and

[10] Citro and Michael, p. 36. See also Atkinson, 1989.
[11] Deaton and Grosh, 2000, p. 95.
[12] Townsend, 1979, also discusses the possession of commodities.
[13] For example, Cutler and Katz, 1991; Jorgenson and Slesnick, 1987; Mayer and Jencks, 1993; Slesnick, 1993, 1994, 2001; Jorgenson, 1998.
[14] Citro and Michael, p. 211.
[15] Feldstein, 1995.

including expenditures made with assistance from in-kind benefit programs, such as food stamps.

Much of the decision concerning whether income or consumption should be used to measure economic well-being depends on the quality and availability of data supporting these measures in surveys. If income is traditionally underreported on surveys, then consumption data may be a more accurate measure. Alternatively, if consumption is difficult to measure or many components of consumption are missing from the survey (or the reporting period is too short to obtain an accurate measure), income may be the preferred measure. As with any measurement issue, accuracy depends on the relative importance of the measurement errors and on the availability of data for the measures.[16]

The Bureau of Labor Statistics (BLS) and the Measurement of Expenditures

The Bureau of Labor Statistics (BLS) has extensive experience in measuring the expenditures of households and families. BLS studies of family living conditions rank among its oldest data-collecting functions, going back to the first consumer expenditure survey in 1888-1891. The objectives of the surveys have always included meeting "the need for timely and detailed information on the spending patterns of different types of families."[17] Data from the Consumer Expenditure (CE) surveys are used by a variety of researchers for a variety of purposes, for example, producing weights for the Consumer Price Index (CPI), evaluating the effects of tax policy changes, examining the buying habits of certain groups of consumers, and obtaining a measure of economic well-being. The CE surveys have always been designed to allow for a variety of uses and definitions of expenditures. The BLS publishes annual reports on consumers' expenditures and conducts frequent studies on spending patterns. Annual data on total expenditures are available on the BLS Web site.[18] Studies examining expenditure levels and spending patterns appear in the Monthly Labor Review (MLR) on a periodic basis.[19]

Over the years, a variety of expenditure measures based on the CE survey have been constructed for use in publications or in research published by BLS staff members. Three definitions of expenditures are constructed by the CE office within the BLS: total expenditures, current consumption expenditures, and total outlays.

Total expenditures is the current definition of expenditures used in the estimates published by the BLS. This measure includes expenditures on goods and services for current consumption plus other expenditures that are used for future consumption (e.g., pensions) or transferred to organizations and people in other households (e.g., cash contributions and gifts). Expenditures with food stamps are included, but only out-of-pocket expenditures for housing and health care are included for people who receive noncash transfers (school meals, benefits from the Special Supplemental Program for Women, Infants, and Children (WIC), medicaid, State Children's Health Insurance Program (SCHIP) benefits, health clinic services, Veterans health care, and medicare). Total expenditures consist of the transaction costs, including excise and sales taxes, of goods and services acquired during the interview or recordkeeping period. These expenditure estimates include expenditures for gifts of goods and services but exclude purchases or portions of purchases directly assignable to business purposes. Also excluded are periodic credit or installment payments on goods or services already acquired. The full cost of each purchase is recorded even though full payment may not have been made at the date of purchase (except for owned housing, where mortgage interest, insurance premiums and property taxes are included rather than the purchase price).

The expenditure concept used in earlier BLS publications, based on 1960-1961 and 1972-1973 survey data, was current consumption expenditures. Current consumption expenditures "refers to the transaction costs, including excise and sales taxes, of goods and services acquired during the interview period for consumption within the consumer unit. These estimates exclude personal insurance premiums, retirement and pension contributions, as well as gifts and contributions to others."[20] As noted by the BLS, this measure was "not a measure of consumption in the true economic sense...because no attempt was made to measure the flows of services provided by durables."[21]

The last measure, total outlays, represents the out-of-pocket

[16] Sabelhaus and Groen, 2000; Johnson and Smeeding, 1998; Kay et al., 1984.

[17] BLS Handbook of Methods, p. 161.

[18] See *www.bls.gov/cex/csxann01.pdf* for the latest report on expenditures.

[19] See various MLR issues (most recently in May 2003 and July 2002), and Federman et al., 1996. In addition, Department of Labor (1995) used consumption expenditures to examine trends in the well-being of families.

[20] BLS, 1978, p. 128.

[21] Rogers and Gray, p. 33.

expenditure outlays of consumers. This measure is similar to total expenditures, but with the modifications that the net purchase price of financed vehicles is excluded, payments on principal loan amounts on all financed vehicles are included, and payments to reduce the borrowed principal on home (primary residence and vacation) mortgages are included.

In examining this measure, Rogers and Gray (1994) state that "Because consumers' expenditures or outlays may be a better indicator of their economic well-being than income is, classifying the data by quintiles of expenditures provides a useful way of examining consumers' expenditure patterns according to their level of well-being."[22] This measure of expenditures is used in Section III of this report.[23]

Finally, the Consumer Price Index (CPI) program within the BLS uses an alternative measure for the value of a particular market basket of consumer goods and services to derive the weights that are applied to prices to produce the CPI. The current CPI "is a measure of price changes for a fixed market basket of goods and services of constant quantity and quality purchased for consumption."[24] Basically, the CPI assumes that the goods and services are given by the transaction cost of all consumer goods and services (except for the treatment of housing services derived from home ownership). For all but owned housing services, the expenditure for consumption is defined as the transaction cost at the time of purchase. The assumption in this case is that durable goods are basically consumed during the reference period, and hence, treated as nondurable goods.[25]

Many researchers have used the CE survey and a combination of these expenditure measures.[26] Some have labeled these measures as consumption, consumption expenditures, or simply expenditures. As stated by Slesnick, "Overall spending, however, is an inaccurate estimate of total consumption, because some goods are consumed without a transaction."[27] These "goods" include leisure, public goods, barter, in-kind transfers, and owner-occupied housing.

As this discussion suggests, a key issue in determining a measure of consumption is distinguishing between expenditures and consumption. Webster's dictionary defines expenditure as "the act of expending (or paying out) something, especially funds," while the definition of consumption is "the using up of goods and services having an exchangeable value." Hence, expenditure is the outlay of funds to purchase a good or service, while the consumption is the using up of the good or service.

Measuring Consumption

Many economists view consumption as defined by Haig-Simons — the difference between income and the change in net worth.[28] As discussed in reviews of the current poverty measure, the key is determining what is included in income, with the additional issue of what to include in the change in net worth.[29] For example, consider the purchase of a new car, for which the consumer pays cash. This purchase will decrease the net worth of the consumer (and increase consumption), yet by how much? The next year, the consumer could resell the car (obviously marked down due to depreciation) and increase the consumer's income. Since this is possible, many suggest that the change in net worth is not the price of the car, but the difference between the price paid and the resale price. This analysis could be completed for most goods — even food products could have a resale value in a short period.

Viewed in the strict economic sense, consumption represents the characteristics of the goods and services that are used during the period to increase the well-being of the individual. As the example suggests, determining the amount of durable goods that are "used" during the period may be difficult.

The World Bank designed a module for their Living Standard Measurement Study to collect data in order to measure consumption, because "For measuring welfare, *consumption* is ultimately a more useful measure than *expenditures* (purchases)."[30]

The document, however, continues by stating that one of the most critical and difficult measurement issues in consumption is the treatment of durable goods:

> For most, although not all, nondurable goods, it is safe to assume that a person's or household's consumption is

[22] Ibid., p. 37.

[23] A similar measure of expenditures (using an outlay concept) was discussed in Watts 1980 and used in Johnson, et al., 2001.

[24] Greenlees and Mason, 1996.

[25] For the CPI weights, the flow of services from owned housing is based on consumer unit reports of what they say their housing would rent for monthly without furnishings and without utilities. In addition, other homeowner expenses (e.g., the expenditures for owned housing related expenditures for durables, home insurance premiums, and various maintenance and repairs costs) are adjusted to reflect the spending patterns of similar renters.

[26] Cutler and Katz, 1991; Slesnick, 1993; Johnson and Shipp, 1997; Krueger and Perri, 2002; Garner et al., 2003.

[27] Slesnick, 2001, p. 42

[28] Ibid., p. 42

[29] Citro and Michael, 1995 and IRP, 1998.

[30] Grosh and Glewwe, p. 91, and Deaton and Grosh, p. 103.

closely tied to their purchases. However, in the case of major durable goods, expenditures and consumption are not closely related in the short run, and household *expenditures* on durable goods will be a poor guide to their *consumption* of durable goods. For major durable goods (and in some cases for stocks of grain or of fuel), consumption should be linked to stocks not purchases, so that the submodule that deals with durable goods needs to collect data on a list of durable goods possessed by the household. From these, some sort of consumption flow needs to be imputed.[31]

There is not a consensus on the correct measure of consumption to use. As stated by Deaton and Grosh, "...there is not a clearly 'right' or 'wrong' way to resolve many of the issues about how to measure consumption."[32] The System of National Accounts also recognizes this problem, when it states: "The term 'consumption' on its own can be ambiguous and misleading. Sometimes it is used by economists to refer to consumption expenditures, sometimes to acquisitions of consumption goods and services and sometimes to the physical use of the goods and services for the direct satisfaction of human needs or wants."[33] Finally, a recent International Labour Organization (ILO) report on household expenditure statistics describes a variety of conceptual approaches to the measurement of consumption.[34]

Recent literature has used a variety of measures to represent consumption: expenditures on nondurable goods, consumption expenditures, and total expenditures.[35] As illustrated in the Definitions Box, the CE survey data can measure expenditures, but not consumption. In addition to accounting for the service flows from durable goods, a measure of consumption must also account for in-kind transfers from government, other households, and nonprofit organizations; the value of home production; and the goods and services received through barter transactions (see the highlighted items in the box, which include a "yes" in the consumption column, but a "no" in the columns for the current measures). Many analysts attempt to measure consumption by using the total expenditures on nondurable goods and services, and then imputing a value for the service flows of durable goods.[36] However, as mentioned in Deaton and Grosh, "Great care must also be taken to avoid erroneous interpretations of the results in cases where such imputations have an important effect on the total consumption measure or on the welfare rankings of households."[37]

What Difference a Measure Makes

Many studies have examined the difference between using income and consumption to measure economic well-being. These studies have examined the effect of using consumption for measuring poverty, inequality, and the effects on the well-being of various demographic groups.[38] As many show, the levels of poverty and inequality tend to decrease using consumption-based measures, in comparison with income-based measures, while there is much disagreement regarding the trends in these measures. Another common finding is that the well-being of the elderly tends to increase relative to other groups when using consumption-based measures. The results for the elderly are mainly due to the inclusion of a value for owner-occupied housing in the measure of consumption.[39]

Consumption and income definitions of resources in a poverty measure have somewhat different implications for who is counted as poor. A consumption resource definition will include in the poverty count people who are income-rich but consumption-poor, that is, people who choose to spend at levels below the poverty threshold when they actually have incomes that would support consumption above that level. In contrast, an income resource definition will exclude people from the poverty count who have adequate income during the measurement period, whether they spend it or not. Not surprisingly, a consumption resource definition will exclude from the poverty count people who are income-poor (e.g., because they lost a job) but who sustain their consumption at a level above the poverty threshold by such means as spending from savings, borrowing from relatives, or charging to the limit on their credit cards.

This discussion also illustrates the importance of the time period for determining poverty status. The official measure uses annual income to determine poverty; however, the above examples show

[31] Ibid., p. 103.
[32] Ibid., p. 102.
[33] Paragraph 9.74 in *System of National Accounts 1993*.
[34] ILO, 2003.
[35] Cutler and Katz, 1991; Attanasio and Weber, 1995; Slesnick, 2001; Fernandez-Villaverde and Krueger, 2002; and Sierminska and Garner, 2002.
[36] This is the approach taken by Cutler and Katz, 1991; Danziger, 1983; Slesnick, 1993, 2001; Luo, 2003.
[37] Deaton and Grosh, p. 103.
[38] The comparison between measures of income and consumption has also been conducted by researchers in other countries (see Bradshaw, 2001; Garner et al., 2003; McGregor and Barooah, 1992; Pendakur, 2001; Saunders, 1997).
[39] Danziger et al., 1983, and Sabelhaus and Schneider, 1997.

Definitions of Expenditures — What's Included

A Conceptual Framework for the Consumer Expenditure (CE) Surveys

ITEM	Total CE Expenditures (current publication definition)	Total CE Outlays (currently used in Section III)	Consumption (A conceptual definition not available in CE)
Total acquisition cost of nondurable and service items	Yes	Yes	Yes
Mortgage principal payments	No	Yes	No
Mortgage interest payments	Yes[1]	Yes	No
Service flow from housing services	No	No[1]	Yes
Purchase price of vehicles	Yes	Only those not financed	No
Purchase price of other durables	Yes	Yes	No
Vehicle loan principal payments	No	Yes	No
Vehicle loan interest payments	Yes	Yes	No
Interest payments on other debt[2]	Yes	Yes	No
Service flow from vehicles	No	No	Yes
Service flow from other durable goods	No	No	Yes
Business purchases	No	No	No
Occupational expenses	Yes	Yes	No
Gifts given outside household	Yes	Yes	No
Cash contributions	Yes	Yes	No
Financial services[2]	Yes	Yes	Yes
Life insurance and other personal insurance	Yes	Yes	No
Annuities	Yes	Yes	No
Pension and retirement contributions	Yes	Yes	No
Home production	No	No	Yes
Barter (goods)	No	No	Yes
In-kind receipts	No[3]	No[3]	Yes

[1] The service flow from housing services is currently used in the System of National Accounts as a measure of the expenditures on housing services (instead of the actual purchase price). These are considered distinct from other types of household production. The current measure of Total Expenditures uses the mortgage interest payments, property taxes, and maintenance and repairs as a measure of the expenditures on housing services. In addition, Rental Equivalence is required to produce the market basket for the Consumer Price Index (CPI).

[2] The CE includes the cost over and above interest.

[3] "Rent as Pay" and "Meals as Pay" are included.

Source: "A Conceptual Framework for the Consumer Expenditure Surveys," (2000) Report to Management, Bureau of Labor Statistics, Washington, DC, September 28.

that with access to credit, a measure that uses a longer time period for income could decrease the number of people counted in poverty.[40] In fact, as Deaton and Grosh state, the "...theoretical advantages of consumption are likely to decrease as the period over which it is feasible to gather data gets longer."[41]

Slesnick conducted a frequently referenced study of consumption-based poverty. His book states that "consumption-based estimates of the standard of living show substantial growth, rather than stagnation, since 1970," and that using income to measure it yields a misleading picture of the standard of living.[42] Using the consumption-based poverty rate as a measure of the standard of living, he shows that the commonly cited U-turn in poverty (i.e., between 1959 and 1973 poverty fell, and after 1973 poverty began to increase) disappears. However, others have shown that many of his results are due to his particular method of measuring consumption-based poverty.[43] A GAO report claims "While Dr. Slesnick's research showed that a consumption-based measure of poverty generally produced a lower rate than the official poverty measure, his research also showed that using different sources of consumption data has affected the size of the difference between the two measures."[44]

The GAO report continues: "Accordingly, to test the sensitivity of his poverty measure to differences in data sources, Dr. Slesnick used a per capita ratio of expenditures from the PCE and CE data sources."[45] Some have referred to this result to illustrate that consumption poverty has fallen dramatically since 1973.[46] However, "According to Dr. Slesnick, he did not intend that the outcome of the sensitivity analysis should be considered a poverty measure."[47]

As with the current official poverty measure, a consumption-based measure also has a multitude of issues to address in determining the appropriate resource and threshold measures for poverty. As mentioned in the NAS report, "...we note that if a consumption-based resource definition is adopted for the poverty measure at some future time, there will still be the need for consistency between the resource definition and the threshold concept. As an example, with the proposed threshold concept, the consistency principle would require that work expenses not be considered as part of families' consumption, just as they are excluded from disposable income."[48]

The issues for the measurement of income poverty discussed in the NAS report are equally important for a measure of consumption poverty: how should medical expenses and work-related and child care expenditures be treated in the resource measure?[49] How should in-kind transfers from the government be valued and included? Finally, the issues regarding the measurement of the thresholds are also relevant. How should the thresholds be adjusted for family size and composition, geographic location, and changes in prices over time? While many of these issues have been discussed in previous reports, there is still not a consensus on how to account for all of them.

MEASURES OF MATERIAL WELL-BEING

Background and History

Concern about poverty is often expressed in terms of its manifestations — inadequate housing, hunger, or lack of basic ingredients of everyday living such as an automobile or telephone. However, direct measures of material well-being from ongoing government efforts to measure material hardship and inadequate levels of consumption, such as food security and sufficiency, inadequate housing, and lack of health insurance, have not been systematically used in the United States. Income poverty remains the most widely used measure of economic well-being and is the official measure of poverty in the United States.

Measures of material well-being are conceptually different from income poverty. This is because material well-being is shaped by many influences that affect the ability to make ends meet, not just income.[50] Income alone does not allow for differences in taste, homeownership, access to credit, and numerous other factors. More sophisticated alternative measures of poverty do account for some of these factors, but not all of them.[51] The ability to get at sometimes-hidden aspects of material circumstances has made direct measures

[40] For example, in a recent Census Bureau Study of income-based poverty (Iceland, 2003), the average monthly poverty rate ranged from 15.5 percent in 1996 to 12.8 percent in 1999, while only 2.0 percent were poor in all 48 months.

[41] Deaton and Grosh, p. 94.

[42] Slesnick, 2001, p. 3.

[43] Triest, 1998; Johnson, 2002; Luo, 2003; U.S. General Accounting Office, 1996.

[44] U.S. General Accounting Office, 1996, p. 6.

[45] Ibid., p. 6. PCE stands for Personal Consumption Expenditures in the National Income and Product Accounts.

[46] Jorgenson, 1998 and Eberstadt, 1996.

[47] U.S. General Accounting Office, 1996, p. 6.

[48] Citro and Michael, p. 214

[49] See Citro and Michael, Recommendation 1.2, p. 4.

[50] Beverly, 2000.

[51] Short, 2001a.

of material well-being an attractive topic for research and policy consideration. Several lines of research have laid the foundation for current understanding of these measures.

International development

Agencies concerned with poverty in developing countries have often relied on measures of material well-being as a matter of convenience. Information on landlessness, food consumption, and literacy are easier to collect than accurate data on income, in part because many rural poor households survive with little or no money income at all. However, a practical method of measuring individual material well-being in countries such as the United States, with well-developed market economies, has not yet emerged from this research.[52]

Models of psychological well-being

Another area of research has been the development of psychological models of well-being focusing on various aspects of peoples lives, including health, employment, family, and community. There are many important insights into material well-being available from this research. [53]

British and European research on poverty and "social exclusion"

British researchers have developed questionnaires to determine a variety of conditions that might indicate a family was not making ends meet, leading to a burgeoning of research, and summary measures of material and social deprivation adopted in publications and reports. A set of questions along these lines was included in the European Community Household Survey.[54]

American research on hardship and poverty

Direct application of measures of material well-being to the study of poverty was introduced in U.S. research in the mid-1980s. In a study of material hardship in Chicago, a set of questions directly assessed the degree to which families experienced financial problems and lack of necessities. Many of the measures first proposed by these researchers were incorporated into the U.S. Census Bureau's Survey of Income and Program Participation (SIPP) and are presented below. Several researchers have examined the performance of these measures as indicators of material well-being.[55]

Measures of Material Well-Being

Many types of measures have been used in the past to take account of material well-being. The SIPP provides one of the most extensive sets of measures available for the United States.[56]

In the SIPP topical module on "extended measures of well-being," the Census Bureau collected over 70 items of information on five topical areas or "domains":

(1) *appliances and electronic goods* - whether the household possessed selected items such as refrigerators, televisions, dishwashers, telephones, and computers;

(2) *housing conditions* - including physical problems such as broken windows and leaky roofs, as well as the household's rating of warmth, space, privacy, overall housing repair, and other aspects of housing comfort;

(3) *neighborhood conditions* - such as traffic, street repair, abandoned buildings, and quality of relations with neighbors;

(4) *community services* - ratings of police, fire, and medical services, as well as schools;

(5) *ability to meet basic needs* - paying rent and utility bills, avoiding eviction, and having enough food in the household.

In addition, households were asked questions on whether help for the household would be available if it were needed. These questions in the SIPP are asked approximately once every 4 years. The latest year for which these data are currently available is 1998.

From the 70 or more measures of material well-being available in the SIPP, this report selects 15 topics representing each of the domains listed above. These shortfalls were selected to present a broad range of incidence. One phenomenon that stands out immediately is how dramatically the rate of shortfalls varied among the 15 selected

[52] See, for example, United Nations Development Program, 2001; Grosh and Glewwe, 2000; Pradhan and Ravallion, 2000.

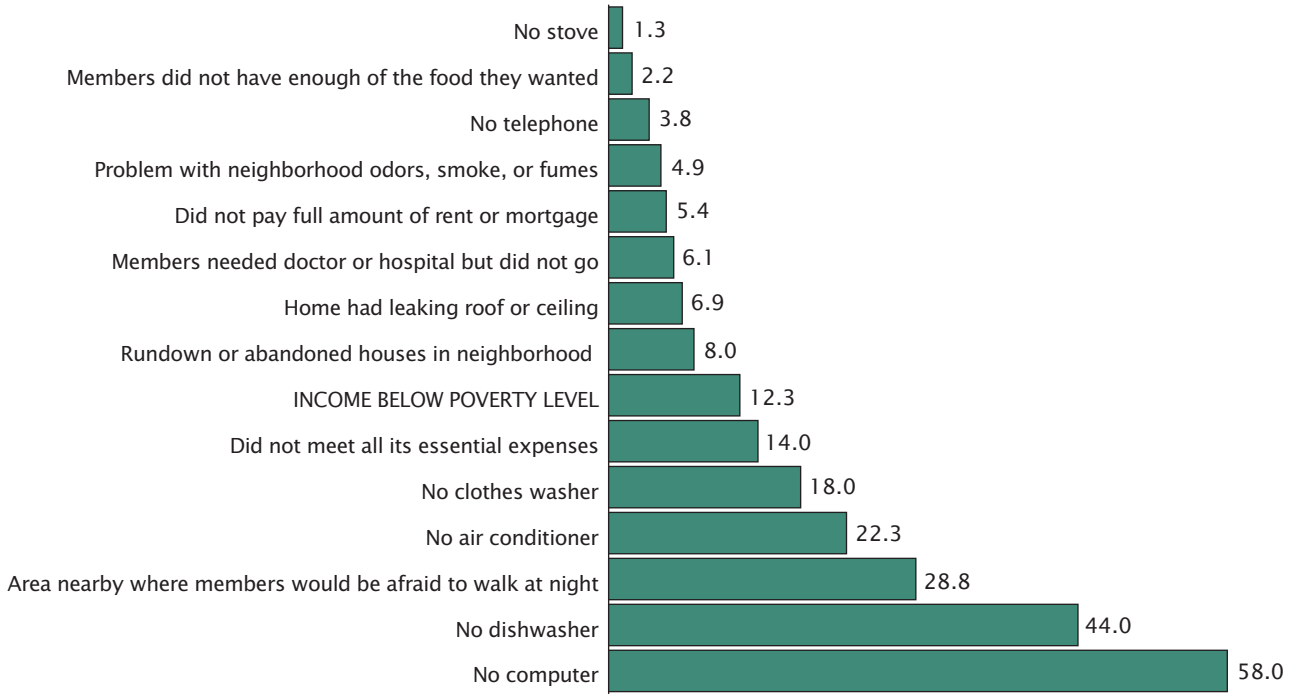
[53] The major founding works in this area are Campbell et al., 1976; Andrews and Withey, 1976. A recent compendium of research is available in Kahneman et al., 1999.

[54] Classic works on this subject include Townsend, 1979, and Mack and Lansley, 1985. A summary of some of this research is available in Fisher, 2001.

[55] The Chicago research is reported in Mayer and Jencks, 1989. SIPP measures were examined by Radbill and Short, 1992; Short and Shea, 1995; Federman et al., 1996; Rector et al., 1999; Bauman, 1999, 2003; Beverly, 2001; and Boushey et al., 2001.

[56] The data in this section of the report were collected from August through November of 1998 in the eighth wave (interview) of the 1996 Survey of Income and Program Participation. The population represented (the population universe) is the civilian noninstitutionalized population of the United States.

Figure 1.
Shortfalls in Material Well-Being Among U.S. Households: 1998
(Percent of households)



Source: U.S. Census Bureau, Survey of Income and Program Participation, August-November 1998.

topics (Figure 1).[57] Some types of shortfalls in material well-being were far rarer than income poverty, whereas others were far more common. The SIPP-based poverty rate, using the official thresholds, for 1998 of 12.3 percent is included in Figure 1 for comparison.[58]

The least common of the shortfalls in material well-being listed here is lack of a stove in the household. Only 1.3 percent of U.S. households lacked this basic appliance in 1998. The most common shortfalls also involve the lack of appliances; 44 percent of households lacked a dishwashing machine and a majority (58 percent) lacked a computer.[59]

The shortfalls that affected only a small portion of the population sometimes were difficult problems. Figure 1 shows that 2.2 percent of all households sometimes or often did not have enough of the food they wanted. Lack of a telephone was cited by 3.8 percent of households. Odors, smoke, or fumes in the neighborhood was a problem for 4.9 percent. Rent or mortgage payments were missed by 5.4 percent. Households with one or more members who needed to visit a doctor or hospital but did not go represented 6.1 percent of the total. Those with leaking roofs or ceilings represented 6.9 percent. About 8.0 percent of households lived in neighborhoods with rundown or abandoned buildings.

The measures of material well-being just described were less prevalent than poverty, while other measures were more common. The SIPP asked households if there was a

[57] The estimates of this section of the report are based on responses from a sample of the population. As with all surveys, estimates may vary from the actual values because of sampling variation or other factors. All comparisons made in this section of the report have undergone statistical testing and are significant at the 90-percent confidence level unless otherwise noted.

[58] The household poverty rate of 12.3 percent using the SIPP is lower than the rate in official Census Bureau publications that is defined separately for families and unrelated individuals. Note that all of the poverty rates in this section refer to households rather than families and are calculated as if all households are family households. Households may consist of families, unrelated individuals, or a combination of the two. Poverty rates for households are typically lower than for families (see Short et al., 1999). Also, the data source (SIPP) differs in many ways from the Current Population Survey, which is used to produce the official poverty statistics. An important difference is the more detailed accounting of income in the SIPP, which leads to higher values.

[59] Since 1998, the percentage of households with computers has climbed greatly. See Newburger, 2001.

Table 1.
Households Experiencing Shortfalls in Material Well-Being—Poverty Status: 1998

[Numbers in thousands)

Characteristic	All households		Poverty status			
			Below poverty level		Above poverty level	
	Number	Percent	Number	Percent	Number	Percent
All households	102,652	100.0	12,648	12.3	90,003	87.7
No stove	1,343	100.0	412	30.7	931	69.3
Members did not have enough of the food they wanted	2,276	100.0	960	42.2	1,316	57.8
No telephone	3,847	100.0	1,630	42.4	2,217	57.6
Problem with neighborhood odors, smoke, or fumes	5,039	100.0	857	17.0	4,182	83.0
Did not pay full amount of rent or mortgage	5,522	100.0	1,669	30.2	3,853	69.8
Members needed doctor or hospital but did not go	6,303	100.0	1,783	28.3	4,519	71.7
Home had leaking roof or ceiling	7,073	100.0	1,380	19.5	5,693	80.5
Rundown or abandoned houses in neighborhood	8,165	100.0	1,478	18.1	6,687	81.9
Did not meet all its essential expenses	14,411	100.0	3,884	27.0	10,527	73.1
No clothes washer	18,431	100.0	4,736	25.7	13,695	74.3
No air conditioner	22,902	100.0	4,085	17.8	18,817	82.2
Area nearby where members would be afraid to walk at night	29,513	100.0	4,517	15.3	24,996	84.7
No dishwasher	45,134	100.0	9,401	20.8	35,733	79.2
No computer	59,545	100.0	10,318	17.3	49,228	82.7

Source: U.S. Census Bureau, Survey of Income and Program Participation, August-November 1998.

time in the last year when they did not pay essential expenses such as mortgage or rent, utility bills, or important medical care; 14 percent said "Yes." Clothes washing machines and air conditioners were absent from 18 percent and 22 percent of households, respectively. Finally, 29 percent of households said there was an area nearby where household members would be afraid to walk alone at night.

The variety of measures available (including many not reported here) leads to difficulties in choosing overall indicators of well-being. One approach has been to create indexes, in which several measures are added together in one way or another to create an overall summary. Various researchers have proposed such indexes, but a broadly accepted consensus approach has not yet been found.[60]

Properties of Material Well-Being Measures

Nearly all studies of material well-being measures have found that they display little overlap with income-based poverty measures.[61] This is a common finding and is easily explained by factors such as differences in tastes (such as those who purchase laundry services rather than owning a clothes washer), differences in the ability to manage available resources, and differences in the ability to dissave from assets or to borrow on credit to acquire material goods. Changes in net worth are an important element in economic well-being that is not accounted for in an income-based measure, but they are also difficult to account for in a consumption-based measure of poverty, as described in Section II.

The list of shortfalls in material well-being and their overlap with an income-based poverty rate in Table 1 follows Figure 1 in listing the rarest shortfalls at the top and the most common ones at the bottom. If the rarest shortfalls were also the most severe, one might expect them also to have the greatest overlap with income poverty, and that is generally what is found. Of the households with not enough food or no telephone, 42 percent were poor. Not far behind were households that failed to pay rent or mortgage or that lacked a stove, who had a poverty rate of about 30 percent. On the other hand, 22.3 percent of households lacked an air conditioner, but only 17.8 percent of them were poor.

Other shortfalls in material well-being show a more complicated relationship with income poverty. For example, neighborhoods with odors, smoke, or fumes were rare (reported by 5 percent of households), but were not particularly

[60] Examples are Mayer and Jencks, 1989; Mirowski and Ross, 1999; Layte et al., 2001; Beverly, 2001. A summary of issues involved in developing indexes is available in Harrison et al., 2002.

[61] Mayer and Jencks, 1989; Beverly, 2001; Layte et al., 2001; Saunders, 2003; Perry, 2002.

Table 2.
Poverty Status and Shortfalls in Material Well-Being of Household by Age, Sex, Race, Ethnicity, Education of Householder, and by Household Type: 1998

(Percent of households)

Characteristic	Household without telephone	Problem with neighborhood odors, smoke, or fumes	Home had leaking roof or ceiling	Household income below poverty level	Household did not meet all its essential expenses	Area nearby where afraid to walk at night
All Households						
Total	**3.7**	**4.9**	**6.9**	**12.3**	**14.0**	**28.8**
Age of Householder						
15 to 29	7.1	5.5	6.4	18.0	19.5	28.1
30 to 44	4.2	5.3	6.9	11.9	18.3	26.7
45 to 64	3.1	4.9	7.1	10.2	12.8	28.1
65 or older	2.2	3.9	6.8	13.0	5.9	33.4
Sex of Householder						
Male	3.6	4.4	6.2	8.4	11.1	21.6
Female	4.0	5.5	7.7	17.1	17.7	37.5
Race of Householder						
White	2.9	4.8	6.5	10.3	12.4	27.5
Black	8.9	5.9	9.0	25.3	25.3	37.6
Other	5.1	5.1	9.9	16.2	13.4	28.4
Ethnicity of Householder						
Hispanic	6.1	7.1	9.1	23.0	21.2	31.7
White non-Hispanic	2.6	4.5	6.2	9.1	11.5	27.1
Householder Education						
Not high school graduate	8.3	6.0	9.7	26.9	19.3	33.8
High school graduate	4.6	4.6	6.6	12.7	15.5	28.1
Some college	2.8	5.4	6.5	9.5	15.7	28.4
Bachelor's or more	0.5	3.9	5.7	4.6	6.5	26.3
Household Type						
Nonfamily alone	5.0	4.3	7.4	19.5	12.9	32.4
Nonfamily with others	4.8	6.0	6.9	6.1	13.6	27.6
Married, no children	1.2	4.4	5.3	4.0	6.4	26.1
Married with children	2.4	4.7	6.6	7.8	14.4	24.8
Unmarried, no children	4.4	5.4	8.4	9.2	16.1	30.4
Unmarried with children	9.4	7.5	9.4	29.7	34.1	35.4

Source: U.S. Census Bureau, Survey of Income and Program Participation, August-November 1998.

associated with poverty (households in such neighborhoods had a poverty rate of 17 percent). Further investigation into these complex relationships would be an important avenue of research and would broaden our understanding of who is in need.

Advantages of Material Well-Being Measures

Because well-being measures reflect actual living conditions, they may more accurately reflect the experience of economic hardship in day-to-day living. Geographic isolation or location away from needed services can have a serious impact on standards of living when other resources are lacking. Disability or the need to care for a disabled individual can entail expenses not necessary in other households. Inability to get credit can restrict budgets or make purchases more expensive. Lack of help from family or friends can constrain choices in many ways.[62]

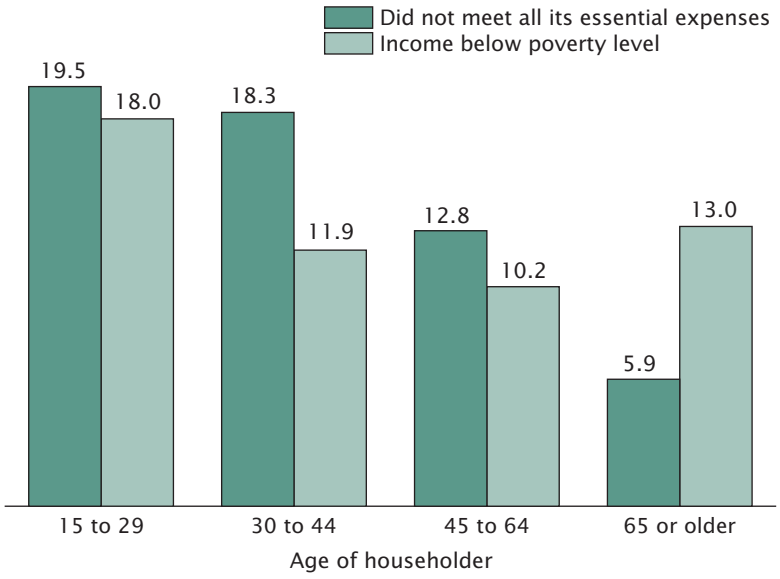
It has been clearly established that measures of material well-being have strong predictive power. For example, researchers have shown that measures of inability to meet basic needs predicted dropout from high school by members of affected households in much the same way that poverty does.[63] Similarly, material hardships are associated with teenage pregnancy and also with subsequent welfare use and patterns of little or no employment, even with controls for prior employment and welfare use.[64]

[62] For a description of these influences on material well-being see Edin and Lein, 1997.

[63] Bauman, 1998.

[64] Mayer, 1997, Bauman, 2002.

Figure 2.
Poverty Rates and Percent Not Meeting Essential Expenses for Households by Age of Householder: 1998



Source: U.S. Census Bureau, Survey of Income and Program Participation, August-November 1998.

Disadvantages of Material Well-Being Measures

The principal disadvantage of material well-being measures is the lack of information on how resources were related to shortfalls that occurred. In some instances, the question is the source of funds to finance consumption, as in the case where a household borrows to make ends meet. Sometimes it is a question of choice, as when money devoted to what some may consider nonessential expenses is not available for basic needs. The fact that direct measures of material well-being reflect choices greatly complicates the task of using them as an overall indicator of well-being. In this sense, income is a better measure, as it reflects the ability to make ends meet, whether or not the "right" choices were made to do so.

There are also data collection problems with measures of material well-being. Due to the lack of experience with the battery of questions involved, it has not been determined which questions to ask and how best to ask them.[65]

Defining Adequate Material Well-Being

Direct measures of material well-being provide an indication of the degree to which a person is "well-off" in a particular way. But because no standards exist to indicate whether or not a particular level is adequate, defining inadequacy is an especially complicated question. As with poverty measures, the question is where to set a standard on a continuum from "well-off" to "badly off." In addition, however, different levels of well-being reflect entirely different conceptions of what it is to be poor. The most severe shortfalls create physical problems for individuals: sickness, hunger, or cold. Other shortfalls, such as the lack of a telephone or lack of an automobile, are not physical problems but may limit the capacity to work, participate in society, or respond to an emergency. Other problems such as inability to afford Christmas presents or fear of crime in the neighborhood may also limit participation, but in a less directly instrumental way. Other shortfalls can best be thought of as sources of discomfort or inconvenience, such as the lack of a dishwasher or cracks in the walls of one's home.

[65] See Stinson, 1998 for recent cognitive research on the meaning of 'basic needs'.

Types of People Affected by Shortfalls in Material Well-Being

The types of people who experience shortfalls in material well-being and whose incomes are below the poverty thresholds are similar (Table 2). Young households (householders under 30), for example, are more likely to be poor than older households (householders aged 30 to 64), and they are also more likely to lack telephones and not pay essential expenses. Female-maintained households are more likely than male-maintained households to experience poverty and shortfalls of material well-being of each of the types listed in Table 2. Blacks and Hispanics are more likely than non-Hispanic Whites to report low income and to report shortfalls. Household type has a large impact on poverty and material well-being, with the category "unmarried with children" being the worst off under all the measures considered in Table 2.

Despite the overall similarity between measures of material well-being and poverty, some notable differences remain. The most striking are by age (Figure 2). Among households with householders 15- to 29-years-old,

18 percent had incomes below poverty and 20 percent did not meet household expenses. The percentage experiencing either problem decreased steadily with age through age group 45 to 64. At this point, there is a sharp divergence. Poverty climbed from 10 percent for households with householders age 45 to 64 to 13 percent for those 65 years and older. By contrast, not meeting essential expenses dropped from 13 percent to 6 percent across the two age groups. A similar decrease in problems with material well-being from the 45-to-64 age group to the 65 and older group is also seen in the lack of a telephone, and in odors, smoke, or fumes in the neighborhood.[66]

Other Possible Data Sources

In addition to the data presented here from the SIPP, other surveys provide similar types of statistics. Data from three surveys are presented here: the Consumer Expenditure Survey; the Residential Energy Consumption Survey; and the National Household Travel Survey. These tables present data for calendar year 2001.

The next two tables show household ("consumer unit"[67]) expenditures in 2001 sorted by expenditure level and divided into 10 equal parts from lowest to highest dollar amount. These expenditure deciles are created by using an outlays definition, as described in Section II.

The primary differences between total expenditures used in CE published data and outlays used in these tables are in the vehicle and home mortgage definitions. The outlays approach replaces vehicle sales price with vehicle payments made during the survey reference period. Home mortgage principal payments are included in outlays, while the CE total expenditures definition considers them to be investments and does not include them.[68]

The information in these tables is based on appliance ownership collected during the first interview.[69] Appliances that are provided in rental units are included. Vehicles include autos, trucks, and vans. The data show increasing levels of appliance ownership and percent ownership as household outlay expenditures increase.

As others have shown, many households have access to most appliances.[70] This approach of examining ownership by decile was also used in Greenspan (1998); he used the ownership by income decile to create an index of inequality for durable goods. Table 3 shows a minimal amount of disparity exists in the ownership of durable goods, especially vehicles, refrigerators, and stoves. However, the disparity in the number of durable goods owned is larger, especially for vehicles, color TVs, and computers (as shown in Table 4). For these items the highest-decile households own two or even three times as many of these goods.

Information on energy consumption and expenditures per household is available from the Residential Energy Consumption Survey for 2001. Heating and cooling consumption is also shown by household income, type of housing unit, and census region and division.[71] Household energy consumption and expenditures generally rise with income, with households in the highest income category consuming and paying about twice as much as those at the bottom of the income scale (see Tables 5-7). However, it does appear that in 2001, households everywhere, except for those in large apartment buildings, allocated $1,000 or more to energy expenses. As might be expected, the geographic area with the lowest energy costs is the Pacific Census division. Dominated by California and also including Hawaii, this division has most of its people living in generally a very temperate climate.

The story is somewhat different when consumption and expenditures are normalized for housing unit size and weather, which affects these energy uses more than others. Though aggregate space heating and cooling generally increases as income increases, the indexes per housing unit square foot and heating or cooling degree day generally decrease with increasing income. This trend probably reflects the increased efficiency of new, higher-end housing, which tends to be occupied by those with higher incomes. As might be expected, mobile homes require large amounts of energy relative to their size. Also as expected, the

(Text continues on page 19.)

[66] The difference between how poverty relates to age and how material well-being relates to age has been examined by several researchers, with no consensus reached thus far. See Mayer and Jencks, 1989; Mirowski and Ross, 1999.

[67] See appendix for a definition of consumer unit.

[68] Unlike the results presented using the SIPP data for above and below a poverty threshold, no adjustments are made in determining the outlay deciles for differences in family size or composition.

[69] The information on appliance ownership is inventoried during the consumer unit's (CU) first interview and is carried forward to subsequent interviews. If a CU purchases an appliance (which it previously did not own) in a subsequent interview, the inventoried information is not updated. Similarly, the first interview appliance information is not updated if an appliance has been sold or discarded by the time of a subsequent interview.

[70] Bauman, 2003; Mayer and Jencks, 1989.

[71] In the language of the Department of Energy/Energy Information Administration (DOE/EIA), 'consumption' is the amount of energy used and expressed in physical units. Expenditures are the cost of energy in dollars.

Table 3.
Percent of Consumer Units (CU) Reporting Ownership of Selected Appliances and Vehicles by Expenditure (Outlay) Decile: 2001

Appliances and vehicles	Outlay decile									
	1 (lowest)	2	3	4	5	6	7	8	9	10 (highest)
Microwave	73.7	85.0	87.2	90.3	91.7	93.6	95.4	95.6	96.8	98.0
Refrigerator	95.8	99.0	98.9	99.1	99.4	99.6	99.7	99.7	99.9	99.9
Freezer	22.5	24.3	27.0	27.5	30.0	32.5	35.9	36.8	38.6	39.4
Garbage disposal	18.9	28.7	33.4	36.4	39.4	43.4	50.4	55.5	61.5	68.8
Washer	52.8	66.4	69.3	73.4	78.4	84.5	88.2	89.4	93.6	95.8
Dryer	47.3	60.8	64.9	69.7	74.3	82.3	85.9	88.3	92.6	95.5
Color TV	90.6	97.2	97.0	98.4	98.3	99.0	99.2	99.2	99.5	99.4
Computer	21.1	25.3	36.9	46.0	51.4	61.1	67.7	76.7	83.1	87.5
Sound components	41.6	53.4	60.5	67.6	72.5	75.7	81.5	84.1	87.7	89.1
VCR	54.9	73.2	80.9	87.6	91.1	92.6	95.2	95.5	97.1	97.8
Stoves	88.8	97.3	98.1	98.7	98.6	99.1	98.9	99.2	99.4	99.6
Dishwashers	22.6	34.0	40.3	47.1	55.1	61.4	67.4	73.5	82.5	88.7
Auto, truck, van	63.9	69.5	79.7	89.0	91.2	92.9	93.9	93.0	92.5	90.5

Notes: Appliances that are provided in rental units are included in the above charts. Expenditure deciles are created by using an "outlays" definition of expenditures. The primary differences between total expenditures, as used in CE published data, and outlays are in the vehicle and home mortgage definitions. The outlays approach replaces vehicle sales price with vehicle payments made during the survey reference period. Home mortgage principal payments are included in outlays, while the CE total expenditures definition considers these to be investments and does not include them.

The information on appliance ownership is inventoried during the CU's first interview and is carried forward to subsequent interviews. If a CU purchases an appliance (which it previously did not own) in a subsequent interview, the inventoried information is not updated. Similarly, the first interview appliance information is not updated if an appliance is sold or discarded in a subsequent interview.

Source: Bureau of Labor Statistics, unpublished Consumer Expenditure Survey Interview Data 2001.

Table 4.
Average Number of Appliances and Vehicles Owned per Consumer Unit (CU) by Expenditure (Outlay) Decile: 2001

Appliances and vehicles	Outlay decile									
	1 (lowest)	2	3	4	5	6	7	8	9	10 (highest)
Microwave	0.7	0.9	0.9	0.9	0.9	1.0	1.0	1.0	1.0	1.0
Refrigerator	1.0	1.0	1.0	1.0	1.1	1.1	1.1	1.1	1.2	1.2
Freezer	0.2	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4
Garbage disposal	0.2	0.3	0.3	0.4	0.4	0.4	0.5	0.6	0.6	0.7
Washer	0.5	0.7	0.7	0.7	0.8	0.8	0.9	0.9	0.9	1.0
Dryer	0.5	0.6	0.7	0.7	0.7	0.8	0.9	0.9	0.9	1.0
Color TV	1.2	1.5	1.6	1.8	2.0	2.2	2.3	2.4	2.6	2.9
Computer	0.2	0.3	0.4	0.5	0.6	0.7	0.8	1.0	1.1	1.3
Sound components	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.4	1.5
VCR	0.6	0.9	1.0	1.1	1.2	1.4	1.5	1.6	1.8	2.0
Stoves	0.9	1.0	1.0	1.0	1.0	1.0	1.1	1.1	1.1	1.2
Dishwashers	0.2	0.3	0.4	0.5	0.6	0.6	0.7	0.7	0.8	0.9
Auto, truck, van	1.0	1.1	1.3	1.6	1.7	1.8	1.9	2.0	2.0	1.9

Notes: Appliances that are provided in rental units are included in the above charts. Expenditure deciles are created by using an "outlays" definition of expenditures. The primary differences between total expenditures, as used in CE published data, and outlays are in the vehicle and home mortgage definitions. The outlays approach replaces vehicle sales price with vehicle payments made during the survey reference period. Home mortgage principal payments are included in outlays, while the CE total expenditures definition considers these to be investments and does not include them.

The information on appliance ownership is inventoried during the CU's first interview and is carried forward to subsequent interviews. If a CU purchases an appliance (which it previously did not own) in a subsequent interview, the inventoried information is not updated. Similarly, the first interview appliance information is not updated if an appliance is sold or discarded in a subsequent interview.

Source: Bureau of Labor Statistics, unpublished Consumer Expenditure Survey Interview Data 2001.

Table 5.
Energy Consumption and Expenditures by Selected Household Characteristics: 2001

Characteristic	Number of households (millions)	Total BTUs per household (1,000 BTU)	Total dollars per household (dollars)
All households	107.0	91,984	1,488
Household Income			
Less than $10,000	11.0	65,321	1,042
$10,000 to $14,999	7.7	69,584	1,118
$15,000 to $19,999	8.9	79,970	1,278
$20,000 to $29,999	14.0	83,176	1,315
$30,000 to $39,999	13.9	86,140	1,379
$40,000 to $49,999	13.2	92,931	1,515
$50,000 to $74,999	21.7	101,950	1,671
$75,000 to $99,999	8.1	112,648	1,830
$100,000 or more	8.6	136,627	2,242
Income Relative to Poverty			
Income less than poverty level (PL)	15.0	70,553	1,135
Income between PL and 1.25 x PL	5.1	87,288	1,401
Income between 1.25 x PL and 1.5 x PL	6.3	79,486	1,258
Income greater than 1.5 x PL	80.5	97,252	1,577
Type of Housing Unit			
Mobile home	6.8	75,730	1,335
Single family detached	63.1	108,318	1,719
Single family attached	10.6	100,339	1,528
Apartment in building with 2-4 units	9.5	77,873	1,256
Apartment in building with 5 or more units	17.0	40,548	792
Census Region and Division			
Northeast	20.3	106,298	1,733
New England	5.4	114,940	1,812
Middle Atlantic	14.8	103,151	1,704
Midwest	24.5	116,631	1,539
East North Central	17.1	118,553	1,525
West North Central	7.4	112,191	1,570
South	38.9	82,191	1,521
South Atlantic	20.3	76,828	1,515
East South Central	6.8	86,452	1,388
West South Central	11.8	88,961	1,608
West	23.3	70,008	1,165
Mountain	6.7	86,978	1,253
Pacific	16.6	63,127	1,129

Notes: Household income is income from all sources, self-reported by the household respondent. Consumption and expenditures are for major fuels used by the household, including electricity, natural gas, fuel oil and kerosene, and liquefied petroleum gas (LPG) as applicable.

British thermal unit (BTU): The quantity of heat required to raise the temperature of 1 pound of liquid water by 1 degree Fahrenheit at the temperature at which water has its greatest density (approximately 39 degrees Fahrenheit).

Heating degree-days (HDD): A measure of how cold a location is over a period of time relative to a base temperature, most commonly specified as 65 degrees Fahrenheit. The measure is computed for each day by subtracting the average of the day's high and low temperatures from the base temperature (65 degrees), with negative values set equal to zero. Each day's heating degree-days are summed to create a heating degree-day measure for a specified reference period. Heating degree-days are used in energy analysis as an indicator of space heating energy requirements or use.

Cooling degree-days (CDD): A measure of how warm a location is over a period of time relative to a base temperature, most commonly specified as 65 degrees Fahrenheit. The measure is computed for each day by subtracting the base temperature (65 degrees) from the average of the day's high and low temperatures, with negative values set equal to zero. Each day's cooling degree-days are summed to create a cooling degree-day measure for a specified reference period. Cooling degree-days are used in energy analysis as an indicator of air conditioning energy requirements or use.

Source: Energy Information Administration, Office of Energy Markets and End Use, Forms EIA-457 A-G of the 2001 Residential Energy Consumption Survey.

Table 6.
Home Space Heating Consumption and Expenditure Ratios by Selected Household Characteristics: 2001

Characteristic	Dollars for space heating per household (dollars)	Heated square footage per household (square feet)	Heating degree days per household	Heating BTU index (BTU per square foot and degree day)	Heating dollar index (cents per 1,000 square foot and degree day)
All households (that use either electricity, natural gas, fuel oil, kerosene, or LPG for heating)	474	1,707	4,001	6.4	6.9
Household Income					
Less than $10,000	370	964	3,942	8.6	9.7
$10,000 to $14,999	387	1,117	3,968	7.8	8.7
$15,000 to $19,999	439	1,305	3,954	7.8	8.5
$20,000 to $29,999	450	1,306	4,043	7.8	8.5
$30,000 to $39,999	450	1,426	4,087	7.2	7.7
$40,000 to $49,999	488	1,776	4,036	6.2	6.8
$50,000 to $74,999	498	2,059	4,037	5.6	6.0
$75,000 to $99,999	558	2,411	4,026	5.4	5.8
$100,000 or more	642	3,046	3,774	5.2	5.6
Income Relative to Poverty					
Income less than poverty level (PL)	379	1,021	3,836	8.6	9.7
Income between PL and 1.25 x PL	442	1,314	3,788	8.0	8.9
Income between 1.25 x PL and 1.5 x PL	423	1,220	4,103	7.8	8.5
Income greater than 1.5 x PL	498	1,897	4,036	6.0	6.5
Type of Housing Unit					
Mobile home	383	979	3,939	8.0	9.9
Single family detached	551	2,076	3,956	6.3	6.7
Single family attached	534	1,879	4,319	6.3	6.6
Apartment in building with 2-4 units	506	1,199	4,277	8.6	9.9
Apartment in building with 5 or more units	162	781	3,833	4.4	5.4
Census Region and Division					
Northeast	699	1,873	5,257	6.4	7.1
New England	776	1,986	5,846	6.1	6.7
Middle Atlantic	671	1,831	5,041	6.5	7.3
Midwest	615	1,994	5,813	5.8	5.3
East North Central	613	1,980	5,782	6.0	5.4
West North Central	620	2,025	5,887	5.1	5.2
South	360	1,624	2,512	6.7	8.8
South Atlantic	359	1,635	2,473	6.3	8.9
East South Central	419	1,761	3,087	6.0	7.7
West South Central	327	1,526	2,247	8.0	9.6
West	318	1,390	3,480	6.1	6.6
Mountain	382	1,564	4,491	5.8	5.4
Pacific	291	1,316	3,049	6.1	7.2

Notes: Household income is income from all sources, self-reported by the household respondent. Consumption and expenditures are for major fuels used by the household, including electricity, natural gas, fuel oil and kerosene, and liquefied petroleum gas, (LPG) as applicable.

British thermal unit (BTU): The quantity of heat required to raise the temperature of 1 pound of liquid water by 1 degree Fahrenheit at the temperature at which water has its greatest density (approximately 39 degrees Fahrenheit).

Heating degree-days (HDD): A measure of how cold a location is over a period of time relative to a base temperature, most commonly specified as 65 degrees Fahrenheit. The measure is computed for each day by subtracting the average of the day's high and low temperatures from the base temperature (65 degrees), with negative values set equal to zero. Each day's heating degree-days are summed to create a heating degree-day measure for a specified reference period. Heating degree-days are used in energy analysis as an indicator of space heating energy requirements or use.

Cooling degree-days (CDD): A measure of how warm a location is over a period of time relative to a base temperature, most commonly specified as 65 degrees Fahrenheit. The measure is computed for each day by subtracting the base temperature (65 degrees) from the average of the day's high and low temperatures, with negative values set equal to zero. Each day's cooling degree-days are summed to create a cooling degree-day measure for a specified reference period. Cooling degree-days are used in energy analysis as an indicator of air conditioning energy requirements or use.

Source: Energy Information Administration, Office of Energy Markets and End Use, Forms EIA-457 A-G of the 2001 Residential Energy Consumption Survey.

Table 7.
Home Space Cooling Consumption and Expenditure Ratios by Selected Household Characteristics: 2001

Characteristic	Dollars for air conditioning per household (dollars)	Cooled square footage per household (square feet)	Cooling degree days per household	Cooling BTU index (BTU per square foot and degree day)	Cooling dollar index (cents per 1,000 square foot and degree day)
All households (that use electricity for air conditioning)	197	1,724	1,578	2.8	7.2
Household Income					
Less than $10,000	128	967	1,696	3.1	7.8
$10,000 to $14,999	135	1,084	1,662	3.1	7.5
$15,000 to $19,999	166	1,207	1,662	3.3	8.3
$20,000 to $29,999	147	1,258	1,589	2.9	7.3
$30,000 to $39,999	167	1,412	1,554	3.0	7.6
$40,000 to $49,999	186	1,762	1,529	2.7	6.9
$50,000 to $74,999	233	2,073	1,541	2.9	7.3
$75,000 to $99,999	241	2,434	1,484	2.6	6.7
$100,000 or more	340	2,944	1,595	2.7	7.2
Income Relative to Poverty					
Income less than poverty level (PL)	146	1,017	1,696	3.4	8.5
Income between PL and 1.25 x PL	182	1,213	1,719	3.6	8.7
Income between 1.25 x PL and 1.5 x PL	162	1,161	1,716	3.3	8.1
Income greater than 1.5 x PL	207	1,892	1,544	2.8	7.1
Type of Housing Unit					
Mobile home	240	958	1,623	6.6	15.4
Single family detached	224	2,078	1,596	2.7	6.8
Single family attached	169	1,957	1,353	2.4	6.4
Apartment in building with 2-4 units	125	1,029	1,511	3.0	8.0
Apartment in building with 5 or more units	124	787	1,673	3.4	9.4
Census Region and Division					
Northeast	110	1,505	917	2.3	7.9
New England	88	1,533	773	2.2	7.4
Middle Atlantic	116	1,497	958	2.3	8.1
Midwest	125	2,021	949	2.7	6.5
East North Central	118	2,031	877	2.6	6.6
West North Central	138	2,003	1,093	2.8	6.3
South	281	1,732	2,167	3.1	7.5
South Atlantic	266	1,737	2,081	2.9	7.4
East South Central	200	1,891	1,698	3.2	6.2
West South Central	350	1,636	2,570	3.3	8.3
West	156	1,394	1,615	2.4	6.9
Mountain	239	1,383	2,527	2.7	6.8
Pacific	114	1,399	1,155	2.0	7.1

Notes: Household income is income from all sources, self-reported by the household respondent. Consumption and expenditures are for major fuels used by the household, including electricity, natural gas, fuel oil and kerosene, and liquefied petroleum gas, (LPG) as applicable.

British thermal unit (BTU): The quantity of heat required to raise the temperature of 1 pound of liquid water by 1 degree Fahrenheit at the temperature at which water has its greatest density (approximately 39 degrees Fahrenheit).

Heating degree-days (HDD): A measure of how cold a location is over a period of time relative to a base temperature, most commonly specified as 65 degrees Fahrenheit. The measure is computed for each day by subtracting the average of the day's high and low temperatures from the base temperature (65 degrees), with negative values set equal to zero. Each day's heating degree-days are summed to create a heating degree-day measure for a specified reference period. Heating degree-days are used in energy analysis as an indicator of space heating energy requirements or use.

Cooling degree-days (CDD): A measure of how warm a location is over a period of time relative to a base temperature, most commonly specified as 65 degrees Fahrenheit. The measure is computed for each day by subtracting the base temperature (65 degrees) from the average of the day's high and low temperatures, with negative values set equal to zero. Each day's cooling degree-days are summed to create a cooling degree-day measure for a specified reference period. Cooling degree-days are used in energy analysis as an indicator of air conditioning energy requirements or use.

Source: Energy Information Administration, Office of Energy Markets and End Use, Forms EIA-457 A-G of the 2001 Residential Energy Consumption Survey.

Table 8.
Energy-Related Ratios for Household Transportation by Household and Vehicle Characteristics: 2001

(Provisional data)

Household and vehicle variables	Consumption per household (gallons)	Expenditures per household (dollars)	Vehicle miles per household (thousands)	Miles per gallon (MPG)	Consumption per vehicle (gallons)	Expenditures per vehicle (dollars)	Vehicles per household
All households/vehicles	1,105	1,468	22.9	20.6	593	788	2.0
Household Income							
Less than $10,000	677	892	14.3	21.0	480	632	1.5
$10,000 to $14,999	605	801	12.8	21.1	451	598	1.5
$15,000 to $19,999	780	1,032	16.6	21.2	523	691	1.6
$20,000 to $29,999	845	1,116	17.7	20.9	524	692	1.8
$30,000 to $39,999	1,054	1,395	21.9	20.7	582	771	2.0
$40,000 to $49,999	1,189	1,576	24.5	20.6	611	811	2.1
$50,000 to $74,999	1,354	1,801	28.0	20.6	643	856	2.3
$75,000 to $99,999	1,497	1,995	30.8	20.4	645	860	2.5
$100,000 or more	1,558	2,081	31.5	20.1	664	886	2.6
Household Composition							
One adult only	541	718	11.4	20.9	464	616	1.3
Two adults only	1,126	1,494	23.2	20.5	556	739	2.1
Households with children	1,436	1,909	29.7	20.6	663	882	2.3
Vehicle Vintage							
2000-2001	(NA)	(NA)	(NA)	20.5	718	952	(NA)
1997-1999	(NA)	(NA)	(NA)	20.7	680	902	(NA)
1994-1996	(NA)	(NA)	(NA)	20.8	607	805	(NA)
1991-1993	(NA)	(NA)	(NA)	21.0	557	742	(NA)
1986-1990	(NA)	(NA)	(NA)	20.6	485	648	(NA)
1978-1985	(NA)	(NA)	(NA)	19.4	406	544	(NA)
Prior to 1978	(NA)	(NA)	(NA)	15.8	365	492	(NA)
Vehicle Type							
Automobile	(NA)	(NA)	(NA)	23.5	500	665	(NA)
Vans (minivans/large vans)	(NA)	(NA)	(NA)	19.2	701	933	(NA)
Sport utility vehicle	(NA)	(NA)	(NA)	17.0	828	1,102	(NA)
Pickup trucks	(NA)	(NA)	(NA)	17.4	737	975	(NA)
Motorcycles	(NA)	(NA)	(NA)	50.0	58	79	(NA)

NA Not applicable.

Notes: Energy and miles per household statistics have as their denominator the number of households with one or more vehicles present at some point during the reference year and with complete energy-related information available for all vehicles in the household. MPG and per vehicle statistics have as their denominator all household vehicles with energy-related information collected, regardless of whether their household had data for all of its vehicles. Vehicles per household is computed using all vehicles, regardless of whether or not they had any energy-related information, and all households with one or more vehicles present at some point during the reference year, regardless of whether any of those vehicles had any energy-related information available. Data for all households/vehicles includes those with unknown values for any of the descriptive variables.

Source: Department of Transportation, 2001 National Household Travel Survey, augmented by derivation methodology developed by the Energy Information Administration.

(Text continued from page 14.)

Northeast and Midwest have heating expenditures about twice as high as the West and the South, while homes in the South have the largest cooling expenses by far.

Finally, Table 8 shows energy-related statistics for households and by vehicle characteristics from the Federal Highway Administration's 2001 National Household Travel Survey. Amount of travel and both fuel consumption and expenditures all generally increased as income increased. As was the case for household energy, the highest income households consumed and paid about twice as much as the households with the lowest incomes, but households at all income levels commonly spent at least $1,000 for vehicle fuel. High-income households didn't drive their individual vehicles that much more; rather, they generally had more vehicles in the household from which to choose. As vehicles age, they are driven less, and they get poorer fuel economy, especially the pre-1978 vintage vehicles.

IMPROVING MEASURES OF EXPENDITURES AND MATERIAL WELL-BEING

In the interest of continuing improvement to the estimation of the measures described in this report, several federal agencies have sponsored conferences in recent years. These conferences have had as a specific goal the improvement of data collection and measurement procedures for the purpose of estimating measures of consumption and material well-being.

In June 2000, the BLS sponsored a conference entitled "Issues in Measuring Price Change and Consumption." The conference included a number of research papers examining the current methodologies used in the CE survey. These issues included the use of global expenditure questions, the integration of the Interview and Diary components of the CE surveys, and the examination of income imputation methods.

As part of the conference, there was also a panel discussion on "The Role of Household Expenditure Surveys in Measuring Consumption." The purpose of the conference panel was to discuss the usefulness and importance of using household expenditure surveys to measure consumption and economic well-being in general. The conference panel consisted of four distinguished scholars from academia and government who were familiar with expenditure data and the CE survey in particular.[72] Each panelist was asked to focus on a particular aspect of the role of expenditure surveys and the measurement of consumption.

Two of the panelists discussed the conceptual issues in using expenditure surveys to measure welfare and economic well-being and the usefulness of these measurements in socioeconomic analysis. The other two panelists focused on the measurement issues of using expenditure surveys in constructing price indexes, demand analysis, and national accounting. After the panel presentations, a lively discussion of a variety of issues ensued, including the conceptual definition of consumption, the best number of expenditure categories, and data comparability.

While the panelists stressed different purposes for the CE survey, they agreed that the CE survey cannot meet the needs of every user at the same time. There also seemed to be agreement that household expenditure surveys should be exploited for the distributions that they capture, that is, the distribution of expenditures across households, as well as the distribution between particular demographic groups. Each panelist also stated that increasing the sample size of the CE survey would improve its usefulness.

In February 2002, the Office of the Assistant Secretary for Planning and Evaluation of the Department of Health and Human Services sponsored a Roundtable on Measuring Material Hardship. Generally speaking, participants identified two broad categories of "next steps" that could be pursued to further the development of these measures.

- First, additional definitional/-theoretical work could focus on examining what is meant by material hardship and how it could be measured in the context of low-income families and children (e.g., identifying what constitutes meeting a family's basic needs in American society or what families define as being normative).
- Second, further research and analysis could explore the implications of material hardship measures that have been used in large surveys. This research would focus on how these measures perform as indicators of material hardship and how they might be improved or augmented, with the intent of evaluating existing measures to determine if they are appropriate as a baseline or starting point for constructing a composite material hardship measure or list of individual measures within specific domains.[73]

Research on Improving the CE Surveys

The BLS is constantly working to improve the expenditure estimates in the CE survey and there have been many recent improvements. One of the most notable improvements was a 50 percent increase of the sample of urban households in 1999. Another important advance occurred in April 2003, when the CE Interview survey changed from being collected on paper to being collected using laptop computers. This innovation has the advantage of making it easier for field staff to complete all required questions, to skip inappropriate questions to reduce respondent burden, and to make it easier to revise the wording of questions.

One of the many improvements that has resulted from introducing computer-assisted interviewing (CAPI) has been an increase in the number

[72] The panelists were Angus Deaton of Princeton University, Susan Mayer of the University of Chicago, Robert Gillingham of the International Monetary Fund, and Robert Parker of GAO (formally of the Bureau of Economic Analysis (BEA).

[73] Harrison et al., p. 16.

of Interview reports of rental equivalence by homeowners. Rental equivalence values are used to form the cost weight for homeownership in the CPI. The new CAPI-instrument is reducing the number of times a value is assigned. In related research, a data adjustment team is considering alternate models to better impute a value for rental equivalence when the owner has not answered the question.

Income is a key demographic variable used in explaining spending behavior. In April 2001, income bracket ranges were added to the questions on the components of income to allow respondents to pick an income bracket when they do not answer a specific dollar amount. A detailed project to impute dollar amounts for missing income components is underway. The project will use multiple regressions to calculate family and member-level income values when respondents cannot, or refuse to, answer the income questions.

The BLS has contracted for a study to determine the feasibility of collecting data separately from each adult member in a household rather than continuing the present method of designating one respondent to report for all members within a household. The CE diary now used for collecting small, frequent, expenditures will be revised in 2005 to become more accurate and easier to use.

Finally, the CE division conducts regular comparisons between the CE survey data and other expenditure data. In particular, one team is comparing the CE survey data to expenditure data obtained by A.C. Nielson using their scanner data technology. Another BLS team is preparing a detailed comparison between the CE survey and the Personal Consumption Expenditure (PCE) accounts in order to understand and explain the differences in expenditure estimates between the two expenditure series (see discussion at the end of this section).

Research on Improving the SIPP

One important recommendation of the NAS panel was to make the SIPP rather than the CPS the official source for measuring income or resources in poverty statistics. The panel made this recommendation because the SIPP collects more information that is relevant to the measurement of poverty than does the CPS. Because the SIPP is an income survey rather than a supplement to a labor force survey, as is the CPS Annual Social and Economic Supplement (ASEC), the SIPP is designed to satisfy the increased data requirements for an improved measure of income-based poverty.

Started in 1983 by the Census Bureau, the SIPP is a continuing longitudinal survey in which household members in the survey are followed even if they move. Until 1993, the design introduced a new sample panel each February. Beginning in 1996, an enlarged 4-year panel was introduced, followed by a 3-year panel in 2001.[74] The sample covers the U.S. civilian noninstitutionalized population and members of the Armed Forces living off post or with their families on post. The sample size historically has varied from 12,500 to 23,500 households per panel; the 1996 and 2001 panels each began with about 36,000 interviewed households.[75]

Methodological investigation by the Census Bureau has concluded that a time series of official statistics, such as poverty, must be based on surveys with consistent design characteristics. Thus, for a longitudinal survey like the SIPP, the overall characteristics of the sample (consisting of households that stay in sample for several years) must not change from year to year. But past research reveals that families in poverty leave the sample at higher rates than non-poverty families. As a consequence, direct survey estimates from a longitudinal panel cannot be used without accounting for and correcting the bias introduced by this differential attrition. In other words, for measures of material well-being, asked toward the end of the panel, sample attrition could potentially bias the results.

To address this problem, an alternative survey redesign has been proposed for the SIPP that would achieve constant attrition bias (similar to the design of the CPS) that allows measuring year-to-year changes accurately (if both years' estimates are biased in the same way, their difference is not biased). Constant attrition bias for an annual statistic like poverty can be obtained by starting a new SIPP panel each year, just as the CPS adds a new sample each month to permit accurate measurement of month-to-month changes in unemployment. Specifically, the alternative design would field a new SIPP panel each year, with each panel collecting data for 3 years (or longer).[76] As part of this design, a desirable sample size would produce a time series of poverty statistics with the same (or lower) variance as the CPS ASEC estimates. Each panel would provide a complete measure of calendar-year income. The proposal is, in effect, to supplement the annual estimate

[74] The 2000 SIPP panel was discontinued early due to budget cuts.

[75] The 2001 SIPP panel sample was reduced by 13 percent in the second wave.

[76] Weinberg et al., 1998.

from each existing longitudinal 3-year panel with estimates from the two additional, smaller, panels. These pooled estimates would yield stable cross-section estimates and allow valid time-series comparisons. This result would hold not only for poverty measures but also for any measures of material well-being intended to be updated on an annual basis.

In addition to investing in an improved sample design and collection system, research could be aimed at improving the measures of material well-being in the SIPP. Such work would include increasing the frequency that topical modules on adult and child well-being are administered, as well as carefully examining the questions that are being asked. Including questions on reasons for not having particular material possessions would clarify whether individuals or families choose not to have specific goods or cannot afford to have them. Including summary expenditure questions in the SIPP, such as those contained in the University of Michigan's Panel Study of Income Dynamics (PSID), would allow examination of an array of measures of well-being for the same families and individuals over time in a large nationally representative survey.[77]

Participants in the Roundtable on Material Hardship, referred to above, suggested that additional work with the SIPP and other existing surveys might contribute valuable information on the adequacy and appropriateness of existing material hardship measures. Specific suggestions included:

- Additional reliability and validity tests of SIPP questions related to material hardship (for example, those included in the SIPP's Basic Needs Topical Module).
- An assessment of the types of material hardship questions asked in the SIPP (in particular) and also possibly in other surveys. For example:
  - Which questions are most important for measuring material hardship?
  - What, if any, additional data should be collected to provide a more complete picture of material hardship (for example, questions about availability of transportation)?
  - Which questions need improvement?
  - Should follow-up questions that gather additional information on intensity or duration be added?
- Empirical analyses that examine relationships among measures of material hardship on the SIPP (such as food insecurity and evictions), and between material hardship measures and other poverty indicators (such as income). Roundtable participants also noted that these types of analyses could also be applied to surveys other than the SIPP.[78]

Continued Collaborative Work on Poverty Measurement Research

Following the release of the NAS report on poverty measurement, researchers at the Census Bureau and the BLS have worked together to calculate alternative poverty thresholds as recommended.[79] This work was conducted under the guidance of an Interagency Technical Working Group on Improving the Measurement of Income and Poverty sponsored by the Office of the Management and Budget. The first Census Bureau report on alternative poverty measures was coauthored by a team of researchers at both agencies.[80] Since that time, several working papers have been coauthored by staff at these two agencies.[81]

In this effort, the major contribution of BLS staff has been to use the CE survey to estimate alternative poverty thresholds, while the Census Bureau has contributed the major effort toward measuring family income or family resources. In this work, several possible modifications to the CE survey have been suggested that would yield improved measures of poverty thresholds for future use.[82] An important area of investigation for alternative poverty measurement is the development of a geographic adjustment to account for differences in cost of living for different areas of the United States. The current official poverty measure is often criticized for its failure to take account of such differences. As such, this was one of the recommendations marked for further improvement by the NAS panel.

Census Bureau reports on alternative poverty measures have generally followed the recommendations of the NAS panel and have included versions that adjusted the poverty thresholds for geographic differences in cost of living using Fair Market Rents from the Department of Housing and Urban Development (HUD). While this adjustment represents a potential improvement in measuring

[77] Meyer and Sullivan, 2003 and Blundell et al., 2002.

[78] Harrison et al., pp. 16-17.

[79] For example, Garner et al., 1998.

[80] Short et al., 1999.

[81] For example, Garner and Short, 2001.

[82] Short et al., 1999, Short, 2001a.

geographic variation in the cost of housing, an improved poverty measure would benefit from considering whether, and if so how, prices of other goods and services vary geographically.

Interarea indexes for *all* areas based on preliminary research at the BLS by Kokoski et al., (1994), for example, could be very beneficial to this application. These researchers used a hedonic methodology and monthly CPI price data for July 1988 through June 1989 to produce experimental price indexes for the 44 CPI publication geographic areas.[83] These experimental interarea price indexes were created at the lowest level of CPI price data available and were aggregated to form index factors for 11 major expenditure categories. These results were produced by weighting lower level indexes using expenditure shares from CE survey data. The resulting 11 expenditure categories constitute about 85 percent of total consumer spending. Further work in this area should be encouraged.

Finally, recent work by a team of researchers within the BLS has provided a quantitative comparison of results from the CE surveys and the PCE data as produced by the Bureau of Economic Analysis (BEA); differences between the two data series are discussed. The BLS team has produced a paper that was presented to the Federal Economic Statistics Advisory Committee in March 2003.[84]

Although the BLS has regularly produced annual comparisons of CE and PCE data, a team of BLS researchers was convened in March 2000 to conduct a thorough review of these comparisons.[85] Earlier calls for detailed CE-PCE comparisons were issued by Slesnick (1992, 1993, 1998), Triplett (1997), Jorgenson (1998), and most recently Lebow and Rudd (2002). In addition, another NAS panel, which produced a report on the cost-of-living and price indexes, included a recommendation to investigate the "source of divergence between PCE- and CE-derived expenditure weights."[86]

In the BLS CE-PCE report, the comparison methodology that was originally developed and is currently used for official CE publications, based on type of expenditure (such as food, housing, or transportation), presents ratios of CE to PCE aggregate expenditures from 1984 through 2000. These results reveal that for all but rented dwellings, footwear, and vehicle rental and other charges, CE to PCE aggregate expenditure ratios have been decreasing over time. For all major commodity groups compared, except expenditures for rented dwellings and vehicle purchases, aggregate CE expenditures are lower than those from the PCE data.

The report finds that, based on a comparison of comparable items, CE aggregate expenditures were 89 percent of PCE aggregate expenditures in 1992.[87] However, by the years 1997 and 2000, the ratios of CE to PCE aggregates of comparable expenditures fall to about 80 percent. The CE-to-PCE ratios would be higher, however, if aggregates were adjusted for population differences; for example, the ratio of comparable expenditures are estimated to be approximately 91 percent for 1992 with this adjustment.

The report also includes an exhaustive analysis of CE and PCE estimates of apparel in 1992. This analysis reveals that CE apparel estimates are approximately two-thirds the magnitude of PCE estimates. An evaluation of the quality of the estimates focuses on three elements: measures of statistical reliability, expert judgment, and differences in definition of component categories. It was not possible to estimate the precise effect of each of the elements on the apparel aggregates due to difficulties in constructing a measure for each element in the CE and PCE. For example, confidence intervals based on standard errors could be calculated for apparel estimates from the CE, but not for the PCE. Taking these elements into account would at most increase the CE-to-PCE ratio by about 5 percentage points.

Concluding Remarks

As has been shown, measures of consumer expenditures and material well-being have both similarities to, and differences from, income-based measures of poverty. In most cases, the relationship is a complicated one. These differences suggest that closer examination would be useful while also underscoring the need to be cautious about their use.

The conceptual, data, and methodological issues outlined in this paper set the stage for at least three lines of future research on consumption-based poverty measures. The first would be to work directly on improving poverty measures using expenditure data. The second would be to develop

[83] The Kokoski et al. research is termed experimental and is not included in official BLS published data.

[84] Garner et al., 2003.

[85] The BLS has a history of conducting comparisons of the CE and PCE. See early work by Branch, 1987, 1994, and Gieseman, 1987. Biannual publications of Diary and Interview CE data include CE-PCE comparisons, with the first published in 1995 using 1992-93 data (BLS, 1995).

[86] National Research Council, 2002, p. 274.

[87] The latest PCE benchmark estimates available from BEA are for 1992; benchmark estimates for 1997 are scheduled to be published in December 2003.

statistical indexes from indicators of material well-being. The third would be to improve our measures of material well-being and use them to understand the relationships between estimates of low income (such as poverty) and estimates of material well-being, including the trends in the material well-being of the officially defined poor.

Such work would include obtaining input from outside experts. The Census Bureau, in consultation with the BLS, the BEA, and other statistical agencies, will continue this research, as resources permit, with the aim of eventually developing a set of experimental consumption-based poverty measures. This work will follow in the tradition of the streams of research on poverty that have been done previously, first using different definitions of income and then alternative poverty measures based on the 1995 NAS report. Any new experimental consumption-based measures could complement the official income-based measure.

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DATA SOURCES

The Survey of Income and Program Participation

The data in Tables 1 and 2 in this report were collected from August through November 1998 in the eighth wave (interview) of the 1996 SIPP. The SIPP is a longitudinal survey conducted at 4-month intervals. The population represented (the population universe) is the civilian noninstitutionalized population of the United States. The institutionalized population, which is excluded from the population universe, is composed primarily of the population in correctional institutions and nursing homes (91 percent of the 4.1 million institutionalized population according to Census 2000).

Statistics from sample surveys are subject to sampling and nonsampling error. All comparisons presented in this section of the report have taken sampling error into account and meet the Census Bureau's standards for statistical significance. Nonsampling errors in surveys may be attributed to a variety of sources, such as how the survey was designed, how respondents interpret questions, how able and willing respondents are to provide correct answers, and how accurately answers are coded and classified. The Census Bureau employs quality control procedures throughout the production process, including the overall design of surveys, testing the wording of questions, reviewing the work of interviewers and coders, and conducting statistical review of reports, to minimize the chance of errors.

The SIPP employs ratio estimation, whereby sample estimates are adjusted to independent estimates of the national population by age, race, sex, and Hispanic origin. This weighting procedure partially corrects for bias because of undercoverage, but how it affects different variables in the survey is not precisely known. Moreover, biases may also be present when people who are missed in the survey differ from those interviewed in ways other than the categories used in weighting (age, race, sex, and Hispanic origin). All of these considerations affect comparisons across different surveys or data sources.

For further information on statistical standards and the computation and use of standard errors, contact John L. Boies, Demographic Statistical Methods Division, at 301-763-4150,or via Internet e-mail (*John.L.Boies@census.gov*).

The Consumer Expenditure Survey

The current CE survey program began in 1980. The Census Bureau conducts the survey for the BLS. The principal objective of the survey is to collect information on the buying habits of consumers living in the United States. The survey consists of two components:

- A Diary, or recordkeeping, survey completed by participating consumer units[88] for two consecutive 1-week periods.
- An Interview survey in which expenditures of consumer units are obtained in five interviews conducted every 3 months.

Survey participants report dollar amounts for goods and services purchased during the reporting period, regardless of whether payment is made at the time of purchase. Expenditure amounts include all sales and excise taxes for all items purchased by the consumer unit for itself or for others. Excluded from both surveys are all business-related expenditures and expenditures for which the consumer unit is reimbursed.

Each component of the survey queries an independent sample of consumer units that is representative of the U.S. population. In the Diary survey, about 7,500 consumer units are sampled each year. Each consumer unit keeps a diary for two 1-week periods, yielding approximately 15,000 diaries a year. The Interview sample is selected on a rotating-panel basis, surveying about 7,500 consumer units each quarter. Each consumer unit is interviewed once per quarter, for 5 consecutive quarters. Data are collected on an ongoing basis in 105 areas of the United States.

The Interview survey is designed to capture expenditure data that respondents can reasonably recall for a period of 3 months or longer. In general, the captured data report relatively large expenditures, such as spending on real property, automobiles, and major appliances, or expenditures that occur on a regular basis, such as spending on rent, utilities, and insurance premiums. Including global estimates of spending for food, it is estimated that about 95 percent of expenditures are covered in the Interview survey. Expenditures on nonprescription drugs, household supplies, and personal care items are excluded, but are collected in the Diary survey. The Interview survey also provides data on expenditures incurred on leisure trips. The Diary survey is designed to capture expenditures on small, frequently purchased items that are normally difficult for respondents to recall. Detailed records of expenses are kept for food and beverages—both at home and in eating places—tobacco,

[88] A consumer unit consists of members of a household related by blood, marriage, adoption, or some other legal arrangement; a single person living alone or sharing a household with others, but who is financially independent; or two or more persons living together who share responsibility for at least two out of the three major types of expenses: food, housing, and other expenses. Students living in university-sponsored housing also are included in the sample as separate consumer units.

housekeeping supplies, nonprescription drugs, and personal care products and services. Expenditures incurred away from home overnight or longer are excluded from the Diary survey. Although the diary was designed to collect information on expenditures that could not be recalled easily over a given period, respondents are asked to report *all* expenses (except overnight travel expenses) that the consumer unit incurs during the survey week.

Residential Energy Consumption Survey

The RECS is the Energy Information Administration's (EIA) benchmark national survey providing data on energy consumption and expenditures in conjunction with characteristics of housing units and their residents. The RECS is conducted every 4 years, most recently for data year 2001. Data are collected via voluntary computer-assisted personal interviews with a probability sample of about 5,000 housing units nationwide and via mandatory followup mail data collection of energy data from the sample households' energy suppliers. Almost all of the housing unit data are provided by a responsible householder, but the interviewer does measure the floorspace of the housing unit, which is a crucial variable explaining energy use.

National Household Travel Survey

Household transportation data reported herein are based on statistical derivation of energy consumption and expenditures by EIA from information gathered in the Department of Transportation's NHTS. The NHTS is a nationally representative survey of household travel in conjunction with household and vehicle characteristics that was conducted for a travel period encompassing May 2001 through April 2002. Data collection consisted of a main telephone interview to collect these characteristics, along with data on travel behavior and odometer readings for vehicles owned or operated by household members at that time. A later telephone contact collected an additional odometer reading for each vehicle. The odometer readings were used to derive estimates of annual vehicle miles traveled (VMT) using monthly travel fractions available from research literature. EIA then derived fuel consumption and expenditures estimates for vehicles in sample households based upon statistically adjusted values of the Environmental Protection Agency's (EPA) test miles-per-gallon values (which were used to estimate fuel quantities from VMT) and EIA-provided fuel prices (which were used to compute expenditures from the derived consumption).

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