# Measuring the Well-Being of the Poor Using Income and Consumption

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May 2002

## ABSTRACT

We examine the relative merits of consumption and income as measures of the material well-being of the poor. Consumption offers several advantages over income because consumption is a more direct measure of well-being than income and is less subject to under-reporting bias. Measurement problems with income are problematic for analyses of changes in well-being of the poor because the biases appear to have changed over time and are correlated with government policies. On the other hand, income is often easier to report and is available for much larger samples, providing greater power to test hypotheses. We begin by considering the conceptual and pragmatic reasons why consumption might be better or worse than income. Then, we employ several empirical strategies to examine the quality of income and consumption data. First, we compare income and consumption reports for those with few resources, as well as their assets and liabilities, to examine measurement errors and under-reporting. Second, we examine other evidence on the internal consistency of reports of low income or consumption. Third, we compare how well micro-data in standard datasets weight up to match aggregates for classes of income and consumption that are especially important for low-resource families. Fourth, we validate income and consumption measures by comparing them to other measures of hardship or material well-being. Although the evidence tends to favor consumption measures, our analyses suggest that both measures should be used to assess the material well-being of the poor.

This paper was prepared for the Joint IRP/ERS Conference on Income Volatility and Implications for Food Assistance, May 2-3, 2002 in Washington, DC. We thank Angus Deaton and Dean Jolliffe for suggestions.

## I. Introduction

Income is almost exclusively used to measure economic deprivation in the U.S. In comparison, consumption is the standard measure of material well-being in developing countries.[1] While there are obvious differences between developing and developed countries, such as the extent of formal employment, these distinctions are blurred when looking at the poor in developed countries who may do little formal work. Ethnographic research on poor households in the U.S. suggests that consumption is better reported than income. There has been some validation of the quality of income data in the U.S., but this work has not focused on measuring incomes at the bottom end of the distribution. We further investigate the quality of income and consumption survey data for poor households in an effort to better measure the material well-being of these families. We use several empirical strategies to examine the sources of the noticeable disparity between income and consumption for poor families, and to test the relative merit of these two measures of material well-being for these families. We also provide information that we hope will be useful in improving income and consumption based measures of material hardship.

Income is by far the most commonly used measure of material well-being. There are large literatures examining the effects of low income on child outcomes such as test scores, behavior problems, and health (see Mayer, 1997, for example). While the accuracy of income reports in many datasets has been extensively analyzed, the vast majority of this work does not focus on the poor. For those at the bottom, where the extent of material deprivation is most important, there is little evidence on the reliability of income measures. Moreover, there are many pieces of evidence that suggest that income is badly measured for the poor. There are also conceptual and economic reasons to prefer consumption to income.

We examine the quality of income and consumption as measures of material well-being in several ways. We begin by exploring the conceptual and pragmatic reasons why consumption might be better or worse than income. We then consider four empirical strategies to examine the quality of income and consumption data. First, we compare the income and consumption reports for those with few resources, as well as their assets and liabilities, to examine measurement errors and under-reporting. Second, we examine other evidence on the internal consistency of reports of low income or consumption. Third, we compare how well micro-data in standard datasets weight up to match aggregates for classes of income and consumption that are especially important for low-resource families. Fourth, we validate income and consumption measures by comparing them to other measures of hardship or material well-being.

We focus on single mothers without a high school degree as a clearly defined group that typically has very low resources. More than half of single mothers without a high school degree receive welfare in a typical year. However, we expect that many of the points we illustrate would also apply to other disadvantaged groups such as the disabled or the aged poor. These groups also rely significantly on government transfers and receive income from many sources.

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[1] See Deaton (1997), particularly Section 1.2, for an informative discussion of income and consumption measurement issues in developing countries.

## II. Strengths and Weaknesses of Income and Consumption Data

This section outlines the reasons that one might prefer consumption or income data when determining levels of or changes in the material well-being of the most disadvantaged families. The reasons are both conceptual and pragmatic. We emphasize past work on these issues and provide some new arguments.

### EASE AND ACCURACY OF INCOME AND CONSUMPTION REPORTING

There are two important reasons why income may be preferable to consumption as a measure of well-being. First, income is often easy to report. For many people, income comes from one source and is reported on a W-2 received in the mail which is in-turn entered on a tax form submitted to the IRS. This simplicity is reflected in the finding by Bound and Krueger (1989) that more than 40 percent of Current Population Survey (CPS) respondents report earnings that are within 2.5 percent of IRS earnings.[2] This argument is probably the main reasons most surveys rely on income measures and is compelling for many demographic groups.

However, for some population groups that are particularly important from a poverty and public policy perspective, such as low-educated single mothers, this argument is less important. For this group, income comes from many other sources besides earnings in covered employment. For disadvantaged families, transfer income (which is consistently underreported in surveys) and off-the-books income (which is likely to be unreported in surveys) account for a greater fraction of total income. For example, in the welfare reliant single mother sample in Edin and Lein (1997), the average single mother obtains at least ten percent of income from each of four different sources (AFDC, Food Stamps, unreported work, boy friends/absent fathers), and only two percent from reported work. With many sources of income that do not appear on a W-2 statement, accurate reporting is much less likely.

While most families may be able to report the amount they earn with greater accuracy than the amount they spend on goods and services, this argument is less compelling for groups that spend a large fraction of their resources on food and housing. Furthermore, consumption of food and housing may be of interest in their own right and sufficient statistics for well-being given that budget shares do not differ sharply across families. Food and housing together also constitute 75 percent of the consumption of low-educated single mothers and thus provide a good measure of well-being.

### SAMPLE SIZE AND PRECISION

Another potential explanation for researchers' predominant use of income to measure well-being is that income data are available in larger datasets such as the CPS and the Survey of Income and Program Participation (SIPP). Because consumption data are much more costly to collect for a given number of households, datasets with consumption information are much smaller. The larger samples with income data allow patterns to be determined with greater

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[2]This finding is for a very select subset of observations that can be matched in the CPS and Social Security earnings records with non-truncated, non-imputed earnings in covered employment.

precision, analyses of subsamples to be performed with confidence, and hypotheses to be tested with greater power. Furthermore, income measures are available in many datasets that include a rich set of demographic variables and other variables of interest.

## SYSTEMATIC UNDER-REPORTING OF INCOME

Income appears to understate the financial resources available to households. Research looking at both household income and consumption shows that reported income falls well short of reported consumption. Cutler and Katz (1991) emphasize that the income distribution is much more highly dispersed than the consumption distribution. They also note that the fraction of individuals with income below the poverty line is much larger than the fraction with consumption below the poverty line. Slesnick (1993) also emphasizes that poverty rates based on total expenditures are much lower than those based on income.

Several papers have pointed out that the reported expenditures of those who report low incomes often are multiples of their reported incomes (Rogers and Gray, 1994; Jencks, 1997). In our view, these results are in large part due to measurement error and the effects of conditioning on a low value of income. We report statistics below in the same vein, but without the potentially misleading aspects of conditioning on low income.

## EARNINGS

Self-employment tends to be concentrated at the top or the bottom of the income distribution. Under-reporting of income is particularly important for the self-employed, so this problem may be worse for assessing the well-being of the poor.

## PRIVATE TRANSFERS

Another reason why consumption might be preferable to income is that income tends to miss monetary transfers from family and friends as well as in-kind transfers. In-depth interviews in ethnographic research has shown that a large share of low resource single mothers obtain substantial income in transfers from family and friends, boyfriends and absent fathers (Edin and Lein, 1997). These sources of support are not captured in survey data on income.

## GOVERNMENT MONEY TRANSFERS

In addition to the under-reporting of earnings and private transfers, household surveys also fail to capture the full value of government transfers, particularly for single mothers. This issue has been recently documented by Coder and Scoon-Rogers (1996) and Roemer (2000) for a large number of transfer programs and recently reviewed by Hotz and Scholz (2001) and Moore et al. (1997). There are also many studies that focus on underreporting in a few programs or a single transfer program such as Bavier (1999) and Primus et al. (1999) on AFDC/TANF and Food Stamps, and Giannarelli and Wheaton (2000) and Meyer (forthcoming) on SSI. We will discuss these issues at length in Section IV.

Comparisons of Current Population Survey (CPS) numbers to administrative data suggest that by 1993 unreported means-tested cash transfers were equal to over 11 percent of total reported income for single mothers in the bottom income quintile.

## IN-KIND TRANSFERS

Under-reporting is not the only reason that income measures are likely to understate the financial wherewithal of households. Income data also fail to capture in-kind transfers, such as Medicaid, that are reflected in expenditure data. These in-kind transfers are a particularly important source of support for households with low cash incomes. Recent changes in Medicaid are likely to substantially affect family well-being without affecting measured family income. On the other hand, non-medical consumption measures would reflect Medicaid changes.

## IS INCOME MORE SENSITIVE AND EASIER TO HIDE?

A view among some researchers is that individuals are more willing to report their expenditures than their income, possibly because they are taxed on their income rather than their expenditures. This view is certainly consistent with the high rates of non-response in the CPS that are listed in Table 2 of Moore et al. (1997). They report non-response rates of over twenty-five percent for most of the large income categories, on top of the 7-8 percent interview refusal rate. For example, in 1996 the non-response rate was 26.2 percent for wage and salary income, 44.1 percent for interest income, and 30.2 for pension income. The reason for non-response is generally that the interviewee refused to answer or indicated that he/she didn't know.

In the CEX the non-response rate was 17 percent and there is no imputation of missing consumption information.

## ILLEGAL ACTIVITY

Income measures also fail to capture illicit or other off-the-books earnings. For example, consider an individual selling illicit drugs. This individual may not report revenue from this illicit activity as income (a problem for income data), but involvement in illicit activity does not imply that food and housing expenditures will be mis-reported. If the illicit activity is on the expenditure side (e.g. drug purchases), expenditures on food, housing, or total expenditures (which do not include illicit drug purchases) would still provide meaningful summary information on household well-being.

## CHANGES IN REPORTING OVER TIME

The problem of understated income is exacerbated by changes in the extent of under-reporting over time. For example, with diminished dependence on cash transfers with their high implicit tax rates, there is a reduced incentive to hide income. AFDC caseloads fell dramatically after March of 1994, reducing the incentive for single mothers to hide income. Consequently, reported income for these households might rise even if the true value of income does not change.[3] Incentives to under-report income were also changed by recent EITC expansions that increased the incentive to substitute on-the-books earnings (which would be partially matched by credit dollars) for off-the-books income.

Under-reporting of means-tested cash transfers (AFDC/TANF and Food Stamps) has increased in recent years (Bavier, 1999; Primus et al., 1999). Overall, unreported cash transfers

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[3] Mayer and Jencks (1993) provide evidence for an earlier period that the growth in both means-tested transfers and illegitimate income resulted in an increase in the under-reporting of income.

grew by 68 percent from 1993 to 1997. Assuming households at the bottom under-report these transfers at the same rate as all welfare recipients, this rise in under-reporting alone would bias downward measured changes over this period in income for single mothers in the bottom income quintile by nearly 8 percentage points.[4]

Certainly, consumption is measured with error as well. However, households do not have the same incentives to under-report consumption, so there is little reason to suspect that the rate at which households mis-report consumption has changed over time nor is under-reporting of consumption likely to be correlated with policy changes. Recent expansions in Medicaid coverage and government provided health insurance through SCHIP are likely to substantially affect family well-being without affecting measured family income. On the other hand, non-medical consumption measures would reflect Medicaid changes.

## REPORTING OF CONSUMPTION

With income a key concern is under-reporting. Since reported consumption often exceeds income for those with few resources, could consumption be over-reported? The evidence comparing CEX consumption to aggregates from independent sources do not suggest that consumption is over-reported (Branch, 1994). It may be that the lack of imputation in the CEX imparts a downward bias. In addition, for analyses of changes over time, welfare and tax programs should not appreciably alter the incentives to report expenditures in the same way that they alter the incentives to report income.

There are concerns that attrition in the CEX has worsened over time and some researchers have suggested that the quality of CEX data declined between the 1970s and the early 1980s (see the references in Cutler and Katz, 1991).

## MEASUREMENT ERROR MODELS AND OUTLIERS

In interpreting income and consumption measures at the bottom of the distribution, it is important to remember that extreme values are more likely to be mis-measured values than other observations. A formal model of measurement error in both income and consumption would be useful to illustrate some of the key points, but it is not possible to lay it out here.

## CONSUMPTION MORE DIRECT: TRANSITORY FLUCTUATIONS IN INCOME

Economic theory suggests that current expenditures serve as a better proxy for the material well-being of the household than current income.[5] Current income can be a misleading indicator of the economic status of the household because earnings are susceptible to temporary fluctuations due to transitory events such as layoffs or changes in family status. These temporary changes cause current income to vary more than consumption, but they do not necessarily reflect changes in well-being (see Wemmerus and Porter, 1996, for example). Also, while current income only reflects short term resources, consumption is more likely to capture a household's

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[4] This figure is based on the authors' calculations using CPS and administrative data reported in Bavier (1999).

[5] For further discussion see Cutler and Katz (1991), Slesnick (1993), or Poterba (1991).

forward looking behavior, thus avoiding the volatility associated with short term fluctuations in income. Furthermore, Poterba (1991) provides evidence that the difference between current income and current expenditures is larger for very young and very old households, suggesting that some of this disparity is likely the result of life-cycle behavior, and that current income understates well-being for these households.

DIFFERENCES OR CHANGES IN ACCESS TO CREDIT

Income measures fail to capture disparities in consumption that result from differences across households in the accumulation of assets or access to credit (Cutler and Katz, 1991).

INSURANCE VALUE OF PROGRAMS

Income also fails to capture the insurance value of means-tested transfers. This insurance value of programs might change when programs change, and would be reflected in consumption, but not income. For example, if welfare is a valuable source of insurance for poor households, then the value of this insurance falls as welfare reform introduces more rigid eligibility rules such as time limits and work requirements. This change creates an incentive for these households to find alternative sources of insurance such as increased savings. Again, the loss of insurance due to a weaker safety net would not reduce income, but could reduce consumption as families save for a rainy day.

DISAGGREGATION

Components of consumption can provide a direct measure of well-being as well as total consumption. One can also measure well-being using expenditures on key categories such as food and housing and child well-being using child clothing and other child goods.

MATERIAL HARDSHIP

Research has also argued that income is only weakly correlated with material hardship (Mayer and Jencks 1989). In Section IV below we more directly examine the association between low reported values of income or consumption and measures of material hardship or bad family outcomes.

PRICE CHANGES

Price changes are likely to affect families differently depending on their preferences for various goods and service and are likely to have an important effect on the material well-being of families. For example, rapidly increasing prices for health care may disproportionately hurt those families that are not fully insured. Price changes need to be accounted for in measuring well-being. By examining several different components of total consumption one can account for relative price changes that cannot be accounted for using income data.

WHAT CONSUMPTION MISSES

Household expenditures do ignore many important components of well-being such as physical and mental health, neighborhood and school quality, and family functioning. Nevertheless, it is hard to argue that income will capture these features of well-being.

## III. Data and Methods

DATA

The analysis that follows compares income and consumption information from several sources including the Consumer Expenditure Survey (CEX), the Panel Study of Income Dynamics (PSID), and the Current Population Survey (CPS). Both the CEX and the PSID provide data on income and expenditures for the same households, while the CPS does not provide data on expenditures.[6] This section provides a brief description of each of these surveys and outlines the methods used to construct consumption, expenditure, and income measures. See the data appendix for more discussion of our samples and detailed descriptions of each of our measures of material well-being.

The CEX is a nationally representative survey conducted by the Bureau of Labor Statistics (BLS) that is designed to provide a continuous summary of the spending habits of U.S. households. The BLS estimates that the survey accounts for up to 95 percent of all household expenditures, making it the most comprehensive survey on household consumption. The CEX also reports detailed information on demographic characteristics as well as employment and income information for each member of the household over the age of 14. Expenditure measures are provided at the family level only. For this analysis, we use the interview component of the CEX—the quarterly survey that asks comprehensive questions about a wide variety of expenditures. From these questions, the BLS provides data on more than 600 unique expenditure categories at the family level. The BLS also conducts a separate diary survey that provides more detailed information on smaller or more frequent expenditures that tend to be more difficult to recall. For more information on the CEX see U.S. Bureau of Labor Statistics (1997).

The PSID is an annual longitudinal survey that has followed a nationally representative random sample of families, their offspring, and coresidents since 1968. The survey provides detailed economic and demographic information on both the family and individual level for a sample of about 7,000 families each year. Although the PSID does not survey families about all expenditures, it does collect data on food and housing expenditures, which together constitute as much as 75 percent of the consumption of low-educated single mothers and an even higher percentage of consumption for those with few resources such as those at the 10$^{th}$ percentile of consumption. In addition to annual measures of family income, inter-family transfers, and food and housing expenditure data, the PSID provides a detailed inventory of the family's asset and liability portfolio at five-year intervals (1984, 1989, 1994, and 1999). By observing all of these components of the family budget constraint we can examine more directly how families balance their budgets.

The Current Population Survey (CPS) is a nationally representative monthly survey of approximately 60,000 households. The CPS is the most commonly used source of nationally

[6] Limited data on food expenditures are available in the CPS Food Security Supplement, which is administered each April.

representative income data. We use the March CPS files that include the Annual Income Supplement data. In the March interviews, individuals are asked to provide detailed retrospective information including hours, earnings, and weeks worked during the previous year.

## INCOME AND CONSUMPTION MEASURES

To establish a consistent unit of analysis across the three surveys, we look at income, consumption, and expenditures at the primary family level. In the CPS, this includes all related family and subfamily members, but excludes unrelated subfamilies and unrelated individuals. We look at income at the family level, rather than the household level, in the CPS because this definition seems to fit most closely with the unit of observation available in the CEX and the PSID. The CEX "consumer unit" includes all related family members or two or more persons living together who use their income to make joint expenditure decisions. To be considered a separate consumer unit in the CEX, at least two of the three major expense categories—housing, food, and other living expenses—have to be provided by the respondent. The PSID definition of the family is similar to, although somewhat broader than, the family unit defined in the CPS. Some have argued that the PSID definition of a family unit is more comparable to the CPS definition of the household (Gouskova and Schoeni, 2002).

For most of the analysis that follows we focus on low educated single mother families as an easily definable group that typically has very limited resources.[7] More than half of all single mothers without a high school degree are on welfare in a typical year. In particular we restrict our samples to female-headed families with heads that are between the ages of 18 and 54, do not have a high school degree, and who have at least one of their own children under the age of 18 living with them. Because the CEX does not allow us to identify subfamilies, the samples do not include separate observations for single mothers that live with their parents. We use sample weights from each survey so that all results reported in the following section are representative of the U.S. population of low educated single mothers.

We construct measures of income, consumption, and expenditures that are defined similarly across surveys. In order to compare these measures across observations with different family sizes, we adjust these measures using a scale for the number of adults and children in the family (see data appendix for more details). Annual income includes all money income for all family members as well as the face value of food stamps received. All income numbers reported in the following section are net of state and federal income taxes. We calculate after tax income by subtracting state and federal income tax liabilities and payroll taxes and by adding credits, including the EITC.

Only the CEX and the PSID provide both expenditure and income data for the same families. While the CEX provides far more comprehensive measures of consumption, it is likely that the PSID has higher quality income data. The PSID data include more than 250 income and tax variables that are derived from a very detailed list of questions about family income. These variables include separate income information for the head, the spouse, and other family

[7] We expect, however, that many of the points we illustrate would apply to other disadvantaged groups including the disabled or the aged poor. These groups also rely on government transfers so their income is not largely reported on a W-2.

members. Survey questions about food and housing in the PSID are much less detailed. The questionnaire includes fewer than ten questions about food expenditures, including spending for food at home and food away from home, although additional questions are asked about food stamp receipt. The survey includes approximately 30 questions about housing arrangements and housing costs.

The income data in the CEX are significantly less detailed. These data are derived from questions covering about 30 different components of income and taxes. These questions are asked of each member of the family over the age of 14. Expenditure data in the CEX, on the other hand, are provided with considerable detail. From the quarterly interview surveys, information on spending for about 600 unique expenditure categories is provided. Questions in the CEX survey are designed to capture the current expenditures of the family. We exploit detailed data on many different components of expenditures in order to convert expenditures to a measure of total family consumption. There are three major differences between our measure of total consumption and the BLS's measure of total expenditures. First, we exclude spending on individuals or entities outside the family. For example, we exclude spending on gifts to non-family members and charitable contributions. Second, consumption does not include spending that can be construed as an investment such as spending on education and health care, and outlays for retirement including pensions and social security. Finally, reported expenditures on durables tend to be lumpy because the entire cost of new durable goods is included in current expenditures. To address concerns about this lumpy nature of expenditures on durables, we convert reported housing and vehicle spending to service flow equivalents for our measure of consumption. For a detailed description of how we calculate these service flows, see Meyer and Sullivan (2001).

Using data on reported food and housing expenditures in the PSID, we calculate predicted measures of total expenditures and total consumption for each family in our PSID sample. First, using CEX data, we regress total family expenditures on food expenditures, housing expenditures (each is equivalent scale adjusted), an indicator for home ownership, and a set of year dummies. A separate regression is estimated for each decile of the equivalent scale adjusted food and housing distribution for single mothers without a high school degree in the CEX. Parameter estimates from each regression are then used to predict total expenditures for each observation in the respective decile of the equivalent scale adjusted food and housing distribution in the PSID using reported spending on food and housing (both equivalent scale adjusted) in the PSID. Even though these predictions give our best estimate of total expenditures, this approach does not give the best estimate of the distribution of consumption because the regressions predict the expected value of expenditures rather than the distribution of expenditures. Therefore, to match the distribution of expenditures more accurately, our measure of total expenditures in the PSID is the sum of the predicted value of total expenditure and a residual, which is randomly drawn from the distribution of residuals generated from the regressions using CEX data.[8]

[8]Applying this method in the CEX data results in a distribution of predicted expenditures that more closely matches the distribution of actual expenditures. The data appendix describes this approach in more detail.

Predicted total consumption in the PSID is calculated following the same procedure as that for predicted expenditures, except that in the CEX we estimate an equation for predicted consumption rather than predicted expenditures. Also, out of sample predictions in the PSID are calculated using a measure of housing flows in the PSID rather than housing expenditures.

## IV. Results

Our first empirical strategy is to directly compare income, expenditure and consumption measures in national datasets. Table 1 reports the distribution of real income, expenditures and consumption for single mothers without a high school degree during 1991-1998. These statistics imply that the poorest single mother families have extremely low levels of income, expenditures and consumption. For example, a CPS family at the 10th percentile has an annual total income of $5,083 (or $424 per month). Nearly 2 percent of all single mother headed families have zero or negative total income.

These lowest income families appear to spend and consume more than their total income. In fact, the expenditure distribution for these families from the CEX suggests that a family at the 10th percentile of the expenditure distribution spends more than $6,600 annually. None of these households report zero expenditures. In both the CEX and the PSID datasets where we have income and expenditure data for the same sample, expenditures greatly exceed income at low percentiles. In the CEX, expenditures exceed income by 46 percent at the $10^{th}$ percentile and 24 percent at the $20^{th}$ percentile. In the PSID, predicted expenditures exceed income by 27 percent at the $10^{th}$ percentile and 12 percent at the $20^{th}$ percentile. These results strongly suggest the presence of substantial unreported income or other forms of measurement error in the income data.

We should emphasize that these are comparisons of the same percentiles, not the same individuals. When we calculate the mean expenditures of those households in the bottom income decile, their expenditures are about twice their income. Similarly, when we examine the income of those households in the bottom expenditure decile, their income exceeds their expenditures. These patterns we believe are largely driven by measurement error in both income and expenditure data. A more meaningful comparison is a comparison of percentiles even though different individuals are being compared.

It is possible that this puzzle of expenditures exceeding income could be resolved by low-educated single mothers drawing down assets or borrowing to make up the difference. However, data on assets and liabilities do no support this conjecture. In Table 2 we report various percentiles of the asset and liability distributions of those with predicted expenditures greater than income and income below given percentiles in the PSID. We select years so that assets are measured the year before expenditures exceed income and liabilities are measured the year after expenditures exceed income. These numbers indicate that the typical single mother who reports low income and expenditures that exceed income does not have any assets or liabilities. Total assets are always zero at the median, while the $75^{th}$ percentile of assets is below $1,000 through the $30^{th}$ percentile of income for these households. Liquid assets are even lower, never above $250 even at the $90^{th}$ percentile. Total liabilities are always zero at the $75^{th}$ percentile, but substantial at the $90^{th}$ percentile for those above the $10^{th}$ percentile of income. Unsecured assets

are zero or trivial amounts except at the 90th percentile for those above the 30th percentile of income. Thus, dissaving cannot explain the excess of reported spending over reported income.

Another way to demonstrate that reported income tends to be much lower than reported expenditures for low-educated single mothers is to compare total income to total expenditures for all single mother families. Table 3 shows that these households spend much more than their reported incomes each year. In Table 3, a comparison of total after-tax household income–including earnings and transfers for all family members–to total household expenditures from 1991 to 1998 in the CEX shows that expenditures exceed income by an average of 11.5 percent for single mother households.[9] For single mothers who do not have a high school degree, the disparity is even larger–21.1 percent on average from 1991 to 1998–suggesting that income numbers are a more problematic measure of well-being for less-skilled single mothers; precisely the group of greatest concern. The relationship between expenditures and income follows a different pattern for other types of households. Single women without children had expenditures that were 3.3 percent less than income on average during the period of this sample, while two parent families had expenditures that were on average 12.3 percent less than income, implying a substantial rate of saving by these households.

It is useful to keep in mind that both income and consumption are measured with error, though we expect that income and consumption are fairly well measured for the vast majority of people. However, observations at the bottom are more likely to have significant measurement error because the more unusual is an observation the more likely its values are due to error than truth. In Table 4 we report whether those that have income below the 10th percentile also have low consumption, and vice versa. The table indicates that with both good consumption and poor income data (the CEX) and good income data and poor consumption data (the PSID), low consumption is a better predictor of low income than vice versa. The tendency is more pronounced in the CEX, but still evident in the PSID. This comparison favors using consumption to measure the well-being of those with few resources.

Our second empirical strategy is to examine some of the components of income for internal inconsistencies. CPS earnings data suggest that wages are also surprisingly low for poor single mother families. Looking at low-educated single mothers with positive earnings in Table 5, more than 25 percent are earning a wage less than five dollars per hour (in 2000 dollars). This is particularly striking given that the nominal value of the federal minimum wage was $4.75 by October, 1996 and was raised to $5.15 in September, 1997. Because some industries are not covered by federal minimum wage legislation, we exclude from the sample single mothers that work in the sectors that are least likely to be covered.[10] The inaccuracy of these reports is

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[9] Comparisons of income and consumption data are based on the authors' calculations from Consumer Expenditure Survey (CEX) data. For this analysis we restrict attention to consumer units in the CEX that are "complete" income reporters. Between 10 and 15 percent of all consumer units are classified as incomplete income reporters by the BLS because of missing data for primary sources of income for these households.

[10] Workers in occupations that may not be covered by the federal minimum wage are excluded, including the following sectors: self employment, managerial and professional, sales, service,

underscored by the low fraction of hourly wages that are reported to be below the minimum wage (less than one percent). For low-educated single mothers, 90 percent of the employed report an hourly wage.

Because wages in the top two rows are calculated using survey reports on annual earnings and the number of weeks worked in the previous year, this result suggests that either earnings are under-reported or hours are over-reported. However, even if we make very conservative assumptions about hours and weeks worked,[11] the earnings data still suggest that 7 percent of working single mothers in covered sectors earn a wage below the federal minimum, suggesting under-reporting.

A third empirical strategy is to compare how well income and expenditure reports in standard datasets weight up to match aggregates for classes of income and consumption especially important for low-income families. There are several recent studies that provide comparisons of weighted survey responses to aggregates for the CPS and the SIPP. Detailed analyses have been conducted by Coder and Scoon-Rogers (1996) and Roemer (2000). Hotz and Scholz (2001) and Moore et al. (1997) also provide useful reviews of this research.

In Table 6, we summarize some of the main findings of Roemer (2000) for CPS and SIPP reports on 1996. Roemer finds significant under-reporting for self-employment income and government transfers, both of which are key sources of income for those with few resources (though self-employment by poor women is low). In the CPS, wages and salaries are slightly over-reported. Family assistance, particularly important for single mothers, has a very low reporting rate, 68 percent in the CPS and 76 percent in the SIPP.

Table 7 reports additional comparisons of CPS and CEX weighted microdata to aggregates from several sources. Comparisons of AFDC/TANF and Food Stamp reports in the CPS to aggregates indicate that 37 percent of these benefits were apparently not reported in 1997, a sharp rise in under-reporting compared to 1990 (Primus et al., 1999). Similarly, the CPS imputation of EITC payments (which assumes that takeup is 100 percent , i.e. that all eligible recipients receive the credit) when weighted to the population still underestimates total payments made by the IRS by 28 percent (Meyer and Holtz-Eakin, 2001). The CPS particularly understates payments received by single parents, for whom 36 percent are missed. This discrepancy is not just tax non-compliance by those who are not single parents, since most in-eligible recipients have a child in their household (Liebman, 2001). Thus the evidence suggests that a substantial share of low-income people fail to report earnings to the CPS. A sharp understatement of welfare payments and EITC payments is especially important because these sources are a large share of after-tax income for those near the bottom.

Table 7 also reports several comparisons of key components of CEX consumption and income to aggregates from administrative sources and other surveys. These comparisons indicate that CEX food and rent do not on average overstate the truth, which might be a concern given that consumption tends to exceed income at the bottom. Furthermore, while CEX income

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farming, forestry, fishing, and the armed forces. Workers under the age of 20 are excluded as, in some cases, they can be exempt from the wage floor for the first 90 days of employment.

[11] In particular, we topcode the weeks at 35 and the hours at 20.

appears to be under-reported, it is 85 percent of CPS income in 1988 and 90 percent in 1991.

Our final validation strategy is to examine whether low consumption or low income is more closely associated with independent measures of bad health and worse material well-being. In particular, we examine whether low values of income or consumption are more closely related to poor health, disability, and worse values of measures of material well-being such as the size of the residence, number of cars, whether the family took a vacation, and whether the household has certain appliances and air conditioning. We calculate whether those at the bottom of the consumption distribution are more different from other households than those at the bottom of the income distribution are from other households.

Table 8 examines how the bottom ten percent of the consumption and income distributions compare to other households. Let Y(.) denote the mean outcome for the group in parentheses, where $I_{0-10}$ is those households in the bottom income decile, and $I_{10-100}$ is those households in other income deciles. Then

$$Y(I_{0-10})- Y(I_{10-100})$$

is the difference in outcomes for those in the bottom decile compared to the remaining deciles. If higher values of the outcome are better, as we expect given the way all outcomes are defined in the table, this difference should be negative if those at the bottom of the income distribution fare worse than others. We report $Y(I_{0-10})$, $Y(I_{10-100})$, and the difference $Y(I_{0-10})- Y(I_{10-100})$ in columns (1) through (3), respectively, in Table 8. Similarly, in columns (4) through (6) we report the same statistics for groups defined by their place in the consumption distribution, so that column (6) reports the difference in mean outcomes for those in the bottom consumption decile and those in the remaining consumption deciles

$$Y(C_{0-10})- Y(C_{10-100}).$$

Column (7) reports the key difference in difference summary measure

$$[Y(C_{0-10}) - Y(C_{10-100})] - [Y(I_{0-10})- Y(I_{10-100})]$$

which should be negative if low consumption is a better indicator of bad outcomes than is low income.

The results in this table indicate that low consumption is usually a better indicator of hardship than income. Starting with the CEX results, column (3) indicates that in almost all cases, those in the bottom decile of income experience worse material conditions. Column (6) indicates that in all cases the bottom decile of consumption fares worse. Finally, column (7) indicates that in the vast majority of cases that low consumption is a clearer indicator of worse outcomes than low income. In all but two cases, the statistic is negative, and the two positive values are small and not significantly different from zero.

The PSID results are less clear, but still favor consumption. Surprisingly, low income is associated in the wrong (contrary to our expectation) direction with poor health, work limitations for the head, and poor health for other family members. The results for low consumption are

similar, but low consumption is associated in the expected way with poor health for other family members. Most of the numbers in column (7) are negative, favoring the use of consumption. However, the PSID measures in general appear to be less clear indicators of well-being given that they often do not rise with income or consumption. Surprisingly, low income seems to be more closely associated with low automobile ownership than is low consumption in the PSID. It should also be mentioned that consumption is handicapped in the PSID where we believe the income data are of higher quality than the consumption data.

Table 9 examines how outcomes for the bottom twenty percent of the consumption and income distributions compare to the remaining households. The key summary statistic is now

$$[Y(C_{0\text{-}20}) - Y(C_{20\text{-}100})] - [Y(I_{0\text{-}20}) - Y(I_{20\text{-}100})]$$

which is reported in column (7). The results are very similar to those in Table 8, slightly more favorable to consumption in the CEX, and slightly less favorable to consumption in the PSID than they were in the earlier table. Overall, the comparisons of outcomes are a fairly strong endorsement of the use of consumption to measure the well-being of those with few resources.

## V. Conclusions

A priori arguments for income or consumption almost always favor consumption. Consumption captures permanent income, reflects the insurance value of government programs and credit markets, better accommodates illegal activity and price changes, is more likely to reflect private and government transfers, and so on. However, it is fairly compelling that most households can more easily report income.

We present strong evidence that income is under-reported and measured with substantial error. These problems are especially severe for those households with few resources and can account for many of the patterns observed in the data. The validation exercises in the paper favor consumption in most cases. Low consumption is more closely associated than low income with material hardship and other bad outcomes. The case for consumption is fairly strong, and suggests that we should use consumption to supplement income in analyses of poverty whenever possible.

One of the long-term goals of this research is improving income and consumption data. There is evidence from small in-depth surveys that much better data may be obtained by asking detailed questions about both income and consumption in the same survey and reconciling the two information sources. It is worth investigating whether these ideas can be applied to a nationally representative survey of a large number of households.

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## DATA APPENDIX

This appendix provides additional information on the three datasets used throughout this study: the March CPS, the PSID, and the CEX. We also provide more detailed descriptions of our income, consumption, and expenditures measures, highlighting any differences in these measures across surveys.

The definitions of after tax income used in this study vary somewhat across surveys. First, the reference periods for the income questions differ somewhat across surveys. Both the CPS and the PSID ask respondents to report income for the full calendar year prior to the interview.[12] In the CEX, however, respondents report income for the 12 months immediately preceding the interview rather than for the previous calendar year.

Second, calculations of tax liabilities and credits vary somewhat across the three surveys. In the CPS, state and federal income taxes, payroll taxes, and tax credits are derived by the BLS using simulations. The PSID also provides simulated tax information, but these variables are not available after 1991. In years where this information is not provided in the PSID, we calculate tax liabilities and credits using TAXSIM (Feenberg and Coutts, 1993). Tax data in the CEX is based on reports from the respondent.

Imputation is another reason why income measures differ. Both the PSID and the CPS impute missing values for components of income, while the CEX does not impute missing values. For this reason, when reporting income statistics our samples from the CEX include only complete income reporters—excluding those with missing data for primary sources of income. About 10 to 15 percent of CEX respondents are classified as incomplete income reporters. A final reason why income may differ is that the precise definition of a family unit varies somewhat across surveys. Differences in expenditure and consumption measures in the CEX and the PSID are described in the definitions below.

In order to compare measures of income, expenditures and consumption across observations with different family sizes, we adjust these measures using a scale for the number of adults and children in the family. In particular, we use a scale factor equal to s/(mean of s), where $s= 1/(\text{number of adults} + \text{number of kids}*0.7)^{0.7}$. This is a fairly standard adjustment scale that follows National Research Council (1995).

### DEFINITIONS FOR INCOME, EXPENDITURES, AND CONSUMPTION IN THE CEX, CPS, AND THE PSID:

**Total Family Income** (CPS): Total family income is the sum of the personal incomes for all related members of a family, excluding unrelated subfamilies and unrelated individuals. Individuals in the armed forces are also excluded. The annual face value of food stamps is added to this measure of family income. To construct an after tax measure of income we add EITC credits and subtract state and federal income taxes and payroll taxes.

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[12] The CPS interviews take place in March while the PSID interviews usually occur during the first six months of the year. Interviews in the CEX occur throughout the year.

**Total Family Income** (CEX): This closely follows the CPS definition of income. Because many respondents have missing values for major components of income, only complete income reporters are used.

**Total Family Income** (PSID): Again, following the CPS definition, total family income includes money income as well as food stamps. The annual value of food stamps is calculated using reported receipt of food stamps in the month prior to the interview. In years where state and federal income taxes are not reported, TAXSIM is used to calculated tax liabilities.

**Total Family Expenditures** (CEX): We use the summary total expenditures variable calculated by the BLS. Expenditures are reported for three-month periods. We scale these quarterly expenditures to an annual level.

**Total Family Expenditures** (PSID): Using CEX data, we regress total family expenditures on scaled food expenditures, scaled housing expenditures (see definition below), an indicator for home ownership, and a set of year dummies. Ten separate regressions are estimated, one for each decile of the equivalent scale adjusted food and housing distribution for single mothers without a high school degree in the CEX. Parameter estimates from each regression are then used to predict total expenditures for each observation in the respective decile of the equivalent scale adjusted food and housing distribution in the PSID using reported spending on food and housing (both equivalent scale adjusted) in the PSID as defined below. To better estimate the distribution of actual expenditures, we add to each predicted expenditure value in the PSID a residual selected at random from the distribution of residuals generated from the regressions using CEX data. Comparisons of these adjusted predicted values in the CEX to actual expenditures in the CEX show that the distribution of these adjusted predicted values match the distribution of actual expenditures much more closely than does the distribution of unadjusted predicted values in the CEX.

**Total Family Consumption** (CEX): Consumption includes all spending in total expenditures less spending on health care, education, pension plans, and cash contributions. In addition, housing and vehicle expenditures are converted to service flows. For example, the rental equivalent for owned dwellings is used instead of spending on mortgage interest, property taxes, and spending on maintenance, repairs, and insurance. See definition of housing flows below and Meyer and Sullivan (2001) for more details.

**Total Family Consumption** (PSID): Consumption in the PSID is calculated following the same procedure as expenditures, except that in the CEX we regress total family consumption on food expenditures, housing flows (each is equivalent scale adjusted), an indicator for home ownership, and a set of year dummies.

**Food Consumption** (CEX): This includes spending for food at home (including food bought with food stamps), food purchased away from home, and meals received as pay.

**Food Consumption** (PSID): This is the sum of expenditures on food at home, expenditures on food away from home, and dollars of food stamps received.

**Housing Expenditures** (CEX): We use the summary expenditure variable for total housing expenditures calculated by the BLS. For the purpose of predicting total expenditures in the PSID, however, we construct a measure of housing expenditures that is more consistent with this measure in the PSID. In particular, we include only rental payments, mortgage interest payments, and property taxes.

**Housing Expenditures** (PSID): This measure is the sum of annual rental payments and annual mortgage payments. These data are not available in the 1988 and 1989 surveys.

**Housing Flows** (CEX): Two different measures of housing flows are used in the analyses. First, the measure of housing flows that is used to calculate total consumption in the CEX excludes from total housing expenditures, mortgage interest payments, property taxes, and spending on maintenance, repairs, and insurance. The rental equivalent of the home, as reported by the respondent, is then added. In quarters when home owners were not asked about the rental equivalent of the home (from the third quarter of 1993 through the fourth quarter of 1994) the rental equivalent value is imputed. See Meyer and Sullivan (2001) for details. The second measure of housing flows is constructed to be more consistent with a measure of housing flows that is available in the PSID for the purposes of predicting total consumption in the PSID. This measure is simply the sum of rental payments (for renters) and the rental equivalent of the home for homeowners.

**Housing Flows** (PSID): This measure includes rental payments, a service flow from owned homes, and the rental equivalent for those that receive free rent. Unfortunately, the PSID does not include data on the rental equivalent value of owned dwellings. Instead, we use information on the current re-sale value of the home. We convert these reported housing values to an annual service flow of housing consumption using an annuity formula.

**Assets**: Total assets equals the sum of the equity value of housing and vehicles, and liquid assets for all members of the family. Liquid assets include all assets held with financial institutions such as checking accounts, savings accounts, money market accounts, certificates of deposit, and other financial assets such as stocks, bonds, cash value in a life insurance policy, and mutual fund shares. Assets represent outstanding balances at the time of the interview.

**Liabilities**: Total liabilities are the sum of unsecured debt and mortgage debt for all members of the family. Questions included in the Wealth Supplement ask the head to report an aggregate measure of unsecured liabilities. Specifically, after responding to questions about mortgage debt heads are asked: “If you added up all other debts [such as for credit card charges, student loans, medical or legal bills, or loans from relatives] (for all of your family living there), about how much would they amount to right now?” Debts represent outstanding balances at the time of the interview.

Table 1--Distributions of Real Income, Expenditures and Consumption, Single Mothers Without a High School Degree, Ages 18-54, 1991-1998

| | Percentiles | | | | | |
|---|---|---|---|---|---|---|
| | **10th** | **20th** | **30th** | **50th** | **80th** | **90th** |
| **Total Family Income (CPS)** | 5,083 | 7,360 | 8,803 | 11,389 | 19,066 | 25,023 |
| **Total Family Income (CEX)** | 4,546 | 6,703 | 7,880 | 10,367 | 16,554 | 22,896 |
| **Total Family Expenditures (CEX)** | 6,638 | 8,341 | 9,771 | 12,605 | 19,932 | 25,791 |
| **Total Family Consumption (CEX)** | 6,728 | 8,423 | 9,912 | 12,762 | 19,861 | 24,647 |
| **Total Family Income (PSID)** | 6,139 | 8,665 | 9,723 | 12,643 | 22,256 | 31,601 |
| **Total Family Expenditures (PSID)** | 7,780 | 9,715 | 11,705 | 14,671 | 21,702 | 25,865 |
| **Total Family Consumption (PSID)** | 7,563 | 8,806 | 10,307 | 13,416 | 19,381 | 24,103 |

*Notes:* Single mothers are defined as female family heads living with at least one child of their own. All figures are indexed to 2000 dollars using the PCE, and expressed on an equivalent scale (scale factor = s/(mean of s), where s= 1/(number of adults + number of kids*0.7)$^{0.7}$). Data reflect income, expenditure, and consumption behavior for the years 1991-1998 unless otherwise noted. All income numbers are after tax, and include all money income plus the cash value of food stamps. Outcomes are at the family level including all related members. All distributions are weighted. Specific details for each outcome are explained below.

*Total Family Income (CPS)*: Total family income is the sum of the personal incomes for all related members of a family, excluding unrelated subfamilies and unrelated individuals. Individuals in the armed forces are also excluded. Data are from 1992-1999 March CPS.

*Total Family Income (CEX)*: This follows the CPS definition of income. Only "complete" income reporters from the CEX are used.

*Total Family Expenditures (CEX)*: This includes all family expenditures including food purchased using food stamps.

*Total Family Consumption (CEX)*: Consumption includes all spending in total expenditures less spending on health care, education, pension plans, and cash contributions. In addition, housing and vehicle expenditures are converted to service flows. For example, the rental equivalent for owned dwellings is used instead of spending on mortgage interest and property taxes. See Meyer and Sullivan (2001) for more details.

*Total Family Income (PSID)*: This follows the CPS definition. In years where state and federal income taxes are not reported, TAXSIM is used to calculated tax liabilities. The income numbers are from the 1992 to 1997 surveys.

*Total Family Expenditures (PSID)*: This measure uses food (including food stamps) and housing expenditures to predict total expenditures. In the CEX we regress total family expenditures on food expenditures, housing expenditures (each is equivalent scale adjusted), an indicator for home ownership, and a set of year dummies. A separate regression is estimated for each decile of the equivalent scale adjusted food and housing distribution for single mothers without a high school degree in the CEX. Parameter estimates from each regression are used to predict total expenditures for each observation in the respective decile of the equivalent scale adjusted food and housing distribution in the PSID using reported spending on food and housing (also equivalent scale adjusted) in the PSID. See text for more details.

*Total Family Consumption (PSID)*: Consumption in the PSID is calculated following the same procedure as expenditures, except that in the CEX we regress total family consumpition on food expenditures, housing flows (each is equivalent scale adjusted), an indicator for home ownership, and a set of year dummies. See text for more details.

Table 2--Percentiles of Assets and Liabilities for those with Expenditures Greater Than Income and Income Below Given Percentiles, Single Mothers Without a High School Degree Ages 18-54, 1983-1995 (PSID)

| **Percentiles of Assets and Liabilities** | **Percentiles of Income** | | | | | |
|---|---|---|---|---|---|---|
| | **10th** | **20th** | **30th** | **50th** | **80th** | **90th** |
| Total Assets | | | | | | |
| Median | 0 | 0 | 0 | 0 | 0 | 0 |
| 75th Percentile | 562 | 899 | 562 | 1,124 | 2,344 | 2,344 |
| 90th Percentile | 674 | 29,224 | 29,224 | 30,348 | 45,104 | 45,104 |
| Liquid Assets | | | | | | |
| Median | 0 | 0 | 0 | 0 | 0 | 0 |
| 75th Percentile | 0 | 0 | 0 | 0 | 0 | 0 |
| 90th Percentile | 0 | 72 | 56 | 0 | 211 | 211 |
| Total Liabilities | | | | | | |
| Median | 0 | 0 | 0 | 0 | 0 | 0 |
| 75th Percentile | 0 | 0 | 0 | 0 | 0 | 0 |
| 90th Percentile | 0 | 4,496 | 4,496 | 20,794 | 14,933 | 14,933 |
| Unsecured Liabilities | | | | | | |
| Median | 0 | 0 | 0 | 0 | 0 | 0 |
| 75th Percentile | 0 | 0 | 0 | 0 | 0 | 0 |
| 90th Percentile | 0 | 0 | 220 | 2,248 | 2,293 | 2,293 |

*Assets*: Include the equity value of housing, vehicle, and financial assets. Liquid assets include savings accounts, checking accounts, and other financial assets. Numbers represent the level of assets at various percentiles for families whose income is below the given percentile in the equivalent scale adjusted income distribution, and whose consumption exceeds income. Assets are reported in 1984, 1989, and 1994, so to reflect initial asset holdings income and expenditure data from the 1985, 1990, and 1995 surveys are used.

*Liabilities*: Include all unsecured debts for the family. Numbers represent level of liabilities at various percentiles for families whose income is below the given percentile in the equivalent scale adjusted income distribution, and whose consumption exceeds income. Liabilities are reported in 1984, 1989, and 1994, so to reflect ex post debt, income and expenditure data from the 1984, and 1994 surveys are used. Expenditure data are not available from the 1989 survey.

Table 3--Mean Income and Expenditures of Single Mother and Comparison Households, 1991-1998 (CEX)

| | Income | Expenditures | Percentage Difference |
|---|---|---|---|
| | (1) | (2) | (3) = [(2) - (1)]/(1) |
| **All Women** | | | |
| Single Mothers | 20,142 | 22,450 | 11.5% |
| Single Women without Children | 22,419 | 21,685 | -3.3% |
| Married Mothers | 52,360 | 45,901 | -12.3% |
| **Women without a High School Degree** | | | |
| Single Mothers | 12,683 | 15,363 | 21.1% |
| Single Women without Children | 11,209 | 12,867 | 14.8% |
| Married Mothers | 29,265 | 30,117 | 2.9% |

Calculations are from the first quarter of 1992 through the first quarter of 1999 waves of the Consumer Expenditure Survey. Income and expenditures are defined in the same manner as in Table 1, although they are NOT equivalent scale adjusted. All numbers are indexed to 2000 dollars using the PCE deflator and are weighted.

Table 4--Percentiles of Income and Consumption, Single Mothers Without a High School Degree, Ages 18-54, 1983-1998

| | Fraction of families in bottom decile of the income distribution that have consumption below given percentiles | Percent of families in bottom decile of the consumption distribution that have income below given percentiles |
|---|---|---|
| **CEX** | | |
| Below the 10th percentile | 0.148 | 0.148 |
| Below the 20th percentile | 0.248 | 0.381 |
| Below the 30th percentile | 0.354 | 0.544 |
| Below the 50th percentile | 0.616 | 0.857 |
| **PSID** | | |
| Below the 10th percentile | 0.199 | 0.199 |
| Below the 20th percentile | 0.348 | 0.395 |
| Below the 30th percentile | 0.425 | 0.520 |
| Below the 50th percentile | 0.686 | 0.729 |

*CEX*: Data are from the first quarter of 1984 through the first quarter of 1999 waves of the CEX. Both income and consumption are adjusted using the same equivalent scale described in Table 1. Samples only include "compete income reporters." All numbers are weighted.

Table 5--Wage Distribution, 1991-1999 (CPS)

| | Fraction Below Minimum Wage | Percentiles 10th | 20th | 30th | 50th | 80th | 90th |
|---|---|---|---|---|---|---|---|
| **Wage = Annual Earnings/Annual Hours** | | | | | | | |
| All Families | 0.04 | 6.40 | 8.27 | 10.00 | 13.29 | 20.29 | 24.61 |
| Single Mothers without a High School Degree | 0.26 | 3.32 | 4.38 | 5.22 | 6.54 | 10.04 | 13.37 |
| **Reported Hourly Wage for Wage Earners Only** | | | | | | | |
| All Families | 0.00 | 7.14 | 8.46 | 9.68 | 12.27 | 17.98 | 20.88 |
| Single Mothers without a High School Degree | 0.00 | 5.49 | 6.05 | 6.33 | 7.25 | 9.52 | 11.69 |

*Notes:* Data come from the 1992-1999 March CPS. Samples include workers between the ages of 20 and 54 that report positive wage and salary earnings and report working positive hours in the previous year. Workers in occupations that may not be covered by the federal minimum wage are excluded, including the following sectors: self employment, managerial and professional, sales, service, farming, forestry, fishing, and the armed forces. Workers under the age of 20 are excluded as, in some cases, they can be exempt from the wage floor for the first 90 days of employment. Wages are compared to the lowest value of the federal minimum wage in the year for which the earnings are reported. All numbers are indexed to 2000 dollars using the PCE deflator and are weighted.

**Table 6**
**Ratio of CPS March Income Supplement and SIPP Aggregate Income Estimates to Administrative Estimates for 1996**

| Source of Income | Administrative Estimate | CPS (%) | SIPP (%) |
|---|---|---|---|
| Earnings | 4068.3 | 96.1 | 88.4 |
| Wages and salaries | 3592.6 | 101.9 | 91.0 |
| Self-employment | 475.7 | 52.6 | 69.1 |
| Asset Income | 392.6 | 70.9 | 56.6 |
| Interest | 187.0 | 83.8 | 50.2 |
| Dividends | 129.4 | 59.4 | 51.0 |
| Rent and Royalties | 76.2 | 58.6 | 82.0 |
| Government Transfer Income | 438.3 | 88.3 | 86.3 |
| Social Security and Railroad Retirement | 332.2 | 91.7 | 87.9 |
| Supplemental Security Income | 26.5 | 84.2 | 101.4 |
| Family Assistance | 19.8 | 67.7 | 76.3 |
| Other Cash Welfare | 3.4 | 80.5 | 114.0 |
| Unemployment Compensation | 21.6 | 81.6 | 69.4 |
| Workers' Compensation | 17.0 | 62.7 | 71.7 |
| Veterans' Payments | 17.8 | 89.6 | 72.9 |
| Pension Income | 231.9 | 92.6 | 86.1 |
| Private Pensions | 98.7 | 93.1 | 98.1 |
| Federal Employee Pensions | 38.8 | 80.8 | 75.6 |
| Military Retirement | 28.3 | 58.2 | 101.6 |
| State and Local Employee Pensions | 66.1 | 57.3 | 67.8 |
| Total | 5131.1 | 92.6 | 85.7 |

Source: Roemer (2000), Tables 2b, 3b, and Appendix I. The administrative estimate is an average of the values used to match CPS and SIPP sample coverage.

**Table 7**
**Measures of Completeness of Reporting of Income and Consumption Measures in CEX and CPS, Various Years, Sources of Income, and Categories of Consumption**

| Measure of Reporting | Size of Category Based on Administrative Source (billions of current dollars) | Reporting Ratio |
|---|---|---|
| CPS AFDC/TANF benefits/Administrative AFDC/TANF payments | | |
| 1990 | 18.9 | 0.76 |
| 1997 | 15.9 | 0.63 |
| CPS Food Stamp benefits/Administrative Food Stamp payments | | |
| 1990 | 13.6 | 0.76 |
| 1997 | 19.6 | 0.63 |
| CPS imputed EITC payments/ IRS reported EITC payments | | |
| 1998, All recipients | 31.6 | 0.72 |
| 1998, Heads of household | 21.2 | 0.64 |
| CEX Food consumption/ PCE Food expenditures | | |
| 1989 | 500.0 | 0.78 |
| 1992 | 560.0 | 0.75 |
| CEX Food consumption, diary component/ PCE Food expenditures for components | | |
| 1989 | 317.6 | 0.71 |
| 1992 | 350.4 | 0.74 |
| CEX Rent payments/ PCE Rental expenditures | | |
| 1989 | 155.2 | 1.05 |
| 1992 | 177.8 | 1.08 |
| CEX Rent payments (median)/ AHS Rent (median) | | |
| 1985 | | 0.87 |
| 1991 | | 0.85 |
| CEX Money income before taxes/ CPS Money income before taxes | | |
| 1988 | | 0.85 |
| 1991 | | 0.90 |

Sources: Primus et al. (1999), Table B-4; Meyer and Holtz-Eakin (2001), Table I.4; Branch (1994) Tables 1, 2, 5, and 6.

Table 8--The Relationship Between the Bottom Decile of Income or Consumption and Outcomes, Single Mothers Without a High School Degree, Ages 18-54

| Outcome | Percentiles of Income | | | Percentiles of Consumption | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 0-10 | 10-100 | Difference | 0-10 | 10-100 | Difference | Difference in Differences | Standard Error for (7) | N |
| | (1) | (2) | (3) =(1) - (2) | (4) | (5) | (6) =(4) - (5) | (7) =(6) - (3) | (8) | (9) |
| **CEX, 1991-1998** | | | | | | | | | |
| Have a stove in the residence | 0.962 | 0.971 | -0.009 | 0.894 | 0.979 | -0.084 | -0.075 | 0.032 | 1,361 |
| Have a microwave in the residence | 0.525 | 0.608 | -0.082 | 0.401 | 0.621 | -0.220 | -0.138 | 0.063 | 1,361 |
| Have a refrigerator in the residence | 0.969 | 0.976 | -0.007 | 0.922 | 0.981 | -0.059 | -0.052 | 0.028 | 1,361 |
| Have a freezer in the residence | 0.120 | 0.140 | -0.020 | 0.087 | 0.144 | -0.057 | -0.037 | 0.040 | 1,361 |
| Have a disposal in the residence | 0.176 | 0.203 | -0.026 | 0.163 | 0.204 | -0.041 | -0.015 | 0.048 | 1,361 |
| Have a dish washer in the residence | 0.122 | 0.138 | -0.016 | 0.060 | 0.145 | -0.086 | -0.070 | 0.037 | 1,361 |
| Have a clothes washer in the residence | 0.448 | 0.533 | -0.084 | 0.367 | 0.542 | -0.175 | -0.090 | 0.063 | 1,361 |
| Have a clothes dryer in the residence | 0.349 | 0.382 | -0.032 | 0.189 | 0.399 | -0.210 | -0.178 | 0.056 | 1,361 |
| Have a color television in the residence | 0.958 | 0.921 | 0.037 | 0.855 | 0.933 | -0.077 | -0.114 | 0.036 | 1,361 |
| Have a computer in the residence | 0.083 | 0.053 | 0.030 | 0.037 | 0.058 | -0.021 | -0.052 | 0.030 | 1,361 |
| Have a stereo in the residence | 0.427 | 0.489 | -0.061 | 0.438 | 0.487 | -0.049 | 0.012 | 0.063 | 1,361 |
| Have a vcr in the residence | 0.509 | 0.626 | -0.117 | 0.472 | 0.630 | -0.158 | -0.041 | 0.064 | 1,361 |
| Have central air conditioning | 0.227 | 0.214 | 0.012 | 0.158 | 0.222 | -0.064 | -0.076 | 0.050 | 1,361 |
| South | 0.351 | 0.425 | -0.074 | 0.257 | 0.436 | -0.180 | -0.106 | 0.104 | 434 |
| Midwest/Northeast | 0.048 | 0.070 | -0.022 | 0.066 | 0.068 | -0.002 | 0.020 | 0.046 | 585 |
| Total # of rooms in the residence (scaled) | 4.188 | 4.261 | -0.072 | 3.707 | 4.312 | -0.605 | -0.533 | 0.071 | 1,361 |
| Whether have a car | 0.416 | 0.464 | -0.048 | 0.116 | 0.497 | -0.381 | -0.333 | 0.054 | 1,361 |
| Average number of cars | 0.483 | 0.571 | -0.088 | 0.116 | 0.611 | -0.495 | -0.407 | 0.035 | 1,361 |
| Whether took a trip or vacation | 0.083 | 0.112 | -0.029 | 0.020 | 0.119 | -0.099 | -0.070 | 0.029 | 1,361 |
| Whether took an overnight trip or vacation | 0.076 | 0.084 | -0.008 | 0.014 | 0.091 | -0.077 | -0.070 | 0.027 | 1,361 |
| **PSID, 1983-1997** | | | | | | | | | |
| Total # of rooms in the residence (scaled) | 4.526 | 4.904 | -0.379 | 4.120 | 4.947 | -0.827 | -0.449 | 0.068 | 2,215 |
| Have some air conditioning | 0.359 | 0.452 | -0.093 | 0.344 | 0.454 | -0.110 | -0.018 | 0.060 | 1,409 |
| South | 0.606 | 0.747 | -0.141 | 0.612 | 0.748 | -0.135 | 0.006 | 0.093 | 596 |
| Midwest/Northeast | 0.142 | 0.259 | -0.117 | 0.029 | 0.267 | -0.238 | -0.121 | 0.063 | 480 |
| Whether have a car | 0.167 | 0.482 | -0.316 | 0.354 | 0.463 | -0.110 | 0.206 | 0.064 | 1,027 |
| Average number of cars | 0.200 | 0.584 | -0.384 | 0.675 | 0.535 | 0.139 | 0.523 | 0.058 | 660 |
| Mother does not report poor health | 0.984 | 0.952 | 0.032 | 0.975 | 0.953 | 0.022 | -0.010 | 0.015 | 2,262 |
| Health does not limit mothers work | 0.858 | 0.830 | 0.028 | 0.836 | 0.832 | 0.003 | -0.025 | 0.036 | 2,262 |
| No other family members in bad health | 0.984 | 0.955 | 0.029 | 0.921 | 0.962 | -0.041 | -0.071 | 0.030 | 1,113 |

*CEX*: Data are from the first quarter of 1992 through the first quarter of 1999 waves. For durables, numbers represent the fraction of the sample that either own, rent , or have access to the good in a rental unit. Both income and consumption are adjusted using the same equivalent scale described in Table 1. Samples only include "compete income reporters."

*PSID*: Data are from various surveys between 1984 and 1997 depending on the availability of outcomes. See notes in Table 1 for description of how predicted consumption is calculated in the PSID.

Table 9--The Relationship Between the Bottom Quintile of Income or Consumption and Outcomes, Single Mothers Without a High School Degree, Ages 18-54

| Outcome | Percentiles of Income | | | Percentiles of Consumption | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 0-20 | 20-100 | Difference | 0-20 | 20-100 | Difference | Difference in Differences | Standard Error for (7) | N |
| | (1) | (2) | (3) =(1) - (2) | (4) | (5) | (6) =(4) - (5) | (7) =(6) - (3) | (8) | (9) |
| **CEX, 1991-1998** | | | | | | | | | |
| Have a stove in the residence | 0.968 | 0.971 | -0.003 | 0.944 | 0.977 | -0.033 | -0.030 | 0.019 | 1,361 |
| Have a microwave in the residence | 0.503 | 0.624 | -0.121 | 0.439 | 0.640 | -0.200 | -0.080 | 0.047 | 1,361 |
| Have a refrigerator in the residence | 0.959 | 0.979 | -0.020 | 0.951 | 0.981 | -0.030 | -0.010 | 0.019 | 1,361 |
| Have a freezer in the residence | 0.121 | 0.143 | -0.022 | 0.082 | 0.152 | -0.070 | -0.048 | 0.030 | 1,361 |
| Have a disposal in the residence | 0.165 | 0.209 | -0.044 | 0.147 | 0.213 | -0.066 | -0.023 | 0.036 | 1,361 |
| Have a dish washer in the residence | 0.120 | 0.141 | -0.021 | 0.059 | 0.156 | -0.097 | -0.077 | 0.029 | 1,361 |
| Have a clothes washer in the residence | 0.487 | 0.534 | -0.047 | 0.346 | 0.569 | -0.223 | -0.176 | 0.047 | 1,361 |
| Have a clothes dryer in the residence | 0.332 | 0.390 | -0.058 | 0.187 | 0.426 | -0.240 | -0.181 | 0.043 | 1,361 |
| Have a color television in the residence | 0.913 | 0.928 | -0.015 | 0.892 | 0.933 | -0.041 | -0.026 | 0.028 | 1,361 |
| Have a computer in the residence | 0.066 | 0.054 | 0.012 | 0.025 | 0.064 | -0.039 | -0.051 | 0.020 | 1,361 |
| Have a stereo in the residence | 0.491 | 0.480 | 0.011 | 0.453 | 0.490 | -0.037 | -0.048 | 0.048 | 1,361 |
| Have a vcr in the residence | 0.544 | 0.631 | -0.087 | 0.474 | 0.649 | -0.175 | -0.087 | 0.047 | 1,361 |
| Have central air conditioning | 0.196 | 0.220 | -0.024 | 0.165 | 0.228 | -0.063 | -0.039 | 0.037 | 1,361 |
| South | 0.331 | 0.446 | -0.115 | 0.294 | 0.459 | -0.166 | -0.050 | 0.080 | 434 |
| Midwest/Northeast | 0.043 | 0.074 | -0.031 | 0.049 | 0.071 | -0.022 | 0.009 | 0.032 | 585 |
| Total # of rooms in the residence (scaled) | 4.117 | 4.288 | -0.171 | 3.777 | 4.370 | -0.593 | -0.422 | 0.069 | 1,361 |
| Whether have a car | 0.337 | 0.490 | -0.153 | 0.184 | 0.528 | -0.345 | -0.191 | 0.043 | 1,361 |
| Average number of cars | 0.386 | 0.606 | -0.220 | 0.194 | 0.654 | -0.460 | -0.241 | 0.035 | 1,361 |
| Whether took a trip or vacation | 0.064 | 0.120 | -0.056 | 0.036 | 0.127 | -0.091 | -0.035 | 0.023 | 1,361 |
| Whether took an overnight trip or vacation | 0.052 | 0.091 | -0.039 | 0.016 | 0.100 | -0.084 | -0.045 | 0.020 | 1,361 |
| **PSID, 1983-1997** | | | | | | | | | |
| Total # of rooms in the residence (scaled) | 4.435 | 4.974 | -0.539 | 4.331 | 4.997 | -0.666 | -0.127 | 0.050 | 2,215 |
| Have some air conditioning | 0.384 | 0.458 | -0.074 | 0.336 | 0.470 | -0.134 | -0.060 | 0.046 | 1,409 |
| South | 0.575 | 0.778 | -0.204 | 0.605 | 0.766 | -0.161 | 0.043 | 0.069 | 596 |
| Midwest/Northeast | 0.202 | 0.259 | -0.057 | 0.138 | 0.272 | -0.134 | -0.076 | 0.063 | 480 |
| Whether have a car | 0.212 | 0.511 | -0.299 | 0.375 | 0.472 | -0.097 | 0.202 | 0.051 | 1,027 |
| Average number of cars | 0.279 | 0.613 | -0.334 | 0.629 | 0.529 | 0.100 | 0.434 | 0.041 | 660 |
| Mother does not report poor health | 0.976 | 0.950 | 0.026 | 0.973 | 0.951 | 0.021 | -0.004 | 0.013 | 2,262 |
| Health does not limit mothers work | 0.834 | 0.832 | 0.002 | 0.819 | 0.836 | -0.017 | -0.019 | 0.028 | 2,262 |
| No other family members in bad health | 0.954 | 0.960 | -0.006 | 0.954 | 0.959 | -0.005 | 0.001 | 0.022 | 1,113 |

*Notes*: See Table 8.