

**Further Results on Measuring the Well-Being of the Poor  
Using Income and Consumption\***

Bruce D. Meyer  
James X. Sullivan

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**ABSTRACT**

We evaluate the relative merits of income and consumption based measures of well-being. Our results provide evidence that consumption better captures well-being for those with few resources. The bottom deciles of expenditures exceed those of income, suggesting under-reporting of income. The under-reporting rate for government transfers is high and rising. Overall nonresponse is more severe in U.S. income data than in expenditure data. Furthermore, a consumption dataset requires fewer observations than an income dataset to obtain the same level of precision for typical estimates. Finally, very low consumption is more strongly related to other bad outcomes than very low income.

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Meyer: Harris School of Public Policy Studies, University of Chicago, 1155 E. 60th Street, Chicago, IL 60637 bdmeyer@uchicago.edu

Sullivan: University of Notre Dame, Department of Economics, 447 Flanner Hall, Notre Dame, IN 46556 sullivan.197@nd.edu

## 1. Introduction

Conceptual arguments generally favor consumption over income for measuring economic well-being. Consumption is a better measure of the long run resources available to the family (their permanent income) than annual income. Income measures fail to capture differences across families and over time in the accumulation of assets or access to credit. Also, consumption is more likely to reflect private and government transfers and the insurance value of government programs. Nevertheless, studies of well-being typically examine income data, which are available in many large, nationally representative surveys. Poverty statistics for most developed countries rely on income data, and income is also the primary measure used to study the effects of anti-poverty programs. A smaller but growing literature has focused on consumption based measures of well-being or used these measures to evaluate programs.<sup>1</sup>

This paper examines the relative merits of income and consumption as measures of well-being for poor families in the U.S. We compare income data from the Current Population Survey (CPS), the Consumer Expenditure (CE) Survey, and the Panel Study of Income Dynamics (PSID) to expenditure and consumption data from the CE Survey and the PSID. We investigate differences between income and consumption at the bottom of the distribution for all families and within demographic groups including single mothers, the elderly and the disabled. We examine the extent of under-reporting for both income and consumption and consider other dimensions of data quality including nonresponse, imputation, and the precision of estimates. Finally, we consider whether

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<sup>1</sup> Examples using U.S. data include Cutler and Katz (1991), Gruber (1997, 2000), Slesnick (1992, 1993, 2001), Jencks, Mayer, and Swingle (2004), Johnson (2004), DeLeire and Levy (2006), Kaushal, Gao, and Waldfogel (2006), and Meyer and Sullivan (2004, 2007, 2008, 2009). Examples for other countries include Browning and Crossley (2001), Blundell and Preston (1998), Zaidi and de Vos (2001), Crossley and Curtis (2006), Milligan (2008).

low consumption or low income is more closely associated with other bad outcomes.

While the evidence presented here relies on data from the U.S., the measurement issues that we examine are relevant for research on the well-being of the poor more generally.

Understanding these measurement issues is particularly important given that the patterns for income and consumption based measures of well-being differ substantially. Recent studies have shown that consumption inequality does not rise as much as income inequality in the U.S. (Heathcote, Perri and Violante, forthcoming; Meyer and Sullivan, 2010; Krueger and Perri, 2006). There is also evidence that income-based poverty differs from consumption poverty for substantial periods in the U.S. and that changes in poverty within groups differ sharply across these measures (Meyer and Sullivan, 2007, 2009). Here, we show that during the 1990s income drops substantially for the bottom decile of single mothers, while their consumption rises moderately. The patterns are similar in two income and two consumption datasets. At slightly higher deciles, income rises sharply while consumption again rises moderately. We show that changes in observable characteristics of single mothers can explain much of the sharp rise in income but do not explain the sharp drop in income at the bottom.

Our results provide evidence that consumption better captures well-being for those with few resources in the U.S. Brewer, Goodman, and Leicester (2006) provide similar evidence for Great Britain. Our analyses of measurement issues provide further evidence that consumption is measured better than income at the bottom of the distribution. Previous work emphasized the case of single mothers (Meyer and Sullivan, 2003) while here we show that the results are much broader. The bottom deciles of expenditures exceed those of income. While consumption smoothing may partly explain

these differences, we argue that under-reporting of income is likely the dominant explanation in these bottom deciles. There is a high and rising under-reporting rate for government transfers, a source of income that is particularly important at the bottom. Because spending exceeds income at the bottom, one might be concerned about over-reporting of expenditures. We show little evidence of over-reporting. In fact, expenditures tend to be under-reported, but some key components of spending for the poor, such as food at home and housing, compare well with national aggregates. Nonresponse and imputation rates are similar or higher in the CPS than in the CE Survey.

One common concern with consumption datasets is that they tend to have much smaller sample sizes than the largest income datasets. These smaller samples limit the precision of estimates at the state or city level, and may require the pooling of years to obtain precisely estimated changes. As we show, the need for larger samples is significantly offset by the lower variability and higher predictability of consumption, which reduce the standard errors of estimates of changes in consumption relative to those for income.

Finally, analyses of families with very low consumption or low income show that the former is more closely associated with poor housing quality, limited access to durable goods, poor health, and other bad outcomes.

The paper proceeds as follows. We first discuss previous studies that examine income and consumption based measures of well-being of the worst off. We then describe the CPS, CE Survey, and PSID data that we use. Next, we document important differences in recent years for income and consumption based measures of well-being. We follow with an analysis of several dimensions of the relative data quality in the CPS

and CE Survey. We then examine whether income or consumption does a better job of predicting measures of well-being at the bottom. Lastly, we offer conclusions and areas for future research.

## **2. Previous Research**

A number of studies have documented differences between consumption and income based measures of well-being for disadvantaged families, both in levels and in trends. Cutler and Katz (1991) examine changes in absolute measures of deprivation by comparing income and consumption to the official U.S. poverty thresholds (or the poverty line). They show that consumption poverty rose more than income poverty during the 1970s, that both of these poverty measures rose in the early 1980s, but between 1984 and 1988 income poverty fell while consumption poverty changed little. They also document differences across these measures within demographic groups. Johnson (2004) also finds that consumption poverty increased more than income poverty during the 1970s and then remained steady through 1995. Using alternative equivalence scales, Slesnick (2001) finds that consumption poverty fell considerably more than income poverty from 1980 through 1995. Meyer and Sullivan (2009) show that similar patterns over some periods for income and consumption based measures of overall head count poverty mask important differences between these poverty measures. For example, the fraction of people below half the poverty line (or deep poverty) measured using income has risen in the last 20 years, while deep poverty measured using consumption has fallen sharply. Sharp differences are also evident for measures of the poverty gap and for poverty within demographic groups. Since 1980, consumption poverty has fallen

much faster than income poverty for the elderly, but more slowly than income poverty for married couples with children.<sup>2</sup>

In contrast to these papers, Bavier (2008) argues that “there is no huge discrepancy in federal surveys between income and expenditures near the bottom of the distribution.” This broad conclusion is based on evidence that changes in consumption poverty are similar to changes in an after-tax disposable income measure. Bavier makes this strong conclusion even though his measures of income and consumption poverty move in opposite directions in recent years. Bavier also concludes that “comprehensive income and consumption poverty rates are similar for all age groups” even though his own results show that between 1984 and 2004, consumption poverty for those 65 and over fell by more than sixty percent, while income poverty actually increased.

Differences between income and consumption have also been emphasized within the inequality literature. In general, these studies find that the distribution of consumption is substantially more equal than that of income and that inequality has grown more when measured with income. Meyer and Sullivan (2010) show that in the U.S. during the 1960s and 1970s income inequality falls while consumption inequality is fairly flat. During the early 1980s, both consumption and income inequality rise, and in recent years income inequality rises while consumption inequality falls. For related studies comparing income and consumption inequality, see Cutler and Katz (1991), Krueger and Perri (2006), Johnson, Smeeding, and Torrey (2005) or Heathcote et al. (2010) for the U.S.; Blundell and Preston (1998) and Blundell and Etheridge (2010) for the U.K.; Barrett, Crossley, and Worswick (2000) for Australia; Brzozowski, Gervais,

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<sup>2</sup> Studies that compare income and consumption based measures of poverty for other countries include Zaidi and de Vos (2001), Crossley and Curtis (2006), Milligan (2008), and Pendakur (2001).

Klein, and Suzuki (2010), Crossley and Pendakur (2006), and Pendakur (1998) for Canada; Fuchs-Schündeln, Krueger, and Sommer (2010) for Germany; Jappelli and Pistaferri (2010) for Italy; Pijoan-Mas and Sánchez-Marcos (2010) for Spain; Domeij and Flodén (2010) for Sweden; Gorodnichenko, Peter, and Stolyarov (2010) for Russia; and Binelli and Attanasio (2010) for Mexico.

Previous research has also compared levels of expenditures and income to assess the relative quality of these measures. Meyer and Sullivan (2003) show that expenditures exceed disposable income for disadvantaged groups such as single mothers, and that the differences are particularly noticeable for those at the very bottom of the distribution.<sup>3</sup> In this paper, we show that these differences matter in practice—important conclusions about recent trends depend on whether one uses consumption or income. We also show that these differences are evident within other disadvantaged groups besides single mothers, and we further examine data quality issues in income and consumption surveys.

Some past work has argued that consumption data should not be used to analyze the well-being of the worst off because patterns for income and consumption poverty are similar and because consumption data are of low quality at the bottom of the distribution (Bavier, 2008). We show that Bavier’s conclusions regarding differences between income and consumption are based on a narrow set of results. Moreover, his analysis of nonresponse ignores item nonresponse, and his analysis of attrition relies on an inappropriate, non-representative sample.

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<sup>3</sup> We compare expenditures to disposable income because in the absence of borrowing or saving they should be equal. On the other hand, consumption should not equal disposable income because it includes the flow of resources from durable goods and excludes certain categories of expenditures.

### 3. Data

Our analyses of income and consumption rely on nationally representative data from the CE Survey, the CPS, and the PSID. The CE Survey is the most comprehensive source of micro-level expenditure data in the U.S. The CPS is the official source of income and poverty data in the U.S. The PSID collects information on income and some expenditures and is the most important source of longitudinal income data in the U.S. Our results focus on the years from 1993 to 2003, although we examine whether many of our results also hold for other periods.<sup>4</sup> Definitions for our measures of income, consumption, and expenditures for each dataset and the equivalence scale used to adjust for differences in family size are defined in the data appendix. Dollar figures are expressed in real 2005 dollars using the CPI-U-RS price index.

In addition to analyses for all families, we examine income and consumption for several demographic groups. Our samples of single mothers includes all families headed by an unmarried mother between the ages of 18 and 54 who lives with at least one child under the age of 18. Our elderly sample includes all families whose head is 65 years old or older. The disabled sample includes all families with a head who did not work in the previous year due to a disability. For most of our analyses, we restrict our samples from the CE Survey to those designated as “complete income reporters” (see U.S. Department of Labor, various years). As part of our sensitivity analysis, we verify that our main findings are not affected by this restriction.

#### *3.1 The Consumer Expenditure Survey*

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<sup>4</sup> Although we examine data for more recent years, we focus on data through 2003 because the CE Survey began imputing values for income in 2004. This change in data processing complicates any analyses of changes in income after 2003.



Our main consumption data come from the Consumer Expenditure (CE) Interview Survey. Although the Consumer Expenditure Survey includes a Diary component for a separate sample, we rely exclusively on the Interview component here because it provides information for more categories of consumption than do the diaries, and because the reference period for the Interview Survey (a quarter) is much longer than that for the Diary Survey (two weeks). While a short reference period does not necessarily bias estimates of average spending, it will overstate the dispersion in spending for longer time periods as explained in Section 5.1.<sup>5</sup>

The CE Interview Survey is a rotating panel survey of approximately 7,600 addresses (5,000 prior to 1999) where spending is collected for up to four consecutive quarters. Expenditures are reported for each consumer unit (CU), which consists of individuals related by blood or marriage or who share resources. See the U.S. Department of Labor (various years) for more details on the CE Survey. For much of our analyses we focus on pooled data from the second quarter of 1993 survey through the 4<sup>th</sup> quarter of 2003 survey, although we also discuss some results for other periods.

Our analyses examine both expenditures and consumption. To capture total out of pocket spending, we define expenditures as all spending reported in the CE Survey plus principal payments on home mortgages and financed vehicles less the purchase price of financed vehicles. This measure, sometimes called outlays, follows Rogers and Gray (1994). To convert reported expenditures into a consumption measure, we make a number of adjustments. First, to smooth lumpy vehicle expenditures, we subtract spending on vehicle purchases and add a flow that reflects the value that a consumer

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<sup>5</sup> There is some disagreement in the literature as to whether diary surveys or recall surveys provide more accurate information for various spending components. See Battistin (2003), Browning et al. (2003), and Ahmed, Brzozowski, and Crossley (2010).

receives from owning a car during the period. This flow is a function of an estimated depreciation rate and the current market value of the vehicle, which is determined from the reported purchase price of the vehicle or an imputed current market value based on the observed price paid for vehicles of the same make, model, year, and age, and with comparable features. See Meyer and Sullivan (2009) for details. Second, we deduct spending on education and outlays for retirement including pensions and social security which are investments rather than consumption. We also exclude out-of-pocket health care expenditures because high levels of such spending can reflect poor health. Third, we measure housing consumption as the reported rental equivalent of the home for homeowners and use reported rent payments for non-homeowners. For CUs living in government or subsidized housing, we impute a rental value using geographic information and the characteristics of the living unit (see Meyer and Sullivan, 2009).

### *3.2 The Current Population Survey*

Our main source of income data is the Annual Social and Economic (ASEC) Supplement, formerly called the Annual Demographic File (ADF or March Supplement), to the CPS which includes approximately 100,000 households (60,000 prior to 2002). Respondents to the ASEC/ADF are interviewed in February through April, and report income for the previous calendar year. Our main analyses focus on data from the 1994 through 2004 surveys.

With these data, we construct two different measures of income: after-tax income plus food stamps and after-tax income plus noncash benefits, which includes food stamps (See the Data Appendix for more details). The first measure captures the resources available for spending, and is therefore the measure we use when comparing income and

expenditures. Our second measure, which is more comprehensive, also includes imputed values for housing subsidies and the school lunch program.<sup>6</sup> We use this measure when comparing income and consumption. The CPS also provides imputed values for other noncash benefits such as health insurance and the net return on home equity. However, there are a number of important limitations with these imputed values. For example, the procedure for imputing Medicare and Medicaid implies that public health insurance has no value for families with very low resources, which surely understates the value of public health insurance for this group.<sup>7</sup>

### *3.3 Panel Study of Income Dynamics*

The Panel Study of Income Dynamics (PSID) is a panel survey that has followed a sample of families, their offspring, and coresidents annually from 1968-1997, and biennially since 1997. The survey provides detailed economic and demographic information for both families and individuals for a sample of about 7,000 families each year. The PSID collects data on a number of different income sources. Although we do not observe all spending, the PSID does include data on food and housing expenditures at the family level.

## **4. Recent Changes in Income and Consumption at the Bottom**

As discussed in Section 2, income and consumption reveal different pictures of how the well-being of the worst off has changed. In some cases, income and

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<sup>6</sup> An important concern with these noncash benefits in the CPS is that the imputations are based on very limited information. For example, for the imputation of housing subsidies, no information is available on the characteristics of the living unit. In fact, the CE Survey is better designed for imputing values for most noncash benefits. For the case of housing subsidies, the CE Survey includes information that is helpful for imputing a rental value including the number of rooms, the presence of amenities such as air conditioning or a dishwasher, etc.

<sup>7</sup> Omitting the imputed value for health insurance cannot reconcile differences between consumption and income measures because our consumption measure does not include the value of health insurance.

consumption move in opposite directions in recent years, and often this is the case for the most disadvantaged. Income and consumption do not differ in all cases or in every time period. However, similarities for aggregate measures can hide important differences for subgroups.

Some of the sharpest differences in recent years are for families headed by a single mother. Single mothers are an important group because they were the focus of recent policy changes in the U.S. including reforms to the welfare program and expansions to the Earned Income Tax Credit (EITC). In addition, single mother families account for just under 30 percent of the poor and nearly 50 percent of all children in poverty.<sup>8</sup> Moreover, these families are the primary recipients of many means-tested transfer programs.

In Figure 1 we report the change in mean consumption and mean income for all families headed by a single mother by decile between 1993-1995 (before federal welfare reform) and 1997-2000 (after federal welfare reform). We report consumption from the CE Survey, after-tax income plus food stamps from the same survey, this same income measure from the CPS, and after-tax income plus noncash benefits. Two patterns are evident in this figure. First, there is a sharp difference between changes in consumption and changes in income over time. In each decile, consumption rises between 6.9 and 9.9 percent. In contrast, income falls sharply, however measured, in the first decile and rises by at least 5 percentage points more than consumption in deciles 3, 4, and 5. The differences between the consumption and income changes (for all measures of income) are statistically significant in deciles 1, 3, 4 and 5. These patterns show that the

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<sup>8</sup> These figures are based on the authors' calculations using the official definition of poverty and data from the 1994-2003 CPS ADF/ASEC Supplements.

implications of consumption and income in evaluating how material well-being changed after welfare reform are sharply different. Second, there is a striking similarity between changes in CE Survey and CPS income, measured on a comparable basis. The changes differ by less than a percentage point in deciles 1, 2, and 4, and never differ by more than 2.1 percentage points.<sup>9</sup>

These patterns are also evident when we examine changes at each percentile, as shown in Figure 2. Again, we see that the patterns for CPS and CE income are remarkably similar. They show the same negative pattern in the low percentiles and the same peak around the 30<sup>th</sup> percentile.<sup>10</sup> We should reiterate that these are from different datasets. On the other hand, changes in consumption differ significantly from changes in comprehensive income.

We have performed extensive robustness checks that validate the findings in Figures 1 and 2. We have shown that our conclusions about changes in income and consumption during the 1990s for single mothers do not change substantially with the inclusion of incomplete income reporters in the CE Survey; are not sensitive to attrition in the CE Survey; and are very similar for broadly defined samples of single parents. The results in Figures 1 and 2 are calculated using the NAS recommended equivalence scale (see Data Appendix), but we verify that these patterns are very similar using the scale implicit in the official poverty thresholds.

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<sup>9</sup> Several studies note that income from the CE Survey is, on average, well below comparable CPS numbers (Cutler and Katz, 1991; Bavier, 2008). A key reason for this is that a large share of CPS income is imputed, whereas, prior to 2004, all missing CE Survey income components are set to zero. Figure 1 shows that even without income imputation in the CE Survey, changes in the percentiles of income line up fairly closely for single mothers. While this is not a broad validation of CE Survey income, it indicates that income trends for certain subgroups of the population are reasonably comparable across surveys.

<sup>10</sup> These patterns for income are similar to those in Blank and Schoeni (2003) and Murray and Primus (2005).

The characteristics of the single mother population are changing over time, and these changes may affect both income and consumption. To address this concern, we estimate quantile regressions of the following form:

$$q_r[\ln(Z_{it})] = \beta_1 + \beta_2 1_{\{\text{year}=(1997-2000)\}} + \beta_3 1_{\{\text{year}=(2001-2003)\}} + X_{it} \beta_4 + q_r[\varepsilon_{it}] \quad (1)$$

where  $q_r[\ ]$  is the  $r^{\text{th}}$  conditional quantile;  $Z_{it}$  is either the log of equivalence scale adjusted consumption or income for family  $i$  in quarter  $t$ ;  $1_{\{\text{year}=(1997-2000)\}}$  and  $1_{\{\text{year}=(2001-2003)\}}$  are period dummies;  $X_{it}$  is a vector of demographic characteristics including a cubic in the age of the head, the number of children less than 18, the number of girls age 2-15, the number of boys age 2-15, education and race of the head, and region; and  $\varepsilon_{it}$  is a household-quarter error term.<sup>11</sup> Columns 1 and 3 of Table 1, report estimates at various quantiles for  $\beta_2$  and  $\beta_3$  when no demographic controls are included ( $\beta_4 = 0$ ). As expected, these estimates are in close agreement with those plotted in Figure 2. The estimates for the specifications including demographic controls are reported in Columns 2 and 4. Adding controls has little effect on the trend for consumption, although changes between the 1993-1995 and 2001-2003 periods shift downward somewhat for most percentiles. Adding controls to the specifications for income accounts for much of the large increases above the bottom quintile. In fact, between 1993-1995 and 1997-2000 these income trends mirror those for consumption very closely above the 10<sup>th</sup> percentile. However, even with the addition of demographic controls income still falls between 1993-1995 and 1997-2000 by 9 percent at the 5<sup>th</sup> percentile, although this estimate is not precise. We also estimate Equation 1 for the sample of single mothers in the CPS (not reported).

Consistent with the pattern for CE Survey income, in the CPS we find that much of the

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<sup>11</sup> We calculate bootstrap standard errors, resampling at the household level, rather than at the household-quarter level in order to allow for within household dependence.

significant rise in income above the bottom decile reported in Figures 1 and 2 disappears with the addition of demographic controls. However, as in the CE Survey, we still see a sharp drop in income in the bottom decile.

To understand whether the policy changes during the 1990s that targeted single mothers affected income and consumption, we also examine estimates for single mothers relative to two comparison groups: single women without children and married mothers. If recent macroeconomic changes and other unobservable factors affect these three groups similarly, but the policy changes only affect single mothers, then the trends in Columns 5 through 8 capture the effect of the recent policy changes.<sup>12</sup> In particular, for a sample including single mothers and a comparison group we estimate specifications similar to Equation 1 that also include interactions of a single mother indicator with each of the three period indicators. Columns 5 through 8 report, for various percentiles, the difference between the coefficient on this interaction with the first period and this interaction with each of the later periods.

In general, these results are consistent with the pattern for the absolute changes. At low percentiles, the rise in consumption is a bit smaller than that reported in column 2. At the 10<sup>th</sup> percentile and above consumption for single mothers rises by 3.6 to 6.4 percentage points relative to comparison groups, and in many cases this change is significant. Changes in relative income mirror those for consumption above the 25<sup>th</sup> percentile. However, we again see noticeable differences at the bottom, where relative

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<sup>12</sup> These three groups of women have similar wages, and this similarity is especially strong for the two groups of single women and when one conditions on educational attainment. Previous research has shown that employment for single women without children responds in a similar way to changes in aggregate unemployment as does employment for single mothers (Meyer and Rosenbaum, 2001). In addition, Meyer (2010) explicitly tests the equality of the employment rate changes of single women with and without children in recent years which have little change in policy.

income falls for single mothers at the 5<sup>th</sup> percentile for both comparison groups and at the 10<sup>th</sup> percentile for the all mothers sample, and this drop is significant. If all other factors affect these three groups similarly, then the trends in Columns 5 through 8 suggest that recent changes in welfare and tax policy had a modest positive effect on consumption between 1993-1995 and 1997-2000 for single mothers between the 5<sup>th</sup> and 50<sup>th</sup> percentiles of the distribution, and the effect for income is similar to that for consumption above the 20<sup>th</sup> percentile.

Figure 3 reports income and consumption measures from the PSID. PSID food consumption exhibits little change during this period. This is similar to the pattern for food consumption in the CE Survey, although for the CE Survey food falls in the bottom half of the distribution (results not reported). While the PSID does not provide data on total consumption, data are available for housing spending. Together, food and housing account for nearly sixty percent of total consumption for single mothers.<sup>13</sup> The trend for food and housing in the PSID is fairly similar to the trend for total consumption in the CE Survey shown in Figure 2. These results show that the consumption changes are not an anomaly due to some aspect of the CE Survey. The trends for PSID income show increases over most percentiles. These trends are quite similar to those for the CPS and the CE Survey except in the bottom quintile. Other research indicates that this rise at the bottom in the PSID is due to unusually low levels of reported income in the PSID during the 1993-1995 period.<sup>14</sup>

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<sup>13</sup> Using CE Survey data, we calculate this share as food and housing spending (excluding utilities not included in rent) divided by total consumption. Housing in the PSID includes rent for renters, a service flow based on the market value of the home for owners, a reported rental equivalent for non-homeowners that do not pay any rent. See Data Appendix for more details.

<sup>14</sup> Gouskova and Schoeni (2002) compare PSID and CPS income between 1970 and 2001 for many points in the distribution. They show that below the 20th percentile PSID income exceeds CPS income for the years prior to 1990. In the early 1990s, however, PSID income at low percentiles falls sharply relative to



The results presented here show that income and consumption measures often tell very different stories about how the well-being of disadvantaged households has changed over the past two decades. These findings are consistent with previous research on poverty and inequality that has also shown that there are important differences. These differences suggest that our understanding of the material well-being of those at the bottom of the distribution is sensitive to how these disadvantaged families are defined. For the remainder of this paper, we examine income and consumption measurement issues in order to determine the relative merits of these measures of well-being for the poor.

## **5. Data Quality Issues**

In order to assess whether the patterns for income or consumption more accurately capture the well-being of the disadvantaged, we investigate measurement issues for income and consumption at the bottom of the distribution, examining under-reporting, survey and item nonresponse, the precision of estimates, and attrition.

### *5.1 Under-reporting of Income and Consumption*

Concerns regarding income under-reporting are well documented (Moore et al., 2000; Coder and Scoon-Rogers, 1996; Roemer, 2000; Meyer and Sullivan 2006, Meyer, Mok, and Sullivan, 2009). One concern that is particularly relevant for disadvantaged households is the extent of under-reporting of transfer income. Meyer, Mok, and Sullivan (2009) compare weighted micro-data from several national surveys to administrative aggregates for several transfer programs and the EITC. These ratios

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CPS income, and after 1997 PSID income at these low percentiles grows at a much faster rate than does CPS income.

capture the fraction of dollars received that are reported in surveys.<sup>15</sup> Their results for the CPS indicate that the reporting rate for most transfer programs is quite low, and for some programs, such as AFDC/TANF and food stamps, the reporting rate has been falling sharply over time. In 2004 the share of TANF dollars reported in the CPS was 49 percent, and the fraction of food stamps dollars reported was 57 percent, down from 71 percent and 76 percent in 1979. In 2004, the corresponding shares for unemployment insurance, Supplemental Security Income (SSI), workers' compensation, and the EITC were 75, 82, 46 and 65 percent. Meyer, Mok, and Sullivan (2009) also report sharp under-reporting of transfers in the CE Survey, the PSID, the Survey of Income and Program Participation, and the American Community Survey.

The potential effect of changes in under-reporting on recent income trends is unclear. On the one hand, sharp increases in under-reporting of transfer income could lead to a significant downward bias in changes in measured income. On the other hand, for some of these programs, such as AFDC/TANF, true receipt also declined significantly in recent years. Consequently, the number of dollars not reported rose slowly between 1993 and 2000. Thus, at least for AFDC/TANF, it is possible that declining true receipt could reverse much of the effect of a lower reporting rate. Nevertheless, based on analyses that correct for under-reporting of AFDC/TANF and food stamps, Meyer and Sullivan (2006) conclude that under-reporting of transfers can explain more than half of the decline in income in the bottom decile that we report in Figure 1.

Strong evidence that income is under-reported at the bottom of the distribution is that expenditures exceed income. Although such differences could be explained by

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<sup>15</sup> False positive reporting by nonrecipients leads the ratio to overstate true reporting by actual recipients. However, research using matched microdata indicates that this type of mis-reporting is appreciably smaller, at least for food stamps (Bollinger and David, 2001 and Meyer and Goerge, 2010).

dissaving or borrowing, as we explain below, consumption smoothing is unlikely to account for most of the large differences at low percentiles. In Table 2 we report percentiles of the income distribution from the CPS, and percentiles of the income and expenditure distributions from the CE Survey, pooling data from 1993 through 2003. We examine expenditures rather than consumption, because the former should equal after-tax income in the absence of saving or dissaving. For all families (panel A), the 5<sup>th</sup> percentile of the CE Survey expenditures distribution is 44 percent higher than the 5<sup>th</sup> percentile of the CPS income distribution. A difference is also evident, but much less extreme, at the 10<sup>th</sup> percentile where CE Survey expenditures exceed CPS income by 8 percent. Average expenditures for families below the 5<sup>th</sup> percentile of expenditures are more than three times greater than the average income for all families below the 5<sup>th</sup> percentile of income (compare rows 2 and 7). These differences between income and consumption are not unique to the 1993 to 2003 period. In results not reported, we show that expenditures also significantly exceed income at the bottom for the period from 1980 to 1992 and from 2004 to 2007. Nor are these differences unique to the U.S. Similar results are evident for Canada (Brzozowski and Crossley, this issue) and Great Britain (Brewer et al., 2006).

By looking at income and expenditures within the CE Survey, we can compare these measures for the same families in the bottom of the income distribution (compare Rows 4 and 8) or the bottom of the expenditure distribution (compare rows 5 and 7). Expenditures exceed income by a factor of 7.05 in the bottom five percent of the income distribution. By contrast, income exceeds expenditures by only a factor of 1.59 in the bottom five percent of the expenditure distribution. It is important to note that

comparisons such as these will naturally lead to differences because we are conditioning on one outcome being very low, either income or consumption, while the other is not restricted to low values. What is telling about the results in Table 2 is that the absolute difference is so much larger when conditioning on low income than when conditioning on low expenditures. See Brewer et al. (2006) for similar results for Great Britain.

Bavier (2008) is critical of such comparisons, because they rely on CE Survey income, which he claims is inferior. However, as evident from comparing Rows 1 and 3, the 5<sup>th</sup> and 10<sup>th</sup> percentiles of CE Survey income are fairly similar to the corresponding percentiles of the CPS income distribution. The 5<sup>th</sup> percentile differs by 2 percent and the 10<sup>th</sup> by 9 percent.<sup>16</sup> CPS income exceeds CE Survey income at higher percentiles, which is not surprising given that the CPS imputes missing values of income components while the CE Survey sets them to zero for this time period. Similar evidence comparing CE Survey income to income from several other datasets is provided by Sabelhaus and Groen (2000).

Similarities between CE Survey income and CPS income are even stronger for the sample of all single mothers (panel B). For this group, the percentiles of CPS income differ from those of CE Survey income by only a few percent for percentiles from the 10<sup>th</sup> through at least the median. The 5<sup>th</sup> percentile of CE Survey income even exceeds that from the CPS. Moreover, we showed in Figures 1 and 2 that changes in income for single mothers are very similar across the two surveys. For this group, expenditures exceed income by a factor of 3.7 for those in the bottom income decile (rows 12 and 16) and by a factor of 2.3 for those in the bottom income quintile. For single mothers,

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<sup>16</sup> We do not interpret the similarity between CE Survey income and CPS income as indicating that CE income is of high quality. Rather, these similarities suggest they we should be concerned about the quality of income at the bottom in both surveys.

differences between CE Survey expenditures and CPS income are especially pronounced (Rows 9 and 14). Expenditures are 114 percent greater than CPS income when comparing the 5<sup>th</sup> percentiles, and spending exceeds income by more than 25 percent at the 20<sup>th</sup> percentile. As was the case for all families, the differences between income and consumption at low percentiles for single mothers are not unique to this time period.

When comparing the distributions of income and consumption it is important to consider the reference period for these variables. The income numbers in Table 2 are based on reported income for a calendar year, while consumption is based on expenditures for a three month period. Although reference periods of different length should not affect the mean, they will affect the dispersion of the distribution because all spending is lumpy to some extent. The variance of the distribution of annualized expenditures based on quarterly data will be higher than true annual numbers, leading low percentiles based on quarterly spending to be lower than they would be with annual expenditures. Thus, the true discrepancies between income and expenditures at the bottom are even larger than those reported in Table 2.

One way to approximate the bias in these comparisons that results from using quarterly expenditure data but annual income data is to contrast the quarterly and annual distribution of expenditures for observations in the CE Survey where we have four quarterly numbers. As shown in Table 3, the distribution of annual expenditures (calculated summing over four quarters of reported spending) is quite a bit less dispersed than that for annualized quarterly expenditures.<sup>17</sup> These differences indicate that for our

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<sup>17</sup> Similarly, we have also examined expenditure data from the CE Diary Survey, comparing 2 weeks of reported expenditures to two times reported expenditures for a single week. Again, the distribution of expenditures for the shorter reference period is more dispersed and has a somewhat different shape. These results are available from the authors.

results in Table 2, the 5<sup>th</sup> percentile of expenditures should be adjusted upward by 9.5 percent and the 10<sup>th</sup> percentile by 8.3 percent.<sup>18</sup>

In addition to the reasons discussed above, we have focused on single mothers in some of our previous work because it allows us to examine a disadvantaged group without conditioning on low income or low consumption. For example, an alternative interpretation of the finding that expenditure percentiles exceed income percentiles is that households are able to draw down assets or borrow (that saving and dissaving explain the difference). This pattern would be consistent with the permanent income hypothesis. Based on the very low asset holdings of single mothers (Meyer and Sullivan, 2003, 2006), we do not think the permanent income hypothesis is the key explanation for this group.<sup>19</sup> Thus, we conclude that for this large group of the poor, the explanation for the difference is likely to be income under-reporting.

In-depth interviews in ethnographic research also indicate that income is under-reported among families with very low resources. Edin and Lein (1997) show that a large share of low-resource single mothers obtain substantial income in transfers from family, friends, boyfriends, and absent fathers. These transfers typically are not captured in income survey data. With many sources of income other than formal labor market earnings, accurate reporting is much less likely.

Another potential explanation for the differences between income and consumption shown in Table 2 is that expenditures are over-reported. However, there is

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<sup>18</sup> Because families that remain in the sample for all four quarters differ from other families, the distribution of expenditures for the four-quarter sample differs from that for the full sample as is evident by comparing rows 6 and 14 of Table 2 to column 2 of Table 4. However, what matters for our suggested adjustment is that the relationship between the distributions for annual and quarterly spending for the four-quarter sample is comparable to this relationship for the full sample.

<sup>19</sup> Sabelhaus and Groen (2000) show that differences between income and consumption in the tails of the income distribution cannot be entirely explained by intertemporal consumption smoothing, and they argue that measurement error is a likely explanation for the differences.

little evidence of over-reporting of expenditures. Rather, past work that has compared survey data to national accounts has emphasized concerns about under-reporting of expenditures. For example, see Gieseeman (1987), Slesnick (1992), Garner et al. (2006), and Attanasio et al. (2006) for analyses of expenditures in the CE Survey, or Deaton (2005) for analyses in other countries. The literature focusing on the CE Survey has compared weighted aggregate spending from the survey with Personal Consumption Expenditure (PCE) data from the National Income and Product Accounts (NIPA), noting that the CE/PCE ratio is about 0.62 in recent years. Some of this evidence is easily misinterpreted and is less applicable to the current analyses than it may seem for several reasons. First, many published comparisons are based on the integrated data that combine CE Diary and CE Interview data rather than the Interview data used exclusively here. Second, the poor consume a larger share of necessities, so that aggregate analyses do not reflect the composition of consumption for the poor. Third, the PCE numbers cover a different population, are defined differently from the CE Survey, and are the product of a great deal of estimation and imputation that is subject to error. One should not expect expenditures weighted by the population to match PCE aggregates. The Bureau of Economic Analysis reported that in 1992 more than half of the difference between PCE and CE Survey consumer spending was due to coverage and definitional differences (summarized in GAO, 1996).

In Table 4 we report comparisons of CE Interview Survey values weighted by population to corresponding categories of PCE data. As shown in the last row, the ratio for total expenditures declined sharply between 1984 and 2004. However, as discussed above, these ratios should be interpreted cautiously. By contrast, reporting rates for

categories of expenditures, such as food and rent, that are a large share of spending by the poor and that are more comparable to PCE categories based on concepts and comprehensiveness are higher and steadier than the rates for expenditures as a whole. Between 1984 and 2004, the CE/PCE ratio for food at home was, on average, about 0.83, and for rent plus utilities the ratio was about 0.96. The ratio for rent plus utilities remained virtually unchanged between these two years.<sup>20</sup>

### *5.2 Survey and Item Nonresponse*

Measures of nonresponse are often used to evaluate the quality of data from a survey (Atrostic et al., 2001; Atrostic and Kalenkoski, 2002). Nonresponse can bias statistical analyses if those who do not respond are different from those who do. Nonresponse is often divided into survey nonresponse and item nonresponse. Survey nonresponse includes cases where no information is obtained for a sample household for reasons such as inability to contact any person in the household or a refusal to respond by those contacted. Item nonresponse occurs when a respondent provides some information, but does not provide valid information on a given item. In the case of nonresponse to income questions, the CPS ADF/ASEC imputes values based on the individual's or household's characteristics. Similarly, the CE Survey provides imputed values for expenditures.

In Table 5 we report the survey nonresponse rate and the fraction of dollars imputed for income in the CPS and for expenditures in the CE Survey from 1993 through

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<sup>20</sup> Although expenditures might be reported relatively well for those with few resources, under-reporting of expenditures is arguably of greater concern for those at higher percentiles. Recent studies have addressed concerns about declining reporting of expenditures at higher points in the expenditure distribution by focusing on components that appear to be measured well and whose quality does not deteriorate over time (Meyer and Sullivan, 2010), or by adjusting spending data using ratios such as those we report in Table 4 (Parker et al., 2009).



2007.<sup>21</sup> Survey nonresponse is similar in the early 1990s, but between 1993 and 2007 the survey nonresponse rate for the CE Survey rises about 10.5 percentage points while the rate for the CPS changes very little. On the other hand, the evidence in Columns 3-6 indicates that imputation is much more prevalent in the CPS. We calculate imputation rates as the fraction of income or expenditures that are imputed. For pre-tax money income, CPS imputation rates start out 5 percentage points higher than CE Survey rates in 1993, and this difference increases over time.

We also examine after-tax income plus food stamps, which is a better measure of the resources available to the family and is more comparable to expenditures.<sup>22</sup> We consider two ways of handling the tax imputations. First, we consider taxes to be imputed if more than half of pre-tax income is imputed. Even though, in fact, all taxes are imputed in the CPS, in some cases taxes can be imputed with considerable accuracy, so they do not necessarily introduce additional error. Second, we consider all taxes to be imputed. Calculating after-tax income requires an additional step that is not necessary when calculating expenditures. Also, when part or all of taxable income is imputed, or when the tax filing unit is uncertain, when deductions and adjustments to taxable income are unobserved, the imputation of taxes will introduce additional error. Under the first assumption (Column 4), imputation rates for the CPS are between 15 and 27 percentage points higher than the CE Survey rates. Under the second assumption, when all taxes are

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<sup>21</sup> We have adopted the convention that when a person responds to the monthly CPS survey but not to the ADF/ASEC supplement (the source of annual income data) we treat that situation as survey nonresponse and do not include it in the imputation rates (even though all income data are imputed in this case). This convention insures that we do not double count such cases as both survey nonresponse and imputation.

<sup>22</sup> Alternatively, one could compare consumption to a more comprehensive measure of income, both of which include additional imputed components. Typically, these additional components are added to both income and consumption, such as the value of owner occupied housing, which typically must be imputed for income but not consumption if a rental equivalent is reported, or the value of housing subsidies, which typically involve some imputation for both income and consumption.

considered to be imputed (Column 5), imputation rates in the CPS range from 34 to 47 percentage points higher than the CE Survey. While it is unclear which is the preferred measure to use, it should be evident that imputation rates are much higher in the CPS. A total measure of nonresponse can be calculated as:  $\text{Total nonresponse} = \text{survey nonresponse} + (1 - \text{survey nonresponse}) * \text{imputation rate}$ . Such a measure shows much higher total nonresponse in the CPS than the CE Survey in all years.<sup>23</sup> A complete discussion of nonresponse would analyze the nonrandomness of nonresponse and the accuracy of imputations, but such analyses are beyond the scope of this paper.<sup>24</sup>

### *5.3 The Precision of Poverty Measures and the Lower Variability of Consumption*

One advantage that income based surveys have relative to expenditure surveys is that they typically have much larger samples, which provide more precise estimates of certain statistics. For example, the CPS ASEC currently includes approximately 100,000 households, while the CE Interview Survey includes approximately 7,600 households. A given household in the CE Survey provides up to four consumption observations over the year which narrows the gap in sample size. This smaller sample size suggests that current survey data for examining consumption at the state or local level, and changes from one year to the next may be fairly imprecise. For statistics such as the head count poverty rate where precision is roughly proportional to the square root of the sample size, this smaller sample size is especially important. For other statistics, the lower variability of consumption may outweigh the small sample size.

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<sup>23</sup> This measure of total nonresponse treats survey and item nonresponse equally. A more sophisticated measure would reflect the degree of nonrandomness in the two sources of nonresponse and the imputation error in the case of item nonresponse.

<sup>24</sup> Bavier (2008) argues that nonresponse is more problematic in the CE Survey than in the CPS. However, this argument is based on survey nonresponse only, ignoring item nonresponse.

Past work has argued that smaller sample sizes in the CE Survey necessarily imply that consumption is less precise (Citro and Michael 1995; Bavier 2008). These arguments are overstated, because they omit the fact that the variance of income is much larger than that of consumption and income is less predictable, which negatively affects the precision of income based statistics. The lower variability of consumption means that fewer consumption observations than income observations are needed to obtain a given level of precision or significance in some common types of analyses.<sup>25</sup>

To demonstrate this point, we estimated a typical regression that is used to determine the change over time for one group relative to a comparison group. For example, we regress income or consumption on time period indicators interacted with demographic group indicators while controlling for other demographic characteristics. Results from these regressions, reported in Table 6, indicate that consumption can provide more precise estimates.<sup>26</sup> The mean ratio of the income based standard errors to the consumption based standard errors, depending on the dataset and comparison group used, ranges from 1.62 to 2.07.<sup>27</sup> The lower consumption based standard errors are due to a sharply lower variance of consumption and a much higher predictability of consumption (higher  $R^2$ ) as can be seen in the last two rows of each panel of Table 5. Since the standard error is proportional to the inverse of the square root of the sample size, these ratios indicate that each consumption observation is worth about 3 or 4 income

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<sup>25</sup> One might be concerned that the lower variability of consumption is due to imputation of some consumption components. However, as discussed in the previous subsection, income imputation rates are higher than expenditure imputation rates. And, the additional imputations necessary to calculate consumption, such as the flow value of vehicles, are based on very detailed information, suggesting that these imputations do not understate true variability considerably.

<sup>26</sup> The number of observations with nonmissing income data in the PSID is slightly smaller than those with consumption data, but this difference accounts for only a small share of the difference in these comparisons.

<sup>27</sup> Significantly larger standard errors for income are also evident in the results presented in Table 1.

observations in terms of precision and the ability to test hypotheses. Thus, even a relatively small consumption dataset may be as useful as a larger income dataset for certain common analyses. Nevertheless, the sample size of the CE Survey would need to be increased in order to obtain estimates of consumption based poverty rates for small geographic areas or for very narrow demographic groups.

#### *5.4 Attrition and Other Robustness Issues*

We verify that the expenditure and consumption patterns for disadvantaged families from the CE Survey, such as those presented in Section 4 or Table 2, are not biased due to nonrandom attrition in the CE Survey or sample restrictions such as the exclusion of incomplete income reporters. We show in Appendix Table 1 that differences in spending between complete income reporters and incomplete income reporters is not large enough to change substantially the distribution of consumption for the bottom half of the distribution (compare rows 1 and 2 for each sample). For all families, the percentiles of consumption for the samples that include only complete income reporters (our base sample) never differ by more than 2 percent from the percentiles for the full sample. For specific disadvantaged groups, the differences are typically less than 2.5 percent.<sup>28</sup> None of the analyses of consumption or expenditures that we present in this paper are sensitive to the inclusion or exclusion of incomplete income reporters.<sup>29</sup>

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<sup>28</sup> A similar analysis for expenditures indicates that the differences for these percentiles are never greater than five percent.

<sup>29</sup> This contradicts claims by Bavier (2008) that “Expenditures of CE ‘complete income reporters’ are not representative of all consumer units.” Bavier argues that average expenditures for complete income reporters exceed those of other consumer units. However, most of the difference is due to differences in spending on insurance and pensions, which is typically excluded from measures of consumption. Moreover this difference arises because income data are used to impute this insurance component. Whether income data are complete matters crucially for this imputation. When insurance is excluded,

To examine how attrition might bias our analyses of consumption, Appendix Table 1 also reports various percentiles for the sample that only includes second quarter interviews. Second quarter interviews are the first for which the full survey is administered for each sampling unit (the first interview just gathers baseline information). The CE Survey is a sample of addresses, not consumer units (CUs). Those who move away from their sample address between interviews are dropped from the survey, while those moving into a sample address are included in the survey after being screened for eligibility (U.S. Department of Labor, various years). These first full interviews for housing units (second quarter interviews) are close to a random sample of housing units as is intended in the survey. As is evident by comparing rows 2 and 3 for all families, and within each demographic group, the bottom part of the distribution for the second quarter interview sample is remarkably similar to that of the full sample. This result suggests that including data from interviews beyond the second quarter does not bias analyses of consumption, even within demographic groups.<sup>30</sup>

## **6. Consumption and Income as Predictors of Well-Being**

The relative quality of income and consumption data at the bottom can be investigated by determining whether low consumption or low income is more closely

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spending for complete income reporters is only slightly higher than spending for incomplete income reporters.

<sup>30</sup> Bavier (2008) examines attrition by restricting his sample to the first reported interview for each consumer unit (not housing unit). For this sample, he then compares consumption across CUs that differ in the number of quarters of reported expenditures. Thus, he is comparing samples that have different shares of CUs that have just moved residences. For example, the four quarter sample will be CUs who never move during the sample period, while movers will be over-represented in the one quarter sample. These samples are all non-representative of the universe of households and should differ from each other even when attrition is random. Comparisons of consumption across these non-representative samples lead Bavier to conclude mistakenly that “sample loss is negatively related to economic status.” The fourth row of each panel in Appendix Table 1 reports consumption percentiles for Bavier’s unconventional sample of first reported interview for each CU. It is not surprising that expenditures for this sample that over-represents movers are lower than for other samples.

associated with other bad outcomes (Meyer and Sullivan, 2003). 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 family has access to certain appliances within the dwelling unit. Table 7 examines how outcomes differ for families in the bottom five percent of the consumption and income distributions compared to all other families using CE Survey and PSID data. Column 1 reports the mean value of each outcome for those in the bottom five percent of the income distribution, while Column 2 reports the mean for those in the top ninety-five percent of the income distribution. If higher values of the outcome are better, as we expect given the way all outcomes are defined in the table, the differences in Column 3 should be negative if those at the bottom of the income distribution fare worse than others. Similarly, in Columns 4 through 6 we report the same statistics for groups defined by their place in the consumption distribution. Column 7 reports the key difference-in-differences summary measure, 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. For the CE Survey, the negative values in Columns 3 and 6 indicate that in all cases, those in the bottom 5 percent of income or consumption experience worse material conditions than those above the bottom 5 percent. Column 7 indicates that in all cases low consumption is a clearer indicator of worse outcomes than low income. Moreover, in all cases, the statistic in Column 7 is significantly different from zero.

The PSID results are less decisive, but still favor consumption. Seven of the ten statistics in Column 7 are negative, which favors consumption, and four of these are significant. Surprisingly, low income seems to be significantly more closely associated with low automobile ownership than is low consumption in the PSID. We should note that consumption is handicapped in the PSID, where we believe the income data are of higher quality than the consumption data, while the reverse is true in the CE Survey. Also, the results are likely biased towards favoring income in the PSID due to the longer reference period for income (the previous calendar year) than food expenditures (a typical week).

We also examine the relationship between low consumption, low income, and the same outcomes listed in Table 7 for a number of at-risk groups such as all single mother headed families, families with a head age 65 and over, and families with a disabled head. We summarize the results of these analyses in Table 8, by reporting the number favoring income (the difference-in-differences statistic is positive) and the number favoring consumption (the difference-in-differences statistic is negative). The evidence from the CE Survey again strongly favors consumption, and in most cases this evidence is statistically significant. For the PSID, we also see more of these outcomes favoring consumption than income within each of these at-risk groups. However, due to small sample sizes for these groups, the results from the PSID are not very precise.

Related evidence from the U.K. suggests that income and material well-being are not strongly related for those with very low income. For a sample of children, Brewer, O'Dea, Paull and Sibieta (2009) show that material deprivation rises with income at the bottom of the distribution.

Charles et al. (2006) perform a similar analysis to ours for a sample of those 53 and over using the 2001 Consumption and Activities Mail Survey (CAMS) of the Health and Retirement Study (HRS). For the full sample, they find that income is more strongly associated with measures of well-being than their measure of consumption. However, for the bottom decile (roughly those who are poor) the evidence strongly favors consumption for physical health and wealth measures. The evidence is mixed for housing and neighborhood measures, and strongly favors income for measures of mental health in the past week and food hardship. It is somewhat surprising to find even modest support for consumption given that the HRS focuses on income while the consumption data come from a supplement mailed to a subsample of HRS households.

Using data from the Survey of Income and Program Participation (SIPP), Bavier (2008) indicates that income is more strongly correlated with material hardship than is expenditures. However, his measure of expenditures from the SIPP is inappropriate for this analysis because it includes components that may indicate worse well-being, such as out of pocket medical expenses, child care, and work expenses, and because consumption of owner-occupied housing is measured using mortgage payments—an approach most researchers examining consumption have rejected (Cutler and Katz, 1991; Slesnick, 1993; Meyer and Sullivan, 2003, 2004). Using an alternative consumption measure that is as good as one can do with the limited information in the SIPP, we find that its correlation with the various hardship measures is the same or higher than that of income.<sup>31</sup> This result is especially striking because the SIPP provides probably the best measure of income available in any standard household dataset (Citro and Michael, 1995;

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<sup>31</sup> Specifically, we sum utilities, rent, and the flow values of homes and vehicles, which are calculated based on the reported values of these durables.



Meyer, Mok and Sullivan, 2009), while the consumption data are based on a little used supplement that provides only about half of total spending and misses key components such as food consumption.

## **7. Discussion and Conclusions**

Previous research on poverty and inequality has shown that patterns for income and consumption can differ sharply. In many cases where income and consumption patterns diverge, consumption measures show greater improvement in recent years than income measures, as is the case for elderly poverty. However, the reverse is true for the poverty of other groups, such as married parent families. This paper shows that recent changes in income and consumption differ sharply for single mothers and that these differences are only somewhat accounted for by changing demographics. In particular, sharp differences remain at the very bottom of the distribution. Following welfare reform, reported income for the bottom decile of single mothers fell as some past authors have emphasized, but we show reported consumption rose. These differences emphasize the importance of understanding the relative merits of income and consumption as measures of well-being

We present substantial evidence that consumption data are measured better than income data at the bottom of the distribution in the U.S. This empirical evidence supports conceptual arguments that generally favor consumption. The bottom deciles of expenditures exceed those for income suggesting under-reporting of income. There is a high and rising under-reporting rate for government transfers, a source of income that is particularly important at the bottom. In addition, total nonresponse and imputation rates

are similar or higher in our source of official income data than in our main source of consumption data. Finally, low consumption for the worst off among the disadvantaged seems to be more closely associated with other bad outcomes than is low income. The results favoring consumption are strongest when examining the bottom 5 or 10 percent of the distribution; the evidence is more mixed higher up in the distribution, particularly for those 65 and over. The evidence favors consumption, or is mixed, in surveys such as the PSID, SIPP, and HRS-CAMS. Given that these surveys focus on income or have incomplete measures of consumption, this evidence is a strong endorsement of consumption.

Although the evidence presented here indicates that greater attention should be given to consumption when studying the well-being of disadvantaged households and the effects of anti-poverty programs, there are some important limitations of consumption data. For example, income data are easier to collect for determining individual program eligibility. Also, the sample sizes in the best consumption datasets currently available are too small to measure precisely poverty for small geographic areas or year to year changes. Nevertheless, we have shown, consumption datasets do not need to be as large as income datasets to obtain the same level of precision for some types of estimates.

Our analyses focus on U.S. families near the bottom of the distribution. Important questions remain regarding the generalizability of these results. For example, the relative importance of unreported income and saving or dissaving is not clear, especially for groups besides single mothers. Further research is needed to examine the reasons for these differences. Also, little is known about whether the measurement issues emphasized here are also relevant in other countries. While both income and

consumption data are available for many countries, further research is needed to evaluate data quality issues in these data. In addition, more research is needed on how to obtain a reasonable consumption measure from a small set of questions, as examined in Browning et al., 2003, and on how to synthesize questions about expenditures and durable holdings into consumption measures.

## References

- Ahmed, Naeem, Matthew Brzozowski, and Thomas Crossley. 2010. "Measurement Errors in Recall Food Consumption Data." University of Cambridge Working Paper.
- Atrostic, B.K. and Kalenkoski, C., 2002, "Item Response Rates: One Indicator of How Well We Measure Income." In proceedings of the annual meetings of the American Statistical Association (ASA), August 11-15.
- Attanasio, Orazio P., Erich Battistin, and Andrew Leicester. 2006. "From Micro to Macro, from Poor to Rich: Consumption and Income in the UK and the US," working paper, University College London.
- Barrett, G.F., Crossley, T.F. and Worswick. 2000. C. "Consumption and Income Inequality in Australia." *Economic Record*, 76(233):116-138.
- Battistin, E. (2003). "Errors in survey reports of consumption expenditures," Institute for Fiscal Studies, Working Paper 0307.
- Bavier, R. (2008), "Reconciliation of Income and Expenditure Data in Poverty Measurement." *Journal of Policy Analysis and Management*, 27:1, 40-62.
- Binelli, Chiara and Orazio Attanasio, (2010), "Mexico in the 1990s: The Main Cross-Sectional Facts." *Review of Economic Dynamics*, 13, 238-264.
- Blank, Rebecca and Robert Schoeni, "Changes in the Distribution of Child Well-Being Over the 1990s, American Economic Review: Papers and Proceedings, 2003, 93(2): 304-308.
- Blundell, Richard and Ben Etheridge, (2010), "Consumption, income and earnings inequality in Britain." *Review of Economic Dynamics*, 13, 76-102.
- Blundell, Richard and Ian Preston, 1998, "Consumption Inequality and Income Uncertainty" *Quarterly Journal of Economics*, May 1998, pp 603-640.
- Bollinger and David (2001), Estimation with Response Error and Nonresponse: Food-Stamp Participation in the SIPP, *Journal of Business and Economic Statistics*, 19:2, 129-141.
- Brewer, Mike, Alisa Goodman and Andrew Leicester (2006), "Household Spending in Britain: what can it teach us about poverty?", Bristol: The Policy Press.
- Brewer, Mike, Cormac O'Dea, Gillian Paull and Luke Sibieta (2009), "The living standards of families with children reporting low incomes", Department for Work and Pensions, Research Report No 577.
- Browning, M. and T.F. Crossley. 2001. "Unemployment Insurance Levels and Consumption Changes," *Journal of Public Economics*, 80(1):1-23.
- Browning, M., Crossley, T. F. and Weber, G., 2003. "Asking Consumption Questions in General Purpose Surveys." *Economic Journal*, 113 (November), F540-F567.
- Brzozowski, M. and Crossley, T. F. (this issue), "Measuring Well-being of the Poor with Income or Consumption: A Canadian Perspective." *Canadian Journal of Economics*.
- Brzozowski, M., M. Gervais, P. Klein and M. Suzuki, (2010), "Consumption, Income, and Wealth Inequality in Canada." *Review of Economic Dynamics*, 13 (2010) 52-75.
- Citro, C. F. and Michael, R. T. (1995). *Measuring Poverty: A New Approach*, eds. Washington, D.C.: National Academy Press.

- Coder, J. and Scoon-Rogers, L. 1996. "Evaluating the Quality of Income Data Collected in the Annual Supplement to the March Current Population Survey and the Survey of Income and Program Participation." Housing and Household Economic Statistics Division. Washington D.C.: U.S. Census Bureau.
- Crossley, Thomas and Lori Curtis. 2006. "Child Poverty in Canada." *Review of Income and Wealth*, 52:2, June, pp. 237-260.
- Crossley, T.F. and K. Pendakur. 2006. "Consumption Inequality," in Green, D. and J. Kesselman, (Eds.), *Dimensions of Inequality in Canada*, UBC Press, Vancouver.
- Cutler, D. M. and Katz, L.F. 1991. "Macroeconomic Performance and the Disadvantaged." *Brookings Papers on Economic Activity* 2: 1-74.
- Deaton, Angus. 2005. "Measuring Poverty in a Growing World (or Measuring Growth in a Poor World)," *Review of Economics and Statistics*, 87:1, 1-19.
- Domeij, David and Martin Flodén, (2010), "Inequality trends in Sweden 1978–2004." *Review of Economic Dynamics*, 13, 179-208.
- Edin, K. and Lein, L. 1997. *Making Ends Meet: How Single Mothers Survive Welfare and Low-Wage Work*. New York: Russell Sage Foundation.
- Feenberg, Daniel and Elizabeth Coutts. 1993. "An Introduction to the TAXSIM Model," *Journal of Policy Analysis and Management*, 12(1):189-194.
- Fuchs-Schündeln, Nicola, Dirk Krueger, and Mathias Sommer, (2010), "Inequality trends for Germany in the last two decades: A tale of two countries." *Review of Economic Dynamics*, 13, 103-132.
- General Accounting Office. 1996. "Alternative Poverty Measures," GAO/GGD-96-183R. Washington, DC: Government Printing Office.
- Gieseman, R. 1987. "The Consumer Expenditure Survey: quality control by comparative analysis," *Monthly Labor Review*, 8-14.
- Gorodnichenko, Yuriy, Klara Sabirianova Peter, and Dmitriy Stolyarov, (2010), "Inequality and volatility moderation in Russia: Evidence from micro-level panel data on consumption and income." *Review of Economic Dynamics*, 13, 209-237.
- Gouskova, Elena, and Robert F. Schoeni. 2002. "Comparing Estimates of Family Income in the Panel Study of Income Dynamics and March Current Population Survey, 1968-1999." Working paper, Institute for Social Research, University of Michigan.
- Gruber, J.. (1997). *The Consumption Smoothing Benefits of Unemployment Insurance*. *American Economic Review*, 87(1), 192-205.
- Heathcote, Jonathan, Fabrizio Perri, and Giovanni L. Violante, (2010), "Unequal we stand: An empirical analysis of economic inequality in the United States, 1967–2006." *Review of Economic Dynamics*, 13, 15-51.
- Jappelli, Tullio and Luigi Pistaferri, (2010), "Does consumption inequality track income inequality in Italy?." *Review of Economic Dynamics*, 13, 133-153.
- Jencks, C., S. E. Mayer, and J. Swingle. 2004. "Who Has Benefitted from Economic Growth in the United States Since 1969? The Case of Children." in E. N. Wolff, ed. *What Has Happened to the Quality of Live in the Advanced Industrial Nations?* Cheltenham, UK: Edward Elgar.
- Johnson, D. S., Smeeding, T. M., and Torrey, B.B. 2005. *Economic Inequality Through the Prisms of Income and Consumption*. *Monthly Labor Review*. April, 11-24.

- Krueger, D. and Perri, F. 2006. "Does Income Inequality lead to Consumption Inequality? Evidence and Theory" *Review of Economic Studies* 73, pp. 163-193.
- Meyer, Bruce D. 2010. "The Effects of the EITC and Recent Reforms," in *Tax Policy and the Economy* 24, edited by Jeffrey Brown, M.I.T. Press.
- Meyer, Bruce D. and Robert Goerge. 2010. "The Analysis of Food Stamp Program Participation with Matched Administrative and Survey Data," University of Chicago Working Paper.
- Meyer, Bruce D. and Dan T. Rosenbaum. 2001. "Welfare, the Earned Income Tax Credit, and the Labor Supply of Single Mothers," *Quarterly Journal of Economics*, CXVI, 1063-1114.
- Meyer, B. D., Mok, W. K. C. and Sullivan, J. X. 2009. "The Under-Reporting of Transfers in household Surveys: Comparisons to Administrative Aggregates" NBER Working Paper 15181, July.
- Meyer, B. D., Sullivan, J. X.. 2010. "Consumption and Income Inequality in the U.S.: 1972-2005," University of Notre Dame Working Paper.
- . 2009. "Five Decades of Consumption and Income Poverty," NBER Working Paper 14827, March.
- . 2008. "Changes in the Consumption, Income, and Well-Being of Single Mother Headed Families," *American Economic Review*, 98(5), December, 2221-2241.
- . 2007. "Consumption and Income Poverty for those 65 and Over," working paper, July.
- . 2006. "Consumption, Income, and Material Well-Being After Welfare Reform," NBER Working Paper 11976, January.
- . 2004. "The Effects of Welfare and Tax Reform: The Material Well-Being of Single Mothers in the 1980s and 1990s," *Journal of Public Economics*, 88, July, 1387-1420.
- . 2003. "Measuring the Well-Being of the Poor Using Income and Consumption." *Journal of Human Resources*, 38:S, 1180-1220.
- Milligan, Kevin. 2008. "The Evolution of Elderly Poverty in Canada." *Canadian Public Policy*, University of Toronto Press, 34:1, November, 79-94.
- Moore, J. C., Stinson, L.L. and Welniak, E. J. Jr. 2000. "Income Measurement Error in Surveys: A Review." *Journal of Official Statistics*, 14:4, 331-361.
- Murray, Kasia O'Neill and Wendell E. Primus 2005. "Recent Data Trends Show Welfare Reform to Be a Mixed Success: Significant Policy Changes Should Accompany Reauthorization" *Review of Policy Research*, 22:3, 301-324.
- Parker, Jonathan, Annette Vissing-Jørgensen, and Nicolas Ziebarth. 2009. "Inequality in Expenditure in the Twentieth Century," Presentation Slides, NBER Summer Institute.
- Pendakur, K. 2001. "Consumption Poverty in Canada, 1969 to 1998." *Canadian Public Policy*, University of Toronto Press, 27:2, 125-149.
- , (1998), "Changes in Canadian Family Income and Family Consumption Inequality Between 1978 and 1992," *Review of Income and Wealth*, 44(2):259-283.
- Pijoan-Mas, Josep and Virginia Sánchez-Marcos, (2010), "Spain is different: Falling trends of inequality." *Review of Economic Dynamics*, 13, 154-178.
- Rogers, J. M. and Gray, M. B. 1994. "CE Data: Quintiles of Income Versus Quintiles of Outlays." *Monthly Labor Review* 117(12): 32-37.

- Roemer, M. I. 2000. "Assessing the Quality of the March Current Population Survey and the Survey of Income and Program Participation Income Estimates, 1990-1996." Staff Papers on Income, Housing and Household Economic Statistics Division. Washington D.C.: U.S. Census Bureau.
- Sabelhaus, John and Jeffrey A. Groen. 2000. "Can Permanent-Income Theory Explain Cross-Sectional Consumption Patterns?" *Review of Economics and Statistics* 82(3): 431-438.
- Slesnick, D. T. 1993. "Gaining Ground: Poverty in the Postwar United States." *Journal of Political Economy* 101(1): 1-38.
- , 2001. *Consumption and Social Welfare*. Cambridge: Cambridge University Press.
- U.S. Census Bureau, *Statistical Abstract of the United States*, 2006 Edition. USGPO: Washington, DC.
- , various years. "Current Population Survey, 2004 ASEC Technical Documentation." Washington, DC.
- U.S. Department of Labor (various years), "Consumer Expenditure Interview Survey Public Use Microdata Documentation," U.S. Department of Labor, Bureau of Labor Statistics, Division of Consumer Expenditure Surveys.
- Zaidi, A. and K. de Vos, 2001. "Trends in Consumption-based Poverty and Inequality in the European Union during the 1980s" *Journal of Population Economics*, 14:367-390.

## **DATA APPENDIX**

**After-Tax Money Income Plus Food Stamps (CE Survey, CPS, and PSID)** adds to money income the value of tax credits such as the EITC, and subtracts state and federal income taxes and payroll taxes, and includes capital gains and losses, and adds the face value of Food Stamps. State and federal income taxes and FICA are calculated using Taxsim (Feenberg and Coutts, 1993).

**After-Tax Income Plus Noncash Benefits (CPS)** adds to After-tax Money Income Plus Food Stamps the imputed cash value of housing subsidies, and school lunch programs.

**Expenditures (CE Survey)** start with the BLS measure of total expenditures. We add principal payments on home mortgages and financed vehicles, and subtract the purchase price for financed vehicles. This measure, sometimes called outlays, follows Rogers and Gray (1994). Expenditures are reported for three-month periods. We scale these quarterly expenditures to an annual level.

**Consumption (CE Survey)** subtracts from the BLS measure of total expenditures spending on health care, education, pension plans, and cash contributions. In addition, housing and vehicle expenditures are converted to service flows. The rental equivalent for owned dwellings is used instead of spending on mortgage interest, property taxes, and spending on maintenance, repairs, and insurance. For those in public or subsidized housing, we impute a rental value. We subtract spending on vehicle purchases and add a vehicle service flow as explained in the text. See Meyer and Sullivan (2009) for more details.

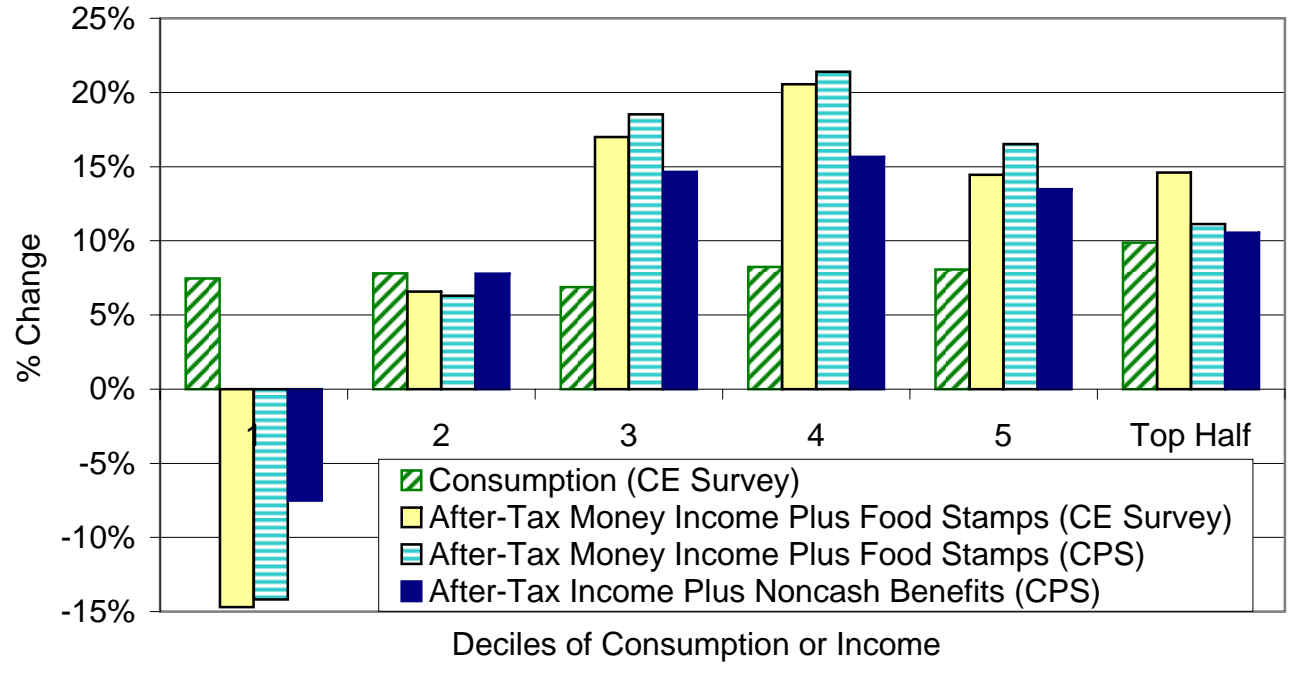
**Food Consumption (PSID)** includes expenditures on food at home and away from home and dollars of food stamps received.

**Housing (PSID)** does not include utilities or other housing costs because they are not available throughout our sample period in the PSID. It includes rent for renters and the reported rental equivalent for those who neither rent nor own. For homeowners, we calculate a service flow of housing consumption based on the value of the home. This flow is calculated as a constant fraction ( $r$ ) of the reported property value. This is the service flow for a durable with an after-tax interest rate  $r$  and with no depreciation. The results reported in Figure 3 are for  $r = 0.07$ , but we verify that the results do not change when we use values of  $r$  between 0.05 and 0.1. In addition, within the CE Survey this flow matched up fairly well with reported rental equivalent of the home.

**Equivalence Scales** are used to adjust resource measures for differences in family size. We use the equivalence scale recommended by the National Academy of Sciences panel (Citro and Michael 1995):  $(Adults + 0.7 * Children)^{0.7}$ . As a robustness check, we verify that the results are similar using the equivalence scale implicit in the official poverty definition.



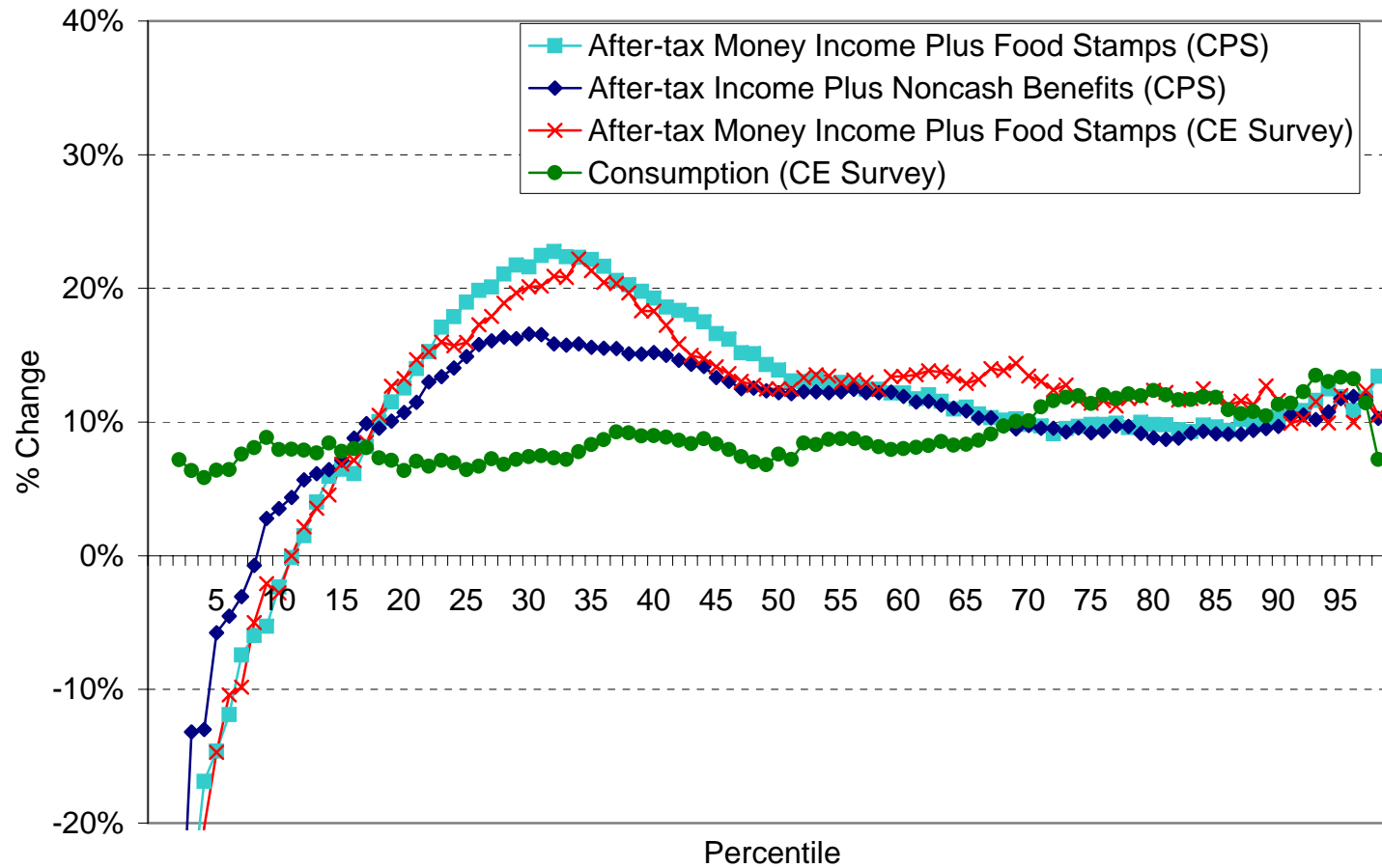
**Figure 1**  
**Changes in Mean Consumption and Income by Decile, 1993-1995 to 1997-2000, All Single Mother Headed Families, CPS and CE Survey**



Notes: The samples include all unmarried female headed families/consumer units living with at least one child under 18. The changes are in real terms (determined using the CPI-U-RS) and outcomes are adjusted for differences in family size using the NAS recommended equivalence scale. Each outcome is sorted by itself. See the Data Appendix for definitions of income and consumption. The CE Survey sample excludes those designated as incomplete income reporters. See text for more details.

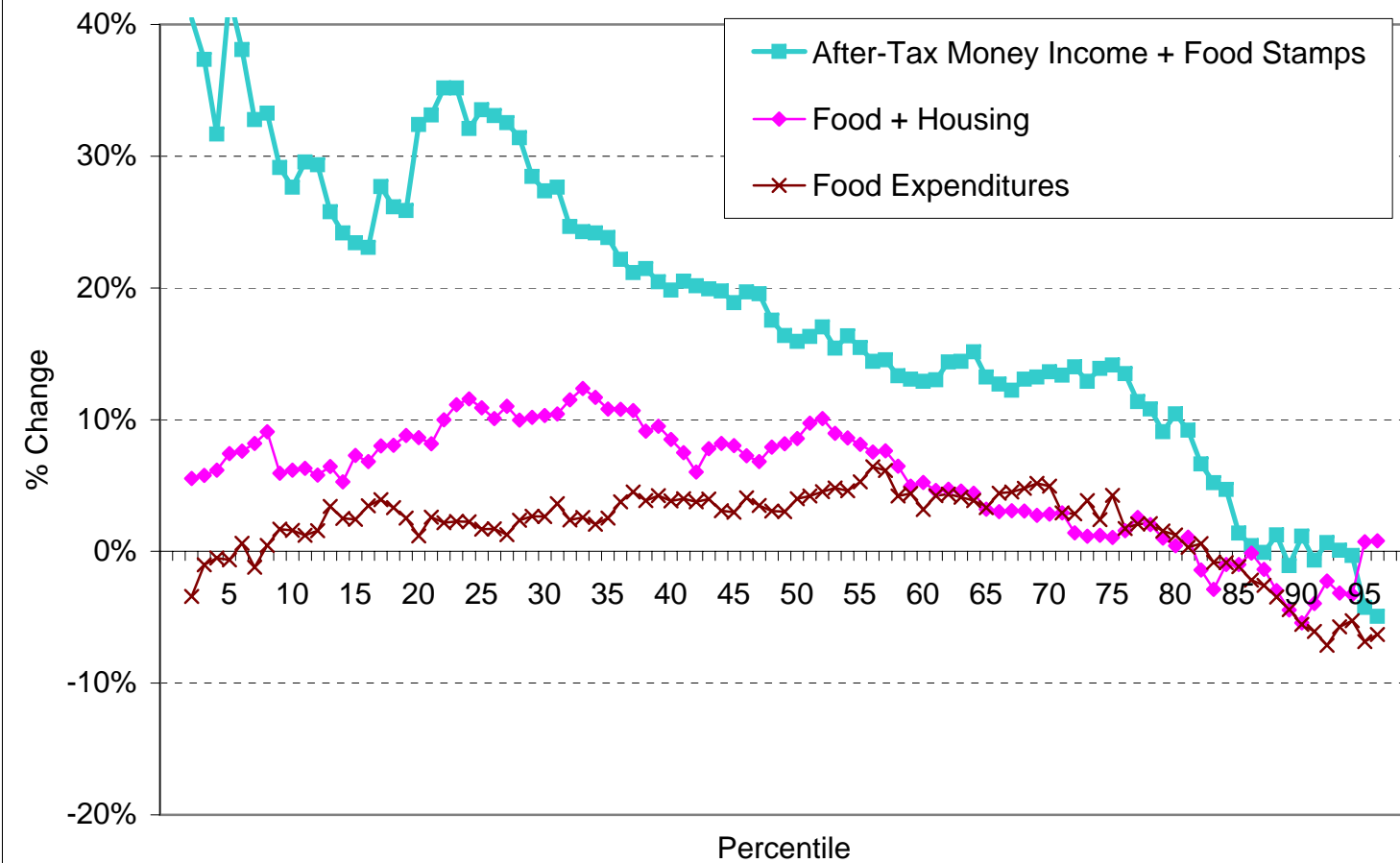
Figure 2

Changes in Income and Consumption at Each Percentile, 1993-1995 to 1997-2000, All Single Mother Headed Families, CPS ADF/ASEC and CE Interview Survey



Notes: See notes to Figure 1.

Figure 3  
 Changes in Income and Food Consumption at Each Percentile, 1993-1995 to 1997-2000, Single Mothers, Panel Study of Income Dynamics



Notes: Data are from the Panel Study of Income Dynamics, waves 1993 through 2001. Housing spending from the PSID includes rent, a service flow from owned property, and the rental equivalent for non-owners that do not pay for housing. The changes are in real terms and outcomes are adjusted for differences in family size.

Table 1  
 Changes in Quantiles of Consumption and Income for Single Mothers or Single Mothers Relative to a Comparison Group,  
 Consumer Expenditure Survey, 1993-2003

	Single Mothers				Single Mothers Relative to Single Childless Women		Single Mothers Relative to Married Mothers	
	Consumption (1)	Income (2)	Consumption (3)	Income (4)	Consumption (5)	Income (6)	Consumption (7)	Income (8)
Quantile Regression:								
5th Percentile								
(1997-00) - (1993-95)	0.062 (0.032)	0.061 (0.030)	-0.159 (0.086)	-0.092 (0.083)	0.027 (0.053)	-0.065 (0.145)	0.013 (0.037)	-0.230 (0.098)
(2001-03) - (1993-95)	0.111 (0.030)	0.070 (0.032)	-0.144 (0.096)	-0.085 (0.101)	0.065 (0.058)	0.089 (0.176)	0.021 (0.041)	-0.284 (0.100)
10th Percentile								
(1997-00) - (1993-95)	0.077 (0.030)	0.060 (0.024)	-0.028 (0.060)	-0.003 (0.063)	0.052 (0.039)	0.011 (0.101)	0.036 (0.026)	-0.074 (0.060)
(2001-03) - (1993-95)	0.107 (0.030)	0.060 (0.024)	0.077 (0.070)	0.086 (0.061)	0.104 (0.047)	0.191 (0.097)	0.036 (0.028)	-0.070 (0.064)
15th Percentile								
(1997-00) - (1993-95)	0.075 (0.026)	0.075 (0.020)	0.066 (0.036)	0.077 (0.045)	0.048 (0.034)	0.040 (0.062)	0.044 (0.025)	-0.024 (0.047)
(2001-03) - (1993-95)	0.096 (0.026)	0.085 (0.021)	0.153 (0.055)	0.120 (0.051)	0.077 (0.037)	0.164 (0.069)	0.048 (0.025)	-0.024 (0.049)
20th Percentile								
(1997-00) - (1993-95)	0.062 (0.021)	0.080 (0.020)	0.125 (0.041)	0.079 (0.039)	0.054 (0.032)	0.078 (0.063)	0.058 (0.020)	0.010 (0.046)
(2001-03) - (1993-95)	0.073 (0.026)	0.083 (0.023)	0.240 (0.043)	0.162 (0.042)	0.071 (0.034)	0.212 (0.070)	0.058 (0.021)	0.030 (0.039)
25th Percentile								
(1997-00) - (1993-95)	0.062 (0.022)	0.069 (0.018)	0.148 (0.038)	0.099 (0.037)	0.048 (0.031)	0.053 (0.049)	0.053 (0.020)	0.037 (0.036)
(2001-03) - (1993-95)	0.079 (0.023)	0.072 (0.019)	0.274 (0.034)	0.177 (0.040)	0.060 (0.033)	0.158 (0.053)	0.051 (0.022)	0.053 (0.034)
30th Percentile								
(1997-00) - (1993-95)	0.071 (0.022)	0.071 (0.016)	0.183 (0.037)	0.103 (0.038)	0.057 (0.027)	0.054 (0.044)	0.059 (0.018)	0.028 (0.032)
(2001-03) - (1993-95)	0.080 (0.023)	0.070 (0.018)	0.282 (0.035)	0.157 (0.036)	0.067 (0.027)	0.167 (0.050)	0.059 (0.019)	0.035 (0.031)
35th Percentile								
(1997-00) - (1993-95)	0.080 (0.023)	0.075 (0.017)	0.193 (0.041)	0.098 (0.034)	0.049 (0.029)	0.063 (0.044)	0.052 (0.017)	0.039 (0.032)
(2001-03) - (1993-95)	0.082 (0.022)	0.073 (0.017)	0.289 (0.041)	0.148 (0.034)	0.053 (0.030)	0.158 (0.045)	0.056 (0.017)	0.028 (0.029)
40th Percentile								
(1997-00) - (1993-95)	0.086 (0.023)	0.071 (0.020)	0.168 (0.040)	0.099 (0.029)	0.040 (0.026)	0.073 (0.037)	0.052 (0.021)	0.045 (0.028)
(2001-03) - (1993-95)	0.095 (0.023)	0.060 (0.017)	0.241 (0.040)	0.140 (0.028)	0.038 (0.027)	0.159 (0.039)	0.037 (0.020)	0.030 (0.028)
45th Percentile								
(1997-00) - (1993-95)	0.080 (0.025)	0.061 (0.018)	0.132 (0.039)	0.097 (0.024)	0.043 (0.025)	0.068 (0.035)	0.064 (0.021)	0.041 (0.024)
(2001-03) - (1993-95)	0.086 (0.024)	0.047 (0.018)	0.199 (0.038)	0.133 (0.026)	0.036 (0.027)	0.140 (0.037)	0.040 (0.020)	0.016 (0.022)
50th Percentile								
(1997-00) - (1993-95)	0.073 (0.025)	0.072 (0.015)	0.118 (0.034)	0.103 (0.023)	0.049 (0.026)	0.073 (0.033)	0.061 (0.021)	0.046 (0.026)
(2001-03) - (1993-95)	0.077 (0.023)	0.054 (0.018)	0.174 (0.031)	0.133 (0.024)	0.038 (0.025)	0.126 (0.033)	0.039 (0.021)	0.008 (0.028)
Controls Included	No	Yes	No	Yes	Yes	Yes	Yes	Yes
N	14,634	14,634	14,634	14,634	29,089	29,090	65,908	65,908

Notes: Controls include a cubic in the age of the head, number of children less than 18, number of girls age 2-15, number of boys age 2-15, education and race of the head, and region. For the models that include married mothers we also include the number of earners in the family and the education of the spouse. Columns 1 through 4 report the coefficients on the 2nd and 3rd period dummies in quantile regressions where the first period dummy is excluded. Columns 5 through 8 report the difference between the coefficients on single mother\*period interaction terms. All standard errors are bootstrapped and corrected for within family dependence. See text for more details.

Table 2  
 Percentiles of Income and Expenditures, CPS and CE Survey, 1993-2003

	Percentiles					
	5th	10th	20th	30th	40th	50th
<b>Panel A: All families</b>						
<b>Total Family Income (CPS)</b>						
(1) Percentile of income	8,151	13,890	20,655	26,749	33,149	40,048
(2) Mean below given percentile of income	2,620	7,006	12,209	16,035	19,505	22,913
<b>Total Family Income (CE)</b>						
(3) Percentile of income	7,973	12,728	18,617	23,684	29,094	35,373
(4) Mean below given percentile of income	3,461	6,996	11,407	14,657	17,581	20,498
(5) Mean below given percentile of expenditures	13,422	15,350	18,465	21,107	23,618	26,140
<b>Total Family Expenditures (CE)</b>						
(6) Percentile of expenditures	11,737	15,027	20,320	25,191	30,177	35,526
(7) Mean below given percentile of expenditures	8,458	10,954	14,348	17,151	19,773	22,379
(8) Mean below given percentile of income	24,397	23,124	23,279	24,681	26,355	28,232
<b>Panel B: All single mother headed families</b>						
<b>Total Family Income (CPS)</b>						
(9) Percentile of income	3,971	7,129	10,941	14,713	18,629	22,409
(10) Mean below given percentile of income	1,260	3,470	6,299	8,465	10,525	12,530
<b>Total Family Income (CE)</b>						
(11) Percentile of income	4,789	7,231	10,820	14,306	18,061	21,331
(12) Mean below given percentile of income	2,724	4,388	6,708	8,647	10,532	12,361
(13) Mean below given percentile of expenditures	9,161	10,035	11,184	12,433	13,799	15,225
<b>Total Family Expenditures (CE)</b>						
(14) Percentile of expenditures	8,507	10,514	13,734	16,739	20,208	23,708
(15) Mean below given percentile of expenditures	6,642	8,103	10,127	11,840	13,500	15,194
(16) Mean below given percentile of income	17,269	16,349	15,704	16,409	17,259	18,462

Notes: These family level outcomes are expressed in real terms (2005 dollars) and adjusted for differences in family size using the NAS recommended equivalence scale and normalized to a family with one adult and two children. The samples in Panel B include all unmarried female headed consumer units or families living with at least one child under 18. The percentiles in Panel B are those from the distributions for all single mother headed families, not all families. Expenditures are measured as outlays (following Rogers and Gray, 1994) and income is after tax and includes food stamps as explained in the text. Samples from the CE Survey include only those designated as complete income reporters (U.S. Department of Labor, various years). See text for more details.

Table 3  
Annual Expenditures and Annualized Quarterly Expenditures, CE Survey 1993-2003

	Annual Expenditures (1)	Annualized Quarterly Expenditures (2)	Ratio (3)=(2)/(1)	Annual Consumption (4)	Annualized Quarterly Consumption (5)	Ratio (6)=(5)/(4)
<b>All Families</b>						
Mean	44,172	44,172	1.000	37,326	37,326	1.000
Standard Deviation	31,761	36,562	1.151	21,171	24,169	1.142
N	44,845	179,380	4.000	44,845	179,380	4.000
5th Percentile	13,624	12,366	0.908	14,419	13,502	0.936
10th Percentile	16,909	15,602	0.923	17,317	16,390	0.946
20th Percentile	22,279	20,815	0.934	21,738	20,869	0.960
30th Percentile	27,135	25,633	0.945	25,655	24,808	0.967
40th Percentile	32,053	30,580	0.954	29,454	28,664	0.973
50th Percentile	37,450	35,921	0.959	33,342	32,725	0.981
60th Percentile	43,447	42,119	0.969	37,745	37,242	0.987
70th Percentile	50,611	49,802	0.984	42,917	42,683	0.995
80th Percentile	60,535	60,445	0.999	49,750	49,902	1.003
90th Percentile	77,713	79,819	1.027	60,948	62,140	1.020
95th Percentile	96,077	101,486	1.056	72,277	74,938	1.037
<b>Single Mother Families</b>						
Mean	28,862	28,862	1.000	25,248	25,248	1.000
Standard Deviation	18,265	20,158	1.104	12,895	13,916	1.079
N	2,501	10,004	4.000	2,501	10,004	4.000
5th Percentile	9,839	8,784	0.893	10,737	9,896	0.922
10th Percentile	11,588	10,756	0.928	12,494	11,692	0.936
20th Percentile	14,469	13,983	0.966	14,893	14,381	0.966
30th Percentile	17,492	16,932	0.968	17,148	16,768	0.978
40th Percentile	20,904	20,379	0.975	19,613	19,198	0.979
50th Percentile	24,235	23,791	0.982	22,012	21,830	0.992
60th Percentile	28,271	27,749	0.982	25,094	24,997	0.996
70th Percentile	33,151	32,744	0.988	28,842	28,993	1.005
80th Percentile	40,309	40,161	0.996	34,126	34,432	1.009
90th Percentile	51,949	52,318	1.007	42,472	42,998	1.012
95th Percentile	62,845	65,164	1.037	49,048	51,265	1.045

Notes: Expenditures and consumption are expressed in 2005 \$. Samples include consumer units that remain in the CE Survey for all four quarters. See notes to Table 2.

Table 4  
Comparison of CE Expenditure Measures to National Aggregates, 1984-2004

	1984	1987	1992	1997	2002	2004
Food at home <sup>a</sup>						
CE	211.9	236.4	324.9	376.2	436.8	477.4
PCE	260.6	290.7	366.8	431.3	540.1	603.4
Ratio	0.813	0.813	0.886	0.872	0.809	0.791
Food away from home <sup>b</sup>						
CE	104.0	120.1	136.4	164.9	191.8	217.8
PCE	123.6	154.9	212.3	262.7	339.4	388.2
Ratio	0.842	0.775	0.643	0.628	0.565	0.561
Total food						
CE	315.9	356.4	461.4	541.1	628.6	695.2
PCE	384.2	445.6	579.1	694.0	879.5	991.6
Ratio	0.822	0.800	0.797	0.780	0.715	0.701
Rent plus utilities <sup>c</sup>						
CE	202.3	235.1	306.7	380.7	438.5	485.1
PCE	209.9	250.0	315.0	387.7	469.6	504.5
Ratio	0.964	0.940	0.974	0.982	0.934	0.961
Total						
CE total expenditures <sup>d</sup>	1,821.0	2,094.0	2,663.1	3,306.5	4,090.7	4,486.1
PCE	2,503.3	3,100.2	4,235.3	5,547.4	7,350.7	8,195.9
Ratio	0.727	0.675	0.629	0.596	0.557	0.547

Notes: PCE numbers come from National Income and Product Account Table 2.5.5: Personal Consumption Expenditures by Type of Expenditure. All survey data come from the CE Interview Survey. The expenditure components reported here are those that align most closely with PCE categories.

a Food at home is food purchased for off-premise consumption minus alcoholic beverages

b Food away from home is purchased meals and beverages minus other alcoholic beverages.

c Rent plus utilities is rent on tenant-occupied nonfarm dwellings plus utilities excluding telephone.

d Total expenditures excludes miscellaneous expenditures and cash contributions which are not asked in all interviews.

Table 5  
 Survey Nonresponse and Imputations Rates, CPS and CE Interview Survey,  
 1993-2007

	Survey Nonresponse		Imputation Rates			
	CPS- ASEC/ADF	CE Survey	CPS-ASEC/ADF			CE Survey
	(1)	(2)	Pre-tax Money Income	After-tax Income <sup>a</sup>	After-tax Income <sup>b</sup>	Total Expenditures
	(1)	(2)	(3)	(4)	(5)	(6)
1993	0.154	0.156	0.153	0.252	0.444	0.104
1994	0.154	0.167	0.156	0.259	0.456	0.104
1995	0.154	0.194	0.180	0.295	0.496	0.104
1996	0.157	0.211	0.190	0.316	0.518	0.125
1997	0.144	0.199	0.204	0.344	0.548	0.128
1998	0.161	0.201	0.219	0.375	0.574	0.129
1999	0.144	0.202	0.217	0.382	0.589	0.149
2000	0.159	0.200	0.248	0.428	0.626	0.154
2001	0.162	0.220	0.255	0.434	0.628	0.163
2002	0.150	0.220	0.262	0.422	0.604	0.179
2003	0.160	0.214	0.254	0.389	0.565	0.184
2004	0.174	0.240	0.256	0.401	0.583	0.167
2005	0.167	0.255	0.239	0.373	0.557	0.194
2006	0.171	0.234	0.252	0.403	0.592	0.228
2007	0.156	0.262	0.251	0.398	0.591	0.130

Notes: Survey nonresponse rates are from U.S. Census Bureau (various years) for the CPS and from U.S. Department of Labor (various years) for the CE Survey. Imputation rates are calculated as the fraction of the total dollars of income or expenditures that are imputed. After-tax income includes pre-tax money income, food stamps, taxes, and capital gains and losses. The expenditures measure used here is the BLS measure of total expenditures. CPS-ASEC/ADF results are reported by reference year for annual income, rather than by the survey year.

<sup>a</sup> If more than half of pre-tax income is imputed, then taxes are considered to be imputed.

<sup>b</sup> Taxes are always considered to be imputed.



Table 6

OLS Estimates for Consumption and Income for Single Mothers Relative to Comparison Groups, High School Degree or Less, CE Survey and PSID

	Single Mothers Relative to Single Childless Women			Single Mothers Relative to Married Mothers		
	Consumption	Income	Ratio of Standard Errors: (2) / (1)	Consumption	Income	Ratio of Standard Errors: (5) / (4)
<b>CE</b>						
Single Mother*1984-1990	0.1392 (0.0243)	0.0502 (0.0365)	1.502	-0.6149 (0.0135)	-0.8888 (0.0206)	1.526
Single Mother*1991-1993	0.2467 (0.0336)	0.2229 (0.0560)	1.667	-0.4606 (0.0187)	-0.7442 (0.0324)	1.733
Single Mother*1994-1995	0.2323 (0.0457)	0.2232 (0.0786)	1.720	-0.4570 (0.0210)	-0.7533 (0.0312)	1.486
Single Mother*1996-2000	0.2969 (0.0287)	0.3317 (0.0497)	1.732	-0.4119 (0.0156)	-0.7557 (0.0265)	1.699
Single Mother*2001-2003	0.3086 (0.0280)	0.3195 (0.0446)	1.593	-0.3800 (0.0144)	-0.7039 (0.0237)	1.646
N	22,135	22,135		69,551	69,551	
R <sup>2</sup>	0.2589	0.1783		0.3515	0.2722	
Variance of Dependent Variable	0.3233	0.7541		0.2773	0.6515	
<b>PSID</b>						
Single Mother*1984-1990	0.3810 (0.0880)	0.3425 (0.1492)	1.696	-0.2954 (0.0287)	-0.5549 (0.0623)	2.170
Single Mother*1991-1993	0.3902 (0.0843)	0.2285 (0.1542)	1.828	-0.2033 (0.0307)	-0.7395 (0.0672)	2.188
Single Mother*1994-1995	0.3849 (0.0963)	0.6207 (0.2098)	2.177	-0.1742 (0.0368)	-0.5538 (0.0564)	1.533
Single Mother*1996-1999	0.4304 (0.0943)	0.2846 (0.1702)	1.805	-0.1919 (0.0290)	-0.5410 (0.0689)	2.374
N	6,952	6,415		18,965	17,233	
R <sup>2</sup>	0.2661	0.1367		0.2943	0.2853	
Variance of Dependent Variable	0.3348	1.5504		0.2293	1.1548	

Notes: For columns 1 and 4, the dependent variable is the log of total consumption (CE Survey) or log of food consumption (PSID). For columns 2 and 5, the dependent variable is the log of after-tax family income. In addition to the variables reported above, all models include flexible controls for family size and composition, a cubic in age, and the race and education of the female head (and education of the spouse for columns 4 and 5). The standard errors in parentheses are corrected for within household dependence.

Table 7

## Relative Outcomes for the Bottom Five Percent of Income and Consumption, All Families, CE Survey and PSID

Outcome	Percentiles of Income			Percentiles of Consumption			Diff in Diff
	0-5	5-100	Difference	0-5	5-100	Difference	
	(1)	(2)	(3) =(1) - (2)	(4)	(5)	(6) =(4) - (5)	
<b>CE, 1993-2003</b>							
Have a stove in residence	0.886	0.989	-0.103	0.871	0.990	-0.119	-0.016*
Have a microwave in residence	0.686	0.883	-0.196	0.608	0.887	-0.279	-0.083*
Have a refrigerator in residence	0.957	0.993	-0.036	0.950	0.993	-0.044	-0.007*
Have a freezer in residence	0.218	0.324	-0.105	0.169	0.326	-0.158	-0.052*
Have a disposal in residence	0.265	0.429	-0.164	0.149	0.435	-0.286	-0.122*
Have a dish washer in residence	0.314	0.561	-0.247	0.142	0.570	-0.428	-0.181*
Have a clothes washer in residence	0.531	0.785	-0.254	0.444	0.790	-0.345	-0.091*
Have a clothes dryer in residence	0.451	0.745	-0.294	0.324	0.751	-0.428	-0.134*
Have a color television in residence	0.887	0.975	-0.088	0.874	0.976	-0.102	-0.014*
Have a computer in residence	0.311	0.423	-0.112	0.179	0.430	-0.251	-0.139*
Have a stereo in residence	0.572	0.678	-0.107	0.472	0.683	-0.211	-0.104*
Have a vcr in residence	0.637	0.830	-0.193	0.529	0.836	-0.307	-0.114*
Have central air conditioning	0.322	0.499	-0.177	0.204	0.505	-0.301	-0.124*
Total # of rooms in residence (scaled)	5.939	6.575	-0.636	4.552	6.637	-2.085	-1.448*
Have a car	0.619	0.876	-0.257	0.513	0.882	-0.369	-0.112*
Average number of cars	1.096	1.965	-0.869	0.787	1.982	-1.195	-0.326*
Took a trip or vacation	0.226	0.320	-0.094	0.114	0.326	-0.212	-0.118*
Took an overnight trip or vacation	0.202	0.287	-0.085	0.099	0.292	-0.193	-0.108*
Did not receive free food	0.962	0.986	-0.024	0.942	0.987	-0.045	-0.021*
<b>PSID, 1984-2003</b>							
Total # of rooms in residence (scaled)	5.293	6.419	-1.125	4.638	6.452	-1.814	-0.689*
Have central air conditioning	0.328	0.491	-0.164	0.289	0.493	-0.204	-0.040*
Have a car	0.530	0.905	-0.375	0.668	0.898	-0.229	0.145*
Average number of cars	0.841	1.707	-0.866	1.043	1.697	-0.654	0.212*
Mother does not report poor health	0.904	0.962	-0.058	0.894	0.963	-0.069	-0.011
Health does not limit mothers work	0.742	0.824	-0.082	0.696	0.826	-0.131	-0.049*
No other family members in bad health	0.950	0.959	-0.009	0.931	0.960	-0.029	-0.020
Not food insecure	0.760	0.929	-0.170	0.775	0.928	-0.153	0.016
Did not go hungry	0.950	0.981	-0.030	0.919	0.982	-0.063	-0.033
Have no children in poor health	0.994	0.995	-0.002	0.987	0.996	-0.009	-0.008*

Notes: Number of rooms is adjusted for family size using the NAS recommended equivalence scale. PSID data are from various waves between 1984 and 2003 depending on the availability of outcome variables. We predict total consumption in the PSID based on reported values in the PSID for food and housing, and housing flows for homeowners are calculated from reported housing values. We also impute a value of housing for those in public or subsidized housing. This approach is a slightly updated version of that used in Meyer & Sullivan (2003). \* denotes significance at the 5% level, which is determined using bootstrapped standard errors that correct for within family dependence.

Table 8  
 Summary of the Number of Relative Outcomes that Favor Income or Consumption,  
 CE Survey and PSID

	Number Favoring Income	Number Significantly Favoring Income	Number Favoring Consumption	Number Significantly Favoring Consumption
	(1)	(2)	(3)	(4)
<b>CE Survey (19 Outcomes)</b>				
All single mother headed families				
Comparing bottom 5% to top 95%	0	0	19	15
Comparing bottom 10% to top 90%	0	0	19	15
All families with head 65 or over				
Comparing bottom 5% to top 95%	1	0	18	17
Comparing bottom 10% to top 90%	0	0	19	17
All families with head that is disabled				
Comparing bottom 5% to top 95%	7	2	12	6
Comparing bottom 10% to top 90%	6	1	13	9
<b>PSID (10 Outcomes)</b>				
All single mother headed families				
Comparing bottom 5% to top 95%	2	0	8	2
Comparing bottom 10% to top 90%	3	1	7	0
All families with head 65 or over				
Comparing bottom 5% to top 95%	3	0	7	1
Comparing bottom 10% to top 90%	5	3	5	1
All families with head that is disabled				
Comparing bottom 5% to top 95%	2	0	8	0
Comparing bottom 10% to top 90%	5	0	5	0

Notes: The outcomes summarized here are the same as those listed in Table 7. The results compare the top and bottom parts of the distributions for a given demographic group (i.e. the bottom and top 5% of the consumption distribution of single mother headed families, not all families). Columns 2 and 4 refer to statistical significance at the 5% level. See the text for sample definitions and the notes to Table 7 for additional details.

Appendix Table 1  
 Percentiles of Consumption for Various Samples, CE Survey, 1993-2003

	Percentiles					
	5th	10th	20th	30th	40th	50th
<b>All families</b>						
(1) Consumption --excluding incomplete income reporters	12,232	15,127	19,544	23,391	27,258	31,327
(2) Consumption --including incomplete income reporters	12,051	14,971	19,314	23,066	26,844	30,851
(3) Consumption --second quarter interviews only	12,135	15,081	19,475	23,243	27,073	31,108
(4) Consumption --first reported interview for each CU	11,107	14,083	18,509	22,308	26,121	30,118
<b>All single mother headed families</b>						
(1) Consumption --excluding incomplete income reporters	9,485	11,263	13,865	16,258	18,701	21,283
(2) Consumption --including incomplete income reporters	9,221	11,019	13,576	15,862	18,263	20,857
(3) Consumption --second quarter interviews only	9,421	11,169	13,963	16,388	18,715	21,361
(4) Consumption --first reported interview for each CU	8,814	10,557	13,217	15,537	17,901	20,694
<b>All families with head 65 or over</b>						
(1) Consumption --excluding incomplete income reporters	13,100	15,689	19,528	22,948	26,382	30,029
(2) Consumption --including incomplete income reporters	13,113	15,688	19,501	22,846	26,215	29,811
(3) Consumption --second quarter interviews only	13,119	15,676	19,655	22,887	26,262	29,867
(4) Consumption --first reported interview for each CU	12,868	15,482	19,370	22,638	25,978	29,644
<b>All families with head that is disabled</b>						
(1) Consumption --excluding incomplete income reporters	9,767	11,576	14,083	16,284	18,459	20,858
(2) Consumption --including incomplete income reporters	9,740	11,616	14,198	16,465	18,690	21,253
(3) Consumption --second quarter interviews only	9,900	11,705	14,298	16,633	19,052	21,695
(4) Consumption --first reported interview for each CU	9,179	11,132	14,030	16,317	18,554	21,162

Notes: Consumption is expressed in 2005 \$. Single mother headed families include all consumer units (CUs) headed by an unmarried female who lives with at least one child under the age of 18. The disabled sample includes all CUs with a head who did not work in the previous year due to a disability. We use the BLS designation of complete income reporters (see U.S. Department of Labor, various years). Rows 3 and 4 do not exclude incomplete income reporters. Row 3 in each panel includes data from second quarter interviews only, which is the first quarter that the living unit is eligible to report complete expenditure data. Following Bavier (2007), Row 4 in each panel includes all CUs reporting complete expenditure data for the first time, which will include multiple responses from the same living unit if different CUs reside in the living unit while the living unit is in the survey. See the notes to Table 2 for additional details.